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Editorial

Reading Between the Lines

It was always apparent, so went the old saw, that one knew when electronic companies were successful because they moved into smaller premises. So it would seem is the case with aortic aneurysms and their associated incisions. One of the most astonishing clinical paradigm shifts in the last decade has been the employment of an endovascular approach to aortic aneurysm repair. In this edition, our review paper authored by Andrew England and Richard McWilliams provides a timely exposition on the subject.

Back in the day, as a senior house officer in Vascular Surgery, in the small hours, I was assisting a mild -mannered Scottish senior registrar with a case of impending aortic rupture. To date, the most shocking expletive I had ever heard him utter was 'Jings!' During the emergency procedure, the aorta abruptly ruptured, and I noted with increasing interest two things: my own increasing tachycardia and how quickly someone's cardiac output could well up over the edges of the abdominal wound. Suddenly, my colleague uttered, staccato, a single word, (originally an exhortation to reproduce), and one heard on street-corners everywhere throughout these islands. Its emotional force took me slightly by surprise. Years later, walking back to his home on a cold Scottish night, in the course of our reminiscence, I remembered that occasion: emotion recollected in tranquillity. "Barry" he said in his soft Scottish burr, "It was simply a brief prayer for continence." The patient, incidentally, survived. Aortic aneurysm rupture surgery always struck me as a high wire act: swashbuckling heroes, big surgery, massive potential volume shifts, impressive co-morbidities, and minimal preparation time. Part of the local EVAR success story is unquestionably due to the pragmatic, engaging and accommodating personalities of our interventional radiologists and vascular surgeons, and for this they rightly deserve great credit.

The UMJ Editorial board is committed to encouraging academic endeavours in junior doctors and in medical students. Accepted wisdom had been that the case report was an ideal starting point, but one can argue that this is no longer the case. There are dedicated journals and on-line resources for case reports of course, but many publications now limit these on the understandable grounds that their actual worth is equivocal, and more pointedly, case reports lower a journal's impact factor. Occasionally an apparent lack of senior guidance, standard of English, and the somewhat calculated nature of the extravagant author numbers weighs heavily with our reviewers.

Given that is there is significant weight attached to academic publishing as a vehicle for career progression, the UMJ editorial board wishes to assist. We shall still accept and publish occasional case reports but the threshold will be high. Fundamental will be a requirement to adhere strictly to the new instructions for authors (please see below). Implicit in these will be the understanding that all authors, particularly the guarantor, are aware of all versions at all stages and that other specialist input is appropriately recognised.

In addition to case reports and papers, other avenues are available. 'Letters to the Editor' should be viewed as an acceptable alternative. Interesting clinical cases, audits, and even the occasional rant at me are fine. Because these are accepted -or rejected - by the editor, they are not restricted by the journal's review regulations and thus their transit is less complex and more likely to succeed. The 'Grand Rounds' feature, which is proving very popular, is aimed at undergraduate and postgraduate examination candidates. This would be a very appropriate vehicle for trainees but does require, reasonably, the presence of a senior author.

In 2013, The editorial board also plans to unveil a new one-page section. Its purpose would be to encourage interactivity and inquisitiveness amongst the junior UMJ readership. Such a section will be limited to one page per paper edition. The subject matter will be wide-ranging, but could include summaries of studies in other journals; picture questions and even historical vignettes; each of which would be of the order of 80-100 words.

The Journal, this year, will phase in a new set of instructions for authors and this will incorporate a guarantor form. The guarantor will typically be the senior author, and will effectively underwrite the entire project. It is anticipated that this revision will bring the UMJ into line with other mainstream medical publications. The new instructions can be found on the Ulster Medical Society website (www.ums.ac.uk/journal) and will be printed in the May 2013 edition. The only exception to this process will be the letters to the editor, which will be accepted or rejected by the editor.

Finally, may I wish you all a peaceful and professionally rewarding 2013. Please keep on sending me your good papers.

Barry Kelly
Honorary Editor

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Review

Endovascular Aortic Aneurysm Repair (EVAR)

Andrew England[1], Richard McWilliams[2]

Accepted 20 December 2012

Over the past 20 years the availability of aortic stent-grafts has allowed a major step change in the management of abdominal aortic aneurysms (AAA). Prior to this open surgical resection, first described by Charles Dubost in 1950, was the mainstay of AAA management(1). For elective cases open surgical repair has now largely been superseded by the deployment of a covered stent (stent-graft) through minimal surgical access in the common femoral arteries. Over the past few years there have been significant developments in stent-graft technology and an improved understanding of how best to utilise stent-grafts when treating aortic disease. Despite this, their role in the management of a patient with an AAA is still, at times, debatable. This article aims to discuss the modern day utilisation of aortic stent-grafts in patients with AAA.

INTRODUCTION

Based on data from the Health and Social Care Information Centre there were 63.9 million people registered with a general practitioner (GP) in the United Kingdom in 2007(2). For those aged between 65 and 80 years the incidence of an AAA is 7.6% in men(4) and lower (4.2%) for women(5). For an average General Practice of 6,300 patients(3) this would suggest that around 44 patients will have an AAA at any one time. If left untreated, Wilmink and Quick(6), estimate that a third of these aneurysms would eventually rupture. Rupture is usually lethal with overall mortality rates of up to 90% common(7). Currently around 7,000 people in England and Wales die each year as a result of ruptured AAA(8). Endovascular aortic aneurysm repair (EVAR) is a treatment option directed at removing the risk of rupture in patients with known AAA. Over recent years EVAR has developed into the most common method for the elective management of AAA(9) and large randomised controlled trials (RCTs) are evaluating its efficacy in those with rupture(10, 11). Potential advantages of EVAR over traditional open repair include reduced time under general anaesthesia, elimination of the pain and trauma associated with major abdominal surgery, reduced length of stay in the hospital and intensive care unit (ICU), and reduced blood loss(12).

Like open surgical repair, decisions regarding whether to use EVAR for the management of an AAA are still partly based on the maximum aneurysm diameter. The natural course of an AAA is continued expansion of between 2-3mm per year and a rupture risk which is exponentially related to AAA diameter(4, 13). Treatment recommendations are based on data from the UK Small Aneurysm Trial(14) and advise the referral of patients with large AAA (>5.5 cm) to a vascular specialist for consideration of surgery (15). Patients with smaller aneurysms, either found incidentally or in screening programmes, are now followed up with surveillance ultrasound (US) examinations generally run through Vascular Surgery units.

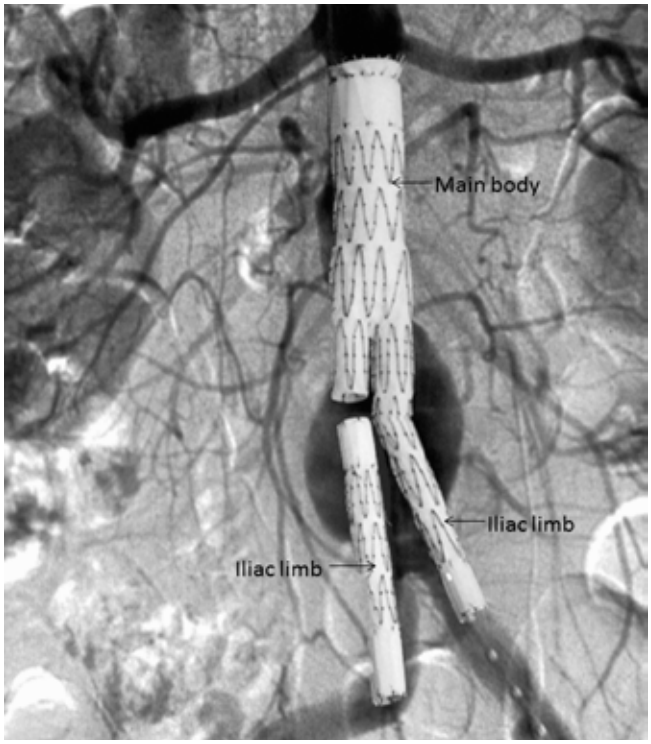

Fig 1. Diagram illustrating the components of a bifurcated modular aortic stent-graft used to treat infrarenal abdominal aortic aneurysms.

TECHNIQUE

EVAR involves the internal lining of the aorta using a stent-graft. A stent-graft comprises a metallic (stainless

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steel or nitinol) skeleton covered with an impermeable (polytetrafluoroethylene or polyster) fabric and is implanted using fluoroscopic guidance through the femoral arteries. Sealing of the device against the aortic wall is achieved above (proximal) and below (distal) the aneurysm and this thereby excludes the aneurysm from the systemic circulation and aims to prevent subsequent rupture (**Fig 1)**. Sealing of the stent-graft unlike a surgically sutured anastomosis is achieved by the radial force of the stent-graft on the aortic wall. Three configurations of stent-graft are currently available: tube, bifurcated and aorto-uni-iliac (AUI) (**Fig 2**). Bifurcated systems are used in the majority (90%) of cases(16-18) having the added advantage of being more stable within the aorta and avoiding the risks of supplying blood to the lower limbs via a single common iliac artery (CIA).

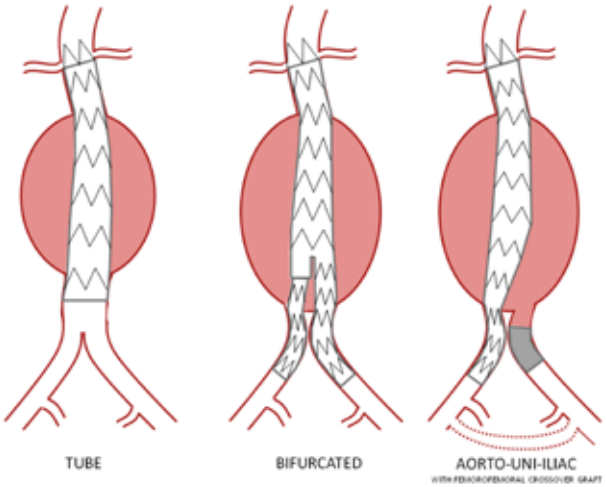


Fig 2. Configurations of aortic stent-graft.

EVAR was first undertaken by a Ukranian surgeon Nicholas Volodos in 1987(19); however, it was a later publication by Juan Carlos Parodi in 1991(20) that was responsible for the widespread introduction of EVAR across the globe. In the UK, EVAR is typically performed by an endovascular team that includes a vascular surgeon and an interventional radiologist. Procedures may be performed under general, regional or local anaesthesia. The stent-graft is delivered into the aorta within a long flexible sheath of between 16F to 24F (8mm) in diameter which allows the stent-graft to be remotely positioned within the abdominal aorta. Surgical exposure and control of the common femoral arteries is the most common means of accessing the aorta. Totally percutaneous EVAR is now available with haemostasis achieved using a percutaneous suturing device. This technique requires careful patient selection with excessive vessel calcification and obesity being associated with technical failures and increased access site complications(21).

For modular devices, composed of two or more parts, the main component (main body) is inserted first. The undeployed device is then positioned so that the fabric at the proximal margin of the device is immediately below the most caudal renal artery. Once deployment has started, a check angiogram is undertaken to confirm the deployment position and the patency of the renal arteries. The main body is then released and the device extended so that both distal ends are within the CIAs (**Fig 1**).

CIA aneurysms are present in around 43% of patients with intact AAA(22). For these patients a decision is made on whether to extend one or both stent-graft limbs into the external iliac artery (EIA). If this is the case then it may be necessary to embolise the internal iliac artery (IIA) in order to prevent backfilling of the aneurysm. Occlusion of an IIA may cause significant buttock claudication and iliac branched devices (**Fig 3**) are now available which provide an option for preserving blood flow to the IIA(23). Whichever strategy is employed, every effort is made to preserve at least one IIA since bilateral IIA occlusion is associated with a risk of neurological and ischaemic complications.

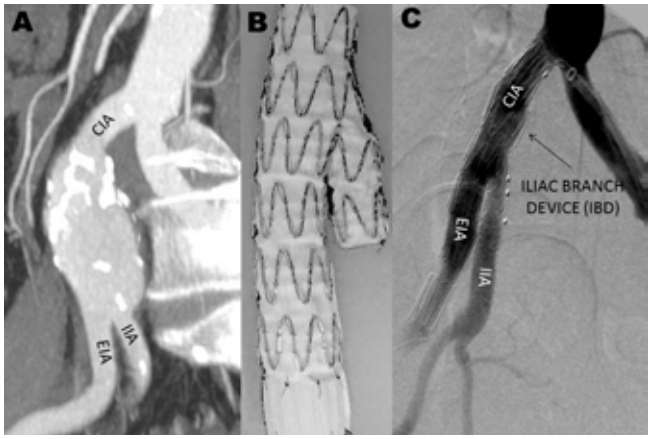
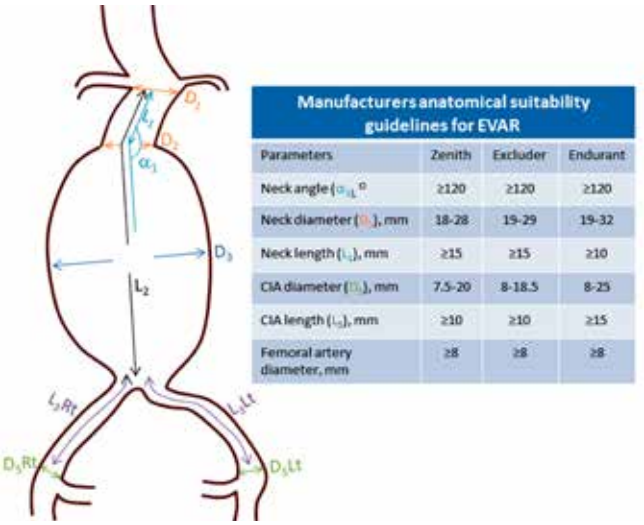


Fig 3. Iliac branched devices (IBD) are an option for treating an isolated CIA aneurysm or an aorto-iliac aneurysm avoiding the need for deliberate occlusion of the IIA. Image A, a CT maximum intensity projection (MIP) demonstrating an isolated CIA aneurysm. Image B shows an in vitro deployed IBD. Image C, post-procedural angiogram of an isolated CIA aneurysm (same case as image A) successfully treated with an IBD.

PATIENT SELECTION

The majority of AAA are first diagnosed on ultrasound (US). If EVAR is considered then a further assessment of aneurysm morphology is necessary. For the majority of patients this will involve a thin-slice contrast-enhanced CT scan of the abdomen and pelvis. The CT data are then displayed as a series of virtual 3D aortic models. From this the diameter, length and quality of the aorta immediately below the renal arteries (aortic neck) can be assessed together with the suitability of the distal landing zones (CIA) and femoral artery access vessels (**Fig 4**). One of the fundamental aims of the EVAR procedure is to cover the entire aorto-iliac segment from below the renal arteries to the CIA bifurcation. Vessel length measurements are therefore very important and stent-grafts are planned to be of adequate length whilst allowing sufficient overlap of the modular components. Suitability for EVAR is also determined by the relevant stent-graft manufacturer's eligibility criteria set down in their '*Instructions for Use*'. One of the strictest criteria surrounds the aortic neck which, for the majority of devices, must be



Manufacturers anatomical suitability guidelines for EVAR

Parameters	Zenith	Excluder	Endurant
Neck angle (α_1)°	≥120	≥120	≥120
Neck diameter (D_1), mm	18-28	19-29	19-32
Neck length (L_1), mm	≥15	≥15	≥10
CIA diameter (D_2), mm	7.5-20	8-18.5	8-25
CIA length (L_2), mm	≥10	≥10	≥15
Femoral artery diameter, mm	≥8	≥8	≥8

Fig 4. Criteria used to assess anatomical suitability for EVAR.

parallel for 15 mm below the lowest renal artery, free from thrombus and excessive angulation. Off-label use of stent-grafts, by treating patients who do not fulfil such anatomical inclusion criteria, is associated with poorer outcomes but is known to be common practice(24).

It is also important that any preoperative imaging data are scrutinised for the presence of non-aortic pathology. Incidental pathology has been reported in over 75% of cases, with around 20% considered as clinically significant e.g. malignancy(25). In these situations unexpected findings may affect the decision to treat the aneurysm or alter the timing of repair.

COMPLICATIONS

Complications following EVAR can occur early or late and are a distinct limitation. Large RCTs have documented a 20-30% higher complication rate for EVAR when compared to open surgery(26, 27). This has led to some opposition to the widespread use of EVAR. Renal impairment, graft-related endoleak, device occlusion, migration, distal embolisation and femoral access site complications all may be encountered(28).

A decline in renal function is often seen after EVAR and usually reverts back to preoperative levels. Permanent renal damage may result from deliberate or unintentional coverage of a renal artery by the stent-graft fabric, toxic effects of the iodinated contrast media and cholesterol emboli. Graft occlusion may occur and is generally the result of poor blood flow due to either graft kinking or poor outflow(29). Infection of an aortic stent-graft and embolisation to the lower limb from arterial debris dislodged during implantation are both rare. Vascular access complications can occur and include haematoma, infection and seroma.

Persistent blood flow outside the stent-graft and within the aneurysm is defined by White et al. (30) as an endoleak (**Fig 5**). The most serious endoleaks are types I and III which are associated with aneurysm enlargement and rupture. Secondary intervention to correct these endoleaks is almost always necessary. Whilst rupture has been reported with type II endoleaks these are considered to have a more benign course and conservative management is recommended unless there is evidence of continuing aneurysm enlargement.

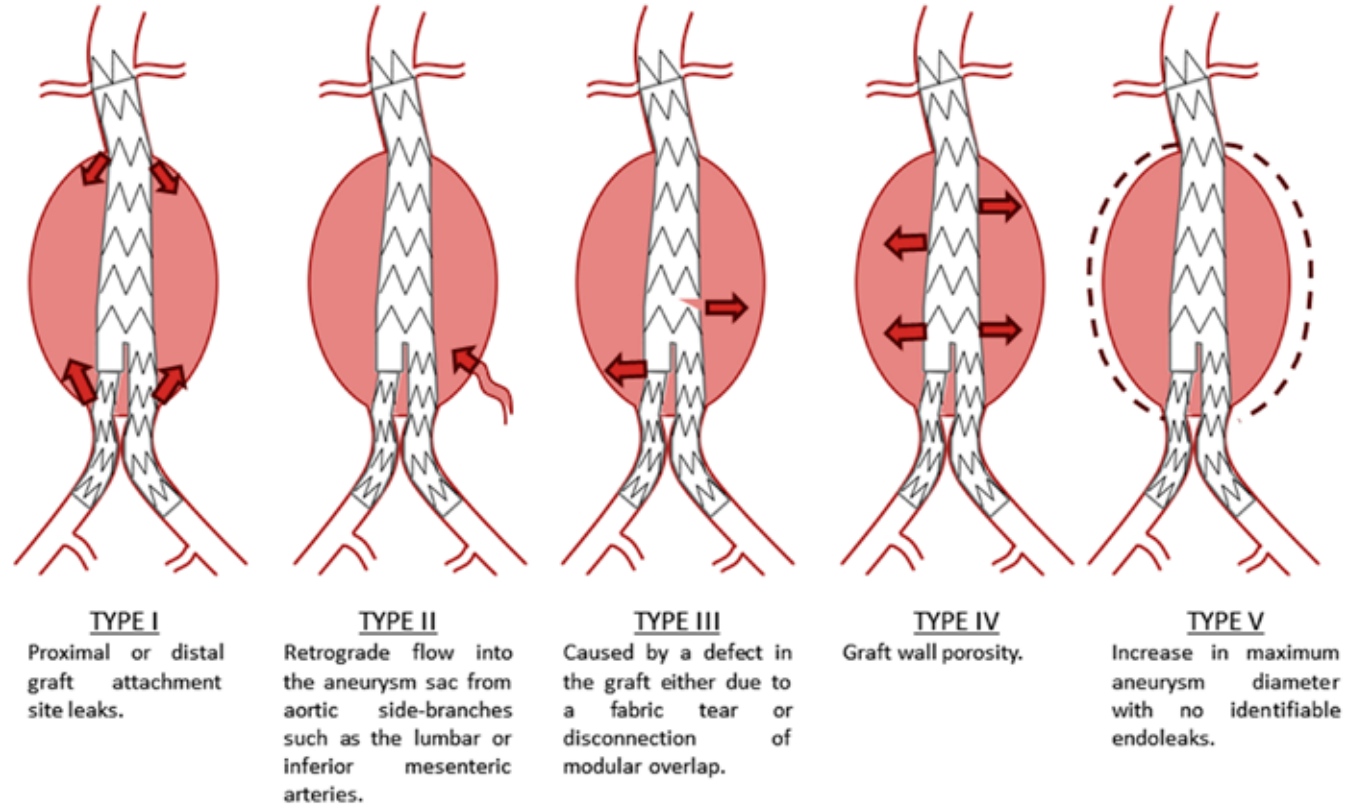


Fig 5. Endoleak classification system.

Stent-grafts are subjected to distraction forces from the relentless force of pulsatile blood flow. These distraction forces act longitudinally and challenge the fixation of the graft and the modular overlap zones. Failure of fixation will lead to migration or disconnection of overlapping components with late type I or type III endoleaks and the risk of aortic rupture. Graft limb distortion with subsequent thrombosis can also arise secondary to device migration. Metallic component fractures and fabric tears have also generated additional durability concerns. Component fractures may lead to diminished stent strength and loss of radial force which can result in graft migration. The jagged ends of metal fractures can also result in fabric tears and subsequent endoleaks.

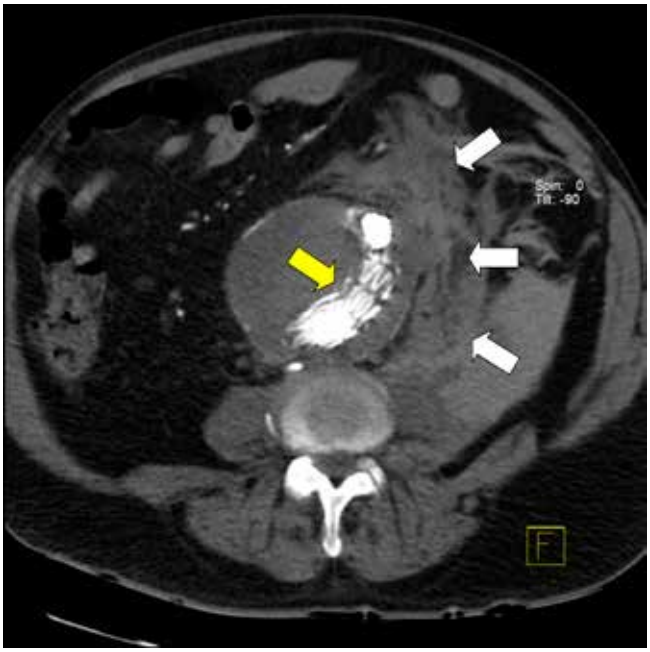


Fig 6. Post-EVAR CT image of a patient with a ruptured AAA. The aortic stent-graft (yellow arrow) can be seen within the aneurysm and there is extensive haemorrhage surrounding the aorta (white arrows)

SECONDARY INTERVENTION AND SURVEILLANCE

The complication rate associated with EVAR has been described by some as its Achilles heel. The EUROSTAR registry reported EVAR outcomes for 2846 patients and highlighted reintervention rates at 1, 2, 3 and 4 years of 6, 9, 12 and 14 per cent(31). These rates are similar to those reported in the main UK and European RCTs (32). There is pathological evidence that the aneurysm wall atrophies with the depressurisation that results from an initially successful EVAR. If there is late repressurisation of the aneurysm due to endoleak then rupture may occur(**Fig 6**). Rupture should be an urgent consideration in any post-EVAR patient presenting with acute abdominal pain with or without collapse. In the UK EVAR trials a total of 27 post-EVAR ruptures have been reported(33). Eighty-two per cent of these ruptures occurred greater than 30-days following implantation and the majority of these (63%) were in patients with previously

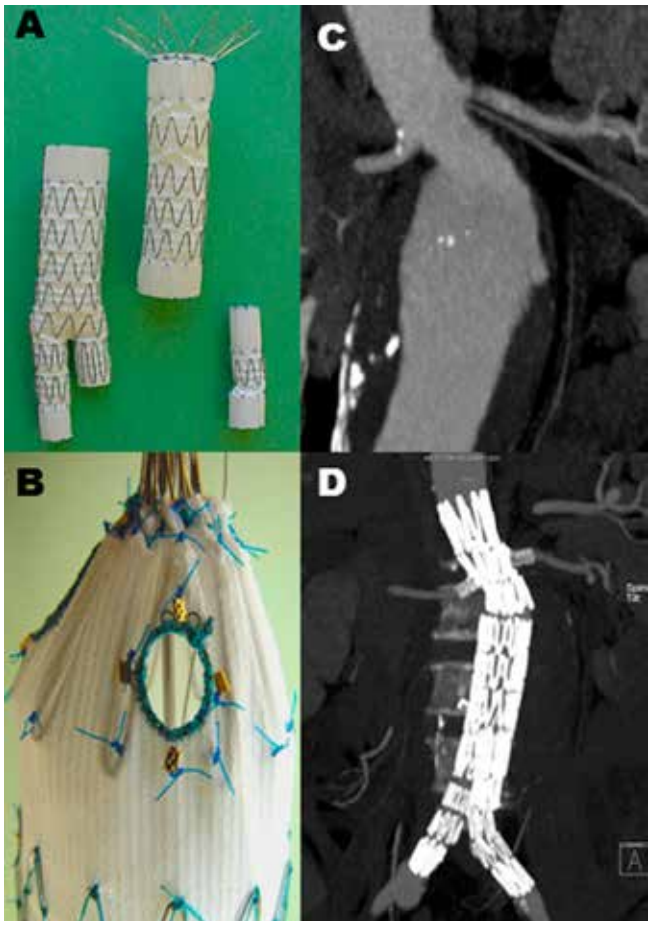


Fig 7. An ***in vitro*** deployed fenestrated stent-graft (Image A). Image B – a magnified view demonstrating a pre-planned fenestration within the proximal component. Image C – a preoperative CT scan of patient with a short and angulated aortic neck that is unsuitable for standard EVAR. Image D - post-operative CT scan (same patient as Image C) showing a deployed fenestrated stent-graft with exclusion of the AAA and patent visceral arteries.

reported complications or signs of failed EVAR. In a review of the literature Schlösser et al.,(34) also reported on post-EVAR ruptures (n=270). In this series 35 patients had no prior abnormalities found during follow-up, 39/101 ruptures showed no change in aneurysm diameter during follow-up and 26/101 showed evidence of aneurysm regression. Research has identified types I and II (with sac enlargement) endoleaks, migration and graft kinking as risk factors for aortic rupture(33). With the possibility of rupture all EVAR patients are recommended to undergo regular follow-up imaging surveillance, especially for patients where secondary intervention would be considered.

Current EVAR surveillance protocols are mostly based on costly and time-consuming imaging procedures and aim to detect adverse events such as graft migration, endoleaks or aneurysm enlargement. These imaging procedures are either associated with serial radiation exposure or may be potentially harmful due to the use of iodine- or gadolinium-based contrast agents. CT is considered by many as the gold standard for

imaging surveillance and is typically performed at 1, 6 and 12 months and then annually thereafter. With the economic and logistical drawbacks of repeat CT a demand has arisen for an alternative examination. Combined ultrasound and plain abdominal radiography (AXR) has emerged as an alternative with studies confirming their efficacy(35, 36).

DEVICE MODIFICATIONS

The main anatomical feature that limits the role of current devices is the quality and length of normal aorta below the renal arteries (aortic neck). For standard stent-grafts the fabric cannot be placed above the renal arteries without occluding them. If the aortic neck is small or non-existent then renal blood flow may be preserved by manufacturing holes or fenestrations in the fabric and sealing the aneurysm above the renal arteries. Fenestrated stent-grafts (**Fig 7**) have been available for several years and are now in widespread use. The locations of the fenestrations must be carefully planned using preoperative CT data and are manufactured to be at the correct height and correct position on the circumference of the graft.

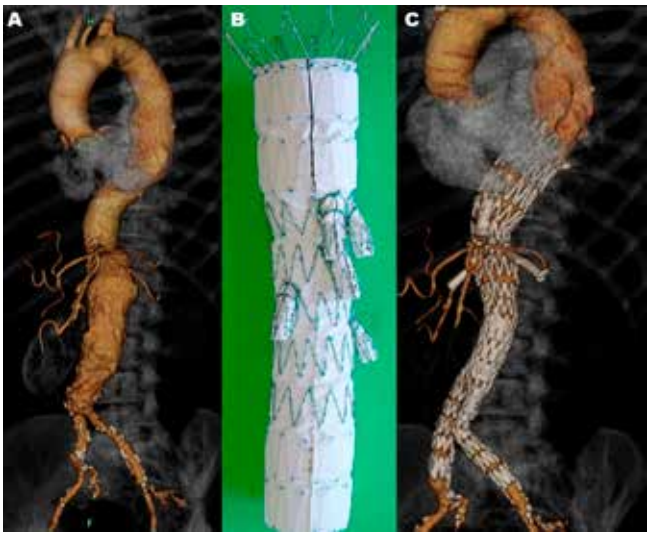


Fig 8. Image A demonstrates an AAA where apposition of the stent-graft against the aortic wall across the visceral arteries would be unlikely. For this situation a branched aortic stent-graft (Image B) was successfully utilised (Image C).

Fenestrated stent-grafts are not well suited if the fabric of the stent-graft cannot abut the aortic wall at the level of the visceral arteries. This is common in thoraco-abdominal aortic aneurysms (TAA) and for these situations custom made stent-grafts with side branch protrusions can be used(37). The idea is that the stent-graft side branches will provide a bridge to reduce the distance from the main body to the visceral artery orifice (**Fig 8**). Covered stents are inserted through the branches and help achieve a better seal due to a longer overlap zone.

The utility of aortic stent-grafts has also extended to aneurysm disease above the diaphragm (TEVAR). Even with a lack of RCT evidence stent-grafts are now the preferred treatment option for aneurysms involving the thoracic aorta. The less invasive nature of TEVAR offers the potential for lower mortality and post-operative morbidity. Anatomical suitability is still a concern; many thoracic aneurysms lie close to or involve the origins of the great vessels arising from the aortic arch. Advances in fenestrated and branched stent-grafts have expanded the application of EVAR for these more complex aortic pathologies and those involving the thoracoabdominal aorta and aortic arch(38). Combined surgical debranching and stent-graft implantation procedures exist(39) and the implantation site can also be lengthened, whilst preserving side-branch blood flow, using a branched stent-graft(40).

In the early days of EVAR treatment decisions were relatively straightforward. With the introduction of these newer technologies there is an increased range of endovascular options for patients. Appropriate consideration of all of these newer techniques must be given when considering a patient for any intervention.

The combination of metal and currently available fabrics has resulted in cases of fabric degeneration with resulting endoleaks. Alternative devices which do not rely on a fabric mounted on a metallic frame are being considered. Such devices may allow the treatment of an AAA by modulating haemodynamic flow(41). In other areas research has focused on treating the aneurysm by the injection of polymers and elastomers. The Endologix Nellix system (Endologix, Irvine, CA) uses two polymer PTFE endobags that are inserted and seek to freeze the aneurysm and prevent any further morphological changes. Other researchers have attempted to fill the aneurysm with polymers whilst temporarily occluding the aortic lumen(42, 43). All of these technologies are currently in the early phases of development and are not part of routine care.

CURRENT EVIDENCE

The most important sources of evidence concerning EVAR are the UK EVAR trials (EVAR 1 and EVAR 2). In the EVAR 1 trial(44) 30-day mortality data showed a significant advantage in favour of EVAR (1.7%) when compared with open surgery (4.7%). All-cause mortality was similar for both procedures by 4-years (28%), however a 3% difference in aneurysm-related mortality, in favour of EVAR remained (4% versus 7%)(17). Post-operative complications were more frequent for EVAR (41%) but had a negligible difference on health-related quality of life (HRQL), being similar for both procedures. Over the long-term the benefit of a lower aneurysm-related mortality for EVAR was eventually lost due to a higher incidence of fatal ruptures in the EVAR group(26). New complications were still occurring up to 8 years following treatment.

EVAR 2 was designed to investigate the role of EVAR in patients deemed unfit for open surgery(45). The 30-day operative mortality for the EVAR group was 7.3%, higher than in the EVAR 1 trial. This trial did not demonstrate a survival benefit for EVAR in patients unfit for open repair,

EVAR was costly and did not improve HRQL. With long-term follow-up there is a benefit from EVAR in terms of a lower aneurysm-related mortality (3.6 vs 7.3 deaths per 100 person-years)(46). No differences in total mortality rates have been demonstrated and the differences in aneurysm-related mortality are limited since this cohort has a limited life expectancy with few surviving >8 years.

Similar results to EVAR 1 have been published by the Dutch Randomised Endovascular Aneurysm Management (DREAM) trial group(47). 30-day mortality rates of 1.2% (EVAR) and 4.6% (open repair) are consistent with the UK trial as is the persistent reduction in aneurysm-related deaths in the EVAR group. Again, no overall survival difference was observed during the mid and long-terms(27). By six years, higher incidences of complications and reinterventions were still being reported in the EVAR group.

The more recent US OVER (Veteran Affairs Open vs. Endovascular Repair) trial demonstrated a lower 30-day mortality for EVAR (0.5%) when compared with open repair (3.0%)(48). This survival advantage, unlike in other studies, was maintained by 2-years. The more recent French ACE trial(49) reported no significant differences in 30-day mortality between open surgery and EVAR (0.6% vs 1.3%). This continued at one and three years but there were higher reintervention rates for EVAR (24% versus 14%). The French study opposes the findings of the three previous RCTs which all favoured EVAR in terms of short-term mortality. Even the large case-matched Medicare analysis (45,660 patients) showed a reduction of post-operative mortality favouring EVAR (1.2% vs. 4.8%)(50). Differences between the ACE trial results and the remaining EVAR mortality data can be attributed to numerous factors which may include study design, experience of the centres and the overall national standards of care.

Three multi-centre trials are currently recruiting or have recently completed evaluating open repair and EVAR in patients with ruptured aneurysms. The Amsterdam Acute Aneurysm (AJAX) trial started in 2004(51) and initially failed to show any differences between techniques for ruptured AAA. Recruitment was extended twice and the study finally completed in 2010 and showed no difference in mortality between the two techniques(52) . The Paris-based Endovasculaire vs Chirurgie dans les Anevrysmes Rompus (ECAR) trial started in 2008 and aims to recruit 190 patients(53). The larger and more recent UK Immediate Management of the Patient with Rupture: Open versus Endovascular Repair (IMPROVE) trial started in 2009 and aims to recruit 600 patients(10).

One of the main criteria for AAA treatment is maximum aneurysm diameter. Data from the UK Small Aneurysm Trial(14) reported a 5.8% 30-day operative mortality rate for AAA between 4.0-5.5 cm and concluded that there is no long-term survival advantage from early surgery. With the lower 30-day mortality for EVAR questions have arisen whether this treatment criterion should now be revised. The European CAESAR (Comparison of Surveillance versus Aortic Endografting for Small Aneurysm Repair) trial failed to demonstrate any advantage of early EVAR over traditional surveillance(54). 30-day mortality rates for EVAR were low (0.6%) with overall aneurysm-related mortality and rupture rates low and comparable between the groups. The study did, however, raise concern that up to 60% of surveillance patients will require treatment within 3 years and that 16% of these patients may lose anatomical suitability for EVAR during this time. Similarly, the US PIVOTAL (Positive Impact of Endovascular Options for Treating Aneurysms Early) trial showed that early all-cause mortality for both EVAR and surveillance groups were equal (4.1%)(55).

CONCLUSION

Over the past three decades the number of patients treatable by EVAR has grown. What started as a series of devices constructed in the operating theatre has evolved into mass produced 'off-the-shelf' systems which can treat a range of patients. Not only has anatomical eligibility increased but other vascular diseases are now being treated using a stent-graft. The endovascular treatment of complex type B dissections, traumatic aortic transections and aorto-enteric fistulae is possible. Pushing the boundaries of both patient and disease selection does, however, bring additional uncertainties. Studies published over recent years have shown that 'off-label' device use brings poorer outcomes and post-EVAR rupture will occur in a limited number of patients. Nevertheless, we have seen huge developments in EVAR technologies and their applicability. Devices are now deployable on smaller delivery systems, are repositionable within the aorta and can conform to more challenging anatomy. Durability issues still exist and appropriate diligence is needed during follow-up. With this in mind, manufacturers are now starting to explore alternatives to a metallic skeleton covered by an impermeable fabric. Open surgery dominated for over forty years but we are currently living in the endovascular era and we anticipate further improvements in the safety and applicability of endovascular therapy for aortic aneurysms.

The authors have no conflicts of interest.

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Paper

Encapsulating peritoneal sclerosis – A 5 year experience

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ABSTRACT

Title: Encapsulating peritoneal sclerosis – A 5 year experience

Aim: Encapsulating peritoneal sclerosis (EPS) is a rare, life-threatening condition, characterised by a progressive, intra-abdominal inflammatory process resulting in fibrotic visceral constriction. We report the aetiology, management, and outcome of EPS in Belfast.

Method: All patients diagnosed with EPS in Belfast over the past 5 years are included. Presentation, aetiology, imaging, pathology, and outcome are retrospectively analysed and reported.

Results: 7 patients (4 males) were identified with EPS with a mean age 54 years (range 33-69). Aetiology included peritoneal dialysis (3), radiation enteritis (1), peritoneal dialysis and radiation enteritis (1), tuberculosis, cirrhosis, and beta-blocker use (1), infected aorto-bifemoral graft (1). Of the 7 patients, 5 underwent definitive surgery. Bowel conserving surgery (laparotomy, division of adhesions, excision of membrane) was performed in 4 patients. One patient required an ileocaecal resection for radiation enteritis. Median pre-operative and post-operative hospital stay were 25 and 62 days respectively. Three patients required total parenteral nutrition (TPN) pre-operatively, 3 patients post-operatively; with 4 of the 7 patients discharged on TPN. 5 out of 7 patients are alive at median follow-up of 24 months. There was no 30-day in-hospital mortality.

Conclusions: Patients with EPS often require parenteral nutrition before and after surgery. Peritoneal dialysis is a major risk factor for the development of EPS but other aetiologies should be considered. These patients have multiple co-morbidities, and operations for EPS are challenging with a high risk of peri-operative complications. Therefore these patients are best managed in a specialised unit with experience in intestinal failure surgery and access to a multi-disciplinary nutrition support team.

Key words: Peritoneal Fibrosis

INTRODUCTION

Encapsulating peritoneal sclerosis (EPS) is a rare and life-threatening condition, with a mortality of 60-93%.[1] It was first reported in 1978, when ten patients underwent surgery for an "abdominal cocoon".[2] Initially known as sclerosing encapsulating peritonitis, but renamed EPS as the term '*sclerosing encapsulating peritonitis*' was thought to imply infection as the major cause.[1]

Peritoneal dialysis was considered responsible for the majority of EPS cases. It is now recognised that EPS is more frequent in the non-dialysis population, as a consequence of other causes of peritoneal inflammation. Non-dialysis aetiologies include previous abdominal surgery, cirrhosis, beta-blocker use, tumours with peritoneal seeding, intraperitoneal infection (including tuberculosis), endometriosis, and intraperitoneal drug administration.[3]

The diagnosis of EPS requires two criteria to be satisfied – clinical features of obstruction, and the demonstration, either by imaging or during surgery, that the clinical features are due to peritoneal membrane thickening, resulting in encapsulation of the bowel.[4] EPS commonly presents with an insidious onset of abdominal pain, anorexia, nausea, vomiting, early satiety, weight loss, altered bowel habit, and malnutrition. On examination, there may be abdominal fullness.[5] In a surgical resection specimen, the characteristic histopathological features are of a dense laminated band of submesothelial fibrosis with mild associated chronic inflammation and, unless a second pathological process is also present, unremarkable muscular bowel wall and mucosal surface.

EPS is a complex disorder whose treatment requires multi-disciplinary input from gastroenterologists, dietitians, and surgeons. Management includes optimising nutrition, symptom control, medication, and surgery.

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Table 1

Pre-operative CT findings of patients with EPS

Patient:	Aetiology of EPS:	Pre-operative CT Findings (graded + to +++ for severity):				
		Peritoneal thickening	Bowel dilatation	Nodularity	Septation	Calcification
1	Peritoneal dialysis	++	+	-	++	-
2	Radiation enteritis	+	+++	-	+	+
3	Peritoneal dialysis	+	+++	-	-	+
4	Peritoneal dialysis	+	++	-	+	+++
5	Radiation enteritis, peritoneal dialysis	+	++	-	-	+
6	TB, Beta-blocker, cirrhosis	++	++	-	+	+
7	Infected aortic graft	+	+	-	-	-

This retrospective case series reports our experience with EPS over the past 5 years in Belfast.

METHODS

This study reports all cases of EPS diagnosed and treated at Royal Victoria and Belfast City Hospitals between 2005 and 2011. Patients were identified from medical records with the diagnosis of EPS. A possible limitation of this study is that it may not represent the full spectrum of the disease, due to the difficulty of accurate diagnosis of EPS. However, the majority of cases in this locality have been referred to a single surgeon, therefore we believe that all significant cases have been included. Information regarding presentation, aetiology, imaging, pathology and management was obtained by accessing patient notes, radiology systems, and pathology results. CT scans were reviewed and graded for severity of peritoneal thickening, bowel dilatation, nodularity, septation and calcification. Each finding was graded 1+ to 4+ for severity by an independent Radiologist. Operative specimens were reviewed pathologically to assess thickness of peritoneum, chronic inflammatory infiltrate, fibroconnective proliferation and dilated lymphatics.

RESULTS

Seven patients were identified from medical records with a diagnosis of EPS, established by satisfying two criteria; bowel obstruction, and the demonstration that clinical symptoms were secondary to peritoneal membrane thickening, confirmed by imaging, surgery, or pathology. Four males and three females were identified, with a mean age of 54 years (range 33-69) at diagnosis. Confirmed aetiology included peritoneal dialysis (3 patients), radiation enteritis (1), peritoneal dialysis and radiation enteritis (1), tuberculosis, cirrhosis and beta-blocker use (1), and infected aorto-bifemoral graft (1). The four peritoneal dialysis patients had differing causes of their renal failure, including diabetes, IgA nephropathy, and mesangiocapillary glomerulonephritis. Median duration of peritoneal dialysis was 53 months (range 36-78 months).

The most common presenting symptoms were abdominal pain (6/7 patients), nausea & vomiting (6/7), and weight loss (6/7). Central abdominal fullness and change in bowel habit were noted in 5 out of 7 patients, with only 3 patients presenting with poor appetite.

CT imaging review and grading demonstrated that peritoneal thickening and bowel dilatation were seen in all 7 patients in the series. Calcification and septations were visible on CT imaging of 5/7 patients and 4/7 patients respectively, as shown in *Table 1*. Figures 1 and 2 demonstrate dilated small bowel loops surrounded by a thin membrane in the central abdomen, and a 'clump' of dilated central small bowel loops with serosal and peritoneal calcification respectively.

Features consistent with EPS were found in the 5 patients who underwent surgery, confirming the diagnosis, as demonstrated in *Table 2*.

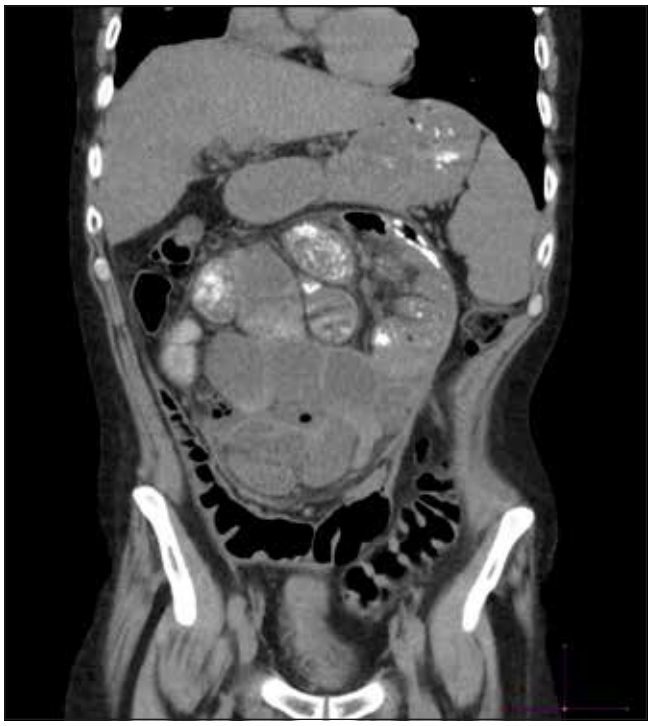

Fig 1. Coronal reformatted image from a CT scan of abdomen demonstrating dilated small bowel loops surrounded by a thin membrane in the central abdomen in keeping with encapsulating peritoneal sclerosis.

Table 2:

Aetiology and pathology findings of case series

Patient:	Aetiology of EPS:	Pathological features consistent with EPS:
1	Peritoneal dialysis	No pathology
2	Radiation enteritis	Yes (also signs of radiation injury)
3	Peritoneal dialysis	Yes
4	Peritoneal dialysis	Yes
5	Radiation enteritis, peritoneal dialysis	No pathology
6	TB, Beta-blocker use, cirrhosis	Yes
7	Infected aortic graft	Yes

Of the seven patients, five underwent surgery, with two patients managed conservatively. Of the five who did progress to definitive surgery, two were initially treated conservatively, with one patient receiving Tamoxifen and Prednisolone, and the second patient receiving Tamoxifen, Prednisolone, and Azathioprine, used to suppress peritonitis. Surgical management was complex and lengthy in duration - median 'skin-to-skin' time was 243 minutes (range 221-439 minutes), with an additional median of 61 minutes (range 32-63 minutes) for anaesthetic set-up time. Bowel conserving surgery (laparotomy, division of adhesions, excision of membrane) was performed except for one patient who required an ileocaecal resection. Two patients required ileostomies. Figures 3 and 4 demonstrate intra-operative findings of fibrous tissue constricting viscera, and the classical "abdominal cocoon" respectively. *Table 2* shows the pathological findings. Patient 2 underwent an ileocaecal resection where pathological resection of the small bowel showed features of both radiation enteritis and EPS.

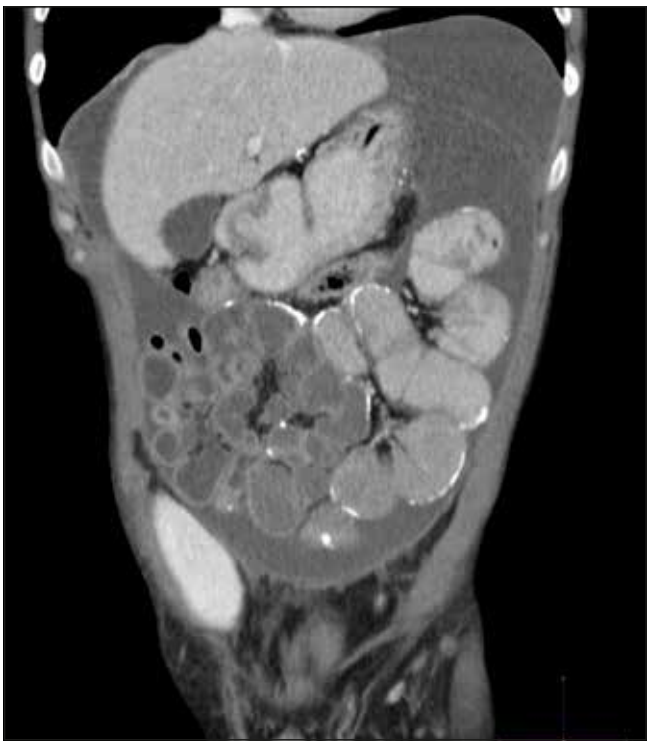

Fig 2. Coronal reformatted image from a CT scan of abdomen demonstrating a 'clump' of dilated central small bowel loops with serosal / peritoneal calcification in a patient with encapsulating peritoneal sclerosis. There is also a significant quantity of ascites.

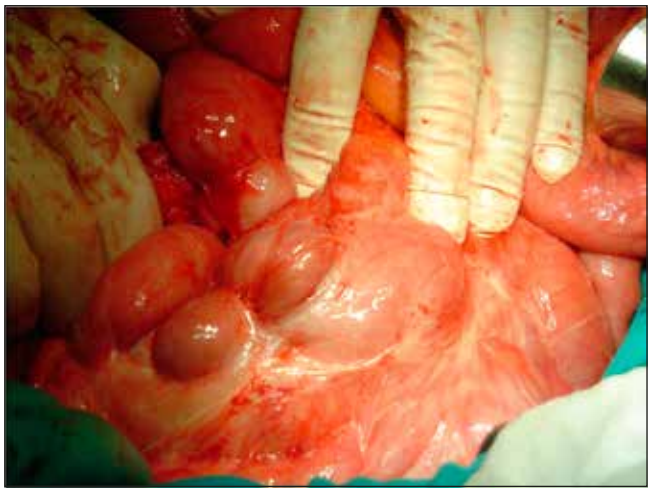

Fig 3. Intra-operative image demonstrating fibrous tissue constricting viscera, typical of EPS.

Median pre-operative and post-operative hospital stay was 25 days (range 1-105 days), and 62 days (range 17-145 days) respectively. 2 out of the 5 patients required ICU / HDU management post-operatively. Post-operative complications included central line sepsis (3 patients), high stoma output (2 patients), and drain site infection (1 patient). Two patients did not proceed to surgery due to the likelihood of not surviving the procedure as a consequence of co-morbidities – one patient with insulin-dependent diabetes, renal failure, myocardial infarction, coronary artery bypass grafting (CABG), and previous renal transplant; the second patient with insulin-dependent diabetes, renal failure, pulmonary embolus, and cervical carcinoma.

Three patients required parenteral nutrition pre-operatively, 3 patients post-operatively; with 4 of the 7 patients discharged

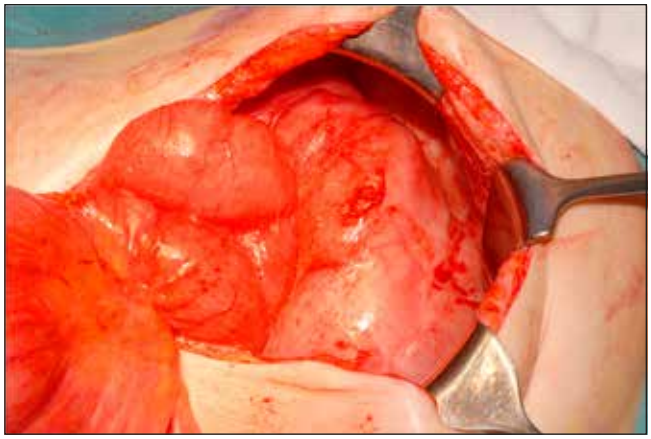

Fig 4. Intra-operative image demonstrating the classical "abdominal cocoon " found with EPS.

on TPN. With long-term follow-up over 24 months, only 1 patient has not been weaned off home TPN.

Five out of seven patients are alive at median follow-up of 24 months from diagnosis. There was no 30-day in-hospital mortality.

DISCUSSION

The clinical features of patients with EPS at initial presentation can be non-specific, with abdominal pain, weight loss, nausea and vomiting being the most common initial symptoms. It is therefore important to investigate non-specific symptoms in 'at-risk' patients, especially patients undergoing peritoneal dialysis. It has been reported that the incidence of EPS is up to 3% in patients undergoing peritoneal dialysis, and is proportional to the amount of time spent undergoing dialysis.[6] There have been three major studies regarding incidence and time on dialysis. A Japanese study (6923 peritoneal dialysis patients) demonstrated an incidence of 0.9% of patients on peritoneal dialysis progressing to EPS.[7] A Manchester study with 810 dialysis patients, demonstrated an incidence of 3.3%.[8] An Australian study showed an prevalence of 0.7%, which increased progressively with the duration of peritoneal dialysis (1.9%, 6.4%, 10.8%, and 19.4% for patients on dialysis for 2, 5, 6 and 8 years respectively).[9]

With the patients who developed EPS secondary to peritoneal dialysis in our series, the median duration of peritoneal dialysis was 53 months (range 36-78 months).

The aetiology of this difficult condition is unclear, with a 'two-hit' hypothesis having been proposed.[4 10] This hypothesis suggests disruption of peritoneal physiology and histology by a long duration of continuous exposure to hypertonic glucose dialysis solutions. A 'second hit' then provokes the full syndrome of EPS, with the second hit being due to recurrent peritonitis, exposure to infections such as tuberculosis, or even the paradox of discontinuing peritoneal dialysis (undergoing renal transplantation, or converting to haemodialysis). In this series, two patients suffered frequent attacks of peritonitis and required increasing glucose content in their dialysis solutions.

Augustine and colleagues propose plasma exudation, fibrin deposition and subsequent fibrosis as the basis of the pathogenesis.[4] Loss of the peritoneal physiological responses of production of fibrinolytic agents increases the risk of fibrinous adhesions. Furthermore, over-expression of TGF-β1 is also associated with adhesions.

Glucose in dialysis fluid may have a role in peritoneal mesenchymal cell malfunction, stimulating angiogenesis with TGF-β (transforming growth factor β) and vascular endothelial growth factor (VEGF) production by mesothelial cells. This however, does not explain those cases not associated with dialysis.

A high index of suspicion is fundamental to diagnosis, especially with patients undergoing peritoneal dialysis suffering from intermittent sub-acute bowel obstruction and weight loss. The literature supports CT (with a scoring system)[11] as the best imaging modality, although dynamic MRI may prove beneficial in the future.[12]

Management of EPS is complex, requiring a multidisciplinary approach. Nutritional support is central, with involvement of specialist dieticians from the outset. Nutrition can be complemented by oral supplements, enteral, or parenteral feeding. This can be successful in maintaining nutrition and minimising obstructive symptoms. Nutritional support should begin early, and may be required for a prolonged period.[10] These patients will most likely also require post-operative nutritional support, as shown in our case series, where 4/7 patients were discharged on home TPN. However, only 1 patient has not been successfully weaned off TPN 24 months post-surgery.

There have been mixed data published regarding medical treatment of EPS. Corticosteroids have been the first line medical management with little evidence to support their use.[6] Tamoxifen has been used with some theoretical basis – due to its anti-TGF-β properties - and is now the mainstay of medical therapy even though the controlled data are limited.[13 14] A randomised controlled trial has not been carried out probably because of small numbers and difficulty of diagnosis. There is some evidence (mostly case reports), that immunosuppressants, such as Azathioprine or Ciclosporin, are effective in EPS. However, it must be noted, that there is a high incidence of EPS in renal transplant patients, who are immunosuppresed.[15]

Surgery should be performed prior to complete obstruction, and before the patient becomes nutritionally deplete. It requires a high index of suspicion of EPS, with the role of surgery being to restore gut function, relieve obstructive symptoms, improve nutrition and may be life-saving. It involves undertaking extensive enterolysis and peritonectomy. The aim is to perform the peritonectomy without enterotomy, or bowel resection, and without a stoma. Morbidity can be an issue with these complex cases, with complications of bleeding, intra-abdominal collections, recurrent obstruction, fistula and sepsis. This is difficult, time consuming surgery.

Prognosis is poor, especially with a late diagnosis. There is a mortality rate between 25% and 55% in the first year.[6 16] In our study, two out of seven patients died within 2 years following their initial diagnosis. Emergency surgery for complete intestinal obstruction must be avoided, with a higher mortality of 60-93%.

Augustine and colleagues in both 2009 and 2012, have clearly indicated these complex patients are challenging to manage.[4 10] These patients need access to an experienced nutrition support team for potentially pre- and post-operative TPN. It is important to avoid emergency surgery in these malnourished patients. If they require surgery, this should be done in a dedicated centre with an experienced intestinal failure surgeon with access to a full team of multi-disciplinary specialists (radiology, nursing, dietetics), including access to

home TPN. There should be a national registry of these rare patients to collate outcome and research data.

In England, centres in Manchester and Cambridge are designated by the National Specialist Commissioning Group[4] for treatment of patients with this rare disorder since 2009.

CONCLUSION

These patients often require nutritional support before and after surgery. Peritoneal dialysis is a risk factor for developing EPS but other aetiologies should be considered. These patients are complex and are best managed in a specialised surgical unit with access to nutritional support. This is difficult surgery and there is merit in two experienced consultants operating together as has been recommended for specialised surgery for intestinal failure.[17]

The authors have no conflicts of interest.

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Paper

Propranolol for infantile haemangioma: A review of current dosing regime in a regional paediatric hospital.

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INTRODUCTION

Cutaneous infantile haemangiomas affect approximately 1 in 10 children. They tend to follow a natural course of rapid proliferation during the first year of life and subsequently regress over 5-10 years. Most haemangiomas are non-problematic, but a few become problematic, through ocular, airway or functional impairment, or ulceration. Oral propranolol therapy has been observed to inhibit the proliferation and incite regression of these lesions during their proliferative phase. At present there are no nationally agreed guidelines on propranolol use in paediatric patients with infantile haemangioma, our unit follows a similar pre screening and dose initiation regimen to that of other paediatric hospitals such as Great Ormond Street Hospital for Children.

METHODS

A retrospective chart review was performed on patients with infantile haemangiomas treated with oral propranolol at the Royal Belfast Hospital for Sick Children (RBHSC) between April 2009 and June 2011. Using a proforma, data was collected on dosing, efficacy and adverse effects.

RESULTS

Twenty four patient notes were identified and reviewed. All 24 patients underwent the work up prior to initiation of therapy. Infant age at start of treatment ranged from 8 weeks to 17 months. Overall, 22/24 infants had improvement in their lesions with propranolol. 23/24 (95.8%) of patients were commenced on the standard dosing regimen of 1mg/kg/day in divided doses. 22/23 of these infants tolerated treatment well and had their dose titrated to 2mg/kg/day. The one child who did not tolerate the initial dose was bradycardic and dose reduced then titrated without further problems. On the 2mg/kg/day dose 3/24 infants had side effects: lethargy in two and disturbed sleep in one. Two of these infants had their dose reduced with good effect.

CONCLUSION

Oral propranolol is an effective treatment for infantile haemangiomas for the indications described. Improvement was noted in the majority of our patients' haemangiomas using the current dosing regimen. A low incidence of side effects was reported. This contributes to the growing evidence that low dose oral propranolol is a safe, efficacious treatment for problematic haemangiomas and we hope, in due course that regional and national guidelines can be developed for this purpose.

INTRODUCTION

Infantile haemangiomas are the most common benign tumours of infancy. They affect approximately one in ten infants.[1] They are more common in Caucasian populations and in female infants. The male to female ratio is variable with some reports suggesting the condition is up to four times more common in females.[2] A higher incidence is observed in premature babies[3] and those who were subject to chorionic villous sampling in utero.[2,3]

The majority of haemangiomas are located in the head and neck region with lesions on the trunk and extremities being less common.[1] The cutaneous lesions present soon after birth and are characterised by rapid proliferation during the first year of life, followed by a gradual involution over the next five to ten years. Whilst most haemangioma are non-problematic, requiring no treatment, approximately 10% cause significant morbidity predominantly through airway obstruction, ocular compression, functional impairment or ulceration.[4] Until recently treatment options for problematic haemangioma have included intralesional and systemic steroids, chemotherapeutic agents including vincristine and interferon-alpha, laser therapy or surgical intervention.[5]

Propranolol is a non selective beta blocker; in the UK it is currently licensed for treatment of arrhythmia, hypertension, Tetralogy of Fallot thyrotoxicosis in children and migraine prophylaxis.[6] In 2008 regression of a facial haemangioma was noted in a child being treated with propranolol for obstructive hypertrophic myocardiopathy.[7] Since then propranolol has been introduced as a primary treatment for complicated haemangioma. This case series examines the indications, dosing regimen, and observed outcomes for children with infantile haemangioma, treated with propranolol, in Northern Ireland.

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To date there are no national pre-screening guidelines for the use of propranolol in the treatment of paediatric haemangioma. In our unit we follow the same pre-screening assessment as many other UK units including that at Great Ormond Street Hospital for Children. Children are admitted to the ward as a day-case for baseline investigations (Figure 1). A dosing regimen of 1 mg/kg/day is commenced initially which is increased to 2mg/kg/day at one week if this is well tolerated.

METHODS

- Full clinical examination including cardiovascular and respiratory assessment
- Full blood picture, urea & electrolytes, blood glucose
- Thyroid function test
- Dipstick urine test for glucose
- Electrocardiogram and echocardiogram
- Abdominal Ultrasound (in patients with multiple lesions)
- Medical Photography

Fig 1. Pre-treatment screening investigations

A retrospective chart review was performed, for paediatric patients with infantile haemangioma, treated with propranolol at the Royal Belfast Hospital for Sick Children between April 2009 and June 2011. Patients had been managed by specialist paediatric dermatology or plastic surgery teams. A proforma was used to collect information on patient demographics, indication for propranolol, dosing regimen undertaken, and observed outcomes. Treatment benefit was measured by subjective assessment of lesion regression by the medical team at clinic review. Improvement was documented objectively by serial photography by the medical photography department, providing a permanent record for parents and staff of the improvement in size, shape, colour, contour and residual deformity of lesions. Outcome of airway lesions was observed by appearance of haemangioma at repeat bronchoscopy.

Indication	Number of patients	Percentage (%)
Ocular involvement	7	29.1
Airway obstruction	4	16.7
Presence of ulceration	3	12.5
Functional impairment	5	20.8
Ulceration and functional impairment	5	20.8

Fig 2. Indication for propranolol therapy

RESULTS

Twenty six patients were identified and of these, 24 patient notes were retrieved. Hence, two patients were excluded as chart retrieval was not possible.

Of the 24 patients, 5 were male and 19 female, giving a male:female ratio of 1:4. All 24 were Caucasian.

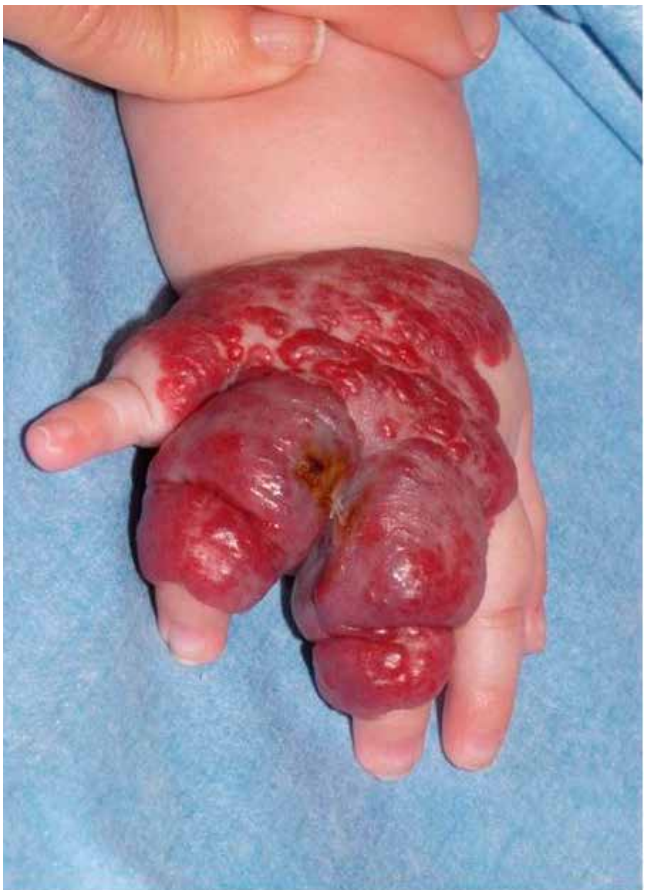

Fig 3a. Ulcerated hand lesion prior to propranolol treatment.

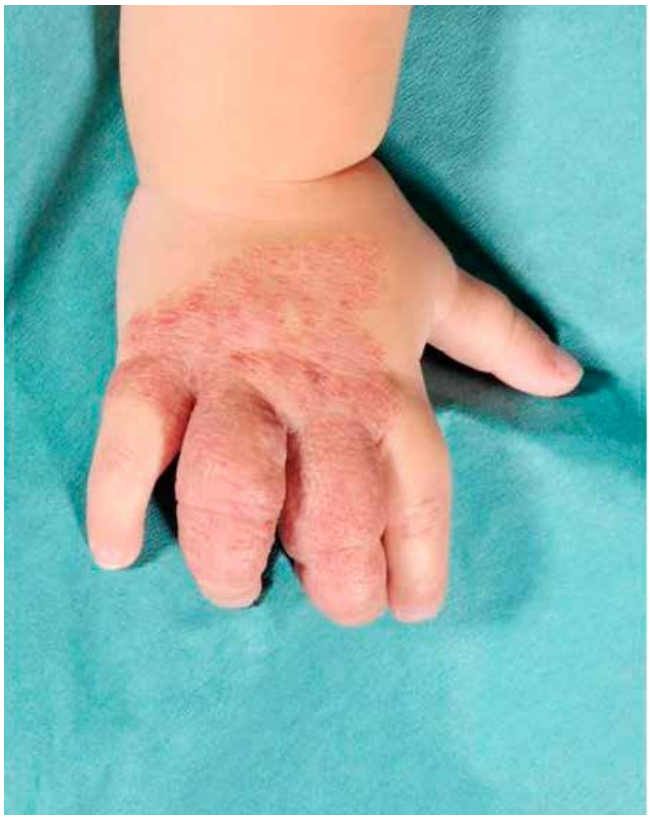

Fig 3b. Appearance of hand lesion after 4 weeks of propranolol therapy

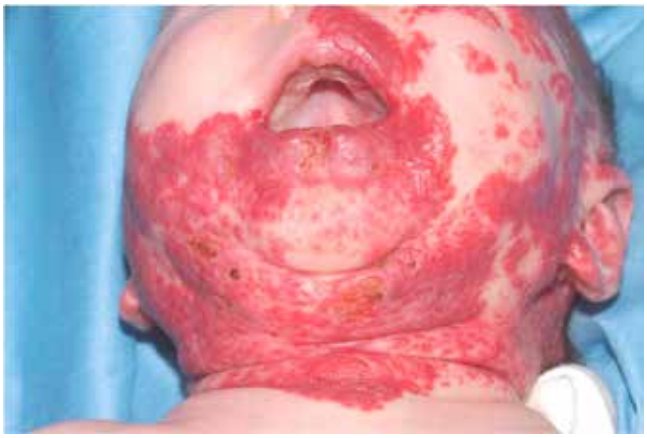

Fig 4a. Extensive ulcerated facial haemangioma prior to propranolol treatment

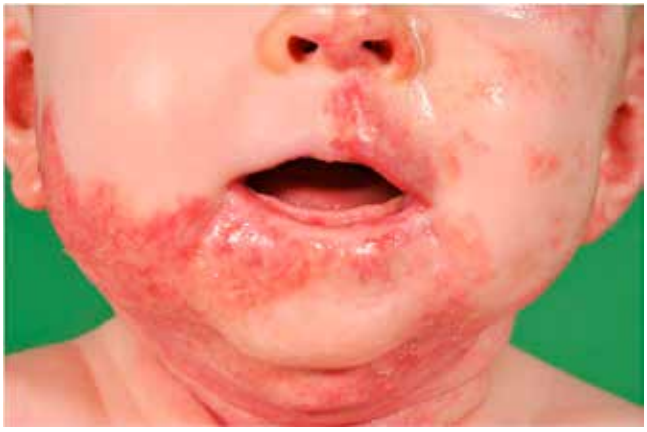

Fig 4b. Appearance of lesion after 10 weeks of propranolol therapy

All children underwent work up, as illustrated in figure 1 before commencing therapy. Patients were monitored closely when starting therapy and during dose escalation. Regular review was arranged throughout the treatment period.

The indications for therapy were ocular involvement, airway compromise, presence of ulceration, functional impairment or a combination of the above. Figure 2 outlines the indications for commencement of propranolol therapy in our population. Ocular compromise was present in seven infants, airway obstruction in four and the presence of ulceration alone in a further three children. Functional impairment was the sole feature in five infants. A further five babies were commenced on propranolol due to ulceration in combination with a functional impairment.

Four out of 24 infants had received prior treatment or were receiving concurrent therapy with oral corticosteroids. The indication was airway obstruction in 3 of these patients and functional impairment in the other child. This is current routine practice for patients with airway obstruction. [8]

The age at the start of therapy ranged from 8 weeks to 17 months, with the median age for commencing therapy being 12 weeks.

DOSING REGIMEN

The standard initial dose of 1mg/kg/day was used in 23/24 (95.8%) children. This was given in three divided doses per day. One patient was commenced on a lower dose (0.5mg/kg/day). This child had PHACES syndrome, and hence cautious dosing was instigated due to cardiac disease. The treatment was well tolerated in this child and the dose gradual escalated in keeping with the standard regime.

Of children commenced on 1mg/kg/day dose, 22/23 (95.6%) had tolerated treatment well at the end of the first week. All but one of these children had their dose escalated to 2mg/kg/day at one week, in keeping with the protocol. Dramatic improvement was noted on the initial dose of 1mg/kg/day in one child and therefore dose escalation was not undertaken.

The one child who had not tolerated the initial 1mg/kg/day of propranolol was bradycardic on commencement of the drug, and hence had their dose halved to 0.5mg/kg/day from day 1. A week later however, the treatment was being well tolerated without bradycardia and the dose titrated to 1mg/kg/day and ongoing, as per protocol, without problems. This child also had underlying congenital hypothyroidism and was on thyroxine replacement therapy.

EFFICACY AND DURATION OF THERAPY

22/24 (91.6%) patients had documented regression of their haemangiomas with propranolol therapy.

10/24 patients had completed their course of propranolol at the time of data collection. Duration of therapy ranged from 3.5 to 14 months (median 10.5 months). Treatment for two of these infants was discontinued after 3.5 and 6 months due to failure to respond to therapy. Of note these children were commenced on therapy at an older age of 17.5 and 11 months respectively. The remaining 8 children responded well to therapy. One of these children did not attend follow up after completion of treatment. No recurrence was observed when the propranolol was discontinued in all 7 children who attended follow up appointments.

14/24 patients were still receiving propranolol at the time our data was compiled. Duration of therapy in this group ranged from 1 to 14 months to date. All 14 patients were demonstrating positive changes in the appearance of their haemangiomas.

ADVERSE REACTION

There were few reported side effects in our group of infants. On the dose of 2mg/kg/day, poor sleep was reported in one child, and lethargy was reported in two children. One child with poor sleep and one child with lethargy had their dose reduced back to 1mg/kg/day in view of the side effects. One child had bradycardia, as above.

DISCUSSION

Propranolol has been used for decades in the practice of paediatrics for the treatment of cardiovascular disease at a dose as high as 8mg/kg/day. Results from our case series

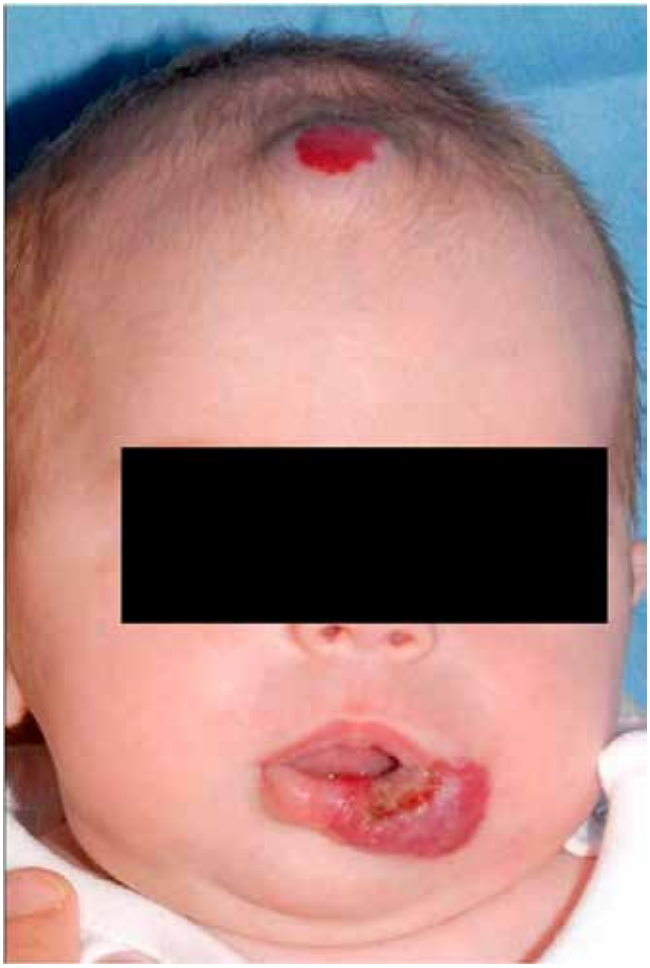

Fig 5a. Ulcerated lip and forehead haemangioma prior to treatment

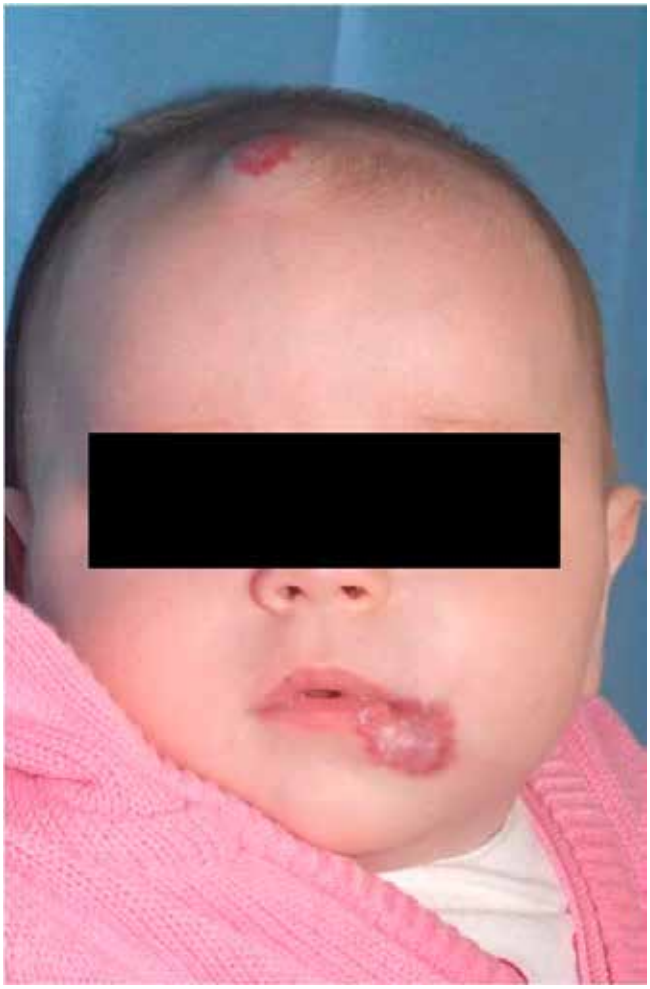

Fig 5b. Lesions 6 weeks into propranolol therapy. Note the previously ulcerated lip lesion has healed.

indicate that propranolol at a dose of 2mg/kg/day is effective in promoting regression and reducing morbidity from problematic cutaneous infantile haemangiomas.

This dose (2mg/kg/day) has been reported as effective in other centres. [9] A higher dose of 3mg/kg/day has been used in Alderhey Hospital, and has been shown to be effective and well tolerated. [10]

Various strengths of propranolol suspension are available. In our unit we prescribe 10mg per 5ml strength. It is important that repeat prescriptions issued in the primary care setting are of the same strength to ensure accurate and safe dosing. We generally advise that propranolol should be given with feeds to reduce the risk of hypoglycaemia and to withhold treatment if the child is vomiting or generally unwell.

Prior to treatment children should undergo some baseline investigations, at present there is huge variation amongst centres in the UK in terms of pre treatment screening tests. We have modified our protocol to include key baseline measurements of pulse, blood pressure and blood glucose. Children with multiple lesions should have an abdominal ultrasound to exclude hepatic involvement and children with suspected cardiac disease require further investigation with ECG, ECHO and input from a paediatric cardiologist.

Children with segmental and large high risk facial lesions should have a MRI of the region to delineate local extension. All children should have medical photography prior to initiation of treatment and regularly throughout treatment to document response to therapy.

The demographics in our small patient population demonstrated characteristics that were consistent with the literature: all our patients were Caucasian and haemangioma affected more females than males. A low incidence of side effects was reported in our patient group, namely disrupted sleep, lethargy and bradycardia. We wonder if the child with bradycardia was prone to this, given the underlying congenital hypothyroidism. Lethargy and sleep disturbance are recognised side effects of propranolol. [11] Well documented side effects not observed in our group but reported elsewhere include hypoglycaemia, [12] gastrointestinal upset and bronchospasm.[1] The children who did not gain benefit from propranolol in our series were those who commenced treatment at an older age. This illustrates the importance of primary care education to ensure children are identified and treated promptly, ideally within the first six months of life.

The effect of propranolol on infantile haemangiomas

was discovered incidentally and little is known about its precise mechanism of action in these tumours. The possible mechanisms include vasoconstriction, inhibition of angiogenesis and induction of apoptosis. [3]

Propranolol is effective during the proliferative phase of growth. Patients who had a poor response to propranolol were those who were commenced on therapy at an older age. This highlights the need for prompt early referral of infants with problematic haemangiomas, for consideration of propranolol therapy. When started at the proliferative stage, the growth of the lesion is inhibited and regression promoted. It may be that the children who did not benefit from the therapy had passed this proliferative stage.

Research is ongoing in this field, looking at efficacy, safety profile and most appropriate dosing regimen for propranolol, in the treatment of complicated infantile haemangioma. At present in Northern Ireland, the use of propranolol for cutaneous haemangiomas is reserved for those which are problematic, and all children are managed at a regional centre under the care and close supervision of a specialist team. Results so far have been promising. In the future its use may be rolled out for non problematic lesions with the aim of reducing the volume of redundant skin when these lesions regress naturally, impacting on cosmetic outcome. Another option maybe the application of topical propranolol to superficial haemangiomas, and a recent paper has reported this novel approach safe and effective. [13]

This case series contributes to the growing evidence that oral propranolol is efficacious and safe, with a careful dosing and monitoring regimen; in time we hope that guidelines will be developed for regional and national use.

The authors have no conflict of interest.

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Case Report

Metastatic cholangiocarcinoma following choledochal cyst excision: an unusual cause of abdominal pain in a 35-year-old female

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INTRODUCTION

Choledochal cysts are anomalous arrangements of the pancreaticobiliary tract and a well-known aetiology for cholangiocarcinoma. The risk of cholangiocarcinoma in patients with an unresected choledochal cyst remains at 20-30%[1]. Of the five types of choledochal cyst, by far the most common is the extrahepatic fusiform (Type I). Management involves complete excision of the extrahepatic bile duct and hepaticojejunostomy. This reduces the risk of cholangiocarcinoma in this group of patients to as low as 0.7%[2]. Because of this, it is rare to encounter a patient with cholangiocarcinoma following previous choledochal cyst excision particularly when the incidence of choledochal cyst is approximately 1:100,000 in western countries[3].

BACKGROUND

This 35-year-old lady was referred to the hepatobiliary clinic with symptoms of abdominal bloating, right upper quadrant abdominal pain and reflux for a number of years. At the age of 8 she had an excision of a Type I choledochal cyst with roux-en-y hepaticojejunostomy reconstruction. The symptom profile was in keeping with gastric outlet obstruction; OGD at the time revealed gastritis with excess bilious secretions seen in the stomach. Due to symptom progression and weight loss she was admitted for investigation.

Liver function tests were unremarkable but computed tomogram scan (CT) of the abdomen and magnetic resonance cholangiopancreaticogram (MRCP) revealed multiple dilated intra-hepatic bile ducts with pneumobilia, raising the possibility of anastomotic stenosis. In addition however, there were dilated loops of jejunum distal to the biliary anastomosis and a large retroperitoneal mass (Figure 1). Due to progressive jaundice, biliary drainage was established via PTC in addition to core tissue biopsy of the retroperitoneal mass. Unfortunately this revealed adenocarcinoma from the pancreaticobiliary tract. As her obstructive GI symptoms progressed and to give her a chance at curative intervention, the opportunity for an exploratory laparotomy was taken where a chronically obstructed roux limb secondary to an internal hernia through the mesentery defect was found. Exploration also revealed liver metastasis, lymphadenopathy in the mesentery and a fixed nodal mass encasing the coeliac axis. The hernia was reduced, mesenteric defect closed and the roux limb refashioned but unfortunately the tumour was unresectable due to advanced disease. Histopathology from a mesentery lymph node revealed metastatic carcinoma likely secondary to cholangiocarcinoma. The patient was referred for palliative chemotherapy and survived for 8 weeks following surgery.

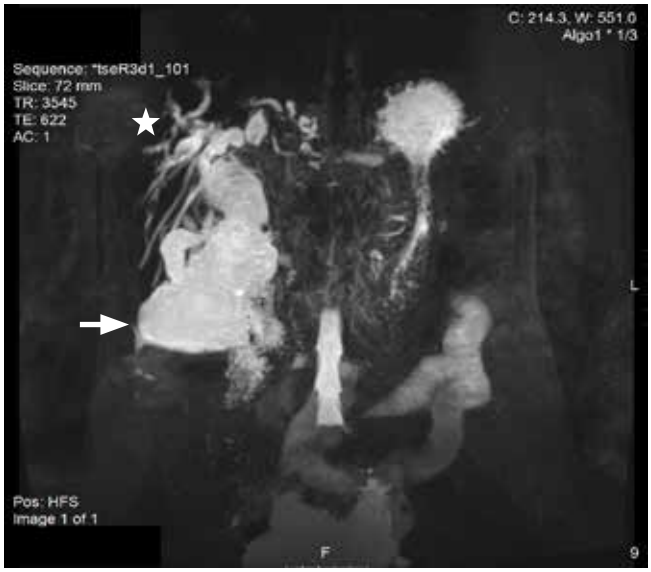

Fig 1. MRCP image demonstrating grossly dilated jejunal loop (arrow) anastomosed with the common bile duct. Also seen are dilated intrahepatic ducts (star)

DISCUSSION

Choledochal cysts are single or multiple dilatations of the intra or extrahepatic biliary tree. They fall into five anatomical subtypes and are typically detected in early childhood. Standard treatment involves complete resection of the extrahepatic bile ducts with subsequent hepaticojejunostomy.

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This prevents cholangitis, pancreatitis, liver abscesses and ultimately cholangiocarcinoma. If not excised, the risk of cholangiocarcinoma in the retained cyst is as high as 20-30% in early adulthood (by the second decade of life) [1]. Within the literature, cholangiocarcinoma following previously resected choledochal cyst is a very rare occurrence. Rates vary from 0.7% - 6%[2]. In one study of 56 patients with previous history of surgical excision, 3 patients were noted to develop cholangiocarcinoma within a range of 2 years to 19 years post surgery[4].

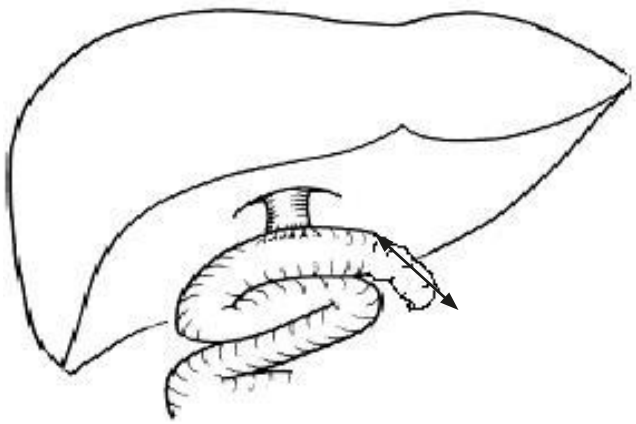

Fig 2. Arrow indicating elongation potential of blind pouch from end to side anastomosis causing potential for complications

This case is complicated however, given the evidence of chronic obstruction of the roux limb. This mechanical cause in itself may have lead to biliary stasis/reflux of enteric contents in to the bile duct thus increasing the likelihood of cholangitis and the risk of carcinogenesis. Yamataka et al. described an overall post-operative complication rate of 9% in children after excision of a choledochal cyst where stone formation/biliary stasis secondary to anastomotic stricture and bowel obstruction were the most common[5]. In a separate study by similar authors, they also stressed that the above complications post-excision in children were mostly related to elongation of the blind pouch (from end-to-side anastomosis) or redundant roux jejunal limb as they have the potential to grow or elongate in children[6] (Figure 2). However, there were more complications seen in adult patients compared to children[5]. In the former study, majority of the patients who re-attended with complications needed a revision of their hepaticoenterostomy or exploratory laparotomy for bowel obstruction[5].

Internal hernias of the small bowel are a recognised complication of roux-en-y bypass procedures mainly in gastric bypass surgery. However, there have been reports of small bowel volvulus secondary to internal hernia after choledocho-enteric anastomoses in transplant patients[7]. Higa et al, recommends closing all potential defects with non-absorbable sutures in a running continous fashion[8]. Even though that study was in the setting of laparoscopic roux-en-y gastric bypass surgery, similar principals can be applied in this case.

CONCLUSION

We stress the need for close follow-up and a high index of suspicion in any patients with a previous history of a resected choledochal cyst and ongoing upper abdominal symptoms. They should be investigated aggressively with a view to ruling out the possibility of malignancy, particularly if there is evidence of obstruction or stenosis at the hepatico-enteric reconstruction. Patients with confirmed anastomotic stricture should undergo revision of either the roux-en-y hepaticoenterostomy or exploratory laparotomy if there was evidence of bowel obstruction to reduce the risk of ascending cholangitis, bile stasis or bowel obstruction which predisposes the patient to an increased risk of developing a malignancy.

The authors have no conflicts of interest

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Case Report

Panspinal epidural and psoas abscess with secondary cervical disc space infection

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INTRODUCTION

Psoas[9] and epidural spinal abscesses[2, 6] have been described as relatively rare conditions. The incidence of epidural spinal abscess, however, has doubled in the recent two decades, reaching 1 in 10000 hospital admissions[8]. Early diagnosis and management of these two pathologies, especially when presenting with insidious and vague symptoms, require a high degree of suspicion. In this case, unusual evolving cervical disc space infection was also noted

CASE PRESENTATION

A 44-year-old man presented to the local hospital with a five-day history of neck pain, neck spasm, anorexia and malaise, on a background of recent lower back manipulation by a physiotherapist. For the previous few days he had complained of bilateral sciatica episodes, tingling sensation in both hands and night sweats. On clinical examination he was found to have high temperature (T=38.7) with no abnormal neurological signs apart from torticollis. Haematological examination showed raised CRP (CRP=246) and neutrophil leucocytosis (WBC=28.7). A blood culture was sent and then the patient was empirically commenced on broad-spectrum antibiotics. While waiting for further investigation on the ward he developed a transient episode of limb weakness followed by quadriplegia with a sensory level at T5 (power 0/5 in all 4 limbs) and absence of reflexes in all limbs. Cranial nerves were intact on examination.

He was transferred to the regional neurosurgical unit about 48 hours after his initial presentation with neck pain followed by a rapid onset of quadriplegia. He was intubated and ventilated because of deteriorating respiratory drive and hypoxia. Urgent MRI scan of cervical spine showed an extensive epidural fluid collection and abnormality of the C5/6 disc space. Because of the lack of oedema in the adjacent marrow or increased signal in the disc on the T2-weighted and STIR (short tau inversion recovery) images, initially it was felt that these changes were be due to degenerative change rather than infection.

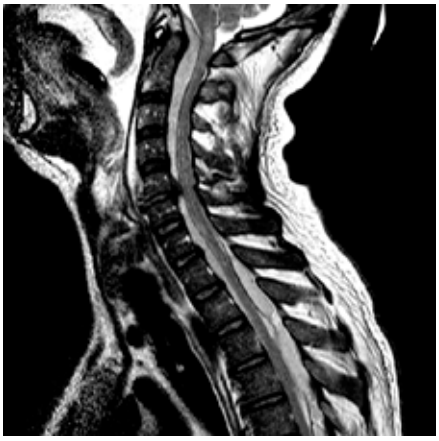

Figure 1(a)

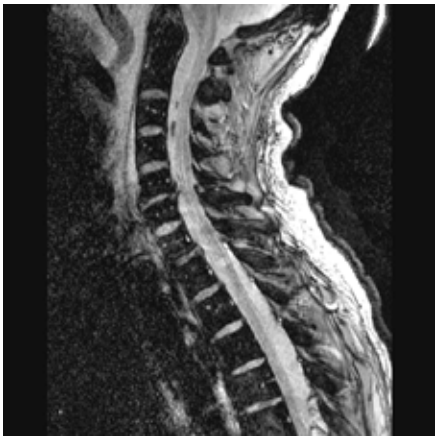

Figure 1(b)

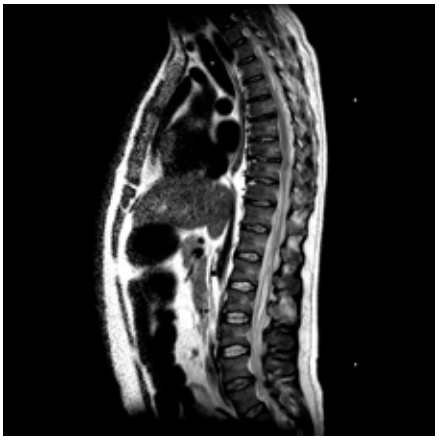

Figure 1(c)

Fig 1. Sagittal T2-weighted (a) and STIR images (b) of the cervical spine and sagittal T2-weighted image of the dorsal spine (c) on admission, showing epidural fluid collection extending entire length of spine.. Note disc space narrowing and disc protrusion at C5/6, with anterior osteophyte formation, and lack of evidence of oedema in adjacent marrow. A prevertebral fluid collection is also present.

Therefore, further scans of the whole spine were performed after intravenous Gadolinium. Axial scans were performed of the dorsolumbar region. These showed peripheral enhancement of the epidural collection, consistent with abscess, and also extensive peripherally enhancing abscesses in the paraspinal muscles with extension into the intervertebral foramina (Figure 2). Further scans of the neck

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were not performed as the patient became haemodynamically unstable and had to be removed from the scanner. Therefore, the presumptive diagnosis was epidural abscess due to extension from paraspinal abscess, possibly secondary to recent manipulation of the lumbar spine.

His platelet count on admission was 69 million per millilitre (the patient was a known case of sticky platelet syndrome), and following transfusion of 4 units of platelets he underwent C3-C6 laminectomy and abscess drainage using an epidural catheter to ensure complete drainage of the abscess proximal and distally. A second incision was made in mid-thoracic region for T3-T5 laminectomy and drainage of epidural abscess. A third incision was made in lumbar region (L1-L4 level) and through para-vertebral approach to neural foramina and accessing the spinal canal we drained the epidural abscess at the same time as draining the psoas and paraspinal muscle abscess with insertion of a drain. We drained a mixture of clots and pus from the paraspinal muscles.

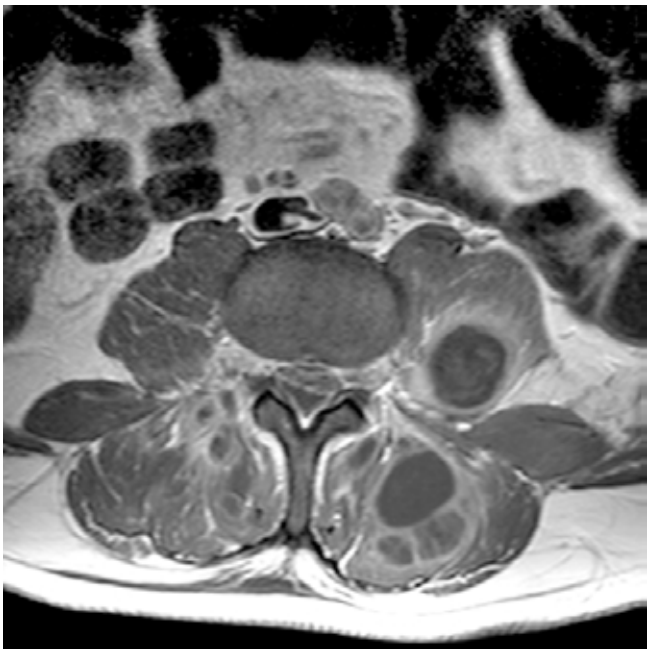

Fig 2. Axial T1-weighted scan of lumbar spine following intravenous Gadolinium, at the time of admission. Note peripherally enhancing epidural and paraspinal abscesses, extending into intervertebral foramina.

Post operatively he was transferred to ICU and was commenced on empirical antibiotic treatment (Flucloxacillin, Rifampicin, Gentamicin) and Dexamethasone (2 mg bd).. The cultures (including the initial blood cultures) confirmed staphylococcus aureus as the cause of the abscess and accordingly his antibiotics were changed. The antibiotic regimen was changed due to a drop in platelet count in the first few days of treatment and other investigations including trans oesophageal echocardiogram (TOE) and HIV test were all negative.

Postoperative MRI scan 3 days after operation showed significant reduction in the epidural abscess, and also abnormal enhancement of the C5/6 intervertebral disc (Figure 3). After two weeks of recovery on the ward the power in his limbs improved to MRC grade of 4/5 in legs and 3/5 in upper limbs. The patient was transferred to a spinal rehabilitation unit where his intravenous antimicrobial regimen for a total period of 8 weeks was continued, and was followed by another 4-week course of oral suppression antibiotic therapy. The follow up MRI scan before transfer to rehabilitation unit showed complete resolution of epidural abscess and irregularity and narrowing of the C5/6 disc space. Approximately two months after intensive rehabilitation his quadriparesis recovered significantly and he was able to walk independently with mild in-coordination and significant improvement of function level in the upper limb with mild degrees of difficulty with fine movements. Follow-up review in 6 months and repeat MRI showed a good neurological recovery and complete resolution of the abscess. Currently he is back to work and apart from occasional tiredness and minor issues with his balance does not have any symptoms.

DISCUSSION:

Spinal epidural abscess, first reported by Morgagni et al. in 1761[1] is a relatively rare condition (0.2-1.2 of 10000 hospital admissions[6, 7]) with potential serious consequences. The advances in imaging technology, ageing population, use of spinal instrumentations and vascular interventions have doubled the incidence of this pathology over the last two decades[6]. Other risk factors including underlying disease (diabetes mellitus, alcoholism, drug abuse, etc.) and local or systemic source of infection are other possible causes of spinal epidural abscess[6]. Contiguous spread (in one third of cases) and haematogenous dissemination (in about half of the cases) have been described as the common mechanisms of acquiring the infection[6]. Staphylococcus aureus has been described as the pathogenic organism in two third of cases[6, 7]. Other organisms such as group B streptococcus have been described in diabetic patients[5]. Mechanical compression and cord infarction secondary to septic thrombophlebitis can lead to irreversible neurological deficits[6]. Clinical presentation can be very non-specific, but the triad of back pain, fever and neurological deficit, which are rarely seen, should raise the concern about spinal epidural abscess until proven otherwise[6].

Psoas abscess with worldwide incidence of 12 cases per year 100,000 in 1992[3, 8], and unknown current incidence, could per se be a challenge to diagnosis. It is thought that the incidence of psoas abscess is increasing. The median time to diagnosis of psoas abscess in literature has been reported up to 3 days[3]. Psoas abscess has been classified as primary (haematogenous) or secondary (neighbour structure)[2] with 80% of primary cases caused by Staphylococcus aureus and enteric bacteria as the most common organism in secondary cases[4]. Spinal manipulation has been described in the literature as one of the predisposing factors to psoas abscess[2].

Our case represents the importance of early diagnosis of epidural abscess especially in conjunction with psoas abscess. Although the initial presentation of our patient was not very

typical of spinal abscess and was not fulfilling the triad of this pathology, the high degree of suspicion and abnormal laboratory findings were the initial findings leading to this diagnosis. Our patient was started on empirical IV antibiotics after obtaining relevant samples for septic screen. We feel the underlying sticky platelet syndrome was not contributing to his pathology and the recent manipulation by physiotherapist could have been a predisposing factor as per literature.

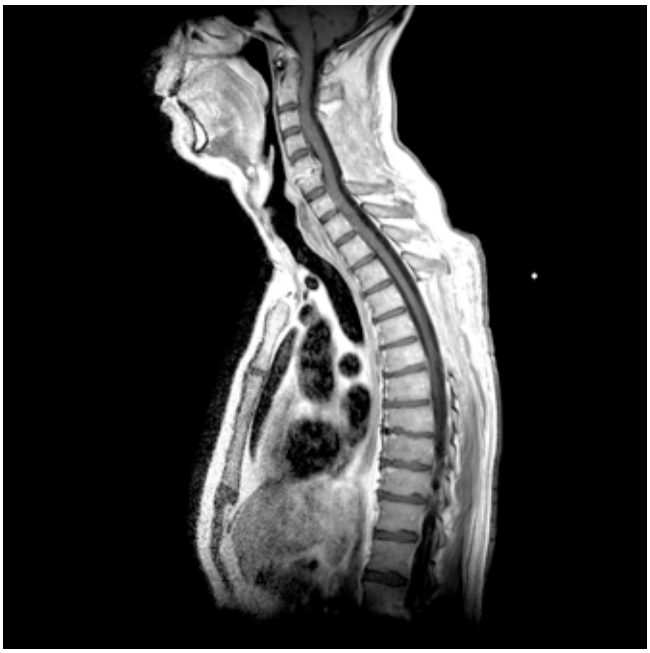

Fig 3. Sagittal T1-weighted scan of cervical and dorsolumbar spine after intravenous Gadolinium, three days following surgery. There has been resolution of the epidural abscess in the cervical and upper dorsal spine, with reduction in its extent in the lower dorsal and lumbar spine. Note enhancement of C5/6 intervertebral disc.

The initial MRI scan was interpreted as showing probable degenerative changes in the C5/6 disc space, due to a lack of adjacent marrow oedema and apparently chronic disc space narrowing and protrusion with osteophyte formation. In retrospect there was also prevertebral soft tissue swelling. At the time of admission, scans of the cervical spine were not obtained after intravenous Gadolinium, as the patient became unwell and had to be removed from the scanner.

MRI of the cervical spine after intravenous Gadolinium three days after surgery showed clear enhancement of the C5/6 disc, consistent with infection, and subsequent scans showed progressive disc space narrowing. It is interesting to speculate whether, if the patient had not become unstable, this enhancement might have been seen at the time of admission, leading to a diagnosis of cervical disc space infection causing spinal epidural abscess. This might have led the radiologist not to carry out axial scans of the dorsolumbar spine and thus in failure to diagnose the psoas abscesses.

It is difficult to decide whether the psoas abscesses or cervical disc space infection were the primary infection resulting in the epidural abscess. Epidural infection secondary to disc space infection would characteristically be associated with typical changes of infection in the disc and adjacent marrow on MRI, at time of presentation. Given that the patient's initial presentation for physiotherapy was with back pain, following which he developed symptoms referable to the neck, and also the lack of florid change in the C5/6 disc on the initial MRI, it is likely that the changes at C5/6 represent secondary infection of a previously degenerate disc. We are unaware of this sequence of events having been previously reported in the literature. Whether the infection originated in the lumbar paraspinal tissues or cervical disc, this case illustrates that imaging should be continued until the full extent of any intraspinal and paraspinal infection has been established. The surgical approach to this pathology in view of the extent of the abscesses helped to maintain the stability of spine in this case in accordance with near complete evacuation of abscess.

CONCLUSION:

To our knowledge panspinal epidural abscess and paraspinal abscess with secondary cervical disc space infection has not been reported in the literature. This case report shows high clinical suspicion and early and thorough radiological investigation in similar cases are essential for ensuring the best possible outcome from surgical intervention in this group of patients.

The authors have no conflicts of interest

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Grand Rounds

Interpretation Of Radiographs Performed For Investigation Of Upper Limb Injury

Tom Savage, Barry Kelly

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Musculoskeletal trauma is one of the common reasons for attendance to Accident & Emergency and/or primary care. Appendicular radiographs, with the chest radiograph, constitute the commonest plain radiographic investigations the population undergo. Diagnosis is often straightforward, but certain patterns of injury may be more complex and elude detection. Reliance on a single investigation, and particularly a single view, at one time point without proper clinicoradiological correlation and follow-up can have detrimental consequences.

A fracture can be defined as a 'break in the continuity of a bone' and is included in the International Classification of Disease (ICD-10) under M84 as 'Disorders of continuity of bone'[1].

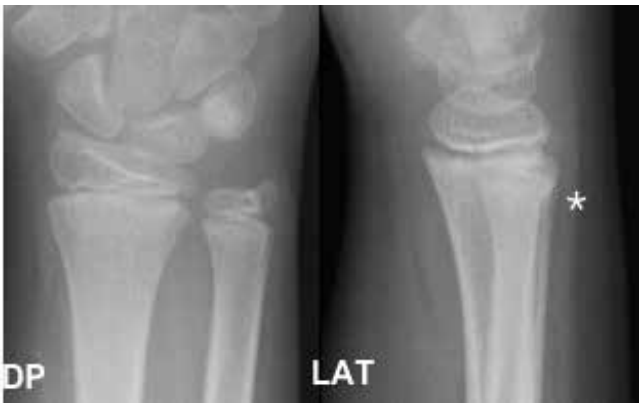

Fig 1. Buckle Fracture.
No fracture is visible in the dorsopalmar (DP) view but a buckle fracture is seen at the radial dorsal cortex (*) on the lateral (LAT) view underlining the importance of imaging in two planes.

The purpose of this paper is to review common fracture patterns of the upper limb. 'Overlooks' or 'don't miss' cases that are detected by radiologists subsequently will be highlighted and discussed. Conventionally the upper limb is divided into 'parts' by the three major joints of wrist, elbow and shoulder and imaging should be tailored around clinical findings and appropriate application of this principle will also be discussed.

THE WRIST AND HAND

Many fracture complexes are described in this region. The patient's age as well as the mechanism of injury are important considerations in the fracture pattern. Children's bones are soft and may not have ossified, so incomplete fractures (where only one cortex breaks) are common. Fig 1 demonstrates one type of incomplete fracture (the other type being a greenstick fracture) and illustrates an important radiological principle: always image in two planes. Typically, the two planes are at right angles to each other and are known as 'orthogonal' planes.

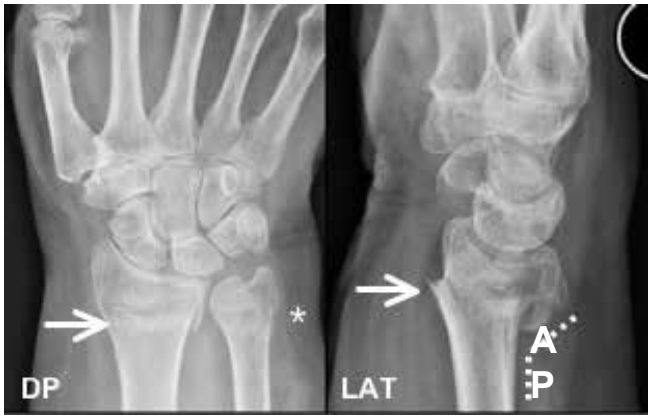

Fig 2. Colles Fracture.
Distal nonarticular radial fracture with dorsal angulation & displacement of the distal radius (←) with soft tissue injury and commonly associated ulnar styloid fracture (*).

It would be remiss not to include the familiar Colles' fracture (Fig 2a), named after the Irish surgeon Abraham Colles who described it in 1814. (Abraham Colles, 1773–1843)[2]. This classically occurs after a fall on an outstretched hand and is the most common fracture of the forearm.

In addition, several other eponymous distal radius-ulnar fractures are described. The classic descriptions are outlined in Table 1 and Fig 3 although depending on the severity of the injury classical patterns are not always seen.

The scaphoid fracture is important, not least because of the medico legal implications if it is missed. There is a high risk of malunion and avascular necrosis of the proximal pole due

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Table 1

Eponymous Fractures of Distal Radius9

Eponymous Name	Fracture of Distal Radius	Intra-articular	Angulation	Displacement
Colles Fracture (Fig2)	Transverse	No	Dorsal	Dorsal
Smith Fracture (Fig3a)	Transverse	No	Palmar	Palmar
Barton Fracture (Fig3b)	Dorsal	Yes	N/A	+/- Dorsal
Chauffeur Fracture	Lateral (Radial Styloid)	Yes	N/A	+/- Lateral

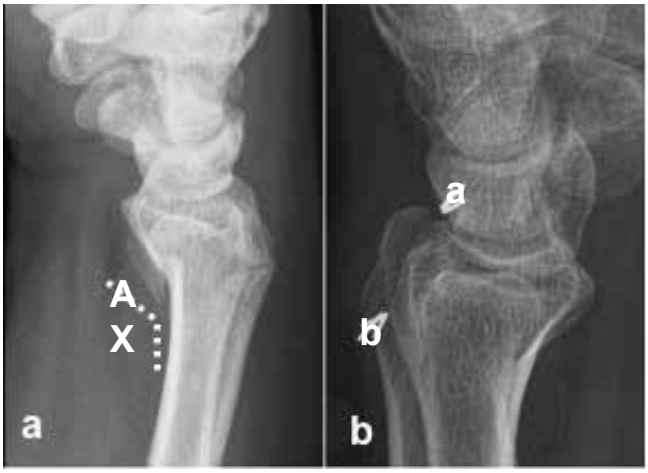

Fig 3. Other Eponymous Wrist Fractures.
(a)Smith ('reverse Colles') with palmar angulation (line).
(b) Barton (dorsal oblique intra-articular) fracture of the distal radius (←)[9].

to the bone's distal blood supply. With an appropriate clinical history, a standard 3 or 4 view radiograph series should be performed to ensure full visualisation of the carpal bones (Fig 4). This however may not reveal an undisplaced scaphoid fracture initially[3].

Non-scaphoid carpal fractures are seen less frequently than scaphoid fractures and form only 10-30% of carpal fractures4,8 It is important to consider an occult fracture (up to 16%3,4), dislocation and/or ligamentous disruption

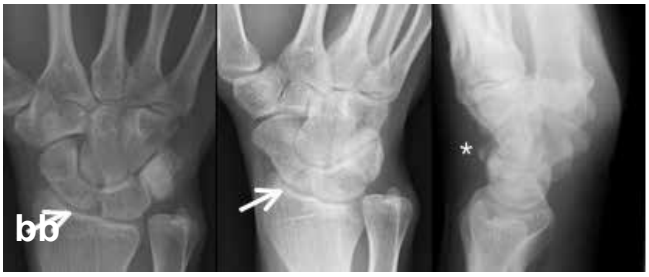

Fig 4. Proximal pole scaphoid fracture (←) & concurrent triquetral fracture (*) .
Common practice in suspected scaphoid injury is to immobilise in cast and perform repeat radiographs after 10 to 14 days[6]. This approach is however debated and it is becoming more common to perform secondary investigations such as Magnetic Resonance Imaging (MRI), Isotope Bone Scan or Computed Tomography (CT), each with their own benefits, limitations and sensitivities[5,6].

when clinical signs or symptoms are present but there is no visible bony injury on radiographs (clinical-radiological disassociation).

In the hand, a common fracture is the Boxer's fracture

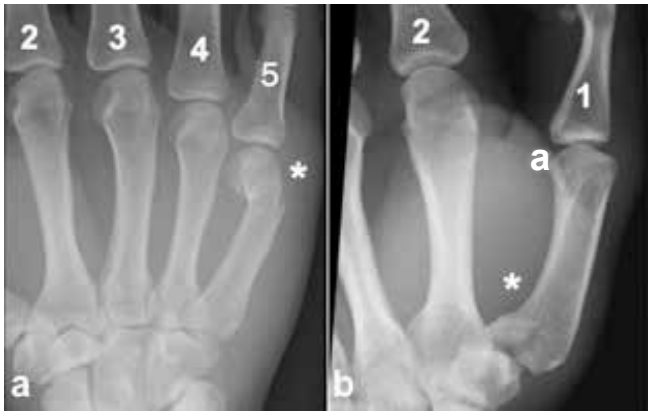

Fig 5. Hand Injuries.
(a) A Boxer's fracture in the 5th metacarpal.
(b) A Bennett fracture which is an intra-articular fracture-dislocation at the base of the metacarpal of the thumb (1st). The dashed line represents the site of MCP-UCL of the thumb involved in Skier's thumb (not present).

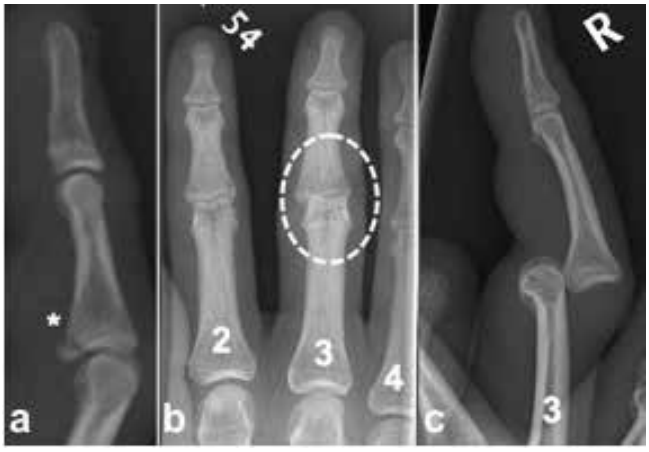

Fig 6. Finger Injuries.
(a) A common example is the volar plate avulsion injury at the base of the middle phalanx.
(b.c) In the absence of bony injury one must consider the less common ligamentous rupture. Always check for joint subluxation or dislocation: less obvious on the DP but clear on lateral projection.

(Fig 5a). This angulated fracture of the distal metacarpal commonly occurs at the metacarpal of the little finger but can occur in any. The base of the thumb is at increased risk of bony-ligamentous injury due to its exposed position and complex articulation. Examples include a Skier's thumb (rupture of the medial/ulnar collateral ligament of the metacarpal-phalangeal joint (MCP-UCL) of the thumb +/- bony avulsion) or Bennett fracture (Fig5b).

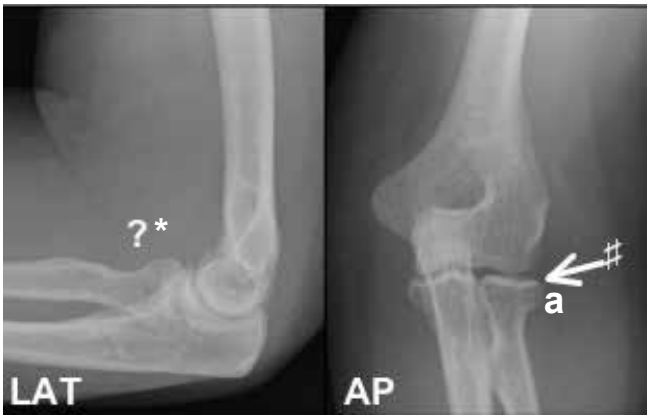

Fig 7. Radial Head Fracture.
In the adult this is the commonest site of elbow injury while in children the developing distal humerus (supracondylar fracture) is the most frequent site[7,8].

The digits themselves, particularly the distal phalanges, are especially vulnerable to direct trauma. Each bone and joint, visible on the radiograph, must be carefully evaluated for any penetrating, crush or avulsion associated injury (Fig 6).

THE FOREARM AND ELBOW

Proximal to the wrist the bony elbow structures require careful assessment not just for cortical integrity (Fig 7) but anatomical alignment (Fig 8) and secondary 'soft tissue' signs. Specifically the presence of an effusion on true lateral (Fig 8) is often critical in the detection algorithm of bony injury.

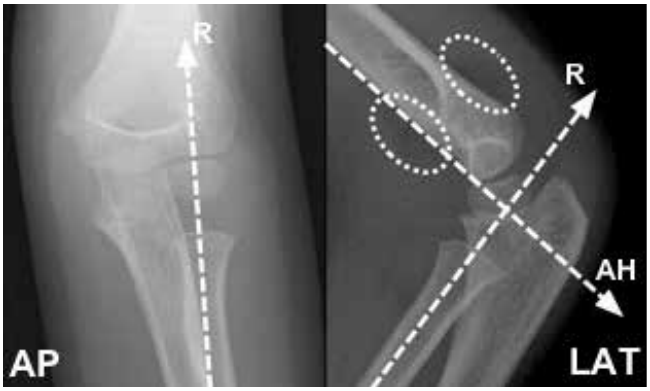

Fig 8. Supra-condylar fracture.
Radial line intersects (R) capitellum in all views. Anterior humeral line (AH) should intersect capitellum anterior to its posterior third.

In children developing ossification centres can provide additional challenges for the radiologist. The centres ossify in a predicable order with age and the 'C.R.I.T.O.L.' mnemonic

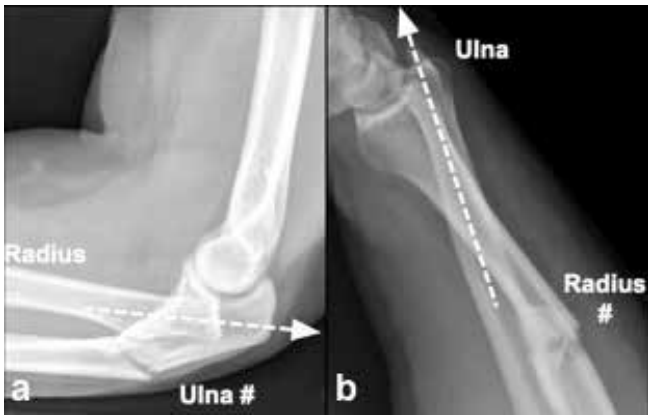

Fig 9. Forearm Fractures- not always isolated.
(a) Monteggia described an ulnar fracture & radial head dislocation
(b) Galeazzi described a mid radial shaft fracture & dislocation of distal radioulnar joint[9].

may be utilised to correlate the sequence of ossification with radiographic findings (ie first **C**apitellum <**R**adius <**I**nternal epicondyle <**T**rochlea <**O**lecranon <**L**ateral epicondyle last)[7].

Injury to any long bone in apparent isolation should prompt clinical assessment of both proximal and distal joints with radiographs undertaken, in two planes to include these joints. Examples of such joint involvement would include the Monteggia and Galeazzi fracture-dislocation patterns (Fig 9)

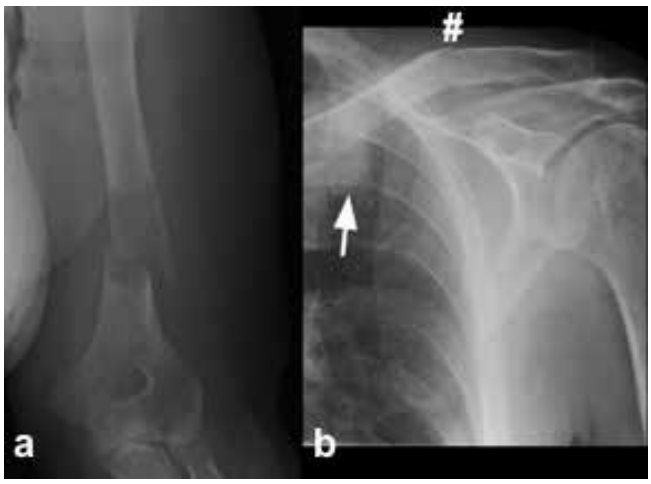

Fig 10. Pathological Fracture
(a) A humeral fracture occurring with minimal trauma reveals a underlying lucency subsequently confirmed to be one of multiple skeletal metastases.
(b) In a different patient investigation of a clavicular fracture (#) reveals a coincidental apical lung tumour (←).

HUMERUS AND SHOULDER

The diaphysis of the humerus is less commonly injured than its peri-articular portions except in severe trauma8. A fracture in the absence of a history of a suitable energy mechanism should raise the possibility of an insufficiency or pathological fracture. Examples of said underlying processes are osteoporosis or metastasis respectively (Fig10a). This

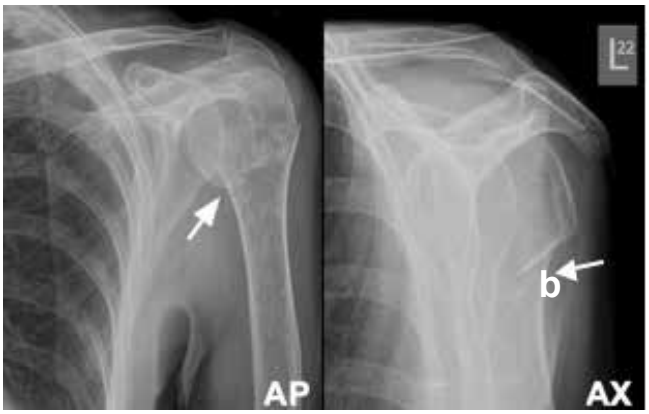

Fig 11. Proximal Humeral Fracture.
Anteroposterior (AP) and Axial (AX) views._
There is a simple (i.e. consisting of only two fragments) fracture (←) at the 'surgical neck' of humerus. The fracture is less easily seen on the axial view but satisfactory gleno-humeral alignment is readily assessed.

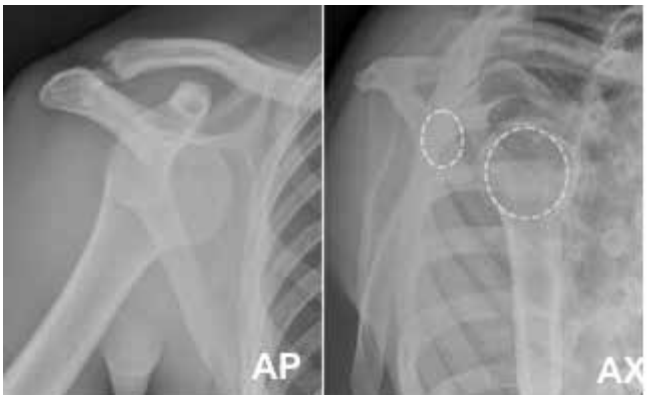

Fig 12. Anterior-Inferior Shoulder Dislocation.
On anteroposterior (AP) views the humeral head overlaps the glenoid.
On axial (AX) views the humeral head (large circle) is seen to lie anterior and inferior in relation to the glenoid (small circle).

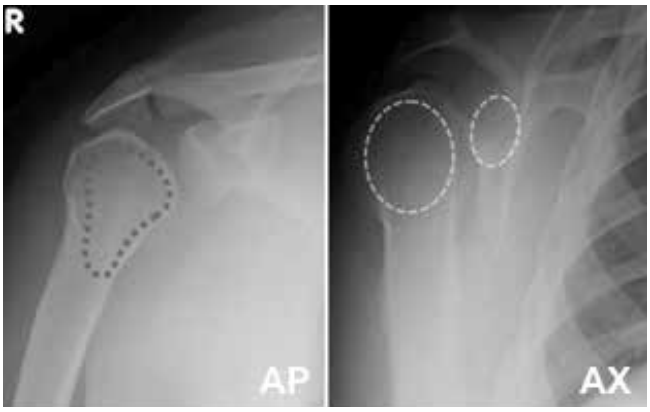

Fig 13. Posterior Shoulder Dislocation.
Axial (AX) view demonstrates the humeral head (large circle) displacement posterior to the glenoid (small circle).
Anteroposterior (AP) view demonstrates internal rotation of the humeral head. This radiological appearance is referred to as the 'light bulb' sign (dark line).

also highlights the importance of reviewing each radiograph for findings outside the 'bony field of view', (Fig 10b).

After the clavicle, the 'surgical' neck of the humerus, just distal to its 'anatomical' head, is the commonest site of fracture in the shoulder region (Fig11) and the third commonest fracture of the extremities[8]. Fractures of the 'anatomical' neck, the articular segment between the tuberosities, in isolation are less common but may seen in complex multi-component injuries [8, 10].

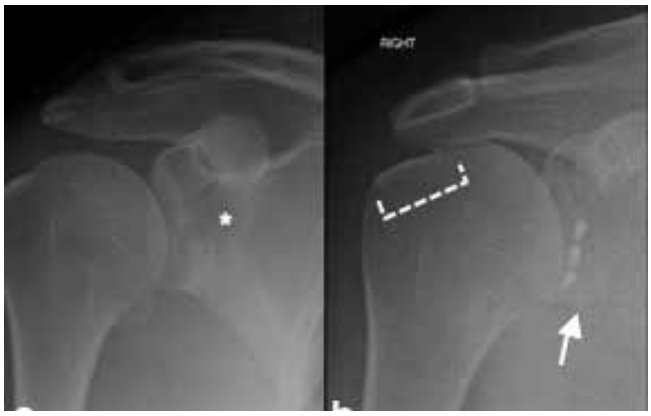

Fig 14. Other shoulder injuries.
(a) **A Bankart lesion:** A fracture of the anterio-inferior glenoid (*) due to anterior dislocation.
(b) **Hill-Sachs deformity:** A subtle impaction fracture of the greater tuberosity (lines) from previous anterior dislocation.
(Note prior surgery ← to a*)

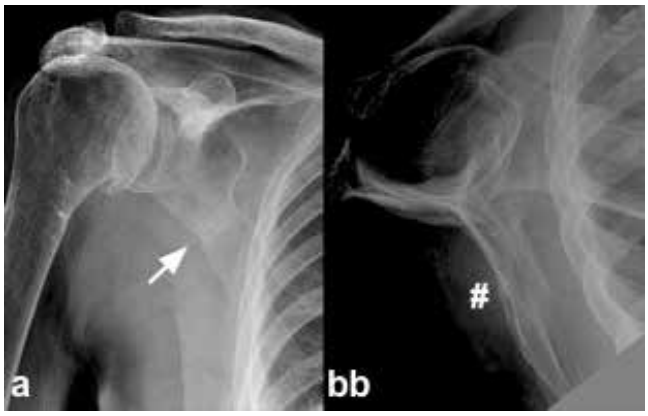

Fig 15 Scapular Fracture
(a) A subtle sclerotic line (←) in the blade of scapula is revealed as a fracture (#) on dedicated views (b).

When interpreting shoulder radiographs, glenohumeral dislocation should also be considered and excluded. The position of the humeral head in relation to the glenoid is assessed on dedicated axial or 'Y' views: an extension of the principle of always reviewing at least two orthogonal views. Anterior-inferior dislocation of the shoulder joint (Fig 12) occurs more frequently than posterior dislocation (Fig 13), each condition presenting with different clinical findings and radiographic appearances[8].

Stabilising soft tissue structures such as the rotator cuff

muscles, tendons and ligaments are often injured in combination and need to be considered as they influence management in the short and long term. One must also look for subtle but important injuries especially in the presence of dislocation (or subsequent reduction) such as a Bankart lesion or Hill-Sachs Deformity (Fig14).

A checklist review of review areas such as scapula and ribs should form part of the diagnostic algorithm to ensure subtle or uncommon injuries are not overlooked (Fig 15).

CONCLUSION

Radiographic interpretation is an essential skill for many clinicians but radiologists are there to help and experienced radiographers can often assist. Remember:

1. Image appropriately and provide maximal clinical information.
2. Consider the history, examination and patient age to maximise/optimise clinical-radiological correlation.
3. Always review at least two orthogonal views e.g. AP and Lateral. Review systematically and in its entirety the region imaged.
4. Consider subtle findings such as the presence of acute angles in cortical surfaces; periosteal reaction and sclerosis.
5. Check your review areas.
6. 'Think outside the bone.' Review the soft tissues and consider what other injury may have occurred.
7. Older images are your friend and if no fracture is identified, on the initial view, consider re-imaging after an appropriate interval or undertaking further investigations if symptoms persist (e.g. CT, MRI or Nuclear Medicine studies).

Radiographs are an adjunct to, not a replacement for, clinical assessment and may not always provide a definitive answer.

While I have provided an overview of upper limb radiographic interpretation the principles described above can be applied, generally to the lower limb and to radiographs of the body and axial skeleton.

The authors have no conflict of interest

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Medical History

Benjamin Moore FRS (1867-1922)

Robin Agnew

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SUMMARY

Dr Benjamin Moore was the first Professor of Biochemistry in these islands. His life and medical career are described together with his prescient contributions to public health. A man of remarkable vision, his ideas were written more than three decades before the Beveridge Plan for a National Health Service.

INTRODUCTION.

The recent publication of a biography by his grandson reminded me of Benjamin Moore senior's contributions on social medicine.[1] The book is dedicated to "Dr. G.A.J. Pitt (who first suggested the biography) and in memory of my father, Dr. T. Moore (1900-1999)." The author was born in Cambridge and saw active service as an officer in the Royal Ulster Rifles in the Korean War (1950-1953). He graduated at Christ's College, Cambridge in Natural Science and after working for eight years as an oil geologist in Western Canada and Northern Brazil, he returned to England to study medicine, qualifying at St Bartholomew's Hospital in 1969; he later specialized in obstetrics and gynaecology. After working in Ireland and abroad he settled down as a consultant in Hereford, where he still lives. He has written one previous book entitled 'Alberta to the Amazon: Geological Travels in North and South America.'

Benjamin Moore junior's biography contains a useful resumé of his grandfather's career (pp.x-xi) and family tree of recent generations of the Moore family (p.xii).

In the PREFACE the author summarizes his grandfather's "short career and difficult family circumstances" and explains that pride in his family history was a prime motivation in writing the book but pointing out that, as his grandparent had died ten years before he was born, they had never met. However Moore junior was able to access many records in three volumes of Moore senior's collected papers as well as family photographs; the reproductions of these heirlooms enhance the value of this elegant biography of the first Professor of Biochemistry in these islands, firstly at Liverpool (1902) and later at Oxford (1920).

EARLY CAREER

Benjamin Moore was born in Paisley, near Glasgow, on 14 January 1867.

His parents, although living in Renfrewshire, were of Northern Irish origin. His father William Moore (1824-1912) was in the grocery business and married Mary Ann Ray in 1858, whose father also had a grocery shop in Paisley. On the death of his father in 1874, William inherited his father's small grocery shop in Conway Street situated between the Falls and Shankill Roads on the western side of Belfast.

He continued this business in a working class district for the next twenty-five years. Benjamin's early education took place at the nearby Belfast Model School. Modern readers may be surprised that the school was multi-denominational and this seems to have worked well until towards the end of the 19th century, when 'faith' schools took over and the intake of the Belfast Model School became largely protestant. Pupils came from a wide range of working and professional backgrounds and were offered a broad education in the Scottish tradition including basic literacy, science and vocational studies. 'Fees ranged from one to five guineas per quarter depending on the course being taken.' (p.3)

In his later terms at the Model School, Benjamin felt the need to augment his knowledge of Science if he were to achieve his ambition of entering Queen's College, Belfast. He enrolled for evening classes at the Belfast Working Men's Institute (WMI) over the next three years. (The WMI had been founded in 1868 to provide pre-university education in a wide range of subjects including science, chemistry and mathematics.) He was diligent to such an extent that Benjamin Moore was awarded the Belfast Mayor's prize for overall achievement in 1886; in addition he won first class prizes for chemistry and philosophy. In 1887 he was awarded the Mayor of Belfast's prize for the second time, a first prize for mathematics and as a bonus, a Science Scholarship of £115 to guarantee his entry to 'Queen's'. He was then twenty years old and was described as 'a sturdy young man, short in stature compared to his father, with a fine head of dark hair and…a moustache.' (p.5) FIGURE 1.

Queen's College Belfast was founded in 1845 at a time when the city was expanding to become a major industrial centre

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in the British Isles. It was a constituent college together with others at Galway and Cork, formed as the Queen's University in Ireland in 1850. In 1879 Queen's University was replaced by the Royal University, which became the National University of Ireland in 1908 and Queen's Belfast achieved independent university status.

When he entered university in the autumn of 1887, Moore intended to study engineering. This involved attendance at lectures in mathematics, physics, chemistry and physiology as well as engineering. He quickly showed an aptitude in chemistry and physics and was awarded the Andrews Studentship in organic and inorganic chemistry, chemical philosophy and physics in 1889 with a total value of £145. Supported by this scholarship and other smaller awards, he graduated as Bachelor of Arts (BA) with first class honours in experimental physics in 1890. The following year he was conferred as Bachelor in Engineering (B.Eng.) and in 1892 as MA Queen's College Belfast (1st Class Hons.).

At 'Queen's' he showed a 'profound knowledge of chemistry.'(p.8); possibly influenced by his professsors he decided to abandon a career in engineering in favour of postgraduate study in chemistry abroad. At that time Germany was at the forefront of scientific studies in chemistry and he was deservedly awarded an '1851' travelling research fellowship to study physical chemistry at Leipzig University between 1891-94.[2] The decision by the University to put Benjamin Moore's name forward was due to his flair for experimental science and laid the foundations for his future as the first professor of biochemistry in these islands.

At Leipzig he worked under the guidance of Professor Friedrich Wilhelm Ostwald (1853-1932), later to be awarded a Nobel Prize in physics (1909). Moore concentrated on physical chemistry and its application to biology. He then worked at the chemistry department of University College, London (UCL) for the next four years on the teaching staff and was influenced by such men as Sir William Ramsay (1852-1916) and Sir Edward Sharpey-Schafer (1850-1935). UCL, with close links to University College Hospital (UCH), was then at the 'cutting - edge' of physiological and pharmacological research, which was a great opportunity for Moore to further his career in physiology. He researched the spleen, the salivary glands and the chemistry of the adrenal cortex finally contributing an article on digestion to the first volume of Schafer's *Textbook of Physiology* in 1899, which involved some innovative ideas on the chemistry of digestion. In December 1898 he married Edith Francis (1871-1913) in London just prior to sailing across the Atlantic to take up his appointment as associate professor of physiology at Yale University Medical School in New Haven, where he further researched the function of the adrenal glands and the osmotic action of colloidal solutions. It was there that Edith gave birth to their son on 1st January 1900, who was named Thomas after his maternal grandfather.[3] Benjamin Moore returned to London as lecturer in physiology at Charing Cross Hospital Medical School between 1900 and 1902. In 1901 he was awarded the degree of Doctor of Science (Gold Medal) by his alma mater, Queen's College, Belfast. At this time he felt the need to acquire a British medical degree. Although over thirty years of age, he commenced to study for and, in 1907, became a member of the Royal College of Surgeons of England and a licentiate of the Royal College of Physicians of London.[4]

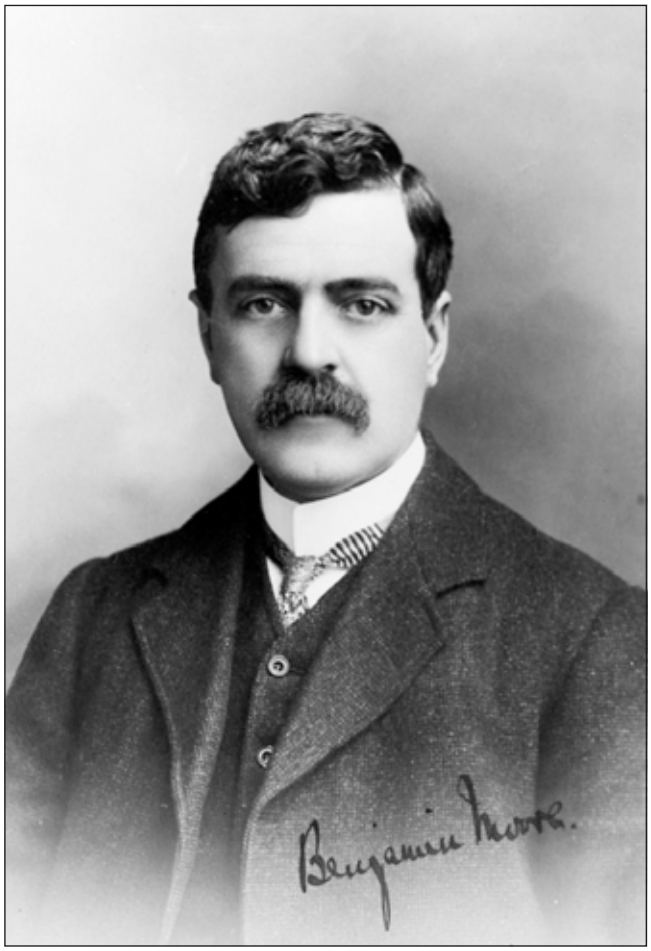

Fig 1: Benjamin Moore as a young man. With acknowledgement to the Image Department of the Wellcome Library, London.

In 1902 Moore was appointed to the newly founded Johnston Chair of Biochemistry in Liverpool, the first chair of its kind in these islands.

[William Johnston (1841-1917) of Bromborough, Cheshire was born in Northern Ireland and commenced his ship-owning business in 1863 at Liverpool. When his firm was taken over by Furness Withy & Co. in February 1903, Johnston endowed the Chair with £10,000. It was originally designated by the university senate as a Chair of Physiological Chemistry in April 1902 but the title was changed to 'Bio-Chemistry' and this hyphenated form existed for some years. 'Dr Benjamin Moore of the Royal University of Ireland was invited to be the first holder of the Chair in October 1902.'][5]

Moore's work at the Johnston Laboratory resulted in a plethora of publications from his department including ten in the *Bio-Chemical Journal,* which he and Edward Whitley

(1879-1945) had founded in 1906. These concerned the application of physico-chemical methods to biological problems and were rewarded by his election to the Fellowship of the Royal Society in 1912. Among his distinguished sponsors is the name of 'F.G. Hopkins', later Sir Frederick Gowland Hopkins (1861-1947).[6] During his stay in Liverpool Moore became acutely aware of how badly the Poor Law Hospitals, which catered for the overcrowded slums of an industrial city, compared with the Teaching Hospitals; this applied particularly to staff to patient ratios. Appalled by the dire social conditions of poverty and destitution both locally and nationally, Moore wrote a 204 page book on the subject. [7] In it he made some practical suggestions for improvements in public health, many of which were well ahead of his time.

In the PREFACE, he fulminated against the practitioners of fringe medicine who 'ruin our systems with drugs in attempting to exorcise the demon of disease, and when we fail we turn to the claptrap of faith-healing or homeopathy, imbued with all the spirit of the superstition and idolatry of the Middle Ages.' [8] 'It is only a strong public feeling, demanding a rationally constituted public medical service armed with powers to fight disease, which can bring reform in these matters.' [9] He was particularly concerned with the high mortality for the United Kingdom of pulmonary tuberculosis (TB), which he called the 'Great White Plague', quoting figures of 56,080 for 'the three kingdoms' for the year 1908. [10] Moore concluded that, with the foundation of a new 'National Health Service' (his words) and the provision of segregation for infectious cases in sanatoria, the disease could be eradicated. He even considered that the private sector could be included to reduce costs: 'although the burthen on the nation may be somewhat relieved by allowing the patient who can pay to do so, and to be treated in a separate

Sanatorium under the inspection and control of the State.'[11] Moore's figures for the cost of eradicating tuberculosis are interesting: he calculated that it would cost between seven and eight million pounds annually for five years. This compared very favourably with the existing cost of thirty million pa to the economy.

NOTIFICATION

Success for the scheme of segregation would depend on compulsory notification of TB so that, by the implementation of both methods, 'the disease could be efficiently stamped out'. [12]

Almost simultaneously, across the Irish Sea, a Tuberculosis Prevention (Ireland) Act (1913) ensured the notification of TB was 'necessary but still not compulsory'; this was a mistake in the legislation strongly opposed by Lady Aberdeen (1857-1939).[13] In England and Wales notification of TB passed into the Law in 1913 and was followed by compulsory isolation of TB patients. The death rate for TB, especially for urban males, was still high in the year 1910 and the public was quick to blame foreign immigrants for importing the disease.[14] Drawing a parallel with the quarantine rules that resulted in British dogs escaping hydrophobia, Moore strongly advised that 'Every case of immigration suspected of phthisis [infectious pulmonary TB] … must be examined' at the port of entry to the United Kingdom. In those found to be a danger to the native population, entry should be refused.[15]

'THE DAWN OF THE HEALTH AGE' AND FURTHER CAREER

The book engendered wide coverage by the Press, mostly with favourable reviews, especially in the north-west of England.[16] In Belfast, the *Telegraph* commented: 'His proposals may be looked upon by some as radical but that is what he intends them to be, for he aims at striking at the root of disease.'[17] In Dublin, the *Irish Independent* praised the book which: 'Opportunely comes at the present time when a health crusade is spreading throughout Ireland.'[18]

In 1913 his wife Edith died from appendicitis, which affected him deeply at a time when he had reached the peak of his career. It was a tragedy from which the whole Moore family never fully recovered.[19]

During the Great War (1914-18), he was employed by the Medical Research Council in London, where he was involved in solving the problems of TNT poisoning and TB in factory workers. He also carried out work on the treatment of surgical shock, including the use of intravenous administration of colloid solutions in the management of severe haemorrhage.[20] Towards the end of the war he recognised that the close proximity of workers in factories, engaged on the production of war materials, was a major factor in the spread of TB.[21] He proposed the establishment of an Industrial Health Medical Service (IHMS), staffed by demobilised personnel of the Royal Army Medical Corps, as a solution to their post-war unemployment problems. The IHMS scheme was to prove the forerunner of a modern Occupational Health Service.[22]

In 1920 he accepted the offer of the chair of biochemistry at Oxford University; this was named the 'Whitley Chair' after its founder, Edward Whitley (1879-1945), who had moved to Oxford in 1911 and donated the sum of £10,000 to endow the Chair named after him in 1920.[23] Moore was its first professor and Whitley his assistant. (During the late summer of 1920 they travelled to Geneva to study the flora of Lake Leman.) He returned briefly to Liverpool in the summer of 1920 to lecture on 'The New Crusade against Tuberculosis.' This included the observation that, egregiously, the incidence of pulmonary TB in Belfast was higher in urban females than in urban males. Moore explained this by the fact that the linen industry there employed greater numbers of women than men and that they worked closely together.[24] The Northern Irish professor settled in to his duties at Oxford and published his final work, which encapsulated his personal feelings on biochemistry.[25] All seemed set for an Oslerian conclusion to his academic career but, tragically, in January 1922 he developed influenza; this was complicated by liver failure (possibly related to TNT exposure during the Great War) and he died on 3 March.[26] In an obituary FG

Hopkins praised Moore's achievements: ' The progress of biochemistry during the first twenty years of this century owed much to his stimulating publications and to his personal influence over his colleagues and pupils.'[27]

Moore's reforming instincts were characterised by his foundation, together with other radical colleagues, of the *State Medical Association* (SMSA) in 1912. The first meeting took place in Liverpool on 26 July: its aims embodied many of the founding principles of the National Health Service established by the Labour government on 1 July 1948.[28] The first honorary treasurer of the SMSA was Dr Jane Harriet Walker (1859-1938). Born in Yorkshire, she qualified in Medicine in 1884, the forty-fifth woman to be entered on the General Medical Register.[29] In 1901 she opened a sanatorium at Nayland, Suffolk and, like Benjamin Moore deserves a place as a pioneer in the defeat of tuberculosis.

In conclusion, the author is aware of the many deficiencies in describing Moore's career in this brief article. For a comprehensive account, the reader is referred to the detailed and well-written book on the subject by his grandson.[1]

ACKNOWLEDGEMENT.

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Biographical details of the author: Robin Agnew MA MD (Dubl) FRCP (Irl) is an Emeritus Consultant Chest Physician from Liverpool. He is the author of many publications in general medical literature and particularly in medical history. He is the author of two books on the life and naval career of Sir John Forbes (1787-1861).

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Letters

THE PATIENT IMPACT OF A&E CLOSURES

Editor,

Accident and emergency (A&E) department closures in Northern Ireland have stimulated controversy in public, media and political opinion. We raise the question, what is the impact of A&E closures on patients?

We summarise below the results from our recent survey, following the closure of Midulster A&E in May 2010. The Midulster residents now have access to acute healthcare services only via alternative hospitals.

METHODS:

We surveyed patients attending Moneymore Medical Centre and Coagh Medical Practice from 7-17 November 2011 (N=100).

RESULTS:

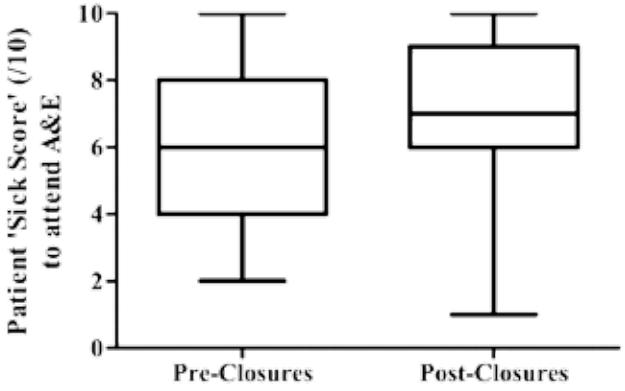
Demographics: Following the closure of Midulster A&E, the closest A&E to 80% of the respondents was Antrim Area Hospital. The mean reported driving time to their current nearest A&E service was 43 minutes. Furthermore, 74% of respondents reported having used at least one of the following hospital services (outside of the Midulster Hospital) within the previous 12 months: A&E, inpatient stay, outpatient clinic or specialist scan.

Responses 1: 82% of respondents rated access to health services as "worse" following Midulster Closures; 17% rated "same"; and 0% rated "better" (1% did not answer this question). A majority of respondents reported "further distance" (86%) and/or "long waiting times" (80%) as the main difficulties introduced by hospital closures. Only 12% reported improved services after the centralisation of acute services.

Responses 2: We asked patients to rate on a ten-point scale how unwell they would need to feel in order to attend A&E (with 1 as least severe and 10 as life-threatening). In the same questionnaire, we asked for two ratings – one for prior to the closure of Midulster A&E, and one post-closure. We refer to each rating as the Patient Sick Score. We found a significant difference between the pre- and post- closure ratings ($p<0.0001$) (Figure 1).

CONCLUSION & DISCUSSION

Our survey shows that the patients perceived a negative impact on ease of access to acute healthcare services following Midulster closures. Few patients perceived benefits to the centralisation of services. The Patient Sick Score measurements (Figure 1) further indicate that patients are only willing to attend A&E when they perceive a more severe illness, following the closure of Midulster A&E. This could strain local primary healthcare services since patients are more reluctant to access acute hospital services.



Mann-Whitney U Value = 3087 ($p<0.0001$)

Fig 1. Boxplot showing Patient Sick Scores to attend A&E pre- and post-hospital closures. Post-closure, patients reported that they would need to feel more unwell in order to attend A&E.

While we acknowledge the limitations of the survey (e.g., retrospective nature and small sample size), the responses suggest that the Midulster closures have negatively impacted this patient group.

We therefore recommend a re-evaluation of the measures that were instituted to ensure continued adequate access to acute healthcare services following the Midulster closures. We also highlight this as a topical issue, since there is ongoing debate regarding further closures of acute hospital services in Northern Ireland.

The authors have no conflicts of interest

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We thank Dr McKay and the staff of Moneymore Health Centre and Coagh Medical Practice for their support in conducting the patient questionnaire.

HOARSING AROUND: IS IT TIME TO GROW UP?

Editor,

Dysphonia is common in children with incidence rates ranging from 6% to 23%[1]. Despite this practice varies considerably regarding what, if any, investigations are performed and how the condition is managed. Although childhood dysphonia is mostly due to simple causes such as voice misuse, serious underlying pathology such as papillomatosis or malignancy needs to be excluded.

Paediatric voice disorders typically have been blamed on vocally "abusive" behaviours or pubertal changes, and many practitioners tend not to provide intervention because they believe that children will "grow out of it." However, changes in pitch, loudness, and overall vocal quality tend to interfere with a child's ability to effectively communicate. Research focused on paediatric voice disorders has shown that there is an association with perceived negative attention, limited participation in activities and an overall decrease in life quality in children suffering from them[2]. Voice disorders are common in the paediatric population and have recently been gaining more attention however there is still a lack of information available to clinicians regarding their evaluation and treatment.

Paediatric head and neck malignancy is rare with paediatric laryngeal cancers being especially rare. Conventional risk factors, such as active and passive smoking, exposure to chemicals or radiation therapy are frequently not present in the clinical history and little may be found on clinical examination. This can therefore be falsely reassuring to the clinician leading to significant delays in investigation and treatment which would not happen in an adult patient. Head and neck cancer in paediatric patients can be particularly devastating with significant long term effects even following successful treatment. In addition to surgical morbidity and mortality, late effects of treatment in children receiving radiotherapy for head and neck cancer are frequent, including neuroendocrine, dental, thyroid, and cognitive toxicity.

Voice clinics and voice therapy services are now well established in most adult health services in the developed world. Equivalent services for children are less common at least in the United Kingdom. NICE currently recommends that any adult with dysphonia for greater than three weeks is investigated and referred onto ENT services[3]. There are currently no national guidelines for referring paediatric patients with voice disorders to the ENT service. In the United States, Johns Hopkins Paediatric ENT department recommends referral following four weeks of persistent hoarseness while Miami's Children's Hospital recommends referral after only one week[4,5]. With increasing incidence of head and neck cancer in adolescents and the associated negative effects of voice disorders on children we need to ask should we be reassessing the need to refer children and adolescents with dysphonia in line with adult referral patterns?

It is the authors view that the paediatric patient with persistent dysphonia for greater than three weeks should be investigated with the same degree of clinical suspicion that their adult counterparts would. Although few will ever be found to have significant pathology, options are available to improve the quality of life of paediatric patients with chronic voice problems.

The authors have no conflicts of interest.

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A DIFFERENT TYPE OF FIGHT BITE- AN UNUSUAL CAUSE FOR RUPTURE OF THE PECTORALIS MAJOR TENDON

Editor

A 40-year-old right hand dominant doorman presented approximately one year following an injury to his left pectoralis major tendon. He reported that whilst restraining an individual in a headlock he was bitten in his left anterior axillary fold and that immediately following the incident he had pain, extensive bruising and swelling in relation to his left anterior chest wall. He did not seek medical attention at that time. Clinical examination revealed bunching of the left pectoralis major muscle towards its sternal origin (Figure 1) and weakness of shoulder adduction. MRI scanning

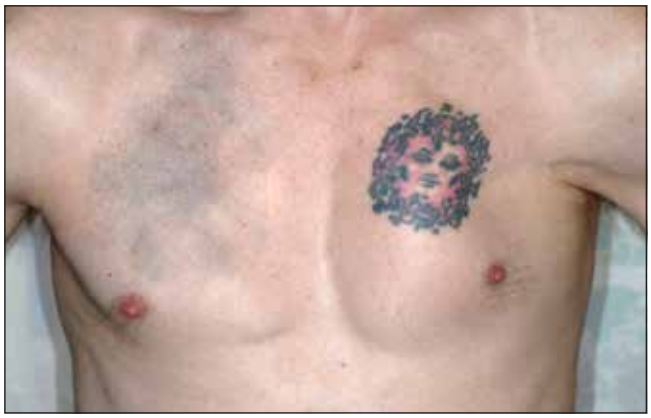

Fig 1. Clinical picture demonstrating loss of contour of the left anterior axillary fold with medial bunching of the pectoralis muscle (Note – distinguishing mark airbrushed from right anterior chest wall)

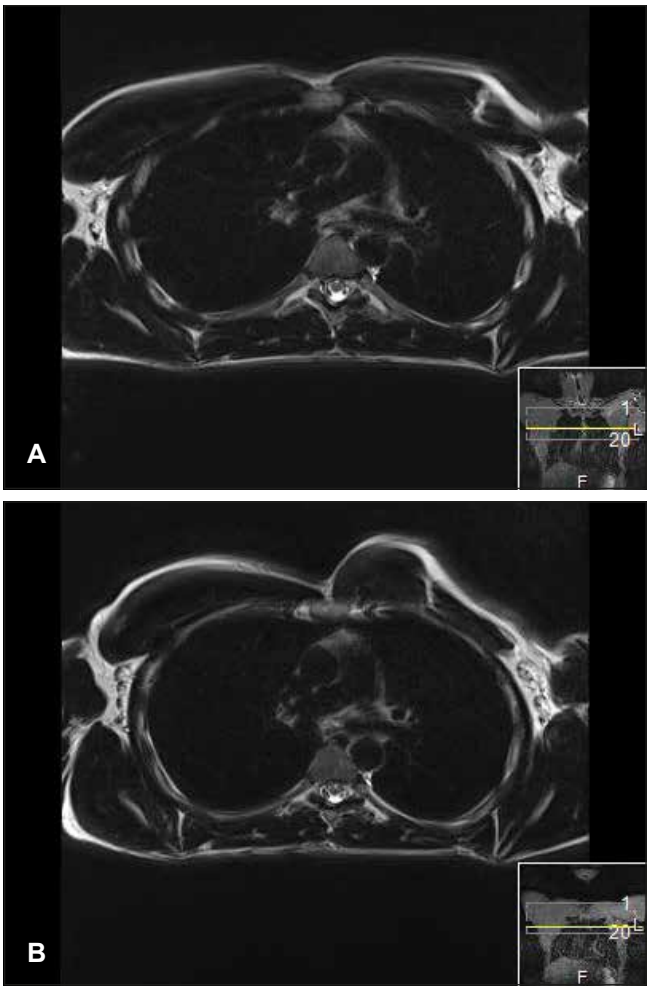

Fig 2 (a) and (b). (a) Axial T2 BLADE studies demonstrating linear high T2 signal traversing the sternal head of the pectoralis major musculotendinous junction in keeping with a full thickness tear in relaxation with medial displacement of the muscle belly during active contraction (b).

demonstrated a full-thickness, complete-width defect of the sternal head of the left pectoralis major tendon (Figures 2a and 2b). The patient declined surgical reconstruction.

Pectoralis major tendon rupture is an uncommon injury. Following a comprehensive review of the literature, Elmaraghy and Devereaux[1] identified 365 reported cases of pectoralis major injury between 1822 and 2010 with only 24% reported between 1822 and 1990. Bak et al reported a meta-analysis of 112 cases [2].

Tears of the pectoralis major tendon predominantly occur in active men aged between 20 and 40 years[1,2]. The majority of ruptures occur at or between the musculotendinous junction medially and the humeral insertion of the pectoralis major tendon laterally (67%)[1]. Delayed presentation is not uncommon with these injuries. MRI has been helpful in identifying complete-width, full-thickness ruptures but is less reliable in identifying partial-thickness ruptures because MRI cannot distinguish between the bilaminar tendon layers[2, 3]. Often it is only at the time of surgery that the true morphology of the rupture can be definitively characterised[4].

Indirect trauma is the most common mechanism of injury (83% cases) with most injuries occurring when a maximal force is applied with the pectoralis muscle eccentrically contracting during an abducted and externally rotated shoulder movement e.g. during the deep part of the lift during a bench press manoeuvre[2].

Studies have shown that the average bite force of an adult male ranges from 382N to 909N with maximal force being applied by the molar teeth[5] which is more than suffice to cause damage to the pectoralis major tendon, which is on average 4mm thick and 4cm wide[1]. We postulate that with the shoulder abducted, flexed and internally rotated, when restraining an individual in a headlock, the pectoralis major tendon is accentuated and thus susceptible to injury from a bite.

Numerous repair techniques have been reported to reconstruct pectoralis major tendon injuries[6]. The decision to proceed with operative treatment depends on the degree of injury and the functional demands of the patient. Better outcomes have been reported with operative treatment particularly in high performance athletes[7, 8]. Due to the chronicity of our case, we suspect that direct repair would not have been possible and that a tendon graft or mesh repair would have been required. To the best of our knowledge rupture of the pectoralis major tendon due to a human bite has not been previously reported.

The authors have no conflicts of interest.

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PYODERMA GANGRENOSUM: THE ROLE OF SURGICAL TREATMENT.

Editor,

In a recent case, we anecdotally found a positive benefit to surgical management of Pyoderma Gangrenosum (PG). The disease process behind PG remains poorly understood, however through epidemiological and etiological studies an understanding of the risk factors involved has developed. There is increasing recognition of post trauma or post surgical PG, with cases reported from a number of specialities[1]. Key to the principles of current treatment is an abnormal over-active response to trauma, or pathergy.

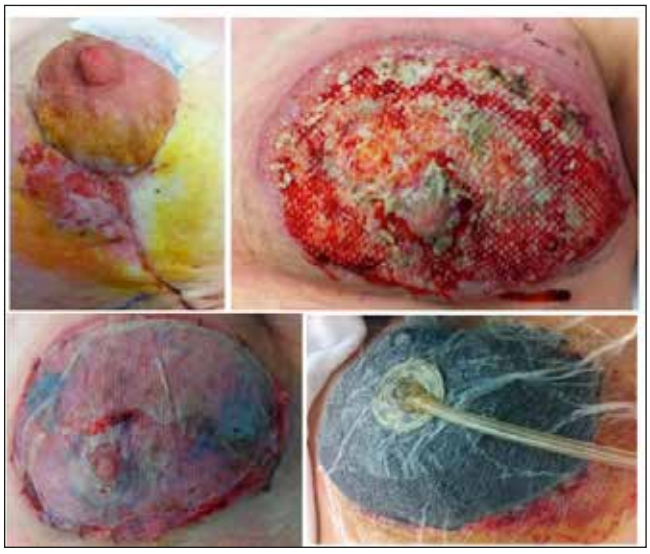

Fig 1. Showing, clockwise from top left, the patients wound; at presentation, after five days of medical treatment, with vacuum dressing in situ, and finally at graft check day 5 post op.

An otherwise fit and well 47 year old female, whom had underwent wide local excision and chemo-radiotherapy four years previously, attended for right breast reduction and left mastopexy. The surgery was carried out without complication and she was discharged home the following day. She presented one week later with erythema, tenderness and an enlarging area of ulceration arising from the mastopexy wound on the left breast. Despite medical management for presumed surgical site infection, the condition progressed. Dermatology reviewed the patient and commenced intravenous steroids for a presumptive diagnosis of PG. Histopathological examination of biopsies showed no vasculitic or malignant process. However it identified a spongiotic, inflamed epidermis, which was infiltrated with neutrophils. The dermis demonstrated extensive necrosis, and mixed neutrophil and lympocytic infiltration. These are the histopathological findings of PG.

Due to the extensive skin loss, after a full discussion of the risk of exacerbation, the patient elected to proceed onto surgical debridement. A split thickness skin graft provided coverage for the left breast, and a vacuum dressing applied. The surrounding skin was covered with a border of hydrocolloid dressing, to prevent maceration of the tissues. Secondly the sponge was deliberately cut slightly small to prevent pressure on the skin edge. She had an uncomplicated recovery, and she continued on a reducing dose of oral steroid and was reviewed in the outpatient clinic at four weeks where the graft was found to have healed fully. At six month review, she has suffered no wound breakdown, and is coping well with the psychological impact of altered aesthesis of the breast.

PG carries a significant risk of mis- or indeed delayed diagnosis. Our case demonstrates the dilemma, and the safe practice of treating the more common diagnosis of surgical site infection in the first instance. It is important to consider PG in the post surgical patient with an apparent infection, which grows no micro-organisms. Early referral to Dermatology and, the commencement of corticosteroids to control the inflammatory response is vital to arresting disease progression. In light of the skin loss, and the psychological impact upon these three women, we also requested the involvement of our clinical psychologist.

We recommend the careful consideration of surgical treatment as an adjunct to appropriate systemic management, as it can achieve an aesthetically good result in the instance of significant skin loss. Meticulous surgical technique to minimise trauma including careful dressing providing the key to success[2].

The authors have no conflicts of interest.

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'TOO MUCH, TOO SOON,' OR 'A STEP TOO FAR?' EXERCISE INDUCED RHABDOMYOLYSIS

Editor,

Introduction: Rhabdomyolysis is clinical condition characterised by damage to striated muscle membranes with resulting biochemical and clinical sequelae. Relatively uncommon and underdiagnosed, it is a potentially severe and debilitating condition with an increasingly multi-factorial aetiology. Exertional rhabdomyolysis refers to skeletal muscle damage induced by exercise, most commonly strenuous and eccentric exercise with clinical features developing after 48-72 hours[1,2].

Case Presentations: Two cases of Exercise Induced Rhabdomyolysis were admitted to a Belfast Teaching Hospital over a 2-week period. Each patient presented de-novo with debilitating myalgia, dark urine and significant CK elevation (CK levels 68,589 and 21,713 respectively). Previously healthy but exercise-naïve, both patients presented 72 hours following structured exercise programmes under 'qualified' supervision (spin class, fitness assessment). Aggressive fluid resuscitation with meticulous fluid balance facilitated renal preservation and complete recovery.

In the absence of muscle biopsies, one could argue that underlying genetic metabolic dysfunction could be responsible. Such conditions are uncommon; therefore the probability of serial independent non-consanguineous presentations is unlikely. Each case presented de-novo in adulthood; no history of previous rhabdomyolysis or exercise induced myalgia was elicited. In addition, both patients had previously participated in sporting activities to a level akin with their peers. Furthermore, the initial patient had persistent elevation of CK levels despite normal renal function, initiating interrogation of biochemical pathways; glucose-6-phosphate dehydrogenase, plasma acylcarnitine, free carnitine and white cell enzymes all within normal range. Undoubtedly the most significant aetiological factor pertinent to these cases was over-exertion by unaccustomed athletes.

Discussion: It is recognised that people who exercise regularly are less likely to develop rhabdomyolysis than their more sedentary counterparts[3]. It would therefore stand to reason that incremental physical training initiates adaptive cellular mechanisms which facilitate increased metabolic demand. Physically conditioned athletes can undergo severe exercise with only modest rises in CK[3]. For any given muscle mass as physical conditioning improves, severe exertion is less likely to produce significant CK elevation. Metabolic adaptation is therefore a dynamic mechanism.

Hamburg et al 2007 demonstrated metabolic changes consistent with physical inactivity. These included the development of insulin resistance, dyslipidaemia, increased blood pressure and impaired microvascular function in otherwise healthy volunteers[4]. Sedentary individuals also developed a down-regulation in reactive hyperaemic responses and a decrease in resting blood flow. These processes result in an imbalance between supply and demand of intracellular adenosine triphosphate (ATP) obligating the myocyte to utilise alternative oxidative pathways. The resulting cascades of pathophysiological reactions stimulate proteolytic enzymes that degrade cellular membranes. Compounds including CK, LDH, ALT, calcium, myoglobin, potassium and phosphate are released systemically. With limited ability to maintain homeostasis, direct tissue toxicity and systemically mediated pro-inflammatory reactions potentiate complications including; compartment syndrome, hyperkalaemia, disseminated intravascular coagulation, coagulopathies and acute renal failure.

Conclusion: Poor physical conditioning and intensive prolonged exercise coupled with inadequate hydration precipitated rhabdomyolysis in these patients. These cases illustrate the perils of over-exertion; 'too much too soon' and 'a step too far.'

Consent: Consent was obtained from both patients for the publication of these case reports.

The authors have no conflicts of interest.

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The James Logan Essay Prize

The Challenges of Cancer Pain Assessment and Management

Clare Shute

Accepted 18 October 2012

Pain, being one of the most common symptoms of cancer[1] , is a heavy weight that a patient often has to carry with them along their journey from pre diagnosis, through treatment and even when in remission[1-3] . It is a debilitating symptom, interfering with not only their physical state, but also their psychological and social wellbeing[1]. It has been shown that 67% of patients find their cancer pain distressing[4] and it is now well noted that uncontrolled pain is a key promoter of the legalisation of physician assisted suicide[1,5-7]. The World Health Organisation analgesic ladder has now been used for over 2 decades[6,8] and is still considered to be the basis for cancer pain management[2]. Revalidation of this ladder, along with many other studies, have repeatedly documented that effective treatment is accessible for 70 – 90% of patients[1,6,8-10]. Despite this reassuring statistic, 66-74% of patients with advanced disease experience pain[2] and nearly one in two patients are being undertreated[11]. This essay therefore aims to explain the discrepancy between publication and practice.

Dame Cicely Saunders coined the term 'total pain' >30 years ago[12] recognizing that a patient's pain experience has physical, emotional, social and spiritual dimensions. This idea, along with the subjective nature of pain and increasing complexity in treatment modalities for cancer[2], highlight that pain as a basic concept is complex and open to ambiguity in its assessment and management.

Studies looking into challenges of managing this complex symptom are no longer few and far between. These were initially captured by the Agency for Healthcare Policy and Research in 1994[13]. Since then, organisations including the American Pain society, the Joint Commission[14] and the Expert working group of the European Association for Palliative care[11] have published guidelines.

Inadequate pain assessment is believed to be the leading barrier to adequate pain management[15]. Recognition of pain should begin at pre-diagnosis[16] and its assessment should include a detailed history, psychosocial evaluation and physical examination[2]. Current guidelines recommend the use of one of 3 validated assessment tools: the visual analogue scale, verbal rating scale or the most commonly used numerical rating scale (NRS)[3].

Furthermore, guidelines state baseline pain assessment, reassessment and analgesia efficacy must be documented within the patient's record[17]. However, the recent EPIC study revealed that 27% of patients said their doctor doesn't always ask them about their pain[4] and one study by Chih-Yi Sun et al. found that only 7.9% had documentation of their pain and evidence of reassessment[13]. This may reflect the fact that there is still the need for a common language when classifying and assessing pain[18]. In fact, over recent years, attempts to include pain as the '5th vital sign' have not been as promising as hoped[19] due to ambiguity over what exact assessment method should be used, causing healthcare workers (HCWs) to adopt a more informal approach[18]. There has been extensive research into the refinement of cancer pain assessment resulting in the continuous influx of new tools with different nomenclature[18]. This may further burden HCWs and in turn cause the gravitation towards informal assessment. It may be time to recognise that perfection is occurring at the expense of efficacy and that an international collaboration is needed to review assessment techniques.

It has now been over 4 decades since McCaffery's definition stating that "Pain is what the experiencing person says it is, existing whenever he says it does"[20]. It highlights that the patient's self report is the most reliable indicator of the presence and severity of pain. However, some patients, often termed as 'non verbal', may be unable to report their pain[21]. These include infants, the cognitively impaired, critically ill, anaesthetised or comatose and some patients reaching the end of their life. In these cases the traditional pain measurement tools are often difficult to employ. Therefore alternative approaches need to be considered and those based on the 'Hierarchy of Importance of Pain Measures' have proved successful[20]. The fact that 'non verbal' patients can often be found within oncology, highlights the importance of increasing awareness of this hierarchy to overcome communication barriers.

In addition to inadequate assessment, further management issues have been recognised in relation to both patients and HCWs as well as within healthcare and regulatory systems [1,11,13,14].

Despite the fact that opioid use is integral to cancer pain

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management[14], HCWs are still displaying incorrect beliefs that affect their prescription to those in need. HCWs are traditionally taught to treat the underlying disease[5,14]. This statement is reinforced by patients as studies have found that 38% feel that their doctor would rather treat their cancer than their pain[4]. The lack of pain recognition by clinicians may follow on from its lack of recognition in medical training [1,14,22]. A survey of oncologists in 1993 revealed that 88% rated their medical school training in pain management as fair or poor and most experts believe not much has changed[14]. Lack of education has lead to misplaced concerns over addiction and tolerance to analgesics as well as problems with key concepts such as side effect management and the use of alternative administration routes or adjuvant treatments[1,7,9,13,14,22]. Indeed, recent reports have found that despite constipation being the most commonly experienced side effect of opioids, only 27% of patients were prescribed laxatives in conjunction with their pain medication[4].

A patient's reluctance to report their pain and hesitancy to comply with treatment is also a major driver for inadequate pain management[14]. This reluctance often comes down to erroneous beliefs shared by patients. The Barriers Questionnaire has played a major part in identifying patient related barriers[23,24]. Patients often view pain as an inevitable part of having cancer and that admitting pain is a sign of weakness[14,24]. Furthermore, patients often hesitate to report their pain as they want to appear as a 'good' patient, they may not want to distract their doctor from treating their cancer or may fear that pain is a sign of disease progression [1,9,13,14,24]. Some studies reinforce the impact of these beliefs in finding that patients continue to paradoxically report high pain intensities while conveying satisfaction with their pain management [14,25]. Concerns about side effects of commonly used opioids follow on from HCWs failure to prevent them and fears over addiction and tolerance are also shared by patients[1,9,13,14,24].

The patient's age and ethnicity create special patient populations in need of mentioning. Elderly patients may provide communication barriers due to cognitive decline as well as having altered responses to analgesics and more complex pain experiences[7,14]. It has also been well documented that ethnic minorities experience undertreatment of their cancer pain, yet most studies of patient-related barriers to pain management have assessed primarily Caucasian patients[26,27]. Undertreatment may originate from an inability to communicate their pain experience with their doctor, socioeconomic challenges and unintentional biases such as racial stereotypes held by HCWs. In the face of an ageing and more ethnically diverse population[7], the healthcare system should be more forthcoming in addressing these issues.

Regulatory bodies have played a part in hindering the provision of optimal care. Traditionally, opioid use has occurred in a highly regulated environment leading to conservative prescribing by doctors who fear scrutiny by those enforcing the regulations[1,7,13,14]. Regulations are put in place with the aim of curtailing abuse, yet standards haven't been clearly set as to what constitutes 'legitimate medical practice' resulting in controversy and intimidation of doctors[14].

Further challenges lie within the fact that cancer patients are fragmented throughout the healthcare system. Most research on cancer pain has been conducted in secondary care, despite the fact that oncology patients are being increasingly cared for in the community[2,28]. The recent EPIC study invited community based patients, >90% of whom rated their pain >5/10 on the NRS and ¼ of whom weren't receiving analgesics[2,4] - a clear indicator that primary care is an area in need of attention. At the other extreme, there is evidence of under-referral to specialist pain management services and incoherent relationships between pain medicine and palliative care specialists[2,4,14]. Studies as early as 1991 have shown improved outcomes from using specialist and multidisciplinary pain management services[29]. Yet a survey in 2007 showed that while 92% of palliative care units had access to specialist advice, only 16% had regular sessions[2]. Furthermore, an American survey highlighted that there were only 6 pain specialists for every 100,000 patients with persistent pain[14] and only 25% of anaesthetists' job plans had time allocated for palliative medicine referrals[2] - statistics that again highlight areas needing increased consideration.

Although challenges of effective pain management have been an area of interest for almost two decades [13], unsatisfactory pain management in oncology is clearly still a prevalent problem. The reputation of pain management needs to move towards becoming fundamental to all aspects of cancer care. What is required is an environment where appropriate treatment is available when and where it is needed, where pain education is the norm and there is open communication between patients and HCWs and across all levels of care. Only through international collaboration among HCWs, policy makers and patients will this much needed standard be met.

The author has no conflict of interest.

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Abstracts

Spring Meeting Ulster Paediatric Society 9th February 2012

Education Centre, Royal Group of Hospitals, Belfast

President **Dr M Stewart**
Secretary **Dr J Bothwell**
Treasurer **Dr M Rollins**

PROGRAMME

Innovations and Examples of Good Clinical Practice in Paediatrics

13.30 Registration
13.45 Welcome and Free Papers
15.30 Coffee/Tea and Poster Session
16.30 Annual RBHSC Lecture
Future Direction and Implications for Paediatric Care
Dr Hiliary Cass
President of the Royal College of Paediatrics and Child Health
17.30 Presentation of Prizes and Closure

ORAL PRESENTATIONS

Best Scientific Paper

Medical and Social Factors associated with Early Neonatal Attendances to a Paediatric Emergency Department

Flanagan C, Stewart MC

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Aim: To examine the medical and social factors involved in the presentation of neonates in the first 14 days of life to a paediatric emergency department (PED) and outcome following attendance.

Methods: Retrospective study of all attendances of neonates in the first 14 days of life to a PED during two separate three month periods in summer and winter 2010-2011. Data were collected from PED computer system and compared with computerized medical records from maternity and paediatric inpatient systems. (PAS)

Results: There were 235 attendances during 6 months of study. The majority of these attendances occurred "out of hours" (80%). Parent self-referrals (62%), GP referrals (20%) and referrals from midwives (12%) accounted for 95% of all attendances.

The most frequent presenting problems were feeding difficulties (37%) and breathing difficulties (18%). The most common final diagnoses on discharge from ED were feeding difficulties (35%), respiratory tract infections (12%) and jaundice (11%); in 14%, no abnormality was found.

The admission rate to hospital was 26%. Seasonal variation was noted; Winter (23%), Summer (30%). One in three babies admitted were discharged within 24 hours; one in ten babies were admitted for 7 days or longer.

Conclusions: Attendance of neonates in the first 14 days of life to a PED is common, especially out of hours. The majority of neonates have minor illnesses. A number of neonates, however, have significant morbidity requiring prolonged admission.

Enhanced community services for neonates are required, particularly out of hours, in order to reduce emergency attendances and subsequent brief admissions to hospital. Adequate signposting of services, given the high proportion of parental referrals, is important. Given the prevalence of feeding difficulties presenting at this age, additional resources would be of benefit.

BEST ORAL PRESENTATION

Comparison of Undergraduate Medical and Nursing Student Numeracy Skills

Bourke T, O'Donoghue D, Bell A, Burns A, Shields MD, Stewart M

Paediatric Department, RBHSC, 180–184 Falls Road, Belfast BT12 6BE

Background: The GMC requires that all medical students are competent in drug prescription. Despite specific teaching on drug prescribing and administration within undergraduate curricula drug errors remain common. One third of paediatric medication errors involve an incorrect calculation.

Aims: We wished to evaluate and compare the numeracy skills of medical and nursing students in the context of drug

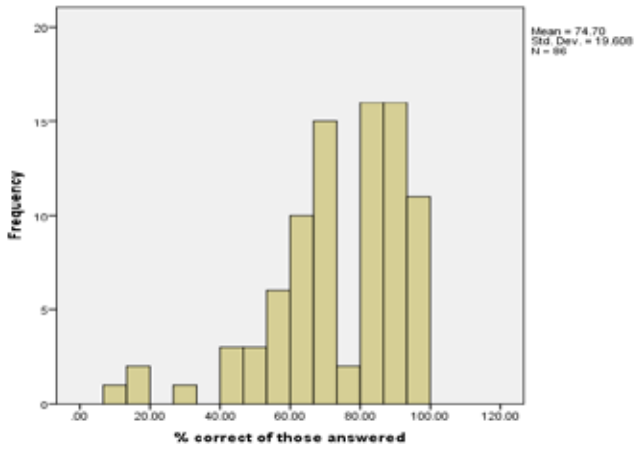


Fig 1.

prescribing and administration.

Method: Fourth year paediatric medical students and 3rd year children's nursing students were invited to complete a series of calculations involving drugs commonly used in paediatric practice.

Results: Eighty six students agreed to participate [68 medical, 14 nursing and four who did not indicate their discipline]. The median score for medical students was 82% [IQR 63% to 90%] and for nursing students was 67% [IQR 48% to 83%]. Only 11 students answered all questions correctly with the majority of students scoring less than 80% [figure 1]. Students who had completed the inter-professional drug prescribing workshop scored better than those who did not although this did not achieve significance. There was also a trend towards higher scores in medical students and in students who had completed A-level mathematics.

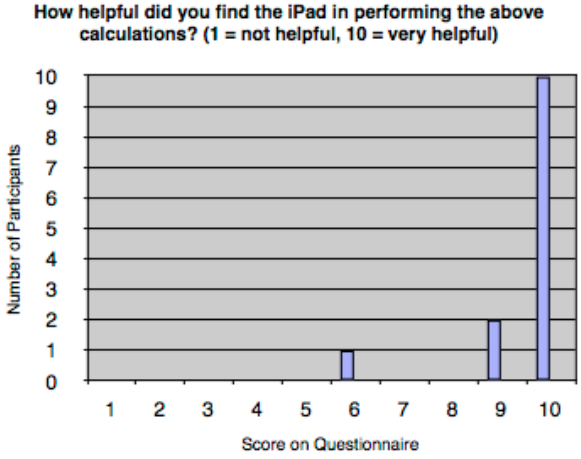
Conclusions: Basic numeracy problems in medical students have implications for safe clinical practice. Current undergraduate curricula fail to identify and address this important topic. Involvement in inter-professional workshops may improve safe drug prescribing and administration although additional specific training in numeracy skills is also required.

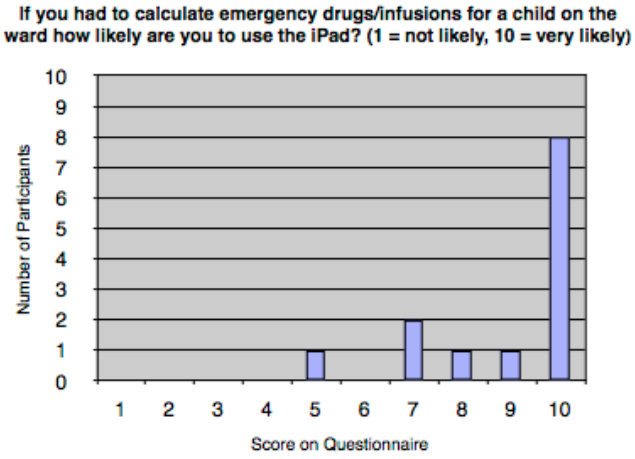
OTHER ORAL PRESENTATIONS:

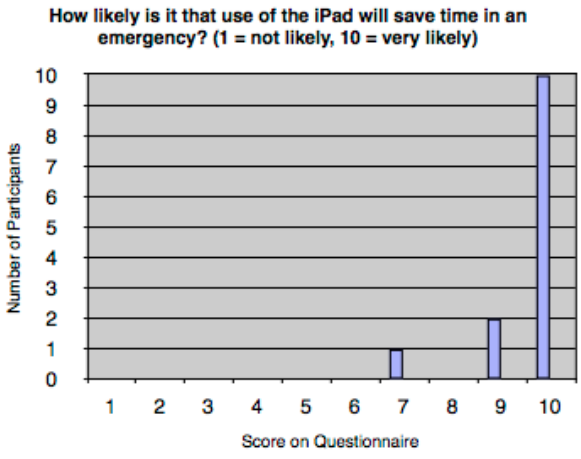
Are APLS Formulae for estimating Weight Appropriate for Use in Children admitted to PICU, Flannigan C, Bourke T, Terris M, Paediatric Intensive Care Unit, RBHSC, 180 –184 Falls Road, Belfast BT12 6BE

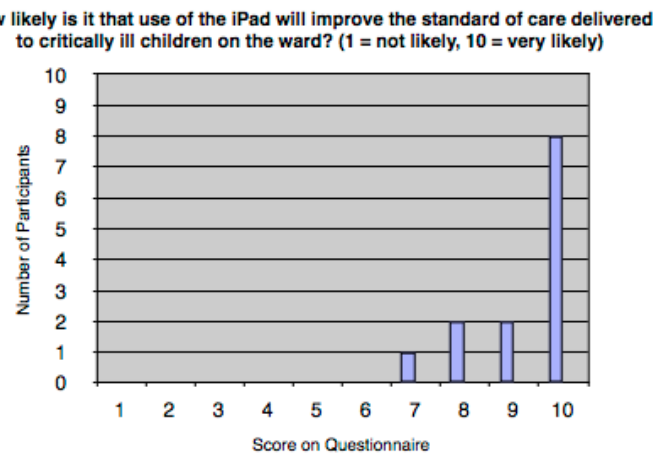
Are APLS Formulae for Estimating Weight Appropriate for Use in Children Admitted to PICU

[a]Christopher Flannigan, [a]Thomas Bourke, [a]Ashley Sproule, [a]Mark Terris.









[a] Paediatric Intensive Care Unit, Royal Belfast Hospital for Sick Children, 180-184 Falls Rd

Belfast, BT12 6BE, United Kingdom.

Background: As children in the developed world continue to become heavier the traditional formula of 'Weight = (Age+4) x2' has been shown to consistently underestimate their weight.[1] In 2011 Advanced Paediatric Life Support (APLS)[2] revised their formulae to provide a higher estimated weights.

Objective: To determine if the new APLS formulae are appropriate for use in PICU patients where failure to thrive is more common than in the background population.

Methods: Data was provided from the Paediatric Intensive Care Audit Network (PICANet) on 82,794 admissions to Paediatric Intensive Care Units in the United Kingdom over a five year period between 2006 - 2010. 10,081 patients (5622 male, 4459 female) between the age of term and 15 years had weights documented and were included in the study.

Results: The formula 'Weight=(0.5 x age in months)+4' for use in the 0-11 months overestimates weight for PICU admission between 8.6-20%. The formula

'Weight = (2 x age in years)+8 for use between 1-5 years underestimate weight between 1-5%. The formula 'Weight = (3 x age in years)+7 for use in 6-12 years overestimates weight between 3.3-17.2%.

Conclusions: The APLS formulae overestimates weight in children admitted to PICU <1 year and >5 years, but provide good estimation of mean weight between 1-5 years. Relying on mean weight alone will result in significant error as the 95% confidence intervals for all age groups are wide. It is therefore recommended that the mean weight should only be used as a starting point for estimation and that the 95% confidence interval for age should be used to aid how much to safely increase or decrease the estimate from the mean depending on visual inspection of the child.

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THE USE OF AN IPAD IN THE MANAGEMENT OF ILL CHILDREN

Sproule A[1], Flannigan C[1], McAloon J[2]

[1] Paediatric Department, RBHSC, 180–184 Falls Road Belfast, BT12 6BE

[2] Paediatric Department, Antrim Hospital, 45 Bush Road, Antrim BT41 2RL

Background: Utilising an emergency drugs calculator on a smartphone has been demonstrated to improve the speed, accuracy and confidence of prescribing in a paediatric emergency[1]. This knowledge prompted the introduction of an iPad into the resuscitation area of the paediatric ward in Antrim Hospital in order to facilitate use of the software [2].

Objectives: To assist evaluation of the benefits for clinical practice of providing this technology in a district general hospital and to ascertain the views of the staff on using the facility.

Design: Over a two week period in July 2011, all ward staff were invited to use the iPad to prescribe a salbutamol infusion and maintenance fluids for a simulated patient. They subsequently completed a questionnaire of their experience.

Results: Completed questionnaires were received from 13 healthcare workers ranging from consultant paediatricians to auxiliary nursing staff. All participants completed the prescriptions correctly using the iPad in a median time of 2 minutes (range 1-4 minutes).

Conclusions: All participants were able to complete both prescriptions correctly and efficiently when using the iPad. Staff generally felt the addition of the iPad was helpful and that it would improve the standard of care delivered to ill children on the ward.

References: Flannigan C, McAloon J. Students prescribing emergency drug infusions utilising smartphones

Fig 1. Staff response to questionnaire after completing prescription using iPad

EVALUATING THE NURSE LED PAEDIATRIC CHRONIC CONSTIPATION CLINIC IN CARLISLE CENTRE

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Introduction: Constipation is a common childhood complaint which presents with a variety of symptoms including abdominal pain, soiling and urological problems. Recent guidelines for the management of childhood idiopathic constipation have been released by NICE and by IMPACT II (RCN). We endeavoured to compare the management of children presenting to the nurse-led constipation clinic in The Carlisle Health and Well-Being Centre, Belfast with these guidelines.

Method: Children attending for the first time in 2009 were identified as eligible for audit. Epidemiological data was collected. The child's clinical assessment (history and examination) was evaluated. A follow up phone-call was made to assess the progress of the child.

Results: 17 children were identified, 9 boys and 8 girls, with an average age of 7.23 years. 8 had a co-morbid diagnosis.

1 history and 3 examinations were deemed satisfactory.

Patient education was reviewed with 83% patients given verbal advice, 23% supplied with charts, 52% advised regarding rewards and toilet training and 29% given written advice.

There was a high non-attendance rate of 58% for all appointments offered, with 10 children lost to follow up because of recurrent non-attendance. Poor compliance with long term laxative therapy was noted.

Recommendations: A medical assessment is undertaken by a doctor prior to first nurse-led clinic visit, with new documentation introduced highlighting red-flag points on history and examination. The number of telephone contacts has increased to try and improve patient attendance and compliance. An education check list has been introduced. The findings have been presented at the Belfast Trust Community Paediatric Audit Meeting.

OVERNIGHT HOME OXIMETRY: IS ONE NIGHT ENOUGH?

Graham D, Maxwell B, O'Donoghue D, Shields MD

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Background: Many children require overnight home oximetry. A major problem is that the finger probe becomes detached and the study is technically poor and may need to be repeated. Our unit currently perform 3 consecutive overnight traces to minimise the number of inadequate traces returned and to avoid interpreting on the basis of a single unexpectedly good or poor night. There is increasing pressure to increase our throughput of these tests.

Key Question: Will a single overnight oximetry trace be adequate compared with three?

Methods: We reviewed the last 20 overnight home oximetry traces.

We recorded the following:

- Technical satisfactory trace > 5hours (yes/no)
- Basal O_2 satuations (%) and classified as normal/abnormal (> or < 95%)
- Adjusted dip index (dips/hour) and classified as normal/abnormal (> or < 5dips/h)

To assess agreement we used the Kappa statistic for categorical measures and Lin's concordance coefficient (Rc, correlation against the line of identity) for continuous measures.

{Kappa: 0.4-0.6 is moderate, 0.6-0.8 is good, > 0.8 is excellent agreement.

Lin's concordance correlation: 0.6-0.8 is moderate, > 0.8-90 is very good, > 0.9 is excellent}

Results: We study traces from 20 children, mean age 6.7 years, range 1.3 to 16.5 years.

Six children had Down Syndrome, 2 Duchenne Muscular Dystrophy, 2 craniofacial, 8 – others

Technically inadequate traces were observed as follows: First night trace N=4, 2nd night trace N=3, 3rd night trace N=2. By doing 3 overnight traces 19 children had at least one adequate trace.

Basal O_2 sat %

Agreement (Kappa) and concordance correlation (Rc) between each nights basal O2 % sat were modest (night 1 v night 2: Rc=0.62 and Kappa 0.57, night 1 v night 3: Rc=0.73 and Kappa 0.68, night 2 v night 3: Rc=0.74 and Kappa 0.48).

Adjusted dip index

Agreement (Kappa) and concordance correlation (Rc) between each nights basal O_2 % sat were very good (night 1 v night 2: Rc=0.89 and Kappa 0.67, night 1 v night 3: Rc=0.90 and Kappa 0.66, night 2 v night 3: Rc=0.88 and Kappa 0.68).

CONCLUSIONS:

1. The probability of having at least one satisfactory overnight home oximetry trace improves with the more nights studied.
2. If a single night oximetry had been performed instead of three nights, 20% of the studies would have been technically unacceptable, uninterpretable and would need to be repeated.
3. The agreement between repeated nights basal O_2 sat % and adjusted dip index is at best moderate to good but not excellent meaning that if only one trace was used, even if it was technically acceptable , some children could be incorrectly classified.

BRONCHIOLITIS IN THE MOLECULAR AGE

Keown K, Bourke T, Flannigan C, Terris M, Shields MD

Paediatric Intensive Care Department, RBHSC, 180-184 Falls Road, Belfast, BT12 6 BE

Background: Modern molecular methods currently used in the regional virus laboratory for detecting respiratory viruses can estimate viral load accurately. It has been suggested that high viral load or co-infection with multiple viruses may increase risk of severe disease. These methods can also detect emerging viruses, the clinical significance of which is often unclear.

Aim: To review all cases of bronchiolitis admitted to PICU to identify the aetiology and estimate the viral load.

Methods: All cases of bronchiolitis admitted to PICU between September 1st 2011 and January 15th 2012 were retrospectively reviewed

Results: Of the 159 children admitted to PICU during this period 19 had bronchiolitis. Nine children were RSV positive. These children had a median of 3.5 x10^6 copies of RSV virus per ml of secretion, range [range 3.0 x 10^5 to 3.5 x 10^8]. None of the children with RSV had significant co-morbidity. Only one child with RSV was infected with more than one virus. Eight of the remaining 10 children had significant co-morbidity. Six had co-infection with more than one virus. These included Rhinovirus type 1, Rhinovirus type 2, Bocavirus and Parainfluenza type 4.

Conclusions: Children admitted to PICU with RSV bronchiolitis were found to have very high viral loads. The majority of children with non-RSV bronchiolitis were infected with more than one virus. Further study is required to establish if access to viral load on presentation can be used to predict severity. Four children had emerging viruses [Bocavirus and Para-influenza type 4], the pathogenicity of these is not well understood at present. However, our findings would suggest that they may be implicated in severe disease.

Ulster Med J 2013;**82(1):**48-51

Abstracts

88th USIM Meeting: Sir Samuel Irwin Lecture Theatre, Friday 19th October

Royal Victoria Hospital

PROGRAMME:

2.00 pm	A Study in Syncope: A review of 94 tilt table tests. M Monaghan, M McCarron, J Purvis, Depts of Cardiology and Neurology, Altnagelvin Hospital, Western HSC Trust.
2.15 pm	Identifying insults: automated AKI detection within a hospital population. P. Stirling, F. McCarroll, R. Mullan, R. Cunningham, M. Ryan , C. Harron Renal Unit and Dept. of Biochemistry, Northern HSC Trust, Antrim,
2.30 pm	Successful Implantation of a CoreValve Evolut in a 89-year old with a degenerated Toronto Stentless Porcine Valve (T-SPV) S Fairley, G Manoharan, M Spence .Cardiology Department. Belfast HSCTrust
2.45 pm	Audit of Diabetes Management Following Renal Transplantation CJ Hill, AE Courtney. Regional Nephrology Unit, Belfast City Hospital
3.00 pm	Guest Lecture: "Update in Rheumatology" Dr Philip Gardiner, Consultant Rheumatologist, Western Trust
3.30 pm	Afternoon Tea & AGM
3.50pm	Radiation Exposure reduction during Transcatheter Aortic Valve Implantation (TAVI) Procedures. A. Ramsewak, D. Sharma, S. O'Connaire, R. Verghis, G. Manoharan and M. S. Spence.Belfast Health and Social Care Trust, Belfast, UK.
4.05pm	An unusual presentation of Hip Pain T Wazir, E Walker, S Quah, M McHenry. Rheumatology unit, Musgrave Park Hospital and GUM clinic Royal Victoria Hospital Belfast HSC Trust.
4.20pm	Closing the therapeutic gap in patients with low vitamin B12 levels. LJE Walker, Mid-Ulster Hospital. Magherafelt.
4.35pm	Presentation of prize for best abstract
4:40pm	Guest lecture: "Update in Cardiomyopathy" Professor Pascal McKeown, Inherited Cardiac Diseases Clinic, Belfast Trust.

A STUDY IN SYNCOPE: A REVIEW OF 94 TILT TABLE TESTS

M Monaghan, M McCarron, J Purvis. Departments of Cardiology and Neurology, Altnagelvin Hospital, Western HSC Trust, Londonderry.

Recurrent syncope (RS) and postural tachycardia (POTS) can be difficult to diagnose and treat effectively. A tilt table test (TTT) provides orthostatic stress whilst heart rate (HR) and blood pressure (BP) are measured. We reviewed 94 TTTs performed over 6 years to assess the usefulness of this investigation.

Altogether, 27 males (29%, average age = 36) and 67 females (71%, average age =33) underwent TTT. Under-18s comprised 20% of the population. 12% of studies were requested by Neurology.

SYNCOPE: 59 tests were performed (average age =39, 71% female). 29 tests (48%) were positive plus 2 patients had epileptic seizures. Of those with positive TTTs; 19(68%) commenced Midodrine, 4(14%) received advice, 3(11%) commenced Fludrocortisone, 1(3%) commenced scopolamine patches and 2(7%) required pacemaker.

Amongst patients with negative tests; 2 were diagnosed with POTS due to inappropriate HR rise, and 2 with fast HR throughout were diagnosed as Inappropriate Sinus Tachycardia (IST).

POTS: 35 tests were performed (average age =25, 74% female). 18 tests (53%) were positive and 1 patient was diagnosed with postural cerebral hypoperfusion following onset of headache on TTT. Of those with positive result; 8(44%) received advice, 6(33%) commenced Midodrine, 2(11%) received Fludrocortisone, 1 commenced Bisoprolol (for postural palpitations) and 1 commenced Clonidine (for hyperadrenergic POTS – raised BP on standing).

Two patients with negative tests were diagnosed with IST due to elevated flat HR response.

CONCLUSION: TTT can serve as a useful guide to diagnosis and treatment in both recurrent syncope and POTS.

IDENTIFYING INSULTS: AUTOMATED AKI DETECTION WITHIN A HOSPITAL POPULATION

P. Stirling 1,*, F. McCarroll 1, R. Mullan 1, R. Cunningham 1, M. Ryan 2, C. Harron 1

1Renal Unit, 2Dept. of Biochemistry, Northern HSC Trust, Antrim, United Kingdom

Introduction: Acute Kidney injury (AKI) remains an important cause of inpatient morbidity and mortality. National enquiry has shown identification and management of AKI to be suboptimal.

Objectives: This study sought to explore the practicalities of hospital population screening for AKI using an automated lab-linked tool. Secondary aims were to observe the pattern of AKI presentation within the hospital and to observe correlation of defined AKIN (Acute Kidney Injury Network) stage on inpatient mortality.

Methods: An automated AKI detection tool was developed to screen all inpatient electrolyte samples on a specified date or current day. The tool created an alert for all patients who had shown a creatinine rise of ≥30 micromol/l against previous baseline values within the previous 30 days (including primary care values). Patients under the care of nephrology, intensive care and paediatrics were automatically excluded. The tool was interrogated on a daily basis over the course of the study and all alerts logged prospectively into a study database. Patient mortality, length of stay and renal referral rate were cross-referenced via patient admin system and a renal database respectively.

Results: Over the course of 17 days the tool identified 137 patients. 84.7% of Alerts met AKIN I standards, 11.7% meeting AKIN II and 3.6% meeting AKIN III. 20.4% of those patients identified showed progression of AKI during the study. Mortality rose with rising AKIN stage (15.5%, 37.5% & 80% respectively). Progressive or prolonged renal impairment (multiple AKI alerts) was associated with increased mortality and increased length of stay ($r = 0.41$, $p=0.004$). Only 5.1% of those identified were referred to the renal specialty team, with an average delay from alert value to referral of 4.6 days. A substantial proportion of alerts occurred within the first day of admission (18.3%) and within the A&E and acute admission wards (27.7%).

Conclusion: We have demonstrated the effectiveness of an automated lab-based tool to improve AKI detection. Although these patients have high rates of mortality, only a minority are referred to the nephrology service. We plan to use this tool to develop a clinical alert system with the intention of reducing delays in the detection and management of AKI.

Successful Implantation of a CoreValve Evolut in a 89-year old with a degenerated Toronto Stentless Porcine Valve (T-SPV)

S Fairley, G Manoharan, M Spence

Cardiology Department , Belfast Health and Social Care Trust BT12 6BJ

Trans-catheter aortic valve implantation (TAVI) is an established treatment option for patients with severe aortic stenosis and excessive surgical risk. Early animal and clinical studies have shown promising results for the use of valve-in-valve TAVI (viv-TAVI) in the management of degenerative aortic bioprostheses (Bedogni et al, 2011). As re-do surgery carries increased risk, this technique offers a feasible treatment option in high-risk patients.

This case describes successful viv-TAVI implantation using the CoreValve Evolut system (Medtronic) in an 89-year old female with a severely regurgitant bioprosthetic aortic valve (Toronto stentless). The patient presented with decompensated heart failure requiring hospitalisation. The logistic Euroscore was 59% and conventional re-do surgery was deemed prohibitive. Therefore, viv-TAVI was considered the only feasible interventional strategy. This case describes one of the first implants of the new CoreValve Evolut (Medtronic) system.

After extensive pre-procedural imaging (transoesophageal echocardiography, aortography, CT), a 23mm CoreValve Evolut valve was implanted successfully via femoral approach under local anaesthesia. The procedure was technically challenging for numerous reasons: the native annulus was small in diameter, the coronary ostia were low in origin relative to the native valve leaflets, and the CoreValve Evolut system was excessively mobile during deployment due to the jet of 'free' regurgitation. The Toronto valve is a supra-annular stentless system, and in addition to absence of annular calcium, the traditional 'landmarks' used to aid valve deployment were absent.

The CoreValve Evolut system (Medtronic) is a safe and technically feasible option for patients with bioprosthetic valve regurgitation and prohibitive surgical risk.

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AUDIT OF DIABETES MANAGEMENT FOLLOWING RENAL TRANSPLANTATION

CJ Hill, AE Courtney

Regional Nephrology Unit, Belfast City Hospital

Diabetic nephropathy is the most common cause of established renal failure in the UK. There is little evidence to guide diabetes management post-transplant. The aim of this audit was to assess the documentation and achievement of diabetes management targets in the Northern Ireland renal transplant population. All transplant patients with a recorded primary renal disease of diabetic nephropathy were identified from the regional renal data system (eMed,

Mediqal Health Informatics®). Audit standards for blood pressure, HbA1c and cholesterol were taken from the National Institute for Health and Clinical Excellence (NICE) type 1 and 2 diabetes guidance (target systolic pressure <140mmHg, target total cholesterol <4mmol/l, target HbA1c <7.5%). Documentation of these variables was assessed and other demographic, clinical and laboratory data was also collected. Fifty-two patients had a functioning renal transplant; 14 had a live donor, 28 a deceased donor and 10 had undergone simultaneous pancreas-kidney transplantation. The majority of patients had type 1 diabetes. Mean systolic blood pressure was highest in the SPK group (141mmHg) and lowest in the live donor group (128mmHg). Glycaemic control was poor in the deceased donor kidney only and live donor groups (mean HbA1c 8.4% and 8.5% respectively) but improved in the SPK group (5.78%). Renal function was worse in the deceased donor group (mean creatinine 153µmol/l versus 113µmol/l in the SPK group and 125µmol/l in the live donor group). Despite attendance at renal and diabetes clinics cardiovascular risk management remains suboptimal and innovative approaches are required to improve this in the post-transplant diabetes population.

RADIATION EXPOSURE REDUCTION DURING TRANSCATHETER AORTIC VALVE IMPLANTATION (TAVI) PROCEDURES.

A. Ramsewak1, D. Sharma1, S. O'Connaire1, R. Verghis2, G. Manoharan1 and M. S. Spence1. 1 – Royal Victoria Hospital. 2 – Clinical Research Support Centre, Belfast.

Belfast Health and Social Care Trust, Belfast, UK.

Aims: Trans-catheter aortic valve implantation (TAVI) is a procedure known to have a higher radiation dose compared to coronary intervention. In this single centre prospective analysis, we determined whether lower fluoroscopy and cine imaging settings would be safe while maintaining an acceptable image quality.

Methods: Data on radiation exposure was collected for consecutive patients undergoing TAVI. Using a single plane C-arm, the settings were changed from coronary to electrophysiology (EP), this resulted in a reduction for fluoroscopy, from 15 pulse-progressive fluoroscopy (ppf) to 3.75 – 7.5 ppf and for cine acquisition, from 15 frames per sec (fps) to 3.75 – 7.5 fps for access site management. We compared the radiation doses in this lower settings (LS) group with the standard settings (SS) group.

Results: Data for 68 consecutive patients was collected over a period of 11 months from the Royal Victoria Hospital, Belfast (see Table 1). The median dose area product using the standard setting was 10,210 cGy*cm2 as compared to 6928 cGy*cm2 for the lower setting group was statistically significant (p-value - 0.006). The screening time, procedure time and contrast were not statistically different. There were no procedural deaths or radiation burns in either group at 30 days follow-up.

Conclusions: This study demonstrates a safe and significant reduction in radiation dose of approximately 32% with the new settings while preserving acceptable image quality. However, radiation exposure still remains higher compared to percutaneous coronary interventions due to length and complexity of this procedure.

TABLE

	Standard	Lower	p-value
Total	34	34	
Male	11	15	
Age (years)	83	81	0.171
BMI	27.8	27.3	0.46
Radiation dose (DAP - Gy*cm2) (median)	10210	6928.5	0.006
Screening Time (minutes)	25	21	0.116
Procedure Time (minutes) (median)	118	115	0.314
Contrast volume (mls)	220	188	0.066

AN UNUSUAL PRESENTATION OF HIP PAIN

T Wazir, E Walker, S Quah, M McHenry. Rheumatology unit, Musgrave Park Hospital and GUM clinic Royal Victoria Hospital, Belfast HSC Trust

We present an unusual case of disseminated gonococcal (GC) septic arthritis with co-existent Chlamydia (CT) infection.

Case A 33 year old Caucasian woman presented with acute oligoarthritis affecting her left wrist and right hip. She had low grade pyrexia, synovitis in her left wrist, marked limitation of right hip movements with severe pain. Bed side ultrasound showed right hip effusion (1.38 cm). Her hip joint was aspirated and yielded 12 ml of cloudy fluid – gram stained microscopy showed leucocytes but no organisms were seen. Blood cultures and fluid cultured from right hip showed no growth. MRI excluded osteomyelitis. Patient "self collected" vaginal swab which tested positive for CT and GC by PCR. Right hip aspirate was positive for GC and negative for CT by PCR. She was treated for GC with IV ceftriaxone for 12 days followed by oral cefixime on discharge, with oral doxycycline for 14 days for CT co-infection. Partner notification was addressed. Follow up MRI and US showed much improvement. Test of cure for GC/CT was negative 3 weeks post treatment.

Discussion Gonococcal septic arthritis is rare in Western Europe. It is significantly less common than sexually acquired reactive arthropathy. This case highlights the importance of considering STIs as a potential differential diagnosis in acute oligoarthritis. Routine enquiry of sexual history may aid risk assessment. Nucleic acid amplification testing (NAAT), e.g. PCR, is highly specific for GC and CT. For GC, NAAT is significantly more sensitive than culture, but does not offer information on antibiotic sensitivity. Gonococcal

antibiotic resistance to penicillin, tetracycline and quinolone has increased in recent years. Ceftriaxone is the current recommended first line option for treating GC in UK and Ireland. Partner notification is essential to avoid reacquisition. Testing for STIs should be done before initiating empirical antibiotic for septic arthritis as suboptimal regime may mask diagnosis with partial response. In UK and Ireland, NAAT is readily accessible and self collected sampling makes tests simple to do in any healthcare setting.

CLOSING THE THERAPEUTIC GAP IN PATIENTS WITH LOW VITAMIN B12 LEVELS. (1)

LJE Walker, Mid-Ulster Hospital, Hospital Road, Magherafelt, BT45 5EX, County Londonderry.

Unfortunately, delay in starting treatment with hydroxycobalamin (vitamin B12) for patients with low vitamin B12 results, is not uncommon. Untreated vitamin B12 deficiency, may lead to severe haematological and neurological complications.

Vitamin B12 therapy is cheap and effective, with little risk of adverse effects.

With the help of Dr Michael Ryan, Consultant in Biochemistry, I undertook a survey of all obtainable medical records of all patients with "rock bottom low" and a further group with "low" vitamin B12 results, selected from 312 Mid-Ulster Hospital general medical patients' results. 56 charts were obtainable for perusal.

Secretarial staff contacted general practioners' receptionists, to ascertain how many patients were receiving vitamin B12 therapy.

Outcome: 9 patients were found who were not receiving vitamin B12 therapy, as might have been expected. I wrote to the patients to alert them to call with their general practitioner, who was copied into correspondence, to have a repeat blood sample for vitamin B12 assay performed and to discuss starting replacement vitamin B12 therapy. A recent report identified a similar problem, but of greater magnitude, in patients with diabetes on metformin therapy. (2) The simple quality improvement exercise described, is transferable to any hospital facility.

Findings published in "Clinical Medicine" (1), forwarded to Trust's governance department, to Dr Ryan.

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Ulster Med J 2013;**82(1):**52-57

Abstracts

Junior Doctors' Prize Evening 4th November 2010

ORAL PRESENTATIONS

DEVELOPMENT OF BIOMARKERS TO PREDICT MALIGNANT PROGRESSION OF BARRETT'S OESOPHAGUS

J Ahmad, K Arthur, P Maxwell, A Kennedy, L Murray, B Johnston, D McManus.

Introduction: The incidence of oesophageal adenocarcinoma (OAC) has increased dramatically over recent years and Barrett's oesophagus (BO) is the most established risk factor for its development. Endoscopic surveillance of BO has been widely advocated but hinges on assessment of repeated endoscopic biopsies, which is problematic. The use of biomarkers presents an opportunity to reduce sampling bias and improve our ability to risk-stratify these patients. We evaluated three novel biomarkers in the setting of BO, low grade dysplasia (LGD) and OAC.

Methods: The biomarkers were immunostained on archived biopsy materials and assessed for expression. 25 cases each of BO, LGD and OAC were included along-with 25 cases of oesophagectomy for OAC.

Results: P504S did not express in BO. Its expression was significant in cases of LGD (56%), OAC (40%) and resections (60%). CD133 also did not express in BO or LGD. It was up-regulated in cases of OAC (24%) and resections (68%). Twist expression was weak in BO and LGD. It was significantly over-expressed in cases of OAC (56%).

Discussion: This cross sectional study has shown increased expression of P504S, CD133 and Twist in the metaplasia-dysplasia-adenocarcinoma sequence and has suggested their possible role as potential biomarkers of Barrett's progression.

LEFT MAIN STEM STENOSIS - IMPROVING ELECTROCARDIOGRAPHIC DIAGNOSIS OF ACUTE MYOCARDIAL INFARCTION IN PATIENTS PRESENTING WITH CHEST PAIN

M Daly, M Harbinson, J Adgey.

Introduction: Non-invasive diagnosis of acute myocardial infarction (AMI) complicating left main stem (LMS) stenosis is challenging, as the characteristic abnormalities on 12-lead ECG have low diagnostic sensitivity.

Methods: Consecutive patients presenting with acute ischaemic-type chest pain from 2000-10 were analysed. Entry criteria comprised 12-lead ECG and Body Surface Potential Map (BSPM) at presentation, cardiac troponin T (cTnT) ≤ 12 hrs and coronary angiography during admission. Significant LMS stenosis was ≥ 70% luminal narrowing on angiography. cTnT ≥ 0.03µg/L defined AMI.

Results: Enrolled were 2810 patients, 116 (4.1%) of whom (age 67±10; 81% male) had significant LMS stenosis. Of these, a significant proportion had hypertension (p=0.016), reduced eGFR (p=0.024) and AMI (p<0.001) and had greater likelihood of death within 24-hrs of symptom-onset (Adjusted OR: 6.61; 95%CI: 3.96–10.57, p<0.001). On ROC analysis of 12-lead ECG criteria, c-statistics were: 0.580 for Minnesota STEMI, 0.596 for ST-elevation (STE) ≥0.05mV in lead aVR, 0.618 for T-wave inversion in ≥2 contiguous leads (CL) and 0.630 for ST-depression in ≥2CL. BSPM STE occurred in 85/116 (73%) patients (c-statistic 0.800 [95% CI: 0.720-0.881; p<0.001]). Of these, 62 (73%) had STE in either the high right anterior or right ventricular territories not identified by the 12-lead ECG.

Discussion: In patients with significant LMS stenosis presenting with acute ischaemic-type chest pain, BSPM improves diagnosis of AMI through detection of STE beyond the territory of the 12-lead ECG.

VALUE OF AXILLARY ULTRASOUND AS A PRE-OPERATIVE STAGING PROCEDURE IN BREAST CANCER – A PILOT STUDY

P Davey, M Stokes, J McKillen, C Majury, J Newell, R Kennedy, S Kirk.

Introduction: The aim of this study was to determine if pre-operative axillary assessment by ultrasound and fine needle aspiration cytology (FNA) would predict node positivity and reduce re-operation rate in sentinel node positive patients.

Methods: 119 consecutive, clinically node negative patients who had undergone pre-operative axillary assessment were analysed. Ultrasound findings were categorised as normal, suspicious or malignant. Ultrasound guided FNA was performed on all suspicious nodes. Patients with a normal or suspicious scans and benign FNA were offered sentinel node biopsy. Patients with a positive assessment underwent axillary node clearance (ANC).

Results: Eighty-two scans (69%) were reported as normal. Of these, 63 were node negative on pathological assessment (77%), 19 were node positive (23%). Sixteen (13%) radiologically suspicious ultrasound scans had a benign FNA. Two were subsequently found to be node positive. Twenty-one patients (18%) were reported as having malignant nodes on ultrasound. Nineteen of these were positive on pathology. Two were false positive (90 % PPV). In total, 40 of the 119 patients were node positive. Twenty-one patients had a second axillary procedure. The use of axillary ultrasound preoperatively

resulted in 19 of the 119 patients (17%) avoiding further axillary surgery.

Discussion: Preoperative axillary ultrasound with FNA in clinically node negative patients identifies a proportion who have lymph node metastases thus preventing a number of patients from having a second axillary procedure. Nodal assessment with ultrasound should be routine for all patients undergoing sentinel node biopsy.

A PROSPECTIVE STUDY OF IMAGING MODALITIES FOR COLORECTAL LIVER METASTASES

C Jones, S Badger, S Gillespie, B Kelly, P Ellis, M Love, J Clarke, L McKie, T Diamond, P Kennedy.

Introduction: Accurate detection of colorectal liver metastases (CRLM) is paramount to aid prompt treatment. This prospective study aimed to compare 3 modalities of liver specific imaging in the detection of CRLM.

Methods: Consecutive patients with CRLM underwent computerised tomographic arterial portography (CTAP), magnetic resonance imaging (MRI), and positron emission tomographic scan (PET-CT). Two blinded radiologists for each modality reviewed the scans by consensus. Group 1 included those suitable for surgical resection, and radiological findings were compared with histopathology. Sensitivity, specificity, and overall accuracy for each investigation were calculated. Group 2 included patients deemed unresectable, and correlation of results between modalities were determined. Long-term survival was calculated. Ethical approval and written consent was obtained.

Results: 55 patients from September 2002 to May 2004 were included. In group 1, 28 CRLM were identified. 15 were identified by all 3 modalities.

	CTAP	MRI	PET-CT
Accuracy	83.7%	90.6%	82.6%
Sensitivity	82.1%	78.6%	57.1%
Specificity	84.4%	96.5%	94.8%

5-year survival was 43.7%. In group 2, correlation of results between MRI and PET-CT was (62.1%), followed by MRI/CTAP(51.4%), then CTAP/PET-CT(35.0%). 5-year survival was 15.6%.

Discussion: MRI of liver provides the most accurate pre-operative assessment of CRLM, for which there is favourable 5-year survival.

MALE BREAST CANCER TREATMENT AND OUTCOMES; A RETROSPECTIVE COHORT STUDY

S McCain, AR Harris, RJ Kennedy, SJ Kirk.

Introduction: Male breast cancer accounts for 1% of breast cancers and is often diagnosed at a more advanced stage than female breast cancer. There is a lack of consensus regarding best treatment. The aim of this study was to determine patient demographics, treatment and outcomes in our unit.

Methods: Unit policy is to treat male breast cancer on the basis of tumour biology, staging and co-morbidity. Hospital breast cancer database analysis and retrospective chart review was used to obtain data.

Results: 2563 patients were diagnosed with breast cancer between 1993-2009, 24 were men. Median age was 69 years. All had surgery. Median tumour size was 19mm with a median NPI of 3.39. Six patients had node positive disease. Eleven patients had radiotherapy, 22 received tamoxifen and none had chemotherapy. Median follow-up was 70 months, with overall 5-year survival of 67% and 5-year disease free survival of 90%. No deaths were due to breast cancer or related to treatment. No patients had local recurrence, one developed systemic relapse.

Discussion: Outcome for male breast cancer in our unit is similar to that of female breast cancer and better than described in the literature. Male breast cancer should be treated proactively, no differently from female breast cancer.

ONCOPLASTIC OUTCOMES WITH IMPLANT BASED BREAST RECONSTRUCTION AND RADIOTHERAPY: AN 8 YEAR RETROSPECTIVE ANALYSIS

C McGoldrick, D Brady, S Sinclair.

Introduction: Capsular contraction is a recognised complication of implant based breast reconstruction with published rates ranging from 28% to 51% in patients undergoing radiotherapy. This results in a painful deformed breast which often requires revision surgery. It has been suggested in recent literature that immediate-delayed reconstruction with a two stage procedure may reduce the capsule formation rates. Our institution has favoured single stage immediate reconstruction, irradiating a permanent expander implant in situ.

Methods: Identified patients with implants from 2000 in a single institution who received radiotherapy (n>102).

Results:Median age of the cohort was 46, with a mean time of follow-up of 4.84 years (range 1-9 years). No significant difference in the rates of capsule formation between immediate (36%) and delayed (31%) groups. Those in immediate group proceeded to revision surgery significantly less frequently (30% vs 12%) and developed capsule later (955 vs 534 days). There was no significant difference in rates of disease recurrence or mortality in either group.

Discussion: Our study has demonstrated equivalent capsule formation rates in a single stage procedure. These patients developed a capsule later and were less likely to require revision surgery, with equivalent oncological outcomes.

POSTER PRESENTATIONS

THE CONTRIBUTION OF WCC AND CRP IN DIAGNOSING APPENDICITIS

K Booth, C Magee, S Badger, C Weir.

Introduction: The diagnosis of acute appendicitis continues to pose problems for the surgical trainee with significant negative appendicectomy rates. The aim of this study was to determine the contribution of white cell count (WCC) and C-reactive protein (CRP) to its diagnosis.

Methods: Patients referred with suspected appendicitis were prospectively enrolled from February to August 2009. CRP and WCC on presentation, diagnosis, operative findings and pathology results were recorded. Continuous variables were expressed as mean (±SD) and compared using ANOVA.

Results: 112 patients were included with average age 24.1 years (±17.1). Fifty-eight underwent appendicectomy, which gave a negative appendicectomy rate of 27.6%. Positive pathology was associated with higher WCC (14.4±4.0 vs. 9.1±4.0; $p<0.0001$) and CRP (59.4±66.9 vs. 29.1±36.5; $p=0.09$). Patients managed non-operatively (n=50) had lower WCC ($p=0.002$) and CRP ($p=0.001$). WCC was less sensitive than CRP (78.6% vs. 88.1%) but more specific (81.2% vs. 18.8%) in the diagnosis. Considered

in combination, sensitivity rose to 93.8% and specificity to 50.0%.

Discussion: WCC is a more specific diagnostic aid but sensitivity is improved by measuring both. The interpretation of these tests in light of the clinical history and examination findings is paramount and therefore they cannot be relied upon in isolation.

DYNAMIC MRI CHANGES IN A CASE OF AUTOIMMUNE LIMBIC ENCEPHALITIS.

J Campbell, J Craig.

Introduction: Limbic encephalitis is a condition often characterised by memory disturbance, confusion, behavioural changes and temporal lobe seizures. It may have an underlying autoimmune or paraneoplastic aetiology. The most commonly associated antibody is directed against the voltage gated potassium channel complex. Limbic encephalitis typically exhibits characteristic MRI changes within the affected temporal lobe structures. It may respond to immunomodulatory therapy.

Case report: We report the case of a 67 year old gentleman with a sub acute presentation of confusion and short term memory impairment. Initially left sided medial temporal lobe changes were noted on MRI. He subsequently developed seizures with EEG revealing a right sided temporal focus. Repeat MRI revealed resolution of changes in the left temporal lobe but a new area of high signal in the right medial temporal lobe. He was found to have a high titre of voltage gated potassium channel antibodies in the absence of occult neoplasm.

Discussion: To our knowledge such dynamic MRI changes have not been previously reported in this condition. Limbic encephalitis is a rare but important cause of potentially reversible dementia and seizures.

BODY SURFACE POTENTIAL MAPPING IN COMBINATION WITH N-TERMINAL PRO-BRAIN NATRIURETIC PEPTIDE AND CARDIAC TROPONIN T IMPROVES DIAGNOSIS OF RIGHT VENTRICULAR INVOLVEMENT DURING ACUTE INFERIOR MYOCARDIAL INFARCTION

MJ Daly, CG Owens, CJ McCann, IS Young , MT Harbinson, JA Adgey.

Introduction: Right ventricular myocardial infarction (RVMI) with an inferior infarction (AIMI) is associated with increased rates of morbidity and mortality necessitating rapid myocardial reperfusion for their reduction.

Methods: Consecutive patients presenting with acute ischemic-type chest pain were enrolled if they had: NT-proBNP, 12-lead ECG, right-sided ECG (V_3R / V_4R) and Body Surface Potential Map (BSPM) at presentation; cardiac troponin T (cTnT) ≤ 12 hrs; and coronary angiography during admission. STEMI was defined by Minnesota criteria, with AIMI as ≥0.1mV ST elevation (STE) in ≥2 of II, III and aVF with cTnT ≥0.03µg/L. Elevation ≥0.1mV defined STE in either V_3R / V_4R. Clinical diagnosis of RVMI required a triad of elevated venous pressure, clear lung fields and hypotension (SBP<90mmHg) in the context of AIMI. Gold standard definition of RVMI was by RCA stenosis ≥70% proximal to the first major RV branch.

Results: Enrolled were 407 patients (age 62 ± 13 yrs; 70% male). Of these, 72 (18%) had STEMI. AIMI occurred in 39/72 (54%). Of these, 24/39 (62%) had RVMI. Clinical signs had sensitivity 25% / specificity 66%, STE V_4R sensitivity 51% / specificity 60%, and BSPM sensitivity 79% / specificity 87% for RVMI diagnosis. NT-proBNP was significantly higher in those with RVMI compared to non-RVMI (996ng/L v 305ng/L, p = 0.006) and cTnT differed significantly between the two groups respectively (6.81µg/L v 3.26µg/L, p = 0.014). Of those with AIMI, the c-statistic for RVMI diagnosis using cTnT alone was 0.722, NT-proBNP alone was 0.761 and BSPM alone was 0.807. Using the combination of BSPM, NT-proBNP and cTnT the c-statistic was 0.902 (95% CI: 0.809 - 0.995; p < 0.001).

Discussion: In patients with AIMI, the combination of NT-proBNP, cTnT and BSPM identifies those with RVMI thus identifying a group where early reperfusion is paramount.

ACUTE KIDNEY INJURY IN BURNS PATIENTS: PROGRESSION AND PREDICTIVE FACTORS

D-T Black, B. Fogarty, K.Khan, A.Bedi .

Introduction: Patients who have suffered an acute burn injury are at risk of developing organ dysfunction leading to mortality. The development of acute renal failure significantly increases the risk of mortality. Prompt diagnosis of AKI and assessment of its progression is essential as subsequent burn outcome and survival is affected.

Methods: Data was collected for all burns patients admitted to the Regional Intensive Care Unit in the RVH for four years. Patients were identified as having an AKI as per to the RIFLE criteria. The progression of AKI and predisposing patient factors were examined.

Results: Of the 41 patients, 17 were classified as having acute kidney injury as per the RIFLE criteria (41%) subdivided into Risk: 8 patients, (19%), Injury: 2 patients (5%) and Failure: 7 patients (17%). Mortality rate for AKI patients was 35% and non AKI patients 21%. Factors associated with AKI include age, APACHE II score but not TBSA% burn.

Discussion: The results identify that AKI is prevalent among the burned patient population and early identification of predisposing factors is essential to prevent progression to acute renal failure. The development of acute kidney injury in the burned patient is associated with a higher mortality rate.

LONG-TERM EFFECTS OF VASCULAR ENDOTHELIAL GROWTH FACTOR AND PLATELET COUNT IN OESOPHAGOGASTRIC CARCINOMA.

RT Gray, ME Donnell, JA McGuigan, GM Spence.

Introduction: Vascular endothelial growth factor (VEGF) is an angiogenic cytokine integral to the regulation of tumour angiogenesis. Previous studies in oesophageal cancer describe correlations between circulating VEGF (C-VEGF) and platelet count and also tissue VEGF (T-VEGF) and lymph node metastases. We assessed the prognostic values of C-VEGF, T-VEGF and platelet count in a 10-year follow-up of oesophageal cancer patients.

Methods: Patients undergoing surgery with curative intent were prospectively recruited between February 1999 and August 2000. C-VEGF, derived from both plasma VEGF (P-VEGF) and serum VEGF (S-VEGF) and T-VEGF were assessed using a commercial ELISA. Pre-operative platelet levels were recorded. 10-year follow-up was performed using the Northern Ireland Cancer Registry.

Results: 61 patients were recruited (male=45) with a mean age of 65.7 years (range 39-83). The mean values observed were P-VEGF 32.0pg/mL (range 0-363), S-VEGF 331.2 pg/mL (55.2-926.7), T-VEGF 507.3pg/mg total protein (52.8-3797.5) and platelets 277

x10^9/L (range 102-487). 10-year survival was 19.7% (n=12) with a mean follow-up of 1382 days (range 10-3977). Multivariate analysis demonstrated that a higher T-VEGF level (p=0.016) and a positive tumour resection margins (p=0.031) were significant predictors of mortality.

Discussion: T-VEGF appears to be a significant predictor of long-term outcome in patients with oesophagogastric cancer undergoing curative resection.

THE TRUE COST OF GALLSTONES

C Jones, A Mawhinney, R Brown.

Introduction: Gallstone related disease accounts for a large proportion of NHS expenditure. This study aimed to review the costs of the patient journey from referral to treatment, and propose guidelines to provide an efficient streamlined service.

Methods: All cholecystectomies performed in one unit in 2009 were reviewed. Patient demographics, outpatient and inpatient episodes, length of hospital stay, and all investigations were recorded. Cost was obtained from the Department of Health. Results were expressed as mean (±SD) and compared using ANOVA.

Results: 132 patients were reviewed. Overall cost from referral to discharge was £4697(±2007) per patient. The largest proportion was surgery contributing £2849(±414), followed by inpatient costs £1527(±1322). Pre-operative outpatient consultations were £174(±144), supplemented by at least one ultrasound £81(±29). Patients who initially presented as an inpatient had an overall larger cost (£6112±1888 vs. £5097±1607;p=0.004). This was largely due to inpatient costs (£2611±1629 vs. £1194±1009;p<0.0001) and not the cost of surgery (p=0.29). Patients who were imaged in primary care prior to referral had a lower overall cost (£4636±1343 vs. £5697±1804;p=0.0005).

Discussion: Emergency presentation and repeat admissions result in higher inpatient costs and should be avoided. Reduced delay to elective surgery through active participation by primary care should be encouraged.

CIRCUMFERENTIAL RESECTION MARGIN (CRM) INVOLVEMENT IN SUPINE ABDOMINO-PERINEAL RESECTION(APER)

P Loughlin, C Stevenson, W Campbell, R Gilliland, K McCallion, R Moorehead, I McAllister

Introduction: APER is associated with increased rates of of CRM involvement and thereby local recurrence, when compared with anterior resection. A recent multi-centre study suggests CRM positivity is reduced from 49.6% to 20%, using a prone cylindrical approach1.

Methods: We conducted a retrospective review of all rectal cancers resected between 2004 and 2009 in a district general hospital, to determine CRM positivity and intra-operative perforation rates in patients who underwent a traditional APER.

Results: 104 patients had surgery for rectal cancer.28(27%) were APERs. 5(18%) specimens had a positive CRM and only1 had intra-operative perforation of the tumour. Of the 69 (66%) who had anterior resections, 7(10%) had a positive CRM and 1 had intra-operative tumour perforation.

Discussion: In our hands the traditional APER may have a comparable rate of CRM involvement to the prone cylindrical approach. Placing the patient in a prone position increases surgical time, has potential anaesthetic implications and may increase morbidity. This area needs further study which would be best done using a randomized controlled trial.

CONTROLLED RELEASE AND DIVIDED DOSE VALPROATE IN PREGNANCY: ARE DOSAGE PEAKS IMPORTANT?

E Mawhinney, J Campbell, A Carr, A Russell, H Smithson, L Parsons, I Robertson, B Irwin, PJ Morrison, B Liggan, N Delanty, S Hunt, J Craig, J Morrow.

Introduction: Use of valproate in pregnancy is known to be associated with a higher risk of major congenital malformations (MCM) than other antiepileptic drugs (AEDs), particularly in doses exceeding 1000mg daily. We aimed to investigate whether there was any evidence to suggest that this increase was related to high serum valproate level peaks rather than total daily dose.

Methods: The UK Epilepsy and Pregnancy register is a 15 year prospective, observational study to determine the risks of MCMs for infants exposed to AEDs in utero. Outcome data was available for 1109 valproate monotherapy exposure pregnancies. We calculated MCM rates and relative risks (RR).

Results: Exposure to valproate in doses over 1000mg daily almost doubled risk of MCM when compared to valproate doses below 1000mg daily (8.86% vs 4.88%, RR:1.7; 95%CI: 1.1, 2.9). There was no difference in risk between conventional valproate and valproate controlled release groups (RR: 1.11; 95%CI: 0.67 to 1.83) or between once daily and divided daily dosing of valproate (RR: 0.99, 95% CI 0.58 to 1.70).

Discussion: This suggests that the higher MCM rates observed for valproate are more likely to be related to total daily dose, rather than instability in serum levels.

CAN EXPIRATORY CHEST RADIOGRAPHS AID EMERGENCY DEPARTMENT JUNIOR DOCTORS IN THE DIAGNOSIS OF SUSPECTED PNEUMOTHORAX?

AT Milligan, D Campbell, B Devlin.

Introduction: All published data recommending expiratory chest x-rays (CXRs) offer no additional benefit to standard inspiratory CXRs in the evaluation of suspected pneumothorax has been performed by radiologists. There is no literature detailing their benefit for junior doctors working in an emergency department. We set out to evaluate their additional benefit to these doctors.

Methods: A retrospective, double blinded, randomised control study was performed. 25 consecutive cases of pneumothorax investigated with paired inspiratory and expiratory CXRs were selected. 25 age, sex and co-morbidity matched control cases were also selected. The films were anoymized with technique labelling removed. These 100 CXRs were randomised and independently interpreted by 4 doctors; 2 consultant radiologists in ideal viewing conditions, and 2 emergency department junior doctors in similar lighting conditions found in an emergency department.

Results: Only 1 case of pneumothorax was missed by a consultant radiologist and this was on an expiratory CXR. With the junior doctors, 12% of pneumothoraces were missed on inspiratory films but seen on the corresponding expiratory film, and 2% pneumothoraces were missed on both films.

Discussion: Although of no benefit to consultant radiologists, expiratory CXRs do help junior doctors diagnose pneumothoraces.

THE BARRIER METHOD: IS IT ENOUGH?

S McCain, AR Harris, K McCallion, WJ Campbell, SJ Kirk.

Introduction: Trainees within some specialties require different skills from others. Aptitude testing can be used, at significant cost, to guide individuals towards a career path. We hypothesised that car parking habits may correlate with medical specialty and aimed to assess car parking habits of consultants to test our hypothesis.

Methods:Assessment of approach and parking in a pass-card controlled consultant car park was monitored. Time was recorded in seconds. Consultants were categorised by specialty and gender.

Results:103 consultant episodes were recorded, 79 male(m) and 24 female(f). Specialty representation was; 28 anaesthetics (22m:6f), 29 medical (18m:11f), 14 radiology (9m:5f) and 32 surgical (30m:2f). Total time for specialty was; anaesthetics (median 82, first quartile 76-3rd quartile 91); medicine (112, 96-136); radiology (86, 70-103) and surgery (68, 61-71) ($p<0.05$). Manner of approach (card ready, card not ready) differed by specialty ($p<0.05$); anaesthetics (15,13); medicine (12,17), radiology (11,3) surgeons (30,2). There was no difference between males and females outwith specialty.

Discussion: Total time taken to park a car differed between specialties. Surgical consultants were fastest, followed by anaesthetics and radiology, with medical consultants slowest. Gender was not an influencing factor. If reproducible, this could provide a low cost method of guiding junior doctors in career selection.

THE DEMISE OF THE OBSTETRIC FLYING SQUAD IN BELFAST?

M McCauley, R McClelland.

Introduction: To determine the role of the obstetric flying squad in the greater Belfast area.

Methods: Retrospective study of all flying squad requests over a ten year period.

Results: 86 requests for the flying squad were officially lodged over the ten year period. The average time taken for the flying squad to reach the patient was longer than the standard ambulance. In the majority of cases 54%, the baby was born before arrival (BBA). The second most common request (16%) was due to minor PV bleeding. No patients bleed heavily, nil were clinically shocked, nil required resuscitation and nil patients required a blood transfusion. 35% of patients required no treatment whatsoever and were simply transported to hospital.

Discussion: The original function of a flying squad was to provide primary resuscitation for women with life-threatening complications of pregnancy. However, over the past ten years in Belfast it has increasingly been used as a means of transport to hospital. In the present day climate of budget cuts we are no longer able to justify the provision of the flying squad service.

ATYPICAL FEMORAL FRACTURES: A COMPLICATION OF PROLONGED BISPHOSPHONATE USE

S. McCauley, R. Thompson, J. Elliot, C. Moran.

Introduction: Recent literature suggests a link between prolonged bisphosphonate use and the occurrence of low energy subtrochanteric and femoral shaft atypical fractures with a characteristic radiographic appearance – a transverse component in an area of cortical hypertrophy. Using data from RVH and University Hospital Nottingham, we performed the first UK-based, and one the largest retrospective reviews of such cases between January 2008 and January 2010.

Methods: Radiographs were reviewed to identify those fractures that had an atypical fracture pattern. For each patient, bisphosphonate use and duration, mechanism of injury and history of prodromal pain were recorded. Corticosteroid use, history of metabolic bone disease, and history of previous fractures were also ascertained. Information was extracted from medical records, fracture databases and patients' GP.

Results: 159 femoral shaft fractures identified, with 17 displaying atypical fracture pattern, 15 (88%) of which were on Bisphosphonates. 77 subtrochanteric fractures identified, with 11 displaying atypical fracture pattern, 8 (73%) of which were on Bisphosphonates. Total mean treatment duration of 4.5 years.

Discussion: Our experience is in line with reports of atypical fractures in these regions appearing to be associated with long-term bisphosphonate use. The proposed mechanism is impaired bone remodelling, leading to the accumulation of microfractures and, ultimately, complete fracture. The extent of the problem in the UK is unknown, thus plans to undertake an audit focussing on subtrochanteric fractures based on the National Hip Fracture Database are being developed. It is hoped that this will allow these fractures to be more accurately characterised and the direction for research determined.

LONG-TERM EFFECTS OF STREPTOCOCCUS BOVIS INFECTION ON COLORECTAL OUTCOMES

A McKenna , ME O'Donnell, R McMullan, ST Irwin.

Introduction: Streptococcus bovis, a non-enterococcal group D streptococcus, is associated with colorectal carcinoma (CRC) and hepatic dysfunction. This study assessed the implications of S. bovis bacteraemia on long-term colorectal outcomes.

Methods: A retrospective cohort study was performed to assess patients with a history of S. bovis bacteraemia between January 2000 and March 2009. Clinical records complemented with follow-up general practitioner questionnaires were reviewed for data regarding demographics, medical co-morbidities, date of admission, clinical presentation, investigations, surgical interventions and final clinical outcome.

Results: 61 positive S. bovis blood cultures from 43 patients were included (M=25, mean age 67.1, range 44-88 years and F=18, mean age 67.6, range 0.5-90 years). 33 and 10 patients had 1 or more positive S. bovis blood culture results respectively which were all performed for pyrexia (temperature>38oC). 5 patients had a previous diagnosis of a colorectal lesion prior to their positive S. bovis result (CRC=4, adenoma=1). 13 of the remaining 38 patients underwent colonoscopy on their index admission where 3 CRCs and 7 adenomas were diagnosed. From the remaining 25 patients, only 1 colorectal carcinoma was detected in a subsequent admission. All colonoscopies were performed from 7- to 468-days following a positive S. bovis culture with 7 colonoscopies within 30-days. Patients with greater than one positive S. bovis culture were more likely to have a colonoscopy performed ($r=0.45$, $p=0.003$) where such patients were also shown to have gastroscopy performed as well ($r=0.49$, $p=0.001$). In patients undergoing colonoscopy, a significantly higher colonic biopsy rate ($r=0.77$, $p<0.001$) was identified which significantly correlated with a CRC diagnosis ($r=0.38$, $p=0.013$). 21 patients are currently alive while 22 patients have died during the study period (median follow-up 654 days,

IQR 36.5-1652 days). 8 of these patients died within 24 hours of hospital admission. 14 patients underwent gastro-intestinal follow-up including 7 repeat colonoscopies while 29 patients had no gastrointestinal follow-up. Although colonoscopic investigation correlated with a diagnosis of CRC, Kaplan Meier survival analysis demonstrated no significant difference in patient outcomes for patients who did and did not undergo colonoscopy (log-rank, p=0.16).

Discussion: Although colonoscopy does not affect long term patient outcomes, the authors recommend a solitary screening colonoscopy for all patients with a history of S. bovis bacteraemia as a colorectal pathology was detected in 76.9% (10/13) of all patients who underwent index admission colonoscopy.

TAKOTSUBO CARDIOMYOPATHY IN A PATIENT WITH STEROID INDUCED PSYCHOSIS- A RARE CLINICAL ASSOCIATION

H Wallace, R Stewart, A Hamilton, S Walsh.

Takotsubo cardiomyopathy, also known as stress-induced cardiomyopathy is a recently described syndrome characterized by left ventricular dysfunction which mimics acute coronary syndrome. We describe a case of Takotsubo cardiomyopathy precipitated by a steroid induced psychosis.

A 62 year old lady with an established history of chronic lymphocytic leukaemia, presented to the emergency department with central chest pain and dyspnoea. She had no known risk factors for cardiac disease. In the six days preceding admission she had received 1000mg boluses of Prednisolone daily. She displayed characteristics in keeping with a steroid induced psychosis. Initial ECGs showed ST segment elevation. Troponin measured 0.13ng/ml (Normal <0.03ng/ml).

Echocardiography demonstrated apical akinesia and a left ventricular systolic ejection fraction of 15%. Coronary angiography confirmed normal coronary arteries and ventricular angiography findings were consistent with Takotsubo cardiomyopathy.

The patient was treated with anxiolytics,beta blockers and an ACE inhibitor. Echocardiography one week following admission calculated the left ventricular systolic ejection fraction at 55%.

There are numerous case reports of Takotsubo cardiomyopathy occurring following extreme emotional stress. In this case mania was induced with high dose steroids. This case suggests that acute psychiatric stressors,as well as emotional and physiological factors may lead to the development of Takotsubo cardiomyopathy.

CINACALCET: A NOVEL TREATMENT FOR COGNITIVE DECLINE IN A CASE OF PRIMARY HYPERPARATHYROIDISM.

HJ Wallace, IR Wallace, P McCaffrey.

Hypercalcaemia is common in the elderly and is most often due to primary hyperparathyroidism. It may result in significant morbidity due to multiple systemic effects. Parathyroidectomy is the treatment of choice, with cinacalcet a second choice medical therapy. We describe a case of primary hyperparathyroidism associated with significant cognitive decline. Cinacalcet resulted in a significant improvement in serum calcium, cognitive function and functional capacity.

An 85 year old lady was found to have an elevated serum corrected calcium concentration of 2.8 mmol/l (2.1 – 2.6 mmol/l), and an elevated plasma parathyroid hormone concentration of 390 pg/ml (10 – 85 pg/ml). Calcium concentrations fell following rehydration. She had a past history of symptomatic renal calculi, no previous fractures and renal function was normal. She declined parathyroidectomy.

On admission one year later Folstein was 6/30 and serum corrected calcium was 2.92 mmol/l. Serum calcium was resistant to repeated treatment with intravenous fluids, diuretics and bisphosphonates. Cinacalcet was commenced. After four weeks serum corrected calcium had normalised (2.15 mmol/l), Folstein was 26/30, and mood and functional status improved. She has now returned to independent living.

Cinacalcet was highly effective in this case, resulting in a normalisation of serum calcium and significant functional and cognitive improvements.

PYLORIC STENOSIS – DO MALES AND FEMALES PRESENT DIFFERENTLY?

A Walls, N Quinn, I Milliken, M McCullagh.

Introduction: In infants with pyloric stenosis we explored (a) if males develop symptoms and present to hospital earlier than females and (b) does any delay in presentation influence the severity of metabolic derangement.

Method s: A retrospective casenote review of 99 infants who underwent pyloromyotomy over a two year period in our hospital. The data collected included: sex, age at onset of symptoms, age at presentation to hospital and initial blood results.

Results: The group comprised 84 males and 15 females. Symptoms developed at 26 (0-70) days in males and 35 (0-77) in females. (Mann-Whitney U=428,p=0.04 two tailed). Males presented to hospital at 34 (13-91) days, females at 45 (13-98) days (Mann-Whitney U=391,p=0.01 two tailed). The differences between males and females for (1) age at onset of symptoms and (2) age at presentation to hospital became more significant when weighted averages were calculated using SPSS. The lower weighted averages for male infants can be seen in the final table. Increasing duration of symptoms showed a positive correlation with fall in Chloride level. (Spearman's rho:rs= -0.2,p=0.049 two tailed). There was a positive correlation between duration of symptoms and bicarbonate level but this was not significant. (rs=0.06,p>0.05 two tailed). There was a positive correlation between duration of symptoms and pH, but this was not significant (rs=0.12,p>0.05 two tailed).

Discussion: In our hospital, females with pyloric stenosis develop symptoms and present significantly later than males. This should be considered when assessing a female with vomiting outside the usual 20-40 day range.

Ulster Med J 2013;**82(1):**58-63

Abstracts

Junior Doctors' Prize Evening 15th December 2011

ORAL PRESENTATIONS

CIRCUMFERENTIAL RESECTION MARGINS IN OESOPHAGEAL CARCINOMA: A NEW APPROACH

Ahmad J, Ranaghan L, Loughrey MB, Rajeev R, Kennedy JA.

Circumferential resection margin (CRM) status is considered to be a significant factor in determining the prognosis and disease free survival of patients with oesophageal carcinoma. The two most commonly used classification systems to define CRM status are described by the Royal College of Pathologists (RCPath) and the College of American Pathologists (CAP). According to RCPath criteria, CRM is involved (R1) if tumour is present within 1 mm of the resection margin. On the other hand, CAP designates R1 status only if tumour is present at the CRM of the resection specimen. Consensus is clearly required in the classification of CRM status to avoid confusion in comparisons between cohorts classified using these different systems. This study compared the CRM status, assessed by both classifications, and the overall survival of patients with oesophageal carcinoma treated by surgical resection, within a population-based cancer registry in Northern Ireland.

All patients who had undergone oesophagectomy and were diagnosed to have a pathological stage T3 tumour between January 2000 and December 2007 were identified from the Northern Ireland Cancer Registry. The pathology reports were examined for RCPath and CAP CRM status by two independent assessors. In cases where clear-cut information about CRM status was not reported, specifically the actual distance in mm to CRM, the archived histopathology slides were reviewed to ascertain classification. 129 patients with T3 oesophageal cancer (all types) were identified. All patients were available at follow up. Male to female ratio was 2:1 (87 males, 42 females) with median age 66 years. 49 patients (37%) received neo-adjuvant chemotherapy and 10 (8%) received both pre and post-operative chemotherapy. According to the RCPath CRM classification, 34 resections were R0 and 95 were R1 within this cohort of patients. Median survivals were 67 and 18 months respectively. When the CAP criterion was applied, 89 patients were R0 and 40 R1. Using the CAP classification, median survival was 65 months for R0 and 12 months for the R1 group. The survival difference between R0 and R1 remained statistically significant, regardless if patients were classified by RCPath or CAP criteria. Patients were then divided into three groups: CRM clear by > 1mm in group 1, 0-1 mm in group 2 and tumour present at the resection margin (0mm) in group 3. Categorisation into these three groups revealed median survivals of 89, 26 and 12 months respectively. Kaplan-Meier analysis showed statistically significant differences in survival for the three groups. CRM status is again shown to be of major prognostic value for stage pT3 oesophageal carcinoma treated by surgery. The difference in survival between R0 and R1 cancers remained consistent irrespective of the classification system used. However, a clear difference in survival curves was evident when CRM status was stratified using a three-tier combination of CAP and RCPath criteria; 0mm, 0-1mm and >1mm. If confirmed prospectively, such an expanded pathology reporting system may be helpul in estimating prognosis more accurately in oesophageal cancer resection specimens and possibly identifying patients who may benefit from adjuvant treatment.

COLORECTAL SCREENING IN THE NORTHERN TRUST – THE FIRST YEAR'S EXPERIENCE

Davey PT, Neely D, Campbell B, McCrory D, Rodgers C, Lynch P, Jacobs A.

Colorectal cancer is the second most common cause of cancer death in NI. Colorectal cancer screening was introduced in England in 2000, with Scotland and Wales following in 2007. The Northern Trust (NI) introduced colorectal screening in May 2010. A retrospective review of the patients participating in the first year of screening was performed. The colonoscopy reports including completion rate and complications, subsequent histopathology biopsies and surgical resection specimens were analysed. These were compared national standards. 182 patients were pre-assessed whose stools tested positive on Faecal Occult Blood (FOB). Of these 177 proceeded to colonoscopy. Caecal intubation rate was 94.4%. 100 patients had one or more polyps. 217 polyps were excised in total. 14 malignancies were detected as well as 6 polyp cancers. Polypectomy site bleeding was recorded in 6 cases. No perforations were recorded. Compared with national standards, more cancers (20 vs 11.3) were detected than would have been expected and these tended to be earlier in TNM stage. Therefore one would presume to increase the prognosis and survival of patients with cancers detected through the screening programme. Further work is planned to ascertain epidemiological significance.

STUDENTS PRESCRIBING EMERGENCY DRUG INFUSIONS UTILISING SMARTPHONES OUTPERFORM CONSULTANTS USING BNFCS

Flannigan C, McAloon J.

To compare a drugs calculator on a smartphone with the BNFC for prescribing in a simulated paediatric emergency. 28 doctors and 7 medical students in a paediatric department of a District General Hospital, were asked to prescribe both a dopamine infusion and an adrenaline infusion for a hypotensive child. For one calculation they used the BNFC as their reference source and for the other they

used the 'PICU Calculator' on the iPhone. The drugs calculator on the smartphone was more accurate than the BNFC, with 28.6% of participants being able to correctly prescribe an inotropic infusion using the BNFC and 100% of participants being able to do so using the drugs calculator on the smartphone ($p < 0.001$). The smartphone calculator was 376% quicker than the BNFC with the mean time saved being 5 min and 17 s per participant ($p < 0.001$). Participants were more confident in their prescription when using the drugs calculator on the smartphone with a mean confidence score of 8.5/10 compared with 3.5/10 when using the BNFC ($p < 0.001$). Utilising the smartphone was significantly more accurate and faster, with prescribers more confident in their calculations, than with use of the BNFC.

EXHALED BREATH TEMPERATURE; THE NEW ASTHMA BIOMARKER?

Hamill LM, Ferris KCA, Kapande KM, McConaghy LA, Shields MD.

Exhaled Breath Temperature (EBT) has been proposed as a novel biomarker for asthma control, but it is not understood how EBT is related to current markers. We evaluated the role of the new handheld EBT (X-Halo®) device as a non-invasive measure of asthmatic airway inflammation. EBT was compared to lung function (FEV1%, MMEF%), Fractional Exhaled Nitric Oxide (FENO) and physician's decision to alter treatment (up/ down/ no change). Cross sectional study with 114 patients aged 4-16 attending outpatient asthma clinics at Royal Belfast Hospital for Sick Children from June 2010 – August 2011. The range of EBT was 27.23 to 35.16°C (mean 32.82°C). Contrary to previous studies, we found no significant relationship between EBT and ENO ($R = 0.10$, $p = 0.51$). We found a poor correlation between EBT and FEV1% ($R = 0.13$, $p = 0.67$) There was no correlation between EBT and MMEF% ($R = 0.12$, $p = 0.86$) or to the clinical decision to alter treatment ($p = 0.27$) whereas Fraction of Exhaled Nitric Oxide (FENO) was higher in those whose treatment was increased ($p = 0.029$). EBT as measured by the handheld XHalo did not correlate with established measures of asthma control. Further research is required to determine what the results mean before we can dismiss EBT as new biomarker.

THE IMPLICATIONS OF CURRENT UPPER GI SURGICAL TRAINING ON FUTURE PRACTICE

Jones C, Loughlin P, Kennedy JA, Taylor MA, Clements WBD.

The current reduced working hours for trainee surgeons have caused many concerns regarding training competent surgeons by CCT. We aimed to assess the current state of upper GI training in the United Kingdom. An e-mail survey of 175 trainees, identified from the Association of Upper Gastrointestinal Surgeons database, was performed. Data was collected on exposure to oncological planning, and operative experience. 26.3% responded. 73.9% were senior trainees. Operatively within oesophagogastric training (67.4%), 45.8% performed 1-5 and 21% greater than 5 oesophagectomies in the past year, while 56.5% had performed 1-5 and 26.1% greater than 5 gastrectomies. No trainee was confident to perform an oesophagectomy or total gastrectomy without supervision, while 13% could perform a subtotal gastrectomy unsupervised. Within hepatopancreatobiliary training (32.6%), 23.1% had performed 1-10 hepatectomies and 7.7% greater than 10 in the past year, while 30.8% had performed 1-5 pancreatic resections, and 7.7% greater than 5. No trainee was confident to perform either of these procedures unsupervised. No trainee felt confident to perform key operations independently, despite the high proportion of senior trainees, raising concerns for the future. This could potentially prevent the delivery of specialist care, affecting the training of a future generation.

POSTER PRESENTATIONS

TELEPHONE REVIEW CLINIC: ASSESSING PATIENT SATISFACTION AND RATE OF WOUND COMPLICATIONS FOLLOWING DAY-CASE PROCEDURES

R Caffrey, IJ Rychlik, MG Brown

Use of telephone review systems varies. In our hospital one general surgical consultant uses post-operative telephone reviews for patients having undergone day-case procedures. Our objectives were to assess patient satisfaction following telephone review, as well as the rate of wound complications following day-case procedures. Completed telephone review forms spanning a ten month period from November 2010 to August 2011 were reviewed retrospectively. Of the 55 included patients, 43 were contactable. Of these, 31 patients felt telephone reviews were 'better for patients' (as opposed to OPC) (72.1%). 16 requested further OPC review (37.2%), however, 9 of these patients still felt on the whole telephone reviews were better for patients. 14 patients (32.6%) reported wound problems. Of these, 7 (50%) requested an OPC review. 11 of these patients still stated a telephone review was better for patients. None of the 5 patients overall who felt telephone reviews were not better for patients had reported wound complications. This study demonstrates a high satisfaction with the telephone review system, although just over a third of patients still requested formal OPC appointments. Wound problems were encountered in less than a third of patients, but did not affect satisfaction with this type of review. Telephone review, therefore, provides an alternative method of follow-up for many day case procedures, & OPC can still be offered if concerns exist.

INTRODUCTION OF PRE-ASSESSMENT CLINIC RATIONALISES INVESTIGATIONS BUT DOES NOT PREVENT VARIATION BETWEEN SPECIALTIES

Campbell J, Clarke L, Scott K.

Antrim Hospital is a district general hospital incorporating general surgery, ENT and gynaecology. We previously audited pre-operative investigations performed on 100 elective patients in the 3 specialties above, and found a large variation in practice across the specialties.

Since then a Pre-Assessment Clinic has started, led by nurse specialists with consultant back-up. We expected the variation between specialties to have ceased, and performed a re-audit to demonstrate this. Standards: 100% compliance to NICE guidelines 2003. We performed a chart review of 100 patients presenting for elective surgery on randomly selected days between January and April 2011. Other hospital systems were cross-checked. Comorbidities and ASA (as graded by the anaesthetist involved) were documented, allowing investigations to be compared with NICE guidelines. We successfully demonstrated an improvement in compliance with NICE guidelines for pre-operative investigations, as 77.8% of patients pre-assessed were compliant, compared to 60.7% patients not pre-assessed. This improvement was seen across all specialties. However, obvious trends were still present in investigations, varying by specialty. Some are demonstrated in the chart below. For example, patients in General Surgery still had the lowest compliance, and continue to have coagulation screens when not indicated. We noticed that pre-assessed patients often continue to have further tests in admission, and reducing compliance in these patients. There are a significant number of patients bypassing

pre-assessment (28%), such as breast cancer patients. Compared to previous results, compliance of pre-op tests in patients not pre-assessed has worsened significantly, from 72% to 60.7%. Reasons for this are unclear, but may include loss of junior doctors skills and knowledge in pre-assessing patients. We found that the pre-assessment clinic has rationalised investigations performed, but suggest that continual rotation of junior medical staff causes difficulty in creating a more efficient system. As some patients "slip through the net" of the pre-assessment clinic, we often still rely on junior doctors for appropriate pre-op investigations.

AUDIT OF DELAYED DETECTION OF CLEFT PALATE IN NORTHERN IRELAND 2005-2010

K. Collier, K.H. Hoo, C. Hill

To identify the prevalence of delayed detection of cleft palate in Northern Ireland and compare the results with other UK centres. A retrospective chart review of patients presenting to the Joint Cleft Clinic with isolated cleft palate from 2005 until 2010. Demographic information was collected, cleft type and within the cohort of delayed detection (diagnosed after discharge from birth unit), calculated the delay in referral, recorded signs and symptomatology. 96 patients with cleft palate presented to the Joint Cleft Clinic, of which 9.3% (n=9) patients had a delay in detection. Mean delay was 180 days; ranged between 2 days and 3 years. The common symptom in the delayed detection cohort was feeding difficulties. Delayed detection of cleft palate is not uncommon and may have an adverse effect on the overall wellbeing of the child. The regional rate of delay in detection is comparable to other parts of the UK. There is scope for improvement through better education of trainees and midwives of a simple method of palate examination in the newborn: visual inspection and digital examination.

TIMELINE OF CARE, FROM FIRST SYMPTOM TO TREATMENT, IN LUNG CANCER PATIENTS. IS THERE A GENERAL PRACTICE DELAY IN DIAGNOSIS?

Connolly E, Burt P.

Lung cancer is the leading cause of cancer death in the U.K. with a mean survival of only six months. Survival rates are considerably lower than in Western Europe and the U.S.A.. Excessive delays are believed to an important factor. This study was undertaken to determine if there is a general practitioner (G.P.) delay in referral for chest x-ray with regard to the 'referral guidelines for suspected cancer: lung cancer' (NICE, 2005). 145 patients were selected randomly from numerous outpatient clinics of a large cancer treatment centre. Data was obtained through patient interview and patient records. The overall timeline of care interval was 135(97) days. The mean G.P. delay was 59 days and the referral guidelines were not adhered to in 25.8% of patients. Only 58.8% of patients received a chest x-ray within 30 days of visiting their G.P. and 6.2% had not received a chest x-ray after 180 days (range 225-724). G.P. delay has increased, since previously reported, despite significant improvements in the NHS. Adherence to the referral guidelines could be improved. A lack of follow up appointments appears to contribute as patients' delay returning to their G.P. This could be addressed in future guidelines.

DRONEDERONE: INTRODUCTION AND EVALUATION OF EVOLVING SAFETY RECOMMENDATIONS WITHIN A NORTHERN-IRELAND BASED POPULATION OVER ONE YEAR.

Connolly M, Hussey S, Cinnamond N, Menown IBA

Atrial Fibrillation (AF) is a common cardiac arrhythmia associated with a 4-5 times increased risk of thromboembolic events. Dronederone (Multaq), a new non-iodinated derivative of amiodarone, was approved by NICE as second-line therapy for patients with non-permanent AF. In ATHENA, dronederone significantly reduced all-cause mortality and cardiovascular hospitalisations[1]. However, two reports of liver failure and transplantation in dronederone treated patients, combined with PALLAS and ANDROMEDA[2] showing concern with dronederone in permanent AF and cardiac failure, has led to safety concerns. Modified prescribing advice has now been issued. We created a database of 107 patients who commenced dronederone in the Southern Trust. Baseline demographics, liver function tests (LFT's) and ejection fraction (EF) on echocardiography were recorded. LFTs were recorded at monthly intervals for the first 6 months, then at 9 and 12 month intervals in keeping with recent guidance. No patients developed significant transaminitis (x3 ULN). Patients with EF<35% have discontinued dronederone. Safety aspects of dronederone in long term use have yet to be established. A service provision model through a primary-secondary care partnership is ideal to facilitate introduction of complex patient monitoring and adapt promptly to additional recommendations.

A SURVEY OF LMA CUFF PRESSURES WITH A DIFFERENCE

Cullen A, Goddard K.

Approximately 2.9 million general anaesthetics are performed each year in the UK equating to 1.3 million LMA insertions.[1] Excessive cuff pressure may cause sore throats, lingual nerve palsy or dysphagia.[2 3 4 5] Ambu® recommends a cuff pressure of < 60cmH_2O for its Auraonce LMA, the device utilised in our institution. Cuff manometer use is not routine in our institution. Reduction of LMA cuff pressures can be achieved by the application of a standard 20ml syringe to the pilot balloon. We speculated that cessation of backward movement of the plunger is a reliable endpoint that could consistently reduce LMA cuff pressure to a safe level. 57 patients undergoing general anaesthesia with an Auraonce LMA were surveyed. Permission was sought from the consultant anaesthetising. If LMA cuff pressure was above 60cmH_20 a 20ml syringe was applied to the pilot balloon until backward movement of the plunger ceased. Cuff pressure was then rechecked. Fifty-seven patients were surveyed. Fifty-six patients had cuff pressures of >60cmH_2O. Following the 20ml syringe manoeuvre 51 patients had cuff pressures <60cmH_2O. The 20ml syringe manoeuvre is a reproducible, safe and cheap technique producing safe LMA cuff pressures in Ambu® Auraonce LMAs.

A DISAPPEARING ACT – A TALE OF IMMUNOSUPPRESSION, EBV AND CNS B-CELL LYMPHOMA

C M Doherty, P Toner, E Healy, S Mc Kinstry, O Sheehy, S J Hunt

A 41 year old female presented in April 2010 with a three day history of frontal headache and verbal dyspraxia. On examination she was encephalopathic with no focal deficits. Past medical history included histologically confirmed ulcerative colitis, treated with azathioprine 2mg/kg/day since October 2008. This was withdrawn on admission. Imaging showed cortical, subcortical and cerebellar enhancing nodular mass lesions. CSF constituents were normal with negative cytology. CT of chest, abdomen and pelvis revealed pulmonary nodules and bilateral adrenal masses. Bronchoscopy was normal, and two adrenal biopsies also normal. Her clinical condition improved and 10 week MRI revealed significant improvement

in lesions other than in the left cerebellum. Biopsy of the lesion demonstrated B-cell lymphoma. Epstein Barr virus was detected by EBV encoded RNA within the brain specimen. CT PET and bone marrow biopsy were normal leading to diagnosis of CNS limited B Cell Lymphoma. Spontaneous resolution of the cerebellar lesion was observed. Following discharge she is well with no neurological deficit. We propose that following withdrawal of the immunosuppressant azathioprine 'immune reconstituition' led to the resolution of her EBV associated malignancy. In similar scenarios the potential for self resolution should be noted, as exposure to toxic therapies may be avoided.

DOES THE SUN ALWAYS SHINE ON PLASTIC'S TRAUMA? – THE INFLUENCE OF WEATHER AND SEASONALITY ON NUMBER OF PATIENTS ATTENDING A PLASTIC'S TRAUMA CLINIC

Eastwood MP, Hoo KH, Stevenson M, Lewis HG.

This was a retrospective study to correlate weather (rainfall, cloud cover and sunshine index) and seasonality with the number of patients attending the plastic surgery trauma clinic in the Ulster Hospital Belfast. The number of patients attending daily between January 2008 and January 2011 were correlated with rainfall (mm), cloud cover (oktas) and sunshine (hrs) the preceding day. Weather data was taken from the local Armagh observatory archives. Data was processed using SPSS (v 18) and a Poisson Regression method of analysis. Rainfall was found to be inversely proportional to the number of attendances at trauma clinic ($p<0.023$). The season was found to play a very highly significant role in number of attendances at clinic ($p<0.001$), with higher patient numbers in the summer months. Cloud cover and amount of sunshine were not found to be statistically significant. Greater rainfall led to fewer attendances at trauma clinic the following day. More referrals are also seen in summer months. We can conclude that weather does have the effect on the number of patients attending Trauma clinic in our regional plastic surgery unit.

AN AUDIT OF THE DIAGNOSIS, MANAGEMENT, AND COMPLICATIONS OF PLACENTA PRAEVIA

Glackin KG, Johnston KM

To audit the diagnosis, management of, and complications arising from cases of placenta praevia in an Area Hospital over 3 years. Retrospective audit of 36 cases in 3 years. Most women had no risk factors. 81% cases were diagnosed at the 2nd trimester scan. 53% women had elective CS (category 4). A consultant obstetrician was present in 58% and consultant anaesthetist in 53% of cases. In 45% cases the diagnosis confirmed at CS. EBL in the majority was 500 – 1000mls. Only 1 patient required blood transfusion (2 units) with no cases of hysterectomy or major complications. Incidence appears stable. The majority of cases were diagnosed at anomaly scan but follow-up arrangements varied and trans-vaginal ultrasound was used in only one case despite evidence about its value and safety. Documentation regarding consent and findings at delivery was poor and should be improved. 38% of elective deliveries were carried out prior to 38 weeks. Consultant presence, both obstetrician and anaesthetist appears to have varied but is recommended for all planned procedures as a minimum. We recommend the unit guideline be updated to reflect RCOG guidelines and thereby reduce risk.

TORSION OF MONOFILAMENT AND POLYFILAMENT SUTURES UNDER TENSION DECREASES SUTURE STRENGTH AND INCREASES RISK OF SUTURE FRACTURE

DB Hennessey, E Carey, CK Simms, AHanly, DC Winter.

A continuous running suture is the preferential method for abdominal closure. In this technique the suture is secured with an initial knot and successive tissue bites are taken. At each tissue bite, the needle is rotated through the tissue; in doing so, the suture can twist around the knot which acts as an anchor. To determine the effect of axial torsional forces on sutures as this is an unknown entity that may increase the risk of wound complications. The effect of axial twisting on polydioxanone (PDS*II), polyglactin (Vicryl), polypropylene (Prolene) and nylon (Ethilion) sutures was investigated with a Zwick /Z005 uniaxial testing device. The maximum tensile force withstood for untwisted sutures was determined: polydioxanone was the strongest material and failed at a tensile force of 116.4±0.84 N, polyglactin failed at 113.9±2.4 N, polypropylene failed at 71.1±1.5 N and nylon, the weakest, failed at 61.8±0.5 N. Twisting decreased the maximum tensile force of all sutures, one complete twist per 10mm (i.e. 15 twists) decreased the tensile strength of polydioxanone by 21%, polyglactin by 23%, polypropylene by 16% and nylon by 13%, $p<0.001$. Furthermore, excessive twisting caused a non linear decrease in suture strength, with one twist per 75mm (i.e. 20 twists) of polydioxanone decreasing strength by 39%, $P<0.001$. Axial twisting sutures also decreased the elasticity and ability of all twisted sutures to extend, $P<0.001$. The effect of excessive twisting on the mechanical properties of sutures is a previously unrecognised phenomenon. Surgeons should be aware that this can result in a decrease in suture strength and reduce the elasticity of the material, and therefore need to adapt their practice to reduce the torsional force placed on sutures.

STEPS TO A BETTER BELFAST – PHYSICAL ACTIVITY PROMOTION IN PRIMARY CARE

Heron N, McKinley M, Tully M, Cupples M.

66% of men and 75% of women report levels of physical activity which substantially increase their risk of chronic disease. This study aims to explore the feasibility of integrating brief assessment of physical activity into GP consultations and recruiting inactive patients to a trial of a pedometer-based intervention. Within four general practices in socio-economically deprived areas of Belfast, 35-75 year olds attending for consultation over a two week period were invited to complete a General Practice Physical Activity Questionnaire (GPPAQ). Each practice determined their method of administration following discussion of options. 'Inactive' individuals were invited to participate in the trial. All were given a pedometer: baseline step-counts were assessed and participants were then advised to increase their activity. Group one was given a specific step-count goal; group two was not. Step-counts were re-assessed after 12 weeks and the analysis of this is on-going. Practices chose different methods of GPPAQ administration: GP/nurse led(n=3) or receptionist-led(n=1); computerised GPPAQ(n=1) or paper-copy(n=3). Of 2154 consultations, 192(8.9%) completed questionnaires: 83(43%) were categorised as inactive; 46(55%) participated in the trial. Recruitment rates varied between practices. Physical activity assessment can be integrated into day-to-day general practice but there appear to be barriers in performing this for every patient. This requires further exploration.

IRELAND NORTH SOUTH URBAN RURAL EPIDEMIOLOGICAL (INSURE) STUDY- DIAGNOSIS BY SITE AND TRAUMA

Maguire S, McLaughlin J, Wylie M, Kelly C on behalf of INSURE Group

The INSURE Collaborative Study of Suicidal Behaviour in Psychiatric Disorders was conducted to increase knowledge on a variety of factors associated with an increased risk of suicidal behaviour throughout Ireland. This presentation aims to compare the rates of diagnosis by gender, and the rates of diagnosis in all six sites. The INSURE study was conducted at six sites throughout Ireland, two in the North, four in the South, of which two were urban and four rural. This presentation presents information relating to Phase One which studied new patient referrals to Mental Health Clinics in the six locations. The most common diagnosis (37.3%) in the overall study and in each individual site except Dublin was depression. In Dublin, the commonest diagnostic category was no current illness (15.6%). In females the commonest diagnosis overall and in each individual site was depression (45.4%). In males the commonest diagnosis in Omagh and Belfast was depression (46.9%, 51.5%) with alcohol dependence being the most common in Balinasloe (20.9%), Donegal (36.8%) and Portlaoise (37.2%). The male to female ratio in schizophrenia (SCZ) was 11:7, in Bipolar Affective Disorder (BPAD) 9:5, in depression 8:11, in anxiety related disorders 9:14, and in alcohol dependence 31:12. Not surprisingly the commonest diagnosis in the overall study for males and females was depression with just over one third of the entire sample having this diagnosis. Interestingly alcohol dependence was the commonest diagnosis in three of the four Southern sites. The male to female 11:7 ratio in SCZ and 9:5 in BPAD approximate the widely accepted 1:1 ratio. Of note, the 8:11 ratio in depression is in contrast with the widely accepted 1:2 ratio. The almost 3:1 male to female ratio in alcohol dependence is higher than the 2:1 ratio which has been suggested.

A COMMON COMPLAINT; A RARE DISEASE

Mallett P, Addley J,Kalansooriya V, Carl I, Johnston S, Mitchell M,Hamilton P, Herron B, Mainie I.

A 63 year old female presented with a 4 week history of intermittent abdominal pain and diarrhoea. Her background included asthma, nasal polyps and mixed conductive/sensorineural deafness. White Blood Cells were elevated at 41.1 $x10^9$/L (4 -10 $x10^9$/L) with an elevated eosinophil count of 24.88$x10^9$/L (0.04 - 0.4 $x10^9$/L) and mildly deranged cholestatic LFTs. Stool Sample for parasites was normal as was sigmoidoscopy. The patient complained of progressive paraesthesia in both hands and feet. Nerve conduction studies showed severe bilateral median nerve lesions with moderate-severe sensorimotor neuropathy, as well as absent left sural and peroneal sensory responses. Electromyography revealed clear active denervation; findings in keeping with mononeuritis multiplex. A mass seen in the right atrium on echocardiogram was further clarified by cardiac magnetic resonance and felt to be a localised mass of inflammatory tissue. Nasal septum tissue biopsy revealed surface ulceration and inflamed granulation tissue. The myeloperoxidase anti-nuclear cytoplasmic antibody (mpo-ANCA) level was raised at > 8 u/mL(0 - 0.8u/mL) with Perinuclear Anti-Neutrophil Cytoplasmic Antibody raised at pANCA of 40u/mL (0 - 19u/mL). Sural nerve biopsy demonstrated axonal loss, with marked eosinophilic infiltration; findings in keeping with peripheral nerve vasculitis and confirming the diagnosis of Churg Strauss Syndrome (CSS). Treatment was initiated with high dose steroids and cyclophosphamide and the patient made a significant clinical recovery, with drastic decrease in her eosinophilic count. The American College of Rheumatology (ACR)has established six criteria for the classification of CSS. The presence of four or more of these criteria had a sensitivity of 85 percent and a specificity of 99.7 percent for CSS. The patient met all 6 of the above criteria. This patient's description of non specific symptoms, grossly abnormal cell counts abnormal imaging and rapidly evolving clinical signs renders this case highly unusual and most interesting.

NOVASURE ENDOMETRIAL ABLATION AFTER CAESAREAN-SECTION: A REPORT OF 75 CASES.

C Monaghan, P Campbell.

There are anecdotal reports of complications in women undergoing endometrial ablation with a previous history of Caesarean delivery. There are no reports in the current literature to support or refute these claims. To determine the safety and efficacy of NovaSure endometrial ablation in women with a previous history of Caesarean delivery. A retrospective observational study of 75 women who attended for NovaSure endometrial ablation between December 2006 and December 2009 with a previous history of one or more Caesarean deliveries. Information was collected from patient charts, postal and telephone questionnaires. Outcome measures were compared with a cohort of 325 women with no previous history of Caesarean delivery. The mean age and parity of patients was 42 and 2.97 respectively. Thirty-two women had one previous Caesarean section, 20 had two, 11 had three, and 6 had four previous Caesarean sections. The complication rate was calculated at 15% and this included abandoned procedures and post-operative admissions. Eighty-four percent of women were satisfied with the procedure. The amenorrhoea rate was 55%. When compared with the control group, complication rates were similar (13%) and there was no statistical difference in satisfaction rates (p=0.5). NovaSure endometrial ablation is a safe and effective treatment for menorrhagia in women with a history of previous lower segment Caesarean-section.

TRANSCATHETER CLOSURE OF SECUNDUM ATRIAL SEPTAL DEFECTS, A COHORT STUDY.

McCain RS, McCain RS, Craig B, Casey F.

Atrial septal defects (ASD) account for 10% of all congenital heart disease and if untreated carry a lifetime mortality risk of 25%. Treatment traditionally involves open surgical repair, however in recent years transcatheter closure has become increasingly common. The aim of this study was to assess the safety and efficacy of transcatheter closure of ASDs. A prospective database was maintained for consecutive patients undergoing transcatheter closure of ASDs. Data gathered included patient demographics, procedural data and outcomes for one year post procedure. Transcatheter closure was attempted in 79 patients and a device successfully deployed in 75 (95%). Five patients experienced transient arrhythmias during the procedure. No serious complications occurred. Successful closure was achieved in 84% of patients at 24 hours, 86% at 3-6 months and 91% at 1 year. Success was less likely in those with multiple or fenestrated defects. Those procedures in which the transcatheter device could not be deployed underwent successful surgical closure with no mortality. This study shows that transcatheter closure of ASD's is a safe and efficacious procedure. Strict selection criteria are essential to ensure the optimum method of closure for each patient.

GASTROINTESTINAL ENDOSCOPY PRIORITY, A PROSPECTIVE COHORT STUDY.

MacCormack B, McCain RS, Skelly BL, Gray RT, Neill AK

NICE guidelines for management of suspected gastrointestinal cancer aid clinicians when deciding the priority of patients for endoscopy. The aim of this study was to assess referral patterns in a district general hospital within this context. A prospective database was maintained for consecutive patients undergoing gastrointestinal

endoscopy. Data gathered included patient demographics, referral priority, clinical presentation and final diagnosis. Data was collected on 117 patients: 61 OGD; 16 flexible sigmoidoscopy; 40 colonoscopy. 35 patients were referred as routine, 31 as urgent, 35 as "red flag", 16 were planned. 94 (80%) referrals were prioritized correctly. 36(30%) endoscopies revealed benign pathology, one malignancy was diagnosed, the remainder were normal. Median waiting time was 336 days for routine, 101 days for urgent, and 18 days for "red flag". Referral for colonoscopy was most likely to have been prioritized correctly. Direct primary care access to endoscopy was most likely to have an inappropriate referral priority (40%). Significant numbers of inappropriate referrals are made for endoscopy. Low numbers of cancers are diagnosed, even in those patients who meet "red flag" criteria. Waiting times for routine endoscopy are long. Inappropriate referrals place patients at risk and have a low diagnostic yield.

PROPRANOLOL THERAPY FOR INFANTILE HAEMANGIOMA – THE NORTHERN IRELAND EXPERIENCE.

Pauline McGee, Sophie Miller, Claire Black, Susannah Hoey.

Infantile haemangioma are the most common tumours of childhood affecting approximately 1 in 10 children. They are characterised by rapid proliferation during the first year of life followed by a slow regression over the next 5-10 years. It has been observed that propranolol can inhibit growth of haemangioma during the proliferative phase. A retrospective chart review was performed on patients with infantile haemangioma treated with oral propranolol at the Royal Belfast Hospital for Sick Children (RBHSC) between April 2009 and June 2011. 24 patients were identified. The male to female ratio was 1:4. There were four indications for propranolol therapy: ocular, airway, presence of ulceration and functional impairment. Age at initiation of therapy ranged from 8 to 47 weeks. Significant improvement was observed in 22/24 (91.6%) of patients. Side effects included disturbed sleep, bradycardia and lethargy. Propranolol is an effective treatment for infantile haemangioma for the indications described. Improvement was noted in the majority of our patients' haemangiomas. A low incidence of side effects was reported. Further research is required to determine efficacy of its use in children with haemangiomas that fall outside the current indications.

DO WE NEED TO SEE DIABETIC PATIENTS MORE OFTEN?

Prabhavalkar P, Xavier A, Gormley M

Optimal glycaemic control minimizes complications associated with diabetes[1] [2]. There is scant evidence on the impact of frequency of diabetic clinic visits on glycaemic control. To determine the effect of frequency of clinic visits and age on glycaemic control. 800 patients with at least 2 diabetic clinic visit episodes from January 2008 until December 2009 were included in the study. Data was obtained from Diamond database and statistical analysis performed using Chi-square test with SPSS. Data from 2300 clinic visit episodes were collated. A rising trend was noted in the percentage of patients showing an improvement in glycaemic control (as measured by the reduction in HBA1c levels) in relation to the frequency of clinic visits 51% (n=176) in 2 visits, 56% (n=164) in 3 visits and, 60% (n=55) in 4 visits (p=0.07). Age positively correlated with improved glycaemic control. HbA1c <8% was found in 42% (n=148) and 56% (n=101) of patients aged <70 and >70 years respectively (p=0.002). Moreover, only 1.6% (n=3) of patients aged >70 years had HbA1c >10% as compared to 16% (n=57) in <70 year age group (p<0.001). Frequent clinic visits were associated with a rising proportion of patients showing an improvement in glycaemic control. Thus frequent outpatient reviews could play an indirect role in reducing risk of complications and need for inpatient admissions. Age might be an important factor in determining the patient cohort that could be discharged from the diabetic clinic and followed up in the community.

LONG-TERM FUNCTIONAL OUTCOMES OF THE MODIFIED BRETTEVILLE TECHNIQUE. WHAT ARE THE TRENDS IN UROFLOWMETRY AND SPRAY ANALYSIS?

Robinson AJ, Harry LE, Stevenson JH.

The Bretteville technique was first described by Gorm Bretteville in 1986 and later modified by our senior author in 1996. Long-term outcomes in hypospadias are lacking. We present the long-term functional outcomes in patients undergoing this technique. We prospectively followed a cohort of patients from surgery between 1998 to 2004 to now. Each patient was reviewed annually and underwent clinical examination, uroflowmetry and spray analysis. Each patient had a HOSE questionnaire filled out for them. 16 patients were followed up on average for 9 yrs and 8 months. Over the follow up patients were able to urinate faster (flow rate: 15.3 ml/s vrs 10.1), straighter (weight sprayed 3.2g vrs 4.4g) with less spray (spray area: 2.05 % vrs 10.29 %). Objectively using the Hypospadias Objective Scoring System (HOSE) questionnaire outcomes improved with time from an 13.8 to 15.3 over the follow up (max score 16). We conclude that the Modified Bretteville Technique provides a cosmetically acceptable and a functionally sound repair that is robust over the long term. Over time the trend is that patients urinate at a faster rate and with less spray.

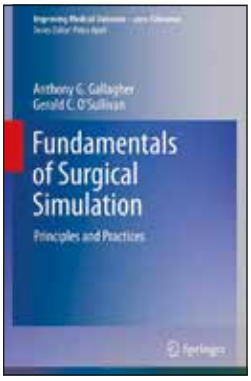
SECONDARY PREVENTION POST MYOCARDIAL REVASCULARISATION– AUDIT REVEALS 'INDUCTION PACKS' OFFER MORE THAN JUST TRUST OBLIGATION

Rychlik IJ, Booth K, Jackson M, Graham A.

Myocardial revascularisation with coronary artery bypass grafting has been indicated in the treatment of patients with coronary artery disease for over a quarter of a century. In-spite of surgical advances, the use of optimal medical therapy (OMT) still remains an important priority[1]. In the Belfast trust, we audited the implementation of ESC/EACTS guidelines in patients undergoing coronary artery bypass grafting and demonstrated the use of 'Junior Doctor Induction Packs' along with local presentation improved compliance with these guidelines. Prospective data was collected by the ward pharmacist in patients undergoing coronary artery bypass grafting from October to December 2009. Age, gender, surgical procedure, past medical history, ejection fraction and admission and discharge medication were recorded and analysed. 54 patients in the first loop and 32 in the second loop were identified. In comparison between pre-operative and post-operative prescribing habits in the first loop, it was noted only 86% of patients were discharged on correct Statin therapy. Change in clinical practice was brought about with junior doctor education (induction pack and oral presentation) with resolution of 100% correct Statin prescription on discharge seen in the second loop of the audit cycle. Our data suggests that to have effective OMT prescribing in patients with coronary artery disease, a multi-disciplinary approach is needed with continued staff education and when followed, successful secondary prevention strategy can be achieved.

Book Reviews

FUNDAMENTALS OF SURGICAL SIMULATION



Anthony G Gallagher and Gerald C O'Sullivan, Springer-Verlag 2012, 390 pp. ; 41 Figs.; 23 tabs.; HARD COVER £144

In twelve informative chapters Gallagher (an experimental psychologist) and O'Sullivan (a master surgeon and Past President (2006 – 2008) of the Royal College of Surgeons in Ireland) tell the story of the emergence of simulation based training as the most significant change in medical education since the apprenticeship model developed by Halstead in the 19th century. Gallagher and O'Sullivan argue that it represents nothing less than a paradigm shift. In this book they set out to equip the reader with the fundamentals of what is required to develop and validate a methodical, evidence-based approach to the training of surgeons and other interventionists in this new paradigm.

The conversational style of the writing coupled with historical and clinical anecdotes which are peppered throughout the book make the content accessible to the non-specialist and easy to read but no less scholarly for that.

Taken as a whole the book gives an historical overview and a chronicle of the latest developments in the training of surgeons and other interventionists – but it is more than this. Each chapter tackles a specific aspect in the development of the thinking behind proficiency-based progression training.

The book may be read cover to cover and will afford the reader a global perspective on the state of simulation based training. Each of the chapters, however, can stand alone and each has its own extensive bibliography which will satisfy the most demanding of scholars. In particular, the chapters on human factors (3 and 4) and those on metrics (5, 6, 7 and 8) give the reader a solid grounding in the theoretical underpinnings of simulation and the assessment thereof. Chapter 7 for example gives a comprehensive account of issues to do with the reliability and validity of tests and how to address these and would be very useful to anyone involved in the construction of high stakes assessments of procedural skills. One chapter (9) even describes how education technology can be harnessed appropriately to ensure that trainees are ready for hands-on skills based programmes.

This book is a must for all those involved in the organisation and delivery of surgical and procedure-based training programmes. It highlights the way training programmes can not only be made more effective but also argues that they can be made more efficient in terms of training time and to a quantitatively defined, quality assured, level of performance. Trainees who wish to gain greater insight into how skills are acquired and who wish to understand how the new paradigm of deliberate practice and proficiency-based progression work, would do well to read this book.

Gallagher and O'Sullivan point out that surgery and medicine with the apprenticeship model are training doctors for 21st Century medicine using a 19th Century training paradigm. Their book will act as a beacon,casting light on how the best of the old can be combined with an understanding of how trainees learn, to produce training schemes which are better attuned to the demands and constraints of modern clinical practice.

Kieran McGlade

So you want to be an **Oncologist?**

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WHAT IS AN ONCOLOGIST?

The term Oncologist is an umbrella term which includes the specialities of Medical Oncology and Clinical Oncology. Medical Oncology is the non-surgical management of malignant disease, using systemic therapy (chemotherapy, hormone therapy and biological agents), whilst Clinical Oncology utilises both radiotherapy and systemic therapy in the treatment of malignant disease.

WHY ONCOLOGY?

Cancer is a common disease with an estimated 1 in 3 persons in the UK likely to be diagnosed with a malignancy in their life-time[1]. Nearly all of us will have had the experience of a close friend or family member who has been diagnosed with cancer. Such a diagnosis is associated with anxiety and concern for the future. It is this uniqueness about patients with cancer that is powerfully motivating to Oncologists. Oncologists have a deep desire to change the course of the disease for patients with cancer; cure where possible and when a cure is not possible to extend and improve the quality of life remaining and provide effective palliation of symptoms. This was my motivation for considering a career in Oncology.

TRAINING:

Both Clinical and Medical Oncology specialty training begins after Core Medical Training (CMT) which includes completion of MRCP(UK). Clinical Oncology training is supervised through the Royal College of Radiologists and Medical Oncology through the Royal College of Physicians. All Oncology Training schemes follow a structured curriculum and deliver training in cancer basic sciences and the management of malignant disease. During training, most trainees rotate from the main (base) hospital to other hospitals in order to gain a wide experience of practice. In Northern Ireland, trainees are based at the Cancer Centre, Belfast City Hospital and attend clinics at each of the four Cancer Units.

During Clinical Oncology specialty training, the Fellowship Examination of The Royal College of Radiologists (FRCR) must be attained. The First FRCR Examination, taken after one year of speciality training covers the basic sciences of medical physics, medical statistics, radiobiology, cell biology and clinical pharmacology. Most trainees sit the Final FRCR Examination two years later and this tests the basic management of most common and some less common malignant diseases. The final phase of training after FRCR allows the trainee to broaden and deepen their experience in one or two disease sites. Most trainees spend some time abroad to gain experience with a novel treatment technique and some will use this time for research. The minimum total duration of training is five years before becoming eligible for the Certificate of Completion of Training (CCT). Medical Oncology training is shorter with a minimum of 4 years to CCT. Medical Oncology trainees are strongly encouraged to undertake a period of research during their specialist training and many take time out to complete an MD or PhD fellowship. Medical Oncology trainees must sit a Speciality Certificate Examination, usually in their penultimate year of training.

WHAT IS AN ONCOLOGIST'S WORKING WEEK LIKE?

Oncology is a very clinically focused specialty, with much of the working week spent in direct patient contact in outpatient clinics, in the radiotherapy department, and on the wards. Clinical Oncologists will spend at least one session per week in the technical planning of radiotherapy for individual patients. Contributing to research through clinical trials or translational research is integral to patient management so Oncologists, and in particular Medical Oncologists, will devote some time to this during the working week.

WHAT QUALITIES ARE NECESSARY FOR BEING AN ONCOLOGIST?

Teamwork is very important for both specialities and most oncologists work as part of a tumour site-specific multidisciplinary team of specialty nurses, radiographers, physicists, surgeons and other clinicians, all of whom must integrate and communicate effectively. Good communication skills are essential to patient management and team-working. Given the accelerating rate of new drug and radiotherapy technologies, Oncologists must have a desire to develop and implement new treatments in their clinic. Above all an Oncologist must have empathy for patients facing what may be a concerning and serious diagnosis.

HOW TO APPLY?

If you think Oncology is for you, speak to Consultants and Trainees in the speciality. General advice includes gaining a good grounding in general medicine and surgery during the Foundation Programme, getting a place on a Core Medical Training (CMT) rotation (possibly including a placement in medical or clinical oncology or palliative medicine), undertaking clinical audit, spending some time finding out about how the cancer services work in the UK and passing the MRCP examination. Recruitment and selection into both specialities in England, Wales and Northern Ireland is carried out through a nationally coordinated process run on behalf of the Colleges by the Kent, Surrey and Sussex (KSS) Deanery and applications are via a dedicated website: http://oncologyrecruitment.nhs.uk/ .

FINALLY…

Fancy pursuing an exciting career with new therapeutic opportunities at frontier of human biology? Considering doing a job that can make a huge difference to patients? Then come do Oncology!

REFERENCES:

1. http://info.cancerresearchuk.org/cancerstats [Accessed 15/11/2012]

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Cover legend: bifurcated modular aortic stent-graft. See review on page 3.