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Editorial

Religio Medici

Michael Trimble

This will be my final editorial before I hand over the reins of the journal to the capable David Armstrong. Regular readers of these editorials will have noticed a tendency to approach the world of medicine from a particular philosophical, even theological angle and I wish to conclude in a similar vein.

Without doubt Sir William Osler was one of the giants of 20th century medicine. With a formidable reputation as clinician, researcher and educator, Osler was professor of medicine, first at McGill University, then the University of Pennsylvania, before being invited to the chair of medicine at the newly established Johns Hopkins School of Medicine, and subsequently holding the title of Regius Professor of Medicine at Oxford.[1] In addition to his medical genius, Osler was an avid reader and collector of books. One book which had a profound influence on him was Sir Thomas Browne's *Religio Medici*.[2] It was said that Osler always kept a copy near him, and would put it in his bag when travelling. It was by his side during his final illness, and, when his funeral was held, a copy was laid on his coffin.[3] A more recent admirer of this book is the American physician and author Abraham Verghese. Verghese is Professor for the Theory and Practice of Medicine at Stanford University Medical School. In his forward to *When Breath becomes Air*, Paul Kalanithi's moving account of his battle with terminal cancer, Verghese reflects on his passion for Browne's work and notes how Kalanithi's writing reminds him of Browne.[4]

Who was Thomas Browne and what was so significant about this book? Browne was a 17th century English physician who, after studying medicine in Padua, Montpellier, and Leiden, practised in Norwich. Browne is noted to have been a compassionate and conscientious physician continuing to provide care throughout the Great Plague of 1655-56, when many others abandoned their patients. Browne was a natural philosopher and prolific writer – often coining new words and expressions. We can thank Browne for words such as "ambidextrous", "coma", "ferocious", "exhaustion", literary", "medical", and "therapeutic".[5]

Browne states that he initially wrote his book for his own "private exercise and satisfaction". However, a copy of the manuscript he had given to a friend was itself copied and recopied, consequently the work entered general circulation. In light of the popularity of this "bootleg" edition, Browne subsequently revised his work, and a corrected, authorised version was published in 1643. It was a hit: The book became an international best seller and was reprinted in 1645, 1648, 1656, and 1649.[6] The impact of the book in literary circles has continued, influencing writers such as Edgar Allen Poe, Herman Melville, Jorge Luis Borges and Virginia Woolf.[7]

But what is it about*? Religio Medici* is simply Latin for "the religion of a doctor" and Browne's religious profession is that of a Christian. He goes on to make clear that this is not because of his baptism as child, his upbringing, or the culture of his country. Instead, he states "having in my riper years and confirmed judgement, seene and examined all, I find myself obliged by the principles of grace and the law of mine own reason, to embrace no other name but this." Browne's faith is carefully thought through. Writing in the period of the English Reformation as a member of the Church of England, Browne does not follow trends blindly, but is an independent thinker:

> "I observe according to the rules of my private reason… neither believing this because Luther affirmed it, nor disapproving that because Calvin hath disavouched it. I condemne not all things in the Council of Trent [i], nor approve all in the Synod of Dort [ii]."

In matters of faith, he seeks the guidance from the Bible and the church.

> "In brief, where Scripture is silent, the Church is my text; where it speaks, 'tis but my Comment."

Browne discusses several matters of religion – the doctrine of the Trinity, the Fall of man, the Incarnation and Resurrection of Jesus Christ. Whilst happy to voice his opinion and to call out error where he sees it, Browne advocates tolerance and charity to those with whom he disagrees.

Browne was also a man of science. In 2017 his collection of specimens of interest formed the basis of an exhibition at the Royal College of Physicians in London. He was an early adopter of William Harvey's anatomical account of the motion of the heart and blood. As a natural philosopher, he saw no conflict between his scientific and religious beliefs, rather they were parts of a complete worldview.

Another theme Browne deals with is the character of the doctor. Compassion is key: "For by compassion we make others' misery our own and so, by relieving them we relieve

i. Council of the Catholic Church (1545 and 1563) held in in Trent (Trento, Italy) in response to the Protestant Reformation.

ii. The Synod of Dort (1618–1619) was an international Synod held in Dordrecht in the Netherlands by the Dutch Reformed Church to settle doctrinal issues in the wake of the Reformation.

ourselves also." He did not practise simply for profit. "I desire to cure his infirmities than my own necessities. Where I do him no good, methinks it is scarce honest gain."

Religio Medici takes careful reading. Browne's writings demonstrate that he was extremely well read. He cites Plato and Aristotle, Tacitus, and Cicero. He is familiar with works of history and literature. He sprinkles his writing with quotes in Latin and Greek. (The glossary and endnotes in my copy are indispensable!)

For all their enthusiasm for Browne's book, I am not sure that either Osler or Verghese have really "got it". Verghese admits that as a young physician, "obsessed with that book", he struggled to understand it but found "it remained opaque". Raised in Ethiopia, Varghese's parents were Syriac Christians originally from the Indian state of Kerala.[8] Verghese acknowledges their deep devotional life.[9] However, he does not appear to share their faith. In one essay he describes a spectacular sunset in El Paso as the closest thing he has had to a religious experience. [10]

So too, with Osler, whilst he was deeply impacted by the book, he did not share Browne's religious outlook. Although he was the son of a clergyman, Osler remained sceptical of religion. As his biographer Michael Bliss writes "As a young man Osler was caught up in the nineteenth century's crisis of faith in traditional religion as a path to salvation." He was "A minister's son who rejected the supernatural for the natural world.... For his Christian parents, life went on forever. Once Osler had abandoned faith in immortality, he knew the terrible brevity of the period fixed by the capacities of the human body."[11] I think that makes all the difference.

For my part, like Browne, I am happy to make the profession of being a Christian. I hope that my editorials have provoked some thought in my readers. The apostle Paul when on trial was asked "Do you think that in such a short time you can persuade me to be a Christian?" I can only echo his reply "Short time or long—I pray to God that not only you but all who are listening to me today may become what I am."[12]

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Commentary

Assisted suicide a 20th century problem, Palliative care a 21st century solution

Matthew Doré

Abstract

Assisted suicide and euthanasia are two forms of what is being called 'assisted dying', and they are touted by proponents as "progressive" and "compassionate". In fact, they are, on the contrary, relics from the last century: today, in the 21st century, we have moved beyond such archaic solutions – we now have, instead, proper evidence-based palliative care. It is this that should be demanded for all.

This article will dispel the myths around dying that are often cited. It will also explore the oft-overlooked tragedies generated by assisted suicide, in the hope you, the reader, can be better informed about this retrogressive practice.

Introduction

I was a young junior doctor, doing my haematology placement, when the gentleman who had occupied side room three for over two weeks died naturally of his leukaemia, comfortably and very peacefully. It was one of the first times I had seen death - certainly the first time I had formed a close bond with a dying patient and their family. In one of those formative moments I will always remember, his adult son handed me a tin of chocolates for the ward and told me:

"Dr Matt, you know, my dad taught me how to use a spoon, ride a bike, wash and dress, to be fair and generous. He taught me how to be a good husband and father, he taught me how to graciously age… he taught me everything I know, and, you know what, he has now taught me how to die as well"

This is what a good death looks like: a life which is complete and a legacy handed on. This dying gentleman has both reassured and helped his son see death as a normal part of living and provided a model for him in the future. It was this moment that helped form my decision to go into palliative care - I found myself asking "how can I help achieve this in all my patients?" and "how can I help people achieve a good death?"

Of course, assisted suicide is incapable of achieving the same thing: because such suicide also creates an example and demands generational repetition. It feeds an unfounded fear of the process of dying, and a misunderstanding that the way to approach this fear is to pre-empt it. After much reflection and careful consideration, I do not think assisted suicide is at all compatible with palliative care. It would be a calamity and a great scandal if introduced here in the UK or Ireland.

There is a narrative that 'of course' palliative care would be heavily involved in assisted suicide. The reality is very different, 'The Association of Palliative medicine'[1], the largest representative body of palliative care doctors in the UK and Ireland, opposes any changes to the law. A survey of members outlined 82 % were opposed in 2015[2] and this was confirmed in the RCP survey in 2020[3] with 81% of palliative medicine physicians opposed. My esteemed palliative care colleagues, who have seen dying the most, are thus overall united in this thinking. These are also the physicians who are anecdotally one of (if not the most) accepting and progressive group of doctors and nurses in the health care profession. Their mantra is compassion. You have to ask yourself: Why are Palliative Care Physicians so overwhelmingly against assisted suicide?

If I were to pick one over-arching reason it would be that palliative care understands how vulnerable people can become. Certainly physically, but also psychologically, spiritually and socially. Indeed, I would argue, out of all the vulnerable groups, those approaching end of life are the most vulnerable, and need a higher degree of protection.

We shall now explore the ways in which this population becomes vulnerable, and why we must protect them.

Mental Health and Suicide prevention

In Canada, where assisted suicide and euthanasia are legal (and, euphemistically, titled "Medical Assistance in Dying – MAiD"), only 6.7% of 10,064 MAiD provisions (3.3% of all deaths in Canada) were referred to a psychiatrist for assessment in 2021[4]. Likewise, in Oregon, in 2021 only 2 patients out of 383 were referred for psychiatric evaluation (0.5%)[5], in 2020 this was only 1 patient out of 188[6]. Couple this with data showing three quarters of those requesting assisted suicide report being lonely and 60% are clinically depressed[7], it is evident we are missing mental health as a causative factor in these patients.

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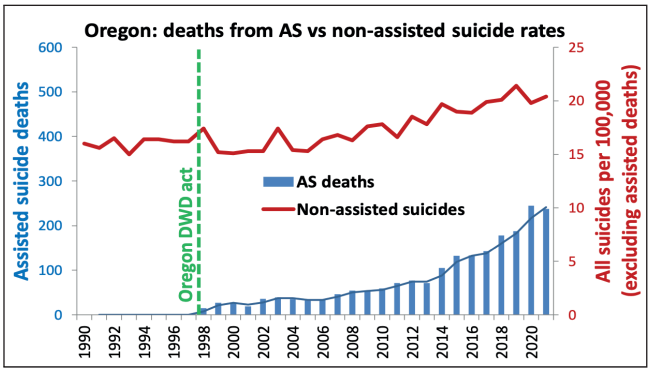
In the Netherlands (where again, assisted suicide and euthanasia are legal) an analysis of individuals requesting euthanasia or assisted suicide for mental health issues showed that the commonest diagnosis was a depressive mood disorder and that, compared with the general population, they were more likely to be single, female, or a lower educational background and with a history of sexual abuse[8].

It had been hoped that legalising assisted suicide would reduce the background rate of "ordinary" suicide, positing that some 'not assisted' suicides happen because the victims are terminally ill and/or have unbearable symptoms.

It doesn't - evidence suggests the opposite. In Oregon, the background suicide rate has risen by nearly one third (32%) since 'assisted suicide' was legalised[9,10]. In Europe this has been thoroughly investigated and controlled against neighbouring countries and trends by David Jones's recent paper[11]. He confirms the data demonstrates a rising 'not assisted' suicide rate in countries permitting assisted suicide. Indeed, Belgium now has the highest non-assisted suicide rate in women in Europe[11].

"In all of the four jurisdictions (Switzerland, Luxembourg, the Netherlands, and Belgium) there have been very steep rises in suicide (incl. AS) or in ISID (Intentional self-initiated death) *after the introduction of EAS (Euthanasia or Assisted Suicide). A striking example is the suicide rate (incl. AS) of women in Switzerland which has roughly doubled since 1998. Many more people have died prematurely after these changes."*[11]



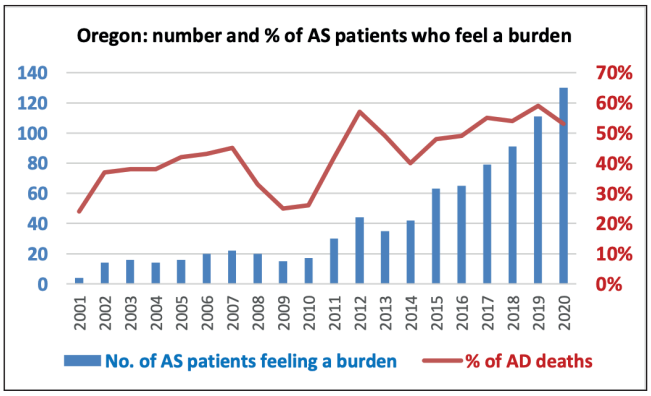
Used with permission from https://kadoh.uk[12] Non-assisted suicides in Oregon have risen by 32% despite legalising assisted suicide[12].

In the name of 'progress' there has been a societal moral shift in these countries. Not only is suicide a reasonable course of action in the face of hardship, but those medical professionals who don't provide assisted suicide have questionable ethics, whereby they are perceived more concerned with their own moral hang-ups than the welfare of the patient. This is outlined in the desperately sad case in which a Dad got his son to shoot him dead because he had been refused legal assisted suicide in Australia[13]. It is becoming a 'right' to demand and thus provide.

Assisted suicide bypasses the exploration of mental health, it damages the excellent work to normalise talking about mental health, and it conflates 'autonomy' above mental illness. All the while often proponents are cheering you on to fight for your right to have someone help you commit suicide. Topsy-Turvy doesn't cover it.

Burden

In Oregon's 2021 report on reasons people had assisted suicide, 54% felt a burden and 8% had financial concerns. The percentage of assisted suicides in Oregon who felt a burden has doubled in the last 10 years (26% to 54%)[5].



Used with permission from https://kadoh.uk [12]

"I don't want to be a nuisance" as one of my patients put it, and although sometimes is perceived as noble, is where I believe society should step in.

Even out-with mental illness, society has a deep responsibility to protect the most vulnerable, and who is the most vulnerable if not those who are open to suggestion or worse, pressurised?

Simply having the option of assisted suicide expressed is in itself, an acknowledgment this is an acceptable course of action, and thus acts as a 'pressure to consider such'. I imagine that disabled people understand what it is to feel like a burden on society, they are only too aware of the implicit suggestion this creates. This explains why all the major organisations representing the disabled are opposed to such legislation as they are aware of being perceived *'as a nuisance'*[14].

No matter how caring your family is, this societal pressure would be exerted upon everyone who had a terminal illness, or in Canada and parts of Europe, self-described suffering. The pressure may be spoken or unspoken, but by creating an option, a door opens, in which consideration of an assisted suicide becomes real. The expectation to alleviate a burden on their family will be felt by the patient, or worse the patient perceives forcing a burden upon their family to care for them. As many suicide letters have sadly written, "*You are better off if I wasn't here.*"[15].

Within palliative care I have readily seen the gratification and melancholy pleasure of family caring for their loved one. Albeit it is often hard work and there comes a tipping

point of which professionals are needed, however like caring for a new-born child there is pleasure in the hardship. This 'burden' perceived by the patient is often a gladly received role by the family.

In discussions with families, I have often asked them to put on each other's shoes. The point reveals how much they care about each other and the 'welcome role' of caring for a loved one. It becomes obvious if roles were reversed they would care for the other.

However if, as sometimes happens there isn't a caring family, our societies role is surely to provide an environment which substitutes that 'family role'. I feel many nursing homes, social care, the hospitals, hospices and community palliative care services provide this role exceptionally well, although albeit work needs to be done to be equitable across the whole country. This is the opposite of what some Canadians are experiencing as assisted suicide becomes the only option with their housing and social crisis[16].

Or maybe it's even worse, how can it be uncovered that there is a coercive family? Exerting a pressure on the patient into assisted suicide. Maybe out of spite, money, feud or neglect or any number of reasons. Legislation has to be for the whole of society not just for the well-meaning families, and not be left for doctors to be pretend detectives or judges.

I have also witnessed the traumatic effects of suicide personally. The regret and questioning and torment this action brings to those remaining. It is important to highlight there is no requirement in any of the legislations to tell family and loved ones of what they are planning to do, as it's touted as being based on individual autonomy. Inevitably, in the pursuit to not be a burden some people may create a greater one. "*No man is an island*" - John Dunne[17].

Dignity

Death is an unknown. Death however has the misconception that it's commonly associated with pain, suffering and indignity, this is really not true for the vast vast majority of cases. The prominent lobbying group is called 'Dignity in Dying' highlights the word 'dignity' in taking one's life. Would assisted suicide help create dignity?

Dignity is not something you can claim for yourself, it is placed upon you. Dignity is given to you through a caring, respectful environment. The Queen, for example, is the most dignified lady I can think of, because we placed that respect and honour upon her. The palliative care ethos is something that restores that dignity in dying because of the caring people and environment the patient finds themselves in at home, hospice, community or hospital.

The lobbying group 'Dignity in Dying' is therefore mis-named, it predisposes the only 'dignified' way to die is to use assisted suicide, hence the name. This is clearly not true as many through history have died with dignity naturally. They also mistakenly define 'dignity' synonymously with personal choice, there is a big overlap to be sure, but compassion and dignity is a lot more than that. Dignity is passionately the pursuit of making 'you' more 'you', bestowing you with worth and value.

The lack of absolute certainty that palliative care can control all the symptoms is often used as a rational for assisted suicide, however a lot less well recognised is that assisted suicide is actually associated with multiple complications itself.

Oregon, despite having the best available recorded data out of all assisted suicide jurisdictions is incomplete, with no record of the complications ('unknown' in the table below) in 67% of all patients. Out of the recorded known data 9.3% had complications[5].

In an interestingly never repeated study in the Netherlands, 7% vomited the medication up and 16% experienced significant problems such as failure to induce coma, or induction of coma followed by awakening of the patient or a prolonged time to die[18].

In Canada there is anecdotal recognition of the many complications from MAiD, but worryingly there is no data recorded to quantify this, creating an evidence free zone[19].

Characteristics	2021 (N=238)	2020 (N=259)	1998–2019 (N=1,662)	Total (N=2,159)
Complications[a]	**(N=238)**	**(N=259)**	**(N=1,662)**	**(N=2,159)**
Difficulty ingesting/regurgitated	5	3	30	38
Seizures	0	1	2	3
Other	1	1	15	17
None	69	69	708	846
Unknown	*163*	*185*	*907*	*1,255*
Other outcomes				
Regained consciousness after ingesting DWDA medications	1	0	8	9

Chart from Oregon 'Death with Dignity Act' 2021 report[5]

This is regrettably understandable given there is no lethal drug combination that has ever been formally researched or agreed for such a purpose[20]. As a consequence Oregon have tried four different drug mixtures in the last seven years[5]. Only one study 30 years ago has examined the complication rate for assisted suicide (outlined above)[18]. This has never been repeated. Why?

Assisted suicide is by its nature a pre-emptive intervention and thus will never wholly correspond to the tiny minority in which death is difficult. Inevitably we will be ending the life of many early, with complications, who would have had a comfortable death. We do this for no good discernible reason other than 'fear of loss of dignity' i.e. an unlikely future of 'suffering'. Is this ethos dignified? How many lives cut short justify avoidance of the rare complex deaths managed by Palliative Care?

Putting this together with our well recognised poor prognostication,[21,22,23] a changing mind (a wish to die is often transient[24]) and we will be ending the life of patients who could also live on and would have nothing to fear. Is fear a good enough reason for ending a life early? What proportion of those who would have had a good natural death justify the right for a minority to avail of assisted suicide?

This poor prognostication is reflected in Oregon's own data. In the 2021 report it outlines:

Of the 383 patients for whom prescriptions were written during 2021, 219 (57%) ingested the medication; 218 died from ingesting the medication, and one patient ingested the medication but regained consciousness before dying from the underlying illness (and therefore is not counted as a DWDA death). An additional 58 (15%) did not take the medications and later died of other causes.[5]

This leaves 106 patients in which the status is unknown. The report goes on to outline out of this 106, 37 have died (unknown if related or not to lethal medications) and the remaining 69 we don't know death or ingestion status. This pattern is repeated in each previous years with a regular cohort in which lethal medication were prescribed in "previous years". This is surprising given legal confirmation in Oregon's touted safeguard has to establish the patient has "six months or less to live" with a 'terminal illness', in which they have clearly objectively outlived![5] There is also no legal requirement to revisit the prescription of lethal medications after they have been issued. Is it safe to anyone to have lethal medications sitting in a person's house for indefinite time periods?

Conclusion

So far, in every piece of proposed legislation for assisted suicide, there is not a single one which explores the question, "Why are you requesting this?" There is no legal requirement, other than eligibility criteria, to explain and address the question 'Why?'

With the exception of mental health causing a distorted reality, the underlying reason for requesting assisted suicide is the simplest and most human of emotions, that of distress and fear. Fear for myself, fear for others and fear of loss of control. Fear of uncertainty, fear of suffering, fear of not being able to cope. Even fear of loss of their self-identity with dementia or simply despair about loss of what was. This is a normal response to awful news, but it is a tragedy if the response becomes a funnel into killing the patient, rather than addressing the distress and fear, the symptoms and psychological turmoil.

If assisted suicide is legalised in the UK or Ireland, every patient at some point will have to confront a new, terrible question. The simple act of placing this option on the table and asking the question, "*Have you considered assisted suicide?*" cruelly demands decisions from the patient. Whether to actively discount the option, in itself a recurrent challenge, often self-perceived as creating work and burden for others in continued living, or to avail of assisted suicide and get it done with.

It is coy to think healthcare professionals are not also caught up in the distress of a situation and in their alarm, take up the so called 'therapeutic option' in recommending assisted suicide. Those healthcare professionals who resist and object are deemed to weigh their own morality above the welfare of the patient by this new culture shift.

This ground swell of a retrogressive moral change in 'valuing life is not a doctors primary aim' anymore is causing a consistent slippage of the legislation. Such as in Canada, where the original restriction on MAiD to people with 'grievous and irremediable suffering' and '6 months or less' has been promptly dropped from the legislation. Now in 2021 the 'reasonably foreseeable death' requirement has also been removed with further legislation predicted pushing for certain mental health reasons to be included as eligible.

If the basis for providing this legislation is the prevention of suffering, it is brutally "logical", and fair that the scope is widened, to those suffering mentally, to those with chronic disease who have a longer period of time, to children with a lower age of consent, or to those with dementia who can't. After all it is only fair and equal to not restrict access to a personal 'right'. Indeed, this is all happening right now.

I suggest we have a new suicide epidemic. The scandal of our century, which will be looked back on with the same horror of the eugenics programmes.

But it is not too late, I believe we should address the underlying, understandable, distress and fear of dying with true compassion and tenderness affirming their valuable personhood. The progressive stance is to move forward away from fear. To address it properly, confront it head on, to drive all care, including palliative care forward for all of us. Maturely addressing the dying person, not prescribing an inaccurate, deadly, pre-emptive strike. Not to go backwards.

"How a society treats its most vulnerable is always the measure of its humanity."

Ambassador Matthew Rycroft[25]

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Review

Prescribing exercise and physical activity to treat and manage health conditions

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Introduction

The significant health benefits of physical activity (PA), which includes exercise, have long been recognised.[1] As well as reducing non-communicable diseases (NCDs) such as heart disease, diabetes and specific cancers, regular physical activity leads to improvements in mental health and cognitive function. Shockingly, around 5 million deaths per year are attributable to physical inactivity.[2] Within the UK, this accounts for 1 in 6 deaths, which is on par with smoking. Of equal importance, it is estimated that 40% of long-term conditions could be prevented if the population successfully met the UK Chief Medical Officer's physical activity recommendations.[3] Furthermore, once a chronic illness is diagnosed, treatment is better managed with physical activity as part of the disease medical management plan, leading to the idea that "exercise is medicine" and should be part of every treatment plan. Indeed there is objective evidence that exercise can be used as an effective first-line treatment for an array of cardiovascular, metabolic, musculoskeletal, psychiatric and neurological conditions.[4]

The social benefits of PA are also apparent. Within children, PA has been shown to play a key role in brain development and long-term educational attainment.[5] Within society, it also boosts workplace productivity and can potentially reduce levels of crime. [6,7]

Despite the importance of physical activity, there has been no improvement in global levels of physical activity since 2001. Indeed we are currently faced with an epidemic of physical inactivity, with the 2012 and 2016 Lancet series on physical activity revealing that over 25% (1.4 billion) of the world's adult population were physically inactive in 2016.[8] So why are we so keen to manage modifiable risk factors such as hypertension and type 2 diabetes through pharmacological measures yet so averse to formulating a structured physical activity and exercise plan for our patients, with no consultant physicians in sport and exercise medicine employed within Northern Ireland to help manage this prescription? The main reason behind this is probably due to a perceived lack of knowledge on how to do this safely and effectively. Doctors should be morally obliged to address this apparent lack of understanding. Doctors not only have a duty of beneficence so that the best interest of the patient is always encouraged but also non-maleficence, that is, the duty to avoid unreasonable harm to patients. Indeed, a lack of understanding of how to safely prescribe exercise might lead to an exercise intervention with a higher degree of relative risk. [9]

Therefore this article aims to outline the key considerations when making an exercise prescription, so that it can be tailored individually for each patient with the ultimate goal of increasing accessibility of PA for all. To do this, we will use examples to demonstrate what an exercise prescription may consist of in patients with a range of chronic conditions.

What is physical activity and exercise and how much should we recommend?

Physical activity (PA) can be defined as any bodily movement produced by skeletal muscles that requires energy expenditure. Already, this definition is important when considering how best to prescribe PA to patients. It should be emphasised that PA includes all movement, whether this involves structured exercise, occupational activity, housing and gardening, or even transport. Exercise is a subcategory of physical activity and it can be defined as any planned, structured, repetitive and intentional movement that is intended to improve or maintain physical fitness.

An effective exercise prescription aims to integrate physical activity back into the individual's daily life so that it becomes a daily habit, rather than a chore. This is especially true in communities where there are significant inequalities in health and a lack of access to resources such as gyms and leisure facilities.

At present, the World Health Organisation (WHO) recommends that all adults should undertake 150-300 min of moderate-intensity PA, or 75-150 min of vigorous-intensity PA, or some equivalent combination of moderate- and vigorous-intensity aerobic physical activity, per week.[10,11] This recommendation is different for children, with the WHO recommending an average of 60 min/day of moderate-to-vigorous intensity aerobic PA across the week.[10] Moderate PA refers to any activity that is performed at 3.0-5.9 times the

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intensity of rest, or around 60% of maximal effort. Examples include a brisk walk, mowing the lawn, heavy cleaning (e.g vacuuming or mopping), light cycling or recreational badminton. Vigorous PA refers to any activity that is performed at more than 6 times the intensity of rest, or >75% of maximal effort. Examples include jogging, cycling fast and playing football, basketball, or a tennis singles match. Patients may also find it difficult to gauge what is moderate or vigorous PA. It is therefore useful to use the **"talk-sing test"** as a relative measure of exertion.[12] Clinicians should explain that during moderate PA, they should be able to talk but not sing. Likewise, during vigorous PA, you should have difficulty talking more than a few single words in response to any questions.

It is also becoming increasingly common that individuals have access to smart watches that track their heart rate during activity and estimate maximum heart rate (HR_{max}). Moderate PA can be more objectively described as activity that results in a HR that is 60-75% of their HR_{max}, whilst vigorous activity is activity that results in a HR that 75-90% of their HR_{max}. To estimate maximum age-related heart rate, the patient's age should be subtracted from 220. For example, for a 40-year-old person, the estimated maximum age-related heart rate would be calculated as 220 – 40 years = 180 beats per minute (bpm).[13]

Without full appreciation of the definition of physical activity, 150-300 minutes of physical activity may sound like a daunting task. However, when we explain to a patient that if almost all of this can be achieved within their daily routine, it becomes much more achievable. It is important to promote a biopsychosocial understanding of PA so that the individual views it as a measure to improve not only their physical health but also their psychological and social health. This way, patients are more likely to view PA as enjoyable and therefore sustainable.

Taking a physical activity history

This skill is as important as taking an effective cardiovascular history if the clinician is to formulate a successful management plan. Firstly, it is vital that we gauge how much PA the individual undertakes every week. This can be summarised by two questions:

i) "How many days per week do you engage in moderate or vigorous PA?" and
ii) "During these days, how many minutes of moderate or vigorous PA do you do?".

Within primary care, clinicians may use the General Practice Physical Activity Questionnaire (GPPAQ), which provides a simple, 4-level Physical Activity Index (PAI) categorising patients as: Active, Moderately Active, Moderately Inactive, and Inactive.

The FITT (Frequency, Intensity, Time, Type) principle is a useful tool for providing a more detailed insight into the individual's current level of physical activity, whilst also forming the basis for future prescriptions. This tool is vital as it gives the clinician a more objective insight into reported activity levels and allows us to differentiate those who overestimate their activity from those who underestimate it:

- Frequency: number of sessions per week;
- Intensity: perceived exertion e.g relative to walking, the 'talk-sing' test or heart rate data (if available);
- Timing: duration of sessions;
- Type: aerobic, resistance, lifestyle activity changes etc.

As well as this, it may be useful to identify the settings that the individual achieves most of their weekly PA and exercise sessions. This includes further exploration into structured exercise (e.g by using the FITT principle) but also occupational PA levels. This could include such questions as:

1. What is the individual's job?
2. How long do they spend sitting in work?
3. What activities are they required to do in work?

This will allow the clinician to identify what areas to target when formulating a physical activity and exercise prescription, for example, encouraging exercise when commuting to work.

Clinicians often worry about prescribing exercise in those who may be at increased risk of adverse health conditions as a direct consequence of exercise and PA. Lack of knowledge in this area may lead to a further barrier to increasing individual PA levels and unnecessary referrals to secondary care for medical clearance prior to commencing a new PA and/or exercise programme. Vigorous-intensity exercise does have a small but measurable acute risk of cardiovascular complications. Consequently, it is still vital that we minimise this risk in susceptible individuals.[14] This paradox should not prevent the clinician from prescribing exercise as the long-term beneficial effects of exercise far outweigh the acute risks.[15]

Indeed a recent landmark study found that higher levels of leisure-time physical activity were associated with a lower risk of mortality at any given level of coronary artery calcification.[16]

Clinicians must ask relevant questions to ascertain those who may be at increased risk from certain types of exercise. Important medical issues to consider include history of cardiovascular disease, renal disease, pulmonary disease, anaemia, cancer, pregnancy, and musculoskeletal disorders. Like any other medical history, ascertain if there is any relevant family history, such as sudden cardiac death or congenital heart disease, which may require further investigation before a PA prescription is started. Medications

used may also impact your proposed prescription. For example, if someone was on anti-coagulant medications, you would be advising against any contact sports or indeed cycling with the risk of head trauma! The Physical Activity Readiness-Questionnaire (PAR-Q) or American College of Sports Medicine (ACSM) Pre-participation Screening Questionnaire can be used to identify individuals who are at higher risk of the adverse outcomes related to exercise. The ACSM guidelines seek to simplify this process by eliminating the need for medical clearance and/or exercise testing in many individuals, especially when low- to moderate-intensity exercise and PA is contemplated.[17] If an individual is thought to be at increased risk of adverse outcomes due to positive responses within the PAR-Q, the Physical Activity Readiness Medical Examination (PARmed-X) tool can be used to convey clearance for PA participation or prompt referral to a medically-supervised exercise programme.

In essence, if individuals understand their exercise tolerance, self-monitoring procedures and relevant prodromal symptoms, clinicians can safely prescribe exercise with confidence that the benefits far outweigh any potential risk. Within any exercise programme, patient safety can be achieved by a gradual progression of intensity, during which the individual remains within the limits of their exercise tolerance. This further promotes the importance of the FITT principle when prescribing exercise and the need for a tailored exercise programme for the individual based on their co-morbidities and personal preference.

How do I effectively prescribe exercise?

For an exercise prescription to work, it must be tailored to the individual. There are a number of key factors that the clinician must take into consideration when formulating an exercise prescription. These are listed below.

1. Take an exercise history – as above

Gauge how much PA an individual does per week with reference to the FIIT principle.
Ask questions to determine a person's motivation and barriers to PA.
It is important that the clinician asks the individual about their reasons for being active and the unique barriers that have prevented them from being active in the past. For instance, someone may want to become more active to improve weight management, reduce risk of ill-health, reduce stress, promote enjoyment or a combination of the above. Common barriers include perceived lack of time or resources, lack of motivation or a fear regarding their physical health. It is important to discuss these common barriers with the patient and think of simple solutions to overcome them. For example, if time is an issue, can the person walk or cycle to and from work rather than always driving or walk/cycle with friends in the evening after work? This would also have the added benefit of combining socialisation with their PA and exercise regimens.
It is also useful to determine the individual's preferences. How does the individual want to increase their levels of PA? For example, would they like to do this via group activities, outdoor versus indoor, general lifestyle changes or in relation to work? What type of exercise do they prefer – aerobic, resistance or a combination?

2. Identify any contraindications using PAR-Q/ PAEmed-X and refer on those who require medical clearance or a medically supervised exercise programme to a sport and exercise medicine consultant.

3. Use the FITT principle to formulate an effective yet realistic PA programme.

In this way, an exercise prescription should be the same as any other pharmacological medicine; it should be of the right class, the benefits should outweigh the drawbacks, and it should be prescribed at the correct dose and frequency to optimise compliance. Different exercise types (such as aerobic activities, resistance training and balance/proprioceptive exercises) serve different purposes and can all be effective. What is more important is that the type of exercise prescribed is perceived as enjoyable to the individual, increasing the likelihood that they will continue with it long-term. One difficulty some clinicians may have is a lack of knowledge of specific resistance exercises to prescribe and this can be overcome by seeking advice from, e.g. local gyms and recognised instructors in the area. Indeed, within the Belfast Trust, patients can access a local gym for 12 weeks 'free' of charge through the 'Healthwise' scheme if they have certain health conditions, such as high blood pressure, mental health issues or being overweight.[18] This may be one way of introducing patients to formal exercise and gym routines through a supervised programme. It has proven to be hugely successful in the formulation of individual goals and encouragement of long-term physical activity in a safe and professional environment. Additionally, there are a variety of online resources available that utilise body weight and elastic bands that could be shown to patients if they wish to use this format of resistance exercise. Example workouts are available on YouTube or alternatively the NHS website.[19] Individuals can also use housework as a form of resistance exercise, such as lifting boxes or shovelling. If desired, this can be incorporated directly into the individual's exercise prescription.

4. **Give advice to reduce sedentary behaviour**

When it comes to increasing activity levels, the premise that "every little helps" should be actively encouraged. Simple lifestyle measures, such as walking up the stairs instead of using the lift or standing whilst undertaking meetings at home, help to reduce sedentary behaviour, which has been proven to be associated with increased all-cause mortality, independent of PA levels.[20]

Worked examples

1. Type 2 diabetes mellitus (T2DM)

A 48 year old man, Eugene, presents to your morning clinic for a diabetic review. His recent HbA1c values have all been >70mmol/m despite dual therapy of metformin and sitagliptin. When you ask him about his physical activity levels, he reports that he works in an office and finds it difficult to find time for exercise when he gets home from work due to family commitments. He wants to become more active to help control his diabetes whilst also setting a good example for his children. You reassure him that type 2 diabetes mellitus can be better controlled with regular physical activity and exercise and indeed, even reversed with appropriate lifestyle management, including appropriate weight loss.[21] You complete the GPPAQ and the PAI indicates that he is "inactive". Despite living only half a mile away from his workplace, he drives to work. He states that he likes walking and resistance exercise but doesn't have the time to join a gym. You decide to prescribe him an exercise programme.

The global prevalence of T2DM is predicted to increase from 171 million individuals (2.8%) in 2000 to 336 million (4.4%) in 2030.[22] Exercise is one of the key management strategies of T2DM, however, unlike pharmacological therapies, it is often neglected within patient's medical management plans. Acute exercise activates alternative molecular signals that can bypass defects in insulin signalling in skeletal muscle, resulting in an insulin-independent increase in glucose uptake. [23] Indeed a Cochrane review, including 377 patients with T2DM found that 8-10 months of exercise in the form of progressive aerobic training, strength training or a combination of the two led to a significant improvement in glycaemic control when compared to the control group, even if no weight loss was achieved.[24] More specifically, **the exercise group saw a reduction of HbA1c of 0.6% which was the same as metformin if used over the same period.** [25]

The first step is to ensure you have taken an accurate exercise history and rule out any medical contraindications so that he can commence an unsupervised exercise programme. The ACSM risk stratification tool recommends that metabolic disorders such as diabetes should have a thorough medical examination and graded exercise testing before moderate or vigorous PA. As previously stated, using the PARmed-X tool provides a safe foundation for allowing commencement of exercise. If you feel that this individual is at higher risk, you should recommend a gradual increase in PA levels and educate him regarding self-monitoring procedures and relevant prodromal symptoms when he should seek medical review. Important symptoms to inform the patient to be aware of are chest pain, palpitations, a feeling of faintness/ dizziness, nausea, or dyspnoea in excess of what would be expected from that level of PA.

In the case of diabetes, it is also important to warn the patient of symptoms related to hypoglycaemia when exercising, such as dizziness, shakiness, visual changes , confusion or a difficulty concentrating. This is particularly important in patients who are prescribed medication that increase their risk of experiencing hypoglycaemia, for example insulin, SGLT-2 inhibitors and sulfonylureas.

Looking at this case, Eugene's main motivation for increasing his physical activity levels is to improve his glycaemic control and set a positive example for his children. Simple education that exercise can be as effective as the medication he is currently using may further motivate Eugene to persist with PA longer term. It is also important to prescribe exercise that he enjoys and in a way that overcomes his current barriers; time and family commitments.

In this gentleman, there is a preference for low-moderate intensity aerobic exercise and resistance exercise. Evidence has shown that a combination of aerobic and resistance exercise is most beneficial for glycaemic control.[26] Interestingly, more recent research has revealed a significant benefit of high-intensity exercise.[27] However, in someone who is previously inactive, it is more useful to start an exercise regime that he is likely to continue long-term as well as starting low, building up his physical activity and conditioning before initiating more vigorous activity. Once regular exercise is established into his life, it might be worth discussing the additional benefits of high intensity exercise.

With all this in mind, here is an example of an exercise prescription for him using the FITT principle:

Frequency: On 3 days per week Monday to Friday - Walk to and back from work; perhaps also walk children to school if time permits.
On 1-2 days per week: Resistance-type training with family. Provide Eugene with several resistance-band workouts or links to YouTube videos. Encourage him to do this with his children after school or at the weekends. He can also build this resistance work into his walks, for example with walking lunges for periods of the walk. Eugene would also qualify for the 'Healthwise' gym referral scheme and this could help him initiate the resistance exercises.

Intensity: Walk at moderate pace; using the talk test, he should be able to talk but not sing when walking and doing his resistance workouts. It is best to recommend a graded approach. Past research has shown that an initial increase of 2,500 steps per day is achievable for inactive patients[28] and this could be monitored through the use of a pedometer, which counts steps taken each day by the patient and the daily step counts then recorded in a diary. Work with the patient and make self-set targets, with a target of 10,000 steps per day being an achievable target longer term.

Timing: Walking should take 30 mins per day if done when commuting to work. He should aim to walk between 90-120 mins per week.
Resistance workouts should take 30 mins at moderate intensity. To meet his PA guidelines, he should aim for 150 mins per week of either walking or moderate intensity resistance training.
Type: As above – combination of moderate aerobic and resistance exercise

Most importantly, this exercise prescription is tailored for Eugene. It includes the exercise type and intensity that he enjoys and aims to fit this into his daily routine so that it becomes a habit. A pedometer device has been utilised to allow him to track his progress and a diary should be kept of his daily step counts, which can then be objectively reviewed by health and fitness professionals. One of his motivations for exercising was to set a good example for his children. By walking to school and engaging in resistance-type workouts with them, he is setting a good example whilst also using exercise as a tool to increase family-time.
You may also recommend strategies for Eugene to minimise his sedentary time, such as standing in work, for example using a standing desk rather than the traditional sitting desks, or taking the stairs instead of the lift. It is vital that you arrange a follow-up appointment to monitor Eugene's progress and then agree future goals and targets as appropriate progress is made.

2. Osteoarthritis (OA)

A 63-year-old female, Niamh, presents with worsening pain in her right knee which she attributes to her 'wear and tear' arthritis. She enjoys running and used to run marathons but states that she has avoided exercise recently as she doesn't want to make her arthritis worse. She doesn't enjoy resistance training as much but is willing to try this. As a result, she has put on weight and now has a BMI of 31. She has had no reduction in pain with simple analgesics but wants to exercise to help improve her knee joint stiffness. You arrange a consultation to educate her about the role of PA in OA and prescribe an exercise regime.

OA affects around 8.5 million people in the UK and can significantly affect patients' quality of life.[29] A common misconception in osteoarthritis patients is that physical activity and exercise will aggravate their symptoms and accelerate the disease process. Recent research has shown that knee joint loading exercise is not harmful to articular cartilage health in people at increased risk of, or with, knee OA.[30] As well as the benefits exercise has for general health, a Cochrane review shows that the benefits of exercise in OA outweigh those of simple analgesics.[31] Clinicians should take time to educate their patients as it is a common misconception that exercise will exacerbate symptoms and reassure them that exercise/PA will be a key part of their osteoarthritis management plan. It is also important to recognise that pain is a modifiable symptom influenced by many biopsychosocial factors of which many can be managed non-surgically. Nevertheless, it is important to get the right prescription for the individual patient and programs must be personalized and adjusted to the patient's phenotype.[32]

With OA, a combination of both aerobic and resistance exercise would also be useful as well as general stretching to reduce stiffness. Aerobic exercise is an effective way to achieve weight loss, which would offload any excess strain on her knee, with weight loss being shown to reduce pain in knee OA.[33,34] Resistance exercise would maximise joint stability by increasing strength of surrounding muscles. In turn, this will improve function and reduce pain. Patients with OA are very much heterogenous and will respond to exercise types differently. This supports the case for early follow-up to monitor pain and make recommendations based on early trials of various exercise types. For example, in OA affecting the knee, it is acceptable to have a discomfort in the knee which is self-graded as 3 or 4 out of 10 when walking or running but if above 7 out of 10, you should consider changing to an alternative activity such as cycling, Nordic skiing or swimming. It is important to stress that pain during therapeutic exercise for chronic musculoskeletal pain need not be a barrier to successful outcomes, with a systematic review showing that exercises where pain is allowed/encouraged have a small but significant benefit for pain and function over pain-free exercises in the short term.[35]
In Niamh's case, you should also encourage that she engages in flexibility work, such as regular stretching at work or at home, as this will help maintain joint range of motion and minimise stiffness.
Here is an example exercise prescription using the FITT principle for Niamh:
Frequency: 5 sessions per week; mixed aerobic and resistance training
Intensity: This should be tailored to Niamh's level of pain. If she can run at a moderate pace (talk but not sing) with minimal exacerbation of symptoms, recommend that she tries this, especially as she has enjoyed this in the past. She may need to decrease the intensity to walking pace 1-2 times per week initially to ensure her pain is well controlled. Alternatively, she could change her aerobic exercise to another form, such as cycling and swimming, based on patient preferences. Also encourage at least one session of moderate resistance training per week.

Timing: To meet the PA guidelines, Niamh should aim for 150 mins per week of either moderate intensity aerobic or resistance training. Talk to her about how best she might split this up during the week.

Type: As above – combination of moderate aerobic and resistance exercise. It would be useful if you recommend that Niamh makes a diary of her activities so that she can identify the activities that trigger pain, so that she can avoid them. If running aggravates her symptoms, recommend that

she tries cycling or swimming as a form of aerobic exercise.

Conclusion

In conclusion, the benefits of exercise and the power of prescribing exercise should not be underestimated. PA is a vital primary treatment for several chronic diseases and is a cost-effective way to reduce population morbidity and mortality. Indeed, physical activity and exercise prescription should be a part of every patient's treatment plan, but the prescription needs to be individualised to their needs. Despite this, clinicians often feel like they lack the knowledge or confidence to prescribe an effective exercise regime for their patients. It is time that we move away from simply asking if our patients are active and provide them with individualised and objective physical activity methods so that they can meet the recommended physical activity guidelines and optimise their overall health. One way to achieve this is for a consultant-led sport medicine service to host clinics that can prescribe physical activity and exercise for different health conditions as well as helping to educate colleagues around 'exercise is medicine'.

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Review

Congenital Epulis: Diagnosis and Management

Kah Heng Lim, Mary-Beth Toner, David Millar, and Conor Jackson

Introduction

Congenital epulis was first described in 1871 by Neumann and over 200 cases of this rare lesion have since been reported, with an estimated incidence of 0.0006% per live birth. It has also been described as congenital gingival granular cell tumour (CGCT) of the newborn, congenital granular cell lesion, congenital myoblastoma (historically), and Neumann's tumour. There appears to be a female predilection, with an estimated ratio of 9-10:1 female to male predominance. The most common site of presentation is the anterior part of the maxillary alveolar ridge, usually in the region of the lateral incisors or canines. However, multiple lesions may occur simultaneously in 10% of cases. Congenital Epulis appears clinically as a smooth-surfaced, sessile or pedunculated mass with typical oral mucosa colour. Tumour size may vary, ranging from a few millimetres to several centimetres in diameter and can cause respiratory and feeding difficulties. In recent years, prenatal imaging of such oral lesions has facilitated diagnosis and operative planning. We report a rare case of a large congenital epulis with striking images and highlight the use of prenatal imaging in aiding diagnosis and surgical management.

Case Presentation

A 33-year-old Para 0 presented for routine obstetric foetal anatomy scan at approximately 19 weeks gestation, to a local district general hospital. During this scan a large mass was detected appearing to involve foetal cheek or mouth.

Magnetic Resonance Imaging (MRI) of foetal brain was arranged which revealed a prominent exophytic mass arising from the right maxillary region extending from the oral cavity through the mouth *(Figure 1)*. Its maximum diameters measured 40 x 42 x 37mm (lr x cc x ap) on imaging. Importantly, the visualised upper airway appeared patent. Liquor volume was also satisfactory and this indicated that the mass was not affecting foetal swallow. There was no evidence of facial clefting.

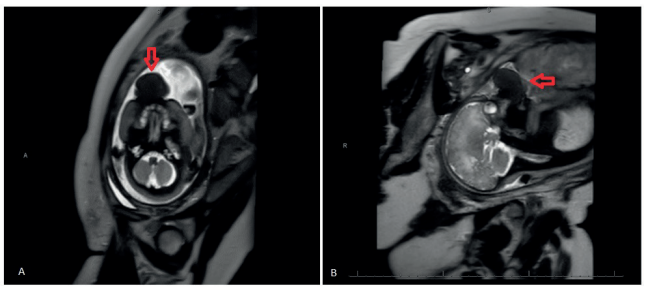

Figure 1 *T2-weighted MRI showing a mass (red arrows) arising from right maxillary region* ***(A)*** *and extending through the mouth* ***(B)****.*

Due to maternal medical history and MRI findings, her case was discussed at the Foetal Medicine Multidisciplinary Team meeting, where a decision was made to proceed with planned caesarean section under general anaesthetic, which took place at 39+3 weeks gestation. This would be coordinated with a multidisciplinary team present including neonatal, paediatric anaesthetics and paediatric Ear, Nose and Throat (ENT) for an ex-utero intrapartum treatment (EXIT) procedure if required. This takes advantage of uteroplacental blood flow and maternal-foetal gas exchange while the foetus' airway is secured with endotracheal intubation. Tracheostomy set would be on stand-by if airway could not be secured.

At delivery, infant B vocalised immediately suggesting airway was patent. A large mass was apparent, obscuring both nostrils, right cheek, right eye and most of mouth. At initial inspection, poor respiratory effort and heart rate <60 were noted. A nasopharyngeal airway (NPA) was inserted and 5 inflation breaths were given via this with initial chest lift and improvement in heart rate. The mass occluded the NPA unless retracted and intubation was planned for ongoing resuscitation. Intubation attempts proved difficult due to the large size of mass making insertion of laryngoscope difficult. The mass was vascular and friable, which meant that bleeding was a significant problem and this further obscured visualisation of vocal cords during intubation. Endotracheal tube placement was eventually established at 39 minutes of life. Airway was maintained in between intubation attempts by gentle manipulation of the mass allowing infant B to cry and breathe.

The following day, surgical excision of this large exophytic mass was performed by ENT. Intraoperatively, a large pedunculated mass was seen to arise from the right maxillary gingival surface. This was excised at the base using bipolar diathermy dissection with minimal blood loss and haemostasis was achieved with no immediate complications *(Figure 2)*. Infant B was extubated in theatre and oral feeding was established quickly in NICU. Infant B was

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then discharged to the post-natal ward on day 3 of life with discharge home on day 4.

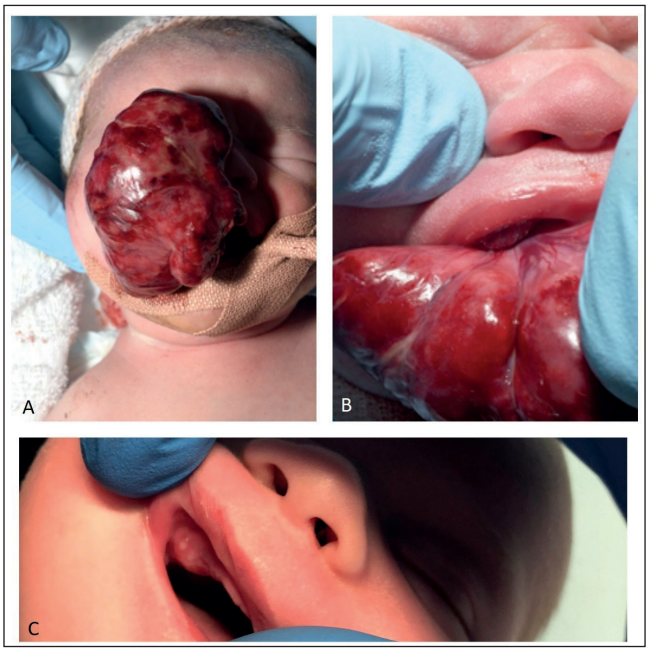

Figure 2 (A) *A large vascular mass obscuring infant's face.* ***(B)*** *Mass originated from the right maxillary gingival mucosal surface.* ***(C)*** *Post-operative image showing successful surgical excision with bipolar diathermy.*

The specimen, measuring 59 x 46 x 23mm with a weight of 36g, was sent to histopathology for analysis with the help of various immunohistochemical stains. There was diffuse fine granular cytoplasm staining with CD68, which is a marker of inflammation associated with macrophages or histiocytes[1]. Staining with S100 occasionally highlighted a specific type of histiocyte known as Langerhans' cells. CD11c, a marker for dendritic cells, was also positive. Estrogen receptor (ER) and progesterone receptor (PR) staining were negative. There were no nuclear pleomorphism or evidence of malignancy. The features therefore confirmed the clinical diagnosis of a congenital epulis.

Infant B was later followed up in the ENT outpatient clinic. On examination of the gingival mucosal surface, the excision site healed well with no evidence of recurrence. There were no issues with feeding and infant B continued to thrive. No further ENT follow-up was required and infant B was discharged.

Discussion

Congenital epulis, also known as congenital granular cell tumour or congenital granular cell myoblastoma is an extremely rare condition in the new-born with a predilection for females[2]. Although the aetiology of this oral cavity tumour is unclear, some theories suggest that it may be hormone-related[3]. A reactive theory has also been proposed in which the tumour arises from gingival stromal cells such as histiocytes, which is now considered an overarching term to describe cells of dendritic cell or macrophage lineage[4]. Immunohistochemical staining in our case supports the latter theory.

The majority of cases are recognised at birth and can cause concern for feeding or airway compromise. Prenatal diagnosis remains a challenge due to the absence of specific signs and the tendency for tumour development beyond the 22nd week of gestation[5]. In our case, the tumour was diagnosed on prenatal ultrasound at 19 weeks and subsequent magnetic resonance imaging (MRI), which proved beneficial for safe delivery planning. Although an ex-utero intrapartum treatment (EXIT) procedure was not performed in this case, it remains a viable option in cases in which significant airway compromise is a potential concern at delivery. The EXIT procedure takes advantage of uteroplacental blood flow and maternal-foetal gas exchange while the foetus' airway is secured safely with endotracheal intubation and has shown to improve outcomes in cases of airway obstruction[6]. Members of the EXIT team should include an experienced paediatric anaesthetist, ENT consultant and neonatologist. The ENT surgeon in this case ensured tracheostomy kit was available at delivery for emergency tracheostomy if endotracheal intubation could not be established.

Classically, a congenital epulis comprises a single firm tumour with a regular surface and can be sessile or pedunculated, but in some cases multiple tumours may occur. It most frequently occurs at the maxillary location opposite the future canines or incisors, but the mandibular region can also be involved. A range of tumour sizes has been recorded from a few millimetres to around 10 centimetres at its widest diameter[7], therefore this case was relatively large.

Although benign, immediate surgical excision is recommended for larger lesions as there is a significant risk of airway compromise. Other clinical manifestations may include dyspnoea and difficulty feeding[8]. Prenatal MRI is therefore recommended in determining the characteristics of the mass to aid surgical planning[9]. Surgical excision can be performed either under local or general anaesthesia and this depends on size and location of the tumour. The literature suggests a preference for excision under general anaesthesia when tumour is large in size, such as in this case[10].

Conclusion

Large congenital epulis, although benign, requires surgical removal due to risks to airway and feeding. Prenatal MRI can be a useful imaging modality and a multidisciplinary approach to management should be adopted. Follow-up is essential to recognise recurrence after surgical removal.

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Clinical Paper

A Neurology Advanced Referral Management System (NARMS) Reduces Face-to- Face Consultations By Over Sixty Percent

John McConville, Annemarie Hunter, Ailsa Fulton, Orla Gray, Andrew Kerr, Victor Patterson

ABSTRACT

Background

The COVID-19 pandemic has made neurology clinic waiting times longer. To prevent a build-up of patients waiting, we introduced a neurology advanced referral management system (NARMS) to deal with new referrals from GPs, using advice, investigations, or the telephone, as alternatives to face-to-face (FF) assessment.

Methods

For six months, electronic referrals from GPs were triaged to the above categories. We recorded the numbers in each category, patient satisfaction, inter-consultant triage variation, re-referrals, and calculated CO2 emissions.

Results

There were 573 referrals. Triage destinations were advice 33%, investigations 27%, telephone 17%, and FF 33%. Of patients referred for MRI, 95% were happy not to be seen if their investigation was normal. Less-experienced consultants triaged 20% and 30% respectively, to advice or investigations, compared with 40% by a triage-experienced neurologist. Four percent were re-referred. Numbers on the waiting list did not increase. CO2 emissions were reduced by 50%.

Discussion

Two thirds of neurological referrals from GPs did not need to be seen FF and 50% were dealt with without the neurologist meeting the patient. Carbon emission was halved. This system should be employed more, with FF examination reserved for those patients who need a neurological examination for diagnosis and management.

Keywords

Neurology; Referral management; Triage; CO2 reduction; Ambulatory care.

Introduction

Even in high-income countries such as the UK, waiting times to see a neurologist as a new referral can be very long. The situation in Northern Ireland is particular problematic with many patients waiting over four years to be seen[1].

The COVID pandemic has exacerbated this situation but gave us the opportunity to introduce a neurology advanced referral management system (NARMS) in our Trust area to try and deal with newly-referred patients effectively, and, by so doing, prevent an increase in the number of patients waiting to be seen. We report the results below.

Methods

Location

The South Eastern Health and Social Care Trust supplies neurological outpatient care to a population of 350 000 people to the east and south of Belfast. There are 2.75 whole-time-equivalent (WTE) permanent consultant neurologists. A 0.4 WTE temporary neurologist was appointed in May 2020. The Trust includes a large busy district general hospital with about 60% of neurology referrals originating from ward referrals and the rest from local GPs. These GP referrals were the focus of this study.

Triage system

This was based on the successful system operating in the south-west of Northern Ireland between 2000 and 2008 where referrals from GPs were received by email and triaged to either advice or investigations or a face-to-face (FF) clinic[2-4]. There were, however, some important differences:

- This was a much larger catchment population – 350 000 as against 110 000 previously
- The referrals were received electronically on the Trust webserver rather than by email
- The triaging neurologist had access to the electronic care record of the referred patient
- A telephone clinic was added to the list of triaging options.

Using the Trust's available electronic systems, it was possible

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to write to GPs about those patients triaged to advice or investigations, to order investigations, to discharge those given advice, and to specify appointments by telephone or FF for those requiring them.

The triage system was designed to produce minimal change to the existing referral system. GPs were informed about the introduction of the new system, and about the minor changes in referral which it would require, principally that referred patients would be informed by their GP that they would be receiving the opinion of a neurologist and might not need a clinic appointment.

Two neurologists performed the triage, one focusing on headaches, and the other, on everything else.

We recorded the number of patients triaged over a six-month period from June to December 2020.

Patient satisfaction

For patients triaged to magnetic resonance imaging as an investigation, an MRI checklist was performed by telephone during which the patients were asked "*Are you happy with triage to Imaging as opposed to face-to-face consultation? You will not be seen in clinic if the imaging is normal.*"

Inter-consultant variation

Triage rates for two consultants with no triaging experience were measured on 20 consecutive patients with non-headache symptoms and compared to that of the triaging consultant.

Effects on waiting lists

We obtained the numbers of patients waiting to see a neurologist to estimate whether the introduction of NARMS had any effect on this.

Ethical issues

This was a service improvement initiative and did not require Ethical Committee approval. The paper follows the SQUIRE 2.0 guidelines.

Results

Total referrals

There were 573 referrals from GPs in the six-month period. Sixty-one percent were female, and the age range was 15 to 97 years-old with a mean of 46 years and a median of 45 years.

The reasons for referral - different symptoms or the presence of abnormal neurological signs or the presence of known neurological diseases - are shown in Figure 1.

Their triage destinations are shown in Figure 2 and individual triage outcomes by most frequent referral reason are shown in Figure 3.

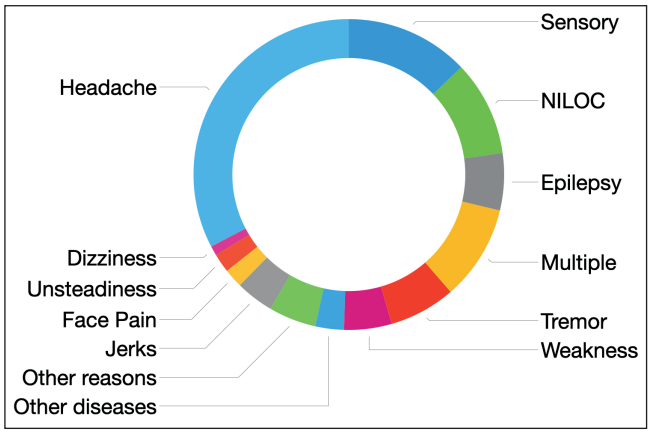

Figure 1. Referral reasons for 573 patients.
(NILOC = new intermittent loss of consciousness)

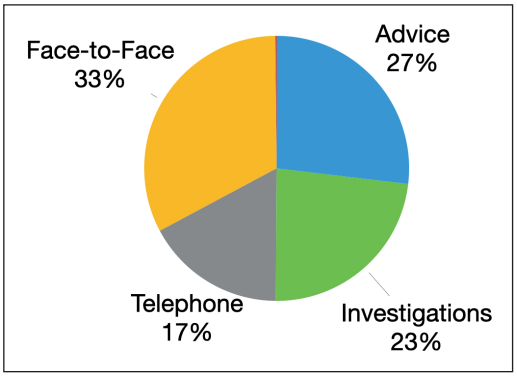

Figure 2. Triage destinations for 573 referrals.

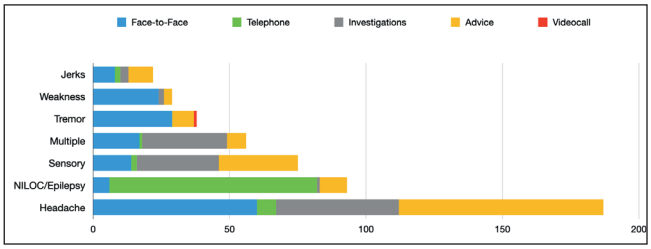

Figure 3. Triage destinations for the seven commonest presentations

Advice and investigations combined, accounted for 50% of referrals and a third of the remainder were managed by telephone so only one third of all patients referred by GPs required a FF consultation.

Investigations were especially used in those patients referred with headache, sensory disturbance, and multiple symptoms; usually this was to exclude a brain tumour in the first, and multiple sclerosis in the last two.
Telephone was the almost exclusive way of dealing with referrals with new intermittent loss of consciousness (NILOC), and epilepsy, but was little used otherwise. Reports from eye-witnesses, where indicated, were also obtained by telephone during these consultations. FF examination was required in most presentations with weakness and tremor.

A single patient, referred with tremor, was dealt with by videocall as she was unable to travel easily to a hospital clinic.

Referrals from GPs were classified, by them, as "Red flag", where malignant disease was suspected, "Urgent", or "Routine". Analysis by these classifications is shown in Figure 4. For "Red flag" referrals, investigation was the management of choice, usually a CT scan of brain to exclude brain tumour. For "Urgent" and "Routine" referrals there was little difference in how patients were triaged.

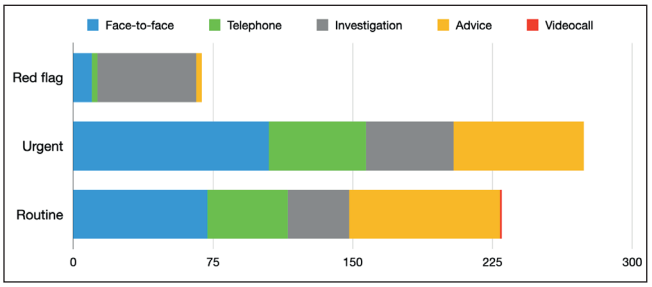

Figure 4. Outcomes by urgency of GP referral

Investigations ordered

These are shown in Figure 5. MRI and CT of brain were the commonest investigations. Videoclips, mostly of abnormal movements, were requested initially, but abandoned because of difficulties accommodating these within an NHS record. No EEGs were ordered in the initial management of referrals, but some were requested following telephone consultations in those presenting with NILOC or epilepsy.

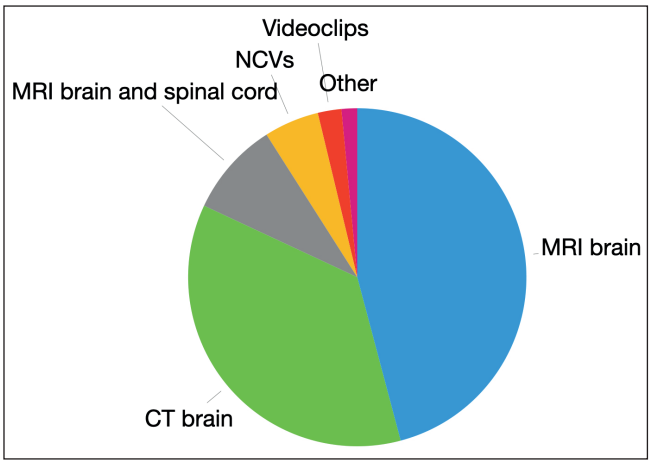

Figure 5. Investigations performed on 133 patients. (NCVs = nerve conduction velocities)

Feedback results from patients triaged to MRI scanning

Sixty-four patients replied to the question, "*Are you happy with triage to Imaging as opposed to a face-to-face appointment? You will not be seen in the clinic if the imaging is normal.*" Sixty-one (95%) were happy not to be seen with three wishing for a clinic appointment as well.

Rereferrals

Seven out of 187 patients (4%) initially triaged to advice or investigations, were re-referred following initial triage.

Inter-consultant variation

Twenty non-headache patients triaged by the triage consultant were later assessed by two other consultants to see what their triage decisions would have been. Results are shown in Table 1. In 10 patients there was complete agreement between all three observers.

Triage Outcome	Triage Consultant	Consultant 1	Consultant 2
Advice	3	1	3
Investigations	5	3	3
Telephone	5	7	6
FF	7	8	8

Table 1. Differences in triage outcomes in 20 patients. (FF = Face-to-face)

Effects on waiting lists

During the study period there was no rise in the number of patients on the neurology waiting list suggesting that supply was approaching demand.

Environmental benefits

Patient transport costs for one trip to hospital were saved on the 154 patients given advice and the 99 who received a telephone consultation or videocall. Also, we can assume that 50% of those triaged to investigation (66) would have had that investigation requested separately at a FF appointment. Thus, in the six-month period, there were 320 patient-journeys using NARMS, compared with 640 if the patients had received conventional care, a reduction of 50%. In absolute terms, using the assumptions in Box 1, NARMS reduced CO2 output by about 912kg over the six months.

80% use private transport
Average return distance 10 miles
Average vehicle fuel consumption 40 miles per gallon
CO2 output is 14.3 kg per gallon of fuel

Box 1. Assumptions to calculate CO2 emission savings of NARMS.

Discussion

Statement of principal findings

Active management of neurology referrals from GPs can reduce the need for face-to-face clinic consultations by two-thirds. This was delivered with very minor change to the way patients were referred from general practice. This is the first neurology referral management system which includes telephone consultation as a triage outcome; the telephone is a well-accepted way of *reviewing* neurological patients but during the Covid pandemic it has needed

to be used to deal with *new* neurology referrals as well, Telephone is particularly useful for referrals with either established epilepsy or NILOC, the latter including those with "first seizure". Here neurological examination is usually unrewarding and a history, which can be taken over the telephone, is key to diagnosis and management. Most telephone consultations were completed within four weeks of referral. The National Institute of Health and Clinical Excellence (NICE) in the UK has a somewhat aspirational guideline, stating that such patients should be seen within two weeks of referral[5]. Before the introduction of NARMS, the waiting time was many months, so four weeks is a much better approximation to the NICE guideline.

Investigations replaced FF consultation in about a quarter of referrals, mostly in two circumstances: CT scan of brain was performed in referrals with headache in whom brain tumour was suspected, and MRI of brain, and if indicated also spinal cord, was ordered in people with either sensory symptoms or multiple symptoms, to exclude multiple sclerosis (MS). In both of these instances, the investigations are considerably more sensitive than FF examination, rendering the latter unnecessary. Once underlying diseases have been excluded, the dynamic of the consultation changes. Feedback from 62 of these patients showed that 95% were happy not to see a neurologist if their MRI scan was normal, suggesting that reassurance may be all that is necessary. On receipt of the investigation result a letter was sent to the referring GP giving the result and suggesting a course of action. Over 95% of such patients were discharged from the clinic. In "Red flag" referrals, the referral question is simply whether a tumour is present, so most of these were investigated and not seen. Most of the scans were completed within three months.

Twenty-seven percent of referrals were given advice and discharged from the clinic. This was normally within a week of referral. This required more careful thought by the neurologist than the other triaging options. We did not evaluate GP and patient satisfaction with this, but the re-referral rate was only 1%. There was little difference in the percentage of patients needing FF examination between the two triaging neurologists – 35% for headaches, and 32% for other neurological referrals.

Triage rates from two triage-inexperienced neurologists compared reasonably well with the results of the triage neurologist. The number needing FF appointment was little different but the numbers were too small to speculate further. This suggests that the ability to triage is not confined just to those with previous experience of it. It seems likely however that it is a skill that can be improved with continuing use – like most other skills in neurology.

There was a small decrease in the number of patients on the neurology waiting list during the period of NARMS it is not possible to relate the two as there were other factors in play at that time.

Last but not least, the carbon footprint of the neurology service was halved, at a time when green issues are beginning to permeate the thinking of the NHS.

Strength and weaknesses

This study was performed in the real-life setting of a busy general hospital and community Trust. No upfront investment was required other than extra consultant neurology hours (VP). The project was helped by supportive management, a helpful Information Technology department and some enthusiasm on the part of GPs, consultants and medical secretaries, all of whom had to change their practice a little. From conception to commencement took eight weeks. The number of patients referred over the six months, allowing for an extra 60% from in-hospital referrals, was 8 per 1000 population, which is the average for England[6].

We did not look specifically at any measures of safety, but a previous study from Northern Ireland (see below) had shown a high level of safety in patients triaged to advice or investigations[4].

Strengths and weaknesses in relation to other studies, discussing important differences in results

This is the first triage study which uses telephone as one of the modes of referral management so it is not completely comparable to previous studies. The non-contact options – advice and investigations – were 50% in the present study which was lower than the 56% and 67% in the earlier studies in N Ireland [3,4]. One change in the 16 years separating these studies is the approach to headache referrals. Previously, most headaches were deemed tension headaches and had a non-contact triage rate of 95%[2]. Now most headaches are deemed to be migraine with many new treatments approved by the UK National Institute of Clinical Excellence so the non-contact triage rate in this study was lower at 64%. The overall triage to advice and investigations is greater than other published studies from elsewhere: a large study from New Zealand[7] triaged 22% of referrals to advice and investigations. The others used advice only (Dublin[8], Edinburgh[9]), with triage rates of 19% and 10% respectively. In an unpublished study from elsewhere in N Ireland, 29% of 515 referrals were triaged out of the clinic by a combination of advice and investigations (Forbes R, personal communication).

This is also the first study to look at inter-rater variation in triage rates between neurology specialists, finding them not very different.

Meaning of the study: possible explanations and implications for clinicians and policymakers

A referral management system for neurology makes sense and has previously been shown to be popular with patients[10]. The main purpose of a face-to-face attendance is to perform a neurological examination, but investigations such as MRI scanning in particular have made this much less relevant

for many patients, particularly where multiple sclerosis is considered possible. Neurologists frequently emphasise that the history is the way to make a diagnosis and of course a history can be taken perfectly well over the telephone.

It could be argued that a referral management system might "deskill" neurologists, and affect postgraduate neurological training, presumably by reducing the number of patients with normal neurological examination that trainees might see. This seems unlikely, but the primary duty of neurologists is to their patients, and if referral management systems improve the service to patients, as this study suggests, then it is up to neurologists to ensure that they and their trainees do not become deskilled.

Health care systems, such as NHS England, have set up so-called "advice and guidance" pathways in which a GP can seek advice through a pathway which is distinct from conventional referral[11,12]. Having two separate pathways does not make sense in neurology, because it is difficult for GPs to appreciate what outcome is best for an individual patient. By providing advice as a core part of its purpose, NARMS makes a separate advice and guidance system unnecessary.

It is not clear why local policymakers have not been interested in referral management systems in neurology; the effectiveness and cost-savings of 35% have been known since 2010[2] and their earlier implementation might have prevented the current serious local problems with neurology waiting lists.

And last but not least, such systems, by reducing travel and therefore CO2 production, help make the planet a healthier place to live. NARMS achieved a 50% reduction in CO2 emissions compared with a conventional neurology service, from a reduction in patient travel The NHS in the UK is committed to net-zero carbon emissions by 2045[13]. Referral management systems such as NARMS can help it achieve that, as well as delivering a service of higher quality, which can be introduced at scale.

Acknowledgements

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Ethical considerations

This was a service improvement initiative as defined locally and did not require Ethical Committee approval or patient informed consent.

Funding

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Competing interests

The authors declare no competing interests.

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Clinical Paper

Management of symptomatic Baker's cysts with ultrasound and fluoroscopic-guided aspiration followed by therapeutic injection with Depomedrone and Bupivacaine leads to a durable reduction in pain symptoms in a majority of patients; A case series and literature review.

Andreea E Stroiescu [1], Judita Laurinkiene [1], Kenneth Courtney [1], Heather K Moriarty [2], Ian P Kelly [3], and Anthony G Ryan [1]

Abstract

Purpose

To evaluate the efficacy of ultrasound and fluoroscopic-guided aspiration and therapeutic injection of Baker's cysts in the relief of pain and pressure symptoms.

Methods

A retrospective, observational, single-arm study of consecutive patients referred from the Orthopaedic service for image-guided aspiration followed by therapeutic injection of symptomatic Baker's cysts was performed with institutional approval in the context of a Quality Improvement project. Patients' pain was graded using a 10-point Likert scale. Under standard sterile conditions, a 10 cm 5 Fr Yueh centesis needle was advanced into the cyst under direct ultrasound guidance, septae disrupted as necessary, the contents of the cyst aspirated, and a sample sent for microbiological analysis. Bursography was performed in an attempt to identify the expected communication with the knee joint, the contrast was aspirated and 40 mg of DepoMedrone and 5 ml of Bupivacaine were injected.

Results

Thirteen patients were referred, nine of whom satisfied the inclusion criteria (all female, average age 63.8 years). Over a 35-month period, 11 procedures were performed (bilateral in 1, repeated in another) yielding an average volume of 20.1 ml (range 10 – 50 mls). In 2/11 procedures the communication with the knee joint was outlined. The average follow up post-procedure was 8.3 months. The average patient's pain score reduced to zero from 5.7 for an average period of 5.96 months. After this period patients reported a gradual return of an ache, but none returned to the pre-procedure severity which, in some cases, had prevented them from sleeping.

Conclusion

Aspiration of symptomatic Baker's cysts under Ultrasound and fluoroscopic guidance followed by therapeutic injection of DepoMedrone and Bupivacaine leads to a durable reduction in pain symptoms in a majority of patients.

Introduction

Conventional treatment options for Baker's cysts include conservative management, oral anti-inflammatory and analgesic medications, and surgery directed at treating underlying joint pathology. Several studies have shown satisfactory outcomes in the treatment of popliteal cysts with ultrasound-guided percutaneous aspiration followed by intra-articular or intra-cyst corticosteroid injection alone [1] or in combination with local anaesthetic agents [2,3].

Data specifically evaluating the efficacy and durability of the combination of ultrasound and fluoroscopy-guided aspiration of Bakers cysts followed by therapeutic injection in the relief of pain and pressure symptoms is lacking. Thus, our aim was to document our results and assess the medium-term durability of symptomatic relief. We situate our pilot study in the context of quality improvement and an up-to-date literature review.

Methods

Study Design

The study was conducted as a retrospective, observational, single-arm study approved by the relevant institutional review board. Consecutive patients referred from the Orthopaedic Service with symptomatic Baker's cysts for ultrasound and fluoroscopic-guided aspiration and therapeutic corticosteroid injection over a 21-month period were included from a prospectively maintained database, all of whom had the presence of a Baker's cyst confirmed on MRI or Ultrasonography prior to referral for aspiration. The patients' pain and symptoms were assessed preceding and following the intervention using reported subjective symptoms and a 10-point Likert scale. Written informed consent was obtained from all patients at the time of the procedure and all patients agreed to clinical follow-up.

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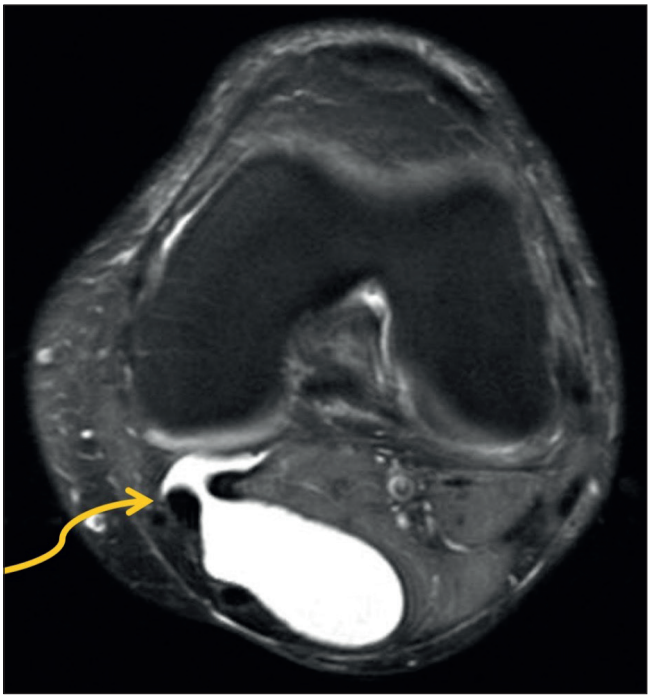

Figure 1.
Distended bursa protruding between the medial head of gastrocnemius and the tendon of semi-membranosus (curved arrows).

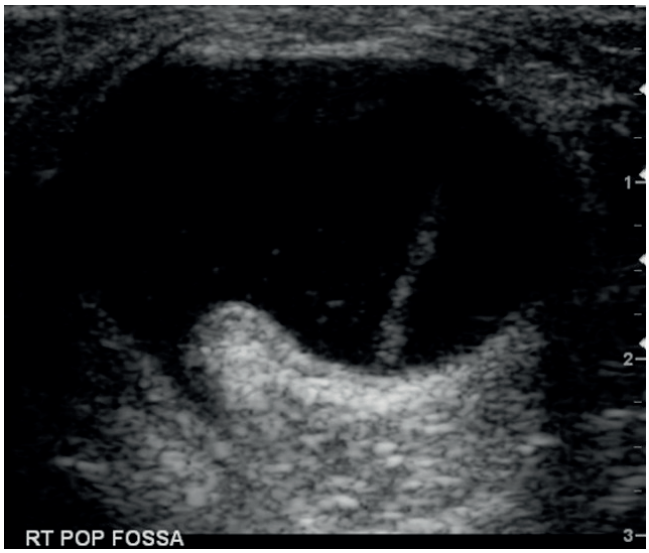

Figure 2.
Popliteal fossa ultrasound demonstrating the typical "talk bubble" configuration of the cyst in transverse orientation, the arrow formed by the tail communicating with the joint.

Exclusion Criteria

Patients were excluded on the basis of the following criteria: a) if no cyst was identifiable at the time of the proposed procedure, b) if the patient reported symptoms in keeping with recent cyst rupture, c) if the protocol under evaluation was not adhered to e.g. where aspiration was performed in the absence of Depomedrone injection and d) if the patient was lost to follow up

Therapeutic Procedure

The patients were positioned prone. All patients initially underwent sonographic evaluation of the popliteal fossa using a high-frequency linear array transducer to confirm the diagnosis, the ongoing presence of the cyst and lack of interval rupture. The expected location of the popliteal neurovascular bundle deep to the cyst was also confirmed, to minimise the risk of potential haemorrhagic complications.

Under standard sterile conditions, a 10 cm long 5 French Yueh centesis catheter needle (COOK MEDICAL LLC, P.O. Box 4195, Bloomington, IN 47402-4195, U.S.A.) was advanced into the popliteal cyst under direct ultrasound guidance. Internal septae were disrupted as necessary, the contents of the cyst aspirated, and a sample was sent for microbiological analysis. Microscopy was also performed in all cases to evaluate for the presence of crystals. The total aspirated volume was recorded in each instance. Fluoroscopy-guided bursography using 50% Omnipaque 300 diluted with saline was performed to evaluate for communication with the knee joint. The contrast was then aspirated and therapeutic injection with 40mg Depomedrone and 5ml of 0.5% Bupivacaine was performed.

Follow Up

Telephone follow-up was performed in all cases at multiple intervals, varying from 2 to 14.5 months, with respect to symptom resolution/persistence and, if the pain had persisted or recurred, the score on the Likert scale was recorded. A follow-up ultrasound was performed in the event of recurrent symptoms.

Results

Thirteen patients were referred for treatment, four of whom were excluded; two as their cysts were aspirated but no therapeutic injection was performed, one on the basis of recent cyst rupture, one had no identifiable cyst on the day of proposed drainage and one patient was lost to follow up secondary to emigration.

All patients included in the final analysis had a confirmed Baker's cyst that was symptomatic at the time of referral and intervention. Some, but not all, patients complained of a 'fullness' behind their knee. A popliteal fossa swelling was palpable in the majority on clinical examination.

Preprocedural knee radiographs demonstrated evidence of osteoarthritis in 8/9 patients. No radiographs were available for the remaining patient.

In total, 9 patients (9 female, average age 63.8 years) all complaining of knee pain and swelling underwent 11 procedures (bilateral in 1 patient, repeated in another) over a 35-month time period. Puncture and aspiration were carried out as described above, yielding an average volume of 20.1 ml (range 10 – 50 mls).

Communication with the knee joint was demonstrated in only 2/11 procedures, despite the characteristic 'tail' being visible

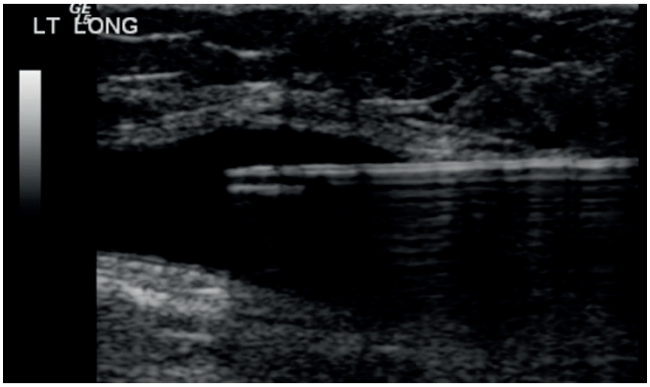

Figure 3.
5 French Yueh centesis cannula in situ, central stylet removed.

on ultrasound in a number. In 5/11 procedures, complex cysts were demonstrated at sonography, with internal septations or evidence of prior intra-cyst haemorrhage.

The average follow-up of patients was 8.3 months, ranging from 2 to 12 months. Patients reported a significant improvement in symptoms for an average duration of 5.96 months (range 0.5 – 12 months), with an average reduction of pain score on a 10-point Likert scale by 5.7 points to 0. After this period, patients reported a gradual return of an ache; however, none reported a return to pre-procedural severity, which in some cases had been enough to prevent them from sleeping. Two patients received no further intervention (including pain relief) for 12 months. The swelling returned in 3 patients; however, this was not painful. A single patient found minimal relief in symptoms and proceeded to Total Knee Arthroplasty, this outcome presumed to reflect moderately severe underlying knee joint osteoarthrosis.

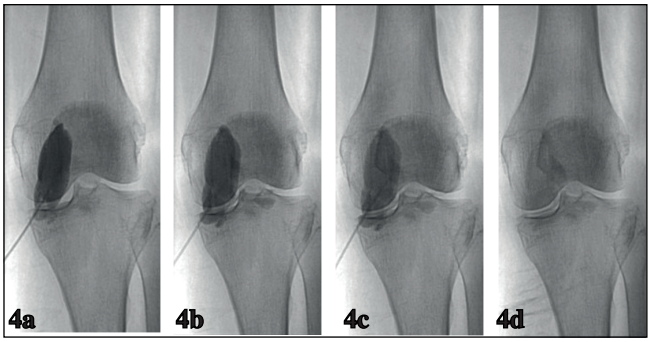

Figure 4.
Baker's cyst fluoroscopy-guided bursography and arthrography using contrast demonstrate communication with the knee joint

Figure 4
- **(a)** Early filling of cyst
- **(b)** Early joint space filling
- **(c)** Later joint space filling with subtle opacification of the suprapatellar pouch
- **(d)** After contrast aspiration, a trace of contrast remains in the medial joint space

Two of the five patients with complex cysts had durable, complete relief of the pain at the cyst site, with some ongoing knee joint pain in one patient and return of swelling in another patient. One of the patients with a complex cyst experienced 1 month of relief followed by a return of less severe pain in comparison to the pre-procedure severity. This patient had ongoing issues with patellar maltracking and was subsequently referred for physiotherapy.

No immediate or delayed complications following intervention were observed or reported.

Discussion

Robert Adams first described the popliteal cyst in 1840, as a fluid-filled synovium-lined sac arising in the popliteal fossa between the semimembranosus tendon and the medial head of gastrocnemius [4]. William Morantt Baker, the British surgeon after whom the condition was subsequently named, described eight further cases and their management [5]. In stark contrast to current management, popliteal cysts were at that time treated with bandaging of the knee, seton insertion and occasionally, limb amputation.

Baker's cysts are found in association with osteoarthritis of the knee, meniscal tears, rheumatoid arthritis, and Charcot joints, and are also seen in the post-traumatic setting in athletes. Furthermore, synovial disorders of the knee including synovitis, synovial osteochondromatosis and pigmented villonodular synovitis can also promote the formation of a Baker's cyst [6]. The fluid may communicate

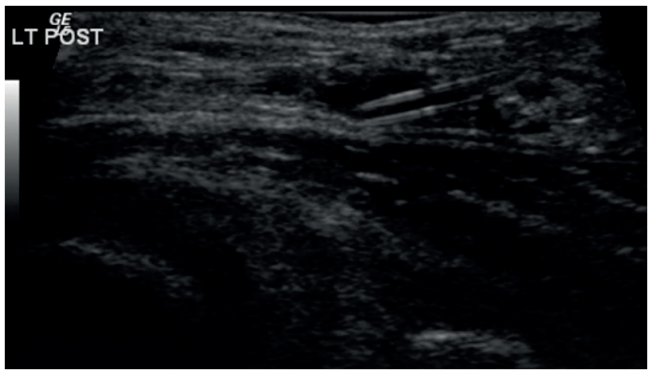

Figure 5.
Post aspiration ultrasound demonstrates minimal residual contrast within the collapsed cyst prior to steroid / Bupivacaine injection.

freely, or via a one-way valve mechanism allowing unidirectional flow from the knee joint into the bursa, between the tendons of the semimembranosus and the medial head of the gastrocnemius muscles. While the majority of Baker's cysts are asymptomatic, patients most commonly present with knee joint pain and stiffness, and/or a palpable mass in the medial popliteal fossa. In cases of cyst rupture or dissection, patients may also present with a clinical picture resembling either deep venous thrombosis or thrombophlebitis, the latter manifesting with pain, ecchymosis and itching, known as 'pseudothombophlebitis

syndrome'. On clinical examination, the differential diagnosis includes parameniscal cysts, liquefied hematoma in the post-traumatic setting, popliteal artery aneurysm and soft tissue masses [7].

Initial imaging of Baker's cysts should include knee radiographs to assess for pathology associated with the condition, such as osteoarthritis or rheumatoid arthritis. Radiography may also identify calcified/ossified loose bodies within the cysts. On ultrasonography, Baker's cysts typically have a well-defined anechoic or hypoechoic appearance with posterior acoustic enhancement. If present, loose bodies are echogenic with posterior acoustic shadowing. Magnetic Resonance Imaging is the preferred modality in the imaging of popliteal cysts, as it can identify a number of the potential underlying causes and differentiate them from parameniscal cysts [7]. The patients in this cohort who had MRIs but not x-rays reflect a growing trend among family practitioners to go directly to MRI, given increasing ease of access to the latter in recent years.

Corticosteroids are widely used in the management of musculoskeletal disorders and are commonly injected into joints, bursae, tendon sheaths, the epidural space, cysts, ganglions and around interdigital neuromas, among others [1, 2, 7]. Absolute contraindications to corticosteroid injection in the musculoskeletal system include local or intraarticular sepsis, bacteraemia, intraarticular fracture, coagulopathy, hypersensitivity or a joint prosthesis. Relative contraindications include severe juxta-articular osteoporosis, joint instability, poorly controlled diabetes and adjacent skin abrasions [8].

Di Sante et al [N = 60] have previously concluded that cyst aspiration with corticosteroid injection affords good pain relief and cyst volume reduction in patients with Baker's cysts and concomitant knee osteoarthritis; however, they suggested that the technique does not achieve results superior to those obtained with intraarticular corticosteroid injection alone [9]. Bandinelli et al [N = 40] demonstrated that in the setting of knee osteoarthritis, a greater reduction in cyst volume and wall thickness was obtained when the Baker's cyst was directly aspirated and infiltrated with corticosteroids compared to intraarticular steroid injection. The study hypothesized that the findings are due to the higher steroid concentrations achieved more rapidly within the cyst [10].

Köroğlu et al [N = 32] concluded that cyst aspiration with ultrasound-guided corticosteroid injection yields clinical improvement and cyst volume reduction in all subgroups of patients with Baker's cysts (simple or complex) secondary to knee osteoarthritis [11]. Acebes et al [N = 30] demonstrated a reduction in Baker's cyst volume and wall thickness four weeks after a single intraarticular corticosteroid injection, hypothesizing that corticosteroids can migrate from the joint into the Baker's cyst by the same valvular mechanism allowing cyst growth [12].

Paladini et al [N = 80] compared the management of Baker's cysts by injecting either steroid or tetracycline antibiotic, each of which resulted in a reduction in cyst volume following direct cyst instillation and a reduction in the patients' VAS pain scores. While tetracycline treatment resulted in a lower cyst persistence/recurrence rate, the authors observed that no Gold Standard treatment of Baker's cysts could be recommended on the basis of the existing literature [13]. All studies demonstrate clinical improvement and cyst volume reduction with Baker's cyst aspiration with ultrasound-guided corticosteroid injection. Corticosteroid injection was used alone in three studies [10, 11, 12], and in combination with anaesthetic in two studies [9, 14], all showing a beneficial effect [14].

Our pilot study replicated the results of others who have benefited from this technique, with a significant reduction in the severity of symptoms and some patients requiring no further medical treatment. Failure to document Baker's cyst communication with the joint on fluoroscopy in 9/12 cases, despite the latter being demonstrated on MRI, or suggested by ultrasound, is presumed to reflect a ball-valve-like effect between the joint and the cyst with unidirectional flow, either in the context of chronic inflammation or due to the action of the semimembranosus and gastrocnemius muscles in knee extension. This is an interesting finding and supports the use of intra-cystic, rather than intra-articular injection to treat symptomatic baker's cysts.

Prior to undertaking our study, we believed more complex, multilocular cysts would respond less well than simple, uncomplicated cysts; however, on analysis, the complicated cysts respond just as well from a symptomatic perspective. This is an important finding as clinicians may be reluctant to perform or refer patients with complex cysts for intra-cystic therapy due to perceived limited benefit in comparison to patients with simple cysts, thus negatively impacting patients with complex Bakers cysts.

Limitations and Future Perspective

This study is limited by the small cohort, with only 11 procedures included in total. The patients' symptoms were subjectively assessed and documented objectively using a Likert scale. An interactive Visual Analog Scale will be used in future studies. The follow-up period was limited and varied between patients [shortest 2 months, longest 1 year]. This has informed current practice, and currently, we employ a standard, 3, 6, 9 and 12-month follow-up questionnaire. The study has served the department well as a baseline for future quality improvement.

There was no comparison group e.g., no placebo control or comparison against an alternative treatment. The absence of a placebo or 'sham' comparison group was at least in part based on the results in a limited number of patients treated prior to the current protocol in whom aspiration alone was performed, without injection of steroid, in whom their symptoms recurred quickly. For this reason, it appeared

unethical to perform this comparison, although it would undoubtedly have scientific merit. The performance of a 'sham' would be near impossible in the patients who could feel the swelling in their popliteal fossa, as clearly, there would be no change post-procedure if aspiration was not performed.

Potential avenues of future research include comparison with other active therapies used elsewhere in the musculoskeletal system e.g., hyaluronic acid, Hypertonic Dextrose, platelet-rich plasma (PRP), and botulinum toxin A (BTA) (all used in treating knee OA), with placebo and each other, with a view to establishing an equivalence with steroids, particularly given concerns raised in recent years regarding the intraarticular injection of the latter [15, 16].

There was no significant difference in results in patients demonstrating free communication with the knee joint at bursography (1 patient demonstrated complete symptom resolution, in the second patient the symptoms returned). While the patient number in our study is small, future studies will further evaluate the practice of bursography at the time of Baker's cyst injection given the apparent absence of significant additional benefit.

Given the concerns regarding the effects of steroids on knee joint cartilage [15, 16], one potential avenue of research would be to compare the knee cartilage (cartilage mapping with MRI) in those with, versus those without a demonstrable communication with the knee joint.

Some authors advocate additional assessment of the knee joint with ultrasound at the time of the procedure, and if an effusion is demonstrable, recommend that it be aspirated at the same appointment, given the potential communication between the Baker's cyst and the knee joint. [17]. This is not part of our protocol given the benefit experienced by the majority of our patients following cyst aspiration and injection alone.

Despite the limitations, the study confirms the safety and efficacy of this technique in the management of patient symptoms and demonstrates a durable medium-term effect on patient's symptoms, the combination of decompression via aspiration and the anti-inflammatory effect of steroids working synergistically.

Conclusion

First-line treatment of symptomatic Baker's cysts with aspiration under ultrasound and fluoroscopic guidance followed by therapeutic injection of corticosteroids and local anaesthetic is a safe procedure, leading to a durable reduction in pain symptoms in the majority of patients.

Main Points

- Treatment of symptomatic Baker's cysts with aspiration under ultrasound and fluoroscopic guidance followed by therapeutic injection of Depomedrone and Bupivacaine leads to a durable reduction in symptoms.
- There was no significant difference in patient-reported outcomes between patients with simple vs complex multilocular Baker's Cysts.
- Similar patient-reported outcomes were obtained in patients where communication between the Baker's cyst and knee joint compartment was documented at fluoroscopy vs. those where a communication was not identified.

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Clinical Paper

Real world outcomes in cancer patients with COVID-19 infection: Northern Ireland experience.

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ABSTRACT

Background

Cancer has been assumed to be associated with a high-risk of morbidity and mortality from COVID-19. Protective measures have incorporated modifications in cancer treatments. There are conflicting data about the impact of COVID-19 infection and outcomes in cancer patients. We aim to describe the impact of demographic and clinical characteristics on COVID-19 outcomes in patients with cancer in Northern Ireland reported within the UK Coronavirus Cancer Monitoring Project (UKCCMP).

Method

Prospective data collection including demographics, cancer stage and type, treatment and outcomes occurred for all Northern Irish patients enrolled in the UKCCMP. The primary endpoint was all-cause mortality. Descriptive statistics and logistic regression analysis were performed using SPSSv25.

Results

Between March 2020 and March 2021, 110 cases were registered. Median age was 63 years (range 27 to 87). Seventy patients (63.6%) were >60 years and 59 (53.8%) were females. Co-morbidities were reported in 83 patients (72.7%). Most patients had metastatic disease (64, 58.2%). Sixty-seven patients (60.9%) received anticancer treatment in the 4 weeks prior to COVID-19 infection. Of those patients, 35 (52.2%) received chemotherapy. Thirty-nine patients (58.2%) continued treatment as planned; 24 (36.9%) stopped treatment due to SARS-CoV-2 infection. The majority of patients were asymptomatic or experienced mild symptoms (67, 60.9%). Fifty-one (46.3%%) were admitted to hospital for COVID-19. Risk of severe/critical COVID-19 disease was significantly associated with age (OR 1.07 [95% CI 1.03-1.11); p=0.004), pre-existing hypertension (OR 3.29 [95% CI 1.42-7.62]; p=0.02) and thoracic primary malignancy (OR 4.41 [95% CI 1.52-12.74]; p=0.042). Twenty-nine patients (26.3%) died of whom 15 (57.7%) died of COVID-19 and 13 (44.8%) died due to cancer. Risk of death was significantly associated with age (OR 1.05 [95% CI 1.01-1.09]; p=0.014), male sex (OR 3.76 [95% CI 1.51-9.34]; p=0.008) and thoracic primary malignancy (OR 5.35 [95% CI 1.88-15.25]; p=0.014). When corrected for age, gender and co-morbidities, chemotherapy within the past 4 weeks was not significantly associated with mortality (OR 0.65 [95% CI 0.20-2.11]; p=0.476).

Conclusion

Age and thoracic cancer diagnosis correlated with survival. Comparison of performance during the pandemic with national benchmarks can inform how regional services should be adapted in preparation for future healthcare crises.

Keywords: COVID-19 infection, cancer patients, Northern Ireland, UKCCMP

Background

The COVID-19 pandemic has had a profound global impact and has presented challenges for healthcare systems and governments around the world. As of 16 November 2022, there have been over 632 million confirmed cases of COVID-19 globally and nearly 6.6 million deaths.[1] Considerable difficulties in cancer care have included decisions around cancer treatments, access to diagnostic services and surgical procedures, and determining optimal methods of protecting patients with cancer from infection.

Early in the pandemic shielding advice for the clinically vulnerable in many countries included the cancer population, who were assumed to be at high risk of infection and mortality due to disease and treatment related immunosuppression. A nationwide Chinese analysis published in March 2020 found that patients with cancer had a higher risk of severe COVID-19 or death than patients without cancer, and particularly those receiving chemotherapy or surgery within the previous month.[2] Furthermore, this study, and a single centre Chinese study[3] published one month earlier, found that patients with

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cancer had a higher risk of infection with COVID-19 than the general population. However, the number of patients with cancer included in these studies were small (n=18 and n=12 respectively). A larger study (n=334) in New York City published in April 2020 found that patients under 50 years old with cancer had a higher rate of mortality from COVID-19 than patients without cancer.[4] Early studies such as these were followed by guidelines from the National Institute for Health and Care Excellence (NICE) and the European Society for Medical Oncologists, containing consensus statements on the management of Oncology patients during the pandemic.[5,6] These recommendations included measures such as treatment interruptions, switching from intravenous to oral regimens, use of hypofractionated radiotherapy (RT) and assignment of prioritisation to systemic anticancer treatment (SACT) clinical scenarios. Given the lack of strong evidence to substantiate such changes in the initial stages of the pandemic and considering the perceived shift in the risk-benefit margin for cancer treatments amongst clinicians, the recommendations were readily and rapidly adopted.

Cancer patients as a whole comprise a heterogeneous group, with considerable differences in treatment modalities and outcomes due to patient factors, such as fitness and co-morbidities, as well as tumour characteristics, such as primary site, stage and histology. The vulnerability of each patient to COVID-19 is likely to be similarly individual, and so globally there are ongoing efforts to rationalise the blanket approach initially taken as more data emerges. In accurately estimating the risk of COVID-19 infection to patients with cancer, Oncologists will be better equipped to strike the optimal balance between cancer treatment and ongoing risk of COVID-19.[7] Given the international variability in cancer epidemiology and healthcare systems, as well as the COVID-19 burden in specific countries, there is a need for real world data on COVID-19 outcomes. Furthermore, as regional variation is observed between cancer populations within the United Kingdom (UK), an analysis of regional data is warranted.[8,9] Additionally, regional variations in the scope and timing of COVID-19 restrictions could also impact on outcomes and analysis of regional data is therefore justified. As observed through work carried out by the UK Cancer Registry, regular collection of prevalence data which corresponds with epidemiological evidence is vital for analyses like this and should remain a priority for the UK Government and devolved Administrations.[9]

In this prospective cohort study, we generated a database of patients with cancer in Northern Ireland (NI) who were diagnosed with COVID-19 with the aim of describing their disease characteristics and outcomes. A secondary aim of this study was to evaluate the impact of the COVID-19 pandemic on cancer treatment delivery in NI. This study was part of a national effort by oncology clinicians known as the UK Coronavirus Cancer Monitoring Project (UKCCMP), which aimed to track cancer patients who tested positive for COVID-19 across the UK.

Methods

Study design and participants

This database was designed as a public health surveillance registry for the COVID-19 pandemic in conjunction with a group working nationally to deliver the UK Coronavirus Cancer Monitoring Project (UKCCMP) seeking to support rapid clinical decision making. The national database was initiated in accordance with the UK Policy Framework for Health and Social Care Research, the UK National Research Ethics Service, and the UK Governance Arrangement for Research Ethics Committees. The Health Research Authority deemed ethical approval not to be required, and local approval and information governance processes were followed.

Written, informed consent was not required for inclusion in this study. Eligibility criteria for enrolment on the NI registry were as follows: adult patients (aged ≥18 years); active cancer; presenting to the oncology speciality service between 18th March 2020 and the 30th March 2021; and a positive SARS-CoV-2 RT-PCR test from a nose or throat swab. Patients with active cancer were defined as those with metastatic cancer or those undergoing anticancer treatment in any setting (palliative, curative, radical, adjuvant, or neoadjuvant) or those treated within the past 12 months with surgery, SACT, or RT. Stages of tumour were divided into primary tumour localised, which were localised to organ and therefore potentially resectable; primary tumour locally advanced, which had spread locally from the primary organ and was not resectable; metastatic, when tumour had spread to distant part(s) of the body; and patients in remission. Management of cancer patients with COVID-19 was directed by the patient's clinical team without input from the local research team or the UKCCMP and was based on local policies and standard clinical practice. Decisions about intensive care unit admission and ventilation were guided by the UK National Health Service National Institute of Health and Care Excellence COVID-19 rapid guidelines. This study was performed in accordance with the STROBE statement.[10]

Data collection and analysis

Case reporting was led by a COVID-19 emergency response reporting individual (LF) supported by a local emergency response reporting group (AH, AL, KT, CO, GW) who are all trainee Oncologists. Cases were screened for inclusion when identified by the treating clinical teams. Patient demographics, treatment details, COVID-19 disease course, and cancer features were obtained by the direct assessment of the electronic hospital medical records. Eligible patients were registered in the database when a positive SARS-CoV-2 test was noted and data fields were subsequently updated when treatment and outcomes became available. The COVID-19 severity category was determined according to World Health Organisation (WHO) guidelines.[11] Tumour types were classified according to International Classification of Diseases, 10th Revision (ICD-10) codes. All data was de-identified at source to ensure data anonymity and was entered with the research electronic data capture (REDCap)

Table 1: Summary of patient demographics.

		All patients (n=110)	Patients who survived (n=78) [a]	Patients who died (n=29) [a]	P value
Sex					
	Male	51	29 (37%)	20 (69%)	0.004†
	Female	59	49 (63%)	9 (31%)	
Age (years)	Median (IQR)	63 (55-74)	70 (63-77)	61 (53-74)	
COVID-19 severity					
	Asymptomatic	18	15 (19%)	3 (10%)	<0.0001*
	Mild	49	44 (56%)	4 (14%)	
	Severe	34	15 (19%)	17 (59%)	
	Critical	9	4 (5%)	5 (17%)	
Comorbidities[c]					
	Hypertension	34	21 (27%)	13 (45%)	
	Cardiovascular disease	17	12 (15%)	5 (17%)	
	Diabetes	15	10 (13%)	4 (14%)	
	Chronic obstructive pulmonary disease	12	7 (9%)	5 (17%)	
	None	27	24 (31%)	2 (7%)	
	Other	39	28 (36%)	10 (34%)	
Cancer type[b] [c]					
	Breast	28	22 (28%)	5 (17%)	
	Digestive organs	22	16 (21%)	5 (17%)	
	Respiratory and intrathoracic organs	19	8 (10%)	11 (38%)	
	Melanoma (skin)	15	14 (18%)	1 (3%)	
	Male genital organs	8	4 (5%)	4 (14%)	
	Female genital organs	7	6 (8%)	1 (3%)	
	Urinary tract	6	5 (6%)	1 (3%)	
	Bone and articular cartilage	2	2 (3%)	0 (0%)	
	Mesothelial and soft tissue	1	0 (0%)	0 (0%)	
	Lip, oral cavity, and pharynx	1	0 (0%)	1 (3%)	
	Thyroid / other endocrine	1	1 (1%)	0 (0%)	
Cancer stage					0.115*
	Primary tumour localised	27	23 (29%)	3 (10%)	
	Primary tumour locally advanced	13	9 (12%)	3 (10%)	
	Metastatic	64	42 (54%)	21 (72%)	
	Remission	1	0 (0%)	1 (3%)	
	Unknown	5	4 (5%)	1 (3%)	
Cancer treatment within 4 weeks of COVID-19 diagnosis [c]					
	Chemotherapy	35	29 (37%)	5 (17%)	
	Radiotherapy	10	9 (12%)	1 (3%)	
	Targeted treatment	14	12 (15%)	1 (3%)	
	Hormone therapy	8	4 (5%)	4 (14%)	
	Immunotherapy	7	6 (8%)	1 (3%)	
	Surgery	1	1 (1%)	0 (0%)	
	Other	4	4 (5%)	0 (0%)	
	None	43	24 (31%)	18 (62%)	
COVID-19 management					
	Not admitted	54	49 (63%)	5 (17%)	
	Admission	51	26 (33%)	22 (76%)	
	Unknown	5	3 (4%)	2 (7%)	
	Intensive therapy unit	2	1 (1%)	1 (3%)	
	Non-invasive ventilation	7	4 (5%)	3 (10%)	

[a] No survival data available for three patients. [b] Classified according to ICD10 classification.
[c] Some patients fall into more than one category. † Mann Whitney U test *Kruskal Wallis test

application, an electronic data capture software system that is browser based and metadata driven. This secure electronic data capture platform is hosted by the Institute of Translational Medicine at the University of Birmingham, Birmingham, UK.

Outcomes

The primary endpoint was all-cause mortality. This definition included deaths described as related to COVID-19 whether during admission or out of hospital, as well as deaths reported as a consequence of any other cause, such as due to cancer progression or treatment toxicity. Secondary outcomes included COVID-19 severity, disruption to anti-cancer therapies and hospital admissions.

Data processing and analysis

Anonymised case identifier data was collected and stored within secure health trust storage. Data was then entered into the REDCap system and was transferred securely through to the Compute and Storage for Life Science (CaStLeS) infrastructure as part of the Birmingham environment for academic research local cloud at the Centre for Computational Biology, University of Birmingham.

Descriptive analysis was performed to display the demographic, diagnostic, staging and outcome data. Analysis of association between the specified clinical outcomes and patient characteristics was undertaken with univariate logistic regression statistical analysis and described as odds ratios. A p-value threshold of 0·05 was used to indicate a significant difference. We used SPSS for data processing and visualisation.

Results

Patient Demographics

Between March 2020 and March 2021, 110 cases were registered for Northern Ireland. Patient demographics are shown in Table 1. The median age was 63 years (range 27 to 87), and gender was approximately balanced (54% female). The most common tumour sites included breast (28, 25%), digestive organs (22, 20%), respiratory and intrathoracic organs (19, 17%) and melanoma (15, 14%). Approximately a third of the patients had localised disease (40, 36%), and over a half had metastatic disease (64, 54%). Co-morbidities were reported in 83 (75%) patients, the most common being hypertension (34, 31%), cardiovascular disease (17, 15%) and diabetes (15, 14%).

Sixty-seven patients (61%) had received anti-cancer treatment in the 4 weeks prior to COVID-19 infection. Of those 67 patients, 35 (52%) received chemotherapy, 14 (21%) received targeted therapy and 7 (10%) received immunotherapy. Thirty-nine patients (58%) continued treatment as planned, whilst 24 (36%) stopped treatment due to COVID-19 infection. The majority of patients were asymptomatic or experienced mild symptoms (67, 61%). Fifty-one patients (46%) required hospital admission due to COVID-19 infection. Of these, 7 required non-invasive ventilation and 2 patients required admission to the intensive therapy unit.

Survival outcomes

Outcome data was available for 107 out of 110 patients, summarised in Table 1. During the study period, 29 patients (27%) died (all causes). Of these 29 patients, the cause of death was attributed to COVID-19 infection in 15 (52%) and 13 deaths (44%) were reported as cancer related. A higher proportion were male (20, 69%) and only 2 (7%) had no co-morbidities recorded. A higher percentage of patients who died had metastatic disease but the difference was not significant (72% versus 54%).

Table 2 summarises the univariable analysis of all-cause mortality. Risk of death was significantly associated with age (OR 1.05 [95% CI 1.01-1.09]; p=0.014), male sex (OR 3.76 [95% CI 1.51-9.34]; p=0.008) and thoracic primary malignancy (OR 5.35 [95% CI 1.88-15.25]; p=0.014). When corrected for age, gender and co-morbidities, chemotherapy within the past 4 weeks was not significantly associated with mortality (OR 0.65 [95% CI 0.20-2.11]; p=0.476) (Table 3).

COVID-19 severity

Following univariable analysis, risk of severe or critical COVID-19 disease was significantly associated with age (OR 1.07 [95% CI 1.03-1.11]; p=0.004), pre-existing hypertension (OR 3.29 [95% CI 1.42-7.62]; p=0.020) and thoracic primary malignancy (OR 4.41 [95% CI 1.52-12.74]; p=0.042) (Table 4).

Table 2: Univariable analysis of mortality (all causes)[a].

		Odds ratio (95% CI)	p value	Adjusted p value
Sex (male vs. female)		3.76 (1.51-9.34)	0.004	0.008
Age		1.05 (1.01-1.09)	0.007	0.014
COVID-19 severity				
	Asymptomatic or Mild	0.080 (0.02-0.28)	<0.001	0.001
	Severe or Critical	12.47 (3.62-42.94)	<0.001	0.001
Comorbidities				
	Hypertension	2.21 (0.90-5.35)	0.080	0.320
	Cardiovascular disease	1.15 (0.37-3.59)	0.815	1
	Diabetes	1.09 (0.31-3.79)	0.895	1
	Chronic obstructive pulmonary disease	2.11 (0.61-7.28)	0.236	0.944
Cancer type				
	Breast	0.53 (0.18-1.57)	0.251	1
	Digestive organs	0.81 (0.27-2.25)	0.705	1
	Respiratory and intrathoracic organs	5.35 (1.88-15.25)	0.002	0.014
	Melanoma (skin)	0.16 (0.02-1.30)	0.087	0.609
	Male genital organs	2.96 (0.69-12.72)	0.145	1
	Female genital organs	0.43 (0.05-3.72)	0.442	1
	Urinary tract	0.52 (0.06-4.66)	0.560	1
Cancer stage				
	Primary tumour localised	0.27 (0.74-0.99)	0.048	0.144
	Primary tumour locally advanced	0.88 (0.22-3.52)	0.856	1
	Metastatic	2.36 (0.89-6.21)	0.083	0.249
Cancer treatment within 4 weeks of COVID-19 diagnosis				
	Chemotherapy	0.35 (0.12-1.02)	0.055	0.275
	Radiotherapy	0.27 (0.03-2.26)	0.229	1
	Targeted treatment	0.13 (0.02 - 1.58)	0.126	0.630
	Hormone therapy	2.96 (0.69-12.72)	0.145	0.725
	Immunotherapy	0.43 (0.05-3.72)	0.442	1
COVID-19 management				
	Intensive therapy unit or NIV	5.21 (1.15-23.42)	0.031	0.031

[a] No survival data available for three patients. Univariable analysis performed by comparing each factor to the absence of each category as a reference, with the exception of sex and age. Male sex compared with female sex. Bonferroni *p* value adjustment performed. NIV, non-invasive ventilation.

Table 3: Multivariate regression analysis and odds of death

Multivariate model	Odds ratio (95% CI)	p value
Gender (Male v female)	3.42 (1.29 - 9.08)	0.014
Age	1.03 (0.98 - 1.07)	0.233
Co-morbidities (Present v absent)	4.19 (0.81 - 21.8)	0.088
Chemotherapy	0.65 (0.20 - 2.11)	0.476

Table 4: Univariable analysis of COVID-19 severity.

		Odds ratio (95% CI)	p value	Adjusted p value
Sex (male vs. female)		1.60 (0.74-3.46)	0.231	0.462
Age		1.07 (1.03-1.11)	0.002	0.004
Comorbidities				
	Hypertension	3.29 (1.42-7.62)	0.005	0.020
	Cardiovascular disease	1.11 (0.38-3.17)	0.848	1
	Diabetes	1.43 (0.48-4.29)	0.513	1
	Chronic obstructive pulmonary disease	5.65 (1.43-22.25)	0.013	0.052
Cancer type				
	Breast	0.54 (0.21-1.36)	0.190	1
	Digestive organs	0.52 (0.19-1.45)	0.209	1
	Respiratory and intrathoracic organs	4.41 (1.52-12.74)	0.006	0.042
	Melanoma (skin)	0.75 (0.24-2.37)	0.624	1
	Male genital organs	2.81 (0.64-12.41)	0.174	1
	Female genital organs	1.81 (0.25-5.56)	0.833	1
	Urinary tract	0.77 (0.14-4.39)	0.767	1
Cancer stage				
	Primary tumour localised	0.56 (0.22-1.42)	0.222	0.666
	Primary tumour locally advanced	0.95 (0.29-3.12)	0.927	1
	Metastatic	1.56 (0.69-3.50)	0.285	0.855
Cancer treatment within 4 weeks of COVID-19 diagnosis				
	Chemotherapy	0.62 (0.26-1.44)	0.262	1
	Radiotherapy	1.04 (0.28-3.93)	0.951	1
	Targeted treatment	0.59 (0.17-2.00)	0.392	1
	Hormone therapy	1.62 (0.338-6.83)	0.515	1
	Immunotherapy	4.28 (0.79-23.13)	0.092	0.460

Univariate analysis performed by comparing each factor to the absence of each category as a reference, with the exception of sex and age. Male sex compared with female sex. Bonferroni p value adjustment performed.

Impact on delivery of anti-cancer treatments

As a secondary outcome this study sought to demonstrate how the health system in Northern Ireland was impacted through excess inpatient care and ITU care due to COVID-19. The number of cycles of SACT administered regionally was reduced during the time period March to August 2020, compared with the remainder of the study period **(Fig. 1A)**. However, the number of new SACT courses commenced was decreased during April and May 2020 only **(Fig. 1B)**. The number of new RT courses commenced at the regions' two RT departments was grossly unaltered during the first waves of the pandemic **(Fig. 2A)**. Although not captured in this data set, a number of patients switched from primary surgery to radical (chemo-)RT during this period which may have influenced these numbers. There was a trend towards hypofractionation (i.e. higher doses of radiation per visit, with a reduced number of total visits), which has been sustained, as reflected in the reduced number of fractions per new course (data for Belfast City Hospital only) **(Fig. 2B)**. This is reflected as a diminished number of fractions administered over the study period **(Fig. 2C)**, despite a preserved rate of new RT courses. These data should be interpreted with caution as they lack granularity with respect to several of the pandemic-specific protocols i.e. increased usage of single-fraction palliative RT treatments and oral therapies in place of more intensive parenteral regimes.

Discussion

The COVID-19 pandemic has introduced additional complexity for patients with cancer, particularly those embarking on active treatment. Early Chinese data indicated that patients with cancer are more likely to develop COVID-19, and more likely to develop severe disease.[2,3] In response, Oncology departments rapidly instigated new processes capable of ameliorating the risk of infection in this population, including tightened selection criteria for systemic therapy, and hypofractionated RT courses.[12,13]

As the pandemic has progressed and more data has become available, there have been conflicting reports regarding

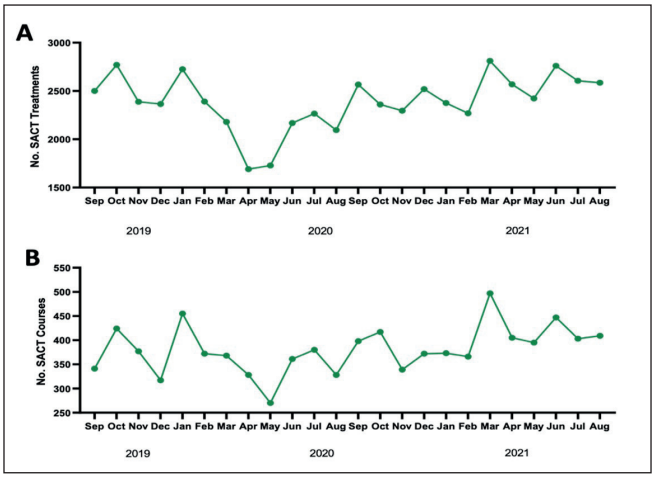

Figure 1: Trends in systemic anti-cancer therapy (SACT) delivery plotted as total number of systemic anti-cancer treatments given (A), and number of new courses commenced (B) per month between September 2019 and August 2021

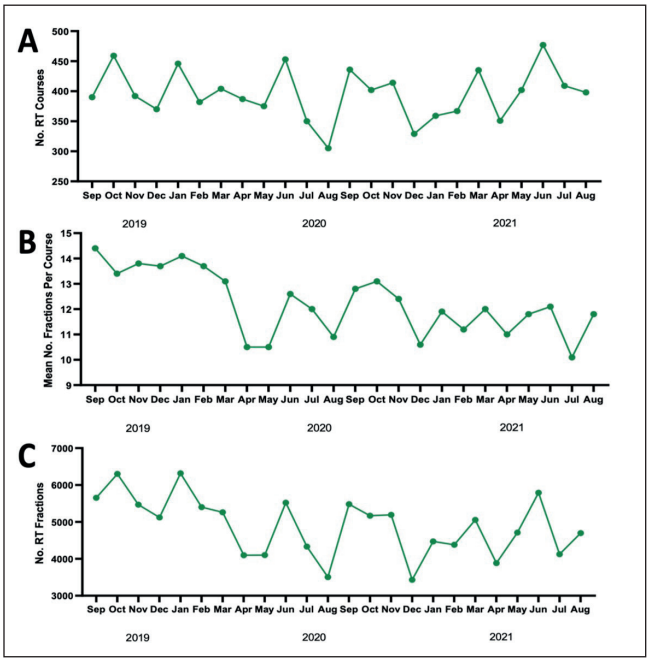

Figure 2: Trends in radiotherapy (RT) delivery plotted as number of courses commenced (A), mean number of fractions per course (B), and total number of fractions delivered (C) per month between September 2019 and August 2021

the risk of COVID-19 infection and death in patients with cancer. More mature data from the first wave of the pandemic subsequently demonstrated that increased mortality was not associated with specific cancer treatments.[14-16] Whilst reassuring, this data contradicted earlier studies, and also the assumption of Oncologists about the cancer population, a cohort generally classified as one with diminished immune systems and physical reserve.[17,18]

The UKCCMP is a UK-wide database for patients with COVID-19 who have cancer. Initial results from this cohort published in May 2020 found that receipt of chemotherapy, immunotherapy, targeted treatments, hormone therapy or RT within the 4 weeks prior to infection had no significant effect on mortality from COVID-19.[14] More recently, international data from various countries, including the United States of America, have also reported that patients with cancer are not at increased risk of severe COVID-19.[19] In contrast, another American study found that in patients with cancer and COVID-19, recent treatment with immune checkpoint inhibitors, chemotherapy or targeted therapies were all significantly associated with greater odds of all-cause mortality.[20]

A systematic review of sixteen studies found inconsistent results, but concluded no excess risk of severe COVID-19 following chemotherapy, immunotherapy, targeted treatments, RT or surgery; however, it did find an increased risk of death with chemotherapy administration within 30 days preceding COVID-19 diagnosis[21] These large, multicentre studies enabled clinicians to cautiously relax some of the stringent measures that had been established to maximise patient safety at the beginning of the pandemic.[22] This project sought to assess the interaction of COVID-19 and patients with cancer in NI specifically during the first year of the pandemic, with the ultimate aims of better risk-stratification of Oncology patients during the remainder of the pandemic, and informing planning for future pandemics. Although not the remit of the current study, more recent studies have reported that mortality from COVID-19 infection in patients with cancer has improved in Europe over time and this has been attributed to earlier diagnosis, improved management and dynamic changes in community transmission over time.[23]

COVID-19 infection was uncommon in the NI cancer population identified in this study. In addition, a minority of patients had treatment stopped due to the pandemic. A large proportion of patients included had metastatic disease, and less than half of patients were undergoing chemotherapy at the time of their COVID-19 diagnosis. Almost half of the affected patients required inpatient care, but intensive therapy was rarely required. Age and pre-existing hypertension were associated with severity of disease, and patients with thoracic cancer were more likely to be affected. Age and pre-existing hypertension were also factors associated with death in the cohort presented, as was a diagnosis of thoracic cancer.

Although the inclusion criteria differed, many of the data from NI are comparable to the UK-wide study; for example, the low recent chemotherapy, treatment interruption, and ITU admission rates.[14] This cohort of over 800 patients from 55 hospitals found no association of COVID-19 with cancer treatments but rather that patient factors such as age and male gender did correspond with risk of mortality, which was mirrored in the current cohort.

In a regional analysis of the Oncology service, the number of patients embarking on new courses of SACT and RT delivery were reduced transiently only, during April-May 2020 and August 2020 respectively. Reduced activity may in part reflect diminished diagnostic capacity delayed presentation of patients during lockdown and suspension of cancer

screening programmes in the early stages of the pandemic.[24] Trends resulting from pandemic-specific clinical protocols complicate the interpretation of these data, such as increased usage of single-fraction palliative RT treatments, and oral SACT regimes in place of more intravenous treatment. Also not captured specifically in this dataset, a sizeable proportion of patients would have had their primary treatment modality switched from surgery to radical chemo-RT in order to accommodate resource issues. Of note, due to the rapidly unfolding healthcare crisis, SACT guidance issued nationally was initially instigated on basic principles, in the absence of a robust evidence base. Similarly, the Royal College of Radiologists published UK-specific recommendations in relation to the use of hypofractionated RT, which some UK centres would have had a limited degree of familiarity with only.[25]

More recently, time-dependent improvements in outcomes have been reported comparing the earlier and later phases of the pandemic supporting universal vaccination of patients with cancer as a protective measure against morbidity and mortality.[26] However, this could not be explored in the cohort included in this study as only patients diagnosed during the early phase were included. Furthermore, vaccination programs in NI commenced in December 2020 and was not routinely collected for the majority of participants in this study during the time of data collection.

The medium and long-term impact of COVID-19 in patients with cancer is unknown. However, evidence suggests that sequelae post-COVID-19 affects a proportion of cancer patients and has an adverse effect on survival and oncological outcomes after recovery.[27] The data collection period included in this study does not allow us to address these issues. Ongoing follow up of sequalae and oncological outcomes is required to further understand the impact of COVID-19 infection in patients with cancer.

This study has a number of limitations. Firstly, it is impossible to exclude selection bias from the enrolled cohort given that the investigators relied on colleagues referring cases for consideration of study inclusion. The intensive nature of delivering most anticancer therapy meant that patients on active treatment were more likely to be referred. Secondly, the impact of changes to service delivery in the initial months of the pandemic could not be determined from this dataset; for example, mortality may have been increased through the reduced use of palliative cytotoxic therapy. Thirdly, the investigators did not have access to testing data at a population level and so denominators could not be calculated. Lastly, testing policies in the UK varied during the study window, meaning some potential cases of COVID-19 infection many have been missed. In addition, sample sizes were small particularly in subgroup analyses, and this is reflected by wide confidence intervals. Nonetheless, the small population size, coupled with electronic healthcare and a unified healthcare system makes Northern Ireland well placed to conduct population-based research, including in groups of the population such as cancer patients, especially in a pandemic situation where there is a need for rapid evaluation of the severity of COVID-19 in a vulnerable patient cohort.

Conclusion

In summary, we present a region-wide prospective cohort study of patients with cancer diagnosed with COVID-19. Although the co-occurrence of these conditions was uncommon in this study cohort, and the mortality rate was low in this population, specific groups were identified as having increased susceptibility. While these data and those of other prospective studies are informative, it is likely that dedicated studies for specific cancer treatments (i.e. cytotoxic chemotherapy, hypofractionated RT) and specific risk groups (i.e. thoracic cancer, young adults) will be required in order to draw robust conclusions about COVID-19 and cancer. This study will go some way in describing the impact of COVID-19 on mortality and treatment delivery in cancer patients in NI and may help to inform our response in future pandemics.

AUTHORS' CONTRIBUTIONS

L.F., A.H., A.L., G.W. and K.T. were involved in the study design; L.F., A.H., A.L., G.W., K.T. and C.O. were involved in the data collection, acquisition and management; L.F., A.H., A.L. and G.W. were involved in data analysis and interpretation; writing—review and editing, all authors; supervision, R.T.; All authors have read and agreed to the published version of the manuscript.

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ETHICS APPROVAL

The UKCCMP database was designed as a public health surveillance registry in accordance with the UK Governance Arrangement for Research Ethics Committees.

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DECLARATION OF INTERESTS

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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Clinical Paper

NHS Trust Boards and Health and Well-being Boards: Do they play any role in the management of disparate levels of care for South Asian patients with Inflammatory Bowel Disease?

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Key words: NHS Trust Boards; Health and Wellbeing Boards; Disparate care; Directors; South Asians

Abstract:

Aims:

There is evidence of disparate levels of care for members of ethnic minority communities with inflammatory bowel disease in various NHS Trusts and Health Boards in England and Scotland. The purpose of this study was to investigate whether there was any association between the existence of disparate levels of care and the ethnic composition of the management boards of NHS Trusts and Health Boards. It also examined the ethnic composition of Health and Wellbeing Boards associated with these Trusts in England

Method:

NHS Trusts in England and Health Boards in Scotland, which had been involved in previous studies of disparate levels of care, were identified through a review of the relevant published papers. Health and Wellbeing Boards associated with these Trusts were then identified. Executive and non-executive membership of the NHS Trust, Health Boards and Health and Wellbeing Boards was determined through scrutiny of their web pages.

Results:

The proportion of Asians, who were executive officers, was significantly lower than the proportion who were non-executive board members both for trusts who offered disparate care ($z = 2.22$; $p < 0.03$) and those which did not ($z = 2.24$; $p < 0.03$). There was no significant difference in the proportion of Asians who were non-executive board members between the two types of trust. The proportion of ethnic minority members of English Health and Well-Being Boards, where there was evidence of disparate levels of care received by South Asian patients was significantly greater than on Boards where this was not the case. ($z = 2.8$. $p < 0.005$).

Conclusions:

The relation of these findings to disparate levels of care is unclear. However, it may point to a culture of tokenism, where either the members are not truly representative of underserved communities or they are unable to have any influence on local policy decisions. In either case there is an urgent need to develop better links with minority communities who are underserved so that issues can be effectively identified and remedied.

Introduction:

Over the last decade it has become apparent that a number of NHS Trusts in England have disparate levels of care when managing patients with inflammatory bowel disease[1-6]. This has been seen in South Asian, Afro-Caribbean and Eastern European communities[2,5,6]. There are also data that it occurs in Scotland, whereas information on minority communities in Wales and Northern Ireland is not collected in sufficient detail to allow an analysis[6]. However, it is not a universal phenomenon with 11 of the 29 Trusts investigated not showing evidence of disparate care. The reasons why it happened in the other 18 Trusts are unclear[4-6]. There is some evidence from research in other areas of healthcare that it may be linked to a reluctance on the part of management to take ownership of the issue[7]. Indeed, a study of the responses in three areas where such disparate care was identified from Trust's own data there was a denial of its accuracy and no action was taken[8].

The purpose of this study was to examine those Trusts reported previously to have provided disparate care and compare their management structure with that of Trusts where there was equitable delivery of care[3,5,6]. Health and Well-Being Boards are tasked with monitoring Trust's performance at a local level[9] and the composition of their management boards was also examined. These investigations were undertaken with a knowledge that "tokenism" has played a role in ensuring that there is apparently adequate representation of minority communities on decision making bodies[10]. Indeed, tokenism has been defined in healthcare as "the practice of making perfunctory or symbolic efforts to engage communities or patients"[10]. As early as 1969, Sherry Arnstein conceptualised a ladder of citizen participation with 8 steps representing increasingly significant levels of involvement in decision-making[11]. However, the reality of that ladder is yet to be seen

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in terms of a positive impact in the delivery of health care to ethnic minority communities. The token inclusion of some members of such communities on the management boards of NHS Trusts and Health and Wellbeing boards is more likely to lead to their assimilation[12]. Kanter has argued that in the workplace representation needs to reach a level of 15% to be effective[12].

Method:

NHS Trusts in England and Health Boards in Scotland, which had been involved in previous studies of disparate levels of care, were identified through a review of the relevant published papers[4,5,6]. In these studies, disparate care had been assessed through Freedom of Information Requests. These had included investigations of the proportion of patients with inflammatory bowel disease from various ethnic communities who had received biologic therapy and the expected and observed number of patients from these communities admitted to hospital.

For this study, Health and Wellbeing Boards associated with these Trusts were identified. Executive and non-executive membership of both the NHS Trust and Health Boards was determined through scrutiny of their web pages. Assessment of ethnicity was through consideration of names and from the content of published bios, including Trust's websites, Linked-in entries and publicly available information identified through Google searches including their standing as executives or non-executives. Chairpersons and Chief Executives were considered separately. A similar approach was adopted for membership of Health and Wellbeing Boards. White, Asian or Afro-Caribbean ethnicity of those members was determined from these web page entries. Although the majority of Asian executives and non-executive directors were South Asian, a small number were East Asian.

The Asian ethnic composition of Trust and Local Health Boards was compared between organisations where there was evidence of disparate levels of care for South Asian patients with inflammatory bowel disease with those where this had not been identified. A similar approach was used to compare Health and Wellbeing Boards. A non-parametric z statistic was used to compare population proportions of ethnic minority membership between Trusts providing disparate care and those providing equitable care[13].

Results:

Of the 29 Trusts and Local Health Boards involved in previous studies, 18 had shown evidence of disparate levels of care. The proportion of Asians, who were executive officers, was significantly lower than the proportion who were non-executive board members both for trusts who offered disparate care ($z = 2.22$; $p < 0.03$) and those which did not ($z = 2.24$; $p < 0.03$). There was no significant difference in the proportion of Asians who were non-executive board members between the two types of trust. In other words, the proportion of Asian professionals working in all Trusts and Health Boards was significantly less than non-executives. However, the proportion of non-executive board members who were Afro-Caribbean was significantly lower in trusts who did not offer disparate care ($z = 2.64$, $p < 0.008$) (Table 1)

Twenty-eight English Health and Wellbeing Boards were identified as being associated with the above NHS Trusts. Scotland does not have a directly comparable system. In three cases no publicly available information on membership of the board was available. The proportion of ethnic minority members of English Health and Well-Being Boards, where there was evidence of disparate levels of care received by South Asian patients was significantly greater than on Boards where this was not the case. ($z = 2.8$. $p < 0.005$) (Table 2).

Discussion:

NHS Trusts and Local Health Boards have a significantly lower number of South and East Asian professional executives than non-executive members. Both South and East Asian communities are also poorly represented amongst Chief Executives and Chairmen. Although the role of non-executives is to represent the local community, it is of some concern that where there is evidence of disparate levels of care, the proportion of members of the local Health and Wellbeing Boards was greater than where there were no such differences. This finding underlines the ineffectiveness of either Trust or Health and Wellbeing Boards having any impact on the care delivered by Trusts to poorly served communities.

The wider relevance of these findings to other English and Scottish NHS Trusts and Health Boards can only be speculative. The 29 Trusts and Health Boards were included in the original studies because they served significant ethnic minority communities. Of these 62% provided disparate levels of care across their populations with minority communities receiving poorer access to biologic therapies or more limited access to consultants and investigations[2,4,5]. The current trend to blame such disparities on the communities themselves provides little hope that the situation would be broadly different in other areas of the UK[14].

In March 2020, NHS England and NHS Improvement set an aspirational target to achieve 19% Black, Asian and Minority Ethnic (BAME) representation across all levels in the organisation by 2025. In October 2020 they adopted the BAME talent strategy to help achieve the 19% target[15]. However, both failed to appreciate that for there to be an effective representation of minority communities, it is critical that appointees at all levels come from those communities and share their cultural, social and religious values. When they do not, they become no more than tokens meeting political targets. In 2021, 12.6% (approximately 350 people) of all English NHS Trust board members were from a BAME background[16]. This report includes about 20% of such board members

The NHS Workforce Race Equality Standard Report for 2021 found that BAME were significantly less likely to

Table 1: Composition of Trust Board Membership

	Disparate Level of Care (n = 18)			Non-Disparate Level of Care (n = 11)		
	White	Asian	Afro-Caribbean	White	Asian	Afro-Caribbean
Chair & Chief Executive	34	1	1	21	1	0
Executive Officers	110	7	9	77	5	1
Non-Executive Members	113	20	14	72	15	1

Table 2: Health and Wellbeing Board Membership

Health and Well-Being Board	Total Membership (n)	Number of Asian Members (n)
Bristol	26	1
Hereford	No details	
Walsall *	8	3
Wolverhampton *	No details	
Luton *	5	3
Southampton *	11	1
Cambridgeshire & Peterborough *	9	0
Redbridge *	No details	
Havering *	10	2
Warwickshire *	18	1
Coventry *	18	3
Leicester *	28	9
Leicestershire *	22	5
Derby	6	0
Nottingham	26	1
Nottinghamshire	25	1
Bradford & Airedale	15	2
Birmingham	13	0
Sandwell	18	3
Lancashire	12	1
Slough	15	2
Richmond	8	0
Hounslow	9	0
Croydon	18	1
Essex *	28	2
Southwark	17	4
King's Lynn	2	0
Buckinghamshire *	20	1
Total	387	46
Mean (± SD)	16 ± 8	2 ± 2

• Trusts where there was evidence of disparate levels of care experienced by South Asian patients with inflammatory bowel disease

The proportion of ethnic minority members of English Health and Well-Being Boards, where there was evidence of disparate levels of care received by South Asian patients was significantly greater than on Boards where this was not the case. ($z = 2.8$. $p < 0.005$)

be short-listed for appointments and this has remained unchanged for the last 6 years[16]. Ferlie, *et al* [17,18] found that English NHS boards tended to endorse managers' decisions rather than make their own, although NHS boards have been re-structured and re-populated several times since that time. Thus, the fact that the proportion of executives who were of Asian origin was significantly less than those who were non-executives raises questions as to their potential to influence decision making within trust boards. The importance of managers taking ownership of issues was recognised by Salway, *et al*[7]. When this does not happen, change does not occur and the relative lack of South Asian executives able to promote change may be part of the explanation for disparate levels of care. However, this low level was also seen in Trusts where there were no issues with appropriate levels of care and so clearly other factors must play a role.

In a study of English NHS Trust Boards in 2015, non-executive members took an interest in what policy makers regarded as the most important policy and managerial issues, in a way that reflected their organisation's role in the wider health economy and their own role in governance activities outside board meetings[19]. In 2007 Nigel Hawkes, the Health Editor of *The Times,* described the role of non-executive directors in the following terms:

"Non-executive directors and chairmen and chairwomen, though I hate to say it, are treated sometimes as no better than useful pawns in a game whose goodwill, local knowledge, and devotion to public duty are exploited by the NHS until the moment comes to toss them aside."[20]

Narrowing health inequalities was one of the driving factors behind the creation of Health and Wellbeing Boards[9]. The evidence that this has been achieved with regards to under-served minority communities has not been demonstrated by this study. Their role was envisaged as:

Having a strategic influence over commissioning decisions across health, public health and social care, integrating services.

Involving democratically elected representatives and patient representatives in commissioning decisions alongside commissioners across health and social care.

Bringing together clinical commissioning groups and councils to develop a shared understanding of the health and wellbeing needs of the community.

Through undertaking a Joint Strategic Needs Assessment (JSNA) drive local commissioning of healthcare[21].

Boards have a statutory duty to involve local people in the preparation of JSNAs and the development of joint health and wellbeing strategies. Overall the Boards involved in this study had a mean of 13% of members coming from a minority community. However, despite having significantly more Asian members, those Health and Wellbeing boards (HWB) linked to Trusts providing disparate levels of care have been ineffective in producing a change to the benefit of minority communities. Although it could be argued that these Boards have not been in existence long-enough to effect such a change, earlier work pointed towards their likely ineffectiveness[8]. A recent study by Visram, *et al*[22], which explored the relationships and interactions between HWB members and the public or their representatives, confirmed that meetings were carefully staged and scripted performances that tended to inhibit rather than enhance democratic accountability. A different study has raised questions as to the transparency with which Health and Wellbeing boards use research data on their local community and their exclusion of published qualitative literature suggests that gaining an understanding of the mechanisms driving health inequalities and how interventions to tackle this 'work' is not prioritized[23].

Healthwatch was established under the Health and Social Care Act 2012 to understand the needs, experiences and concerns of people who use health and social care services and to speak out on their behalf. These organisations are funded by local authorities and have an input into the Health and Wellbeing Board. However, the disconnect between such bodies and local ethnic minority communities is well illustrated by a comment in the annual report from Healthwatch Leicester and Healthwatch Leicestershire:

> "The response to our survey from minority ethnic (BME) people was low and this limited our ability to analyse how the Covid-19 lockdown impacted on these communities. Therefore, to understand further the impact of Covid-19 lockdown on minority ethnic communities, we established 'BME Connect' – a platform for communities to come together to talk about the issues that matter the most to them."[24]

The concept that underserved communities will make use of an internet-based platform in contrast to completing survey forms points to a fundamental lack of understanding of the issues.

Institutional or structural racism was recognised within the NHS shortly after publication of the Macpherson report[25]. Although discrimination against staff is frequently reported, that experienced by patients receives considerably less attention. Nevertheless, the Public Sector Equality Duty (Equality Act (2010)) formed the basis for the statement in the NHS Constitution that:

> "Legal duties require NHS England and each clinical commissioning group to have regard to the need to reduce inequalities in access to health services and the outcomes achieved for patients."[26]

In 2013, NHS Improvement was tasked with issuing Provider Licences to Trusts and among the conditions is:

> "4 (b) reducing inequalities between persons with respect to their ability to access those services"[27]

However, in 2019 a British Medical Journal editorial discussed "decades of evidence of disparities in health outcomes related to ethnicity"[28]. It reported that: "The evidence is clear on the discrimination and prejudice against patients and staff from ethnic minorities. What is less clear is the appetite of health systems in the UK and around the world to tackle age-old health inequalities based on race and ethnicity." Indeed, there have been no reports of responsible organisations ever taking action on the basis of ethnic or religious discrimination.

There is an extensive network of statutory bodies[29] whose function is to ensure the equitable delivery of care to the communities that they serve. Over the last decade many of them have been completely ineffective in achieving this objective. It is unclear as to why this is the case. Where there are significant issues, South Asians make up a significant proportion of board members. However, whether they are representative of these underserved communities is open to serious question and their presence is more consistent with tokenism than a real attempt to address fundamental issues of inequality in the delivery of care.

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Medical History

The Launch of William Whitla's Medical Institute: Undercurrents and Outcomes

Alun Evans Honorary Professor

Introduction

Although the launch of the new Medical Institute took pride of place, the unveiling of the Dr William Smyth Memorial Window by the Countess of Dudley was a highlight of the day. Surprisingly, as we shall see, the launch involved considerable political undercurrents. Also, the paths subsequently taken by three of the launch's main participants had some strange twists.

An Occupational Disease of Irish Doctors

Dr William Smyth died of Typhus, which has been something of an Occupational Disease of doctors. Howard Ricketts and Stanislaus von Prowazek, the doctors for whom the causative agent *Rickettsia prowazekii* is named, both succumbed to it.[1] It is well accepted that the eruption of Mount Tambora in the Philippines in 1815, thanks to its adverse weather effects, caused 'The Year without a Summer' in 1816.[2] That year, Mary Shelley created Frankenstein on a washout holiday beside Lake Geneva. It also led to the Ireland's Typhus epidemic from 1816-19, with 1.5 million cases and 65,000 deaths, most notably in 1817. Mortality was higher in doctors and clerics[3] because "They had less or no immunity, were older, male, came into contact with cases through their calling, and therefore suffered a high mortality".

Dr George Gillichan of Dundalk died in December 1817 aged just 28 years,[4] "During a Contagious Fever with which Providence was pleas'd to afflict this Country", and:

> Under his directions a system of medical police was established, and a hospital on an ample scale provided, which he gratuitously attended, and which the inhabitants liberally maintained. From the time the fever began to rage, he declined visiting the rich, that the poor might have his undivided attention.

Barker and Cheyne proposed control measures, one of which was the prohibition of Wakes,[5] which was prescient, given that the disease's vector, *Pediculus humanus corporis*, leaves its host not only when fever takes hold but when the body cools after death.

Typhus returned with a vengeance during the Great Famine of the 1840s. MacArthur[6] noted that, as in the earlier Typhus epidemic, people were not only hungry but cold because it was too wet to 'win' turf. Traditional Irish hospitality was also problematic because when starving people went on the road, they were invariably taken in, and congregating at soup kitchens facilitated disease transmission. MacArthur differentiated between 'Typhus in the Peasantry' and 'Typhus in the Gentry'. In the former group there was transmission within the family (source: fresh louse faeces), with a low mortality (high resistance, younger victims, previous exposure). In the latter, there was no transmission within the family (source: inhaled, dried louse faeces), with a high mortality (low resistance, older victims, no previous exposure).[6] Doctors fell into this group in what was a reversal of the general social class gradients of disease. In 'Black 47' in Munster alone, 48 doctors died, mainly from Typhus, and of the 473 medical doctors appointed by the board of health to special fever duty, one in every fourteen died at his post.

Dr William Smyth

William Smyth was born at 'Stonepark', Mountcharles, Co Donegal, on 30th March 1859, the eldest son of Samuel Smyth, the local Dispensary Doctor.[7] Smyth junior attended the Royal School, Raphoe in Co Donegal and afterwards read Medicine at Trinity College Dublin (TCD), where he survived Smallpox, and was awarded his Licentiates in Medicine and Surgery from TCD and the Royal College of Surgeons of Ireland, respectively, in December 1880.[8] His 'MD' was celebrated in Mountcharles with bonfires when, "a lighted barrel on poles" was carried and placed in front of the family's hall door, whereupon Smyth emerged to deliver, "a neat and appropriate speech". "The assembly then amused themselves [sic] to a late hour with music and dancing."[9]

That year he was appointed as a Dispensary Doctor in Ardara,[10] moving to the Dungloe/Burtonport Dispensary district in the Rosses, which included Arranmore Island, in October 1882 after the death of Dr John Spencer from Typhus. The outbreak seems to have been caused by migratory workers (*spailpín*) returning from harvesting in Scotland,[10] or from imported second-hand clothes.[7]

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Figure 1:
Wedding photograph of
William and Esther Smyth, 1883.
Courtesy: Anthea Smith

Smyth took up residence at Roshine Lodge, since demolished, just outside Burtonport. He married Esther Keown, five years his junior, in April 1883 (see Figure 1).[11] She was a daughter of William Keown, formerly of Ardglass, Co Down,[12] whose brother had been brought by Lord George Hill in 1846 to run the Corn Store at Bunbeg.[13] Just before Christmas 1900, there was an outbreak of Smallpox and Smyth vaccinated around 700 people at Lettercaugh in a fortnight.[14]

In October 1901 there was an outbreak of Typhus on Arranmore Island.[14] Typhus was always a threat to doctors in the Rosses: we have already discussed John Spencer's demise,[10] and Dr Charles Doherty died from the disease in 1887,[15] and at least two deaths had occurred from Typhus in local doctors earlier that century.[16,17] Smyth was "summoned" to Arranmore on 13th October to treat the Gallagher family. In a fashion reminiscent of George Gillichan, Smyth took over the sole care of the family and decided to move the husband, wife and three children to the hospital in Glenties.[14] The family was not keen to leave their cottage (see Figure 2) as it was feared it might be burnt by neighbours, so strong was the dread of the disease, but they finally consented. An

Figure 2:
The Gallagher's cottage on Arranmore Island,
which survived their departure.
Reconstituted watercolour by FD How

ambulance was arranged for the mainland but the problem was to find a suitable boat. He failed to borrow one because of fear of infection, so had to buy an old one which had been out of the water for two years.[14]

Smyth had no one to crew for him, but help arrived in the shape of Dr Brendan MacCarthy, the Medical Officer of Health for Co Donegal. The pair successfully rowed the family across the three miles of sea to the waiting ambulance. This took them to hospital where they all made a good recovery. The boat, on the other hand, sank after a few hours,[14] or according to the BMJ,[18] after five minutes. Smyth then decided to visit the Glasgow International Exhibition (see Figure 3),

Figure 3:
Postcard of the Glasgow International
Exhibition, 1901. Source: Author's collection

and sailed directly there from Burtonport on 6th November, but he soon started to feel ill and returned home. He died from Typhus on 19th November and is buried in St Crone's Church of Ireland cemetery in Dungloe, along with six of the couple's 14 children.[14] There is a fine monument to him inside the church (see Figure 4).

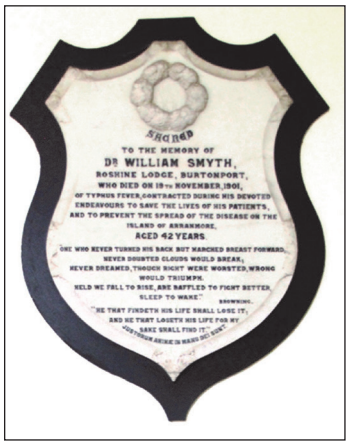

Figure 4: Memorial Plaque to Dr William Smyth. St Crone's Church of Ireland, Dungloe

A Hero of Donegal

Smyth's death caught the public's imagination, and a fund to support his family was established a month after Smyth's death, chaired by the Duke of Abercorn, the Lord Lieutenant of Co Donegal, with Smyth's old college mate, Thomas Myles, serving as a trustee.[19] An editorial in the BMJ declared:[18]

> But such a man as William Smyth is a glory to the whole profession, and his death in the prime of manhood … must be counted more heroic than a death in battle. Soldiers die for their country in the fierce joy of combat; William Smyth died for his fellow men with nothing to cheer him on but the sense of professional duty.

The following year, Frederick Douglas How published a 'Memoir' entitled, 'A Hero of Donegal'. How's initial literary excursion was a biography of his father, Bishop Walsham How, in 1898.[20] He comes across as a high-minded, Anglican hagiographer who specialised in 'uplifting' moral tales for boys and girls. Smyth's death had featured heavily in the English press and How spotted a vehicle for his talents. He was a gifted watercolourist who illustrated his own books. He visited the Rosses in early 1902 when he commented on the idleness, "…there is enough and to spare", and disapproved of the local blacksmith being still in bed at 9.15 am![7]

It seems, however, that How had blundered into something that he did not fully understand, and no one saw fit to enlighten him. It is a valuable little book, although it is only told from one perspective. The Derry Journal carried a critical review:[21]

> The memoir is a friend's tribute to a friend gone before and in this character is appropriate and sympathetic. We cannot help, however, expressing regret that the author goes into other matters that in our judgement had much better – certainly with much nicer taste – have been left out, and that, as it seems to us, jar somewhat on the spirit of graciousness and appreciative kindly good-will so markedly in evidence during the promotion of the testimonial fund subscribed to in splendid generosity and cordiality by all sections of the public.

No clue is given as to the nature of the "other matters" which "nicer taste" should have omitted. There are a number of possibilities, including the fact that Smyth was a "strong Loyalist"… [who] "did not hide his loyalty under a bushel,"[11] and the district was "'Nationalist,' almost to a man". Smyth had even been captain of the Burtonport cricket team,[22] however unlikely that sounds, but the Herdmans of Sion Mills, where cricket reigned supreme, had a longtime connection with the Rosses.[23] During the Boer War, Smyth, "…raised a sum of £20 in Burtonport—a strong pro-Boer locality—for the widows of those who were killed in South Africa".[24]

No, it is undoubtedly the six-month sea voyage that Smyth embarked upon in the autumn of 1889[25] – "a six months' [sic] trip to Australia for the benefit of his health".[26] This was on the advice of the eminent Dublin-based Physician,[27] James Little, with whom How corresponded.[28] James Little had befriended Smyth during a sporting holiday in Donegal.[21] Little reported that Smyth had suffered from a persistent cough, "…and feared he was going into consumption".[25] Incidentally, Little's name was on the guest list for the Institute's launch in 1902, but he doesn't seem to have attended.[29]

Little's diagnosis lies uneasily with the description of Smyth given by How: he was six feet two inches tall, "As fine a man as you'd see coming into a fair," and, "…he came to weigh fifteen stone, but there was never an ounce of superfluous flesh upon him".[10] There was also Brendan MacCarthy's description of Smyth at the Annual Dinner in the new Medical Institute:[30]

> Of splendid physique, a fearless horseman, an all-round athlete, as well as a man thoroughly grounded in the work of his profession. He was fully appreciated by the people among whom he worked. Though differing widely from them in many things considered of importance, he was recognised as a true man, and was respected and loved by all.

He was also a highly accomplished sailor, winning a cup outright at the Rosses Annual Regatta on 8th August 1889, just ten weeks before his world circumnavigation for the "benefit of his health".[31] Smyth was plainly not a man to be cowed by anything, or anybody, so what exactly was going on?

The Land War

In Ireland in the 1870s, some landlords such as the Marquis of Downshire had massive estates (115,000 acres) along the east coast, while the Duke of Abercorn owned 76,000 acres in Tyrone and Donegal; more than half the land was owned by less than 1,000 landlords. In contrast, in 1851 over half of tenants had less than 15 acres.[32] Despite Gladstone's Land Acts, which aimed to break up the estates, the return of famine in 1879 saw the foundation of the Irish National Land

League by Michael Davitt and others, which resulted in the Land War. This led to tenants withholding rent, and multiple evictions.[32]

It was replaced from 1886-91 by 'The Plan of Campaign', which involved a more focused version of agitation and called for withholding rent when owners refused to reduce them by 20-40%.[33] Donegal had witnessed the Derryveagh Clearance of 1861 when the Landlord, John George Adair, evicted 45 families. By the late 1880s Wybrant Olphert's estate of just over 18,000 acres at Falcarragh had become a political hotbed.[32] Tenants who joined the Plan would hand over their rent, less the reduction, to a trustee – in this case to James McFadden, "The Patriot Priest of Gweedore".[13] This resulted in many evictions with battering rams to the fore.[34] McFadden was jailed for his activities for six months in 1888.[13]

The Murder of District-Inspector Martin

On his release, McFadden blithely continued as before, but when his re-arrest was bungled on 3rd February 1889, McFadden's angry parishioners bludgeoned the RIC's District-Inspector Martin to death with paling posts and stones.[13] Ten people, including McFadden, were charged with murder and a further 13 with conspiracy. Their trial began at Maryborough (Port Laoise) on 17th October,[35] but collapsed on 26th, partly thanks to stark photographs of the peasantry's living conditions (see Figure 5). They were taken by James Glass, a Derry photographer, and commissioned to inform the defence in the trial, which may have helped soften the attitude of a hostile jury.[36] McFadden, who pleaded guilty to obstruction, was immediately released. Several others received relatively light sentences, and they all were released when the Liberals were returned to power in 1892.[35]

Figure 5:
A Derrybeg extended family, photograph by James Glass, 1889. Source: Author's collection

Dr William Smyth's Sea Voyage

According to How,[28] James Little confirmed that Smyth had consulted him about his health in 1888 or 1889. The upshot was that Smyth sailed to Quebec from Moville on the *Parisian*,[37] departing on the day the Maryborough Trial began. That August he had received permission for six months' leave of absence from duties,[38] and in September he was presented with an Address and a bag of sovereigns by friends.[37] He left nine days after his son – and second child to survive – was born (three previous children had not survived their first day).

It seems highly probable that Smyth departed just as the Trial started because he was considered a reprisal risk. So, was Smyth involved in the Land War? He had been made a Justice of the Peace for Co Donegal by its Lord Lieutenant, the Duke of Abercorn, the previous year when just 29 years old.[39] He undoubtedly presided at Petty Sessions, but records have not survived. A merchant in Dungloe had been boycotted but Smyth strongly supported him, and he was warned not to fraternise with an RIC Inspector in Dungloe.[28] A glimpse of Smyth's antipathy to the Land War is given by his support for District-Inspector Markham at his Court Martial. Markham may have been a scapegoat for the mishandled arrest of Father McFadden that February, because, although Markham was found guilty, he afterwards returned to duty.[40]

Questioned by Markham in April 1889, Smyth stated:[41]

> Dungloe district was disturbed some time after your arrival there. The peace of the district has been well preserved during your time. From my intercourse with the people I believe the fear you instilled into them, and the prompt manner in which you met warlike rowdyism and riot, was the means of deterring them from coming into Dungloe after sunset lest they came into contact with the police.

Thus, it seems highly likely that Smyth had created animosities which the Maryborough Trial was going to further inflame, so it was considered prudent for him to go abroad. If so, why did he leave his wife and children behind? One contemporary authority noted that, "…maiming of women and children – have never dishonoured the county".[42] It seems, therefore, that his family were thought to be safe, but he may have been considering a new life elsewhere. He set sail for Australia and England from Victoria, BC, on the *Dochra*,[25] at the end of December, no doubt having heard that the Trial had collapsed. He arrived in Liverpool on 29th April 1890,[43] to return home "… in a wonderfully improved state of health".[25]

The Impact of Two Donegal Murders on Public Opinion

Writing in 1899, Stephen Gwynn observed: "Two murders in Donegal – this one [Martin's] and that of Lord Leitrim – have had a wide-spread notoriety".[42] Lord Leitrim had been murdered in an ambush on Fanad in April 1878 over land disputes.[44] Martin's murder sparked a Loyalist 'Indignation Meeting' in Belfast's Ulster Hall on 14th February,[45]

addressed by Sir Edward Harland, and the Reverend Hugh Hanna, where 'Partition' was very much in the air. One newspaper referred to, "…the half-civilised peasants of Gweedore".[46] In view of such polarization, the friendship and respect shown towards Smyth by Brendan MacCarthy is heartening: whereas Smyth was a staunch Loyalist, Brendan had an impeccable Nationalist background. His father was Denis Florence MacCarthy, who, like Oscar Wilde's mother *Speranza*, wrote for Thomas Davis' Nationalist paper, *The Nation*.[47]

In September 1895, a request was made by John St. Clair Boyd,[48] a Fellow of the Ulster Medical Society and first President of the Gaelic League, to hold Irish classes in the Society's rooms – the application was, "…not entertained".[49] Sir William Whitla himself was a staunch Loyalist, signing various Covenants.[50] In 1909, when Sir William was President, the handbook prepared for the British Medical Society's AGM in Belfast didn't even mention 'Ulster', alluding instead to "Belfast and North-East Ireland".[51] Probably to Sir William's consternation, the Burroughs Wellcome handbook, produced by Henry Wellcome for the AGM, was entitled "Medicine in Ancient Erin"[52] and dripped with Celtic iconography.

Fresh Departures

As mentioned, some of the main players at the launch developed new interests. Sir William would have been concerned that the Earl of Dudley, a Conservative, and therefore hostile to the Liberals' 'Home Rule' rhetoric, later "…developed strong Nationalist views, much to the annoyance and amazement of his own political party".[53]

Sir Thomas Myles, who had received his knighthood with Sir William, took a more bizarre diversion. He was a huge man, an accomplished athlete and boxer, who used to spar with John L Sullivan, the pugilist, and even fought a three-round bout with him.[54] In 1886 he became a founding member of the short-lived Protestant Home Rule Association, and often spoke on Home Rule at public meetings. He was also a keen yachtsman, so thanks to his commitment to Home Rule, and his concern over the Ulster Volunteer Force's arming in 1914, he agreed to assist Erskine Childers in acquiring arms for the Irish Volunteers. In his steam yacht, *Chotah*, he met Childers in the *Asgard*, transferred rifles and ammunition, and landed them at Kilcoole, Co Wicklow, on the night of 1st August 1914.[54] Years later he exclaimed to a young Volunteer who questioned his commitment, "I brought you those guns to show that bloody Craig that two could play his game".

The Countess of Dudley was born Rachel Gurney in 1868, the daughter of a Quaker banker, who ran into financial difficulties. To survive, she and her sister helped their mother to run a millinery shop, but it went badly. She was noticed for her beauty and singing by the Duchess of Bedford and became her protégée (see Figure 6). She was wooed by the second Earl of Dudley, and the couple married in 1891. The

Figure 6:
Rachel, Countess of Dudley in 1891,
© National Portrait Gallery, London

Earl's family was not that pleased and sometimes referred to her as the "shop girl Countess".[55] The couple came to Ireland as Viceroy and Vicereine in August 1902 and stayed until December 1905.[56] She became acutely aware of poverty in Dublin city, although people there had access to doctors and charities, but during holidays in Connemara she was shocked at the destitution of the poor.[57] The Countess wrote to the newspapers to raise money for her 'Lady Dudley Nursing Scheme' covering the entire west coast.[58] Up to its launch in April 1903, there were only four certified district nurses in the west of Ireland.[59]

The Scheme's First Annual Report in 1904 observed:[60]

> The Island of Aranmore [sic] and district of Burtonport, Co. Donegal came next in order of selection, and Nurse McMahon (see Figure 7) was appointed to this district on March 3rd [1904]. From this remote locality, familiar to the ear of most Irishmen, comes the echo of a name which yet endures, that of Dr. Smyth of Burtonport, who nursed the sick on the Island of Aranmore during an epidemic of typhus, eventually dying himself of the same disease.

Figure 7:
Nurse MacMahon, the eighth Dudley Nurse appointed, on the strand at Arranmore Island in 1904. Source: Second Annual Report, 1904. Courtesy of the National Library of Ireland, Dublin

The Burtonport Priest wrote thanking her 'EXCELLENCY' because, until then, it had not been possible for "…the dispensary doctor to reach the island in stormy weather" so that the sick were "…left to the mercy of the winds and waves". The Scheme co-operated with the Congested Districts Board until 1923, and ended in 1974.[61]

From 1908-11 the couple were in Australia when the Earl became the country's fourth Governor General. In 1909 the Countess launched her Bush Nursing Scheme, which faltered through lack of funding,[62] but eventually became a forerunner for the famous 'Flying Doctor' service.[57] She also established the Countess of Dudley's Polo Challenge Cup, which is still contested today.[63] Sadly, despite the couple's seven children, the Earl was a philanderer whose 'Concupiscent Capers'[63] led to the couple's separation with a hush hush financial settlement in 1918. In June 1920, the Countess, then aged 51, had just arrived in Galway on holiday, when she drowned while swimming in the sea, watched by her maid, who "…was powerless to assist".[55]

The Whitla Medical Institute

In 1946 cracks began to appear in the Institute and doors were inclined to jam. This was traced to the enlargement of the old Police Barrack on the east side of the Institute to make a Merchant Seamen's Club. A hike in the Rates was also a headache.[64] During the 1950s there were wrangles with the Club about liability, but eventually incomplete compensation from the Club was received. Costs of publishing the Journal were also soaring, and as more problems were arising, the Institute was sold to Inst in 1965. Eventually new accommodation was made available in the new Whitla Medical Building, which was opened in May 1976, but it was not until 1982 that all the details were ironed out.[65] It provides a fitting home for the Smyth Memorial Window, and other important 'legacies' from the old building.

Conclusion

Frederick Douglas How had no grasp whatsoever of the real reason for the long voyage which William Smyth embarked upon in the autumn of 1889, but Sir William, and the Trustees of the Smyth Fund, certainly had. Its Chair, the Duke of Abercorn, would have been well aware of Smyth's previous history. Indeed, the fact that Smyth might have been a potential target of the same political forces that led to the murder of District-Inspector Martin, perhaps added to the poignancy of his tragic death, and the window represented a token of defiance against these political forces. In this much, at least, it was itself driven by political forces. In any case, the subsequent direction taken by the Countess was uplifting. She had witnessed destitution in Co Galway, but perhaps her noble initiative was triggered by the shining example of Dr William Smyth?

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Medical History

From a Vintage Journal (1890): Dr. Whitla's Urticaria Case and Dr. J.A. Lindsay's Notes on Asthma

Tracy Freudenthaler

Key words: Sir William Whitla, Dr. J.A. Lindsay, Ulster Medical Society, Stramonium, Himrod's Powders, asthma, patent medicines

Introduction:

Within a vintage 1890's handwritten journal believed to have been owned by Dr. Henry 'Health' O'Neill are a series of entries from additional Ulster Medical Society (UMS) Presidents: Dr. (later Sir) William Whitla, Dr. J.A. Lindsay, and Dr. (later Sir) J.W. Browne. The journal begins with Dr. O'Neill's 1889 procedure for brain surgery,[1] then include various medical conditions with treatment recommendations by each colleague. Presented here are images and transcripts of two original entries: Dr. Whitla's unusual urticaria case, and Dr. Lindsay's brief notes on asthma and its treatment. Inspired by Dr. Lindsay's entry, this article features a synopsis of Victorian era perspectives on asthma etiology and common treatments from the 1800's, specifically the affinity for smoking Stramonium. The broad use of the term 'asthma' included a host of conditions and symptoms, inviting many patent medicines to market their cures.

Background: The vintage journal authors: Whitla, Lindsay, Browne, and O'Neill

The *Transactions of the Ulster Medical Society* from the late 1800's show Dr. Whitla, Lindsay, Browne, and O'Neill frequently intersecting professionally. Whitla memorialized the January 1880 Ulster Medical Society session placing himself, Browne, and O'Neill together at Royal Belfast hospital and Queen's College[2]; here they observed each other in practice and discoursed over specimen samples and case studies. Whitla noted, "O'Neill spoke of the careful and dexterous way in which he witnessed the ovariotomy performed by Dr. Browne." [2]

The vintage journal establishes all men together in the 1890's. The timeline below adds additional historical significance; near the time the entries were made (circa 1889-1891), each had held leadership roles within the Ulster Medical Society. In 1880-1881, when Dr. Browne was UMS President, Dr. Whitla was serving as Secretary[3]. Dr. Lindsay served as Secretary from 1885-1886. [4] The gentlemen each served Presidential terms within a few years of each other: Whitla served from 1886-1887, and then 1901-1902; O'Neill served from 1891-1892, and Lindsay from 1897-1898.[5] Whitla was among Belfast Royal Hospital's professors in its final years and offered his vision and support to build (and fund) the Ulster Medical Institute. All practiced at the Royal Victoria Hospital; when it opened, Dr. Browne was recognized by his colleagues as its most distinguished surgeon.[6]

What is not yet understood is the original purpose of the journal. In no purposeful order, it includes random medical diagnoses with treatments, patient admissions and discharges with associated fees, and even the occasional poem written by a patient. O'Neill included a treasure, a full one-page description of brain surgery procedure including antiseptic agents and his trephine preference from 1889.[1] Lindsay documented cardiac patient care along with some curious tonics and tinctures of iron, quinine, and strychnine, then digitalis. Today, these entries provide a rare first-hand glimpse into medical practice in the late 1800's; for some unknown reason, these men memorialized their medical knowledge and experiences across the pages of this journal.

Dr. Whitla's unusual case of urticaria

Dr. Whitla made an interesting entry related to urticaria in 1890 (see Table 1 and Figure 1). Simply stated, urticaria, also known as hives, is a reaction to an allergen that is seen on the skin. He referenced the commonly observed reaction 'a nittle (*nettle*) rash or hives.' Next, he briefly presented a rare and dangerous case of an allergic reaction that occurred in a young man who was left 'unrecognizable,' likely from eating shellfish. The onset of symptoms was so swift and severe, the young man's hat would no longer fit on his head.

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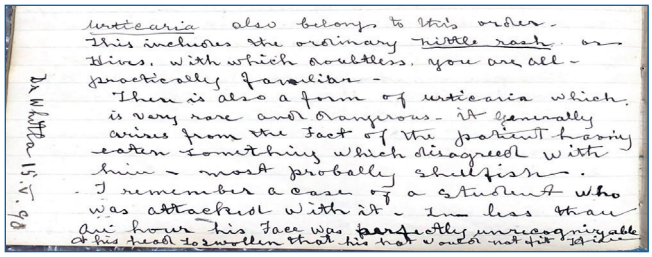
Lacking the contributors' perspectives on the purpose of the vintage journal, the entry appears random. It lies between a two and one-half page discussion of erythema and Dr. J.W. Browne's notes on caries, which were arranged around various names and addresses with no explanation.

Still, Dr. Whitla provides an interesting description of this unusual case of urticaria. Whitla does not offer treatment suggestions, leaving us to wonder this unfortunate student's outcome.

Table 1: Dr. Whitla's urticaria entry (1890)

Urticaria: Transcript of Dr. Whitla's handwritten journal entry (1890)
Urticaria also belongs to this order. This includes the ordinary nittle (nettle) rash or hives, with which doubtless you are all practically familiar. There is also a form of urticaria which is very rare and dangerous. It generally arises from the fact of the patient having eaten something which disagreed with him, most probably shellfish. I remember a case of a student who was attacked with it. In less than an hour his face was perfectly unrecognizable & his head so swollen that his hat would not fit (illegible). Dr. Whitla 1890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& his head so swollen that his hat would not fit (illegible)
Dr Whitla 1890

Figure 1: Image of Dr. Whitla's urticaria journal entry (1890). Journal owned by T. Freudenthaler.

Dr. Lindsay's notes on asthma

Dr. Lindsay's brief, yet concise notes on asthma spark interest. (See Table 2 and Figure 2 for transcript and image of his entry). Curiously, he stated asthma was not common as many believed; likely disdaining the over-use of the term that falsely included a variety of ailments. During the Victorian era there were many conditions and subsequent symptoms associated with the term 'asthma' including hay fever, colds, wheezing, and even tuberculosis. Dr. Lindsay did not indicate diagnostic criteria, but carefully noted in the journal that asthma was "a spasmodic affection of the bronchial tubes." However, historic viewpoints indicate the condition impacted those who were irritable with unstable nervous systems[7]. Lindsay's note that "Bronchial and Bright's disease are often mistaken for asthma" reinforces the position that 'asthma' was being broadly used as an umbrella term for multiple conditions. At the end of his journal entry, Lindsay recommended cigarettes de joy and Himrod's powders for relief.

Table 2: Asthma: Transcript of Dr. Lindsay's handwritten journal entry (Nov 5th, 1890)

Asthma: Transcript of Dr. Lindsay's handwritten journal entry (Nov 5th, 1890)
Asthma 'A spasmodic affection of the bronchial tubes' This disease is not nearly so common as is generally supposed. A physician may often not meet a simple case of it in twelve months general practice. Bronchial & Bright's disease are often mistaken for asthma- The most speedy relief is to be obtained by cigarettes de joy, & Himrod's powders. Dr. Lindsay Nov 5th 1890.

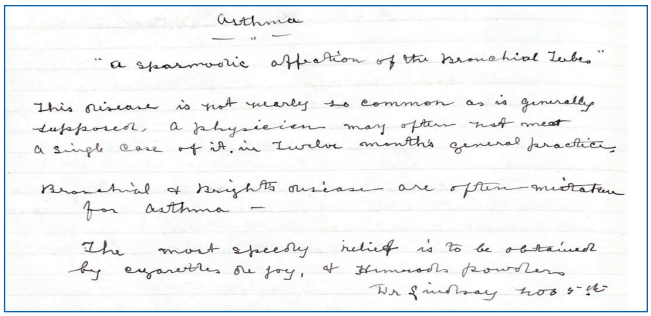
Asthma
"a spasmodic affection of the bronchial tubes"
This disease is not nearly so common as is generally supposed. A physician may often not meet a single case of it, in twelve months general practice.
Bronchial & Bright's disease are often mistaken for asthma -
The most speedy relief is to be obtained by cigarettes de joy, & Himrods powders
Dr Lindsay Nov 5-90

Figure 2: Image of Dr. J. A. Lindsay's asthma entry 1890. Journal owned by T. Freudenthaler.

Bygone asthma etiology: a nervous disease

In 1901, Sir William Olser, one of the four founders of Johns Hopkins and the father of medical residency programs[8], published several theories on the causes of bronchial asthma in *The principles and practice of medicine*. He acknowledged physiological indicators, such as inflammation of mucous membranes and presence of nasal polyps; he also provided an assortment of miscellaneous contributing factors. These included place of residence (i.e., city or country living), and environmental contact with dust and animals. Curiously, he also associated epilepsy and uterine conditions with asthma. He noted sudden attacks (paroxysms) could be brought on by "…*bizarre* and extraordinary variety of circumstances…" including "…fright or violent emotion…".[7] Olser's words strongly reflected the prevailing attitude of the time that there was a neurotic element involved.[7] These beliefs were a continuation of earlier prevailing beliefs, as seen in Henry Salter's 1864 work *On asthma: its pathology and treatment*. His second chapter begins "Asthma essentially a nervous disease."[8]

Asthma relief in the 1890's: inhalants, patent medicines, and Stramonium

Sir Olser also included a variety of treatments in *The principles and practice of medicine*. The cigarette was noted as an effective delivery device for antispasmodics such as "…belladonna, henbane, stramonium, and lobelia…"[7]; noting smoking tobacco could lead to relief for some patients. Similarly, burning nitre paper with chlorate of potash was another remedy[7,10]. However, these remedies follow a series of *first* recommendations which are more interesting to medical history: chloroform for pediatric cases, inhaling nitrate of amyl soaked on a rag or cotton-wool, then spirits of chloroform in hot whisky, injections of pilocarpin, and for reoccurring episodes, "Permanent relief is given by the hypodermic injection of morphia or of morphia and cocaine combined." [7] Other relief may come "…by inhaling oxygen, iodide of potassium, and a very light diet avoiding carbohydrates."[7]

Since the term 'asthma' was being used as a catch-all for any "episodic shortness of breath"[11], it was quite convenient for both the credible and wayward remedies appearing in the late 1800's and early 1900's. Patent medicines were aggressively marketed to the public in a variety of advertisements and becoming quite popular among doctors at the turn of the century.[10] There was no need for manufacturers to distinguish between asthma, its symptoms, or other conditions; a 'cure-all' was far more profitable. The lack of distinction bolstered not only the sales of the remedies, but also the perpetuation of the inaccurate use of 'asthma' to equate a host of *symptoms*.

We now recognize urticaria, wheezing, coughing, swelling, etc. to be associated with an allergic reaction; but when Clemons von Pirquet introduced the term 'allergy' to the scientific community in 1906, the concept that these symptoms and asthma might share a common cause or pathology was rejected by many.[12] It was not until around 1910 that Meltzer indicated asthma was not a result of neurosis and should be viewed as a product of allergic inflammatory response .[12] By then, the onslaught of patent remedies dominated public perception of asthma and perpetuated the use of assorted remedies such as asthma cigarettes and powders. There may have been some therapeutic benefit from using the products, but egregious advertisements falsely claimed to cure asthma, and its related diseases such as winter colds and tuberculosis.

In 1886 Dr. Whitla strongly cautioned the Ulster Medical Society in his opening address against the wave of American and English drug houses flooding the country with "…ready-made remedies and cut and dry formulae for every ache and symptom…"[13] They were purposefully "retarding" the progress of medicine, which "will either put the pharmacist out of practice or convert him to a bottle filling machine."[13] Recall, Whitla began his medical career as a chemist apprentice in pharmacy shops prior to medical school[14], he also authored *Elements of Pharmacy, Materia Medica and Therapeutics*[15] in 1884. He championed efforts to ensure purity and efficacy of all pharmaceuticals and reverenced the evidence-based pharmaceutical product. Obviously in his address to UMS, he publicly scorned the abundance of patent medicines encroaching into medical practice.

Figure 3: Image of advertisement for Cigares de Joy (Joy's Cigarettes). Note the advertisement's promise of a permanent cure. Image reproduced with expressed permission from Caroline Rance. Available from: http://thequackdoctor.com/

Yet, the smoking of asthma cigars and cigarettes were not considered quackery by all. Fumigations, inhalants, and powders were all deemed valuable treatments during the time. In the handwritten journal (see Figure 2), Dr. Lindsay refers to two specific remedies, Cigarettes de Joy (Figure 3) and Himrod's Asthma Powder (Figures 4 and 5) produced by the American Himrod Manufacturing Company located in New Jersey. The advertisement for Joy's Cigarettes shows a woman smoking, like many products promoting they were suitable for both women and children. Marketing campaigns reassured the products were safe, which is ironic considering many other types of patent medicines contained addictive ingredients such as alcohol. In 1921 Himrod's Asthma Powder advertised it did not contain heroin, cocaine, or morphine to build public trust.

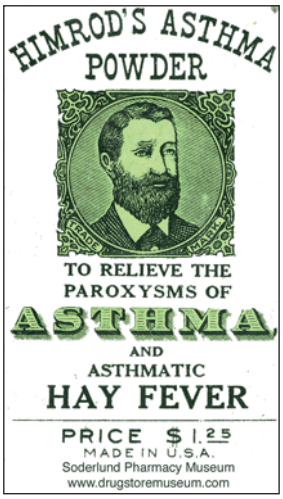

Figure 4: Image of Himrod's Asthma Powder. Bill Soderlund, Soderlund Drugstore and Pharmacy History Museum. Available from: www.drugstoremuseum.com

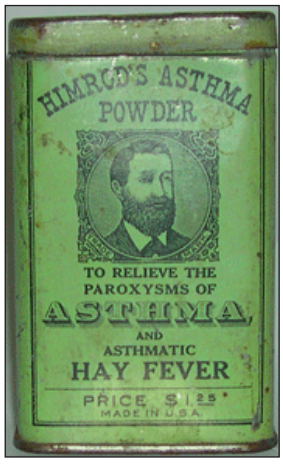

Figure 5: Image of Himrod's Asthma Powder. Bill Soderlund, Soderlund Drugstore and Pharmacy History Museum. Available from: www.drugstoremuseum.com

Stramonium's legacy of relief

Most commercial asthma cigarettes were commonly made from stramonium[10], the leaves of the thorn apple, *Datura stramonium,*[11] and Belladonna. Stramonium and Belladonna were both acknowledged in the 1918 U.S. Dispensatory for containing the anticholinergic chemical atropine which would provide relief for a bronchial spasm.[16] The inhaling of smoke from these and other substances likely aligned with the increase in public popularity for smoking tobacco, as well as cannabis and opium for medicinal and recreational purposes.[10] Dr. Salter in 1864 strongly regarded burning of nitre paper fumes to relieve symptoms, one lady felt relief and fell "…sound asleep in as little as three minutes."[8] He also believed in the potential therapeutic benefits of smoking Stramonium but noted the 'uncertainty' and variability from case to case. He quoted one gentleman who would 'rather be without life than be without Stramonium.'[8]

The common methods for using Stramonium included smoking it in a pipe, swallowing the saliva produced while smoking, and filling a room full of its smoke to then inhale it. The relief of symptoms might vary whether smoking the leaves or the seeds; indeed, some individuals were making Stramonium preparations on their own, needing the druggist only to purchase the rolling papers to make their cigarette. There appeared no caution to smoking it multiple times per day, some smoked on days when symptoms were not present. Although other remedies such as bronchiodiolators were becoming available during the early 1900's,[18] Stramonium was already grandfathered into most successful accounts of asthma treatments, and the public's confidence.

Interestingly, in 1811, *Belfast Monthly Magazine* presented a small compilation of testimonials supporting Stramonium use, one which had first been presented by a writer in *The London Monthly Magazine,* praising its benefits for asthma. He reported smoking '…a dozen pipes at a time…' with no ill effect, like one might associate with opiates, tobacco, or hops. The writer was convinced Stramonium was so beneficial for '…this most afflicting disease…' and to suppress the '… cruel violence…' of the episodes that 'I should not have been able to go through exertions that my daily avocations call for' without it.[17] In fact, he recommended Stramonium be grown in all gardens and not be viewed as it truly was… an invasive weed (Jimson weed). Curiously, the article also mentions the rising costs of Stramonium in herbal shops, perhaps a prelude to the influx of asthma 'health' cigars and powders by the end of the century.

Summary:

From a public health perspective, it is interesting to consider Dr. Lindsay's 1890 journal entry on asthma: "a physician may often not meet a simple case of it in twelve months general practice." Looking back, his comment stands in sharp contrast to the public demand for asthma cigarettes and remedies, which were being met by the onslaught of patent medicines. Knowing 'asthma' evoked various meanings in the 1800's, it stands to reason that Dr. Lindsay may have been attempting to clarify the condition as a "…bronchial tube" condition. Today, the World Health Organization considers asthma to be one of the most common chronic diseases especially among children, which is often under-diagnosed and under treated; in 2019 it impacted at least 262 million people.[19]

The historical documents referenced in this article present four UMS Presidents- Drs. Whitla, Lindsay, Browne, and O'Neill as colleagues, co-workers, and collaborators; surely there are more accounts than pursued here. However, these accounts are enough to validate the vintage 1890's journal which memorializes all four doctors together- evidenced by their handwritten entries. It is my continued goal to share the vintage journal's contents and examine its historical underpinnings, in efforts to understand the prevailing attitudes and medical practices of the time.

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James Logan Prize Essay

Multidisciplinary Approach to Cancer Pain Management

by Grace Kettyle

INTRODUCTION

Cancer is the leading cause of death worldwide, accounting for nearly 10 million deaths in 2020, with the global cancer burden expected to grow by 47% between 2020 and 2040[1]. Despite these statistics, cancer survivorship has increased to 70% in developed countries, primarily due to early detections[1] and advances in life-prolonging or curative treatments, subsequently resulting in the growing number of patients living with cancer. Pain is one of the commonest symptoms in cancer patients, occurring in as many as 90%[3], the pain continuum often beginning with the diagnosis and remaining with the patient during treatment, post treatment, and right until the end of life[4]. Cancer pain is a multifactorial, complex phenomenon, not only affecting the patient physically but also impacting their psychological, cognitive, social, and spiritual domains leading to increased morbidity and poor quality of life[5]. It is estimated that 20-30% of cancer patients experience pain in the early stage of the disease[5], with this figure rising to 70% and possibly beyond[6] in individuals in the advanced stages who report suffering moderate to severe pain (Numerical Rating Scale ≥ 4)[7]. Cancer pain has long been acknowledged, with the World Health Organisation (WHO) first publishing the analgesic ladder in 1986 to provide guidelines on an international standard of care[8]. Although these guidelines are effective in controlling pain for approximately 70-80% of patients, it still leaves poor management in around 20-30% of cancer sufferers[3]. Recent research suggests that poor control of cancer pain is a major public health challenge worldwide[9], often being suboptimal and secondary to other cancer-related treatments, leaving many patients undertreated[10] which is especially worrying as the presence of pain is associated with decreased survival rates[11]. Many barriers can lead to inadequate pain management, such predictors include patient characteristics, physician practice and type of treatment setting[12]. Despite these reasons, as already noted, cancer pain is not just physical pain but is a multifaceted symptom[13] that is individualised and specific to each patient, with Dame Cicely Saunders, coining the term 'total pain' to characterise its multidimensional and interdependent nature[14] (*figure 1*).

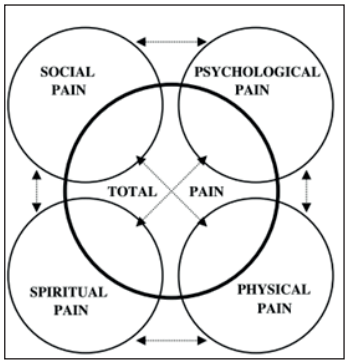

Figure 1. The 'total pain' experience: An interactive model (14)

This idea of 'total pain' and its management in relation to cancer is endorsed by the World Health Organisation[15] and has given rise to the concept of multidisciplinary management of cancer pain. An overview of pain and the multimodal approach of pharmacological and non-pharmacological interventions that may be utilised to manage pain in the oncology patient will ensue.

PAIN

Pain is defined by the International Association for the Study of Pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage[16]. Pain is a subjective phenomenon – pain is what the patient says it is. The regular self-reporting of pain intensity with the help of validated assessment tools (*figure 2*) is the first step towards effective and individualised treatment. Pain can be either acute or chronic depending on its duration. The former usually resolving in less than 3 months while the latter prevailing for more than 3 months[15]. Furthermore, cancer pain can be classified as being nociceptive or neuropathic[16]. Nociceptive pain is caused by ongoing tissue damage, either somatic (such as bone pain) or visceral (such as gut or hepatic pain), and neuropathic pain is caused by damage or dysfunction in the nervous system, such as brachial plexopathy or in spinal cord compression by a tumour[16]. In cancer patients, the physical pain often gets compounded by associated psychological, social, and spiritual factors to contribute to the 'total pain' experience so it is essential that impeccable assessment and reassessment of the severity of pain, type of pain and cause of pain is done so that a multimodal management plan can be implemented accordingly to optimise relief. Cancer-associated pain is even more complex as it involves facing one's own mortality and existential distress, again accentuating the requirement for a multidimensional approach for treatment[17].

PHARMACOLOGICAL INTERVENTIONS

Pharmacological pain management

Since 1986 the prevailing pharmacological framework for managing cancer pain has been the WHO Analgesic Ladder (*figure 3A)*, which has undergone several modifications. This universal strategy, based on expert opinion, was developed for use in the global context where access to medications may be limited.

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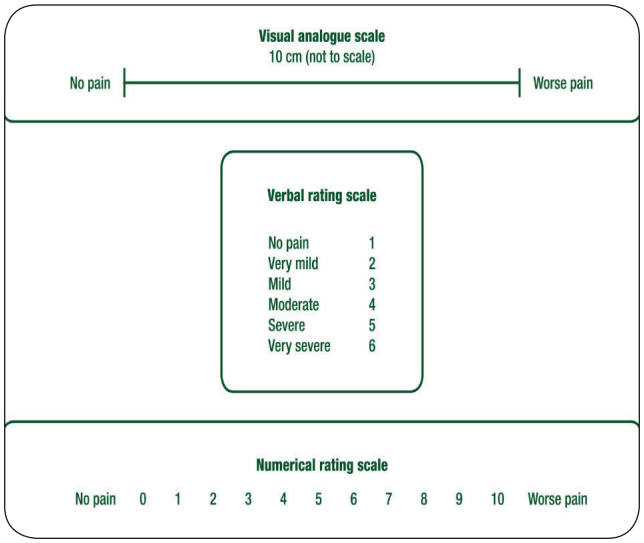

Figure 2. Validated and most frequently used pain assessment tools (16)

The original ladder consisted of a stepwise approach[18]:

1. First step – Mild pain: non-opioid analgesics such as nonsteroidal anti-inflammatory drugs (NSAIDs) or paracetamol with or without adjuvants.

2. Second step – Moderate pain: weak opioids (hydrocodone, codeine, tramadol) with or without non-opioid analgesics, and with or without adjuvants.

3. Third step – Severe and persistent pain: potent opioids (morphine, oxycodone, hydromorphone, alfentanil, fentanyl, methadone) with or without non-opioid analgesics, and with or without adjuvants.

Adjuvants encompass a vast set of drugs such as antidepressants, anticonvulsants, corticosteroids, bisphosphonates and topical anaesthetics and are usually administered for indications other than pain, but they have a role, in combination with opioids, to manage nociceptive pain or as a sole agent for neuropathic pain[19]. Long-term opioid therapy has been associated with reduced immune function, addiction, opioid-induced androgen deficiency as well as predisposing to osteoporosis and reduced high density lipoprotein (HDL) levels[20]. However, the real limitation of the original ladder was the lack of opportunity to integrate non-pharmacological treatments into the therapy path.

NON-PHARMACOLOGICAL INTERVENTIONS

Interventional therapy for pain management

Recently, a fourth step was added to the WHO Analgesic Ladder (*figure 3B*) encompassing interventional and minimally invasive procedures such as, but not limited to, epidural or intrathecal analgesia, neuromodulation with or without a pump, nerve blocks or ablation procedures[20]. The updated ladder has removed the existing unidirectional approach to pain management and now permits a bidirectional system allowing for escalation and de-escalation of the pain

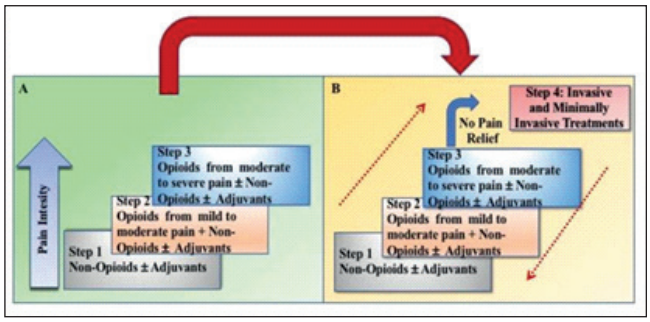

Figure 3. Transition from the original WHO three-step analgesic ladder **(A)** to the revised WHO fourth-step form **(B)**. The additional step 4 is an 'interventional' step and includes invasive and minimally invasive techniques. The updated WHO ladder provides a bidirectional approach (21)

management strategy as the patient's clinical condition dictates[21].

Oncological pain management

Radiotherapy, chemotherapy, hormones and bisphosphates are all used to treat and palliate cancers and, when used in combination with pharmacological and non-pharmacological methods can optimise pain relief[20]. However, it must be acknowledged that oncological treatments themselves can induce pain in some patients.

Radiotherapy is administered to over half of all cancer patients in the UK and is used as an integral component for palliation of symptoms including pain[22]. The success of radiotherapy in controlling symptoms is well supported in literature as evidence has shown pain relief in 73% of patients with bone metastases which was previously uncontrolled by analgesics[22]. Brief courses of pelvic radiotherapy have been shown to control severe pelvic pain in patients with gynaecologic and colorectal cancers, with the added advantage of minimal morbidity[22]. However, the time delay between delivery of radiation and symptom relief should be considered especially for a palliative patient[19].

Cytotoxic chemotherapy drugs play a role in managing pain through reducing tumour growth and ultimately lessening compression on surrounding tissues, organs and bones, thereby reducing nociceptive pain[23]. The effectiveness of chemotherapy is difficult to assess as it is frequently used in combination with other treatments. However, in prostate cancer patients, the chemotherapeutic drug docetaxel administered along with a corticosteroid provided superior outcomes in managing pain than the use of the corticosteroid alone[24]. This analysis did not address questions of safety so this putative benefit must be weighed against potential side effects of the corticosteroid in the individual patient. Certain types of chemotherapy drugs are neurotoxic and can damage the nerves, resulting in chemotherapy-induced peripheral neuropathy (CIPN). Common offending agents are taxanes and platinum which are used to treat some of the most common cancers – breast, lung, gastrointestinal

and gynaecologic[21]. Adjuvants can be used to treat the neuropathic pain associated with CIPN but the oncologist should be vigilant to the onset of neurological symptoms and amend the treatment regimen accordingly.

Hormone treatment in the form of anti-androgen therapy has been shown to provide pain relief in over 90% of prostate cancer patients upon initial exposure[20]. The anti-oestrogen drug tamoxifen has been shown to reduce pain in those with metastatic breast cancer[25].

Bisphosphonates are increasingly used to manage cancer-induced bone pain. A Cochrane review (2000) concluded, that despite methodological limitations, evidence suggested that bisphosphonates provide modest pain relief in patients with bony metastases where analgesics and/or radiotherapy were inadequate[26].

Psychological, social and spiritual pain management

The 'total pain' concept involving physical, psychological, social and spiritual aspects is clearly acknowledged in literature, yet the physical determinants of pain often remain a predominant focus in clinical practice[14]. However, the others are no less important as they contribute to a person's perception of pain and subsequently affects their response to it[27].

In a study by Zaza and Baine (2002) a strong correlation was reported between increasing pain intensity and greater psychological distress, predominantly anxiety and depression[28]. This recognition of the importance of psychological factors has led to the development of psychosocial interventions based on cognitive behavioural approaches for managing pain which help to identify and change unhelpful thoughts, beliefs and behaviours[29]. Studies examining pain coping strategies indicated that catastrophising is associated with increased pain and anxiety[28], again supporting the use of cognitive behaviour techniques.

Social support is another factor that should be considered when approaching cancer-related pain management as findings reported by Zaza and Blaine (2002) noted that in 7 out of the 8 studies reviewed there was a significant association between social support and cancer pain with higher levels in those with decreased social activities and lower levels of social support[28].

Spirituality has been identified as an adaptive coping strategy as it impacts the perception of pain, however the assessment of spirituality in coping with pain is still incipient[17]. Oliveira et al. (2021) reported that as faith increased, pain decreased by 0.394 points on the Visual Analogue Scale reinforcing the role of spirituality in managing cancer-related pain[17].

Physical therapies in pain management

Physiotherapists and occupational therapists have an important role to play in the management of patients with cancer pain at various stages in their 'cancer journey.' A common response to pain is the development of 'pain behaviours' where the patient may guard the painful area or develop an overly sedentary lifestyle; such inactivity resulting in deconditioning, increased muscle tension and increased attention to pain[20]. The aim is for the patient to achieve full functioning potential and become autonomous in managing the impact of pain on their daily life using many interventions including exercise, massage, heat and cold therapy[20].

Complementary and alternative medicine (CAM)

CAM may not be first-line treatment of cancer-related pain, but many cancer patients use the plethora of practices on offer[30]. An estimated 31% use acupuncture to complement cancer treatment but data is conflicting as the literature includes many types of pain (chronic, neuropathic, post-operative) and often has high risk of bias[31]. However, a 2022 study by Ge at al. put forward a strong recommendation for the use of acupuncture to relieve pain in patients with moderate to severe cancer pain and particularly for breast cancer patients to relieve their aromatase inhibitor-induced arthralgia[6]. Despite much conflicting evidence, CAM has the potential to increase wellbeing and thus influence pain, however, this is not an endorsement for its use given the lack of regulation and availability of robust evidence on its effectiveness specifically in cancer patients. Caution should be exercised before proceeding with CAM and it is imperative that, going forward, health care professionals work with their cancer patients to explore the potential beneficial therapies and work towards an integrated model of health-care provision[32].

CONCLUSION

In the 1960s, hospice movement founder Cicely Saunders coined the term "total pain" to illustrate the complexity and multidimensional nature of the pain experience in cancer patients. To this day, her simple yet profound holistic concept holds true. This concept underlies the need for personalised therapy and for clinicians to dynamically manage the pain by combining several pharmacologic and non-pharmacologic strategies according to the physiopathology of pain, pain features, complexity of symptoms, the presence of comorbidity and social context. Consequently, a wide range of non-pharmacological approaches such as yoga, acupuncture and psychotherapy are some of the tools available to the modern clinician. This new and expanded paradigm of treatment that incorporates novel ways of managing pain not only focuses on the nociception but also on the emotional and cognitive aspects of cancer pain in a comprehensive and patient-centred way.

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Curiositas

QUIZ 1

Fernando Frazão/Agência Brasil, CC BY 3.0 BR, via Wikimedia Commons

1. Who is this?
2. What is the cause of the abnormal areas on the skin?
3. Does the technique enhance performance?

Andrew D Spence (Academic Clinical Lecturer, Queen's University Belfast), Aaron Vage (PhD Student, Centre for Medical Education, Queen's University Belfast).

QUIZ 2

Blood test	*Haemoglobin (g/L)*	*Haematocrit (%)*	*Arterial O2 content (ml/dl)*
1	140	45	22
2	140-160	48	16-20
3	180-200	54	20-26

TheHellRace, CC BY-SA 4.0, via Wikimedia Commons

1. What can cause these blood tests in the same person?
2. How is this image linked to (1)?
3. How effective is it, does it result in improved performance?

Andrew D Spence (Academic Clinical Lecturer, Queen's University Belfast), Aaron Vage (PhD Student, Centre for Medical Education, Queen's University Belfast).

QUIZ 3

de:Benutzer:Hase, CC BY-SA 3.0, via Wikimedia Commons

Rob Annis from Indianapolis, USA, CC BY 2.0, via Wikimedia Commons

1. Who are these cyclists?
2. What common association do they share?
3. How are they linked to court cases in 2004 and 2013?

Aaron Vage (PhD Student, Centre for Medical Education, Queen's University Belfast), Andrew D Spence (Academic Clinical Lecturer, Queen's University Belfast).

QUIZ 4

Gepiblu, CC BY-SA 2.0, via Wikimedia Commons

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1. Who are these people?
2. What do they have in common?

Aaron Vage (PhD Student, Centre for Medical Education, Queen's University Belfast), Andrew D Spence (Academic Clinical Lecturer, Queen's University Belfast).

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Please refer to 'Curiositas: Guidelines for contributors' http://www.ums.ac.uk/curiositas.html and email curiositas@ums.ac.uk with your ideas and submissions.

Curiositas: Answers

QUIZ 1

1. Michael Phelps, a retired American swimmer, is the most decorated Olympian in any discipline, having won 23 gold medals. His career spanned five Olympic games, during which he undertook such arduous training regimens that he needed to consume over 10,000 calories per day[1]. Along with gym and pool exercises, some professional swimmers seek an edge and turn to an alternative method to enhance performance: cupping.

2. Cupping has been used as a complementary therapy to treat illnesses for the past 3000 years and, more recently, by sports persons to reduce muscle fatigue/pain. It is suggested that cupping causes a negative pressure on the area targeted, thus increasing tissue perfusion and reducing inflammation[3]. Others describe physiological effects including immunomodulation where skin stimulation causes the neuroendocrine changes that produce therapeutic effects[4].

3. A systematic review described studies reporting beneficial effects of cupping on the perception of pain and disability, and a reduction in creatine kinase, elevated levels of which may indicate muscle injury[5]. These studies however were particularly prone to bias, thus evidence of the practice in performance is inconclusive. Regardless, for now, given the desire for even potential marginal gains, it seems the practice is likely to continue.

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QUIZ 2

1. Polycythaemia can occur due to states of chronic hypoxia including pulmonary disease or cardiac septal defects, genetic disorders, haematological conditions and medication such as testosterone[1]. Exposure to a hypoxic *environment* can also contribute; the blood tests in the table show approximate parameters for a person living in three different locations (sea-level, Tibet, and the Andes)[2]. Athletes have taken advantage of these physiological alterations to increase oxygen carrying capacity.

2. During high altitude training, the body's reaction to chronic hypoxia is to increase erythropoietin (EPO) production from the kidneys, which in turn facilitates erythrocyte maturation in the bone marrow before release into the vasculature[3]. However, persistent hypoxia can have detrimental effects: complex reaction time slows, there is psychomotor retardation and at >4000 metres, learning and spatial memory is impaired[4].

3. It is accepted in the athletic community that training at high altitude is associated with superior performance[5]. Evidence shows haemoglobin and red cell volume increase at altitude and return to near-sea levels 16 days post-descent. Furthermore, plasma EPO levels increase until day 4 at altitude[6]. Timing of altitude training around competitions is therefore crucial.

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QUIZ 3

1. Lance Armstrong and Tyler Hamilton

2. The pair were teammates in the U.S Postal Service Cycling Team between 1998 and 2001; Hamilton playing an integral role that solidified Armstrong's first three Tour de France victories[1]. Seven times, Armstrong would go on to win the Tour during his career. However, on the 22nd of October 2012, Armstrong was stripped of all seven titles, having been found guilty of the systematic, log-term use of performance-enhancing drugs. After receiving a suspension from 2004 to 2006 for manipulating haematocrit levels, Hamilton too, would later confess to doping alongside Armstrong. Amongst other compounds such as testosterone derivatives and growth hormone, erythropoietin (EPO) was the drug of choice among cycling's enhanced community. EPO is a glycoprotein secreted by the kidneys, stimulating red blood cell production to counter hypoxia[2]. When taken exogenously, EPO acts to increase haematocrit levels, enhancing one's capacity for oxygen uptake and ultimately increasing cardiovascular performance[3]. But how did cycling's elite run sophisticated, long-term drug programmes whilst avoiding detection? Enter the facilitator, Dr. Ferrari. Coming to prominence as the team physician for Gewiss, Ferrari decided to start a private sports consultation venture in 1995; his most notable clients being the U.S Postal Service Cycling Team.

3. With heat mounting from the media concerning a doping endemic within cycling, Dr. Michele Ferrari was summoned to court in October 2004 and handed a one-year suspended sentence, after a series of statements (including Hamilton's) implicating his involvement in the administration and trafficking of prohibited substances within the sport of cycling[4]. Ferrari finally received a lifetime ban from professional sport in 2012, with Lance Armstrong naming him under oath in 2013, as one of the performance-enhancing drug specialists from which he obtained EPO.

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QUIZ 4

1. Jannie du Plessis (left) is a South-African rugby union player, currently signed to the Sigma Golden Lions. In 2007, du Plessis became one of only four Springbok players to win the Rugby World Cup and Currie Cup in the same year[1]. Jamie Roberts (right) is an ex-Welsh rugby union player. Between 2008 and 2017, Roberts won two Grand Slams, a Six Nations Championship, and featured in two World Cups[2].

2. Both du Plessis and Roberts qualified as medical doctors during their rugby careers; du Plessis from the University of the Free State (South Africa)[3] and Roberts from Cardiff University (Wales)[4]. Whilst Roberts chose to focus on his rugby career after graduation, du Plessis actively juggled both professions. These roles both collided in March 2009, when a colleague of du Plessis's (Brumbies player, Shawn McKay) was struck by a car outside a Durban nightclub. Du Plessis was able to help manage McKay's condition prior to the arrival of the emergency services, however, McKay sadly died in hospital several days later[5].

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Letters

Editor

Thank you very much for your September editorial, which I considered quite profound. I thought your references were very well chosen. When teaching ethics classes at QUB for nearly ten years from about 2003, I did notice a tendency for students to increasingly favour personal feelings in regard to abortion, euthanasia and other issues.

Can one practice medicine without morality? I don't think so. Can one be culturally conditioned to a particular moral viewpoint? I think it is to some extent possible (and suggested by history) but I think that is no reason not to promote the 'best' morality.

James Douglas
jamesfdouglas38@hotmail.com

Editor

Apropos of your Ulster Medical Journal editorial Ulster Med J 2022:;91(3):121-122

First they came for the socialists, and I did not speak out—because I was not a socialist.

Then they came for the trade unionists, and I did not speak out—because I was not a trade unionist.

Then they came for the Jews, and I did not speak out—because I was not a Jew.

Then they came for me—and there was no one left to speak for me.

—Martin Niemöller

Eight or so decades later a medical educator asks his year 1 class, who have elected to take a course in medical ethics, what they think of doctors who joined Hitler's Nazi party : were they evil, or mistaken? He finds their answers, of which he tells us only that most "felt that evil was not a valid concept in these circumstances", disturbing…..

I wonder if the students, perhaps thinking aloud in attempting to answer, might have been asking themselves whether they might have been at moral risk, themselves, had they found that their careers could depend on collaboration with a cruel and oppressive regime which had a firm hold on power in their own country. The response of a German physician between 1933 and 1944 (at which later date it would have been clear to most that Naziism was beaten) would have depended on how much danger that physician could accept to himself, his family, his career….as well as pre-existing prejudices, and where personality testing would have placed him on an axis of empathy-sociopathy. (By the 1930s Germany had been a Christian society for at least 1700 years, suggesting that religiosity gives only limited protection against mass hysteria and consequent state cruelty…)

It would be intriguing to be told what the students in the aforementioned ethics class actually said to their teacher. It might also have been fairer to those students than leaving alternative implications of "a disturbing example of Lewis's thesis from the Abolition of Man" (Lewis had invoked Naziism in a sort of "straw-man" argument about absolute morality) hanging in the air. Indeed, the class might already feel they should have a right of reply… But my feeling is that, had the students instead opted for the unqualified, apparently expected, ready-provided, one-word answers "evil" or "mistaken", it would have let them off the real challenge, which was to examine their own potential for being conscripted into an utterly vile project. It sounds to me as though they rose to that challenge. I hope they got credit for that.

A couple of footnotes: Pastor Martin Niemoller , previously a supporter, fell out with the Nazis in 1936, and eventually endured eight years in the concentration camps of the Nazis, an experience which led him to become a committed pacifist after WW2. I would urge everyone to read, at the very least, the Wikipedia article about him.

On doctors who collaborated with the Nazis, I found it helpful to read the psychiatrist Robert Jay Lifton's 1986 account "The Nazi Doctors" (MacMillan).

James Barbour (retired GP)
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Editor,

I read your editorial in the UMS September 2022 with interest. In my academic teaching days in the 1970s ethics was not part of the curriculum and there was no formal ethical teaching for medical undergraduates although it was an important part of the then unwritten curriculum. We taught knowledge, skills and attitudes and the greatest of these was knowledge. Even in those distant days it was clear that medical knowledge was a slippery subject with significant portions becoming obsolete within a few years not to mention a professional lifetime, whereas skills had a much longer shelf life and attitudes longer still.

In my undergraduate days it was implicitly accepted that part of becoming a doctor was to adopt the attitudes and approaches of senior practitioners to your own medical practice. None of our teachers was perfect but we selectively accepted from each what seemed most appropriate for ourselves and our patients.

Since and probably long before Hippocrates, medicine has had a strong ethical component. This was recognised by the collective taking of the Hippocratic Oath by my entire undergraduate year in 1965 immediately prior to graduation, supervised by the Dean of the Faculty Prof. John Henry Biggart.

I am struck by the change in general social attitudes during my lifetime. As a war baby I grew up with the memory and experience of individuals then being prepared to sacrifice,

their lives if necessary for the good of the group, regiment or community. Nowadays this attitude seems to have evaporated to be replaced by what is for the individual's personal good and perceived benefit although I see that currently in Ukraine the old social habits seem to have persisted.

God is dead. Nietzsche rules. What next? Perhaps Darwin is right about more than we thought? In evolutionary history the group mattered, the individual didn't. Maybe it's time to change our old-fashioned views in line with modern values or perhaps our culture will be supplanted by another less selfish and more collective? Time will tell.

Sincerely,

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THE ULSTER MEDICAL JOURNAL

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- *Example:* Devlin LA, Price JH, Morrison PJ. Hereditary non-polyposis colon cancer. *Ulster Med J* 2005;**74(1)**: 14-21.
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The inner workings of the human body are hidden from the naked eye, but to go beyond the surface and dive beneath our layers, we begin to see the most incredible piece of artwork designed for one purpose – to give life. As a medical student it is a privilege to study the inner workings of such a well-designed system and how each part works harmoniously to perform a function that supports life in itself.

Curiosity for what is unseen has spiked my interest to study the human body from a creative perspective. Looking at the contents of the body through a creative lens changes your perspective of the anatomy. As a medical student it is often easy to get caught up on learning the function of each component, but to pause and take in the beauty of our system allows you to appreciate its complexity in a different manner.

The image is of a sheep's heart that has been cut to expose the inner surface. The angle of this image exposes the right atrium and right ventricle with an excellent view of the chordae tendineae. To create this piece, I decided to use acrylic paint as I felt it would capture the texture of the heart muscle, allowing the smooth nature of the vessels to be portrayed, whilst emphasising the bulkiness of the myocardial walls. To translate the piece to digital media, I scanned the image and added further texture using the Procreate digital platform. I was able to correct any definition that was lost through the scanning process, enhance the colour palate and add the anatomy labels.

Alana Atkinson, year 4 medical student, Queen's University, Belfast