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Ulster Med J 2017;**86(2):**81-83

Editorial

Second Foundation – A New Medical School for Northern Ireland?

There is but one medicine and one medical problem – the sick patient

FOUNDATION

Back in 1808, Belfast was a rapidly growing town of some 25000 inhabitants. With access to a good port, industries such as ship-building, rope-works and linen mills were thriving. Higher level education however was another matter. Many of the growing commercial class were dissenting Presbyterians and as such, they were unpopular in Trinity College Dublin and Oxbridge. The Scottish Universities welcomed them as co-religionists but the need was felt for a local secular college "without religious test".[1]

The non-denominational Belfast Academical Institution (Inst) was incorporated by Act of Parliament in 1810 to be part boys' school (ages 8-12, the primary department) and an amalgam of further education college and University (the college department). The college taught 3 year courses in the Arts, Agriculture and Manufacturing deemed equivalent to a Scottish MA degree. A medical faculty was planned but anti-establishment behaviour by some of the college staff lost government support for the project in 1817.[1,2]

In 1818 however, James Lawson Drummond, attending physician at the Belfast Fever Hospital in Frederick Street offered to start anatomy lectures at "Inst" which began in 1819. By 1821, students "walked the wards" of the 100-bed Fever Hospital for a fee, but all this amounted to no more than an "introduction to medicine" course.[2]

By 1826, there was renewed government support for further education in Ireland allowing Inst and the Fever hospital to collaborate on "a preparatory [non-degree-giving] school of medicine and surgery, useful and important to the *medical youth* of Ulster". A comprehensive curriculum was planned with bedside teaching. Anatomy, Chemistry and Materia Medica were the chief lecture topics.

Over the next 9 years however, disputes between "Hospital and College" arose over funding and permitting Professors appointed by the College to exercise authority over Physicians appointed by the Hospital. Inst's ability to raise funds to support the Hospital and build a suitable campus was constrained. It was 1835 before teaching began – a unique partnership at that time of an autonomous college and voluntary hospital offering a 4-year course. Most of the major licensing bodies approved the course.

In 1845, the government planned a new 3 college university system for Ireland with "Queen's College Belfast" opening in a new and much larger campus to the south of the town centre. The Inst students were transferred across to the new facilities in 1849, although dissection classes were still held in Inst until 1863.

The initial 55 medical students of 1849 had become 327 by 1879 and more clinical material became available as the Fever Hospital expanded (eventually becoming the Royal Victoria Hospital), a new Union Hospital was developed from the old workhouse (Belfast City Hospital) and the Mater Infirmorium was opened.[3]

FOUNDATION AND EMPIRE

The decades after World War II saw a "golden age" at Queens with world-class developments in Cardiology and Renal medicine. The "Troubles" too, led to innovations in Neurosurgery, Orthopaedics Vascular Surgery and blast lung management.

Perhaps the name most associated with this period is Sir John Henry Biggart who held the post of Dean of the Medical School for an unprecedented 27 years and in 1972 was appointed Pro-Chancellor of the University.[4] Under his aegis, new extensions to the Medical School were built on both the RVH (Institute of Clinical Science and Medical Library, 1954) and BCH (Medical Biology Centre, 1968) sites. The number of professorial chairs was also greatly expanded to cope with increasing areas of specialisation in the profession.

In the context of this editorial, it may be worth quoting sections from 2 guest UMJ editorials on medical education written by Sir John Henry in 1962 and 1963:

Things are not what they used to be. The medical education today is different and therefore in the opinion of many [past] graduates inferior. The system that produced "us" was obviously good. By virtue of it we have attained platforms from which we may thunder at those who dare to vary it. Yet we are the first to realise that the practice of medicine has changed...

… We would retort that it is a necessity of medical advance that methods of education and content of courses should change. Not only so, but the graduate must be so equipped that he can relatively easily understand and apply the advances expected during his professional life.[5]

In our own school we have all endeavoured to lead the student to the belief that, in spite of all its apparent fragmentation…

there is but one medicine and one medical problem-the sick patient.[6]

THE WINDS OF CHANGE

Is Northern Ireland well served with doctors today? No-one would question the skill and dedication shown by modern QUB graduates in an increasingly difficult professional environment but are we producing sufficient *medical youth* in Northern Ireland?

General Practice seems particularly hard hit– practices in Bangor, Enniskillen and Portadown have been left with only locum coverage for 1000's of patients. Roslea in Fermanagh has closed.[7,8,9] Secondary care is struggling to keep some units open and the cost of locum doctors in the Province has doubled over 5 years reaching £46.1 million in 2015/2016.[10,11]

For both primary and secondary care, the problem is at its most acute outside Belfast.

It can be difficult to persuade medical graduates to move far from their home university. In Scandinavia, this has been formulated in the 60/20/20 rule – 60% of medical graduates are likely to spend 20 years of their career working within 20 miles of their medical school. Health boards in rural Wales such as Powys and Betsi Cadwaladr suffer 14-15% medical vacancies compared with 3% in Cardiff. Of note, the equivalent figure in our Western HSC Trust is 18% (15% filled by locums and 3% chronically vacant)[12] The Welsh Assembly has opened a postgraduate medical school in Swansea alongside the undergraduate school in Cardiff to address this imbalance. Should Northern Ireland consider such a solution?

SECOND FOUNDATION

Earlier this year, I met with Professor Hugh McKenna, Ulster University's Dean of Medical School Development in Magee College, Derry to discuss plans to open a new postgraduate entry medical school in the North West. A four-year course is proposed with initial recruitment of 80 students into year 1 building up to 100 per year. The Ulster University would be building on its extensive experience in the field with existing courses in Stratified Medicine, Physician Associate, Nursing, Pharmacy and Biomedical Sciences.

Clinical attachments would be spread widely throughout the Province and the curriculum would have strong roots in primary care and chronic disease prevention.

An accreditation process is being followed that could see the first students entering the new medical school in 2019 and qualifying in 2023. There are many steps to the process and the bid is currently being scrutinised by the GMC.

With Queens oversubscribed by a factor of 2.5 and a marked shortage of doctors in the Northwest, one can see the logic of this approach.

It took 25 years from the foundation of Inst to the first accredited students attending the Belfast medical school in 1835, hopefully, we won't have to wait quite so long this time around.

John Purvis, Hon Editor.

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ULSTER MEDICAL SOCIETY

PROGRAMME OF LECTURES: AUTUMN 2017

Presidential Theme

'AIM HIGHER'

Date	**Thursday 5 October 2017**
Meeting	**Presidential Address**
Speaker	President Ms Angela M. Carragher Meeting
Venue	North Lecture Theatre, Medical Biology Centre, Lisburn Road, Belfast.
Time	20.00hrs

Date	**Thursday 19 October 2017**
Event	Ulster Medical Society Joint Meeting with Queens University Belfast and Northern Ireland Medical & Dental Training Agency ***'Learning from clinical cases; Quality Improvement, & Research Symposium'***
Time	09.00hrs -16.00hrs
Venue	Belfast City Hospital Postgraduate Lecture Theatre, Lisburn Road, Belfast.

Date	**Thursday 19 October 2017**
Meeting	**Evening Meeting**
Speaker	Mrs Margaret Murphy, Chairperson World Health Organisation (WHO) Patients for Patient's Safety
Venue	North Lecture Theatre, Medical Biology Centre, Lisburn Road, Belfast.
Time	20.00hrs

Ulster Med J 2017;**86(2):**84-89

Grand Rounds

Hyponatraemia in Hospitalised Adults: a Guide for the Junior Doctor

Joseph Fogarty and Clodagh Loughrey

Accepted: 8th December 2016
Provenance: externally peer-reviewed.

Abstract: Hyponatraemia is common and often a source of confusion for junior doctors. It is infrequently dangerous, but when it is, is a medical emergency and requires urgent treatment to avoid life-threatening cerebral oedema. Treatment of acute hyponatraemia is also potentially hazardous; it is therefore important to be able to recognise when urgent management is **not** indicated, and to investigate appropriately. This paper focuses on these issues, which are most likely to be the cause of consternation for the junior doctor. Recommendations are largely based on the 2014 joint European clinical practice guidance for management of hyponatraemia; the 2010 GAIN (N Ireland) guidance and 2013 American guidance are also referenced.

INTRODUCTION

Hyponatraemia is the most common electrolyte disorder encountered in clinical practice, occurring in up to 30% of hospital patients[1]. It is seen in a wide variety of conditions and, in most situations is mild and simply a marker of disordered physiology[2].

Hyponatraemia is defined as a serum sodium < 135 mmol/L (laboratory reference range typically 135-145 mmol/L). It may be classified according to biochemical severity or to duration / time since onset[2]:

- Mild: 130-134 mmol/L
- Moderate: 125-129 mmol/L
- Severe: < 125 mmol/L
- Acute: < 48 hours duration
- Chronic: > 48 hours duration

Mild hyponatraemia is in itself not hazardous and any management should be that of the underlying disorder, where one is identified. More severe hyponatraemia, particularly when of rapid onset, may be associated with acute fluid shifts which can cause life-threatening cerebral oedema. This can be ameliorated with rapid infusion of hypertonic saline. However, inappropriate administration of hypertonic saline can itself have potentially very serious neurological consequences[1,3].

Thus it is very important to recognise when hyponatraemia is a medical emergency needing urgent treatment before waiting for results of investigations, and when it is more appropriate to investigate first, which is by far the more common scenario. This may require rapid decision-making, particularly in hospital inpatients.

Hyponatraemia presents in many very different clinical situations; it is generally not well understood and is often poorly managed[1]. In a recent audit of requests for advice from medical staff in Belfast Health & Social Care Trust Clinical Biochemistry department, 62% of all requests logged were in relation to abnormalities in serum sodium[4]. The potential consequences of both over- and under-treatment in the acute setting mean that all doctors looking after hospital inpatients must be able to investigate the cause and understand the results of investigations, be able to identify those at risk and treat patients appropriately and in a timely manner.

Both adults and children are at risk and indeed the relatively small skull:brain volume ratio found in children makes them more vulnerable to the effects of rapid fluid shifts[5]. The principles of investigation and management are the same; however, this article is focused on hyponatraemia in adults, and the rates and volumes of hypertonic saline suggested here do not apply to children (< age 16 years).

WHAT CAUSES HYPONATRAEMIA?

Hyponatraemia is very rarely due to sodium deficiency. The most important factor influencing the concentration of sodium in plasma (which is the intravascular component of extracellular fluid) is the relative amount of water in extracellular fluid. To understand what factors influence water balance and osmolality of plasma, it is necessary to first of all understand the underpinning physiology.

PHYSIOLOGY OF WATER BALANCE

Approximately 60% of an adult male's body mass is made up of water. Approximately 40% of total body water (TBW) is extracellular, the remaining 60% intracellular. Approximately 20% of extracellular fluid (ECF) is intravascular (ie plasma).

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Thus a 75kg man's body contains 45L of water, of which 18L is extracellular, and he has approximately 3.6L plasma. Adult females have proportionately more fat and are approximately 50% water. Equivalent calculations indicate that a 65kg woman has 2.6L plasma.

The extracellular and intracellular compartments are in osmotic equilibrium, and water moves freely across the cell membrane in response to changes in concentration of solutes present in serum or serum osmolality. Sodium is the most abundant solute in ECF, and is thus the largest contributor to serum osmolality. *Serum sodium concentration is essentially the ratio of amount of extracellular sodium to amount of extracellular water; the major determinant of serum osmolality, and serum sodium, is the amount of water in the ECF compartment*. The absolute amount of ECF sodium is much less commonly a factor.

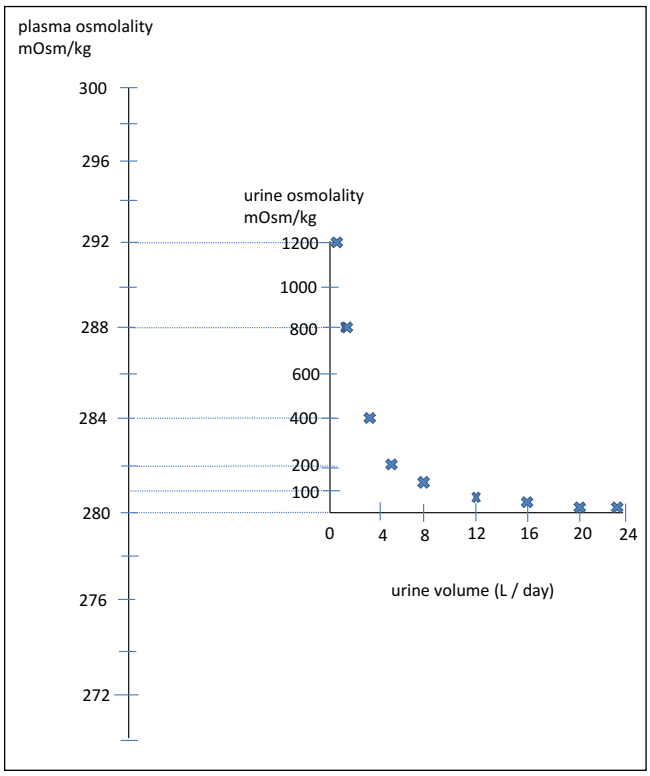

Fig 1. Normal physiological relationship between plasma osmolality, urine osmolality and urine volume in humans (taken from ref 1 Spasovski et al)

The main hormone that regulates extracellular water is anti-diuretic hormone (ADH), which is secreted by the posterior pituitary gland in response to high serum osmolality. It acts on the V2 receptors in the distal convoluted tubule and collecting duct of the kidney. This causes aquaporin 2 proteins to be inserted into the cell membrane, which increases its permeability to water. Water is drawn out of the collecting ducts, which makes the urine more concentrated (anti-diuresis), and into the blood, which decreases the serum osmolality and serum sodium concentration. ADH secretion is also a potent stimulator of thirst, which also brings more water into the ECF via fluid ingestion. Normal serum osmolality is 275-295 mOsm/kg. ADH switches on at around 280 mOsm/kg, and the effect of this on urine osmolality can be seen in Fig. 1, which shows the relationship between plasma osmolality and urine osmolality and volume in healthy humans. There is clearly a much wider range of urine osmolality (< 100 to >1000 mOsm/kg) compared to serum osmolality, which is normally kept within a narrow range, primarily under the influence of ADH. It is apparent that, as plasma osmolality rises, urine becomes more concentrated and decreases in volume to conserve water. Thirst is stimulated at around 290mOsm/kg to bring more water into the system.

The renin-angiotensin-aldosterone system (RAAS) tightly controls excretion of sodium in the distal renal tubules, and also has an effect on serum sodium concentration via ADH release. Renin is released by the juxtaglomerular cells of the kidney in response to a low blood pressure and low circulating volume. This eventually leads to the conversion of angiotensin I to angiotensin II, which has two main functions in this context. Firstly, it stimulates the release of ADH, leading to increased water retention. It also causes aldosterone to be released, which leads to sodium (and therefore water) retention in the thick ascending loop of Henle.

Natriuretic peptides, particularly atrial natriuretic peptide (ANP) and brain natriuretic peptide (BNP), also play a part in sodium regulation. Their main effect, in response to stretch of cardiac myocytes in the atria, is diuresis, ie sodium and water loss through the kidneys.

ABNORMAL WATER BALANCE LEADING TO HYPONATRAEMIA

Consideration of ECF volume or hydrational state is useful in determining the cause, which frequently dictates the treatment.

1. *Decreased ECF volume* leads to ADH secretion via the RAAS, which acts to preserve intravascular volume. This may occur in salt-losing states such as excessive gastrointestinal losses, adrenal insufficiency or salt-losing nephropathies.

2. *Increased ECF volume* – cardiac failure, liver failure, renal failure and nephrotic syndrome are all associated with difficulty excreting water due to factors including decreased circulating blood volume, renal underperfusion and associated RAAS activation. Associated medication (notably diuretics) is a common complicating factor. Renal sodium loss will also be promoted by high concentrations of natriuretic peptides.

3. *Normal ECF volume* (euvolaemia) – hyponatraemia in this situation results from impaired excretion of water, usually due to inappropriate release of ADH. Syndrome of inappropriate antidiuresis (SIAD) occurs when ADH is secreted independently of serum osmolality or circulating volume. This leads to urine which is inappropriately concentrated and the failure to excrete water results in hyponatraemia. SIAD is essentially a

diagnosis of exclusion. True euvolaemic hyponatraemia with inappropriately concentrated urine, in the absence of renal, adrenal or thyroid disease, or diuretic therapy, meets criteria for diagnosis of SIAD. SIAD occurs in a wide range of pulmonary, CNS and malignant conditions, as well as frequently being implicated in drug-induced hyponatraemia. It is a common cause of hyponatraemia but is probably overdiagnosed, frequently without other causes having been excluded[3].

A further cause of euvolaemic hyponatraemia is primary polydipsia – urine osmolality is very low indicating ADH suppression, but the water intake overwhelms the capacity to excrete water. This is particularly seen with concurrent low solute intake, eg anorexia nervosa, beer potomania and 'tea and toast' hyponatraemia – excretion of 1L of fluid requires co-excretion of 50-100 mmol of solute, e.g. urea, normally generated from dietary protein.

ASSESSMENT OF THE HYPONATRAEMIC PATIENT (Fig. 2)

How should I investigate a hyponatraemic patient?

The first question to ask is whether you have time to investigate fully, or whether you need to instigate urgent treatment, regardless of the cause, to prevent life-threatening cerebral oedema.

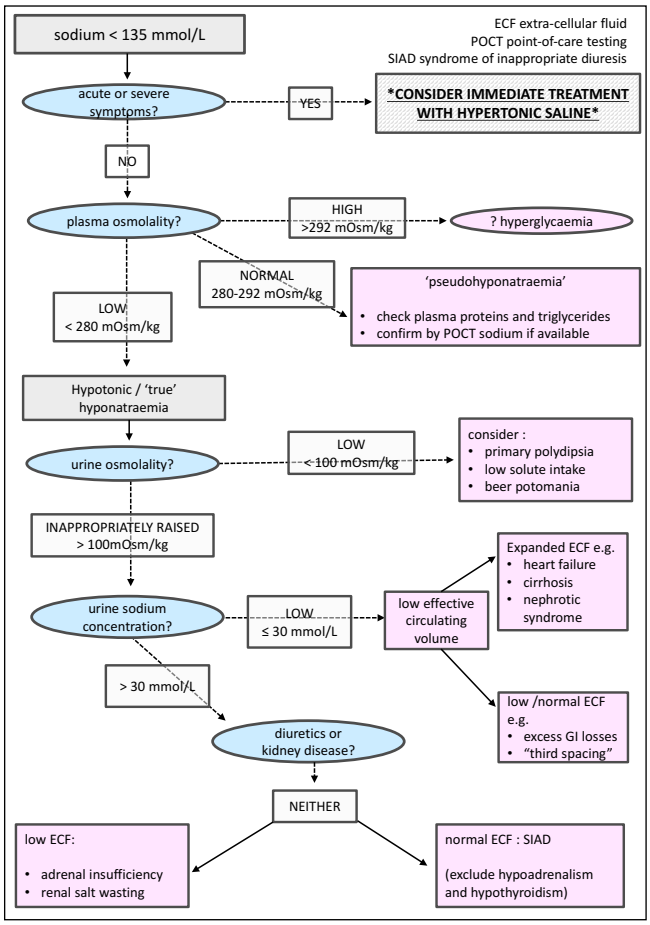

Fig 2. Algorithm for the investigation of hyponatraemia (adapted from Spasovski et al)

How do I decide who is at risk of cerebral oedema and needs urgent treatment?

The most pressing criterion to address is the presence or absence of symptoms which may herald incipient cerebral oedema. The joint European guidance on management of true hypotonic hyponatraemia emphasises the importance of managing the patient rather than the serum sodium concentration[1]. The presence of any symptoms of cerebral oedema should be taken very seriously:

Box 1

Symptoms of cerebral oedema seen in symptomatic hyponatraemia [1]

Severity	Symptom
Moderate	Headache
	Nausea
	Confusion
Severe	Vomiting
	Abnormal or deep somnolence
	Seizures
	Decreased level of consciousness
	Cardiorespiratory distress

It must be borne in mind that these symptoms are non-specific and may be the symptoms of the disorder causing the hyponatraemia. However if there is no apparent primary cause of such symptoms ***arising acutely*** *in a patient with at least moderate hyponatraemia, and the hyponatraemia is not known to be chronic, urgent treatment with hypertonic saline is indicated.*

Box 2

Some drugs and conditions associated with acute (< 48 hrs) hyponatraemia[1]

Post-operative phase (general anaesthesia)
Post-resection of prostate or uterine surgery
Polydipsia
Prolonged exercise
Recent thiazide prescription
MDMA or Ecstasy ingestion
IV cyclophosphamide
Colonoscopy preparation

The 48 hours threshold arises from studies which indicate that the brain adapts to a chronic hyponatraemic state (>48 hrs) by extruding intracellular osmoles to maintain osmotic equilibrium, and so there is much less risk of cerebral oedema[1]. Once the brain has adapted, brain cells are then vulnerable to the effects of increasing sodium too quickly, which can cause stripping of the neuronal myelin sheath leading to the potentially disastrous Osmotic Demyelination Syndrome (ODS). Patients at increased risk include those with malnutrition, hypokalaemia and a history of alcohol excess.

Thus the distinction between acute and chronic hyponatraemia is important. However duration is not always known, as quite frequently there has not been a recent measurement of sodium preceding the low one; if not known, and there is no clinical indication of a recent onset (most frequent causes - box 2), it may be safer to assume it is chronic, which is much more common, although clinical assessment should be undertaken to ensure there are no acute symptoms (see box 1).

If hypertonic saline is not indicated, the management of the hyponatraemia depends on the cause which, if possible, should be treated.

CLINICAL ASSESSMENT MAY REVEAL LIKELY CAUSES.

History: first ask about symptoms of acute hyponatraemia (headache, nausea). Then ask about symptoms of chest or CNS disease, or malignancy. Enquire about medical history (recent surgery; cardiac, liver or kidney disease), smoking and medication, especially those recently started. Ask about thirst and fluid intake.

Examination: assess volume status, looking for evidence of dehydration (reduced skin turgor, postural drop in BP, dry tongue) or oedema; however signs may be subtle[6].

Laboratory assessment of serum and spot urine is the cornerstone of diagnosis and should be requested at an early stage in all patients with a moderate or severe hyponatraemia.

1. *Serum osmolality* is necessary to distinguish between true and pseudohyponatraemia. (Osmolality is measured in the laboratory, whereas calculated osmolarity is based on certain assumptions which may be erroneous – lab measurement of serum osmolality should always be sought initially.) True hyponatraemia is associated with hypo-osmolar serum, i.e. < 275 mOsm/kg. If serum osmolality is normal, consider pseudohyponatraemia; this is a spuriously low sodium measurement seen in hyperproteinaemia or hypertriglyceridaemia when measured by an indirect ISE (Ion Selective Electrode) method. Measuring plasma protein and triglycerides, and/or measurement of sodium with direct ISE if available (most point-of-care assays) will provide confirmation of this. If serum osmolality is high, consider hyperglycaemia as a cause of hyponatraemia (glucose is an osmole and high levels will lead to ADH secretion and water retention).

2. In the presence of true (hypo-osmolar or hypotonic) hyponatraemia, *urine osmolality* distinguishes between excessive fluid intake (urine osmo < 100mOsm/kg) and failure to excrete water (urine osmo > 100 mOsm/kg).

3. If failure to excrete water, *urine sodium* distinguishes between low circulating blood volume (urine sodium < 30mmol/L) and SIAD (urine sodium > 30mmol/L). SIAD diagnosis also requires exclusion of cardiac, liver, renal, adrenal and thyroid disease, and diuretic therapy.

TREATMENT OF ACUTE SYMPTOMATIC HYPONATRAEMIA:

- **Prompt infusion of 200 mls 2.7% hypertonic sodium chloride solution over 30 min[7]**
- This is a medical emergency[8] and senior assistance should be sought as soon as possible – advice is available at any time from a chemical pathologist, nephrologist, endocrinologist or ICU physician.
- Remeasure serum sodium 20 minutes after infusion ends.
- Repeat infusion of hypertonic saline may be necessary.
- Aim for a rise of 5 mmol/L, and not more than 10mmol/L, in the first 24 hours (maximum 8 mmol/L in those at risk of ODS).
- Determine the cause and remove or treat where possible.

TREATMENT OF CHRONIC ASYMPTOMATIC HYPONATRAEMIA

- Determine the cause and remove or treat where possible.
- Mild hyponatraemia may not require any treatment.
- Management of reduced circulating volume:
  - Restore ECF volume with intravenous 0.9% saline solution
- Management of expanded ECF volume:
  - Treat the cause
  - Fluid restriction
- Management of SIAD with moderate or severe hyponatraemia
  - First-line treatment is fluid restriction[1]
  - Second-line treatment oral sodium chloride plus low dose loop diuretic (recommended by European guidance)[1]
  - Demeclocycline is licensed in Europe for treatment of SIAD associated with malignancy and can be very useful in the short to medium term (it is not recommended in European guidance 2014[1], with low grade evidence; it is however recommended in US guidance 2013[3]). Follow-up monitoring is mandatory.

CASES

Q1. A 73 year old lady is admitted with hyponatraemia (sodium 114 mmol/L) and slightly low potassium of 3.2 mmol/L, found incidentally by her GP. When last checked 6 months previously, it had been 131 mmol/L. She has had no acute symptoms and examination is unremarkable. She had been recently started on citalopram by her GP and is also on metformin, ibuprofen and esomeprazole. On examination she is euvolaemic.

Table 1

Some causes of SIAD

Drugs	**Pulmonary disease**	**CNS disease**	**Malignancy**	**Other**
SSRIs	Bacterial pneumonia	Brain trauma	Carcinoma of :- bronchus	Pain
MAOIs	Viral pneumonia	Stroke	- endometrium	Nausea
Carbamazepine	Legionella pneumonia	Encephalitis	- oropharynx	General anaesthesia
Opiates	Aspergillosis	Meningitis	- stomach	Exercise
MDMA (Ecstasy)	Cystic fibrosis	Tumours	- duodenum,	
NSAIDs	Asthma	Subarachnoid haemorrhage	- pancreas	
Cyclophosphamide	TB	Subdural haematoma	- ureter	
Platinum compounds	Positive pressure mechanical ventilation	Cerebral aneurysm	- bladder	
Vinca alkaloids	Malignancy		- prostate	
Proton pump inhibitors				

(a) Would you give this lady hypertonic saline whilst awaiting further investigations?

(b) Her serum osmolality is 242 mOsm/kg; urine osmolality is 578 mOsm/kg; urinary sodium is 72 mmol/L. What is the most likely diagnosis? How do you manage her now?

A1. (a) No – treat the patient and not the lab result – this lady is not unwell and this is probably not an acute hyponatraemia. Hypokalaemia increases the risk of ODS with hypertonic saline.

(b) She has hypotonic hyponatraemia with an inappropriately concentrated urine. The high urine sodium implies that she is perfusing her kidneys. Clinically and biochemically this fits with SIAD, probably caused by the SSRI. Both NSAIDs and PPIs can also cause SIAD, though rarely[1].

Restrict fluid intake (e.g. to 800 mLs/day), monitoring fluid balance. Check thyroid and renal function and perform a short Synacthen test if indicated by the clinical context. Recheck serum sodium daily and urine sodium and osmolality after 2 days. If still SIAD picture, consider changing antidepressant.

Q2. A 34 year old lady is admitted with 'thunderclap' headache. Brain imaging confirms sub arachnoid haemorrhage. She is not on any medication. On admission examination is unremarkable; her serum sodium is 133 mmol/L. The following morning the nurses report that she is very sleepy and has been vomiting during the night. You find her difficult to rouse but neurological examination is otherwise normal and she is euvolaemic. Fluid balance is positive (intake > output) by 640 mls since admission 14 hours previously. U+E now shows serum sodium has fallen to 121 mmol/L.

(a) Would you give this lady hypertonic saline whilst awaiting further investigations?

(b) Her serum osmolality is 253 mOsm/kg; urine osmolality is 925 mOsm/kg; urinary sodium is 37 mmol/L. What is the most likely diagnosis?

A2. (a) Yes. She has acute hyponatraemia, clinical history including a cause of SIAD, and most importantly, symptoms of moderate cerebral oedema. She should be given 150mls 2.7% sodium chloride solution over 20 min while you look for senior assistance.

(b) Investigations confirm hypotonic hyponatraemia with inappropriately very concentrated urine and urinary sodium is also consistent with SIAD. Need to exclude renal, thyroid and adrenal dysfunction.

Q3. A 39 year old man has had extensive small bowel resection for Crohn's disease following which he has a persistently high intestinal output from his ileostomy. He is losing approximately 3 L / day and feels thirsty and weak. On examination he has sunken eyes, reduced skin turgor, blood pressure of 102/64 mmHg with a postural drop to 82/56 mmHg. His serum sodium is 125 mmol/L; urea is raised at 16mmol/L, creatinine also slightly raised at 141mmol/L. Previous serum sodium 1 week previously was 132 mmol/L, urea 9 mmol/L, creatinine 96 mmol/L.

(a) Would you give this man hypertonic saline whilst awaiting further investigations?

(b) Serum osmolality is 268 mmol/L; urine osmolality is 824 mOsm/kg; urine sodium is < 10 mmol/L. What is the most likely cause of his hyponatraemia? How would you treat him?

A3. (a) No. He is unwell, but the clinical picture is not of cerebral oedema and the hyponatraemia is not acute.

(b) Biochemistry is entirely consistent with the clinical picture of intravascular volume depletion due to sodium and water loss. He should be treated with infusion of resuscitation fluids such as 0.9% sodium chloride or Hartmann's.

Q4. An 82 year old man is admitted for management of severe left ventricular dysfunction following acute myocardial infarction 6 weeks previously. On examination he has marked peripheral oedema and bibasal lung crepitations with a raised JVP. His blood pressure is 96/58mmHg. His serum sodium is 124 mmol/L.

(a) What is the most likely cause of the hyponatraemia?

(b) His serum osmolality is 262mOsm/kg; urine osmolality 642mOsm/L; urine sodium 44mmol/L. Does this alter your answer to (a)? What further information would you like to know? How do you manage him?

A4. (a) Pump failure leading to underperfusion of kidneys and failure to excrete water.

(b) No – although underperfusion of kidneys is associated with urine sodium < 30, he is likely to be on a diuretic which causes natriuresis. Medication history needs to be explored. Management is that of his left ventricular failure.

Q5. A 58 year old man was diagnosed with multiple myeloma and was admitted to start chemotherapy. He seemed well on admission; hydration was normal and he was not taking any medication. You were surprised to be told that his serum sodium was 124 mmol/L.

What is the most likely cause of his hyponatraemia?

(b) His serum osmolality is 284 mOsm/kg; does this confirm your answer to (a)? Does he need urine investigations? What investigation do you request next?

A5. (a) Pseudohyponatraemia due to high plasma protein expanding the plasma volume and causing spurious hyponatraemia with indirect ISE measurement.

(b) Yes his serum osmolality is normal and he does not require investigation of his urine. To confirm, either total protein or, if available, POCT sodium measurement would be useful. POCT sodium usually employs different methodology and will indicate that the serum sodium is normal.

Q6 A 21 year old student with type 1 diabetes mellitus developed recurrent fainting episodes and was taken by ambulance to the Emergency Dept after one such episode at the end of the Christmas term. She denied any prescribed, over the counter or recreational drugs, but stated that she had been more prone to hypoglycaemia in recent months despite reducing her insulin doses. On examination she was neurologically intact. Her tongue was slightly dry and she had a postural drop in blood pressure but otherwise she appeared well. She was also noted to have an unusually tanned appearance for the season but had not been engaging in any artificial tanning behaviours or travel abroad.

Serum sodium was 119 mmol/L; potassium 5.4 mmol/L; urea 7.2 mmol/L; random blood glucose 3.2 mmol/L. tCO2 19mmol/L; chloride 95. Serum osmolality 250 mOsm/kg; urine osmolality 642 mOsm/kg; urine sodium 58 mmolL

What is the diagnosis?

A6 Addison's disease or auto-immune primary adrenal insufficiency. More common in people with type 1 DM. Pigmented appearance classical and has been mistaken for 'fake tan'. Mineralocorticoid deficiency results in renal tubular loss of sodium causing mild intravascular volume depletion and in turn postural hypotension and fainting. Glucocorticoid insufficiency may reduce insulin requirements. Mild hyperkalaemia and normal anion gap metabolic acidosis are further biochemical effects of mineralocorticoid deficiency and yield further clues.

Q7 A 19 year old patient with a history of anorexia nervosa was admitted to a medical ward with a serum sodium of 115mol/L; urea 0.8 mmol/L, creatinine 36 mmol/L. She was underweight (BMI 17.6kg/m^2) but appeared well; she was not clinically dehydrated and there was no oedema. BP 128/84. Lab investigation showed serum osmolality 228 mOsm/kg; urine osmolality 58 mOsm/kg.

What is the cause of the hyponatraemia?

A7 Polydipsia. Patients with eating disorders not infrequently water-load in order to suppress appetite or to falsify weight. The hypo-osmolar serum indicated that the hyponatraemia was not spurious. Urine was maximally dilute, appropriate to the very dilute serum. Urea and creatinine were low partly due to dilution, but also due to poor protein intake and low muscle mass. This patient admitted drinking 10-14 L of water or Coke Zero /day.

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Clinical Paper

Punishment Attacks in Post-Ceasefire Northern Ireland: An Emergency Department Perspective.

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ABSTRACT

Northern Ireland (NI) has been in a post-conflict state for over twenty years. However, injuries sustained during paramilitary Punishment Attacks (PA) remain a common hospital presentation. The aim of this study was to compare the current province-wide frequency and cost with data collected from the same unit in 1994, the end of the so called, "Troubles".

A ten month retrospective emergency chart analysis from all assault and gunshot wound (GSW) attendances to the Emergency Department, Royal Victoria Hospital Belfast (RVH) in 2012 was carried out. Age, sex, injury type, treatment outcome and associated cost of PA was documented. During the study period we recorded a total of thirty two PAs. Twenty seven were the result of gunshot wounds (GSWs), while five were assaults (punishment beatings). Seventeen required admission for definitive management. Nine cases required orthopaedic intervention, two required plastic surgery, two required maxillofacial input and one case required vascular surgery. All but two of those involved were male. Mean age of individuals admitted was 27.47. Total cost of patients both admitted and managed in the Emergency Department (ED) amounted to £91,362. On comparison with 1994, there are more PA presentations. Due to changing wound characteristics and evolving management overall cost is however less.

INTRODUCTION

The 31st of August 1994 saw the first lasting ceasefire of the Provisional Irish Republican Army (PIRA). The gesture was followed by further ceasefires from Loyalist paramilitaries leading to the Good Friday Agreement in 1998. This was set to be the official end of paramilitary violence within Ireland.

Prior to the agreement, a period deemed "The Troubles", paramilitaries imparted their own brand of social justice upon individuals judged to be engaged in antisocial behaviour. Suspected drug dealers, car thieves and those who had attacked paramilitary group members were particularly at risk. Due to distrust of state security forces[1] their suspected crimes were not reported by official means. Rather individuals were ordered to report to a set location at a set time for a "Punishment Attack" (PA). This usually involved, "knee-capping," a gunshot wound (GSW) discharged into the lower limb or organised assault with batons. Locally, it was understood that if they failed to report for PA, the individual would face life long eviction from the area or even execution.

A generation has passed since the end of "The Troubles" with a changed political landscape and established peace. The Royal Victoria Hospital in Belfast (RVH), the country's regional trauma centre, is still treating victims of PA on a near weekly basis. In 1994, clinicians within our hospital reported a retrospective analysis of all PA in the ten months before and after the PIRA ceasefire.[2] The aims of the present study were to see if number, cost and type of PA continues at a comparable rate in a ten month period in 2012, eighteen years after established peace.

METHODS

A 10 month retrospective chart analysis (2012-2013) of all patients admitted to the R.V.H. Belfast, with an assault or GSW coding was carried out. This amounted to approximately 2500 charts. From these we reviewed every record and any associated operative note to delineate PA from other admissions. Specifically, we looked for documentation that the patient's injury was the result of a PA; any close range soft tissue injuries to the lower calves or gang attacks with batons. Patient age, sex, injury type and associated operative intervention on primary admission was documented. For injury type, we looked specifically at location, type of weapon used and number of limbs involved. Patients were then anonymised by age and sex.

Any attacks where direct motivation appeared to be murder e.g. multiple gunshots discharged into the head were excluded. One patient who sustained close range lower limb injury on a shooting range was also discounted.

The financial cost for all 32 (PA) patients was then calculated. This included generic cost of department attendance, bed days

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TABLE 1:

Patients Requiring Admission for Punishment Shootings

Age	Sex	Mechanism	Injury Sustained	Outcome	2012 Admission and Intervention Costs
22	Male	4 GSWs bilateral lower limbs	# R tibia with retained bullet # distal left tibia	T&O theatre for wound debridement	£1488
24	Male	Single GSW left foot	Communicated # 3rd and 4th metatarsals	T&O theatre for wound debridement	£3862
32	Male	GSW to right knee and left ankle	# Left Talus	T&O theatre for wound debridement and bullet removal	£2262
22	Male	GSW to right thigh and Left Lower leg	Soft Tissue Injury	General Surgery Theatre for Washout	£985
22	Male	GSW left lower Limb	Communicated # left Tibia	External Fixation	£7054
20	Male	GSW L popliteal fossa	Soft Tissue Injury	T&O theatre for Washout	£1211
37	Male	GSW Right Lower Limb	Soft tissue Injury associated Peroneal Nerve Transection	Plastics theatre for Debridement and Nerve repair	£8368
29	Male	4 GSWs bilaterally to Lower Limbs and strike to head with Machete	# Parietal bone with associated subarachnoid haematoma. Soft tissue injury to both lower limbs	T&O theatre for bilateral lower limb debridement and washout	£6152
35	Male	GSW Right Knee	Right knee Articular injury	ORIF medial tibial plateau and femoral condyle	£5474
18	Male	GSW Right Knee	# Prox Tibia	Wash out and casting in A+E	£440
26	Male	Shotgun blast to right thigh	Soft tissue injury with femoral Artery Compromise.	Joint Vascular, T&O and Plastics theatre. Vascular repair, External Fixation and grafting.	£8174
18	Female	GSW to left hand and Left thigh penetrating abdomen	Haemodynamic compromise	General surgery theatre for laparotomy. Left hand exploration	£8474

from primary admission and cost of operative intervention. It did not include cost of any outpatient follow up or additional multidisciplinary input (e.g OT / Physiotherapy). From this we made direct cost comparison from the 1994 Nolan study carried out in the same institution in 1994.

RESULTS

A total of 32 victims of PA attended the ED within the 10 month study period. Of these, 17 required admission for further management, whilst 15 suffered low velocity soft tissue GSWs and were managed in the ED with outpatient review. Twelve of the admissions were secondary to GSWs (Table 1), while 5 were secondary to punishment beatings (Table 2).

A further 15 patients who attended ED with GSW were managed in the department with washout and dressing. This incurred a further total cost of £2,223, an average of £148 per patient, substantially lower than inpatient costs.

Of the total PA admissions, 30 were male and 2 were female. Mean age of punishment beating patients was 35. Mean age of punishment shooting patients was 25. Ten patients required operative orthopaedic invention. Two required plastic surgery for tissue recovery while one required vascular intervention. Of the GSWs, 11 attacks were carried out using low velocity weapons. One attack involved the use of a shotgun (Figures 1 and 2). Seven attacks involved a single bullet while the remaining 5 involved 2 or more. The lower limb was the most commonly affected area - 13 of the 22 admissions.

Table 2:

Patients requiring admission for Punishment Beatings

Age	Sex	Mechanism	Injury Sustained	Outcome	Intervention Cost
22	Male	Gang Attack Iron Bars	Head injury requiring intubation	ICU Admission	£2740
38	Male	Gang Attack Iron Bars	Displaced right patellar # Closed bony avulsion left tibia tuberosity. Left mandibular condyle and left maxillary wall & left zygomatic arch #.	T&O theatre: Tension band wiring Right patella Washout/debridement right knee placement pericutaneous screw in left tibial tuberosity	£7555
45	Female	Gang Attack and fall from first floor window	# Right Os Calcis	T&O ORIF	£7879
43	Male	Gang Attack with batons	# Zygoma	MaxFax Theatre for fixation	£3150
31	Male	Gang Attack with hammers	# Right fibula, # Left 9th and 10th ribs, # Right Zygomatic Arch, # L4	MaxFax Theatre for Fixation	£8939

Fig 1. X-ray appearance of a shotgun wound to the leg.

The study population totalled one more victim than recorded in the 10 months preceding the 1994 ceasefire and 4 more than immediately post the 1994 ceasefire (Figure 3).

Adjusting for Bank of England inflation the present day total

Fig 2. In-patient management of the same patient.

cost of all PA in the 10-month period was £91,362. Average PA patient cost overall was £2,855, less than the average 1994 cost of £3,849. If inflation is again included however, 1994 equivalent costs would amount to £6,017 per patient in 2015. Despite comparable numbers of PA , our average spend per patient is substantially lower.

DISCUSSION

Our results show that PAs continue at a significant rate within the province. There has been a return to shooting as the primary means of PA, with an increase in total caseload from 1994. Cost remains a substantial drain on department resources.

On direct comparison, our total £91,362 cost of care is less than both the pre- and post -1994 ceasefire costs (£150,339 and £168,461 respectively). We propose that the changing mode of PA and modern treatment of injuries have produced this change[2 4].

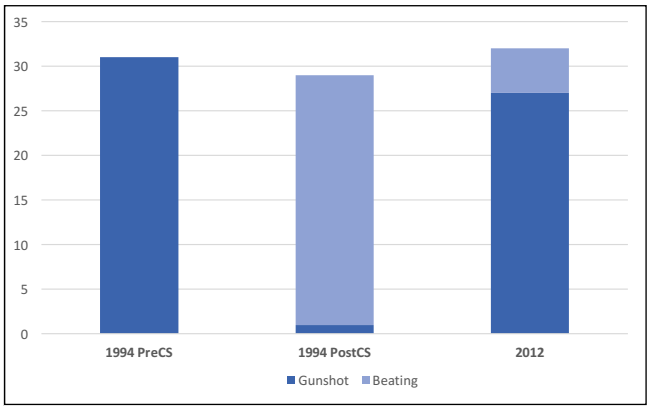

Fig 3. Return to shooting as the commonest mode of punishment attack by 2012

Previous studies have documented a change in the style of PA over the years.[2-3] "Knee-Capping" was the punishment of choice from the 1950s onwards, typically involving a high velocity round through the knee articulation. Occasionally, this was bilateral and sometimes involved the elbows and ankles, known colloquially as a "Six Pack."[3] Typically, mortality with this technique was high and the functional morbidity in survivors was extreme. As such, this made it unpopular within the local communities the paramilitary groups were supposedly representing. As The Troubles evolved through the 1980's, Republican and Loyalist groupings moved away from this high morbidity approach, with most forms of PA involving low velocity rounds fired through soft tissue of the lower limbs.[4] This study confirms that "Knee Capping" is a misnomer in modern practice as a minimal number of injuries actually involve the knee articulation.[5]

Management of PA injuries has also evolved. Byrne et. al 2006 highlighted how superficial injuries not involving vascular or orthopaedic structures can be safely managed in the ED with wound lavage and outpatient follow up. Almost half of our patients (15/32) fell into this category, saving on both bed days and cost.[4]

The main limitation of this study is that it documents only the primary attendance of those subjected to a PA. Multiple patients included in this study had recurrent attendances to the ED after their initial injury, for associated physical and psychological injury. On combining the physical effects of PA with the psychosocial effects, it is safe to assume that the ongoing total spend on this cohort is far greater than what we have calculated.[6]

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Clinical Paper

The use of Collagenase Clostridium Histolyticum in the management of Dupuytren's contracture- outcomes of a pilot study in a District General Hospital setting

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ABSTRACT

Introduction: Collagenase Clostridium Histolyticum (CCH) is a recognised treatment option for adult patients presenting with Dupuytren's contracture (DC).

Patients and Methods: Twenty male patients with established DC were treated using CCH. The average metacarpophalangeal (MCP) joint and proximal interphalangeal joint (PIP) contractures pre-treatment were 52^0 (range, 0 – 75^0) and 35^0 (range, 0 – 84^0) respectively. The average DASH score pre-treatment was 24.2 points (range, 0 – 68.2 points). Patients were reviewed at 1month, 3months and at an average of 23 months (17 to 27 months).

Results: MCP joint contractures significantly improved compared to pre-treatment and the improvement was maintained at latest follow up. PIP joint contractures did significantly improve but to a lesser degree and there was no significant improvement compared to pre-treatment beyond 3months. A trend for MCP and PIP joint contracture recurrence was observed at latest follow up but did not reach statistical significance. DASH scores significantly improved from pre-treatment and the improvement was maintained at latest follow up. At 3months, the average patient satisfaction score was 9.5 (range, 6 – 10), which decreased to 8.6 (range, 6 – 10) at latest follow up. We estimated a potential cost saving of approximately £70,000 by treating 20 patients using CCH compared to inpatient operative fasciectomy.

Conclusion: CCH is a useful option in the management of DC in appropriately selected patients. Cost-effectiveness in the treatment of DC should be carefully considered.

Keywords: Dupuytren's contracture, Collagenase Clostridium Histolyticum, fasciectomy

INTRODUCTION

Dupuytren's disease (DD) is characterized by an imbalance of collagen synthesis over degradation[1–3] leading to the development of nodules and cords within the palmar fascia. With progressive cord formation flexion contractures of the metacarpophalangeal (MCP) and/or proximal interphalangeal (PIP) joints may occur resulting in impaired hand function.[2, 4] The prevalence of DD has been reported to vary between 0.2 and 56% and rises with increasing age.[5, 6] DD is found most frequently in white males.[7] The precise aetiology of DD is unknown although it has been suggested that several genetic and environmental risk factors are involved each contributing to disease susceptibility.[8] There is no cure for DD and because the condition can be progressive, recurrence after treatment is often considered inevitable over a patient's lifetime. [9]

Histologically, DD is composed primarily of types I and III collagen. Collagenase Clostridium Histolyticum (CCH) [Xiapex; Swedish Orphan Biovitrium AB; Stockholm, Sweden] is an approved enzymatic treatment for adult patients with DD with a palpable cord. CCH consists of two distinct collagenases (clostridial type I collagenase [AUX-I] and clostridial type II collagenase [AUX-II]). Types I and III collagen are substrates for both collagenases. These enzymes have been shown *in vitro* to cleave collagen strands at complementary terminal and internal sites into peptide fragments that are rapidly degraded.[10] Enzymatic degradation results in cord rupture and improvement of the digital contracture.

The primary aim of this pilot study was to evaluate the clinical outcome of CCH in the management of adult patients presenting with DC to a District General Hospital and to determine if the outcomes were comparable to those reported in the literature. We also performed an estimated cost saving

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analysis by comparing the cost of treatment using CCH to the potential cost of treating the study group surgically utilising operative fasciectomy in our unit.

PATIENTS AND METHODS

Local approval was obtained for a pilot study to treat 20 patients with DC using CCH. Patients were identified as suitable candidates by the senior author (NWT). Patients were included if they: were of either sex, aged ≥ 18 years, had a palpable cord on clinical examination with a fixed flexion deformity of $\geq 20^0$ and $\leq 100^0$ for MCP joints and $\geq 20^0$ and $\leq 90^0$ for PIP joints in at least one finger other than the thumb. Exclusion criteria included patients with recurrent disease, any other prior treatment or operation on the finger to be treated, any other condition limiting motion in the finger to be treated, any contra-indications to CCH and any chronic neuromuscular disease compromising hand function. All patients received an information booklet and provided written informed consent.

Baseline data recorded included: age, gender, hand dominance, hand involvement, affected digit (s), disease duration, smoking status, alcohol habit, family history and the presence of associated fibromatoses (e.g. Garrod's pads, Ledderhose disease or Peyronie's disease). In patients with a digital contracture involving both the MCP and PIP joints in all cases this was due to a single cord crossing the MCP and PIP joints of the same finger. Digital angles of the finger planned for treatment were measured to the nearest degree using a hand-held goniometer. A pre-treatment Disabilities of the Arm, Shoulder and Hand (DASH) score was recorded.[11] Based on his experience, the senior author also estimated the surgical time in minutes (not inclusive of anaesthetic or recovery time) that would have been needed to treat the contracture by operative fasciectomy.

The senior author (NWT) performed all of the CCH injections in the outpatient clinic. Local anaesthetic (LA) was not administered prior to the CCH injection to avoid inadvertent intra-neural injection. The CCH injection was administered in accordance with the manufacturers instructions (0.58mg per injection). Only one digit or joint contracture was treated per visit. For those patients with a combined MCP and PIP joint contracture, the MCP joint contracture was corrected first. Immediately following the injection the patient was asked to rate the degree of pain experienced using a visual analogue scale (0 = no pain; 10 = worst possible pain). All patients were observed for 30 minutes after the procedure in case of an allergic reaction.

Patients re-attended the clinic 48 hours post-injection. The injection site was checked. Under aseptic conditions a nerve block was performed using 10mls 1% lignocaine to anaesthetise the finger for manipulation. The affected finger was manipulated until the maximum amount of correction could be achieved. The digital angle measurements for the manipulated finger were repeated. Any skin tears that occurred were dressed and a thermoplastic splint applied with the manipulated digit in maximal extension.

Patients attended for hand therapy as per protocol. They were advised to use a night splint for 3months. Digital angle measurements and a DASH score were obtained at 1month and 3months following the manipulation procedure and at latest follow up (average, 23 months; range, 17-27 months). A patient satisfaction score for the treatment was obtained using a simple scoring system at 3months and at latest follow up (0 = very dissatisfied; 10 = very satisfied). The patients were not routinely reviewed at the senior authors clinic.

Statistical analysis was performed using the one-way Analysis of Variance (ANOVA) method utilising a statistics software package (SPSS, Version 22) to determine if the changes noted in the MCP and PIP joint contractures and the DASH score were statistically significant. Tukey's test was performed to determine any significant differences between time frames. For all analyses, a p value <0.05 was considered statistically significant.

RESULTS

Twenty patients were enrolled into the study. The baseline characteristics of the patients are summarised in Table 1. Twenty-two CCH injections were administered. Two patients had 2 injections (one patient had two different cords injected in the same digit and the other patient had two injections into the same cord in the same digit). The second injection was performed in both cases approximately 4weeks from the initial injection.

The mean pain score following the CCH injection was 3.5 (range, 1 – 10). All patients had a minor local reaction at the injection site most commonly bruising and swelling. There were no instances of a systemic reaction. Following the finger manipulation procedure, 9 patients sustained a skin tear of variable size (ranging approximately from 1 to 5mm) all of which healed satisfactorily. One patient on warfarin therapy had a significant bleed, which stopped with the application of a pressure dressing. One patient suffered a vasovagal episode after the manipulation procedure.

In one patient, no improvement was obtained following the manipulation procedure. A second CCH injection into the same cord was performed approximately 4weeks later and a second manipulation procedure was attempted which was unsuccessful. The patient refused any further injections and was listed for operative fasciectomy leaving 19 patients within the study group at 1 month. One patient at this stage had an 84^0 PIP joint contracture that was treated by a second separate injection after correction of his MCP joint contracture.

One patient refused to attend for his 3 month assessment stating that he was happy with the outcome and cited no reason to attend. Eighteen patients attended for their 3 month assessment. At latest follow up (average, 23months; range 17 to 27months) one patient was too ill to attend but stated over the telephone that he was happy with the outcome in relation to the treated digit thus leaving 17 patients available

Table 1:

Baseline characteristics of study group

Parameter	N=20
Age	Average: 64.8 years; Range: 38 – 86 years
Gender	20 males
Dominant hand affected	11 patients
Affected digit	Little finger, 10; ring finger, 8; middle finger 2
Isolated or combined contracture	16 combined MCPJ/PIPJ; 3 isolated MCPJ; 1 isolated PIPJ
Duration of disease	Average: 6 years; Range: 1 – 20 years
Smoking	1 patient
Alcohol intake	14 social; 3 alcohol-dependent; 3 abstinence
Family History	11 patients
Estimated fasciectomy time	Average 64 minutes; Range: 45 – 120 minutes)
Associated fibromatoses	1 patient (plantar and penile disease)

for review. The digital angle measurements and DASH score for each time point are summarised in Table 2. At 3months, the average patient satisfaction score was 9.5 (range, 6 – 10), which decreased to 8.6 (range, 6 – 10) at latest follow up.

Statistical analysis demonstrated that MCP joint contractures significantly improved ($p<0.0001$). A between group analysis demonstrated that MCP joint contractures improved significantly from baseline at each time point ($p<0.01$) however there was no significant difference between each stage. A trend, which was not statistically significant, for MCP joint contracture recurrence was observed at most recent follow up, however the MCP joint contracture still remained significantly better compared to baseline.

Similarly, PIP joint contractures significantly improved but to a lesser degree than MCP joint contractures ($p=0.023$). Only at 3months was there a significant improvement compared to baseline PIP joint contracture ($p<0.05$). There was no significant improvement compared to baseline beyond 3months. Furthermore, there was no significant difference between each stage of assessment. Similar to the MCP joint a trend for PIP joint contracture recurrence was observed at most recent follow up but did not reach statistical significance. DASH scores significantly improved from baseline ($p<0.0001$). Significant improvements from baseline were also noted at each time point ($p<0.01$) however there was no significant difference when comparing the DASH scores at each time point.

In order to simplify the cost analysis we excluded the elements both treatment methods had in common e.g. consumables, hand therapy and Consultant appointments. The senior author does not have access to daycase facilities and hence each patient would have required an inpatient bed and main theatre appointment for their hand surgery. The senior author estimated that the average surgical time per patient would be approximately 1 hour and that each patient would most likely require approximately 2 hours in total of main theatre time (includes anaesthetic, surgical and recovery time). The drug cost was thus compared to the cost of operative fasciectomy. The drug cost of performing 22 CCH injections was approximately £16,000 (plus VAT). Based on information provided by the hospital Finance Department at the time of the study we estimated that the cost of treating the same 20 patients surgically without complication would have been approximately £86,500 (plus VAT) giving a potential cost saving of approximately £70,000.

DISCUSSION

Surgery is the mainstay for the treatment of DC. Procedures include sectioning the cords with a scalpel (fasciotomy), using needles to puncture diseased cords (percutaneous needle fasciotomy-PNF), and more invasive techniques such as removal of the diseased fascia (limited, partial or total fasciectomy); in addition, the lost tissue may be replaced with a full-thickness graft (dermofasciectomy).[12 – 15]

Table 2:

Digital angle measurements and DASH score for each stage (range in parentheses)

Parameter	Pre-CCH	Post-MUA	1 month	3 months	Latest Review
MCP joint	52^0 ($0 – 75^0$)	12^0 ($0 – 65^0$)	7^0 ($0 – 25^0$)	8^0 ($0 – 26^0$)	17^0 ($0 – 53^0$)
PIP joint	35^0 ($0 – 84^0$)	23^0 ($0 – 64^0$)	18^0 ($0 – 84^0$)	16^0 ($0 – 43^0$)	29^0 ($0 – 66^0$)
DASH score	24.2 (0 – 68.2)	–	4.5 (0 – 25)	3.8 (0 – 27.4)	4.5 (0 – 29.5)

Complications associated with surgical treatment occur frequently in patients with DC, especially when the severity of contracture is high.[9, 16 - 17] Overall complication rates after surgery are reported to be between 4% and 39%. The most common complications reported have been problems with wound healing (23%), scar pain from incisions (17%), dysaesthesia or paraesthesia (13%), hypoaesthesia (10%), flare reaction (10%), complex regional pain syndrome (6%), infection (2%), and hematoma (2%). [18 – 19] Complication rates after re-operation are even greater. [19]

CCH has been demonstrated in well-controlled level-1 clinical trials to reduce digital contractures and increase digital range of motion. [18, 20 - 21] Peimer et al. [22] collected data on the real-world effectiveness of CCH during its first year of use following US Food and Drug Administration approval and compared the results with clinical trial efficacy data. Clinical use, including the number of injections per cord and effectiveness outcomes such as, joint contracture and range of motion, were compared with the results from the CORD I and CORD II trials. [18, 20] The authors concluded that despite a lower injection rate, correction of joint contracture and range of motion was similar to the findings from the clinical trials. Furthermore, it has been reported that the incidence of adverse events is numerically lower with CCH versus equivalent complications from fasciectomy and that most CCH-related adverse events are predominantly injection-related and transient. [23]

The baseline characteristics of our study group are comparable to the literature i.e. older males predominantly affected, preponderance for ring and little finger involvement and frequently a positive family history. In keeping with other studies, the number of administered injections in our study was 1.1 per patient and the side-effect profile was similar to that reported in the literature with the CCH injection being well tolerated by the majority of patients. [22 - 24]

In keeping with all the CCH studies to date, we noted that the results of CCH are better at the MCP joint level compared to the PIP joint level. We also observed that individuals with less severe MCP and PIP joint contractures at baseline had a better response to CCH than those with more severe contractures. In the JOINT I and II studies, severely contracted PIP joint cords had lower success rates than both MCP joints and less severely contracted PIP joints. [21] The observation that PIP joints are more resistant to full correction than MCP joints is also consistent with other studies.[25] In a randomized study by van Rijssen et al. [26] fasciectomies or PNF performed on MCP joints were much more successful than those on PIP joints, affirming that severe contractures in PIP joints are associated with a less favorable prognosis. In a comprehensive review, Rayan[1] reported that after excising the offending cord in severe and prolonged PIP joint contractures, residual contracture can be expected, especially when the flexion contracture exceeds 60°. Our finding of greater benefit in joints with milder contracture suggests that CCH could result in better outcomes when joints are treated earlier in the course of the disease. DC can be a progressive disease, and the current evidence suggests that providing treatment to contractures of lower severity is more likely to result in clinical success rather than watching and waiting for contractures to become more severe.

At latest review, approximately 2 years on average from CCH treatment, we noted a trend towards recurrence of the MCP and PIP joint contractures in keeping with the 5-year data reported by Peimer et al. [27] This finding most likely accounts for the slight increase in the average DASH score at latest review. Patient satisfaction, which we feel is an important measure of outcome, however only fell by approximately one point overall suggesting that despite some degree of recurrence patients remain happy with the outcome of their CCH treatment. The overall recurrence rate reported by Peimer et al. is comparable to published recurrence rates after surgical treatments. [27]

Given the increasing financial pressures within the NHS, it is important that the management of DC is cost-effective. PNF is a non-surgical treatment option for DC, which has been popularized in recent years.[28 – 30] PNF can be performed in the outpatient setting under LA using a hypodermic needle. Multiple digits can be treated and the procedure can be performed in patients with significant morbidities. [31] Major risks however include nerve and vessel injury and flexor tendon ruptures. Pess et al. [32] reported their results of PNF in over 1000 patients with DC. They concluded that PNF is a safe procedure with a low complication rate however recurrences were more common in younger patients and the procedure was less effective for PIP joint contractures. Nydick et al. [33] compared PNF and CCH injection in the treatment of DC and in the short term, both PNF and CCH had similar clinical outcomes and patient satisfaction. A recently published prospective, single-blinded randomized study comparing the efficacy of CCH and PNF for MCP joint contracture secondary to DD did not demonstrate any difference between the treatment outcomes after 1 year. [34] The authors also acknowledged that CCH was significantly more expensive than PNF (1280 euros versus 479 euros respectively).

We estimated a potential saving of approximately £70,000 using CCH instead of treating the study group utilising operative fasciectomy. Whilst we appreciate that this is an over-simplified cost analysis, one fact that it does highlight is the significant cost of inpatient treatment for DC. We acknowledge that performing operative fasciectomy in a daycase setting or employing PNF in appropriate cases can reduce the cost of treating DC within the NHS and this is one of the aims within the hand surgery service in our unit. To the best of our knowledge this is the first study to objectively evaluate the use of CCH in the Health and Social Care system in Northern Ireland.

Whilst we acknowledge the limitations of our study in terms of the small patient numbers and relatively short follow up, we have demonstrated CCH to be safe and clinically

effective with a high level of patient satisfaction. CCH is also cost-effective when compared to operative fasciectomy in our unit. Furthermore, we have demonstrated that the same results can be achieved in the DGH setting to those reported in large multi-centre studies. It would be our opinion that this procedure is not a substitute for surgery but should be part of the armamentarium available to a hand surgeon when treating patients with DC.

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Clinical Paper

An Imperfect Peace: Trends In Paramilitary Related Violence 20 Years After The Northern Ireland Ceasefires

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ABSTRACT

Background: The 1994 Northern Ireland ceasefire heralded a new beginning for the region after 30-years of violence. In the 20-years following the cessation of hostilities, paramilitary punishment attacks continue to occur in breach of the ceasefire. The aim of this study was to review trends in these attacks over the 20-years and their impact on orthopaedic services.

Methods: We conducted a retrospective review of patients admitted under orthopaedic services following paramilitary assault across Northern Ireland over the last 20-years. The frequency of assaults, demographics of the victim population, injury pattern and weapons used was determined. Data on the total number of attacks was obtained from the Police Service for Northern Ireland (PSNI).

Results: 3691 paramilitary style attacks occurred between 1994 and 2014 despite bilateral ceasefires. The overwhelming majority of attacks are on males, however females and children as young as 12 have been victims. Prior to 1994, penetrating trauma predominated (62% vs 38%), with blunt trauma more common post ceasefire (60% vs 40%). 33% of those injured required orthopaedic treatment. The type of weapon used in these assaults has changed primarily from ballistic to non-ballistic devices.

Conclusions: We present data of paramilitary related trauma presenting to orthopaedic services across Northern Ireland in the 20-years since the conclusion of hostilities following the negotiated 1994 ceasefire. Many assaults continue to occur despite being in breach of the ceasefire. The frequency of these assaults is however, declining. The type of weapons used has changed resulting in less ballistic trauma and more blunt trauma. The injury pattern associated with blunt trauma has significant long-term morbidity and potentially a greater financial burden on the health service.

Implications: 20-years of peace in Northern Ireland has had a hugely positive impact on the political and financial stability of the region. Unfortunately, continued violence represents a significant burden on the health service resources and causes potential long-term changes to victim's lives.

Keywords: polytrauma; open fracture; epidemiology; fracture services; ballistic; blunt trauma

INTRODUCTION

Northern Ireland transitioned from a period of 30 years of violence to a period of relative peace following the 1994 paramilitary ceasefires. Ballistics injuries and explosive trauma predominated prior to the ceasefire but since 1994 there has been a change in the pattern of violence with paramilitary attacks occurring where victims are being attacked with a variety of non-ballistic weapons such as hammers, baseball bats, and metal rods in so called "punishment attacks".

The use of firearms is still commonly used in breach of the peace process but these are used more as shoot to maim rather than shoot to kill with low velocity handguns or shotguns being used to injure joints - typically elbows, knees or ankles. A combination of these is colloquially known as a '6-pack'[1].

Attacks continue to be employed by organisations on both sides of the political divide. Victims tend to be from the same community as their attackers and punishment beatings are commonly 'prescribed' to discipline members of their own community for perceived antisocial behaviour such as drug-dealing, burglary, car theft, paedophilia, child abuse or infidelity.

We report the frequency of assaults, demographics of the victim population, injury pattern, and weapons used in these cases 20 years on from the ceasefires. The impact this violence on orthopaedic services is outlined.

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METHODS

We undertook a retrospective review of paramilitary style assaults presenting to all orthopaedic and trauma centres across Northern Ireland since 1994. Data was provided by the Fractures Outcomes and Research Database (FORD). Patient age, date of injury, number of limbs injured, operative interventions and duration of inpatient stay where all assessed. The nature of the attack and the weapons used (ballistics or blunt trauma) was recorded. Associated injuries and whether the trauma was intra-articular or extra-articular were documented.

Data was also obtained from the Police Service for Northern Ireland (PSNI) to determine the total number of attacks over the 20-year period to place our data in context and reflect the percentage of these attacks that result in admission under orthopaedics.

RESULTS

Data obtained from the PSNI documents 3691 paramilitary style attacks between 1994 and 2014 despite bilateral ceasefires. 2231 were blunt assaults (60.4%) and 1460 were shootings (39.6%). There has been a decreasing incidence of paramilitary attacks with 491 recorded in the five years from 2009-14 in comparison to 1182 attacks reported in the first 5 years after the ceasefire (1994-99). Additionally, the number of bomb blasts and penetrating ballistic trauma has declined. In the four years prior to the ceasefire (1990-94) 645 attacks were recorded by the PSNI (245 assaults (38%) and 400 shootings (62%)).

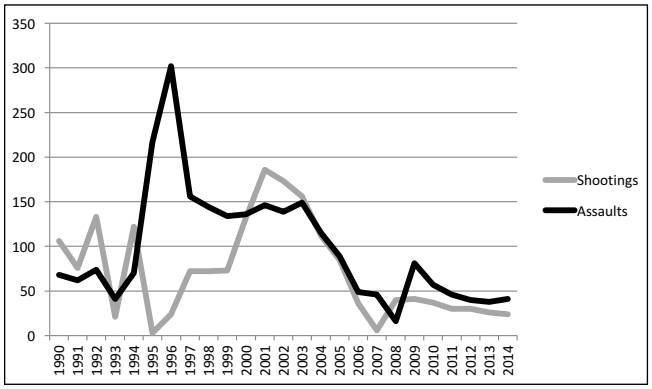

Fig 1. The number of assaults increased sharply from 1994 onwards. A progressive decrease in ballistic injury such as gunshot wounds, explosive injuries and vascular injuries has been observed.

The overwhelming majority of attacks are on males, with females accounting for 2% of all victims. In terms of age most victims are in their 20s but victims as old as 75 and as young as 12 have been reported. 470 children were attacked (12.7%). Fifty-eight percent of the victims were Protestant, 42% Catholic and less than 1% categorised as 'other'. Over the last 8 years there has been an increasing trend in the number of immigrants to Northern Ireland also being the victims of these attacks. Half of the assaults took place in Belfast. The majority of the assaults occurred in West Belfast with the majority of shootings occurring in North Belfast.

Of the 3691 attacks, 1232 (33.4%) required orthopaedic treatment. 456 (37.1%) were compound injuries. Lower limb injury predominated (63.8%).

A progressive decrease in ballistic injury such as gunshot wounds, explosive injuries and vascular injuries was recorded (Figure 1). A wide variety of non-military weapons have been utilised in the non-ballistic assaults (Figure 2).

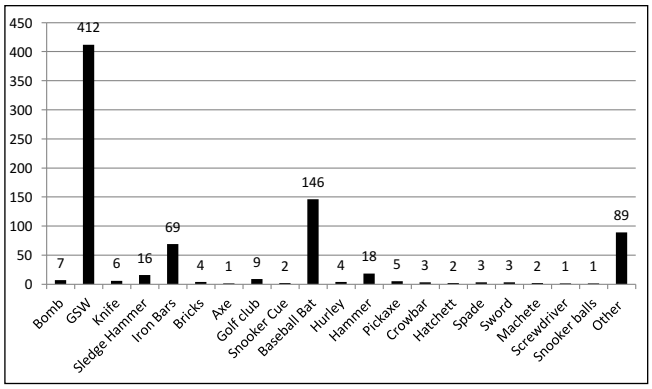

Fig 2. A wide variety of weapons were used to conduct these assaults, which presented to the orthopaedic service.

DISCUSSION

The PSNI define paramilitary attacks as "*an attack carried out on an individual or individuals by one or more persons usually from their own community. The reasoning behind the attack is usually either to intimidate the victim or to punish them for perceived anti-social activities*[2]."

Data obtained from the PSNI reports that there were 3691 paramilitary style assaults between 1994 and 2014 despite bilateral ceasefires. This figure represents minimum estimates as the extent of paramilitary intimidation and terror within working class communities remains significantly underestimated or reported[2]. The trends in paramilitary assaults do appear to correlate with major political events occurring at the time (Figure 1). August 1994 saw the first Republican ceasefire. In 1995 US President Bill Clinton Visited Northern Ireland with the number of shootings that year at a record low. A definite decrease in gunshot wounds was observed both in 2005 and again in 2010. In September 2005 Republican paramilitaries began decommissioning their weapons, and later in 2009-10 Loyalist paramilitaries began decommissioning their arsenal. The lowest number of paramilitary attacks recorded was in 2007, when the political spotlight was on Northern Ireland following success of the St Andrews agreement in October 2006, which resulted in the restoration of devolution of powers to Northern Ireland assembly in 2007.

The change in pattern of paramilitary punishment across Northern Ireland had been previously documented following the Loyalist and Republican ceasefires in 1994[3]. Twenty years on from this cessation of hostilities the practice continues with varying degrees of media coverage. There has been a gradual

reduction in incidence of recorded paramilitary attacks. Firearms continue to be used despite bilateral ceasefires and decommissioning although the use of blunt trauma now predominates. Nolan et al. described increasing trend for blunt trauma in assaults in the immediate post ceasefire period. The timing of these assaults continues to happen typically late evening or after dark, with the majority who require surgical intervention being operated on the following day, unless there is an associated vascular injury or limb threatening soft tissue contamination/injury[1]. Considerable expertise was amassed by trauma surgeons in the management of paramilitary injuries[4,5].

The injury pattern observed prior to the ceasefires associated with low velocity handguns was frequently extra-articular with limited soft tissue damage. Over the subsequent 20 years blunt trauma punitive beatings are associated with extensive soft tissue contusion with increased incidence of comminuted intra-articular injuries. Such injuries involved prolonged surgical reconstruction and rehabilitation, with longer inpatient stays and greater long-term morbidity[6,7]. Many of these injuries require soft tissue reconstruction with skin grafting or tissue flaps[6]. Overall a decrease in the number of vascular injuries has been observed.

O'Neill et al 2002 recorded that 79% of non-ballistic punishment victims sustained at least one fracture, while in those who were shot, 32% sustained at least one fracture. They estimated at that time the acute inpatient costs to be on average £2010 for each attack[7]. Discharges from hospital may be delayed if it is deemed unsafe for the victim to return to their family home or community. Many of these victims later claim compensation from the Secretary of State for Northern Ireland, further increasing the financial burden. The human costs, however, physically and mentally for both victims and their families in incalculable[3].

There is a disturbing recent trend towards 'elective' punishment beatings with victims being contacted to arrange a time and date for their beating, and ambulances are then arranged by the assailants on departure[9]. In one incident a mother actually brought her son for his paramilitary shooting[10]. A historic mistrust of the policing system within these communities means these punishment squads are ironically welcomed by some as a means of punishing antisocial behaviour[11].

Children under 16 are not exempt from such punitive beatings. Attacks on children actually increased in the two years following the signing of the Good Friday agreement in 1998. Between 1990 and 2013 paramilitary groups assaulted over 500 children under the age of 16. Nineteen children under the age of 16 were shot by paramilitaries and 91 received beatings. There were 148 shootings of 16-17 year-olds and 253 beatings. Eight children under the age of 14 were beaten. The youngest victims were aged 12[8,12]. Such data gave Northern Ireland unparalleled levels of child abuse. It wasn't until 2004 that a sharp decline in attacks was observed due to mounting political pressure. The majority of these child victims are treated within the adult trauma service unless under 14 years old.

Both victims and attackers are becoming increasingly knowledgeable about wound and joint infections. Victims with prior knowledge of their imminent assault wear shorts and T-shirts to avoid clothing material contaminating their wounds and self-prescribe prophylactic analgesia in the form of alcohol or drugs[9]. Assailants tend to favour intra-articular injuries given their associated morbidity. In some instances canine faecal matter has been placed on nails through baseball bats prior to the assault.

CONCLUSION

20 years of peace in Northern Ireland has had a hugely positive impact on the political and financial stability of the region. Tourism is increasing and there is a renewed hope that future generations will not allow a regression of this process. Allied to this is that even 20 years on from the ceasefire, there continues to be a paramilitary presence within some communities. The pattern of these attacks may have changed to be more internal than against their old political foes - this still represents a significant burden on the health service resources, together with the associated morbidity which impacts on the public purse in the form of disability living allowance and compensation claims. The psychological impact both victims and witnesses of these crimes remains indeterminable.

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Clinical Paper

All-Terrain Vehicle(ATV) Injuries – An Institutional Review Over 6 Years.

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ABSTRACT

Objective: Quad bike or all-terrain vehicle (ATV) related injuries are a significant cause of trauma and may present with severe or fatal injuries. Most of the literature describing ATV related injuries come from North America and Australasia and data from the United Kingdom is scarce despite a high prevalence of ATV use. The aim of this study was to describe our single centre experience with ATV injuries over a 6-year period from 2010 to 2015.

Materials and Methods: This is a cohort analysis of 65 patients who presented with ATV related injuries in South West Acute Hospital, UK between 2010 and 2015.

Results: 65 patients had ATV injuries. 34 (52%) patients were children between 0 – 17 years of age. 88% (n=57) patients were ejected from the ATV, six got trapped underneath and two had collisions. "Ejection" as a mechanism of injury was significantly more common than the other mechanisms ($p<0.0001$). Compliance with helmet use was low at 16% (n=10). Extremity (48%) and head and face trauma (43%) were the most common injuries. One (1.5%) patient died while 3 (4.6%) patients had major morbidity.

Conclusion: ATV injuries are an important cause of trauma admissions and carry a significant risk of morbidity and mortality. Extremity and head trauma are the most common injuries resulting from ATV accidents. More than 50% of the injured are children. Compliance with helmet use is low and calls for legislation and public awareness strategies to reduce the impact of ATV accidents on health care.

Key words: all-terrain vehicle injury, quad bike, trauma, helmet, childhood trauma, occupational hazard

INTRODUCTION

All-Terrain Vehicles (ATVs), popularly known as Quad bikes are defined by the All Terrain Vehicle Industry European Association as "any motorised vehicle designed to travel on four low pressure tyres on unpaved surfaces, having a seat designed to be straddled by the operator and handlebars for steering control".[1] They were first designed for work-related use in farms; but have become increasingly popular for recreation and sports.[2,3] After their introduction in the early 1980s, it soon became evident that ATVs were a significant user hazard with an estimated 106,000 injuries needing treatment and 347 deaths in 1986.[4,5] 40% of these deaths and injuries involved children less than 16 years.[5] According to estimates in United States, there is a 0.7 risk of death occurring per 10,000 ATVs in use and over 4 billion dollars spent each year in estimated lifetime economic costs.[6,7] Several studies from the United States, Canada, Australia and New Zealand confirm the danger of ATV use and the findings suggest a high incidence of both fatal and non-fatal injuries.[4,5,8-11] It is known that the use of helmet and crush protection devices reduce the impact of injury in an ATV accident.[9] A crush protection device is a small unobtrusive hairpin shaped hoop mounted on an ATV behind the rider meant to counter some of the risks associated with a rollover. Despite the high prevalence of ATV use in the UK and Ireland both off-road and on-road, literature on ATV use and injuries is scarce. There is only 1 study on ATV related accidents from the Republic of Ireland published in 2003 and a more recent case series in 2012.[11,12]

The purpose of this study was to describe our single centre experience with ATV related injuries in Northern Ireland, UK. This study on 65 ATV injury patients is the largest series of its kind from either UK or RoI to date. We describe our experience with ATV related injuries over a 6 year period including analysis of demographics, presenting characteristics, pattern of injuries, management of injuries, outcome in terms of morbidity, mortality and follow-up.

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METHODS

Data Collection

A cohort analysis was performed on a prospectively maintained database of all patients who presented to South West Acute Hospital, Enniskillen, UK (previously known as Erne Hospital) from 2010 to 2015. Using clinical notes, we identified 65 patients with ATV related injuries.

A review of the clinical notes was carried out to collect information regarding demographics, clinical features, mechanism of injury, pattern of injuries, ICU admission, laboratory results, radiological findings, operative interventions, crucial events (morbidity and mortality) and follow-up. We also studied compliance with helmet use and childhood (0 – 17 years) injuries due to ATV-related accidents.

Table 1:

Mechanism of ATV related injuries.

Mechanism of Injury	Number (%)of Patients (n=65)
Ejection	57 (88%)
Entrapment	6 (9%)
Collision	2 (3%)

The type of surgery performed, operative findings, postoperative hospital stay, and complications were recorded. Injury pattern was classified as per the Abbreviated Injury Scale(AIS) and a score of 3 and above was defined as a major injury. Follow-up was arranged for injuries as deemed necessary by the treating clinician.

Statistical Analysis

Results were interpreted as mean and range where applicable. Analysis and comparison of groups was performed using numbers and percentages or statistical tests depending on the variables and distribution of data. One-sided or two-sided tests were performed using SPSS software (ver. 22) where applicable and a P-value of less than 0.05 was considered statistically significant.

RESULTS

65 patients were identified with ATV related injuries between 2010 and 2015. The mean (SD) age of the study population was 21 (9) (range – 3-74) years. 52% (n=34) of the injured were children in the age group of 0 – 17 years of whom 12 patients (19%) were between 3 and 10 years of age. Eleven were female.

62 patients (95%) were driving quad bikes at the time of injury while the remaining 3 were passengers. The analysis of the mechanisms of injury is listed in Table 1. Ejection was found to be significantly more common than the other mechanisms ($p<0.0001$). Analysis of compliance with the use of helmets revealed that only 10 (16%) of the 65 patients were wearing helmets at the time of injury.

The injury pattern was found to be variable in the study group with involvement of all major organ systems. Thirty-four out of 65 (52%) were found to have multiple injuries involving more than one organ system. Forty-six patients (71%) had minor and moderate injury (AIS ≤ 2) while 19 patients (29%) had an AIS of 3 and above consistent with major injury. Fifteen patients (23%) were found to have injuries which did not require any investigation or intervention. A detailed analysis of the pattern of injuries identified is given in Table 2.

A total of 108 radiological investigations were requested. Skiagrams (X-rays) were most common constituting 71% (77). Computed tomography scans constituted 25 of 108 (23%), Ultrasonography of the abdomen was performed in 4 patients (4%) and magnetic resonance imaging of the spine was performed in 2 patients (2%). Detailed analysis of the radiological investigations is given in Table 3.

Inpatient admission was required in 14 patients (22%) due to the severity of their injuries. Four (6%) were admitted to an Intensive Care Unit. Surgical intervention was performed in 7 patients (11%). One patient was treated with decompressive craniotomy for subdural hematoma and 6 required orthopedic

Table 2:

Patterns of injuries identified and description of major injuries with respect to organ system involvement.

Location of Injury	No (%) of Patients (n = 65)	Number and Description of Major Injuries
Head and Face	28 (43%)	8 5 intracranial haematomas 2 temporal bone fractures 1 zygomatic fracture
Thorax	19 (29%)	3 2 clavicular fractures 1 sternal fracture
Abdomen	7 (11%)	1 liver laceration
Pelvis	8 (12%)	1 pelvic fracture
Back/Spine	20 (31%)	2 vertebral fractures
Extremities	31 (48%)	6 extremity fractures

TABLE 3:

Investigations done for ATV related injury patterns.

Location of Injury	No (%) of X-rays (n = 77)	No (%) of Computed Tomography Scans (n=25)
Head and Face	3 (5%)	9 (14%)
Thorax	15 (23%)	3 (5%)
Abdomen	4 (6%) (+4 ultrasonography)	3 (5%)
Pelvis	8 (12%)	1 (2%)
Back/Spine	19 (30 %)	9 (14%) (+2 MRI)
Extremities	28 (43%)	0

fixation (1 clavicular fixation for fracture, 1 pelvic fracture treated with internal fixation and 4 extremity fractures treated with open reduction and internal fixation). Twenty patients (31%) were followed up at the outpatient clinic. None of the 20 patients showed any further progression of their injury or development of new symptoms.

Analysis of treatment is given in Figure 1.

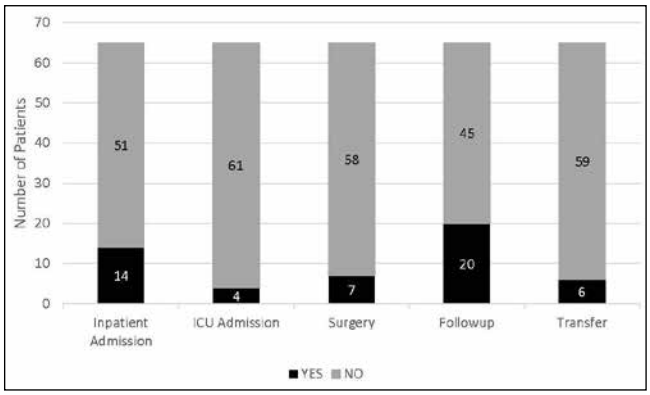

Fig 1. Analysis of treatment given for ATV injuries

Analysis of morbidity and mortality data revealed 4 crucial events. One patient died as a result of severe traumatic brain injury with multiple contusions on the day of admission. One patient developed a left sided hemiplegia after she recovered from severe head injury (Glasgow Coma Score – 8). Another patient with a fracture of the petrous part of right temporal bone developed permanent hearing loss in his right ear after recovering from head injury. Both of these patients were less than 17 years of age. One patient had multiple haematomas and lacerations involving the right lobe of liver. He developed acute kidney injury during the course of his ultimately successful conservative treatment. Ten out of 14 admitted patients were discharged uneventfully without any major sequelae.

DISCUSSION

ATV related injuries are a recognised public hazard with significant morbidity, mortality and healthcare costs.[4,5,8-10,13] In the UK, about 1200 patients visited Accident and Emergency in 1998 after quad bike injuries.[14] By the year 2000, the number had reached 3200 and in 2002, more than 4200 people had an ATV accident.[14] The UK Health and Safety Executive (HSE) has stopped releasing figures of ATV related injuries but it is assumed that the numbers have grown since then.[14] Most of the studies on ATV injury come from North America and the Australasian continent. There is a paucity of literature from other parts of the world. Our study is the largest review of ATV related injury over a 6-year period within the UK.

It is now recognised that young children may lack the physical power and cognitive capacity to operate a quad bike with safety.[8] Studies have shown that children less than 16 years account for 30% to 50% of all ATV related injuries and 35% of all ATV related deaths.[10,15,16] Our findings are similar with children in the age group of 0 – 17 years accounting for 52% of the injuries and 19% were between 3 and 10 years of age. According to HSE guidance, it is illegal to carry a child on a quad bike as a passenger and children less than 13yrs of age are prohibited from using ATVs for off-road riding.[17] For on-road use, it is illegal to drive an ATV without a valid driving license.[18] The high incidence of ATV related injuries in children in our study reflects a lack of adherence to the existing laws.

According to a study, 61% of quad bike riders experience at least one loss of control event.[19] Risk factors for ATV accidents include uneven ground, taller and heavier riders, increasing mileage and higher speeds.[19] One recommended strategy which has been studied previously pertains to the use of helmets.[9,20,21] Helmet use is associated with reduction of non-fatal head injury by 64%.[21] The risk of overall fatal injury is reduced by 42% and overall injury by 15% with helmet use.[21] Compliance with the use of helmet varies between 30% to 70% in the literature.[11,22] Our study shows an unusually low compliance. Out of the 28 patients who sustained head injury, only two (7%) were wearing helmets at the time of the accident and both had a minor head injury. The overall compliance was 16% (10 out of 65). Our findings are in contrast to a study from RoI where 78% of ATV injured patients were wearing helmets at the time of injury and only 2 patients (6%) suffered from head injury.[11] An explanation could be that 66% of the injuries in the RoI study occurred during supervised commercial courses where helmets are

compulsory.[11] In contrast, HSE only recommends wearing a helmet whilst riding a quad bike but does not make it compulsory.[18] Stricter governance in this regard would probably be appropriate as we believe that compulsory helmet use while riding an ATV would reduce the severity of head trauma which can constitute up to 70% of all major ATV related injuries.[22]

The most common injuries to occur after an ATV accident are extremity and head trauma.[23,24] According to a study, 40% of ATV related injuries involve the extremities and 27% involves the head and face.[24] This is followed by thoracic and spine injuries which occur in 13% cases each while 5% of the injury occurs in the abdomen and pelvis.[24] Another study by Clapperton et al showed that fractures constitute more than half of all admissions.[9] Our study showed similar findings with 48% injuries involving the extremities and 43% involving the head and face. Fractures account for 19% of all extremity trauma in our series. Analysis of data revealed that a potentially major injury was more likely to occur following head trauma than any other organ injury, though the results were statistically insignificant (21.4% vs 15.3%; p=0.5).

Literature on the mechanism of an ATV accident shows that the most common mechanism of injury is ejection where the driver or passenger is thrown off the quad bike (32% to 48%).[25,26] This is followed by rollovers where riders get trapped under their vehicles (14% to 33%) and collisions where the vehicle collides against a moving or stationary object(27% to 31%).[25,26] A steep slope is associated with 69% of fatalities in an ATV injury.[27] In our study, 88% of ATV accidents occurred as a result of ejection while 9% were rollovers which got the victims trapped under the quad bike and 3% were ATV collisions. Ejection was the commonest mechanism of injury ($p<0.0001$). These findings are in contrast with those of McIntosh et al who showed rollovers to occur in 70% of ATV accidents with entrapment in 49% cases.[28]

There was one death in our study which was due to traumatic brain injury incurred while driving without a helmet. The mortality rate attributed to ATV related injury was 1.5% while disruption of an organ system posing threat to life or affecting the quality of life was observed in 4.6% of patients.

CONCLUSION

ATV injuries are an important cause of trauma-related emergency and hospital admissions. Extremity and head trauma are the most commonly observed injuries; some may be life-threatening. More than 50% of the injured victims are children. There is an unusually low compliance with wearing a helmet while riding a quad bike. A change in legislation and public awareness strategies may address these issues by prohibiting children from ATV use and mandating the use of helmet under all circumstances.

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Case Report

Faecal Microbiota Transplantation for Clostridium Difficile – a local perspective

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ABSTRACT:

Clostridium Difficile represents one of the major challenges of the antimicrobial era with associated significant morbidity. Treatment options are limited to a number of specific antibiotics with significant failure rates. Faecal Microbiota Transplantation has been recognised as a possible treatment option when standard therapy fails.

We report a local case of Clostridium Difficile Infection ultimately requiring Faecal Microbiota Transplantation with good success. While no formal service providing the treatment is available within Northern Ireland it is a feasible treatment option for Clostridium Difficile Infection.

INTRODUCTION:

Clostridium Difficile (CD) is an anaerobic, gram-positive spore-forming bacillus. It can be identified in the bowel flora of 3% of the healthy adult UK population[1]. When the normal balance of bowel flora is altered, CD can precipitate life threatening inflammation of the intestine by the nature of the toxin produced by the bacteria. Antibiotic usage has been identified as a potent trigger for Clostridium Difficile Infection (CDI) disrupting the natural balance of gut flora.

CDI is defined as diarrhoea with a positive stool test for CD toxin. The clinical spectrum of CDI can vary from asymptomatic carriage to life threatening disease. Populations at particular risk include children under 2 years of age, patients over 65 years of age or immunocompromised patients[1]. The clinical impact of CDI is significant as evidenced by the outbreak in 2007-8 within hospitals in Northern Ireland[2].

CDI is on the decline in the UK as a result of appropriate antibiotic protocols[1]. While standard antibiotic therapies, including metronidazole and vancomycin, are used successfully in the majority of cases a significant number of patients developed resistant infection. Despite initially successful treatment, recurrence of CDI occurs in 15-20% of patients[3]**.** In these situations, there is growing recognition that Faecal Microbiota Transplant (FMT) is a viable alternative option.

CASE:

A 77-year-old lady female was admitted to the general medical take at Craigavon Area Hospital following a fall which was attributed to a catheter associated urinary infection. She had an extensive medical history including rheumatoid arthritis (on long term steroids), chronic kidney disease (Stage III), bilateral total hip replacements, hypertension and diverticulosis. Previously, in 2008, she had developed CDI which was successfully treated with oral metronidazole and vancomycin. Her health issues, prior to admission, related to recurrent catheter related infections, with various antibiotic regimes used in the community. She lived independently in a fold, mobilising with a rollator.

The initial working diagnosis was presumed catheter associated urinary sepsis. Initial antibiotic therapy was Tazocin and then Gentamicin – subsequent urine culture was negative. On further review it became apparent that diarrhoea (Bristol Stool chart – type 7) was present prior to admission. Testing of stool samples revealed CDI. Enzyme immunoassay testing identified Glutamate Dehydrogenase (GDH) and Toxin A/B positivity with polymerase chain reaction confirming presence of toxigenic CDI.

Appropriate infection control measures were established while Tazocin and Gentamicin were stopped. Assessment of severity indicated severe disease with on-going pyrexia and constitutional upset. Computed tomography (CT) of the chest, abdomen and pelvis showed significant mural thickening of the caecum and ascending colon.

Subsequent antimicrobial therapy was coordinated with regular microbiology input. As per local trust policy, Metronidazole (500mg 8-hourly) and Vancomycin (125mg 6-hourly) were initially commenced. However by day 8, with on-going diarrhoea and pyrexia, there was felt to be no meaningful response. Fidoximicin (200mg 12-hourly) was commenced while IV Immunoglobulin 400mg/kg was administered as well. With ongoing symptoms Rifampicin (300mg 12-hourly) was

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later added and a second dose of IV Immunoglobulin 400mg/kg was administered. The patient received a total of 12 days of Fidoximicin with 8 days of Rifampicin.

By this stage, clinical assessment indicated on-going active infection with persistent abdominal distension and diarrhoea. The patient's nutritional state was declining due to systemic illness and reduced oral intake. Following multidisciplinary discussion consideration was given towards FMT. As there is no current provision for this treatment option in Northern Ireland it was facilitated through a service based at Ysbyty Gwynedd Hospital, Bangor, North Wales with the patient requiring transfer by the air ambulance service. Antibiotics were stopped for 24 hours prior to FMT which was performed via naso-jejunal approach. After observation for 2 days the patient returned to Northern Ireland for further care.

After a number of days the patient's bowel habit returned to normal with resolution of abdominal distension. Her oral intake gradually improved with markers of nutritional status showing improvement. The patient required transfer to a rehabilitation unit for further multi-disciplinary input prior to discharge home. There has been no recurrence of CDI to date.

DISCUSSION:

FMT was first described in the 1950s as a possible treatment option for pseudomembranous colitis. The process involves the transfer of faecal material (approximately 30-50g) from the intestinal tract of a healthy donor. Possible routes of administration to the recipient include naso-jejunal tube, colonoscopy or rectal enema. The desired aim is restoration of the normal microbiota flora within the recipient's intestinal tract. While the exact mechanism is unclear, the restored microbiota suppresses Clostridium Difficile colonisation and promotes an immunological response, facilitating eradication of the CD[3].

While standard therapies for CDI, including metrondiazole and vancomycin, are successful in most cases they have a deleterious effect on the post infection microbiota characterised by lower-than-expected diversity of the subsequent microbiota. This has the effect of reducing resistance to repeat colonisation by CD explaining the 15-20% risk of reinfection after the first episode of CDI[4].

In recent years FMT has been increasingly recognised as a viable alternative treatment option for CDI. A recent meta-analysis of non-randomised observational data reported resolution rates of 245 out 273 patients - resolution rate 89.1% (95% CI 84.0% to 93.3%; 11 studies)[3]. Commonly reported side effects related to FMT include transient diarrhoea and abdominal pain relating to colonic irritation lasting less than 48hour[5]. A case series in immunocompromised patients reported a 14% risk of flare of inflammatory bowel disease in patients previously diagnosed with the disease receiving FMT for CDI[6]. Long term complications after altering the gut microbiota with FMT is unknown with long-term follow-up studies required. One case report indicated unintentional weight gain in a recipient after receiving donor faeces from patient with obesity[7].

Within the UK a number of specialist centres now offer FMT as a treatment option for treatment resistant or recurrent CDI although no such option is available in Northern Ireland. NICE guidance from 2014 recommend FMT be reserved for treatment of CDI that is either recurrent or resistant to standard antimicrobial therapy.[5]

Faecal donors are usually selected from a banked donor stool system. Screening of stool samples is under taken, including CD toxin and enteric pathogens including Salmonella, Campylobacter, Giardia, Norovirus and Cryptosoridium. Screening serology tests comprise HIV, HTLV, Hepatitis A/B/C/E, syphilis and strongyloides.[8] Exclusion criteria for donors include gastrointestinal disease (such as inflammatory bowel syndrome, irritable bowel disease, gastrointestinal malignancy or active diarrhoea), immunosuppression, recent antibiotic use (within 3 months) and obesity (BMI>30).[8] Donor faeces can be administered fresh or stored in frozen formulation for later use[1]. Prior to performing FMT, it is recommended antibiotics should be stopped for 24 hours.

Proposed indications for FMT include the following[9]

1) Recurrent or relapsing CDI (A. at least 3 of episodes Mild/moderate CDI and failure of 6-8 week trial of vancomycin or B. 2 episodes of severe CDI requiring hospitalisation),

2) Moderate CDI not responding to standard therapy after 1 week,

3) Severe CDI with no response to treatment after 48hours

A number of obstacles exist in relation to FMT which includes the following[10]. Recruitment of donors and screening of donor faeces entail certain costs particularly for storage and transport of material. Infection control issues particularly in the endoscopy suite are obvious practical concerns. Concerns regarding risk of transmission of viral or bacterial infections potentially missed during screening. The aesthetic nature of the procedure is a significant consideration of patients. Cost-effectiveness studies have not been performed.

There is growing interest in what role FMT may play in other conditions particularly Inflammatory Bowel Disease (IBD)[11]. Research is also looking at how processing of donor faeces could affect outcomes and address safety concerns. Route and form of administration may also evolve with time particularly in relation to encapsulated oral administration.

Currently FMT would not be seen as a standard treatment option for CDI in Northern Ireland. However the growing evidence base suggests it is becoming a more viable option. Certainly in this case it proved invaluable. How the utilisation of FMT changes over time will be interesting to watch.

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Case Report

"Showercap" Sign: Spontaneous Uterine Rupture in a Primiparous Woman

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ABSTRACT

A 32-year-old primiparous woman presented with severe abdominal pain at 21 weeks' gestation. Background history of laparoscopy for chronic pelvic pain and a spontaneous miscarriage was noted. On examination, she was peritonitic and tachycardic with low grade fever and anemia. MRI abdomen demonstrated a uterine rupture with a large cap of clotted blood overlying the uterine fundus with the appearance of a "shower cap" and large volume haemoperitoneum, the presumptive diagnosis was uterine rupture with placental extrusion. Emergency laparotomy confirmed a two litre haemoperitoneum due to a 3cm defect at the uterine fundus through which a portion of placenta and membrane were extruding. Hysterotomy and delivery of the non-viable fetus was performed. The defect was repaired. It is important to remember that there are many causes of acute abdominal pain in pregnant patients, obstetric and other. Uterine rupture is a rare but life-threatening cause. An underlying risk factor is usually identified.

INTRODUCTION

Uterine rupture is a serious obstetric complication with high risk of feto-maternal morbidity and mortality. It is defined as separation of the entire thickness of the uterine wall with extrusion of fetal parts and intra-amniotic contents into the peritoneal cavity[1]. This rare complication has an incidence of <1% in women with scarred uteri, however it is extremely rare in the unscarred uterus with a suggested incidence of only 0.006%[2, 3]. Non-contrast MRI is being increasingly used in pregnant patients in the emergency setting for rapid and accurate identification of aetiology of abdominal pain[4]. Our case is of a 32-year-old primiparous patient, 21 weeks gestation with severe abdominal pain without any clearly defined risk factors for rupture on initial enquiry.

CASE REPORT

At 21 weeks gestation, our patient, gravida 2 para 0, presented to her maternity unit with a two hour history of sudden onset severe abdominal pain and two episodes of diarrhoea. No vaginal bleeding was noted. Background history included a spontaneous complete miscarriage 5 months previously. Past medical history included a diagnostic laparoscopy for chronic pelvic pain, peptic ulcer disease, and depression.

Maternal observations were notable for intermittent tachycardia, a brief hypotensive episode, responsive to fluids and a temperature spike to 38.1°c. Haemoglobin at presentation was 11.6 g/dL. Fetal assessment ultrasound was unremarkable, the fetal heartbeat was present. There was a clinical suspicion of appendicitis. Septic screen was performed and empiric antibiotics were given before transfer to tertiary general hospital for general surgical review.

On examination, her abdomen was tender, with rebound and signs of peritonitis. The haemoglobin had been slowly trending downwards from initial 11.6g/dl to 8.9g/dl.

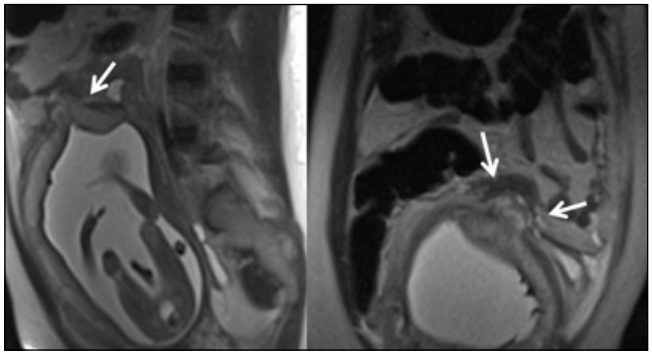

Fig 1. T2 weighted sagittal and coronal images of the defect at the fundus of the uterus with placental extrusion (white arrows).

Initial transabdominal ultrasound was non-specific, demonstrating a small volume of free fluid in the pelvis. The patient was transferred directly for multiplanar, rapid sequence T2 weighted MRI abdomen which identified a fundal uterine defect (Fig 1) with a large cap of material overlying the uterine fundus. This gave the appearance of

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a "shower cap" and was thought to represent clotted blood or extensive placental extrusion or percreta (Fig 2). The appendix was unremarkable.

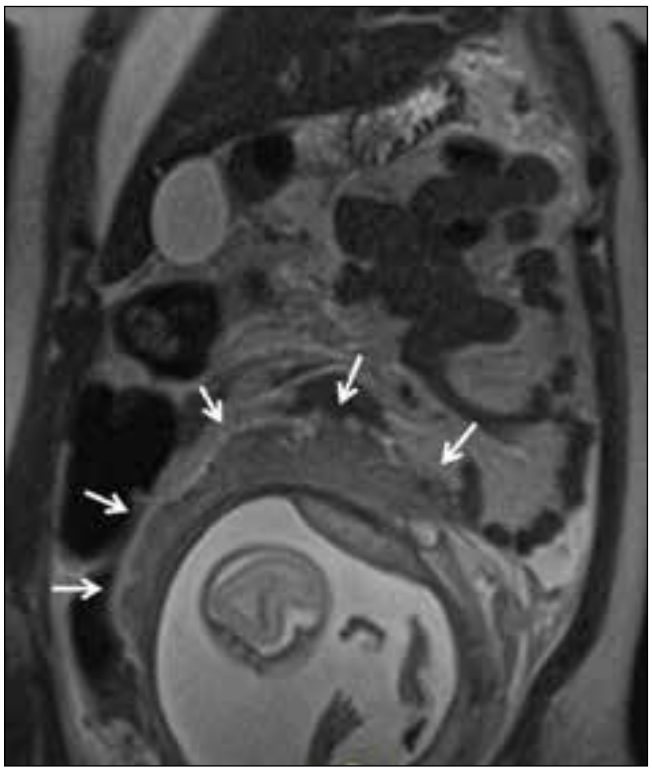

Fig 2. T2 weighted coronal image illustrating the "showercap" sign of clotted blood products overlying the point of uterine rupture (white arrows).

An emergency laparotomy was performed. The MRI findings clearly correlated with 3cm defect at the uterine fundus through which a portion of placenta and membrane were extruding (Fig 3), and large volume haemoperitoneum with a cap of clotted blood over the uterus corresponding to the "shower cap" sign seen on MRI. Hysterotomy via a linear extension of the uterine defect was performed, the non-viable fetus was delivered and the uterus was repaired. The course of her physical recovery as an inpatient was uncomplicated. It emerged on retrospective review that there had been inadvertent uterine rupture at the time of prior laparoscopy for chronic pelvic pain, this had not previously been disclosed to the patient.

DISCUSSION

Uterine rupture is rarely seen in modern radiology practice. The majority of uterine ruptures occur intrapartum in the third trimester. It classically presents when a previously scarred uterus (most commonly caesarean section) is further stressed by labour, and patients are transferred directly to the operating room without preoperative imaging.

Other predisposing factors include induction of labour or oxytocin augmentation, uterine anomalies, grand multiparity among others. Third trimester uterine rupture classically involves the lower segment, regardless of whether the uterus is scarred or not. First and second trimester ruptures occur typically at the fundus. Nulliparous women have been described as "virtually immune to rupture", especially before the onset of contractions[5]. This case was especially confounding as it occurred in the second trimester, in a primiparous patient, with no apparent uterine scar or anomalies, although this was later found not to be the case.

Magnetic resonance imaging (MRI) is commonly used for the assessment of the acute abdomen in pregnant women as a second line imaging modality after ultrasound[6, 7]. In our institution, we use a rapid sequence multiplanar T2 weighted protocol, imaging in the axial, coronal and sagittal planes. The protocol takes approximately 15 minutes to complete.

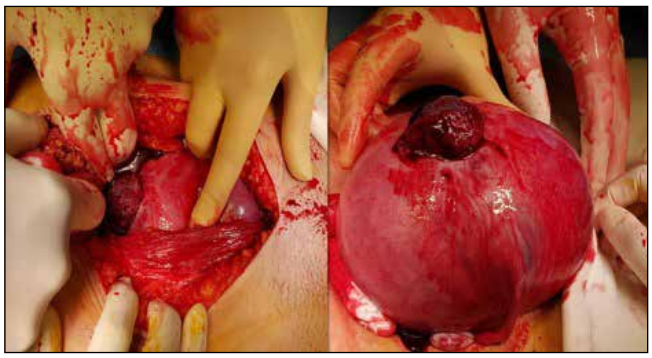

Fig 3. Corresponding intraoperative images of the defect at the fundus of the uterus with placental extrusion.

Appendicitis often needs to be excluded and MRI has been proven to be accurate in the diagnosis of appendicitis [8], while also giving information regarding other relevant structures such as the kidneys, bowel, gallbladder and pelvic organs. MRI is not routinely used for imaging abdominal emergencies as it is less available out of hours and imaging can take considerably longer than an equivalent CT study. However, during pregnancy, the gravid uterus causes anatomical distortion of the abdomen and pelvis which decreases the sensitivity of ultrasound.

The absence of ionising radiation renders MRI relatively safe in pregnancy. There are some concerns of the heating effect on the placenta during prolonged image acquisition[9, 10] so rapid sequence multiplanar T2 sequences with high soft tissue resolution are acquired and the patient is removed from the magnetic field as quickly as possible[9]. Rapid sequence acquisition also minimizes any delay in diagnosis and treatment - hugely advantageous in the setting of an acute abdomen. Despite concerns, there has been no documented teratogenic effect. Gadolinium based contrast agents cross the placenta and hence its administration is not recommended in pregnant patients unless the benefit outweighs the risk.

A gravid young woman in a hyperdynamic circulatory state can lose 2.5L of her circulating volume before becoming symptomatic. The importance of a thorough history and attention to the physical examination cannot be overemphasised. The initial differential diagnosis in a pregnant woman with abdominal pain always includes the most obvious obstetric causes: constipation, urinary tract infections, uterine contractions, musculoskeletal pain, and,

less commonly, placental abruption, as well as non-obstetric causes including cholecystitis and appendicitis. On MRI, the diagnosis of uterine rupture became readily apparent and the appearance clearly correlated with the intraoperative findings, without delaying intervention. We wish to describe the novel "showercap" sign on T2 weighted MRI corresponding with clotted blood products overlying the point of uterine rupture.

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Medical History

Severe Burns in World War II.

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INTRODUCTION

The Ulster Auxiliary Air Force Squadron RAF 502 were former "weekend flyers". Officers and most of the air and ground crew were from Ulster[1]. Supported by their medical and surgical care and their leadership they contributed decisively to Allied victory in World War II .

At 3:15 AM on 27th April 1941, Pilot Officer Christopher Carmichael of 502 Squadron took Whitley aircraft Z6501 to roll out on Limavady's partially completed airfield. A crew of 6, including Pilot Officer Christopher Carmichael, Flight Lieutenant John Dickson, Sergeant Desmond "Des" O'Connell, Sergeant Stanley William Dorney, Sergeant Fred Redhead, Sergeant John Wilson (Air Gunner) were scheduled for a ten-hour anti U-boat patrol over the Atlantic. Shortly after take-off, the starboard propeller broke off. The Whitley hit Loughermore Mountain being unable to gain altitude or fly level on one engine. Fire broke out and ignited aviation gasoline and the 250 pound bombs[2,3] (Fig.1).

Fig 1. Two Whitley Bombers Airborne, by Robert T. Horvath (1942-), 1989. Oil on canvas, 61 x 92 cm, copyright of the Yorkshire Air Museum and Allied Air Forces Memorial, Elvington, UK, and reproduced with their permission. Mark V and VII were flown from Limavady RAF Airfield in 1941 by 502 Ulster (Auxiliary) Squadron. Mark VIIs were designed specifically for Coastal Command. With a crew of six, the VIIs had a flight endurance of approximately 11 hours.

Flight Sergeant Des O'Connell exited in the middle of the fuselage. The fuel tank ruptured and drenched O'Connell who became ablaze. Flight Sergeant Redhead stamped and swatted O'Connell's flames, severely burning his hands. Flight Lieutenant Dickson, the plane's commander was also badly burned and losing blood from head wounds, but Sergeant O'Connell was even more severely burned. Dickson collapsed and cows licked O'Connell's wounds[3,4,5].

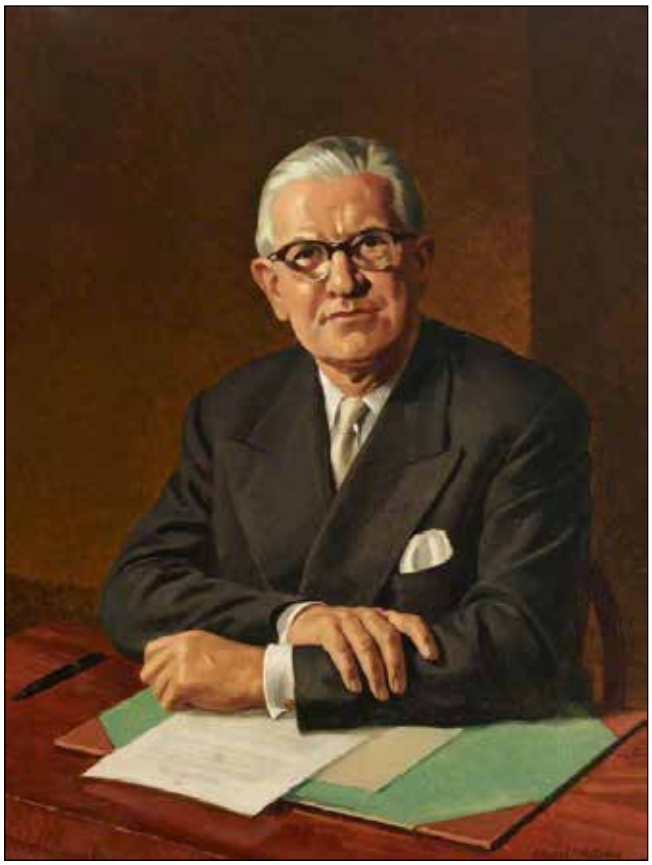

Fig 2. Sir Archibald McIndoe (1900-1960), by Edward Irvine Halliday, painted 1962-63, oil on canvas 92 x 72 cm, courtesy of Hunterian Museum at the Royal College of Surgeons of England and reproduced with their permission solely for this Medical History.

BURN TREATMENT

The treatment of the aircrew's burns had been recently updated. On November 6th, 1940, after their experience

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of treating RAF pilots in the Battle of Britain[6], Archibald McIndoe and Sir Harold Gillies had spoken to the Royal Society of Medicine. The aim of "the treatment of burns was to save life and preserve function"[7]. Coagulation, especially by tannic acid, had been carried too far[8,9]. There must be no coagulation of third degree burns. The raw surface of a third degree burn must be covered by a skin graft. McIndoe continued "he was getting good results by treatment with saline baths at 105ºF. The patient could be totally immersed and usually found after the first bath that pain was relieved." Sir Harold Gillies "thought that saline treatment was improved by the Bunyan bag. An accompanying Lancet editorial fully endorsed the views of Archibald McIndoe and Sir Harold Gillies and added that a Bunyan bag was an oiled-silk envelope which could encase the limb[9]. Five months after the RSM concordat, Max Rosenheim[10] and Roe Valley Hospital Matron Mabel Huddlestone[11] and their team so treated Des O'Connell and John Dickson. The local priest said he found it almost impossible to find annointable flesh on Des O'Connell except at the midriff[5] (Fig. 2) (Fig.3).

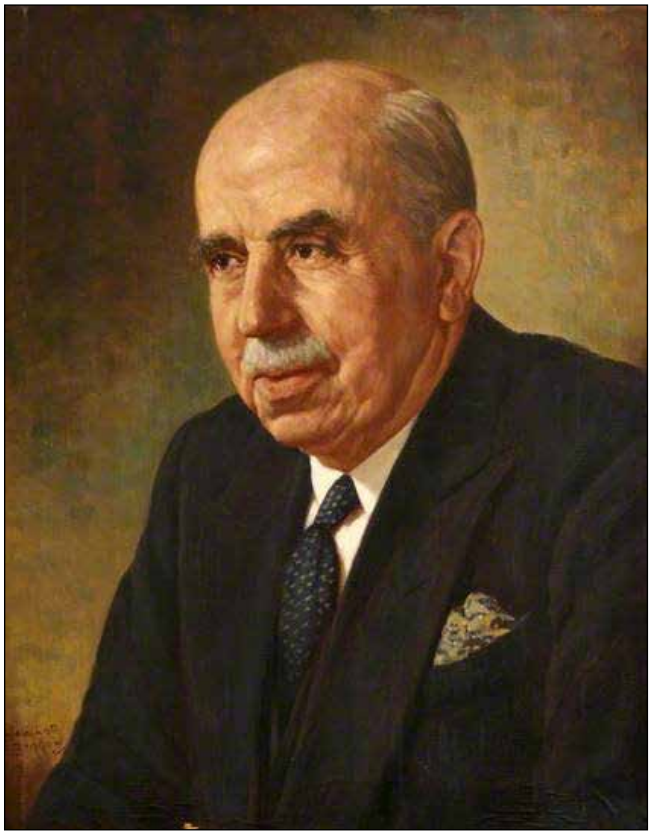

Fig 3. Sir Harold Delf Gillies (1882-1960), oil on canvas, by Howard Barron, painted 1962, 52 x 42 cm, courtesy of Hunterian Museum at the Royal College of Surgeons of England and reproduced with their permission solely for this Medical History.

LIMAVADY HOSPITAL

By 7:00 AM on 27th April 1941 the crew of Whitley Z6501 were all admitted to Roe Valley Hospital, Limavady[2]. Max Rosenheim, later Lord Rosenheim, PRCP, gave instructions for immediate intravenous resuscitation, 24 hour saline baths at 102-105º for Des O'Connell, and Fred Redhead. John Dickson's blood loss was corrected and his limb burns placed in Bunyan bags containing tepid 2% saline. Rosenheim, recalled from the Massachusetts General Hospital to supervise Northern Ireland military medicine, had previously formed the highest opinion of Matron Mabel Huddleston and staff[12,13]. Huddleston summoned Benjamin Rycroft[14] from Musgrave Park to assess the burned eyelids. Rycroft organized the transfer several days later of O'Connell to Princess Mary's RAF Hospital, Halton, Buckinghamshire[15], where Bunyan had developed the bags. O'Connell's family, his parents and a priest brother were unable to fit into the RAF evacuation plane, an Oxford, and were left behind. The transfer flight of Des O'Connell was eventful. The Luftwaffe were bombing Liverpool so the RAF provided an escort of three fighters. Having delivered O'Connell safely[4], the RAF fighters performed victory rolls before returning to their Northern Ireland base. Senior RAF staff were not amused. Archibald McIndoe operated on Des O'Connell both at Halton and later from Ward III at East Grinstead, where O'Connell was elected an early member of the Guinea Pig Club[16,17,18,19](Table 1).

TABLE 1.
Burn Injuries to RAF Home Force, 1939-1945[20]

BURN SITE	1939	1940	1941	1942	1943	1944	1945	TOTAL
Head	2	5	3	7	4	-	10	31
Face/Mouth	7	77	123	130	113	205	170	825
Eye Area	4	14	36	55	23	50	40	222
Ears	-	-	1	-	-	-	10	11
Neck	1	2	2	3	6	20	-	34
Chest	-	3	2	12	2	-	10	29
Back	2	2	5	10	5	-	-	24
Abdomen	-	2	6	2	3	-	10	23
Pelvic area	-	2	4	5	8	19	-	38
Arm-Hand/Wrist	6	97	167	204	263	478	210	1,425
Arm-Rest of limb	1	23	69	82	86	178	80	519
Leg-Foot/Ankle	12	91	169	195	181	292	150	1,090
Leg-Rest of limb	3	49	67	94	83	275	80	651
Totals	38	367	654	799	777	1,517	770	4,922

Des O'Connell was not the first RAF 502 Ulster Squadron crewman to become a McIndoe guinea pig. Thomas Percy Gleave (1903-1993), C.B.E., U.S. Legion of Merit, joined the RAF in 1930 and served in 502 with Coastal Command. Transferred to Bomber Command, then Fighter Command, he was shot down over Biggin Hill on 31 August 1940. Badly burned, he was operated on seven times by McIndoe and twice by Percy Jayes, later Head of Plastic Surgery at Barts. Gleave returned within a year to command RAF Manston in Kent, and ended World War II as Chief of Air Plans at SHAEF under Eisenhower. Gleave remained the one and only "Chief Guinea Pig"[18].

Varaztad H. Kazanjian emigrated from Turkish Armenia to Worcester, Massachusetts in 1895 at the age of sixteen. He found work in a wire mill. His dexterity with steel wire and Armenian Jesuit training gained him a scholarship to Harvard Dental School and a job at the Peter Bent Brigham Hospital. Harvey Cushing, in 1915, took Kazanjian to France with the Harvard Surgical Unit, where Kazanjian worked at Dannes-Camiers from 1915-1919. Kazanjian was superb at

Maxillofacial Orthopaedics, which he successfully performed on over 3,000 Allied wounded during World War I[21]; those requiring major plastic surgery were sent to Gillies and Ivor Magill at Sidcup[22]. Gillies tried to recruit Kazanjian to Sidcup, much to the annoyance of President A. Lawrence Lowell of Harvard who granted Kazanjian a Harvard MD in 1922[21].

On 16 August 1919, A. Lawrence Lowell had written to Kazanjian: "I was very much grieved to hear of your wife's death. I hope the child will grow to be a consolation to you, as you abundantly deserve"[23]. She did, and the second Mrs. Kazanjian and their children did likewise. This maternal death was caused by peritonitis after a caesarean section (Fig. 4).

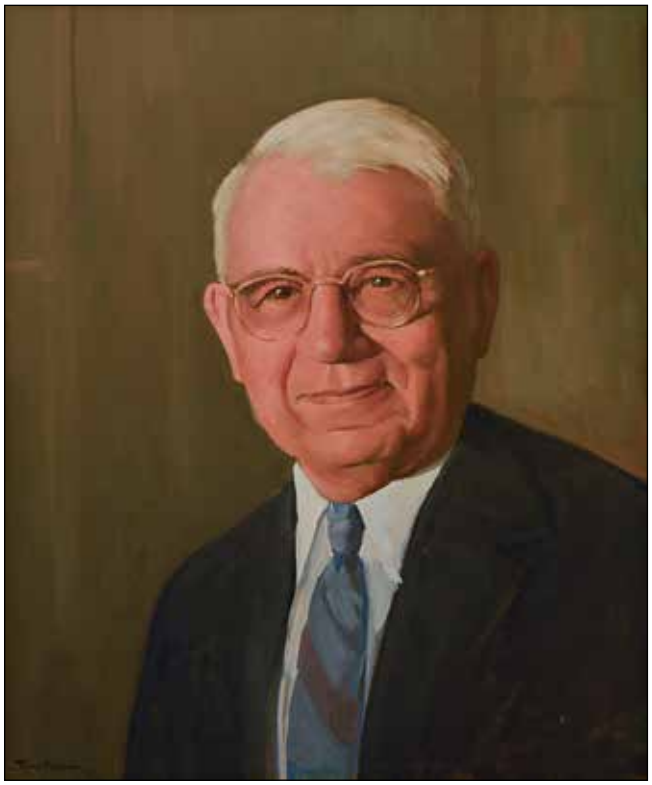

Fig 4. Professor Varaztad Hovhaness Kazanjian (1879-1974), oil on canvas by Dr. Robert Shaw Wesson (1902-1967), painted 1960-67, 61 x 51 cm (24 x 20 1/16 inches), Harvard University Portrait Collection, Gift of Mrs. Robert S. Wesson to the School of Dental Medicine, 1979; Reproduction courtesy of the Harvard School of Dental Medicine, Boston, MA and the Harvard University Art Museums, Cambridge, MA, No. H717. Photograph by Susan R. Symonds, Mainframe Photographics, Inc., Boston, MA.

AFTER WORLD WAR I

Gillies and Pomfret Kilner who were later joined by McIndoe and Rainsford Mowlem, another Kiwi, "would go anywhere"[18] to operate and treat patients with burns and maxillo-facial abnormalities. Gillies, Kilner, McIndoe and Mowlem, known as the "Big Four" conducted the only plastic surgery clinic of any size at St. George's Hospital, Tooting, with a total of 25 beds[18]. Rainsford Mowlem (1902-1986) and Archibald McIndoe were classmates in medical school at Dunedin. After two years as House Surgeon at Auckland Hospital, Mowlem became a ship's surgeon to work his way to London. In 1929 he gained his FRCS Eng[18]. Gillies recruited Mowlem as an assistant. His predecessor had died suddenly after eating too much Christmas Pudding (or so said Gillies). In 1936 Mowlem became consulting plastic surgeon to the Middlesex Hospital and Medical School and junior partner of Gillies and McIndoe. Pomfret Kilner by 1916 was in charge of orthopaedics at Number 4 Base Hospital at Dannes-Camiers. Post-war he was advised to work with Gillies, which he did for ten years.

After World War I, Kazanjian and Gillies continued to exchange letters chiefly about techniques of nerve regeneration[24]. Kazanjian visited "Giles", as Gillies was affectionately known, in London and "Giles" was royally entertained by the Harvey Cushings in Boston[25,26]. Sir Harold Gillies wrote in 1957 to Professor Kazanjian, "So I thank you dear friend for all that has happened since the day that you arrived in Wimereaux in 1915. My wife for 46 years died…this Spring. I had a very tough time, and now comes into my life in a different way my own special friend who has looked after me surgically for over 20 years, and she has decided to hitch me on to her bandwagon. We get married on November 5th. All the best to you." Signed Giles[27]. The new Lady Gillies, Marjorie Clayton, was always most popular with everyone at Barts.

It was not until 1939 and the onset of World War II that the establishment of Emergency Medical Services (EMS) burn and plastic surgical units at East Grinstead, Hill End in St. Albans, Roehampton and Rooksdown House, Basingstoke that plastic surgeons were trained in significant numbers in the UK; sixty had been trained in the U.S. following Gillies' 1920 visit[18].

WORLD WAR II AND AFTER

During World War II, Kazanjian became Harvard's first Professor of Plastic Surgery. On my* arrival at the Massachusetts General Hospital, I learned from him that his friend 'Giles' had told him of my father's rescue of the burned from the sinking of the RMS Lancastria on 17 June 1940[28,29]. Over 1400 tons of fuel oil had leaked into the sea which was partially set ablaze. The burned survivors had been sent to Gillies at Rooksdown House, formerly the private wing of the Park Prevett Hospital, Basingstoke, Hampshire[29].

During 1955-1960, the last years of their lives, Giles (Gillies) and Archie (McIndoe) gave advice to the Pink Firm of surgeons at Barts. Gillies had been awarded four Barts beds in 1936[18]. In 1958 and 1959, I was Pink Firm House Surgeon and later Chief Resident at Barts. Giles gave advice on fistulae management[30-39] and Archie on abdominal surgery for tropical disease[40-42]. My boss, Sir Clifford Naunton Morgan was Archie's sole trustee. Giles, Archie and Cliff were wonderful mentors. Patients, doctors, nurses and orderlies, were awed and generally complied with their advice.

Sergeant Des O'Connell was promoted to Flight Lieutenant

* This and other first-person references refer to the first author.

and post-war had a successful career in Air Traffic Control at Heathrow, and in 2015 remained the oldest guinea pig[43,44] (Fig.5).

Fig 5. Des O'Connell is at the extreme right as the Princess Royal in October 2013 opens four new operating rooms at Queen Victoria Hospital, East Grinstead. Bob Marchant, secretary of the Guinea Pigs Club is on the Princess Royal's left. Beribbboned Derek Martin received severe burns as he crashed into the Atlantic in 1941. After successful surgery by McIndoe, Martin recovered to fly over Hiroshima after the atomic blast[43,44]. Photograph reproduced with the permission of the *East Grinstead Courier* exclusively for this Medical History.

When I first was introduced to Professor Kazanjian in 1960, he greeted me warmly. For the next 14 years he was the noblest and most erudite influence for good at Harvard Medical School. Joe Murray, 1990 Nobel Laureate in Medicine[45] has written of Dr. Kazanjian "He was one of the kindest persons I have ever known." Always available even after he gave up [in 1964] his "private practice" for even greater good to humanity[46].

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Medical Education

Widening Participation To The Medical Course At Queens University Belfast

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ABSTRACT

The United Kingdom Clinical Aptitude Test (UKCAT) was introduced to assist in identification of applicants from all levels of society with the appropriate characteristics to become good doctors. Evidence that the UKCAT has achieved such widened participation (WP) in applicants to medical school remains elusive.

One of the limitations to WP investigation has been that data on socioeconomic status of applicants to medical schools has been obtained through voluntary submission on application to UKCAT and up to 30% of applications offered either none or only limited information. In this study of local applicants (451 from Northern Ireland) to Queens University Belfast (QUB) for 2012, socioeconomic data was ascertained through post code analysis. These data were utilized to investigate the relationship between affluence, application to the medical school and UKCAT score.

Our study has shown that for NI applicants to QUB medical school, postcode /socioeconomic back ground accounts for only 3 percent of UK CAT score variation. We have also shown that our admissions process is largely independent of socioeconomic background.

However we have demonstrated that the socioeconomic profile of applicants from Northern Ireland to QUB medical school is such that even if every applicant to QUB in 2012 were offered a place in the medical school the number of applicants from least affluent areas would increase by only 9. In conclusion efforts to achieve meaningful WP must be directed at raising aspirations for a career in Medicine within the community.

Key Words QUB Medical School application, UKCAT, Widening Participation,

INTRODUCTION

The Further and Higher Education Act 1992 was introduced to improve social mobility. However despite political pressure and sustained efforts to promote widening participation (WP) in medical schools, little has changed since the 1980's when it was noted that only 5% of medical school entrants had parents from a non-professional background[1]. In 2006 the UK CAT (Clinical Aptitude Test) was introduced with the dual aim of selecting medical students on the basis of aptitude rather than academic ability and to encourage WP. However published data from UKCAT in 2013 confirms that only 3.2% of all medical school entrants were from Social Class 5[2]. Locally in addition to utilizing UK CAT as part of the Admissions process, Queens University Belfast (QUB) has promoted WP by offering Post graduate students the opportunity to apply to the medical school.

A number of studies have investigated the lack of representation of students from lower social class and ethnic minorities at medical schools but they are limited by reliance on volunteered socioeconomic data which because of stigmatization is often limited[3,4]. In this study socioeconomic data was available for all applicants to the QUB medical school from Northern Ireland through the Northern Ireland Statistics and Research Agency (NISRA) website[5].

Currently admission to QUB medical school involves scoring of previous academic performance combined with a score for UK CAT performance following which the highest scoring applicants are offered a Multiple Mini Interview (MMI). Given QUB's intention to widen participation for local applicants from lower socioeconomic groups in Northern Ireland we hypothesised that, unlike GCSE's[6], the UK CAT score would have no relationship with Social Class. If this hypothesis was upheld then by increasing the weighting for UK CAT and reducing the weighting for academic achievement there may be the potential to increase the number of applicants from lower socioeconomic groups.

METHODS

Following Ethical Committee approval[8] details of all applicants from Northern Ireland to the QUB medical school for 2012 entry, including postcode, individual identity number, previous academic achievement and UKCAT scores were obtained. Using these data, applicants were allocated between two groups. Group 1 comprised those students who

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Table 1

MDI Quintile by Interview Status for all applicants to QUB medical school resident in Northern Ireland for 2012 (Total applicants 462)

MDI Quintile	1	2	3	4	5	Total
Group 1 Interview	129 (37%)	71 (20%)	74 (21%)	50 (14%)	22 (6%)	346
Group 2 No interview	36 (31%)	21 (18%)	34 (29%)	16 (14%)	9 (7%)	116
Total	165 (36%)	92 (20%)	108 (23%)	66 (14%)	31 (7%)	462

Note: Most quintiles are based on SOA rank such that Q1 = SOA rank 713-890, Q2 = SOA rank 535-712 and so on. In a small number of cases SOA rank was unavailable so these cases were categorised by Ward Rank such that Q1 = Ward Rank 467-582 and so on. Q1 represents the most affluent quintile and Q5 the most deprived quintile in Northern Ireland. The MDI categorisation is based on the full deprivation measure which includes issues to do with access to services and crime.

were ranked highest using academic assessment based on previous academic achievement combined with the candidates UK CAT score and were admitted to the second stage for a Multiple Mini Interview. Group 2 were applicants who scored least well in the selection process and were excluded from the process.

For both groups the Northern Ireland Statistics and Research Agency (NISRA) website[5] was used to obtain a Multiple Deprivation Index (MDI) from each applicant's postcode. These data, based on a number of markers for deprivation including income and employment, are obtained from 2010 census information and the population is ranked into 890 groups or Super Output areas (SOA), each representing approximately 2000 individuals (1=least affluent area,890 most affluent)[5]. Through interrogation of the NISRA website an MDI between 1 and 890 was determined for each applicant. The MDIs of SOA were divided into five equal groups as determined by MDI rank.

Statistical analysis considered the relationship between MDI and UK CAT score for all applicants using the chi-squared for trend test.

For interviewed applicants (Group 1) and for unsuccessful applicants (Group 2) the correlation between MDI and MMI rank was investigated using Spearman's Rank Coefficient of Correlation. Finally a Mann-Whitney test and chi-squared tests for differences in MDI rank between successful and unsuccessful candidates was carried out.

RESULTS

In total there were 951 applicants for admission to QUB medical school for 2012 entry and of these 462 were resident in Northern Ireland. The number and percentage of applicants in each MDI group is shown in Table 1. Of the 462 applicants, 346 fulfilled the cognitive criteria of previous academic achievement and UK CAT score and were permitted to progress to stage 2 (MMI) of the QUB medical school admissions process. The number and percentage of applicants in each MDI group is shown in Table 1 below. There were 116 applicants who did not achieve the QUB cognitive entry score and were excluded from the admission process.

A chi-squared for trend test was applied to the data in Table 1. This resulted in a test statistic of 1.54 and a two-sided P-value of 0.21. We therefore conclude that while there clearly is a greater propensity to apply to QUB medical school if you hail from a more affluent area, if someone does apply, the chance of being offered an interview is roughly equal across all MDI quintiles.

For 448 of the 462 applicants from NI to QUB Medical school in 2012 we determined the correlation between UKCAT categorical score (seven categories) and MDI SOA rank Spearman's rank correlation. Result: $r_s = 0.177$ ($P<0.001$) which is statistically significant but still only represents a situation where 3% of the variation in UKCAT score can be possibly attributed to social background. .

For 335 of the 346 successful applicants we correlated MDI rank with MMI score again using Spearman's rank correlation. Result: $r_s = 0.121$ ($P=0.026$) which is just statistically significant and in fact just 1.5% of the variation (estimated from adjusted R-square) in MMI score can be attributed to deprivation.

A Mann-Whitney test for differences in MDI rank between successful and unsuccessful candidates gave a P-value of 0.25 which reinforced the conclusion of no difference in MDI rank between the successful applicants and those who were unsuccessful and excluded from interview. Further analysis of MDI rank for those applicants offered MMI versus those excluded using chi-squared tests reveals a linear trend P-value of 0.21 as shown in Table 2.

Table 2

Chi-Square tests Interview vs No Interview for QUB medical school applicants resident in Northern Ireland 2012

	Value	df	Asymp.Sig
Pearson Chi-Square	3.818[a]	4	0.431
Likelihood Ratio	3.731	4	0.444
Linear by Linear Association	1.543	1	0.214
N of Valid Cases	462		

[a] 0 cells (0.0%) have expected outcomes less than 5. The minimum expected count is 7.78

DISCUSSION

Results show that the original hypothesis was largely correct. Although a P value of 0.001 is demonstrated for the relationship between MDI SAO rank and UKCAT score this must be seen in the context that only 3% of the variation in this score is attributable to socioeconomic status. As with all observational studies none of this can be assumed to be causal. There is no doubt that the schools which students from poorer backgrounds attend are less familiar with, and consequently less equipped to coach and encourage students who have an aptitude towards medicine. The socioeconomic status for applicants to QUB medical school who are resident in Northern Ireland does not appear to have a major influence on their performance in the UK CAT assessment. This information provides an independent and objective confirmation of the UKCAT Consortiums aspiration to increase diversity.

Unfortunately, despite the above finding, the study reveals that our hypothesis of increasing the loading of UKCAT score in the QUB selection process to widen participation and redress the imbalance regarding underrepresentation of more deprived students has not been effective. Even if all the applicants from Northern Ireland for 2012 entry who did not fulfill the cognitive score required for interview were offered a place in the medical school this would not change the socioeconomic bias significantly. Table 1 shows these data and though a smaller group (116) the percentage of applicants for each social class is very similar to that of the complete cohort of applicants (with a predominance of affluent MDI Bands 1 and 2 applicants (56%) and smaller percentage in the more deprived MDI Bands 4 and 5 (21%). In summary if all the 116 excluded applicants to QUB medical school from Northern Ireland in 2012 were offered admission the number of students from the most deprived MDI Band 5 in the medical school would increase by only 9.

It is reassuring to note that numbers of applicants to QUB medical school from the least affluent areas, ((MDI zones 4 and 5), whether information is derived from UKCAT application or postcode analysis as in this study, do compare favorably to national data[7]. An influential paper in 2012 noted 5.5% of applicants or 4.5% of entrants were from lower social classes[3]. The percentage of Northern Irish applicants to QUB medical school from Social Classes 4 and 5 was 11.7% using UKCAT data[7] whereas in this study, information from postcode analysis (bands 4 and 5) shows a higher figure of 21%.

The study also suggests that the QUB MMI process is largely unaffected by socioeconomic status as comparison of MDI rank with MMI score gives a P value which is only just statistically significant. As this is a relatively large sample size, MMI score is just significantly correlated to deprivation in the direction we might have anticipated but represents only 1.5% in score variation. Further analysis by Chi-square tests for MDI rank comparing applicants offered an interview with those who were excluded again gives a P value of 0.21as Table 2 demonstrates.

When the MDI from Super Output area data for the full cohort of applicants to QUB medical school (Table 1) was analysed the distribution is as expected with a significant proportion of applicants from the more affluent MDI groups1 and 2 (56%). An unexplained finding is the slight increase in applicants from band 3 (534 – 357), 23% when compared with applicants from bands 2 and 4, 20% and 14% respectively. It is not immediately obvious why these groups are slightly over represented when compared to other medical schools[7] although it is possible that the number of post graduate applicants to QUB may be influencing the data. Post graduate applicants with residency in the popular student areas of Belfast (multiple rental properties and a preponderance of lower income groups) may have increased the number of applicants with MDI in the 3-5 band range. Unfortunately the data provided from QUB did not contain date of birth details which may have been useful to identify postgraduate applicants.

It is interesting to speculate the relationship between Social Class as obtained from occupation and income analysis and MDI obtained from a range of 52 deprivation indicators, which in addition to income includes health, education, proximity to services and crime. The difference between the number of applicants in each socioeconomic group between the data obtained from UKCAT sources and the data obtained in this study using post code analysis is informative at both local and national levels. Socioeconomic information submitted is voluntary and published studies[3,4] have documented a similar percentage of applications with missing or incomplete data (approximately 30%). Intuitively applicants from lower socioeconomic groups may be reluctant to provide socioeconomic information. In this study because the socioeconomic detail is obtained through the NISRA website and is derived from post code all the information is available for every applicant.

Finally, in terms of our hypothesis to widen participation and particularly increase the number of medical students at QUB from lower socioeconomic groups in Northern Ireland. It is possible that an initial, raising aspirations program directed at secondary schools with few applicants to medical school may be effective. If subsequently combined with an increase in weighting for UK CAT, given its relatively weak association with socio-economic deprivation and accompanied by a reduction in emphasis on GCSE's, where better results are associated with affluence[6], then QUB may be more successful in improving WP at the medical school.

ACKNOWLEDGEMENTS

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Letters

PRE-OPERATIVE CARBAMAZEPINE-INDUCED HYPONATRAEMIA: SHOULD WE ACCEPT A RESET HYPO-OSMOLAR BASELINE AND PROCEED WITH SURGERY?

Editor,

Hyponatraemia is an increasingly ubiquitous abnormality that whilst often reversible, is becoming a recognised pre-operative prognostic indicator. A known caveat of subclinical disease, hyponatraemia has been associated with perioperative coronary events, pneumonias and prolonged in-hospital stays, but has not yet been proven to be a causal determinant of mortality[1].

We present a 31-year-old Caucasian woman with community-acquired hyponatraemia, whose elective thymectomy for myasthenia gravis has been deferred in light of the perceived hazards of serum sodium less than 130mmol/L.

Further analysis revealed an inability to dilute urine (Ur-Osmolality 561mOsm/kg) despite a serum hypo-osmolality (Sr-Osmolality 265mOsm/kg) and high urine sodium content (160mmol/L), classically in keeping with the syndrome of inappropriate secretion of anti-diuretic hormone.

Physical examination was unremarkable, and the patient was clinically euvolaemic and asymptomatic throughout. She did however have a complex medical background that included a trans-osseous cerebral arterio-venous-malformation, epilepsy, gastro-oesophageal reflux and depression, as well as myasthenia gravis.

Four Endocrinologists independently concluded on a diagnosis of drug-induced chronic hyponatraemia. Contributory medications included: Carbamazepine (Tegretol-PR 400mg BD), Omeprazole and Fluoxetine; and being seizure-free for many years, there was strong reluctance to stop Tegretol but Omeprazole and Fluoxetine were stopped. In-spite of this and diligent fluid restriction, her serum sodium remained static between 122-128mmol/L.

At this point Demeclocycline (300mg BD) was tried, but was futile and served only to exacerbate symptoms of her myasthenia, a recognised side effect of Demeclocycline. Treatment was escalated to Tolvaptan (15mg twice-weekly). Although it had marginal impact on zenith sodium (129mmol/L) she noted excessive thirstiness and nausea as side effects. Tolvaptan was nonetheless persevered with.

Biochemistry results and treatment timeline are listed in Table 1.

The chronicity and refractory nature of her hyponatraemia led to the consensus of a reset hypothalamic osmostat to a lowered hypo-osmolar threshold, a recognised phenomenon, most likely due to prolonged use of Tegretol, and to ever achieve pre-operative serum sodium close to 135mmol/L would require significant volume losses.

Table 1.

Biochemistry Results and Treatment Timeline.

	2014	2015		2016
	9-Dec	9-Nov	15-Apr	4-Jul
	*	**	***	
Sr Na	131	127	122	129
Sr Osmo	275	265		
Ur Na	188	160		
Ur Osmo	601	561		

*May 2015 Fluoxetine/Omeprazole Stopped
**Mar 2015 Demeclocycline Commenced
***Apr 2016 Tolvaptan Commenced

Carbamazepine was initially thought to only potentiate anti-diuretic hormone (vasopressin) secretion from the posterior pituitary, but it has been shown to increase the sensitivity of the renal tubule to vasopressin as well, suggesting a duality in cause-effect[2]. To this effect, Carbamazepine has been used to treat polyuric patients with cranial diabetes insipidus specifically for its anti-diuretic properties[3].

However, a study by De Bragança et al revealed that Carbamazepine could itself exert an effect on the nephron, independent of vasopressin. Carbamazepine was found to directly stimulate the V2-vasopressin receptor and thus increase aquaporin-2 expression on the membrane of the collecting-ducts, allowing increased osmotic permeability and water absorption leading to a dilutional hyponatraemia[4].

Furthermore, they realised Carbamazepine could partially recover aquaporin-2 expression in Lithium-induced nephrogenic diabetes insipidus[4] (NDI), suggesting a possible novel treatment modality for Carbamazepine in NDI.

Thymectomy can potentially benefit this patient. Whilst unable to forego Carbamazepine, her consequent hyponatraemia, and gradual resetting to a hypo-osmolar state, has become her baseline. Her hyponatraemia will necessitate closer perioperative surveillance, but acknowledging the mechanism for her hypo-osmolar reset should provide the confidence to proceed with surgery.

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HOW CONFIDENT AND PREPARED ARE CORE MEDICAL TRAINEES IN THE UK TO PROCEED TO THE REGISTRAR LEVEL: THE TRAINEES' PERSPECTIVES.

Editor,

The journey through medical training is full of significant transitions and changes in the responsibilities and seniority levels of trainees[1]. Many articles examine the early transition from a medical student to a newly qualified doctor[2]. Nonetheless, few studies were designed to investigate the impact of on-going transitions following the completion of the first year as a postgraduate doctor and transitions at higher levels of training. We aimed to explore the extent to which core medical trainees in their second (final) year (CMT2) feel prepared and confident about starting their higher medical training.

METHODS

In 2013, a pretested questionnaire was sent to all CMT2 in the sector covered by University College London (UCL) partners. The total number of eligible trainees was 88. Thematic analysis was applied to qualitative data.

RESULTS

The survey was completed by 53 trainees (60.2%). While the vast majority of the CMT2s (88.7%) completed the Membership of the Royal College of Physicians (MRCP) exam, 25 (28%) revealed that they had insufficient confidence to become registrars. This confirms the previously reported finding that a positive relationship between competence and self-perceived confidence is often absent[3].

The trainees expressed concerns across a wide range of clinical and non-clinical domains. It appeared, however, that practical procedures constituted the major area of lack of confidence, followed by managing cardiac arrest calls, running outpatient clinics and responding to referrals from other specialties. The trainees primarily blamed the low volume of exposure to these activities during the training programme. This resembles the association of the lack of confidence with 'low volume/high impact' clinical activities described by Kneeborn[4].

The majority agreed that their job was more of a 'service provision', as opposed to being a training one reflecting that the CMT2s are rather distracted by jobs which are less suited for them. The lack of flexibility of placements and inadequate exposure to certain specialties was considered by many trainees as another important reason behind their insufficient confidence.

TABLE 1:

The different suggestions proposed by the core medical trainees to improve their overall confidence.

Suggestion Themes
A period of 'acting up' as a Medical Registrar:
○ Opportunities to shadow registrars.
○ Encouragement to step up to fill registrar on-call shifts towards the end of CMT once full MRCP is obtained.
More opportunities to achieve confidence in specific areas:
○ More free courses aimed at practical skills.
○ Fixed Leave/time out of work to improve confidence in certain skills.
○ Protected, allocated and compulsory clinic time across all rotations.
Improving and reforming CMT teaching:
○ Incorporating simulation training.
○ More practical teaching in protected teaching sessions.
Service and placement rearrangement:
○ Incorporating specific mandatory placements into the CMT programme that would allow building up confidence in generic skills (ITU, Acute Medicine, Renal).
○ CMT2s to have more junior doctors doing the basic ward jobs.
Others
○ Regular consultant and registrar feedback during the medical take.
○ CMT2s to be recognized as preparing to become registrars and not as junior doctors.
○ More clear definition of roles on the ward (CMT trainees versus Foundation doctors).

The recommendations made by the CMT2s are summarised in **Table 1**. The primary suggestion was a period of shadowing or 'acting up' as medical registrars and greater opportunity to take referrals during the acute take. This suggestion remains plausible particularly as the concept of shadowing of near peers has been successfully used at lower-level transitions (such as students shadowing foundation doctors) and was proved to enhance preparedness levels[5]. Alternatively, the trainees felt that simulation teaching could be a good compromise. In addition, the trainees expected to have more opportunities to improve their confidence in specific areas by taking 'time out' through fixed leave or allocated slots. Others suggested full rearrangement of the service and the CMT rotations by having more juniors (foundation doctors) to which tasks could be delegated. They believed that this should be combined with clearly defined roles of the CMT2s, as well as separation from the roles of foundation doctors and GP trainees, who are less committed to medicine. Although a few CMT2s indicated that they would be more satisfied with an extension of the CMT, this was challenged by the majority of the trainees.

CONCLUSION

This survey highlighted a number of areas of insufficient confidence and generated relevant solutions. However, further in-depth studies are required to explore the methods of implementing these recommendations.

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A PILOT OF THE USE OF VOICE RECOGNITION SOFTWARE IN AN ENDOCRINE OUTPATIENT CLINIC

Editor,

Voice recognition software (VRS) has increasingly been utilised to document clinical care, typically within an electronic health care record and often with the use of 'templates'. This software has been purported to enhance doctor efficiency, reduce costs and improve patient care[1]. The aim of the current pilot was the mandatory adoption of VRS embedded into electronic clinical documentation within a new patient endocrine clinic.

METHODS

Dragon Medical Practice Edition 2 speech recognition software manufactured by Nuance was installed onto a single office computer; a run in period of two months was required to optimize user dictation. Prior to clinic attendance, each patient had a voice activated clinic template note constructed online within Patient Center. The online medical note was then re-opened and typed in real time during the patient consultation. Once constructed, the outpatient note was reviewed, formatted (by typing and/or VRS) then authorised with an electronic signature.

RESULTS

Data from 24 consecutive medical notes were collected before and after the implementation of VRS. The use of VRS resulted in all of the outpatient medical notes transferring to an electronic/online version. The setup time for VRS was one minute per clinic letter, the existing process did not require any set up time. The total time allocation per clinic visit was similar (n=25 minutes) per patient for both processes (included obtaining a history, examination, medical note documentation and discussion with the patient). VRS improved the number of clinic letters appearing on NIECR on the day of clinic attendance (24 v 2, p=0.01) in comparison to the existing process. There was an improved mean turnaround time with VRS from day of clinic to the completion of clinic letter (7 v 25 days, p=0.01) appearing on NIECR in comparison to the existing process. Total clinician online medical note typing time was 7 minutes per patient in comparison to the existing process which did not require any time for clinician typing. The mean dictation time for the existing process per clinic letter was 1.5 minutes in comparison to 3 minutes using VRS. One new patient clinic (n=6 patients) resulted in savings in secretarial transcription time on average 30 minutes per clinic session.

DISCUSSION

Current upgraded versions of VRS have allowed the transcription of speech into written text with speed and accuracy[2]. The use of VRS enabled the process of construction of the electronic outpatient clinical note into a single step and resulted in 'same day letters', improved turnaround time and subsequent accessibility of clinic letters. The online letters could be accessed remotely and out of typical working hours if required. Advantages of the use of VRS include reducing errors in dictation and in illegible handwritten notes. Disadvantages commonly encountered are lack of accuracy and misinterpretation. The use of the software can be time consuming initially and prone to errors with background noise[3]. VRS has the potential for additional roll out in other outpatient settings and in streamlining and easing the burden of the written outpatient clinic note.

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'THE USE OF THYROID ULTRASOUND BY NON-RADIOLOGISTS FOR THE ASSESSMENT OF THYROID NODULES'

Editor,

INTRODUCTION

In the UK and Ireland, the use of thyroid ultrasound (US) for the assessment of thyroid dysfunction, thyroid nodules and follow up of thyroid cancers is typically performed by a radiologist or a trained sonographer. The majority of thyroid nodules will be benign, however significant resources can be utilized in the investigation of thyroid nodules, often with unnecessary surgical treatment, this has implications for cost. In 2014, the BTA (British Thyroid Association) introduced the ultrasound 'U' classification to rationalize the use of thyroid ultrasound in the assessment of thyroid nodules. They suggested standards for reporting, and indications for FNA (fine needle aspiration) based on a US scoring system U1-5, as well as appropriate follow up based on these US findings[1]. More recently in some centres, trained endocrinologists are increasingly performing routine diagnostic ultrasonography in the management of thyroid disease, often in the context of 'one stop' thyroid nodules clinics.

ACCREDITATION

In the UK, obtaining accreditation for endocrinologists is through the BTA and the RCR (Royal College of Radiologists), through participation in a curriculum for training in neck ultrasound. Support is also provided from the Society for Endocrinology and approved by the Royal College of Physicians. The training program is recommended for specialty registrars and endocrinologists who manage thyroid disease and thyroid cancer. Participants complete a mandatory one day course in London (fees: £300 for consultants, £250 for trainees/registrars), which comprises of lectures on the theory, principles and practice of ultrasound with a practical 'hands on' workshops on how to perform thyroid ultrasound and FNA. For Level 1 certification, applicants should complete a log of 50 scans and a minimum of 200 cases with supervision from a consultant radiologist competent in thyroid US. For level 2 certification at least one scanning session per week is required, with an additional 120-200 cases over a further 6 months. A level 3 practitioner can mentor and supervise level 1 and 2, conduct research and teach thyroid ultrasound at all levels.

POSITIVES AND NEGATIVES

Purchasing an ultrasound machine can be expensive and demonstration of cost effectiveness is often required to confirm overall value. The process of obtaining certification can be time consuming and would only be recommended if there is a reasonable volume of thyroid cases reviewed on a yearly basis. Finding a supervising radiologist to assist with certification is another consideration, as is the perceived 'removal of business' from radiology colleagues. The use of thyroid ultrasound is relatively inexpensive, non-invasive and accurate in describing thyroid morphology and is a useful adjunct to the clinical exam[2]. In addition, its use by endocrinologists can expedite diagnoses and ease the burden of imaging on radiology colleagues.

SUMMARY

Obtaining certification in the use of thyroid ultrasound can be timely and expensive for endocrinologists. There is a clear pathway in the UK as to how this can be achieved. Once established, thyroid ultrasound embedded within a thyroid clinic has the potential to improve and streamline the investigation and management of thyroid nodules.

Key words: endocrinologists, thyroid ultrasound, accreditation, thyroid nodules

The authors have no conflict of interest

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ERRATUM:

The editor has been informed that there is an error in the following paper:

Outcome of primary rhegmatogenous retinal detachment surgery in a tertiary referral centre in Northern Ireland — A regional study. Ulster Med J 2017;86(1):15-19.

The third author's name should be corrected to Giuseppe Casalino

We apologise for any inconvenience caused.

Ulster Med J 2017;**86(2):**127-133

Abstracts

Annual Trainee Doctors' Prize Evening, Thursday 5th November 2015.

Centre for Experimental Medicine, Queens University Belfast.

ORAL PRESENTATIONS

Investigating Dermal Scaffold-Stem Cell Constructs in Wound Healing

Sandra E McAllister, James Bojdo, Christina O'Neill, Jasenka Guduric-Fuchs, Reinhold Medina, Alan W Stitt

Introduction: Chronic wounds affect around 200 000 people in the UK, costing around £3 billion annually. Wound healing problems are associated with hypoxia of the wound microenvironment. Promoting angiogenesis with autologous cell-based treatments requires both the correct cell and the optimal application method.

Aims: This study has been designed to investigate the use of commercially-available dermal scaffolds in delivering stem cell therapy to wounds.

Methods: Endothelial colony forming cells (ECFCs) were isolated from adult human peripheral blood, and cultured on one of three scaffolds in vitro (Matriderm®, Glyaderm®, Optimaix). The capacity of the cells to form three-dimensional microtubular constructs in scaffolds was determined. Scaffold-cell constructs were implanted into full thickness wounds on the dorsum of athymic nude mice. Wound blood flow was measured using laser Doppler imaging. Wound size was calculated from serial photographs.

Results: ECFCs formed more numerous and more stable microtubular constructs in Matriderm® than in other scaffolds. Preliminary results show that wounds with implanted ECFC-Matriderm® constructs had significantly higher blood flow both 2 and 4 days after wounding than wounds treated with Matriderm® alone.

Discussion: Wound healing problems cause substantial morbidity and considerable costs. Characterising cell delivery methods is essential to translate research into clinical use

The role of cyclooxygenase 2 expression in stage II and stage III colon cancer survival

RT Gray, MM Cantwell, HG Coleman, MB Loughrey, P Bankhead, S McQuaid, RF O'Neill, K Arthur, CR Cardwell, BT Johnston, J James, P Hamilton, M Salto-Tellez, LJ Murray

Introduction: The association between overexpression of cyclooxgenase 2 (COX-2) and survival in colorectal cancer remains incompletely investigated.

Aims: To investigate the role of COX-2 expression and survival in a population-based cohort of patients with stage II and III colon cancer.

Methods: Immunohistochemical expression of COX-2 (positive versus negative) was assessed in 663 stage II and III colon cancer patients. Five-year follow-up data were obtained through the Northern Ireland Cancer Registry. Cox proportional hazards models were used to calculate hazard ratios (HR) and 95% confidence intervals (CI) for colon cancer-specific survival (CSS).

Results: Medication history was available for n=607 (91.6%) patients and aspirin use within this subgroup was n=130 (21.4%). COX-2 positive cancers (p=0.01) were slightly older but stage distribution and aspirin use were similar between the COX-2 groups. COX-2 expression and aspirin use were not associated with improved CSS after adjusting for age, gender and stage. CSS was improved amongst aspirin users with COX-2 positive tumours (HR 0.52, CI 0.29-0.99) but this finding was no longer statistically significant when adjuvant chemotherapy and co-morbidities were considered (HR 0.67, CI 0.28-1.63).

Discussion: COX-2 expression does not appear to have prognostic or predictive potential within this population-based cohort of colon cancer.

Cognitive Rehabilitation in MS. Evidence for Neuroplasticity. A fMRI study.

Jamie Campbell, Dawn Langdon, Waqar Rashid, Mara Cercignani

Introduction: Cognitive impairment is known to affect between 40-60% of individuals with multiple sclerosis (MS). The effectiveness of cognitive rehabilitation in MS is uncertain.

Aims: To explore the feasibility and efficacy of computerised, home-based cognitive rehabilitation in patients with MS using advanced structural and functional MRI techniques.

Methods: 38 patients with MS and evidence of cognitive impairment on the Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS) were enrolled in the study. Patients were randomly assigned to undergo 45-minutes of computerised cognitive rehabilitation (n= 19) three times weekly for six weeks or to a control condition (n = 19). All patients underwent MRI at baseline (time 1) and post-intervention (time 2). Changes in cortical activations were explored using a visual n-back fMRI paradigm.

Results: The n-back task was associated with robust cortical activations in known working memory networks. At time 2 the treatment group exhibited a significantly increased activation in the bilateral prefrontal cortex and right temporo-parietal regions relative to control group at time 2 ($p<0.05$ FWEcorr).

Discussion: This study supports the hypothesis that computerised cognitive rehabilitation may be an effective approach to improving cognitive performance in patients with MS. The alterations in cortical activation are likely to represent more efficient neural processing.

Surgical operation note quality

Serena Martin, Scott McCain, Ian McAllister, Stephen Kirk

Introduction: Royal College of Surgeons (RCS) Good Surgical Practice guidelines provide eighteen key parameters which should be documented on a surgical operation note to allow for quality patient care and effective handover. Poor documentation of these parameters and poor legibility of note keeping both have the potential to impact on patient safety.

Aims: To audit the quality of 50 surgical operation notes for General Surgery and Urology in the Ulster Hospital Dundonald.

Methods: Operation note quality for 50 consecutive patients was audited. Operation notes were assessed in comparison with the RCS criteria. Legibility was assessed by both a doctor and a lay person using the Adjusted Note Keeping and Legibility Score.

Results: No patient had all parameters recorded. Time of operation and CEPOD status was not recorded for any patient. Only seven (39%) parameters were met for all patients. Seven (14%) operation notes were classed "illegible" by a lay person.

Discussion: Current operation notes do not comply with RCS guidelines. An electronic operation note, potentially accessible through NIECR would facilitate direct patient care by automatically recording many parameters and provide legible, easily accessible operation notes.

As easy as ABC - a discharge checklist for oesophagogastric surgical patients

A McIlroy, R Robinson, P Black

Introduction: Working on a busy ward for oesophagogastric surgery involves a large multidisciplinary approach to discharge. Many aspects need to be covered such as dietary care, wound care, analgesia and medication. The aim of our audit was to improve adherence to the following national guidelines: NICE recommend 28 days post op enoxaparin for major abdominal surgery, and British guidelines for haematology recommend 3 monthly hydroxocobalamin post gastrectomy but not oesophagectomy.

Aims: The initial audit was a review of 34 discharge letters between January and June 2015 which showed a large variation in discharge prescriptions, particularly at weekends.

Methods: A checklist with an ABC style approach to include MDT aspects of discharge was implemented. A reaudit for 16 patients between July and October was completed.

Results: Following checklist implementation, hydroxocobalamin and enoxaparin prescription increased from 68% to 82%. 7% of oesophagectomy patients inappropriately received hydroxocobalamin on discharge which reduced to 0% on reaudit. There was no change in the prescription of enoxaparin in oesophagectomy patients.

Discussion: Since the introduction of the checklist, adherence with national guidelines has improved. We plan further ward staff education and reaudit.

POSTER PRESENTATIONS

CLINICAL RESEARCH

Patient outcomes after urgent laparotomy – A retrospective cohort study in a district general hospital

Christopher Brown

Introduction: Non-elective laparotomy is commonly performed in the UK. Unfortunately, there is limited evidence on patient outcomes. Evidence is lacking on the impact of timing of laparotomy and the use of pre-operative computerised tomography (CT) scanning on outcomes.

Aims: To investigate the impact of pre-operative CT scan, time and day of laparotomy on mortality rate and length of hospital stay (LOS) following urgent laparotomy.

Methods: Data was collected retrospectively for consecutive adult patients who underwent a midline laparotomy within 24 hours of admission to Causeway Hospital between 1st January 2012 – 31st December 2013. Statistical analysis was performed.

Results: 78 patients were included. 11 patients died in-hospital (14.1%) and 18 patients died within 12-months of laparotomy (23.1%). The timing of laparotomy, along with pre-operative CT scanning, did not demonstrate any statistically significant impact on survival or LOS.

Discussion: Urgent laparotomy has a significant in-hospital mortality rate. Analysis demonstrated no statistically significant difference in mortality or LOS when analysed against timing of laparotomy and performance of pre-operative CT scan. Findings may apply to similar sized hospitals within the UK.

Diagnostic rates in thyroid lobectomy

David Dick

Introduction: British Society of Thyroid guidelines on thyroid cancer continue to recommend using the Thy1-5 classification for the reporting of fine needle aspirates taken from suspicious thyroid lesions. Of interest to us is the somewhat grey area of Thy3, which includes 3a (indeterminate, suspicious) and 3f (possible follicular). How good is our diagnostic cytology service in helping us decide whom to operate on?

Aims: To find our local diagnostic rate for samples reported as Thy3 on cytology, after proceeding to hemithyroidectomy.

Methods: We reviewed pre and post op pathology results over a period of on calendar year, and then compiled the data to find our diagnostic rates.

Results: 247 needle or core biopsies, strong female preponderance, mean age of 53. 31 cases of Thy 3a, 13% diagnostic. 37 cases of Thy 3f, 22% diagnostic rate.

Discussion: This data compares well with internationally published data regarding the acceptable variation in thy3 diagnosis and outcomes. It has allowed us to better inform our patients and improved pre-operative counselling. It has also formed a base for further audit into the U classification mandated for radiological ultrasound reporting.

CASE REPORTS/SERIES

Transanal Endoscopic Microsurgery – Changing the Management of Early Rectal Cancer

Robert Spence

Introduction: While the management of rectal cancer has become increasingly multimodal, surgical excision in the form of anterior resection or abdomino-perineal resection remains the mainstay of treatment. Transanal endoscopic microsurgery (TEM) increases the options available to the colorectal surgeon for early rectal cancer and endoscopically unresectable polyps, which can be used as an alternative to radical abdominal surgery, or challenging transanal excision.

Aims: To evaluate the outcome of all TEM procedures performed in a district general hospital over the past 4 years.

Methods: Data were obtained from reviewing patient notes, operation records, and PACS Radiology system.

Results: 21 patients (Male 11: Female 10) with a mean age of 67.9 years underwent TEM. Initial biopsy results: 17 patients with low-grade tubulovillous adenoma (TVA), 1 patient with high-grade TVA, and 3 with adenocarcinoma. All 21 procedures were completed as TEM, with a mean inpatient stay of 2.1 days. Post-operative pathology showed clear margins in 18 patients. Only 2 patients suffered complications - secondary haemorrhage; perforated rectum, repaired laparoscopically. At mean follow-up of 26 months, there have been two recurrences, with one mortality secondary to co-morbidities.

Discussion: TEM is a proven alternative to radical abdominal surgery with comparable results with traditional abdominal surgery.

Buschke- Löwenstein tumour - an alternative management approach.

Aidan Bannon

Case Study: We describe the case of a 47 year-old male who presented with bleeding and discharge from a long-standing large, malodorous warty lesion in his natal cleft. Histopathology confirmed Giant Condylomata Accuminatum (GCA) with mild-to-moderate dysplasia and widespread koilocytosis. He was later readmitted for wide local excision of the lesion which was 105x85x25mm in size. His wound was successfully managed with Topical Negative Pressure Wound Therapy (TNPWT) and he was discharged day 3 postoperatively.

Discussion: GCA, also referred to as a Buschke-Löwenstein tumour is a locally aggressive verrucous growth of the ano-genital mucosa. Incidence is less than 0.1% and tumour pathogenesis is strongly associated with HPV-infection. Due to significant risks of recurrence and malignant transformation surgical excision is recommended. Options include wide local excision with mesh skin-grafts or flaps and abdominoperineal resection is reserved for those with pelvic involvement. Due to complications such as poor wound healing from faecal contamination, abscess and perianal fistulae formation, a temporary loop colostomy is a more common surgical approach. This is the first reported case to use TNPWT post excision, which allowed for reduced inpatient stay, quicker recovery and less impact on patient quality of life.

Outcomes Following Appendicectomy: A single centre cohort review

Brendan Skelly

Introduction: Identification of variation in practice is a key step towards standardisation and determination of reliable quality markers. Following similar national studies, this study aimed to investigate the outcomes following emergency appendicectomy, paying attention to key rates of morbidity.

Aims & Methods: Single centre trainee led retrospective cohort study performed (2014). Primary outcome of interest was the normal pathology rate. Secondary outcomes were laparoscopy and 30-day adverse events.

Results: N=195. Age range (yrs): 32% (<16), 61% (16-50), 7% (>50). 54% M:F 46% ASA I-II: 96% ASA III-IV: 3%; Pre-Op Imaging: 49% None/AXR, 11% USS, 18% CT, 23% Missing; Operative Type: 78% Open, 19% Laparoscopic, 3% Lap-to-Open; Operating Surgeon Grade: 6% Consultant, 93% StR/Middle Grade, 1% SHO; Duration of Surgery: 55% <60mins, 45% >60mins; Histology: 16% Normal, 57% Simple Appendicitis, 20% Complicated Appendicitis, 7% Malignancy/Other; 30 Day Adverse Events: 0% Requiring Surgery/ Radiology Intervention, 4% Wound Infection, 2% Pelvic Abscess, 11% Post-Op Imaging, 0.5% Composite

Conclusions: National studies reveal a wide variation of practice and outcomes when performing appendicectomy for acute appendicitis. Our data suggests much better than average overall outcomes compared with landmark recent national studies. 'Normal' appendicectomy rate is acceptably low (16%), allied to 30-day adverse event rates. Deterioration of surgical training is a concern however, with only 1% of cases being performed by the SHO grade and 19% laparoscopic surgery rate, suggesting a lack of trainee confidence when performing laparoscopy unsupervised.

Managing Acute Diverticulitis: A single centre ten year review

Brendan Skelly

Introduction: Acute Diverticulitis is one of the most common entities which presents to the general surgeon. Flexible Endoscopy, CT Colonography and Barium Enema are the common diagnostic modalities.

Aims: 1. Evaluate change in the age or BMI of those presenting with acute diverticulitis in the last decade; 2. Establish if there has been a change in diagnosis and management; 3. Assess waiting times for definitive colonic assessment

Methods: Single centre retrospective cohort study: patients hospitalised with acute diverticulitis in years 2004 (n=24) and 2014 (n=30).

Results: Mean age 58.1 (2004) versus 52.7 (2014) (p=0.22). Mean BMI 31.5 (2004) versus 31.9 (2014)

(p=0.87); Diagnostic CT 29.4% (2004), 90% (2014); 2004: 23.5% had surgery, 50% pre-operative CT; 2014: 16.7% had surgery, 90% pre-operative CT; 2014: Significantly increased interval between discharge and definitive colonic assessment

Average wait for barium enema 42.4 days (2004) versus 80 days for endoscopy/CT Colonoscopy (2014) (p=0.05)

Conclusions: No significant change in demographics or BMI. Increased utilisation of diagnostic CT with subsequent reduction in surgery. Generational paradigm shift with modality of colonic assessment. By 2014 patients waiting significantly longer for assessment, majority >6 weeks for definitive diagnosis

QUALITY IMPROVEMENT

Management of Acute Gallstone Pancreatitis - A Multi-Centre Study

Robert Spence

Introduction: British Society of Gastroenterology (BSG) set standards for the management of acute gallstone pancreatitis; in particular, time until definitive treatment (2-weeks from index admission).

Aims: To evaluate the management of acute pancreatitis against BSG guidelines, focusing on delays to definitive management, in 3 district general hospitals.

Methods: Data were obtained retrospectively for consecutive patients over 1-year period in each hospital between 2012-2015, and evaluated against BSG guidelines.

Results: 113 patients in total were admitted with gallstone pancreatitis (mean age 56 years). Mortality was 4.9%; mean length of stay - 7.9 days. Mean wait for ultrasound: 1.4 days; MRCP as inpatient: 3.3 days, as outpatient: 22.5 days. Intervention included ERCP (mean inpatient wait: 4.1 days, as outpatient: 47.7 days) and cholecystectomy (60 patients, mean wait 77.3 days). There were 13 re-admissions of patients awaiting cholecystectomy. Compliance with BSG guidelines were 8%, 24%, and 75% respectively within the three centres.

Discussion: Delay for definitive management was partly attributable to imaging, especially as outpatient. Patients should be investigated as an inpatient to ensure guideline compliance with the 2-week rule. There was variability between the centres, concluding that these patients should have surgery during their index admission.

Eye and Hand Fatigue in Minimal Invasive Surgery; 2D VS. 3D: Randomised Control Trial.

Adham Youssef

Aims: The available data reports the efficacy of the three-dimensional (3D) vision system and its superiority over two-dimensional (2D). However the physiological effects of 3D on surgeons remain unaddressed. To address such gap in literature; we aimed to objectively investigate the effects of 3D on ocular and hand muscles fatigue in comparison to 2D and its impact on surgical performance in novices.

Methods: We conducted a stratified randomised comparative study with cross-over of 26 novices. Eye fatigue was assessed using Visual Stress Test (VST), Visual Acuity (VA) and post-study display questionnaire. Hand fatigue was assessed using grip dynamometer. Surgical performance was evaluated using a validated curriculum with proficiency criteria Fundamentals of Laparoscopic Surgery curriculum (FLS).

Results: The VST showed a higher mean score in the 3D group of 3.92 in comparison to the 2D group with mean of 3.15, (P-value = 0.23). It is apparent from VA test that the 3D group had a better VA on both eyes compared to the 2D group after performing the suturing task (right eye; P-value=0.29, left eye P-value=0.47). There was no statistical difference in handgrip strength between both display groups (right hand; P-value=0.55, left hand P- value=0.70). The 3D group demonstrated statistically evident superior performance in terms of less slippage errors (P-value=0.003) and gap errors (P-value=0.015), number of repetitions and accuracy were similar in both groups (P-value = 0.81 and P-value = 0.20 respectively).

Conclusion: 3D offers superior visual feedback that positively reflects on the VA and accuracy without any evident substantial physiological impact on the operating surgeon, which in turn favourably impact training and patient safety.

Popular medical and health apps targeting patients, and the general public in the UK: Do they conform to basic standards of information portrayal?

Ali Ben-Mussa

Introduction: Smartphones today with their rising popularity and versatile apps have great potential for revolutionising healthcare services. However, this was soon overshadowed by worrying studies over the quality of publically available medical and health apps. These were subject and/or discipline specific, and mostly evaluated partial compliance with information portrayal standards.

Aims: This study aimed to take a broader approach by assessing the most popular medical and health apps in the UK for full compliance with information portrayal standards.

Methods: The top 50 free and paid apps of the “medical” category on both iTunes and Google App stores were evaluated for evidence of compliance with an app-adapted version of the “Health On the Net” foundation principles.

Results: The sample included 64 apps, 34/64 (53%) were on Google Play and 36/64 (56%) were free. None managed to comply with the entire eight principles.

Discussion: Improving the current situation requires raising public awareness, providing tools that would assist in quality evaluation, encouraging developers to use a robust development process, and facilitating collaboration and engagement among the stakeholders

Development of a Rapid Tranquillisation Treatment Algorithm for older adults

Graeme Young

Introduction: Variation in PRN and RT prescribing practices observed in a Dementia Ward, especially with the 58% of patients admitted “out-of-hours”. At time of observation, there was no specific treatment algorithm to inform prescribing practice.

Aims: To establish standardised PRN and RT prescribing practice in older adult psychiatric inpatients through the development of a Treatment Algorithm for RT in Older Adults following audit of current practice.

Methods: Admission procedures were audited, to collate and analyse what, and how, medications were prescribed in accordance with standard criteria. Literature search was conducted. Subsequently, a new Treatment Algorithm was developed in collaboration with Consultants in Old Age Psychiatry.

Results: 27% of RT/PRN medications prescribed at admission were changed at the Consultant-led first ward-round as they were considered inappropriate, found to be more prevalent in patients admitted out of hours. Literature search identified deficiencies in the evidence base for RT.

Discussion: Hypothesised variability in prescribing practices was confirmed, likely perpetuated by a lack of consensus on RT prescribing in the literature. Guidance is necessary to standardise practice and ensure patient safety, and a Treatment Algorithm has been developed to meet this need.

Audit of Low Intensity Pulse Ultrasound – A retrospective study for its effects on fracture heading at RVH

Sharib Ziya Khan

Introduction: Fractures carry an incidence of 5-10% for non union. Low intensity Pulse ultrasound therapy (LIPUS) can accelerate fracture healing and gives clinical benefit in cases such as delayed or non-unions.

Aim: The objective of this study is to evaluate the efficacy of LIPUS at RVH trauma unit.

Methods: Data was collected retrospectively for 45 patients who underwent LIPUS therapy prescribed via RVH trauma team with regards to time scale from date of injury to diagnosis of delayed/ non-union to final outcome with demographic parameters and smoking status.

Results: Of the 45 patients, 28 (62%) progressed to radiological evidence of union as compared to 8 (18%) with documented non-union despite therapy. The majority (60%) were diagnosed and considered for LIPUS during the 3-6 month period with 72% progressing to radiological union within 3-6 months following the introduction of LIPUS. There was an equal gender distribution with 51% male and 49% female patients with 38% of patients identified as smokers.

Conclusion: LIPUS is clinically effective as a safe and a cost effective non-invasive adjunct to consider for delayed/ non-unions in fractures.

Autism Medical Clinics- a new approach

Julie-Ann Collins

Introduction: NICE guidelines recommend that an Autism assessment includes a medical assessment. In the Belfast Trust children assessed by the Autism Assessment and Intervention Team are not necessarily reviewed by a Paediatrician. Significant non-attendance rates at these Paediatrician led clinics in recent years highlighted the need to review this service.

Aims: The aim of this project was to provide an efficient "New" Autism Medical Clinic service which best serves the children with Autism in the Belfast Trust and is compliant with NICE guidance.

Methods: We implemented a partial booking process and created Trust approved age appropriate "Going to see the Doctor" leaflets (11yrs or >11yrs) which were enclosed with the appointment letter. Four Autism Medical clinics were conducted between June and July 2015.

Results: 28 appointments were allocated. The Did Not Attend (DNA) rate almost halved (44% less) compared with figures in 2013 and 2014. Feedback to date has been generally positive regarding the booking process, the waiting times and the staff encountered at the assessment.

Discussion: The partial booking process to promote patient autonomy and the introduction of patient leaflets to better prepare patients has resulted in a reduction in clinic DNA rates and improved patient/parent satisfaction which has positive implications for resource management.

Improving neutropenic sepsis management in two hospital departments with multidisciplinary teaching

Gerard Walls

Introduction: Neutropenic sepsis (NS) is a common medical emergency in Emergency (ED) and Acute Medicine units (AMU). London Cancer Alliance audit data highlights suboptimal guideline adherence. Management is often initiated by junior doctors with limited Oncology experience.

Aims: To assess and improve NS management in a London district general hospital.

Methods: Data was collected for 6 months on crucial aspects of NS management. A teaching programme for the ED and AMU, delivered by the Acute Oncology Service was designed. A Consultant, Nurse and CMT jointly facilitated educational sessions consisting of an interactive presentation and a forum to discuss barriers. Parameters were re-audited for 6 months.

Results: Proportion of patients receiving the standard of care improved in 11 of 15 parameters. 'Door-to-needle' antibiotic time reduced from 3.3hrs to 1.7hrs. Admission length reduced from 6.2days to 4.2days.

Discussion: An improvement in the proportion of patients receiving standard of care, including door-to-needle antibiotic time was observed. Mean admission length was 48hours shorter following intervention. The teaching programme will be embedded into junior doctor inductions. An e-prescribing tool is in development. Re-audit is required.

Conclusions: Multidisciplinary teaching on a focused topic has the potential to improve an interdepartmental problem.

Abdominal X-rays in acute general surgery: Routine radiation hazard?

Jonathan Donnelly

Introduction: As a surgical SHO in Altnagelvin, I noted that a high volume of admissions had Abdominal X-Rays performed routinely. Given the radiation exposure (35 times the dose of a chest x-ray), risk to patients (0.009% increase in cancer risk), and cost (£16 per AXR), I undertook a retrospective audit to determine whether or not these AXRs were being done appropriately.

Aims: To evaluate if AXRs requested on the General Surgery take are appropriate as per IRMER Guidelines. Target: 100%.

Methods: - Review of Surgical take records over a 2 week period, including differential diagnosis - Review of AXR requests, and final report, - Comparison of requests with IRMER guidelines

Results: - 52% of Admissions got AXRs, - 80.7% were inappropriate, - 67% were reported as normal

Discussion: AXRs requested seemed to be to rule out obstruction or perforation, despite a lack of clinical suspicion. Most Surgical consultants expect that anyone presenting with abdominal pain will have an AXR, and awareness of the IRMER guidelines for appropriate requests is seemingly non-existent. I presented this audit to my surgical colleagues, and posted the IRMER guidelines around the surgical assessment areas for reference. Re-audit is taking place currently.

Reducing Surgical Site Infection (SSI) rates after Caesarean Section

Susan Addley

Introduction: Last year the NHS Caesarean section rate increased from 25.5% to 26.2%. Surgical site infection (SSI) is a common post-operative complication. Elevated BMI and diabetes - both increasing amongst the maternal population - add to risk of SSI. SSIs often lead to a negative maternal experience and also impact adversely on resources.

Aims: A multi-disciplinary quality improvement project was designed to:

Improve clinical practice to reduce rates of SSI, Educate staff in SSI recognition

Educate patients in wound-care, Improve SSI reporting rates

Methods: Intra-operative measures were introduced: standardised skin preparation with `Chloroprep' and administration of intravenous antibiotic prophylaxis prior to knife-skin. Midwifery staff were trained by infection control and tissue viability teams in symptoms and signs of SSI; and 48-hour wound-dressing introduced. A patient information wound-care leaflet was developed and administered on discharge. Staff were educated in completion of RISC monitoring forms.

Results: SSI rates reduced from 18% in 2012 to 6% in 2015, below the acceptable standard of 10%. HISC form completion increased from 35% in 2008 to >70% in 2015.

Discussion: Reduced SSI rates increase patient safety, improve maternal experience and reduce demands on resources.

What's holding you(R) back? Tertiary Care Imaging in metastatic spinal cord compression

Umberto Pisano

Introduction: Metastatic spinal cord compression (MSCC) refers to spinal cord/cauda equina compression by direct pressure and/or induction of vertebral collapse or instability by metastatic spread or direct malignancy extension.

Aims: To ascertain compliance with the MSCC NICE guidelines and explore the characteristics of the populations undergoing imaging.

Methods: Retrospective analysis of patients who underwent urgent whole-spine MRI extracted from radiology database between 01/07/2015-30/09/2015. Data collection included demographics, diagnosis, symptoms, MRI outcome and time between request and report. Dichotomous variables analysis was performed via Chi-square; for continuous variables a Mann-Whitney was used. A p-value <5% was significant.

Results: 83 patients were included. Median age was 66 (IQR 58-73). There were 42 females (42.2%). Back pain was the commonest indication (84.3%). Motor (30.1%) and sensory symptoms (15.7%) were less frequent, followed by urinary/bowel disturbance (12%). Despite a pre-existing spinal metastases in 41% of patients, only 6 (6.3%) suffered from MSCC. The median time between referral and MRI report was 2 days (IQR 1-5): the standards were partially met.

Discussion: MSCC patients didn't display differences of age (p=0.38), sex (p=1.0) or presenting symptoms (p>0.5) from the others. A Root Cause Analysis is being carried out with involvement of the Oncology department. Greater numbers are required to study variables associated with MSCC.

Assessing the first year of a Primary Percutaneous Coronary Intervention (PPCI) service, east of region.

Judith Tweedie

Introduction: In September 2013 24/7 PPCI was rolled out across the eastern region of Northern Ireland.

Aim: The aim of this project was to evaluate the first year outcomes of the primary percutaneous coronary intervention service against national standards.

Methods: Retrospective analysis of all patients activating the primary percutaneous coronary intervention service between 30/09/2013 and 30/09/2014 including call to balloon time (CTB) and door to balloon time (DTB).

Results: 720 activations of the PPCI team between 30/09/2013 and 30/09/2014. 54% originated from NIAS and 39% for emergency departments (ED). 79% of patient had a CTB less than 150 minutes. No statistically significant difference in CTB with age and gender. Patients admitted via ED were 40 times more likely (OR=40, CI: 21-75) to have CTB <150mins. For every one year increase in patient age, there was a 3% reduction (OR=0.97, CI: 0.94, 1.00) in the odds of meeting DTB target (p=0.020),

Discussion: The East of Region PPCI demonstrated key objectives of CTB and DTB in keeping with national standards. Further analysis of effect of age on DTB is required.

Formalisation of the Plastic Surgery handover process

Andrew Robinson

Introduction: Several potential areas for improvement with respect to morning handover in the Plastic Surgery department were identified in the recent GMC survey. It is recognised that improper handover can be a major contributory factor to human error and patient harm[1,2].

Aims: The aim of our project was to ensure that an efficient and comprehensive handover process is implemented and utilised.

Methods: Using the PDSA cycle a handover proforma was devised. A time and place was agreed for the meeting. The proforma was piloted for one week. Following initial verbal and written feedback the template was adjusted. Six weeks following implementation, a further PDSA cycle was implemented and attendees were asked to complete a questionnaire.

Results: The PDSA approach has facilitated the implementation of a multidisciplinary team (MDT) morning handover meeting. The questionnaire had a 60% response rate. The handover sped up the ward round and allowed planning with regards to trauma patients. The proforma contained enough pertinent information to enhance patient care.

Discussion: The introduction of a daily MDT handover meeting supplemented with a handover proforma has increased the knowledge of issues affecting current inpatients, leading to a more efficient ward round and planning of the trauma service.

References: [1]General Medical Council – Good Medical Practice 2013. [2]British Medical Association. Safe handover: safe patients. Guidance on clinical handover for clinicians and managers. London: BMA, 2004.

Audit of Scan Documentation

Christopher Brown

Introduction: Documentation of radiology reports in patient case notes is essential for medico-legal reasons and patient safety. Anecdotally this was not being appropriately carried out in our unit.

Aims: 100% of scans reports to be documented in patient notes by completion of morning ward round the day after result reported.

Methods: Patients who had investigations reported between 7th -14th November 2014 within surgical unit of Causeway Hospital were identified. Individual case notes were analysed for documentation of result. Documentation of report's conclusion felt appropriate. Audit was limited to scans (CT and USS) with plain films excluded. Result of first cycle presented at unit-based teaching session. Second cycle completed (12th -24th March 2014).

Results: 1st cycle: 19 surgical patients identified (9 CT and 10 USS); 12/19 scan results appropriately documented by following day ward round (63.2%)

2nd cycle: 19 patients included (14 CT and 5 USS); 17/19 scan results documented in the notes (89.5%). Improvement from 63.2%.

Discussion: the 1st cycle of data collection revealed a poor rate of documentation. Following the education of the team regarding this issue, the second cycle of data collection demonstrated a significant improvement but not 100%.

Audit of Red Flag Referrals for suspected colorectal cancer

Christopher Brown

Introduction: Red flag referrals are for suspected cancer. Northern Ireland Cancer Network (NICAN) provides guidelines. This project audited referrals for suspected colorectal cancer (CRC) to surgical team in Causeway Hospital.

Aims: 100% of referrals in accordance with NICAn guidelines; 100% of patients referred seen within 14 days.

Methods: Red flag referrals for suspected CRC included (July-August 2014). Details of referral and outcomes for each patient found by analysis of Electronic Care Record (ECR).

Results: 55 patients identified. 39 referrals analysed with 16 not found on ECR. 15/39 referred appropriately (38.5%) with 24/39 not referred appropriately (61.2%). 11/55 patients seen within 14 day target (20%). 5/55 patients diagnosed with colorectal cancer (9.1%) with 100% being referred appropriately. 5/15 appropriate referrals led to cancer diagnosis (33%) with 0/24 inappropriate referrals

leading to cancer diagnosis.

Discussion: The majority of referrals for suspected CRC are not in accordance with NICAN guidelines. Appropriate referral associated with significant probability of diagnosing CRC (33%) with very low probability in those referred inappropriately. Improvements to reduce inappropriate referrals (e.g. proforma) and subsequent impact on waiting times may be possible.

Ulster Med J 2017;**86(2):**134-142

Abstracts

Annual Trainee Doctors' Prize Day, Thursday 10th November 2016.

Postgraduate Centre, Belfast City Hospital

Oral Presentations

Cytokine concentrations change with age in healthy individuals without chronic disease.

F Keshtkar, C Ford, M Rice

Background: With increasing age, the processes of functional decline in the immune system that are collectively termed immunosenescence result in an imbalance between inflammatory and anti-inflammatory pathways. The resulting low grade chronic proinflammatory state is associated with the development of age related conditions including Alzheimer's and cardiovascular disease. The primary aim of the study was to investigate cytokine concentrations change with age in healthy individuals without chronic disease.

Methods: Plasma samples were examined for cytokines IL-1ra, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12(p70), eotaxin-1, GM-CSF, IP-10 and TNF-α. This information was used to compare cytokine levels with average polyphenol intake and increase in age.

Results: 63 healthy participants aged 20–84 years were divided into young and old groups. IL4 and IL8 exhibited statistically significant declines in plasma concentrations with age. When comparing cytokine levels between females and males the two anti-inflammatory cytokines IL-4 and IL-10 were higher in women than men and all pro-inflammatory cytokines were decreased. Links between diet, exercise, BMI and plasma cytokine levels were assessed and this identified two associations as significant in young people only: IL-1ra vs. fruit and IP-10 vs. dairy.

Discussion: the results of this study indicate a signal of healthy ageing which differs between genders, with a less inflammatory cytokine milieu observed in females and more substantial proinflammatory changes in men.

Statin use, mevalonate pathway biomarkers, and colon cancer survival.

Ronan Gray, Maurice B Loughrey, Peter Bankhead, Chris R Cardwell, Stephen McQuaid, Roisin F O'Neill, Kenneth Arthur, Victoria Bingham, Claire McGready, Anna T Gavin, Jacqueline A James, Peter W Hamilton, Manuel Salto-Tellez, Liam J Murray, Helen G Coleman.

Introduction: The potential anti-cancer effect of statins in colon cancer may be restricted to certain molecular subgroups.

Aims: To assess the interaction between p53 and HMGCR expression, KRAS mutations, and the association between statin use and colon cancer survival.

Methods: 740 stage II/III colon cancer patients were identified using population-based methods (2004-2008). Medication data at diagnosis was available. Tissue blocks were retrieved to determine immunohistochemical expression of p53 and HMGCR and the presence of KRAS mutations. Cox proportional hazards models were used to calculate cancer-specific and overall survival.

Results: Statin use was not associated with improved cancer-specific survival compared to non-use (HR=0.82, 95% CI 0.59-1.15). However, there was some evidence of a difference in the association between statins and survival by HMGCR status (P for interaction=0.07) and by KRAS status (P for interaction=0.04). The associations were attenuated for overall survival. No interaction was observed between statin use and p53 expression.

Discussion: There was evidence of improved survival amongst statin users but only amongst individuals with KRAS-wild-type tumours or tumours that overexpress HMGCR. Further investigation is warranted to determine if trials assessing adjuvant statin therapy in specific molecular subgroups are justified.

Abbreviations: HMGCR – hydroxymethylglutaryl-CoA reductase; HR – hazard ratio; CI – confidence interval.

Medical students' lived experience of a cancer diagnosis

Michael Corr, Gary Roulston, Nigel King, Tim Dornan, Gerard Gormley

Introduction: Developing empathy is crucial in medical education. Studies have suggested that theroetical learning of empathy is less effective than experiential learning. So is there a way for students to have a learning experience to develop their empathy?

Aims: To use novel melanoma tattoos to see if students learn anything about the lived experience of a cancer diagnosis.

Methods: As a phenomenological study, we recruited 10 4th year medical students. Participants had a melanoma transfer tattoo applied to their forearm and listened to an audio narrative of a patient who had been diagnosed with melanoma. Participants were then asked to go about their typical day and make audio-diary recordings. Following this they were interviewed. Template Analysis was used to qualitatively analyse the data.

Results: Four main themes were derived: (1) Cancer simulation: opening up new experiences; (2) Drawing upon past experiences; (3) A transformative induction into patient-hood; (4) Doctors in the making: seeing cancer patients in a new light.

Discussion: This study provides insights into medical students' experiences of 'living' with a simulated cancer diagnosis. The simulation technique used in this study appears to facilitate a realistic and embodied learning experience which may affect future practice.

Atypical bilateral femoral fractures secondary to bisphosphonate use; a diagnosis to pre-empt?

M Arneill, I Jidaal, D Dawson, D Kealey

Case Study: We present the case of a 44 year-old lady who sustained bilateral simultaneous subtrochanteric femoral fractures following a fall from standing height. The patient had a history of bronchiectasis and allergic bronchopulmonary aspergillus. She had been commenced on the oral bisphosphonate, Alendronic Acid, 7 years previous due to osteopenia. She reported a 3-month history of bilateral thigh and hip pain preceding her fractures. Sciatica was suspected and investigated with a lumbar-spine x-ray. The patient underwent bilateral femoral intramedullary nailing and has made a good recovery to date. The bisphosphonate was discontinued.

Discussion: This case highlights an important differential diagnosis of stress fracture in an at-risk patient that initially presented with thigh pain. Bisphosphonate use is common in patients with, and at risk of, osteoporosis[1]. Evidence from observational studies suggests an increased relative risk of atypical femur fractures in long-term users of bisphosphonates[2]. All patients commenced on a bisphosphonate should be warned regarding this risk. Symptoms of thigh/hip pain should prompt consideration of developing femoral stress fracture and may be investigated with plain x-ray of the femur in the first instance. Treatment options include protected weight-bearing and prophylactic nailing.

References: 1. Abrahamsen Bo, Eiken Pia, Prieto-Alhambra Daniel, Eastell Richard. Risk of hip, subtrochanteric, and femoral shaft fractures among mid and long term users of alendronate: nationwide cohort and nested case-control study. *BMJ* 2016; **353 :**i3365. 2. Shane E, Burr D, Abrahamsen B, *et al.* Atypical subtrochanteric and diaphyseal femoral fractures: second report of a task force of the American Society for Bone and Mineral Research. J *Bone Miner Res* 2014; **29:**1-23.

Improving the Prescribing of Antimicrobials in the Northern Ireland Regional Trauma Centre

Stephen F McAleer

Introduction: The Strategy for Tackling Antimicrobial Resistance (STAR 2012-2017) was launched by the Department of Health to promote optimal prescribing through professional education and monitoring antimicrobial usage, which were examined in this audit.

Aims: Ensuring adherence to antimicrobial guidelines, review of antibiotic choice and timely switch or discontinuation of IV antibiotics.

Methods: An audit tool was developed in partnership with the Belfast Health and Social Care Trust (BHSCT) Antimicrobial Stewardship Committee. All inpatients receiving antibiotics were included. Data collection took place on three separate occasions over three months; 62 inpatients were included. Sepsis screening, antibiotic choice, documentation and stewardship were assessed. An antimicrobial stewardship poster was created, and discussion of antibiotics was embedded in to daily handover and ward rounds. Second and third audits were completed after each intervention.

Results:

	Audit Cycle	Audit Result
Antimicrobial Adherence	1	78%
Antimicrobial Adherence	2	83%
Antimicrobial Adherence	3	96%

Discussion: Following this project, communication on antimicrobial stewardship occurs daily; documentation and practice is reviewed, and this area has vastly improved. In order to make this change sustainable, an antimicrobial information pack was developed for junior doctors in the Trauma Centre.

Poster Presentations

CLINICAL RESEARCH

Lymph node harvest in colorectal cancer: A comparison between laparoscopic and open approaches

Robert Spence

Introduction: Lymph node harvest is important for staging colorectal cancer, determining the requirement for adjuvant chemotherapy, and predicts survival.

Aims: To investigate lymph node harvest in colorectal cancer resections, comparing laparoscopic and open approaches.

Methods: Data were obtained from a prospective database of patients with colorectal adenocarcinoma over a 4-year period (2011-2015). Resections were grouped: right-sided (right hemicolectomy; extended-right hemicolectomy); left-sided (left hemicolectomy; sigmoid colectomy; Hartmann's); rectal (anterior resection; APR).

Results: There were 178 resections over the 4-year period, with 169 cases eligible for inclusion (M: F 113:65); mean age: 71 years (range 43-89). 122 laparoscopic and 47 open resections were performed, with mean node harvest for laparoscopic: 18.9 nodes; open: 19.5 nodes (P=0.634; CI-3.06-1.87).

There were 71 right-sided resections (53 laparoscopic; 18 open) with mean harvest for laparoscopic: 20.3 nodes; open: 20.1 nodes (P=0.920; CI-4.03-4.47). 26 left-sided resections were recorded (19 laparoscopic; 7 open) with mean laparoscopic harvest: 16.4 nodes; open: 19.3 nodes (P=0.495; CI-12.40-6.56). 72 rectal resections were performed (50 laparoscopic; 22 open) with mean node harvest for laparoscopic: 18.3 nodes; open: 19.0 nodes (P=0.677; CI-4.13-2.70).

Discussion: There was no statistically significant difference demonstrated in nodal harvest between open and laparoscopic surgery for all types of colorectal cancer resections.

Reoperation Risk Factors for Endometriosis

Cathy Malone

Introduction: We reviewed patient demographics for women undergoing laparoscopic surgery for endometriosis, to counsel patients about their prognosis and reoperation risk.

Aims: To identify reoperation risk factors for endometriosis

Methods: Retrospective chart, electronic and histopathology record review for excisional surgery over six years by two laparoscopic surgeons in the gynaecology department of a UK DGH (108 patients).

Results: Average age was 31 years, average parity 0 and average BMI 26. Psychomotor co-morbidities coexisted in 41%; depression 31%, IBS 17% and fibromyalgia 5%. Patients ≤30 years had higher reoperation rates (OR 2.47 [95% C.I. 1.08-5.61], p=0.03). There was no association with operator and reoperation rate (RR 0.96 [95%C.I. 0.55-1.67], p=0.89) or use of adjunctive hormonal therapy (OR 1.40 [95%C.I. 0.61-3.15] p=0.41). IBS was associated with reoperation but was not statistically significant (OR 2.33 [95%C.I. 0.83-6.52] p=0.10). Patients with depression did not have greater reoperation rates (OR 1.51 [95%C.I. 0.61-3.72] p=0.36), or those with a combination of fibromyalgia and IBS (OR 1.35 [95%CI 0.21-8.48] p=0.74).

Discussion: Only age ≤30 was associated with reoperation; other factors including operator, BMI and parity were not. The perception that patients with psychomotor comorbidities have poorer outcomes is not reflected.

A qualitative analysis of Consultant Psychiatrists' attitudes to the diagnosis of Emotionally Unstable Personality Disorder (EUPD) and its disclosure to patients: why do they delay?

Ryan McNamara

Introduction/Aim: EUPD is a controversial yet common mental disorder affecting 1-2% of the population. We explored why Psychiatrists are reluctant to diagnose EUPD and disclose it to patients.

Method: A thematic analysis of transcribed, semi-structured interviews with four Consultant Psychiatrists was performed in 2016.

Results: Emerging themes showed the immense stigma that both Psychiatrists and patients associate with this disorder. There is still a lack of training, therapeutic options and support available to Psychiatrists in managing patients with this condition, leading to a reluctance to disclose the condition to patients. Important relational processes also occur between the Psychiatrist and patient that appear to limit the clinician's ability to reflect, formulate a diagnosis and disclose it to the patient.

Discussion: The study shows the need for improvement in training so that Psychiatrists can employ a psychotherapeutic framework in understanding patients' behaviours and indeed, their own responses to patients. Personality disorder services and treatments need to be developed locally, to support Psychiatrists in their diagnosis, disclosure and treatment of patients with EUPD.

Royal Victoria Hospital Emergency Department Trauma Transfers 2015

Kevin McGarry

Introduction: Patients presenting to the Royal Victoria Hospital (RVH) Emergency Department requiring Plastic Surgery input are referred to the trauma clinic in Ulster Hospital Dundonald (UHD). Number of transfer / year, patient demographic and outcomes post transfer are unknown.

Aims: To identify reason for transfer, distance from home postcode to each site and outcome of transfer.

Methods: All 2015 transfers were reviewed. Patients anonymised by sex, age and home post code. Outcomes and average distance from home post code to UHD and RVH was calculated.

Results: 56 transfers in 2015 occurred. 42 males, 14 females, age range 874. 42 had operative management: 4 patients for nerve injuries, 3 for arterial injuries, 23 for tendon injuries, 18 for cosmetic injuries and 16 for plasticorthopaedic input. Mean distance from patient home postcode to RVH 9.13 miles and to UHD 13.9 miles, a statistically significant difference (P >0.05).

Discussion: Despite patients travelling significantly further to UHD it is unclear if this has any impact upon outcomes. Considering the vast majority of patients went on to theatre, our study suggests that the current triage system is effective, but could perhaps be refined to prevent unnecessary transfers.

Informed Consent is not improved by the provision of written information

Scott McCain

Introduction: Determining what is appropriate patient consent is a clinical and medical-legal problem. Valid patient consent requires that the patient can recall, understand and weigh up information, thus facilitating effective decision making. Several studies report high patient satisfaction when informed consent occurs within the context of shared decision making.

Aims: To measure recall and understanding of consent information after a shared decision making consent process, and assess if written information improved patient understanding.

Methods: Patients diagnosed with inguinal hernia were consented in an outpatient setting using standardized information through a shared decision making process. Recall and understanding of consent information were objectively measured using a knowledge questionnaire after verbal information and again after written information.

Results: 100 patients (97 males) were recruited. Age was 57.7 (SD=14.0) years. Mean recall was 51.3% (SD=13.2) after verbal information and 51.6% (SD=12.45) (p=0.88) after written information. Mean understanding was 34.8% (SD=15.9) after verbal information and 36.9% (SD 15.23) (p=0.28) after written information.

Conclusions: Patient recall and understanding of informed consent information were worryingly low. Written information did not improve patient recall or understanding. Focused interventions are necessary to improve informed consent.

Long-term follow-up of male breast cancer.

Nicola McKinley

Introduction: Male Breast Cancer accounts for less than 1% of breast cancers with published overall and disease free survival being lower than in females.

Aims: To determine treatment and long term outcomes for male breast cancer in our unit.

Methods: A database has been maintained for all breast cancer patients diagnosed since 1993. Patients were identified using the database and data collated using the database and retrospective chart review. Male breast cancer patients were treated using similar principles to female breast cancer.

Results: From 1994-2009 twenty-four cancers were diagnosed in twenty-two patients. Mean age at diagnosis was 69. Twenty patients underwent mastectomy, two patients underwent wide local excision. No patients developed local recurrence. One patient died from their breast cancer with systemic metastases. 10-year overall survival was 22%, 10 year disease-specific survival was 80%. Other causes of death included co-morbidity and secondary cancers.

Discussion: Disease free survival in our unit is better than other published studies and is comparable to and even better than female breast cancer. High age at diagnosis and co-morbidity are the most important factors in determining overall outcome. Treatment pathways for male breast cancer should follow guidelines for females to optimise outcomes.

QUALITY IMPROVEMENT/PATIENT SAFETY

Neonatal Sepsis

Clare Morley, Hannah Smyth

Introduction: Neonatal sepsis is a serious cause of neonatal morbidity and mortality, accounting for 10% of newborn deaths. NICE published guidelines for neonatal sepsis management in 2015. The SEHSCT follows guidelines published in 2016 by the NI

Neonatal Network. The major difference in the SEHSCT protocol is the inclusion of pre labour rupture of membranes and prolonged rupture of membranes at term (Pre & PROM) as two separate risk factors for sepsis.

Aims: Determine percentage of infants screened for Pre & PROM.

Identify the risk factors in infants who require a prolonged course of antibiotics/lumbar puncture.

Methods: Retrospective study. Data analysed from a 5 months period (Aug-Dec 15)

Results: Pre & PROM accounted for a third of infants screened and a third of infants requiring lumbar puncture/prolonged course of antibiotics.

Discussion: A significant proportion of infants are requiring antibiotics for Pre & PROM at term. A contributing factor is the obstetric protocols in the SEHSCT. In order to improve patient care and optimise patient safety we recommend combining Pre & PROM at term as one non red flag risk factor, instigating a period of enhanced observation monitoring and reviewing the obstetric protocols. This should result in change in practice and potentially a change in regional guidelines.

Dictation recorded at the RVH Fracture clinic; requiring internal fixation?

Matthew Arneill

Introduction: Good record keeping is essential for continuity in patient care and a requirement of the GMC. Record keeping in our busy fracture clinic is predominantly with the use of Dictaphones and tape. Anecdotal evidence existed of problems with missing dictation due to lost and poor quality tapes.

Aims: To determine the extent of missing dictation in patients attending consultant fracture clinics. Improve the quality of our record keeping by introducing electronic dictation and subsequently reassessing performance.

Method: Data was collected for 45 consultant clinics over a 4-week study period (March 2016) using a proforma. Electronic dictation software was then procured and is due for imminent introduction to fracture clinic.

Results: Data for 998 patients attending clinics was assessed. Of these, 113 had no dictation recorded from their last attendance. (11.3%). The location of the patients last attendance was Front-of-House (65.7%), Consultant Clinic (30.3%), other (3.9%).

Discussion: At present, missing recorded dictation from patient attendances is a significant problem. This data was presented at the M&M meeting. It is our expectation that the introduction of electronic dictation will result in an improvement in patient records and lead to better quality care. We await the results of our post-intervention assessment.

Appendicectomy practice and outcomes in Northern Ireland

Scott McCain

Introduction: Appendicectomy is the most common general surgical emergency operation. Numerous controversies exist, including rates of negative appendicectomy, pre-operative imaging and laparoscopy. Practice and outcomes in Northern Ireland remain unknown.

Aim: To describe current practice and outcomes of appendicectomy in Northern Ireland.

Methods: A prospective population-based study was carried out by a trainee research collaborative. Patients were recruited over two months in June and July 2016.

Results: Preliminary data are available for 134 patients (78 males) with a median age of 28.4 (IQR 14.0-41.3) years. Cross-sectional imaging was performed in 41(30.6%) patients and was diagnostic in 95% of these. A Consultant surgeon made the decision to operate in 51(38.1%) patients and was in theatre for 26 (19.4%) appendicectomies. A laparoscopic approach was employed for 65 (48.5%) patients with a 3.1% conversion rate to open appendicectomy. The negative appendicectomy rate was 22.4%.

Conclusions: This multicentre study is the first to describe appendicectomy practice in Northern Ireland. Use of cross-sectional imaging, a laparoscopic approach, and consultant input are less frequent than in similar published studies but the negative appendicectomy rates are higher. Practice must change to standardise and optimise patient care in Northern Ireland.

An Accident Waiting To Happen – Handover Is Key To Inter-hospital Transfers

Sophie Davidson

Introduction: Inter-hospital transfers lengthen patient stay and increase mortality; however, they are integral to the functioning of the Belfast trust. From January - March 2016 there were 256 transfers to BCH from RVH alone. The BHSCT inter-hospital transfer policy states patients must have verbal and written communication with the receiving unit. Initial audit showed RVH handed over only 48% of transfers, demonstrating a process that was sub-optimal and compromised patient safety.

Aim: To achieve a 100% verbal handover rate for patients transferred from RVH to BCH by June 2016.

Method:

- Transfer file started in BCH for data collection
- Percentage handovers received collected weekly (12/1/16–18/4/16)
- Patients excluded if not from RVH or missing data
- Teaching session for BCH on how to complete transfer lists.
- RVH sent contact number for BCH transfers.
- New transfer form requiring accepting Doctor's name placed on intranet.
- Regular email reminders to RVH staff.

Results: Median value found to be 56.5%, highest rate of 73%. Three implied trends: 1. Downward trend when transfers phone broken, 2. Noticeable decline during changeover week, 3. Upward trend when transfers phone re-established

Discussion: Handover rates continue to vary. No intervention showed a definitive improvement. Further work is needed across BHSCT to ensure a safer, more effective transfer process.

Antenatal Aspirin Prophylaxis

Adeeb Khan

Introduction: Hypertensive disorders remain one of the leading causes of maternal and perinatal morbidity and mortality in the UK. NICE guidelines published in 2010 recommend aspirin for moderate to high risk patients.

Methods: An audit and re-audit of antenatal aspirin prophylaxis was

carried in Antrim Area Hospital. The objectives were to identify moderate and high risk patients and identify the proportion who received prophylactic aspirin in accordance with NICE guidelines.

Results: The initial audit in March 2015 had a cohort of 41 patients. Nine patients were high risk and did not receive aspirin. The re-audit was carried out 6 months later in September 2015.

Overall there has been an improvement in identifying moderate and high risk patients in accordance with the NICE guidelines and those who have received aspirin correctly, from 21% to 58%.

Discussion: The recommendations are to insert risk assessment tools at the booking visit for all antenatal patients, update community midwives, GPs and hospital staff. Another suggestion has been to have a laminated copy of the risk assessment tool in the consultation room wall. A re-audit is to be carried out in a further 6 months to monitor the progress of this unit.

Effective Utilisation of Pre-Operative Assessment for Elective Plastic Surgery Patients

Serena Martin

Introduction: The NHS modernisation agency states >80% of patients should be treated as a day case. Selection of appropriate patients occurs during pre-assessment, which only occurs if patients are referred. Pre-assessment clinic (PAC) allows patient optimisation for surgery. This can improve patient safety and lead to lower morbidity and mortality rates and effective use of resources.

Aims: To establish current practice with regards to utilisation of pre-assessment clinics in elective plastic surgery patients and introduce guidelines to ensure appropriate patient referral.

Methods: Prospective audit of all elective plastic surgery patients admitted over a one week period.

Results: Only 31% were pre-assessed. 91% of patients not pre-assessed should have been (ASA grade 3/4). 38% of patients were admitted as a day case despite 100% of patients being suitable for day case surgery.

Discussion: Disappointing results led to consultation with anaesthetists and pre-assessment staff. A new department guideline has been implemented. This identifies patients who necessitate PAC referral and demonstrates the referral process as well as highlighting key information which must be included to allow timely pre-assessment and patient optimisation. Better utilisation will ensure patient optimisation, reduced cancellation of operations and facilitation

Suitable indications for elective Colonoscopy and Flexible Sigmoidoscopy

Victoria Rizzo

Colonoscopy and Flexible Sigmoidoscopy are essential tools for investigation, diagnosis and treatment of colorectal disease.

Aim: To assess validity of indications for Colonoscopy/Flexible Sigmoidoscopy using guidelines by the British Society of Gastroenterology BSG, AUGIS and ACPGBI.

Method: Indications and an outcome summary was compiled for elective endoscopies performed during one month of practice.

Results: 61 colonoscopies and 25 flexible sigmoidoscopies were considered. 19.7% of colonoscopies had no valid indication. No abnormalities were detected in 33.3% of non-indicated colonoscopies as compared to 26.5% of those indicated.

16% of the 25 flexible sigmoidoscopies had no valid indication. The most common indication (52.4%) was rectal bleeding with no bowel habit change in patients >40years. Almost 15% of indicated flexible sigmoidoscopes had criteria valid for a full colonoscopy: surveillance after resected colorectal cancer (14.3%), adenomas and FAP (4.8%).

Discussion: The guidelines emphasise that clinical judgement remains key to decision making when booking endoscopies[1]. However, in the non-valid colonoscopy cohort a high percentage of procedures were normal. Furthermore the results suggest that procedure selection (colonoscopy vs sigmoidoscopy) may be improved by referral to guidelines. This is especially relevant in follow up of colorectal carcinoma and FAP, where colonoscopy is recommended as per NICE guidelines[2].

References: 1. British Society of Gastroenterology BSG, AUGIS and ACPGBI. Guidance on the indications for diagnostic upper GI endoscopy, flexible sigmoidoscopy and colonoscopy. Position Statement. 2011. Available at: http://www.bsg.org.uk/images/stories/docs/clinical/guidance/indications_diagnostic_endoscopy_13.pdf

2. NICE guidelines. Colorectal cancer: Diagnosis and management. Last updated December 2014. Available at: https://www.nice.org.uk/guidance/cg131/

The assessment of Plastic Surgical Trainees attitudes and behaviours in communicating with temporary voiceless (TV) head and neck cancer patients

Joshua Clements

Introduction: Communicating with a temporarily voiceless head and neck cancer patient presents a unique communicative challenge for some surgical sub-specialties. Little is known about the best means of communication or the attitudes of patients or clinicians. Effective communication is an inherent part of Good Medical Practice and the ISCP curriculum for trainees.

Aims: To identify attitudes and behaviours of plastic surgical trainees in communicating with TV patients

Methods: A 32-question survey was sent to all plastics surgical trainees in Northern Ireland in a one-year period. (August 2015 - August 2016). Attitudes and behaviours were assessed using a 5-point Likert scale.

Results: 15 (83%) trainees responded. No trainee had received formal training in how to communicate effectively with a TV patient. The majority of trainees found communicating with a TV patient time consuming, more difficult and have had to adapt their ways of communicating. All trainees agreed to trialling information technology (IT) devices and would be open to formal teaching.

Discussion: We have identified a need for further education in communication for trainees and support of the introduction of IT devices. Further research into patient attitudes and behaviours is required to allow for correlation

Mentoring is a key tool for personal and professional development

Lyndsay Thompson

Introduction: Mentoring is a key tool for personal and professional development, with a range of benefits described for mentees, mentors and their organisations[1].

Recently many peer-mentorship programmes have been developed throughout the UK[2]. Within Northern Ireland a paediatric peer mentoring programme commenced in 2014.

Aims: To review trainee engagement throughout the NI paediatric mentorship programme, in response to various interventions and adjustments.

Method: Online questionnaires and focus groups were conducted to

assess engagement and satisfaction throughout the programme. In response to feedback, various changes were implemented, including setting minimum numbers of contacts, introducing e-diaries, an induction evening for mentees, and changing from mandatory to voluntary mentee recruitment.

Results: Within the 2014-2015 year of the programme, there were low levels of engagement. After changes were made, levels of engagement improved well in the second year. Overall, ninety two percent found the mentorship programme beneficial.

Discussion: With many new peer mentorship schemes being developed, quality improvement measures need to be implemented to support trainee engagement. We have found that small changes to the programme structure have improved trainee engagement. However more areas still need to be developed, and only with continuing adaptation will we be able to help our trainees get the most out of mentorship.

References: 1. Department of Health (2004) 'Mentoring for doctors: signposts to current practice for career grade doctors'. 2. RCPCH: Mentoring Support. Available at: http://www.rcpch.ac.uk/training-examinations-professional-development/careers/career-development/mentoring-support/ Accessed September 2016.

Accurate body weight recording in a Trauma and Orthopaedics ward: a quality improvement project

Jonathan Rooney, Ruth Wallace, Paul Cooper, Anna Durkan, Aisling Carroll-Downey.

Introduction: Patient body weight is an essential parameter in safe medication management. Drugs requiring weight-adjusted doses are often prescribed and administered without a recorded weight. We investigate the recording of patient body weight on the drug chart in a Trauma + Orthopaedics ward in RVH, Belfast.

Aim: Accurate body weight recorded on the drug chart of 100% of patients in the T&O ward.

Method: The current practice of weight recording on the drug chart was audited. Following this, an informal session with the nursing team was held to promote weight recording. This was succeeded by a formal teaching session where potential barriers to accurate weight measurement were explored using an anonymous questionnaire. "Weigh Day" was introduced whereby each Saturday would be assigned as a day for recording patient body weight.

Results / Progress: The results of the initial data collection are shown in Figure 1, and the first 3 PDSA cycles in Figure 2 (not included in abstract).

Discussion: Following implementation of the 'Weigh Day' initiative, documentation of accurate body weight on the drug chart increased from 4% to 73%. The number of patients without recorded body weight decreased dramatically to less than 20%. We plan to extend the project across all T&O wards in the future.

Appreciating Clinical Excellence: A positive feedback tool

Danielle Leemon

Introduction: Traditionally patient safety has focussed on learning from errors. A more positive alternative is to highlight what is done well by individuals and adopt this behaviour as a team to increase the standard of care as a whole.

Aims: 1. To nurture a culture of positive feedback. 2. To create a feedback tool to complement appraisal/revalidation. 3. To improve staff morale. 4. To identify areas for improvement through analysis of feedback.

Methods: A postcard template was created with 3 questions: 1. Who did well? 2. What did they do well? 3. What can we do to develop excellence in this area? The postcards are available to all staff and deposited in a box. An electronic certificate is presented to the nominated people along with formal feedback. We aim to analyse trends and categories and use appreciative inquiry to investigate the most important reports. We hope to then identify areas of focus for improvement and provide constructive feedback for all staff as part of their continuing professional development.

Results: The project is currently in the design phase.

Discussion: We hope to expand this regionally within our specialty and then hopefully extend this to other specialties.

Foundation Doctors' First Steps to Leadership

Grainne Donaghey

Introduction: Foundation doctors routinely encounter problems relating to patient care and are well placed to identify solutions and lead improvement strategies.

Aim: We identified a lack of training programmes to support foundation doctors in leading improvement within Belfast Health and Social Care Trust (BHSCT). We developed the First Steps to Leadership (First Steps) Programme with the aim of improving foundation doctors' skills in clinical leadership and quality improvement (QI).

Method: First Steps was piloted across BHSCT from October 2015 – June 2016. The programme includes ten monthly workshops which align with online learning modules facilitated via the Institute for Healthcare Improvement Open School and experiential learning through completion of small group QI projects.

Results: Thirty-three foundation doctors completed the programme. Post-programme questionnaires displayed

An Audit on the use of AKI risk assessment tool as part of the medical proforma at Daisy Hill Hospital.

Eimear Joyce;

Introduction: Acute kidney injury (AKI) is a common occurrence during hospital admission. It is often defined as sudden loss in kidney function resulting in retention of urea and other nitrogenous waste products. AKI during hospital admission correlates with a significant rise in morbidity. Furthermore it costs the NHS approximately £50million per annum in Northern Ireland alone. Utilising a risk assessment tool as part of the admission assessment can identify patients at risk of developing AKI and thus prevent it occurring.

Aims: To highlight how frequent AKI presents during hospital admission, To access how often the AKI risk assessment tool is used as part of patient assessment on admission, To access how often the AKI management plan is completed

Methods: Random sampling of 50 medical patients across three medical wards.

Results: 30% of patients had the risk assessment completed on admission.

Discussion: We have since implemented change to the medical proforma and have re-audited to see if there is an improvement in our ability to prevent, recognise and manage AKI in medical patients at the time of admission to hospital.

Multidisciplinary algorithm for category 1 caesarean sections; a collaborative service improvement

Helen Murray

Introduction: Review of serious adverse incidents within our institution highlighted a requirement to improve the approach to category 1 sections.

Aim: To improve pertinent areas identified including documentation, clarity in communication, and availability of staff.

Methods: A retrospective chart review of Category 1 caesarean sections were undertaken. Informal structured interviews and focus group discussions were carried out with each MDT group to identify pertinent issues.

Results: Just over half the cases (58%) had the decision clearly documented, with 64% of cases in agreement between anaesthetic and obstetric records. One of the most significant issues identified by staff was the availability of anaesthetic nurse assistance out of hours.

Discussion: The issues specific to our individual institution were considered and challenged in a collaborative approach. Initially the anaesthetic assistant was added to the team emergency pager, and this pager also used to declare every category 1 section. An algorithm was subsequently developed, combining this service improvement, which streamlined the overall approach to the process. Achieving this level of agreement between all specialty members marks a significant step in our unit's approach of learning from previous events, to improve safety and patient care.

Oral health status of Northern Ireland's head and neck oncology patients: a 10-year audit.

Ciaran Moore

Introduction: 1. All head and neck cancer (HANC) patients must undergo oral assessment to ensure adequate dental fitness pre-radiotherapy. 2. Post-radiotherapy HANC patients are at increased risk of dental caries.

Aims: Determine the oral health status of pre- and post-radiotherapy HANC patients in Northern Ireland between 2004 and 2014.

Methods: Health and care numbers of all HANC patients diagnosed between 2004-2014 were obtained from the Northern Ireland Cancer Registry. Dental records of patients also registered with the Centre for Dentistry, Belfast, were reviewed.

Results: Between 2004 and 2014, 504 patients attended for pre-radiotherapy dental assessment. 57% of patients had dental caries, with a mean of 3.6 carious teeth. 46% required at least one tooth extraction, with an average of 5.4 teeth removed per patient. Approximately half of post-radiotherapy patients had evidence of dental caries (49%). Patients with tongue cancer had a greater number of mean carious teeth (6.4) than patients with tonsillar (4.5) or laryngeal (3.6) cancer. There was an overall decline in the mean number of carious teeth in post-radiotherapy patients from 2004 to 2014.

Discussion: Head and neck cancer patients present with significant oral disease pre- and post-radiotherapy. Improvements in radiotherapy technology and the dental care pathway may account for a reduction in post-radiotherapy dental caries from 2004 to 2014.

STUDIES IN MEDICAL EDUCATION

Medical Education in Palestine: The need for alternative pedagogical approaches during conflict

Emma Keelan

Introduction: Violent instability infringes upon access to medical education for many undergraduate students. The Israeli-Palestinian conflict is such an example where violence, transport issues, class cancellations and campus evacuations result in disruptions to student learning.

Aims: October 2015 saw an increase in hostilities in the Palestinian territories. Consequently there was a need to adopt flexible pedagogies to ensure students remained up to date with their studies. Palestinian students, like their peers globally, use smartphones to communicate and share information. As such, an online portfolio was developed as a means of disseminating the Clinical Physiology course material.

Methods: To assess the benefits of such a program, student marks were analysed before and after the implementation of the portfolio to ascertain if the change in pedagogy proved useful to students.

Results: Thirty-nine demonstrated an improvement in their marks using the online program (72.2%); The greatest improvement between the pre and post initiative examinations was eight marks (40%).

Discussion: The use of social media & online learning materials proved to be effective pedagogical tools for students studying medicine in areas of uncertainty. In the future, online resources could be considered in similar circumstances where conflict and violence disrupt access to education.

Fourth Year Medical Student Perception of the Use of Visual Likert Scales to Self-Identify their Learning Needs during the Ageing and Health Module

Grace Kennedy

Introduction: The General Medical Council recommends students seek benefit from self-assessment and reflection[1]. Although students find self-assessment helpful in steering learning[2], they do not automatically consider their learning needs.

Aims: A Visual Likert Scale (VLS) method was used to track the outcome of student-perceived self-assessment at the beginning and end of the Ageing and Health module.

Methods: Fourth year students (252) were invited to complete the VLS to assess self-perceived learning needs for key areas of the curriculum at the beginning and end of the module. The areas were history-taking and skills, examination skills, medications, co-morbidity, nutritional assessment, and swallowing assessment. Values were compared before and after the module. Student focus groups explored issues surrounding VLS use.

Results: Significant improvement for each area was demonstrated. Key focus groups themes included ease of VLS use, its use in identifying learning needs, and potential future uses.

Discussion: The results demonstrated increased student-perceived competencies after the module. VLSs were generally viewed positively and suggestions for VLS use were identified.

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Formation and output of a regional surgical research collaborative

Gareth Irwin

Introduction: Trainee-led regional networks can facilitate research through a novel, collaborative approach. We report the establishment and output of the Northern Ireland Surgical Research Collaborative, the first trainee collaborative formed in Northern Ireland.

Aims: To evaluate if a trainee research collaborative could be established in Northern Ireland and if it could deliver good quality research.

Results: After four meetings and a two-month period of research, over a total of six months, the first trainee-led prospective audit has been completed, submitted for presentation and prepared for publication.

The strengths of this model were identified as having an enthusiastic cohort of trainees available to gather data, choice of topic acutely relevant to trainees and increase in the profile of research amongst the surgical community.

Weaknesses identified included multiple site rotas limiting accurate and timely follow-up, loss of momentum from some members of the collaborative and lack of wider infrastructure to support ongoing research.

Discussion: This process confirms that good quality research can be carried out when initiated and undertaken by trainees, given that trainees can be in frequent contact with each other, are motivated, and require formalised evidence of research and audit

Northern Ireland Basic ENT, a new course and its experience

Shanna Leonard

Introduction: ENT trainees are expected to have a sound knowledge of common conditions. However, teaching and assessment of these conditions are not equally emphasized during medical school nor as part of the foundation programme curriculum. We developed a one day intensive course for the upcoming junior trainee into the department.

Aim: To develop a course that will reinforce current trainee knowledge and skill sets for the specialty.

Method: A one day course curriculum, including didactic lectures and hands-on skill stations, was designed based on round-robin scheduling. The lectures and skill stations were aimed at basic otology, rhinology and laryngology disease. A pre-course survey and post-course survey was collected after the course. Unpaired t-test were performed on the data with $p<0.05$ being significant.

Results: Pre and post course surveys were completed, and results overall showed an improvement in knowledge and ability to deal with various ENT conditions. Free text feedback was positive.

Discussion: A combination of lectures and practical teaching in this case has proven to be effective. The use of simulated learning is also a key tool when learning new skills. Our aim for this course is to continue to teach trainees upcoming to ENT to enable them to effectively and safely treat patients.

Medical student Resilience: A cross-sectional study

Michael Doris

Introduction: Resilience has been described as the capacity to 'bounce back' from adversity. The relevance of this to medical training has become recognised by the GMC, who recommend that medical schools make resilience training an 'integral part' of the medical curriculum.

Aims: To establish a baseline of subjective resilience in 1st year medical students.

Methods: First year medical students attended targeted 'resilience workshops'. The sessions covered practical areas of resilience training for student life and specific medical student issues. Prior to these sessions students filled out the Connor-Davidson Resilience Scale (CD-RISC), Perceived Stress Scale, Budner's Tolerance of Ambiguity and the Warwick-Edinburgh Well-Being scale to measure baseline levels of resilience and other personality traits.

Result: 248 of the 268 students 93% attended the sessions - of which 228 completed the questionnaires. Mean scores for resilience (73.64) were slightly higher than equivalent populations. Higher levels of resilience correlated with better scores of global well-being and lower perceived stress.

Discussion: This study suggests that first year medical students are in fact relatively resilient. Our results support, evidence that higher levels of personal resilience as scored on the CD-RISC correspond with higher levels of self-reported wellbeing

Does Precision Teaching Enhance Dermatology diagnostic skills?

Conor McGrath

Medical students often lack confidence in assessing/diagnosing skin conditions thus new teaching methods are required to enhance knowledge acquisition. Precision Teaching (PT) is an educational technique that can improve knowledge retention by using frequent, brief, timed measures of student performance on specific learning points e.g. multiple dermatological images.

Aims: To determine the impact of PT on dermatology diagnostic skills compared to traditional teaching.

Methods: Third year medical students were randomly allocated to the intervention group (PT + traditional teaching) or control group (traditional teaching). For the PT group, we designed 50 image flashcards. Flashcard practice during timed one minute periods took place 2-3 times/teaching day and students' data on accuracy was recorded. Pre + post-training tests were carried out to determine the impact of PT on students' diagnostic skills.

Results: 135 participants were randomised to the intervention (n=70) or control groups (n=65). Analysis of covariance was used to calculate the 'change score' (comparing pre- and post-test). Compared with the control group, there was a statistically significant improvement of 8.8% (95% CIs; 4.9-12.7, $p<0.001$) in the intervention group.

Discussion: Our study demonstrates a positive effect of PT on dermatology diagnostic and recognition skills.

CASE REPORTS / SERIES

Rare benign metastasising leiomyomas of the lung

Victoria Rizzo

Introduction: Benign metastasising leiomyoma (BML) is a rare disorder involving distant metastases secondary to a primary smooth muscle tumour of the myometrium. Most literature is available in the form of case reports.

This case report describes a 48 year old woman with multiple pulmonary nodules noted on routine chest x-ray. She had a total abdominal hysterectomy 6 years prior to the scan, for multiple benign fibroids of the uterus. CT FNA of the pulmonary nodules showed abnormal smooth muscle proliferation within lung parenchyma, suggesting smooth muscle tumour confirmed with immunohistochemistry.

Discussion: BML lesions are most often found incidentally in lung tissue; however metastases to abdominal lymph nodes, oesophagus, trachea, striated muscle, nervous system, heart and breast have also been described[1-4]. Metastatic spread is thought to be haematogenous in nature[5,6]. Growth of pulmonary metastases secondary to uterine

leiomyoma are affected by oestrogen and progesterone levels[2] and metastases are often positive for hormone receptors[6].

Due to low case numbers, management is still controversial. Hormone therapies (e.g. tamoxifen, aromatase inhibitors), chemical and surgical castration have been used in the management of BML[1,2,7]. Spontaneous regression of the pulmonary metastases has been described after the onset of menopause[8].

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Myxodema Madness: a neurological manifestation of hypothyroidism

Hannah Smyth, George Graham

A 36 year old woman, with no previous contact with mental health services was referred to psychiatry after an acute psychotic episode. Bloods were carried out which showed gross hyperthyroidism. On subsequent physical examination, she had generalised myxodema, a boggy thyroid and thinning hair and had had weight gain, cognitive slowness & intolerance to cold in the preceding months. Advice was sought from endocrinology and she was commenced on thyroxine. Over weeks of treatment with thyroxine & haloperidol her delusions resolved and her mental state recovered.

Discussion: This case was complicated as she had just given birth to her first child by emergency section & had other contributing factors including stressful job as a probation officer. Her delusions centred around her baby & she believed that she and her daughter would come to harm. The initial impression was puerperal psychosis and she was managed in the community. It was only when her mental state deteriorated and she was admitted to the ward that thyroid function was checked. This case highlights the need for awareness of physical causes of psychosis & also the wide variety of manifestations that thyroid dysfunction can present with.

BASIC SCIENCE/ RESEARCH

Use of Well-differentiated Paediatric Nasal Epithelial Cell (WD-PNEC) Cultures to study Respiratory Syncytial Virus (RSV) infection in newborn infants

Helen Groves

Background: Preterm infants and young infants are at greater risk of severe RSV-related disease. Little is known regarding innate immune responses of airway epithelium to RSV in these groups. We aimed to establish WD-PNEC cultures from term and preterm infants at birth and characterise morphology and RSV cytopathogenesis.

Methods: Nasal epithelial cells from term and preterm infants were obtained within hours/days of birth. Paediatric nasal cells were grown under an air-liquid interface until formation of a pseudostratified columnar epithelium with extensive cilia coverage and mucous production. WD-PNECs were infected with a clinical isolate of RSV. Culture morphology was examined by fluorescent microscopy. Chemokine/cytokine secretions and qRT-PCR of targeted genes comparing responses to RSV in preterm and term derived WD-PNECs is underway.

Results: Newborn WD-PNEC cultures with extensive cilia coverage and mucous production were successfully generated. Proportions of ciliated and goblet cells were similar in term and preterm WD-PNECs. Following infection of newborn WD-PNECs, similar RSV growth kinetics to that previously reported in WD-PNECs derived from older infants, were observed.

Conclusion: The successful culture of WD-PNECs from new-borns represents a unique opportunity to study RSV cytopathogenesis and innate immune responses in early life.

Periodontal ligament stem cell osteoblastic response to nanostructured titanium surfaces

Lewis Winning

Introduction: Bioactive materials offer particular clinical benefits in the field of dental implantology, where differentiation of stem cells towards an osteoblastic lineage is required for osseointegration and appropriate function of implants in vivo.

Aims: The aim of this study was to evaluate the osteoblastic response of Stro-1+ve periodontal ligament stem cells (PDLSCs) to three well-characterised biomaterial surfaces: an abraded titanium surface control (cpTi); a polycrystalline titanium surface, with both micro and nano-topography produced by radio frequency magnetron sputtering (TiTi); and the same surface incorporating a sputter deposited calcium phosphate coating (CaP-TiTi).

Methods: PDLSCs were grown on each surface in the absence of supplementary osteogneic-inducing agents. Osteoblastic responses were assessed for up to 21 days in culture by measuring gene expression using real time q-PCR and via assessment of intracellular alkaline phosphatase (ALP) activity.

Results: The CaP-TiTi surfaces were non-stoichiometric, carbonated, and calcium rich with a Ca/P ratio of 1.74. Gene expression analysis for the CaP-TiTi surfaces showed a significant late stage up-regulation of Secreted Phosphoprotein 1 combined with a late stage down regulation of ALP (gene expression). There was also a significant increase in intracellular ALP at day 21 for the CaP-TiTi surface. These data suggest that the CaP-TiTi surfaces provide the bioactive conditions required for direct osteoblastic differentiation of PDLSCs.

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James Logan Prize Essay

The Importance of Holistic Care at the End of Life

Jonathan Hackett

Accepted: 12th of November 2016

PREFACE

James Alexander Logan, a second-year medical student at the Barts and The London School of Medicine and Dentistry, died in February 2001 after a painful illness. A Trust was set up in his name in 2003 to promote education in the recognition and treatment of cancer pain and it provided funds for an annual essay prize, open to those undergraduate medical students of Queen's University, Belfast, who had completed their fourth year palliative care teaching. The first competition took place in 2010 and the winning entry appeared in the Ulster Medical Journal in 2011.

The Trust itself was dissolved in 2014 but the essay prize continues and the Trust's website can still be accessed at http://www.jameslogantrust.org.uk/

INTRODUCTION

No man is an island
Entire of itself;
Every man is a piece of the continent,
A part of the main;
If a clod be washed away by the sea,
Europe is the less,
As well as if a promontory were,
As well as any manner of thy friends
Or of thine own were;
Any man's death diminishes me,
Because I am involved in mankind,
And therefore never send to know for whom the bell tolls;
It tolls for thee'

MEDITATION XVII
Devotions upon Emergent Occasions
John Donne

This 17th Century poem by John Donne is a rare piece of literature that transcends generations, cultures and ages. This is partly because it deals with the universal theme of death and partly because the central message is, and always will be, true. That central tenet is that all human beings live their lives as interconnected entities and the invariable presence of death must be considered in the context of these connections. This essay seeks to explore how a holistic approach is required to optimise palliative care for not only the dying person's physical needs but also, for their relational existence.

BIOPSYCHOSOCIAL-SPIRITUAL

The most widely accepted model of care and research is George Engel's 1977 Biopsychosocial model[1]. This model was unique as it was the first time that healthcare providers were challenged to view service users within their wider context and not just as diagnostic and therapeutic challenges. More recent advances on this model have encompassed spirituality which is a sensible and necessary addition particularly in end of life care[2]. This essay will use the Biopsychosocial-Spiritual as a basis to explore how holistic care can be achieved at the end of life.

BIOLOGICAL

The biological needs of service users are largely dependent on the underlying illness. As the intent of treatment changes from curative to palliative many medical issues may arise. The most common challenges facing clinicians tasked with end of life care are pain, nausea, vomiting and breathlessness[3]. Multidisciplinary teams are assembled to optimise symptom control. Advances in therapeutics over the last century means that doctors have a significant arsenal of drugs to help ensure symptom control. While opiates remain the mainstay of treatment for pain at the end of life, many useful drug and non-drug adjuncts now exist. Complementary therapies are increasingly becoming integrated into end of life care. Although the quantitative evidence base for many of the treatments is still being collected there is certainly vast anecdotal evidence of its benefit. These complementary therapies which include acupuncture, aromatherapy and massage therapy, amongst others, can be used for not only symptom relief but also for psychological well-being[4].

PSYCHOLOGICAL

The psychological component of the Biopsychosocial-Spiritual model recognises the complex interplay of mind and matter. Emotional turmoil, lack of control, depression, despair and anxiety are all recognised manifestations in end of life care. The origins of these psychological issues are manifold but misgivings about diagnosis, treatment and the future should be addressed. The psychological theory

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of 'concreteness' is often employed to alleviate distress[5]. Concreteness stops service users dwelling on abstract questions about the future and encourages consideration of the concrete past and present experiences. There is an innate interplay between the psychological and the biological which is particularly well illustrated in palliative care. For example, if a service user is particularly dyspnoeic because of their underlying disease they may become increasingly anxious which will perpetuate the dyspnoea. This may continue until the point of exhaustion. However, simple interventions such as opening windows, use of fans, and use of medications can be made to improve either the underlying pathology or the anxiety which will in turn improve the dyspnoea. This is just one example of how management with a holistic approach can ameliorate the end of life experience for a patient.

SOCIAL

Humans are innately social entities. Interpersonal relationships allow us, as humans, to fulfil our innate need to belong. Relationships are dynamic systems which evolve over time and circumstances. We live our lives with many varied relationships including spousal, family, friends and neighbours. In end of life care consideration must be given to these connections and importantly to the person at the centre of these. Effective communication is absolutely essential for nurturing relationships at the end of life. Stress and grief are often potent catalysts for conflict in families. Often, sincere open conversations can help alleviate some of the conflict. This role should be undertaken by all members of the multidisciplinary team but often trained counsellors are required to address complex disputes. Where children are involved, efforts should be made to include them. Children will bring a unique set of questions and challenges so all communication should be age-appropriate. Another, often overlooked, relationship is the therapeutic relationship. In practice this means shared decision-making between service users and clinicians as well as transparency with the individual and the individual's family. Holistic care at the end of life then, not only extends to the individual, but to the many varied interconnections they have formed.

SPIRITUAL

Spirituality is something which is difficult to define with many definitions from different perspectives. In essence, it can be thought of as 'a person's search for meaning'. Traditionally this has meant a religious belief in one or more deities. As our society grows so too does the boundary of spirituality. Many more minority religions are now part of society as well as an increasing number of atheist groups. Spiritual care at the end of life is seen as a vastly important issue by healthcare providers. There is an abundance of formal research and a systematic review by the department of health in order to equip providers with the best possible tools to provide holistic end of life care[6]. An evolution of services is taking place that better reflects our changing society. Spiritual care has increased in visibility in the last two decades. Previously spiritual care was equated with religious care and the provision of chaplains was seen as zenith. Now, a broader concept of spirituality has been adopted and is seen as the remit of not only the chaplains but of all healthcare staff. Although the Liverpool Care Pathway is now discredited, one of the positive aspects was that it included a question about spiritual and religious beliefs[7]. This question often prompted discussions within families about a subject that they may have found difficult to broach. So, although spirituality is a complex and challenging aspect of end of life care, it is paramount to providing quality holistic care.

CONCLUSION

This essay has outlined the principles of end of life care using the biopsychosocial-spiritual model as a framework. However, it is inaccurate to conclude that rigid provision of care according to this model would provide sufficient care. Death, like life, is a matter of individuality. Service users should be granted autonomy in all aspects of their care with continued input and feedback from the family. Exemplary end of life care is not about rigid guidelines but rather supporting the individual and their family on their personal journey.

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Ulster Med J 2016;**86(2):**145-146

Curiositas (Neurology)

In this edition of Curiositas we have a neurology perspective on a range of interesting topics.

UNDERGRADUATE QUIZ

A 50 year old woman (70kg) presents with convulsive status epilepticus which persists despite lorazepam therapy, for which she is prescribed phenytoin.

Medicine	Dose	Route
PHENYTOIN	300MG	INTRAMUSCULAR

What is wrong with this prescription?

(Mr Mohab Hassib, Medical Student, Queen's University Belfast; Dr Michael Kinney, ST7 in Neurology, Western Health and Social Care Trust; Dr Mark McCarron, Consultant Neurologist, Western Health and Social Care Trust)

CONTINUING MEDICAL EDUCATION QUIZ

A 29 year old female gives a 4 month history of a frontal headache described as 'pressure', of 6/10 severity. It is worse with coughing and in the morning. She has noticed intermittent blurring of vision and occasional whooshing noises in her right ear. On systemic questioning weight gain of 12 kg over the last 6 months is identified. Neurological examination was normal other than funduscopic examination, which is shown below.

Courtesy of Dr Kinshuck http://www.goodhopeeyeclinic.org.uk

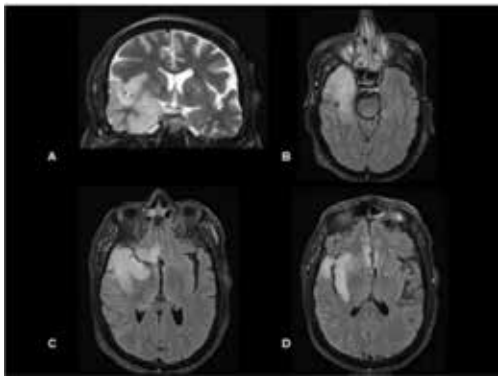
(Website last accessed 21/03/2017)

1. Describe the fundi.
2. What is the likely diagnosis and what differential diagnoses should be considered?
3. How would you investigate and manage this patient?

(Dr Gavin McCluskey, CT2 in Medicine, Southern Health and Social Care Trust; Dr Michael Kinney, ST7 in Neurology, Western Health and Social Care Trust; Dr. Mark McCarron, Consultant Neurologist, Western Health and Social Care Trust)

'ON THE ACUTE MEDICAL TAKE'

A 50 year old male patient presents with an altered mental state and is noted to be febrile. He has a tonic-clonic seizure at home prior to coming to hospital. On assessment he scores 13/15 on the Glasgow Coma Scale. He is confused and opens his eyes to voice. His neurological examination is otherwise normal. Magnetic resonance imaging (MRI) of his brain is displayed below.

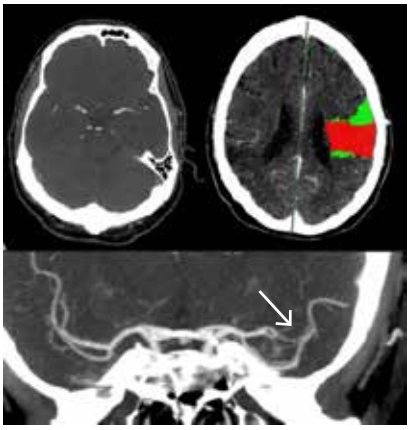


1. What is the most likely diagnosis and what would be your initial management?
2. What other non-infective diagnoses should be considered if he failed to improve?

(Dr Gordon Anderson, FY1 in Medicine, Northern Health and Social Care Trust; Dr Michael Kinney, ST7 in Neurology, Western Health and Social Care Trust; Dr Mark McCarron, Western Heath and Social Care Trust)

POSTGRADUATE QUIZ

A 56 year old male presented to the emergency department with a sudden onset of dysarthria with right arm and right leg weakness which started 45 minutes earlier. His National Institutes of Health stroke score was 18. He had a stroke 12 weeks earlier with full recovery after receiving thrombolysis. He has atrial fibrillation and takes APIXIBAN 5 mg BD.



1. What does the acute imaging demonstrate?
2. What potential treatment could be considered?

(Dr Rebecca Robinson, CT1, Stroke Medicine, Belfast Health and Social Care Trust; Dr Patricia Gordon, Consultant Stroke Physician, Belfast Health and Social Care Trust).

ANSWERS See overleaf

CONSIDER CONTRIBUTING TO CURIOSITAS?
Please refer to '*Curiositas: Guidelines for contributors*' http://www.ums.ac.uk/curiositas.html and email *umj@qub.ac.uk* with your ideas and submissions.

Curiositas: Answers

UNDERGRADUATE QUIZ

Phenytoin should be given intravenously at 20 mg/kg (max 2g in total) at a rate not exceeding 1 mg/kg/min (or a maximum of 50 mg per minute). In a 70kg woman the correct dose is therefore 1400mg. The rate should not exceed 50 mg/min due to the risk of cardiac arrhythmias and hypotension. If given in the elderly, the rate can be reduced, particularly if cardiac side effects emerge. For this reason cardiac monitoring is mandatory.

(Mr Mohab Hassib, Medical Student, Queen's University Belfast; Dr Michael Kinney, ST7 in Neurology, Western Health and Social Care Trust; Dr Mark McCarron; Consultant Neurologist, Western Health and Social Care Trust)

CONTINUING MEDICAL EDUCATION QUIZ

1. The images show bilateral optic disc oedema, without haemorrhage.

2. The most likely diagnosis is idiopathic intracranial hypertension (IIH). The main differential diagnoses would include a space occupying lesion, hydrocephalus and cerebral venous sinus thrombosis.

3. Initial investigation would involve an urgent computed tomography (CT) scan of brain with a mandatory venogram study to exclude the above differentials; lumbar puncture in the lateral position to measure the opening pressure of cerebrospinal fluid (CSF) if not contraindicated. CSF constituents must also be checked and be normal in an IIH case. A CSF opening pressure of > 25cm CSF is elevated. Specialist ophthalmology confirmation of the optic disc oedema and visual field testing is essential as visual loss is the major morbidity.

4. The patient should be educated regarding weight loss. Pharmacotherapy options include acetazolamide, topiramate, or furosemide. If experiencing rapidly deteriorating visual fields, an urgent neurosurgical referral for ventriculoperitoneal shunt insertion should be considered.

(Dr Gavin McCluskey, CT2 in Medicine, Southern Health and Social Care Trust; Dr Michael Kinney, ST7 in Neurology, Western Health and Social Care Trust; Dr. Mark McCarron, Consultant Neurologist, Western Health and Social Care Trust)

'ON THE ACUTE MEDICAL TAKE'

1. In the UK, herpes simplex virus (HSV) is the commonest identified cause of encephalitis in adults. This case is a classical presentation, with typical imaging findings predominantly involving the medial temporal lobes. CSF assessment typically confirms the presence of HSV, as it did in this case. Aciclovir (10mg/kg TDS) should be started empirically if a strong clinical suspicion exists and if a >6 hour delay in performing the lumbar puncture and acting on the results is anticipated. Renal function should be regularly monitored whilst on aciclovir, due to risk of acute kidney injury. Aciclovir dose adjustments should be made depending on pre-existing renal function. HIV and syphilis serology should also be checked in patients with encephalitis.

2. Autoimmune encephalitis should be considered. It tends to be more sub-acute in its presentation, and is associated with behavioral disturbances, autonomic dysfunction and stereotyped movement disorders, particular facial movements. MRI can be normal and should not be used to exclude the diagnosis. CSF/Serum antibody testing is performed to confirm the diagnosis and should be guided by a neurologist typically.

(Dr Gordon Anderson, FY1 in Medicine, Northern Health and Social Care Trust; Dr Michael Kinney, ST7 in Neurology, Western Health and Social Care Trust; Dr Mark McCarron, Western Heath and Social Care Trust)

POSTGRADUATE QUIZ

1. The imaging shows a proximal left middle cerebral artery (M2) occlusion (white arrow), on the CT angiogram (bottom image), with a perfusion deficit (green) and established infarct core (red) on the CT perfusion image (top right).

2. The time of onset is crucial in identifying patients suitable for thrombolysis. The current time window is 4.5 hours. Thrombolysis was contraindicated due to the use of anticoagulants. The time window for clot retrieval is typically 6 hours, but is essentially determined by the presence of an accessible proximal clot in the presence of ongoing significant clinical deficit, without substantial established infarct. Clot retrieval was successfully carried out with vessel recanalisation achieved in this case in the neuro-interventional suite by the neuroradiology team.

He made an excellent recovery and was discharged with mildly reduced fine finger movements in his right hand.

(Dr Rebecca Robinson, CT1, Stroke Medicine, Belfast Health and Social Care Trust; Dr Patricia Gordon, Consultant Stroke Physician, Belfast Health and Social Care Trust).

USEFUL REFERENCES

Case 1: Joint Formulary Committee, British National Formulary. London 72. BMJ Group and Pharmaceutical press, 2017.

Case 2: Friedman DI, Liu G, Digre K. Revised diagnostic criteria for the pseudotumr cerebri syndrome in adults and children. Neurology 2013;81:1159-1165

Case 3: Solomon T, Michael BD, Smith PE, Sanderson F, Davies NW, Holland M et al. Management of suspected viral encephalitis in adults—Association of British Neurologists and British infection Association National Guidelines. J Infect 2012;64:347-73

Case 4: Interventional procedures guidance [IPG548] Mechanical clot retrieval for treating acute ischaemic stroke. 2016, NICE. Accessed online [Last accessed 27/04/2017]: www.nice.org.uk/guidance/ipg548

Book Case

Dr Carol Wilson recommends 6 books (5 and 2 halves) and some music for the weary off-duty medic to enjoy.

AN EVIL CRADLING

Brian Keenan. (Vintage 1993. ISBN-13: 978-0099990307. RRP £9.99 paperback)

I read this book not only as an account of a Belfast man held in captivity in the Lebanon for four and a half years, but also to find out how a man from east Belfast somehow stumbled into the political quagmire of 1985 Beirut.

If you read only the Preface you will understand the themes that are explored and form the basis of the narrative.

It explores the cruelty of men, but how that they too are prisoners of their circumstances. Yet it is not this and the descriptions of physical privation, petty cruelty, and inhuman treatment that pervade the book. More it is a testament to friendship, his unlikely friendship with John McCarthy, a friendship that has endured beyond the Lebanon. Keenan, in little more than a paragraph, describes how from being held in solitude he had to decide how much of himself he would reveal to this stranger to bridge the apparent gulf between them. Both men took the step, laying the foundations for what Keenan called the "remaking of humanity".

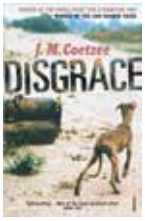
The book starts in Belfast and ends in Damascus – Keenan had not yet come "home", and in answer to the question as to how he came to Beirut – then it was because he had not yet worked out where "home" was. The Keenan at the beginning of the book is something of an enigma, the man at the end of the book only a little less so.

AFTER ANNA

Alex Lake. (Harper 2015. ISBN-13: 978-0008168483. RRP £7.99 paperback)

This is a book I picked up as a 3 for £5 deal. Although billed "The No 1 ebook bestseller" I had not previously been aware of either author or book. A true psychological thriller – no one dies – and although a five year old girl is abducted she reappears a week later but with no recollection of where she has been. You know that there will be twists in the plot, you try to be clever and anticipate the true villain, but until close to the end I missed the clues that were subtly laid out. Like all of modern life, the story is also influenced by the press and more so by the anonymous world of Twitter. It is not high literature, but a good read for a wet Sunday afternoon.

DISGRACE



JM Coetzee. (Vintage 1999. ISBN-13: 978-0099289524. RRP £8.99 paperback)

There are many benefits of attending medical meetings, and a recommendation to read this book made during a late night "discussion session" was one. I had been aware that Coetzee had won the Nobel Prize for Literature was not familiar with his work.

This book is set in post apartheid South Africa – no rainbow nation here. No jubilation, no joy in diversity. This is what I call a "hard" book to read. The themes are difficult and troubling, the characters far from endearing, and even the most sympathetic one does not behave as this reader feels they should. The story told by another author in another style would be unpalatable, but Coetzee's storytelling style makes this a powerful story of individuals in transition in a nation in painful transition.

When asked for "the best" book I have ever read "Disgrace" is my answer.

TINKER TAILOR SOLDIER SPY

John Le Carré. (Sceptre, 2011. ISBN-13: 978-0340993767. RRP £8.99 paperback)

I am a big fan of the John Le Carré 's cold war novels and found it difficult to choose only one. Unlike his more recent novels which have a contemporary setting, the cold war novels are set in a time a little removed from our immediate experience and our appreciation of them may be coloured by this. Le Carré of course had worked for MI5 and MI6, with his cover, it is said, being blown by Kim Philby.

This is a novel populated by men, with the exception of Connie Sachs, an analyst with an encyclopaedic memory, and references to Smiley's erstwhile wife, Ann.

This is ultimately a story driven as much by character as by storyline. The basic storyline is simple – Smiley is reeled back in from an uncomfortable retirement to find a possible "mole". Each time I come to the story, or see a rerun of the television serialisation of the book, I am still slightly taken aback when the mole is eventually revealed.

There are blurred lines between good and ill; "they" are more like "us" than is comfortable; no character is free from their own guilt. The truth is always bathed in shades of grey.

Now read The Spy who Came in from the Cold.

VOICES AND THE SOUND OF DRUMS. AN IRISH AUTOBIOGRAPHY

Patrick Shea. (Blackstaff Press 1981. ISBN-13: 978-0856402470. Out of print c. £3-£6 paperback)

As I write this I have to confess to having met Paddy Shea in his later years.

The book is often introduced as being written by the first Catholic to have reached the position of Permanent Secretary in the Northern Ireland Civil Service since Bonaparte Wyse. However the book is so much more than this. About half the book is taken up by his memories of his childhood and school days. Born in 1908, the son of an Irish speaking RIC officer, his early days encompassed the Home Rule Bill of 1914 – in celebration of which he remembers his father taking him to a bonfire, the First World War, and the Easter Rising. As he approaches and enters his teenage

years he relates his recollections and experiences of the Treaty, irregulars, Black and Tans, turbulence and partition. Rather than the history of acadaemics, it is written about the people he met and is written with a soft and generous touch. He describes how years later he found an old notebook of his father's and under the name of a man known to be a leader of a flying column was written, "Treat with respect. He has shown kindness towards wounded men".

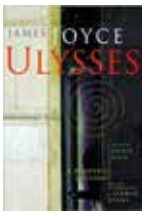
Flags have always caused problems in NI. Shea was involved in two skirmishes. The first concerned the jubilee of George V – in Enniskillen, the Ministry of Labour flew the union flag, only for it to be taken down by Customs and Excise in favour of flying their own flag. Tommy the cleaner had several trips up the flagpole before their seniors in Belfast reached a final decision. The second was on the death of George V – parliament sitting so flag should be flying, monarch dead flag should be at half-mast. A decision for the Head of Civil Service!

Shea describes his Civil Service career with remarkable generosity given the fact he had undoubtedly spent too many years in grades below that which he ultimately reached.

Like all men of substance, Shea had another side to his personality and for him it was a love and appreciation of the arts. He wrote a number of short plays, some broadcast on Radio **Éireann** and the BBC.

For his assessment of the politicians he encountered – read the book.

ULYSSES



James Joyce. (Wordsworth Editions 2010. ISBN-13: 978-1840226355. RRP £1.99 paperback).

FOUCAULT'S PENDULUM

Umberto Eco. (Vintage 2001. ISBN-13: 978-0099287155. RRP £9.99 paperback).

I will finish with two books – 2 that have defeated me in spite of multiple attempts to complete.

The first is James Joyce's "Ulysses". The second is Umberto Eco's "Foucault's Pendulum"

As I pondered what I might actually say about two novels I have not actually read, I did find a dubious link between them by random slouching on the Internet. There is an International James Joyce Foundation (https://joycefoundation.osu.edu) of which Umberto Eco is a trustee!

I went back and looked at my copy of Ulysses, which I have had for many years – there is a London to Barcelona boarding pass at page 22, the extent of my last foray into it. On looking more closely at this it is billed as "A Reader's Edition" edited by Danis Rose. Now this is when it really becomes interesting, and I was introduced to the world, occasionally bitchy, of Joycean scholarship, the Joyce estate and the fiercesome and litigious protection of the this by Joyce's grandson Stephen (who insisted being called Stephen James) until 2012 when the final copyrights expired.

Ultimately my brain likes novels with a standard construction, a storyline based in some semblance reality, so the style of Ulysses and the esotericism of Foucault's Pendulum are beyond what my brain was designed to appreciate.

So instead of fighting with the impossibility of ever reading these novels, go listen to Allergri's Miserere (The Sixteen, Harry Christophers)

Game Changers

DIAGNOSIS DIZZY?

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The 'dizziness' consultation can be one of frustration for both patient and doctor. At times, the history is clear and the diagnosis evident. However, often this is not the case and trying to glean an accurate history and tie in examination findings to arrive at a diagnosis is challenging. Management varies significantly depending on the cause of the dizziness, so a correct diagnosis is crucial.

Obtaining an accurate history remains the cornerstone of diagnosis. However, we have a useful battery of examinations to aid in making the diagnosis. Technology has also advanced with an effective and user-friendly device for use in the outpatient clinic. Traditional vestibular testing involved returning to the department on a different day to see the specialist Audiologist for Electronystagmography and Calorics testing. These provide limited information about vestibular function and the time, cost and patient disruption they cause are not insignificant. This new technology is VHIT (video head impulse testing). It is a simple device worn like a pair of glasses. Sophisticated hardware and software detects the eye movements on head impulse testing and this gives accurate information on the function of all six semicircular canals. This information is immediately available to the ENT doctor and aids diagnosis. This has proven a Game Changer for the ENT dizziness consultation and allows a diagnosis to be made on the first outpatient attendance, which in turn leads to earlier treatment intervention and fewer review consultations.[1]

1. Yung et al. *Consultant-led, multidisciplinary balance clinic: process evaluation of a specialist model of care in a district general hospital* Clin. Otolaryngol. 2014, 39, 95–101

CAN WE PREVENT PSYCHOSIS? INNOVATIVE SERVICE OFFERS NEW HOPE

Dr C Mulholland, Dr D Mongan, Dr A Boyd, Dr C Shannon

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Schizophrenia is one of the top ten causes of disability globally.[1] Recent attention has focused on the importance of early intervention and prevention, and the identification of the prodromal or pre-psychotic phase. Clinical characteristics which define those at increased risk of psychosis (an 'At Risk Mental State' or ARMS) have been explored. These include attenuated psychotic symptoms (such as mumbling sounds), brief limited intermittent psychotic episodes (BLIPS) where definite psychotic symptoms last for less than one week, and trait vulnerability (a first-degree relative with psychosis or personal history of schizotypal personality disorder) plus impairment of social functioning.[2] The risk of transition for those who meet these criteria is 18% at 6 months and 36% at 3 years (meta-analysis; n=2500).[3] Research suggests that effective treatments are available; cognitive-behavioural therapy reduced the rate of transition at 12 months.[4]

The STEP (Service, Treatment, Education and Prevention) Team is an initiative for young people aged 16 to 35 years in the Northern Health and Social Care Trust. This is the only bespoke psychosis prevention service in Northern Ireland and one of only a handful in the UK. Intervention includes a variety of methods, including one-to-one and group-based psychological therapies, and considers the need for medication on an individual basis. The STEP Team is representative of a new paradigm in mental health service provision. By intervening early in order to prevent psychosis from developing or progressing much of the associated disability can be reduced with obvious benefits for the individual and society.

1. WHO. Burden of Mental and Behavioural Disorders. Mental health: new understanding, new hope. World Health Organisation, Geneva, 2001;19-45.

2. The psychosis high-risk state: a comprehensive state-of-the-art review. Fusar-Poli P, Borgwardt S, Beechdolf A et al. *JAMA Psychiatry*. 2013 January;**70(1)**:107–120.

3. Fusar-Poli P, Bonoldi I, Yung AR et al. Predicting psychosis: meta-analysis of transition outcomes in individuals at high clinical risk. *Arch Gen Psychiatry* 2012;**69(3)**:220–229.

4. Stafford MR, Jackson H, Mayo-Wilson E et al. Early interventions to prevent psychosis: systematic review and meta-analysis. *BMJ* 2013;346:f185.

THE SUCCESS OF INTRAVITREAL INJECTIONS

Mr Matthew O'Donnell, Dr Michael Williams

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Age-related macular degeneration (AMD) is the leading cause of visual loss in those over 65 years of age in the developed world. Advanced AMD consists of two forms, dry (geographic atrophy or GA) and wet (neovascular AMD): both can coexist. It is increasingly considered that dry AMD may be the default pathway of ageing. While there is currently no medical treatment for dry AMD, wet AMD can be treated using regular intravitreal injections of anti-vascular endothelial growth factor antibodies (anti-VEGFs) such as ranibizumab and aflibercept. Such treatment preserves visual acuity in most patients by preventing scarring.

Excess VEGF inhibition may contribute to GA. In the Comparison of AMD Treatment Trial (CATT) 1185 participants with wet AMD were treated with anti-VEGFs. For the 1011 with no GA at baseline, the cumulative incidence of GA was 17% at 2 years.[1] It's not clear if this was associated with the pathological progress of AMD, or was an effect of intravitreal anti-VEGFS or was part of

normal ageing. Animal models indicate a physiological role for VEGF secreted by the retinal pigment epithelium in the maintenance of choriocapillaris health, crucial for outer retinal function.[2] However interesting the debate may be, the benefits of anti-VEGFs for most patients should be remembered. In the CATT and in the Inhibition of VEGF in Age-related choroidal Neovascularisation (IVAN) trial,[3] both trials comparing anti-VEGF drugs and regimens for wet AMD, the overall mean visual acuity gain after two years of anti-VEGFs was an impressive three lines of vision on the visual acuity charts used.[1,3] The advent of anti-VEGFs in ophthalmology 10 years ago led to a paradigm shift in the treatment of many retinal diseases, transforming outcomes for patients. Patient centered treatment is an ideal approach, but the present challenge is to optimise regimens for wet AMD for the large number of patients requiring treatment.

1. Grunwald et al. Incidence and Growth of Geographic Atrophy during 5 Years of Comparison of Age-Related Macular Degeneration Treatments Trials. *Ophthalmology*. 2017 Jan;**124(1):**97-104.

2. Saint-Geniez M, Kurihara T, Sekiyama E, Maldonado AE, D'Amore PA. An essential role for RPE-derived soluble VEGF in the maintenance of the choriocapillaris. *Proc Natl Acad Sci U S A* 2009 Nov 3;**106(44):**18751-18756.

3. Chakravarthy U et al. Alternative treatments to inhibit VEGF in age-related choroidal neovascularisation: 2-year findings of the IVAN randomised controlled trial. *Lancet* 2013;**382(9900)**:1258-674.

So you want to be a **Mohs surgeon?**

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Provenance: invited article.

WHAT IS MOHS MICROGRAPHIC SURGERY AND WHAT DOES IT INVOLVE?

Mohs micrographic surgery (MMS) is a highly specialised surgical technique performed by dermatologists under local anaesthesia and used for the treatment of complex skin cancers. The technique was first developed by Frederic Mohs in the 1930s. The process involves taking horizontal sections of skin tissue which are then carefully mapped, colour-coded and examined microscopically in real-time. This technique differs from other surgical excision techniques which involve examination of vertical sections. During the process of MMS, 100% of the tissue margins are evaluated to ensure that the tumour is completely clear prior to repair of the skin defect. It therefore results in the highest cure rates for complex skin cancer (up to 99%) and minimises removal of normal tissue. Depending on the size of the defect post MMS, there are often several repair options available which should be discussed with the patient for most satisfactory results. These include; secondary intention healing, direct linear closure, use of a local skin flap or skin graft repair. MMS is recognised as the gold standard treatment for high-risk basal cell carcinoma (BCC). 'High Risk' BCCs have a greater risk of recurrence and are typically located on the central face, periorbital region, nose, lips and ears, where it is essential to preserve function and cosmetic appearance. It is also indicated for other aggressive skin tumour types including; squamous cell carcinoma, dermatofibrosarcoma protuberans, microcystic adnexal carcinoma, lentigo maligna and extramammary Pagets disease.

ADVANTAGES AND DISADVANTAGES OF MMS AS A SUBSPECIALTY?

MMS is a very meticulous staged procedure. It is performed in an outpatient setting and can take several hours to achieve complete clearance of any skin cancer. In patients with deep infiltrating tumours the procedure may be prolonged and it can become more difficult to remove a large tumour in one day. This is often disappointing for both the patient and clinician and the larger the resulting defect, the more challenging it is to repair. Despite these obstacles, MMS is a highly rewarding procedure for the operator, allowing confident removal of 99-100% of a skin cancer on a site where cosmetic appearance is of importance. It also involves the use of more advanced surgical techniques to repair the resulting defect. If you are a hands-on person and have good diagnostic skills but you also enjoy managing patients with other complex acute and chronic conditions, then a career in dermatology with a sub-specialist interest in MMS maybe the path for you.

BECOMING A MOHS SURGEON

Mohs surgeons are Dermatologists who have performed additional fellowship training to become experts in the field of MMS, skin cancer management and dermatological surgery. After obtaining formal medical qualification, a doctor interested in a career in dermatology must complete 2 years of foundation training (FY1, FY2) followed by a further 2 years of core medical training (CMT). During this time, membership of the Royal College of Physicians (MRCP) examinations must be obtained before applying for a 4-year training post in Dermatology. Following award of certificate of completion of training (CCT), an additional year may be granted to undertake a fellowship to gain sub-specialisation.

There are various specialist centers across the UK which offer post CCT Mohs Fellowships. These are competitive posts offered to motivated trainees, demonstrating an interest and flare for this sub-specialty. Other fellowships may be undertaken outside the UK, in Europe and the USA, however additional qualifications are often a requisite to work abroad. It is a recommendation to complete at least 1 years Mohs fellowship, during which time the trainee will perfect their skills in the Mohs technique, which requires manual dexterity and precision alongside learning the steps involved in the processing of frozen sections and histological interpretation of slides, and developing advanced skills in surgical repair procedures.

THE FUTURE: WHY BECOME A MOHS SURGEON

With the continued rise in the incidence of skin cancer particularly throughout the UK, dermatology is becoming more of a surgical specialty and with many skin cancers arising on the head and neck area, these is a high demand for colleagues with an interest in cutaneous surgery, who can offer the best management for our patients. MMS is a very intricate and unique subspecialty, and although challenging, it is highly rewarding and offers a lot, especially in terms of overall clinician and patient satisfaction.

THE ULSTER MEDICAL JOURNAL

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Manuscripts should be accompanied by a covering letter **signed** by all the authors agreeing to publication and stating that the work has not been published elsewhere; and stating that they have been actively involved in the preparation of the paper and outlining their contribution to the paper. Any conflict of interest should be declared.

A **PDF** copy of the printed and signed covering letter is ideal for electronic submission.

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Colour images and tables are encouraged and there is currently no charge for colour reproduction.

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Dr Purvis will be pleased to advise on the preparation of manuscripts on request.

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    4. the year.
    5. volume number and issue number (in brackets) **in bold**.
    6. first and last pages.

- *Example:* Devlin LA, Price JH, Morrison PJ. Hereditary non-polyposis colon cancer. *Ulster Med J* 2005;**74(1)**: 14-21.
- Book references should give the author, title, edition, town of publication, name of publisher, year of publication, and, where appropriate, volume and page numbers.

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Front cover: Magee College, Londonderry, one possible location for a new medical school in Northern Ireland.