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This Issue in the Journal

Quantifying the demand for hip and knee replacement in Otago, New Zealand

David Gwynne-Jones

The demand for hip and knee replacement in Otago over the years 2010 to 2012 has been calculated to be 798 cases per year. Around 390 cases are publicly funded and 335 funded in private or by ACC. Therefore there is a shortfall of around 73 cases per year. The main reasons for this appears to be that there are more people over the age of 55 years in Otago than the NZ average and a backlog of patients has built up due to insufficient numbers being done over several years. The result is that many patients are not qualifying for public surgery despite having severe symptoms.

Hospitalisation associated with use of the synthetic cannabinoid K2

Paul Glue, Sultan Al-Shaqsi, Douglas Hancock, Chris Gale, Brad Strong, Leo Schep

In early 2013, 13% of all admissions to an acute inpatient psychiatric ward were associated with use of the legal high K2. Patients presented with severe changes in mood, symptoms of psychosis such as paranoia and hallucinations, and/or intense suicidality. This is a recent occurrence, as an audit of the same clinic in 2010 showed no admissions associated with use of legal highs.

Management of small unruptured intracranial aneurysms in Australia and New Zealand

Ben McGuinness

Brain aneurysms are areas of blebs/bulging where arteries of the brain bifurcate. When these aneurysms rupture they cause potentially life-threatening bleeding around the surface of the brain. Not all aneurysms rupture and predicting which aneurysms will rupture is difficult. Treatment of such aneurysms carries a risk of serious complications. This paper discusses the issues around how to decide whether to treat a person with a small unruptured brain aneurysm.

Epidemiology of cervical spinal cord injury in eastern India: an autopsy-based study

Suvam Das, Pratyay P Datta, Moumi Das, Suchibrata De, Kazi A Firdoush, Tanmay Sardar, Debalina Datta, Tapan K Jana, Mrinal K Ghosh, Soumyadip Dutta, Sujit N Nandy, Parthasarathi Sarkar, Sabyasachi Santra, Chinmoy De

Cervical spinal cord injuries are fatal injuries. This autopsy-based study has pointed out several important points and risk factors for these kinds of injuries. The findings may bring change in training of surgeons as well as may bring change in intervention to save lives.

Medical students' and clinical teachers' perceptions of Māori health teaching

Rhys G Jones, Marcus A Henning, Ralph Pinnock, Boaz Shulruf, Susan J Hawken

It is important that doctors are competent in dealing with Māori health issues so that they can contribute to reducing inequalities. In this study we surveyed 276 medical students and 135 clinical teachers about Māori health teaching and assessment at medical school. The findings showed that most students question the quality of Māori health teaching and assessment, and that many clinical teachers felt poorly prepared to teach in this area. This raises concerns about how well medical students are being supported to achieve competency in Māori health. Addressing these issues will require action at multiple levels in medical schools.

Why do potential body donors decide against donating?

Kathryn McClea, Mark D Stringer

This paper looks at the reasons why applicants who requested information about donating their body to the Department of Anatomy at the Otago Medical School fail to complete the registration process. Respondents to our survey were mostly deterred from body donation by some of our current acceptance criteria. However about 40% of respondents had either lost their form or were still considering body donation; many were prompted to complete the registration process by this survey. This information is important to us in order to maintain a robust body bequest programme.

“Serious” but not “imminent”: genetics and the disclosure of health information to at-risk relatives ((viewpoint article))

Joanne Lee

The proposed Amendment No. 7 to the Health Information Privacy Code will permit disclosure of health information to third parties where there is “serious” risk to the life and safety of an individual or to others. In this article, I discuss the complexities that arise in the application of the proposed test for “seriousness” to genetic information and why this new standard is subjective and a threat to patient privacy.

The ageing population and the increasing demand for joint replacement

Gary Hooper

Arthritis of the hip and knee joint is a common cause of disability within the community creating a significant and increasing socioeconomic burden.¹ The incidence of osteoarthritis, which is responsible for well over 90% of joint replacements performed in this country, increases rapidly in patients over 50 years of age.

Currently the mean age for both total hip (THR) and total knee replacement (TKR) in New Zealand (NZ) is 68 years for females with the youngest replacement being 15 years.² Males are similar to females for THR but have a lower mean age of 65 years for TKR. Projections from the USA³ suggest that by the year 2030 the demand for THR and TKR will have increased by 174% and 673% respectively. Joint registry data from several countries support this increasing demand.^{2,4}

The NZ Joint Registry was initiated by the NZ Orthopaedic Association in 1999 to collect information on all patients undergoing joint replacement. It provides accurate and real time data on both the rate and distribution of replacement surgery in this country. It has shown a steady increase in the number of both hip and knee replacements over the last 13 years, with a 75% increase in THR and 158% increase in TKR. Already there have been more than 165,000 joints entered on this registry.

Like all developed countries, the population of NZ is ageing, with the 65+ age group likely to make up over one quarter of the population in the late 2030s. This will result in an increase from half a million in 2005 to 1.33 million in 2051 in this age group (Statistics New Zealand, March 2006). This ageing population will place a heavy burden on health care funding in the future 20 years. The outcome of pain relief and improved function following joint replacement is both predictable and lasting.

With people living to an older age and remaining healthy and active for longer, there is an increased expectation of being productive during this time which fuels the increasing demand for joint replacement.

Gwynne-Jones, in this issue of the *NZMJ*, highlights the problem of fair access to joint replacement across NZ in “*Quantifying the demand for hip and knee replacement in Otago, New Zealand*” and criticises the current methodology for determining funding apportioned to DHBs.⁵

Any formula for funding of public hospital joint replacements must take into account the demographic data of the region rather than rely on standardised intervention rates. The NZ Joint Registry has a 98% capture rate for all joint replacements and is a robust and reliable tool to provide funding agencies with information to rationalise funding for joint replacements.

The issue of unmet need is troubling. While the demand for joint replacement increases the waiting times in public hospitals have shortened without a

corresponding increase in service provision. This has resulted in a larger number of patients being rejected from the waiting list because they fall outside of the recommended waiting time despite reaching the clinical threshold for replacement. Return of these patients to their general practitioner for 'further care' is a major source of frustration not only for the patient but for the doctor who has exhausted all avenues of treatment.

Reducing the waiting time by excluding these patients is nothing short of manipulating the numbers and does nothing to facilitate patient care. Shorter waiting times may have given some patients certainty of treatment but as the waiting times drop and the demand increases, with no compensatory increase in service provision, this group of 'privileged' patients will also diminish.

Competing interests: Nil.

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Quantifying the demand for hip and knee replacement in Otago, New Zealand

David Gwynne-Jones

Abstract

Aim The purpose of this study is to quantify the current demand in Otago for hip and knee replacement.

Methods Hospital databases and the New Zealand Joint Registry were used to calculate the intervention rate for primary total hip (THR) or knee (TKR) replacement between February 2010 and February 2012. All patients meeting the clinical threshold but waiting for surgery were also recorded over the same period.

Results The intervention rate for THR and TKR in NZ in 2011 was 33.0/10000 while in Otago it has varied from 30.7 to 42.6 over the last 5 years. This is at or above the national average based on population share. Over a 2-year period the numbers reaching the clinical threshold and waiting for primary joint replacement surgery rose from 247 to 347 patients, while 1496 primary elective joints replacements were performed. The current demand for primary THR and TKR is 798 per year (41.7/10000 per year). The unmet demand is 73 cases per year.

Conclusion The increased demand in Otago compared to the NZ average is due to greater numbers of people over the age of 55 years and the backlog of patients due to under provision relative to demand in previous years.

Osteoarthritis is a common condition affecting about 15% of adult New Zealanders.¹ It is typically a disease of older age and hence the prevalence is likely to increase further as the population ages.

Hip and knee replacement are highly successful operations for symptomatic osteoarthritis. In response to increasing demand the Ministry of Health introduced the joint initiative in 2004 with the aim of increasing the rate of publicly funded major joint replacements. In Otago the agreed volumes were an increase of 160 cases from a base contract of 315 to a new target of 475 major joints.

It is government policy that there should be nationally consistent access to surgery. Prioritisation tools such as the Clinical Priority Access Criteria (CPAC) score and the Hip and Knee prioritisation tool developed by the Orthopaedic Working Group of the National Waiting Times Project are used to varying degrees across the country. Currently the target national standardised intervention rate (SIR) for publicly funded major joint replacement (primary, bilateral or revision hip or knee replacement) is 21.0/ 10000 population per year.

In 2009, following the end of the joint initiative, the minimum number of joints required to be performed in Otago was reduced from 475 to 425 in order to match the SIR. It appears that the clinical need for surgery is significantly greater than this.

A DHB must not offer certainty of surgery to a patient if they are unable to perform the surgery within 5 months (6 months until June 2012) (Elective Surgery Performance Indicator (ESPI) 5). Patients not meeting this “financial threshold” may be placed on Active Review (AR) if their condition is likely to deteriorate and meet the threshold within the foreseeable future, or they are returned to their General Practitioner (GP) for ongoing care and monitoring.

In Otago the financial threshold has risen to an unacceptably high level in order to maintain ESPI compliance. This has led to an increasing number of significantly disabled patients now not qualifying for surgery in the public sector.

The purpose of this study is to quantify the current incidence of hip and knee arthritis in Otago that is severe enough to justify primary hip or knee replacement and compare it with local and national intervention rates in both public and private sectors.

Methods

All patients undergoing hip and knee replacement in NZ are registered in the NZ joint registry (NZJR) for which there is 98% compliance.² Figures for primary and revision total hip (THR) and total knee replacement (TKR) and unicompartmental knee replacement (UKR) were obtained for calendar years 2007–2011.

Numbers performed at Dunedin Public Hospital (DPH) and Mercy Hospital, Dunedin were also obtained from the NJR and cross referenced with numbers of cases performed at the hospitals from prospectively gathered figures. Bilateral cases are counted as two separate procedures in the NJR, but as one procedure to calculate the SIR for major joint replacement. UKRs were included in the figures for TKR. THRs for acute hip fractures were excluded.

The Public sector financial year runs from 1 July to 30 June. DPH figures were available by month from July 2006 to June 2012. Cases performed at a private hospital under contract from the DHB were classified as publicly funded. ACC funded cases were classified separately or included in private figures. Patients were placed on the public waiting list if they had failed medical management and were judged by a consultant orthopaedic surgeon to be a suitable candidate for THR or TKR.

The hip and knee replacement tool developed by the Orthopaedic Working Group of the National Waiting Times Project (Appendix 1) was used to score the patient and an Oxford hip or knee score (OHKS)³ given to the patient to complete. For the last 2 years the threshold for certainty has been 79 points or higher and active review over 62 points. Patients falling below the threshold for active review are classified as Clinical Benefit (CB). These patients are returned to their GP for ongoing care. Surgery is rarely advised if the score is less than 50 points.

Total numbers of patients in each category have been recorded over the past 3 years. The two years 2010 and 2011 were analysed to determine the current level of demand based on intervention rates and changes in total waiting list numbers.

An audit of all patients seen for FSA at DPH with a hip or knee problem between February and August 2012 was performed. The outcome of the consultation, (wait list, discharge, further investigation etc), CPAC score and Oxford score were recorded and final decision regarding certainty, active review or return to GP was noted. All patients on active review are sent a questionnaire including an OHKS. For this study the OHKS was scored from 0-48 with 0 the worst and 48 the best possible score.³

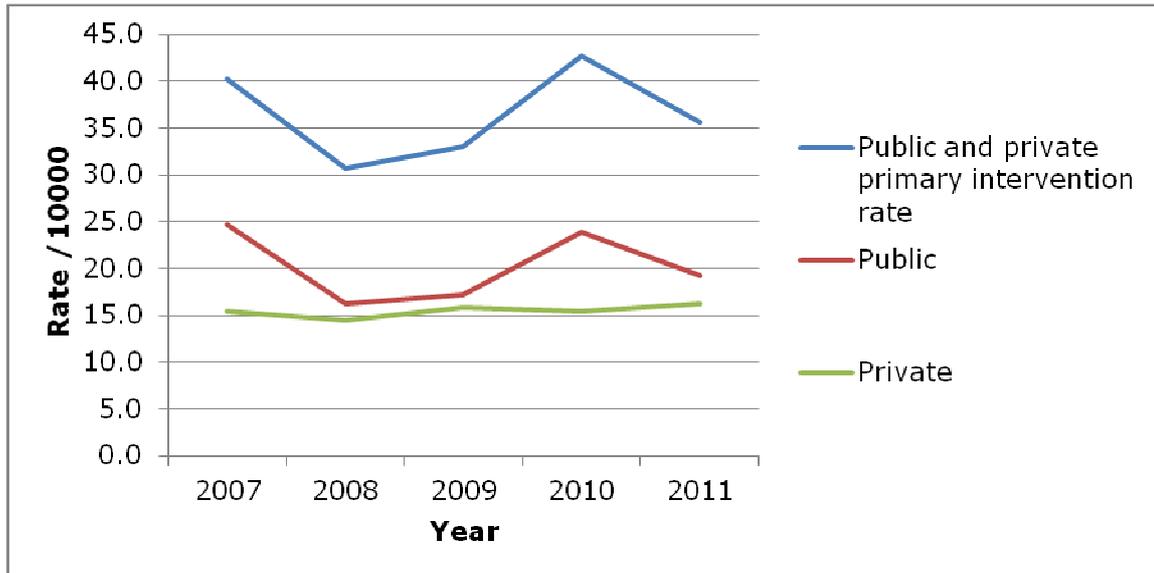
Population figures (191,361) for the Otago region (excluding Queenstown) were based on the latest estimates from Southern DHB funding and planning department. The national population figure was taken as 4,271,223.

The 2006 Census figures with 5-year age bands were used to compare Otago to New Zealand.⁴ Comparative raw intervention rates for England and Wales and Australia were calculated from their respective joint registries.^{5,6}

Results

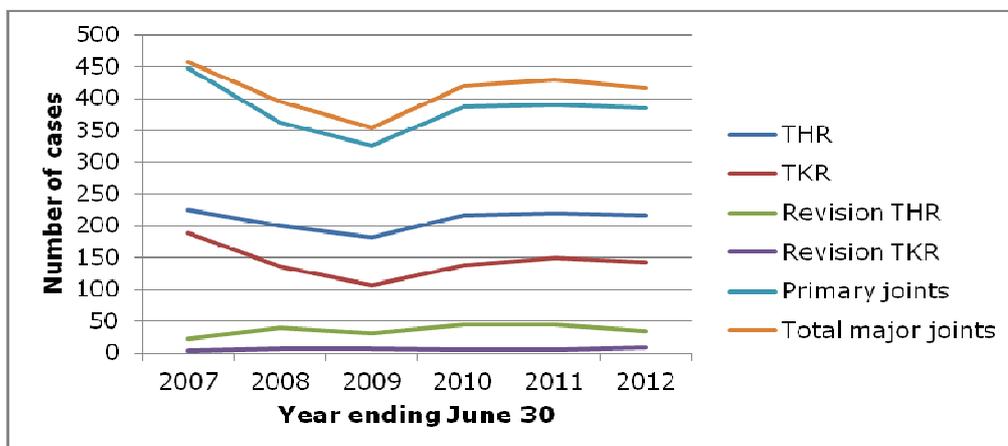
The intervention rate for primary THR or TKR in New Zealand has risen from 28.9/10000 in 2005 to 33.0/10000 in 2011. In Otago the rate has varied from 29.2 in 2005 to 42.6 /10000 in 2010 with the variation chiefly occurring in the public sector (Figure 1).

Figure 1 Intervention rates per 10,000 population per year for primary elective THR, TKR in Otago calendar years 2007–2011



The breakdown of major joint replacements in the public sector is shown in Figure 2.

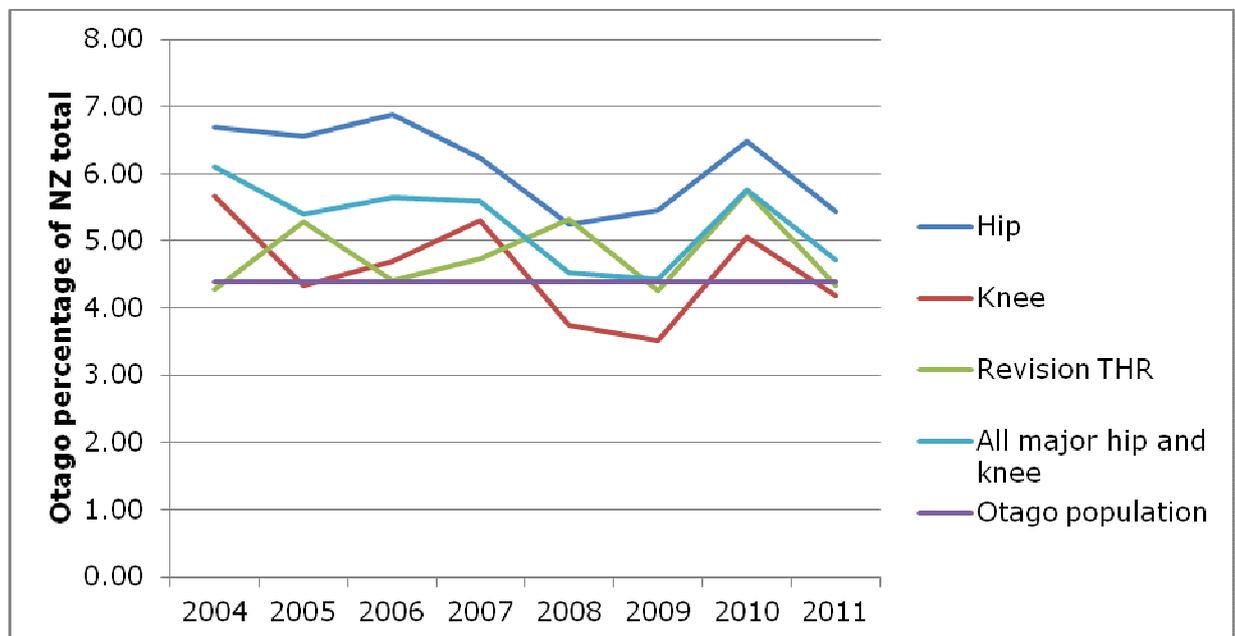
Figure 2. DHB-funded elective major joint replacements (financial years ending 30 June 2007–2012)



Fewer than the target volume of 475 joints were performed in years ending June 2008 and 2009 due to problems with dropped lists due to acute cases, and lack of beds, theatre and anaesthetic resource. The target volume was reduced to 425 joints for year ending June 2010. Over the last 3 years there has been a shortfall of only nine joints.

Otago comprises approximately 4.5% of the NZ population. Since 2007 Otago has provided major joint replacements at or above the national average based on its population share. (Figure 3). This is mainly due to high rates of primary hip replacement with the rate of primary knee replacements below the population share for three of the past 4 years.

Figure 3. Percentage of joint replacements performed in Otago compared with New Zealand total (public and private combined)



From 1 February 2010 to 1 February 2012 the number of patients on the public waiting list for primary hip and knee replacement surgery rose by 100 from 247 to 347 patients. (Table 1) During this time 4389 referrals were received at DPH, 2558 (58%) were seen and 1183 referrals (27%) were returned. These included 234 patients referred with hip or knee arthritis.

In the same period a total of 1496 primary elective joints were performed in Otago (mean 748 per year): 827 (55.2%) were funded by the DHB, 53 (3.6%) by ACC and 616 (41.2%) in private (insurance or self-funding). (Table 2)

Table 1. Waiting list at Dunedin Public Hospital

Status	February 2010	February 2012	August 2012
Certainty	72	127	126
Active Review	66	114	162
Clinical Benefit	109	106	106
Total wait list	247	347	394

Table 2. Details of primary joint replacements performed in Otago 2010–2012

	Feb 2010–Feb 2012	%	Per year	Intervention rate/10000 per year
Joints performed	1496		748	39.1
Public	827	55.2	414	21.6
Private	616	41.2	308	16.1
ACC	53	3.6	27	1.4
Change in total waiting	+100		+50	2.6
Total demand	1596		798	41.7

Therefore the current minimum demand for primary hip and knee replacement in Otago is 798 per year. This equates to an intervention rate of 41.7/10000 per year.

Currently there is funding for approximately 390 primary hip or knee replacements or 20.4/10000 per year by the DHB for the Otago region. This assumes no change in the number of revisions or bilateral procedures performed. An additional 335 are performed in private or under ACC.

This gives a shortfall of 73 primary joints per year. If these were to be funded by the DHB then the contracted volume would need to rise by 17% to 498 major joint replacements per year.

Over the 6-month period February to August 2012 the total public wait list for primary hip or knee replacement increased by a further 47 patients despite performing 209 procedures (Table 1). During this period a total of 225 patients were seen at DPH out-patients with a hip or knee problem. 155 (69%) were listed for primary TKR or THR of whom 96% had a Oxford score of 20 or less, 74% less than 15 and 37% less than 10 points.

124 (80%) scored over 70 points on the CPAC score, while 76 (49%) scored 79 points or more. In total 81 patients (52%) were given certainty, 61 patients (39%) were placed on active review and 13 (8%) were classified as clinical benefit and returned to their GP.

On average over the last 12 months, 82% of patients, initially classified as active review, have moved to certainty.

Discussion

It is difficult to estimate demand for primary hip and knee replacement. In this study we have collected data on all patients meeting the clinical threshold for THR or TKR whether they were placed on the certainty or active review list or were returned to their GP with advice.

Our end point therefore is based on orthopaedic assessment, radiographs and patient reported scores in a patient suitable for surgery. In order to accurately compare our figures with other DHBs similar data need to be collected.

Using intervention rates allows comparison between countries but assumes no limit on access. In 2009 Germany had the highest rate of hip and knee replacement at 50.1/10000.⁷ The rates for Australia and England and Wales are 30.6 and 30.5/10000.^{5,6} In New Zealand the combined public and private intervention rate in 2011 was 33.0/10000.

The intervention rate for primary THR and TKR in Otago (public and private combined) has been at or higher than the national average for many years. Despite this current demand exceeds capacity by 7–10% per annum.

We made a number of assumptions in calculating the demand for primary joint replacement in Otago. In the private sector these include that there is no limit on private hospital capacity, there is no net flow of private patients in or out of the province and the number insured and the number prepared to self-fund remain constant. These are reasonable assumptions but may underestimate the future demand for publicly funded surgery.

There is good access to primary healthcare in Otago and this may be a cause for the high number of referrals made requesting an FSA. The limited access to FSA is likely to underestimate the potential demand. During the 2 year study period 234 referrals of patients with hip or knee arthritis were returned. At least some of these are likely to have reached the clinical threshold for joint replacement. However, many of these may have subsequently been re-referred and will appear on the waiting list figures.

There may be a number of reasons for the increased demand. In the public sector raw intervention rates are corrected to the standardised rate by a formula that includes age, gender, rural location and deprivation. Revision procedures are also counted in the standardised intervention rate. A higher number of revisions will reduce the number of primary procedures that can be performed. Nationally the revision burden (percentage of revisions to primaries) is approximately 13% for hips and 8% for knees. In Otago the rates are 12.3% and 4.3%.²

The proportion of patients with health insurance or able to afford private healthcare may influence demand in the public sector. However, high rates of private provision may not be associated with better access to publicly funded surgery.⁸ Otago does not appear to have a smaller than average private sector.

In 2010/11, DHBs had widely differing rates for the percentage of joint replacements performed in a private hospital (range 9% to 73%).² These figures include public cases contracted out to private hospitals so reflect the use of out-sourcing as well as the private market.

Otago was on the median for the country with 44% of cases performed in a private hospital but during this time only 14 joint replacements were out-sourced. It has been reported that rural populations have a higher need for hip replacement^{9,10} but not for knee replacement.¹⁰ This may partially explain why there is a much higher rate of THR than TKR in Otago.

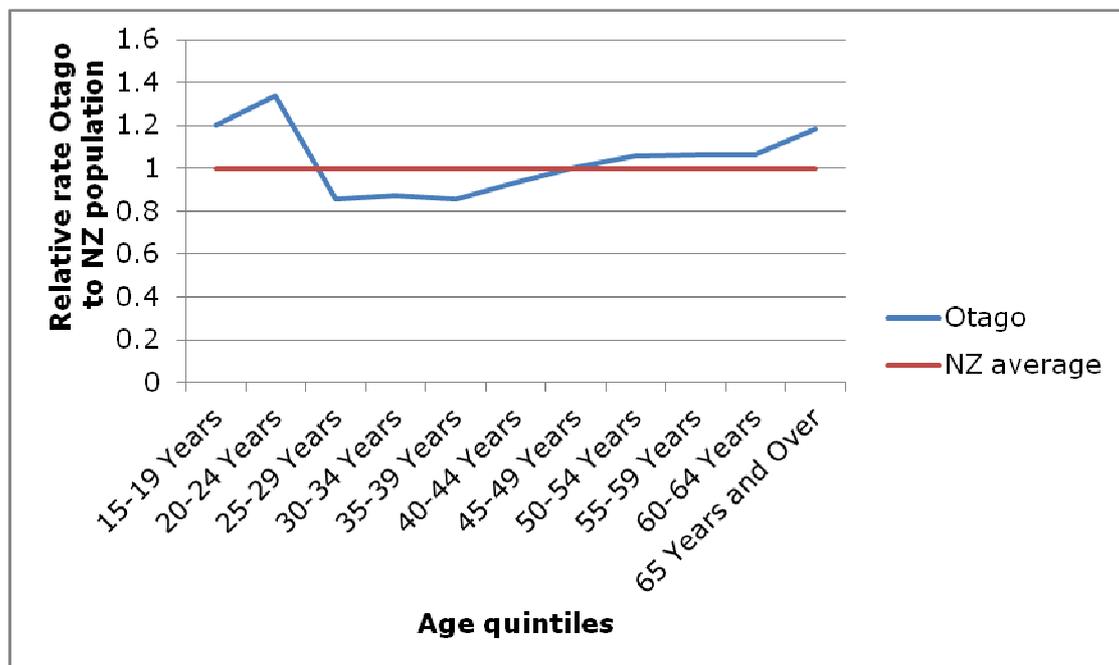
The local orthopaedic surgeons do not appear to be more likely to recommend joint replacement than average. In the audited 6-month period the Oxford scores of those patients wait-listed in public were less than 20 in 96%, less than 15 in 74% and less than 10 in 37%. In a large study from Scotland the average OHKS for patients undergoing THR or TKR was 18.3 and 18.7 respectively.¹¹

Age is strongly associated with increasing demand for joint replacement. Eighty eight per cent of primary hip and knee replacements in NZ are performed in the over 55 age group.²

Despite having a large young student population there is a higher proportion of people for each 5-year age group over 50 years in Otago than the NZ average (Figure 3). The prevalence of people over 55 years relative to the NZ average is 1.13 and over 65 years is 1.18.

Adjusting the national intervention rate of 33.0/10000 to reflect this would result in an age adjusted rate of approximately 39/10000 pa which more closely matches our estimated demand. In the public sector an increase of 73 joints per year from 425 would equate to a 17% increase.

Figure 3. Proportion of Otago population in 5-year bands compared to New Zealand population (figures from 2006 Census)⁴



Another key determinant of demand is the backlog of patients awaiting surgery. In the public sector there has been a shortfall of nine patients over the last 3 years against the minimum target of 425 major joints. The target for years ending June 2008 and 2009 was 475 joints (315 base contract plus 160 joint initiative).

The Dunedin Public Hospital capacity was restricted at this time by a shortage of anaesthetists and beds. This resulted in a backlog of 210 joints against potential public funding. Only a limited number of cases (34) were outsourced to the private sector between April and November 2008.

If the volumes had not been reduced in 2010 and 475 joints (12% greater than NZ average to reflect the age of the Otago population) had been performed each year for the last 5 years then an additional 358 joint replacements could have been performed which would almost eliminate the current waiting list of 394 patients.

Anecdotally we hear that some DHBs have very similar problems to Otago while in others patients are qualifying for surgery with a lower score or less severe symptoms regardless of whether their DHB is over or under providing against the national average. Some DHBs have no patients on active review while others have more than recommended. This may reflect either implementation of policy, or possibly a lower financial threshold.

When the clinical priority criteria were introduced the two crucial issues were whether they would correctly and consistently prioritise patients according to symptoms and ability to benefit from surgery and whether the thresholds would be chosen so as not to leave patients with clear needs untreated.¹²

We believe that the scoring tools are useful but lose the ability to discriminate at higher scores. However it is clear that currently the financial threshold in Otago is too high and many patients with severe symptoms who would benefit from joint replacement are not qualifying for surgery.

In conclusion in Otago the current demand for primary hip and knee replacement is approximately 41.7/10000. Current funding from the DHB is for approximately 20.4/10000 with the private sector and ACC providing 17.5/100000.

There is an unmet demand of at least 73 cases per year or 3.8/10000. The two main reasons for this are the greater numbers of people over the age of 55 years in Otago and the backlog of patients due to under provision in previous years.

To address both the ongoing local demand and the backlog, there needs to be additional provision for joint replacement surgery by the DHB or the situation will continue to deteriorate.

The problem is unlikely to be isolated to Otago and similar data needs to be collected to allow direct comparison between other DHBs. Using standardised intervention rates to determine volumes will not necessarily result in equity of access across the country.

Competing interests: Nil.

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Appendix 1. Hip and knee prioritisation tool

Criterion	Category	Category Descriptions - Assign patient to highest scoring category that applies (Patient must be on optimal medical therapy at time of rating)	Points
Pain	1	No Pain	0
	2	Episodic activity-related pain	4
		May use occasional analgesics	
	3	Daily pain with weight-bearing activity	10
		2-3 times/week pm use of simple analgesics/NSAIDs	
	4	Pain which cannot be ignored with activity and at rest	19
		Sleep disturbance 2-3 times / week due to pain	
		Daily analgesics/NSAIDs	
	5	Dominates life and interferes with sleep every night	27
		Pain poorly controlled by analgesics	
Personal Functional Limitation DUE to Hip or Knee Orthopaedic Condition	1	No Limitation	0
	2	Minimal restriction of personal activities e.g. trouble reaching toes	3
		Walking stick used for longer walks	
	3	Moderate restriction of personal activities e.g. requires help with socks/shoes	9
		Requires help cutting toenails	
		Use of walking stick indoors and outdoors	
	4	Severe Restriction of personal activities e.g. requires help with dressing or showering	18
		Consistently uses 2 crutches or wheelchair	
	1	No Limitation	0

Social Limitation DUE to Hip or Knee Orthopaedic Condition	2	Mild Restriction e.g. can't walk >1 hour	4
		Some limitation of leisure activity e.g. golf or tennis	
	3	Moderate Restriction e.g. can walk 15-60 mins	10
		Significant limitation of leisure activity	
		Can manage garden or bowls	
	4	Severe Restriction e.g. can't walk > 15 mins - slow	19
		Difficulty with steps or stairs	
		Severe limitation on leisure activity – can't maintain garden	
		Requires help with shopping	
	5	Profound Restriction e.g. confined to the property	23
Shopping done by others			
Requires meals or other domestic help			
Can't work due to orthopaedic condition			
Potential to Benefit from Operation (for patient, dependents or community)	1	Small Improvement Likely – significant residual symptoms +/- functional limitation	0
	2	Moderate Improvement Likely – some residual symptoms +/- functional limitation	6
	3	Return to near normal likely – asymptomatic + full return of function	
Consequence of delay >6 months (for patient, dependents or community)	1	Little risk will deteriorate over next 6 months	0
	2	Considerable risk will deteriorate and result in increased disability during next 6 months	7
	3	Likely to progress to major complication during next 6 months with increased clinical costs, e.g. impending fracture or structural failure	24

Hospitalisation associated with use of the synthetic cannabinoid K2

Paul Glue, Sultan Al-Shaqsi, Douglas Hancock, Chris Gale, Brad Strong, Leo Schep

Abstract

Aims To evaluate the proportion of patients hospitalised in an acute psychiatric ward associated with use of the synthetic cannabinoid K2, along with their clinical features.

Methods Retrospective audit. K2 use was based on self-report.

Results Seventeen patients had a total of 21 admissions during between January and April 2013; this represented 13% of all admissions to the ward during this time. This was a first hospitalisation for 4 patients. Of the 13 patients with previous psychiatric hospitalisation, 9 patients had recurrences of pre-existing disorders, and 4 patients presented new psychotic symptoms. Presenting symptoms were variable, and included psychotic (paranoia, thought disorder, disorganised behaviour), affective (anxious, depressed) disturbances, and/or intense suicidal thinking/behaviour. Mean duration of admission was 8.5 days, with significantly longer durations for those presenting with psychotic symptoms (13.1 vs 4.4 days).

Conclusions In this case series, use of K2 was associated with significant psychotoxicity requiring hospitalisation, and indicates substantial risk associated with use of synthetic cannabinoids.

Synthetic cannabinoids describe a range of chemicals that bind to cannabinoid CB₁ and CB₂ receptors and mimic the effects of delta-9-tetrahydrocannabinol, though with greater efficacy.¹ They are actively marketed to adolescents and young adults as a legal alternative to cannabis,² and have been legally available in New Zealand for several years.

K2 is one of a number of marketed brands of synthetic cannabinoids that have been sold in corner shops in the last 18 months. The active substances in K2 can vary, but may include agonists similar to JWH-018 and JWH-073, which are potent full agonists at CB₁ receptors.^{3,4}

Several case reports have described toxic psychological reactions after use of synthetic cannabinoids—including irritability,^{5,6} hallucinations,⁷ psychosis⁸ including psychotic relapse⁹ and development of intense mood symptoms,¹⁰ and suicidality.^{11,12} There is, to our knowledge, one case series of clinical presentations¹³ who report an increased irritability and a more intense high in people presenting to a substance research unit in the USA. There have not been any case series or clinical audits within New Zealand of the clinical presentation to psychiatric services.

We therefore performed a retrospective audit of recent hospitalisations to evaluate what proportion of these was associated with K2 use, what symptoms were reported, what treatment was administered, and outcome.

Methods

This was an audit of all admissions to an open (unlocked) adult inpatient psychiatric unit in Dunedin, New Zealand from January 1 2013 to April 15 2013, where self-reported use of K2 was associated with hospitalisation. This ward has 16 beds, and serves a mixed urban/rural catchment of 193,800 (2006 Census, Statistics New Zealand).

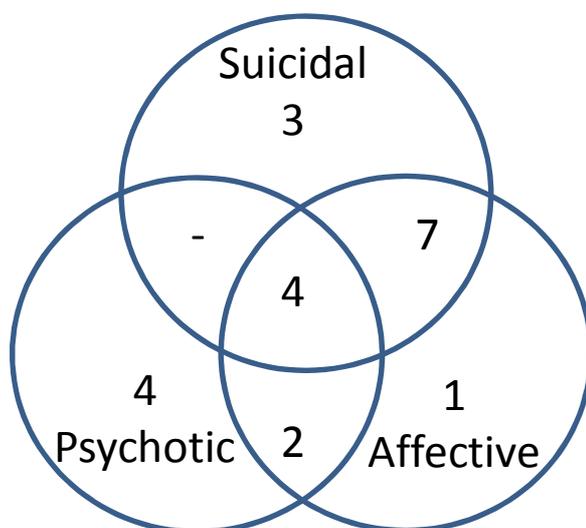
Patients are routinely questioned for use of legal highs at admission. The following data were obtained from hospital notes: demographics (age, gender); symptoms at admission; whether this was a first or repeat admission; past psychiatric history, duration of admission; treatment and follow-up arrangements. Data were analysed using summary statistics, and between-group comparisons made using unpaired t-tests.

Results

During the 3½-month period, 17 patients whose symptoms were associated with use of K2 had 21 hospital admissions, out of a total of 162 admissions (13%). There were 7 females and 10 males, with a mean (SD) age of 26.1 (10.0) years.

Patients reported or were noted to have psychotic symptoms (paranoia, thought disorder, disorganised behaviour), affective changes (anxious, depressive), and/or intense suicidal thinking/behaviour (Figure 1). One individual (M, 32y) also reported homicidal ideation.

Figure 1. Variability in the range of symptoms reported or noted at admission, associated with use of K2



This was the first hospitalisation for 4 patients (aged 16, 18, 20 and 24), who reported affective symptoms (n=3), psychotic symptoms (n=2) and suicidality (n=3). Of the 13 patients with previous psychiatric hospitalisations, 9 patients had recurrences of pre-existing, mainly affective disorders, and 4 patients presented new symptoms, all of which were psychotic.

Mean duration of admission was 8.5 days, with significantly longer durations for those presenting with psychotic symptoms compared with mood disturbance or suicidal thinking (13.1 vs 4.4 days, $t=2.9$, $p=0.01$).

Medications used during admission included antidepressants and antipsychotics. Following discharge, patients were generally referred for follow-up by community mental health teams.

Discussion

There are several key findings in this audit. Over a 3½ month period, use of K2 was associated with 13% of admissions to an inpatient psychiatric unit in Dunedin. Presenting symptoms were variable, and included psychotic and affective changes, with high levels of reported suicidality.

Most patients (13/17) had previous hospitalisations, and nine of these reported recurrences of symptoms. However four patients reported *de novo* psychotic symptoms. For four patients, use of K2 was associated with their first hospitalisation. Most symptoms resolved within one week, with symptomatic treatment.

As a group, the patients recently admitted after K2 use were younger than patients admitted for alcohol and drug dependence to the same unit in an audit of all admissions in 2010 (26.1 y vs 37.5 y, $t=2.89$, $p=0.005$),¹⁴ when K2 was not marketed.

The finding of a younger mean age would be consistent with the demographic group to which legal highs are marketed.² However mean duration of admission was not different from alcohol and drug dependence patients admitted in 2010 (8.9 vs 7.3 days) and the gender balance (~60% male) was also not different.¹⁴

The range of symptoms reported (affective, psychotic, suicidal) are consistent with some previous case reports and series,⁵⁻¹¹ but may be more severe than those reported in the Gunderson case series.⁵ In another series of case reports of patients suffering psychotic episodes following exposure to synthetic cannabinoids,¹² 10 patients without a previous history of psychosis were admitted to hospital and required psychiatric supportive care for 6–10 days.

Symptoms included disorganised speech and behaviour, hallucinations, thought blocking, paranoid delusions and suicidal ideations. These papers underscore the variability and intensity of clinical presentations associated with use of synthetic cannabinoids, similar to the present findings.

Additionally, of the 17 users in this audit, we identified four patients that suffered psychosis without a previous history of these symptoms. This study, and other case reports, demonstrates synthetic cannabinoids may act as a trigger to those having a history of psychosis⁹ or may precipitate these events in users *de novo*.¹²

We also identified high rates of suicidal thinking and one instance of homicidal ideation in this case series. Identification of psychotic symptoms was important prognostically, as it was associated with almost 3-fold longer mean duration of admission than for patients presenting with mood disturbance or suicidal thinking.

This audit cannot assess how different K2-associated admission frequency or type of clinical presentation may be from that associated with cannabis use. Our earlier audit of hospital admissions¹⁴ did not identify any where cannabis use was considered to be

primarily responsible for hospitalisation, and contrasts with the high number of recent admissions associated with K2 use.

We noted high rates of affective symptoms in our cohort (in 14/21 admissions), whereas patients presenting with first episode psychosis associated with cannabis appear to have lower levels of depressive symptoms than first episode patients who have not used cannabis.¹⁵

The literature on clinical symptoms associated with hospitalisation after use of cannabis is modest, and further research to compare its toxicity profile with that of K2 would be illuminating.

The potential shortcomings of this audit should be acknowledged. This was a retrospective audit, and cannot establish rates of psychosis or mood disturbance caused by K2. Use of K2 was established by self-report, and thus its role in hospitalisation could be an underestimate.

Symptoms at presentation were based on clinical interviews and not by structured interviews. We did not obtain blood or urine samples to establish what cannabinoids had been ingested (these may differ by marketed product²). However it should be noted that there are no assays currently available locally for the multiple potential synthetic cannabinoids. We could also not objectively quantify the amount or duration of K2 use, which might also influence clinical presentation.

In conclusion, this retrospective audit has identified use of the synthetic cannabinoid K2 being associated with 13% of admissions to an acute inpatient psychiatric unit over a 3½ month period, affecting a younger population. The clinical presentation was variable, and included psychotic and affective symptoms and suicidal thinking. Some of these symptoms may represent recurrence of an existing disorder, however some patients are presenting for the first time, or with new psychotic symptoms.

Use of K2 was associated with significant psychotoxicity requiring hospitalisation, and highlights an ongoing and substantial risk associated with use of synthetic cannabinoids. We suggest there is a clear need for further prospective research to quantify individual and population risks of these substances.

Competing interests: Nil.

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Management of small unruptured intracranial aneurysms in Australia and New Zealand

Ben McGuinness

Abstract

Aim To evaluate current management of small unruptured anterior circulation cerebral aneurysms in New Zealand and Australia.

Method A survey was performed of 35 neurosurgeons and interventional neuroradiologists practising in Australia and New Zealand regarding their management of five representative cases of anterior circulation aneurysms ranging from 3–6 mm in size.

Results There was a 64% overall active treatment rate with patient age being the most important determining factor. For the 4 cases under the age of 50 years there was a 78% active treatment rate. Other factors influencing decision making are discussed.

Conclusion Despite controversial available literature to guide management most small anterior circulation aneurysms in New Zealand and Australia would be recommended for active treatment by microsurgical clipping or endovascular coiling, particularly in younger patients.

Intracranial aneurysms are present in 2-6% of the population.¹ Therefore small unruptured and mostly asymptomatic aneurysms are relatively commonly found on brain imaging studies performed for other reasons. Management decisions regarding these aneurysms are often difficult for specialists who are usually subsequently consulted once such an aneurysm is found.

The International Study of Unruptured Intracranial Aneurysms (ISUIA) study has the largest number of patient-years of any published cohort series and found a 0% rupture risk for anterior circulation aneurysms (excluding posterior communicating aneurysms) <7 mm in size in patients without a prior history of subarachnoid haemorrhage.² This is at odds both with other published papers on this topic and the fact that approximately 50% of patients presenting with subarachnoid haemorrhage have an index aneurysm that is <7.5 mm in size.³⁻⁸

This survey sought to assess the degree to which practitioners in Australasia believe that small unruptured anterior circulation aneurysms should be treated. There are many unique patient factors other than aneurysm size which influence clinical decision making. These include patient age, gender, smoking history, family history, co-morbidities, aneurysm aspect ratio and morphology, aneurysm location, relationship to branch vessels and perceived unique inherent treatment risks. Secondary aims of this study were to assess the relative importance given to these factors.

Methods

A prospective database of patients discussed at the Auckland City Hospital (Auckland, New Zealand) combined Neuroradiology-Neurosurgery meeting was reviewed over a 12-month period from June 2009 to June 2010. Five representative patients with small anterior circulation unruptured aneurysms requiring management decisions were selected.

Posterior circulation and posterior communicating artery aneurysms were not included as these have a higher rupture risk in the ISUIA study.² In addition none of the patients had a history of prior subarachnoid haemorrhage (higher risk group 2 patients in ISUIA) or multiple aneurysms.

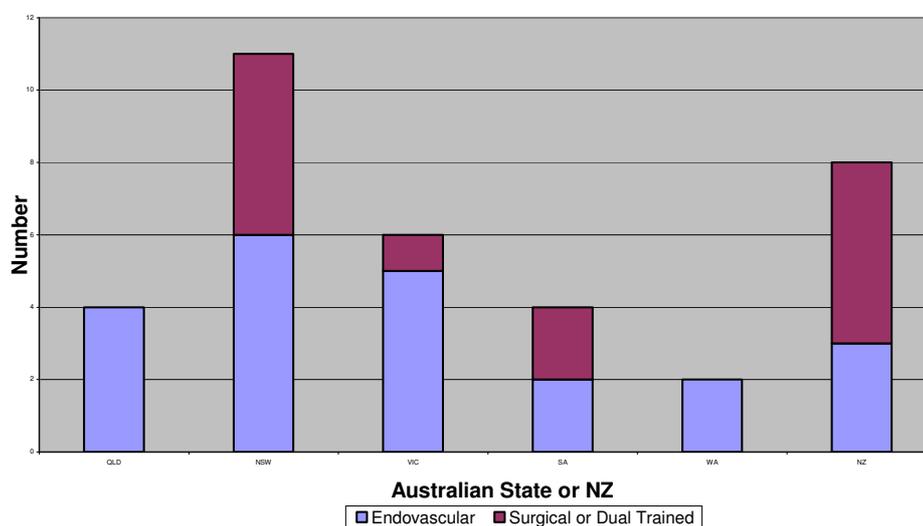
Interventional Neuroradiologists and Cerebrovascular Neurosurgeons in New Zealand and Australia were surveyed regarding their management of these patients. Respondents were given available representative CTA, MRA or DSA images of each aneurysm along with size of aneurysm, aspect ratio, age and sex of patient, smoking history and relevant comorbidities or family history (imaging and data available by request from the author).

Results

There were a total of 35 respondents consisting of 22 interventional neuroradiologists (INRs) and 13 neurosurgeons, of which 2 were dual trained in microsurgical clipping and endovascular techniques. There was reasonable representation from all the major metropolitan areas except for a lack of neurosurgical respondents from Queensland or Western Australia (Figure 1).

Response rate was reasonable at approximately 52%. This consisting of 13 out of an estimated 35 (37%) neurosurgeons that are thought to be regularly involved in cerebrovascular work and 22 out of 32 (69%) interventional neuroradiologists.

Figure 1. Location of survey respondents



Overall decision to treat rate for all 5 aneurysm cases (anterior circulation and ranging from 3-6 mm size) was 64% (68% neurosurgeons and 62% INRs). When case 2 (74 year old patient) is excluded then there is a 78% treatment rate for patients less than 50 years of age (Table 1).

Table 1. Treatment recommendations for cases presented

Patient	Patient age	Aneurysm size (mm)	Percentage treating
1	21	3	71
2	74	5	9
3	47	5	97
4	42	5	49
5	47	6	94

When a decision was made to treat an aneurysm neurosurgeons (excluding dual trained specialists) chose endovascular treatment as the best management strategy in 38% of cases (14 of 38 treatments) while INRs chose microsurgical clipping as the best management strategy in 24% of cases (16 of 68 treatments).

The case with the greatest crossover in suggested treatment was for a 6 mm anterior communicating artery aneurysm in a 47-year-old male with significant cardiac and peripheral vascular disease co-morbidities. Despite 94% of specialists advising treatment, 60% (6 of 10) of neurosurgeons chose endovascular treatment and 57% (11 of 21) of INRs chose microsurgical clipping.

When looking at the factors involved in deciding whether to treat an aneurysm, patient age was overall the most commonly cited factor in arguing both for and against treatment (Figures 2 and 3).

The four most common reasons cited when treatment was recommended were patient age in 64% out of 112 cases, aneurysm shape 35%, aneurysm aspect ratio 26% and a low perceived risk of treatment procedure 21%.

When treatment was not recommended the four most common reasons given were aneurysm size 44% of 63 cases, patient age 43%, comorbidities 30% and a high perceived risk of treatment procedure 22%.

Figure 2. Factors influencing decision making when aneurysm treated (n=112)

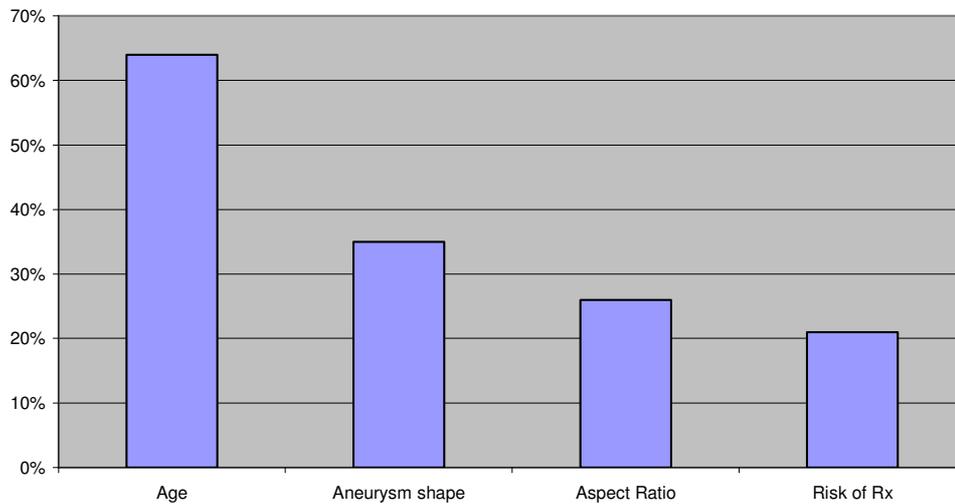
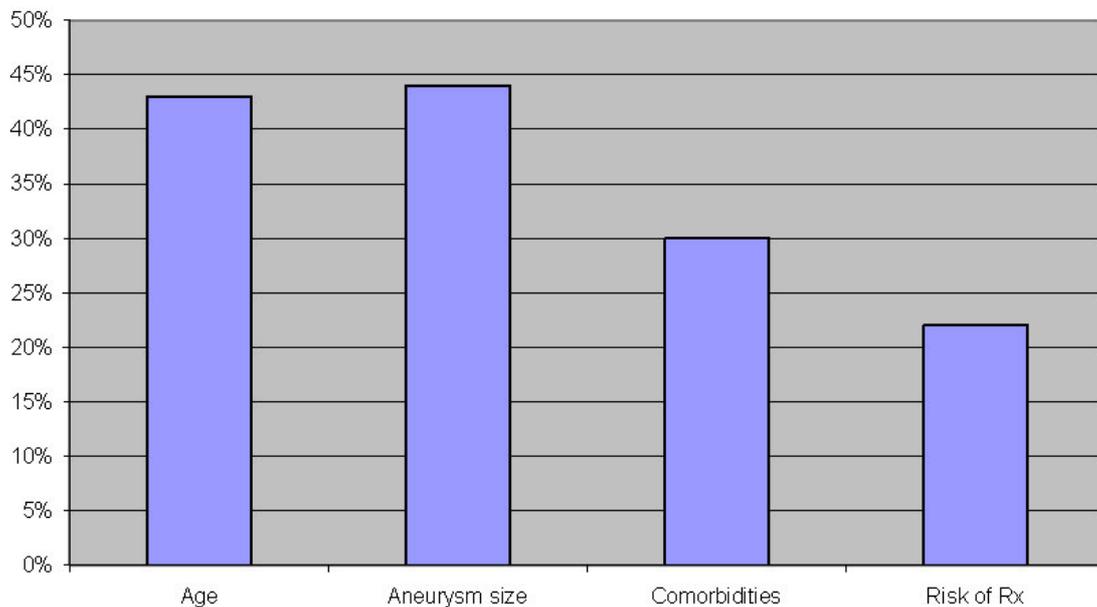


Figure 3. Factors influencing decision making when aneurysm not treated (n=63)



Discussion

The management of small anterior circulation unruptured cerebral aneurysms remains controversial despite multiple published retrospective and prospective cohort studies evaluating the risks of such aneurysms. There are no randomised trials evaluating

patient outcome of active treatment versus conservative management of unruptured aneurysms.

Data from the ISUIA publication indicate that small anterior circulation aneurysms less than 7 mm in size in patients without a prior history of subarachnoid haemorrhage have a negligible risk of rupture over a 5 year period (0% in this study).² These findings are at odds with other cohort studies and cause considerable unease amongst practitioners counselling such patients. Methodological criticisms have suggested that the ISUIA studies are not representative of clinical practise.⁹ Data from the United States suggests a large number of small unruptured aneurysms are being treated despite the findings of ISUIA.¹⁰

Cohort studies mainly from Japan and Finland have shown a higher rupture risk for small aneurysms ranging from 0.5%–2.3% per year.^{3–7} The Finland study has the longest median duration of follow up of any study at nearly 20 years and had annual rupture rate of 1.1% per year for 2–6 mm aneurysms (although most patients in this group would fall into the higher risk ISUIA group 2 patients i.e. with a prior history of subarachnoid haemorrhage).³

The most plausible explanation given for the discrepancy between the incidence of SAH and the prevalence of unruptured aneurysms is that most small aneurysms that rupture do so at or shortly after the time of aneurysm formation (the so-called high risk period).^{11,12} Mathematical analysis confirms the feasibility of this theory although there is uncertainty about the duration of the high risk period.¹²

Despite the small number of cases presented in the survey it is reasonable to conclude that the majority of practitioners in Australasia would recommend treatment of small (<7 mm) unruptured anterior circulation aneurysms in patients under the age of 50 (treatment rate of 78% in this survey). It is also clear from this survey that age is the most important factor in deciding whether to treat or not. For those that decide not to treat aneurysm size was shown to be an equally important factor as age, likely demonstrating the influence of the ISUIA study on these practitioners.

Aneurysm shape was commonly cited when arguing for treatment of an aneurysm in this study. Previous cohort studies using multivariate analysis of this factor including an irregular shape, large aspect ratio or presence of a daughter sac has suggested that it confers an increased risk of rupture.^{7,13–15}

An interesting finding from this survey was the tendency of practitioners to choose the opposite modality of treatment from what they personally perform for treatment of ACOM aneurysms. The implication being that these aneurysms are perceived as perhaps more difficult to treat for both microsurgical clipping and endovascular practitioners. This may be a spurious finding due to the unique patient factors of this case but could be evaluated with a survey involving larger numbers of ACOM aneurysms.

Limitations of this survey include the small number of cases shown to each specialist, incomplete response rate (in particular the relative under-representation of neurosurgical practitioners) and the fact that such a survey cannot truly replicate a proper clinical consultation with a patient.

This study has shown that despite ambiguous available evidence to guide decision making, most practitioners actively involved in aneurysm treatment in Australia and New Zealand would recommend treatment of small (<7 mm) unruptured anterior circulation aneurysms in patients under the age of 50 (78% treatment rate in this survey).

Competing interests: Nil.

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Epidemiology of cervical spinal cord injury in eastern India: an autopsy-based study

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Abstract

Aims Cervical spinal cord injury is a major cause of fatality among trauma victims. Unlike developed countries, national spinal cord injury database is not maintained in India. Paucity of data hampers the understanding of epidemiology of the event in India. So, this study was conducted to ascertain the epidemiological pattern of death due to cervical spinal cord injury and to identify the risk factors; also to find the association of vertebral injuries with various epidemiological parameters.

Methods Among autopsies conducted in Burdwan Medical College and Hospital from 2000 to 2010, cases with autopsy report mentioning “death due to cervical spinal cord injury” either primary or secondary were included in the study. It was a retrospective observational study based on autopsy report.

Results 536 cases met the inclusion criteria. Among them 89.4% were male and 10.6% were female; 63.8% victims were young adults (20-39 years). Mean (\pm S.D.) age was 33.5 years (\pm 12.8). All, apart from 5.4%, suffered from single segment injury with commonest site being C3-C4 (37.3%). Highest number of trauma occurred between 6 am to 9 am, 56.6% of the victims died before hospitalisation.

Commonest mode of injury was road traffic accident (52.2%) followed by fall from height (25.0%); 53.7% cases had vertebral fracture with dislocation, 34.3% had only vertebral fracture. Only dislocation was significantly high up to 19 years age ($p < 0.001$) and among females ($p = 0.029$). All elderly suffered from fracture.

Conclusions This study revealed an unusually high male:female ratio with much representation of the younger age groups in the injuries in comparison to other parts of world. In absence of national database, this result can be used as a surrogate data.

Spinal cord injury (SCI) is often considered to be a fatal injury with a documented case fatality rate of 43%.¹ Literature search revealed the cervical region is the most commonly affected region in the spine among the traumatic spinal cord injury cases.^{2,3}

Extensive studies have been done on spinal cord injury epidemiology; but there are limited studies focusing only on the cervical region particularly in the developing countries including India. The mortality due to SCI has not been reduced in recent years even with implementation of modern management protocols.^{4,5}

In developed countries the data regarding the SCI is easily available from national level Spinal Cord Injury Databases.⁶⁻⁸ Similar national level databases are not available in most of the developing countries. This hampers the estimation of the

burden of this fatality in the respective regions of the world and hinders the formulation of strategy at the national level to fight this menace.

There have been limited autopsy based studies estimating the epidemiological patterns of the death due to spinal cord injury at cervical region around the world.

Autopsy-based studies can confirm the site as well as the extent of injury even in doubtful cases. It also specifically addresses the population who by presence of some special factors, succumbed to the injury. Identifying those particular factors may benefit the society by taking precautionary measures.

Vertebral injuries, either fracture or dislocation or both, are very common with SCI cases. However study regarding the association of bony injuries with various parameters was limited despite extensive literature search. This necessitates detailed analysis of these factors in order to have a detailed epidemiological view.

With this background, this study was undertaken to ascertain the epidemiological pattern of death due to spinal cord injury at cervical region and to identify the risk factors; as well as to find the association of vertebral injuries with various epidemiological parameters.

Methods

Study design—This was a retrospective observational study based on autopsy reports.

Study site and population—The study was jointly conducted by the Department of Orthopaedics and Department of Forensic and State Medicine of Burdwan Medical College and Hospital, West Bengal, India. Cases with autopsy report mentioning “death due to cervical spinal cord injury”, either primary or secondary, were selected. Total 536 cases met the inclusion criteria out of 19742 autopsy reports.

Study parameters and statistical analysis—Data regarding demographic features, level of cervical spinal cord injury, date and time of the injury and mode of injury were taken. The victims were categorised according to age as follows: children and adolescents (up to 19 years), young adults (20-39 years), older adult (40-59 years) and geriatric victims (60 years and above). The mode of injury was categorised into four groups: road traffic accident, railway accident, fall from height and others. Date and time of hospitalisation, time gap between occurrences of injury and the time of death were other important parameters of the study. After collection of data it was double entered in Microsoft Excel sheet and validated. A clean database was generated and copied into SPSS sheet. Then the whole data was analysed using SPSS (version 16.0) software.

Results

During the 11 years period between 2000 to 2010, total autopsies done in Burdwan Medical College and Hospital were 19742. Out of which 536 cases died due to cervical spinal cord injury.

The study group comprised of 479 (89.4%) males and only 57 (10.6%) females. Most of the victims were between the age of 20 to 39 years (342; 63.8%) followed by 40-59 years (127; 23.7%). The mean age was found to be 33.5 years (± 12.8 , SD). The minimum age was 1.5 years and maximum was 74 years. Median age was 31 years with an inter-quartile range of 24 to 42 years.

Table 1. Distribution of study population according to age and sex (n=536)

Age group (years)	Sex		Total
	Male	Female	
	No. (%)	No. (%)	No. (%)
Up to 19	41 (89.1)	5 (10.9)	46 (100)
20-39	309 (90.4)	33 (9.6)	342 (100)
40-59	110 (86.6)	17 (13.4)	127 (100)
60 and more	19 (90.5)	2 (9.5)	21 (100)
Total	479 (89.4)	57 (10.6)	536 (100)

Chi-squared=1.391, d.f.=3, p=0.708.

Almost all cases had only single segment spinal cord injury except 29 (5.4%) who had involvement of multiple segments. The commonest site of spinal cord injury was between C3 and C4 (200; 37.3%) followed by C4-C5 (168; 31.3%).

Table 2. Comparison of time gap of injury to hospitalisation between direct admission and referred cases (n=264*)

Type of hospitalisation	Time gap of injury to hospitalisation	Frequency	Percentage
Direct admission	Less than 6 hours	70	33.0
	6-24 hours	119	56.1
	24-48 hours	20	9.4
	More than 48 hours	3	1.4
	Total	212	100.0
Referred cases	Less than 6 hours	6	11.5
	6-24 hours	17	32.7
	24-48 hours	12	23.1
	More than 48 hours	2	32.7
	Total	52	100.0

*271 victims died before hospitalisation; time of hospitalisation was not mentioned in one autopsy report.

Most of the injuries (386; 72%) occurred during daylight. Highest occurrence of events was between 6 a.m. to 9 a.m. (19.8%) followed by the time between 3 p.m. to 6 p.m. (19.2%). Only five events (0.9%) occurred between 12 midnight to 3 a.m. The frequency of event was higher in the period between the months of March to June.

Almost half of the cases (271; 50.6%) died before hospitalisation. Death before hospitalisation was more frequent among males (51.8%) as compared to their female counterpart (40.2%). Age wise analysis showed death before hospitalisation was highest (56.5%) among victims aged up to 19 years followed by victims aged between 40-59 years (55.1%). Almost 80% of the victims were hospitalised directly in this institution; remaining cases were hospitalised as a referred case.

Table 3. Distribution of study population according to time, type and mode of injury (n=536)

Variables		No.	Percentage
Time of injury	12 midnight to 3a.m.	5	0.9
	3 a.m. to 6 a.m.	59	11.0
	6 a.m. to 9 a.m.	106	19.8
	9 a.m. to 12 noon	91	17.0
	12 noon to 3 p.m.	73	13.6
	3 p.m. to 6 p.m.	103	19.2
	6 p.m. to 9 p.m.	75	14.0
	9 p.m. to 12 midnight	24	4.5
Type of vertebral injury	Fracture	184	34.3
	Dislocation	58	10.8
	Fracture with dislocation	288	53.7
	No abnormality	6	1.2
Mode of injury	Road traffic accident	280	52.2
	Railway accident	46	8.6
	Fall from height	134	25.0
	Others	76	14.2

The time gap between injuries to hospitalisation were analysed; it showed 89% of the direct hospitalisation cases were admitted within 24 hours in comparison to only 44% of the referred cases. Majority of cases died within 24 hours of injury (342; 63.8%). Among rest of the cases, almost all died by the fifth day of injury.

Table 4. Association of vertebral injuries with age, sex and mode of injury (n=530)

Study variables		Type of vertebral injury			Total (n=530)
		Fracture only (n=184)	Dislocation only (n=58)	Fracture with dislocation (n=288)	
		No. (%)	No. (%)	No. (%)	No. (%)
Age	Up to 19 years	6 (15.0)	27 (67.5)	7 (17.5)	40 (100)
	20-59 years	164 (35.0)	31 (6.6)	274 (58.4)	469 (100)
	60 years and more	14 (66.7)	0 (0.0)	7 (33.3)	21 (100)
	Chi squared=151.1, d.f.=4, p<0.001				
Sex	Male	173 (36.6)	49 (10.4)	251 (53.1)	473 (100)
	Female	11 (19.3)	9 (15.8)	37 (64.9)	57 (100)
	Chi squared=7.058, d.f.=2, p=0.029				
Mode of injury	RTA*	37 (13.3)	45 (16.2)	196 (70.5)	278 (100)
	Railway accidents	12 (27.9)	2 (4.7)	29 (67.4)	43 (100)
	Fall from height	104 (77.6)	4 (3.0)	26 (19.4)	134 (100)
	Others	31 (41.3)	7 (9.3)	37 (49.3)	75 (100)
	Chi squared=170.9, d.f.=6, p<0.001				

* RTA: Road Traffic Accident.

Initial analysis revealed that 184 cases (34.3%) had fracture of cervical vertebra without any dislocation, 58 cases (10.8%) had only dislocation of cervical vertebra

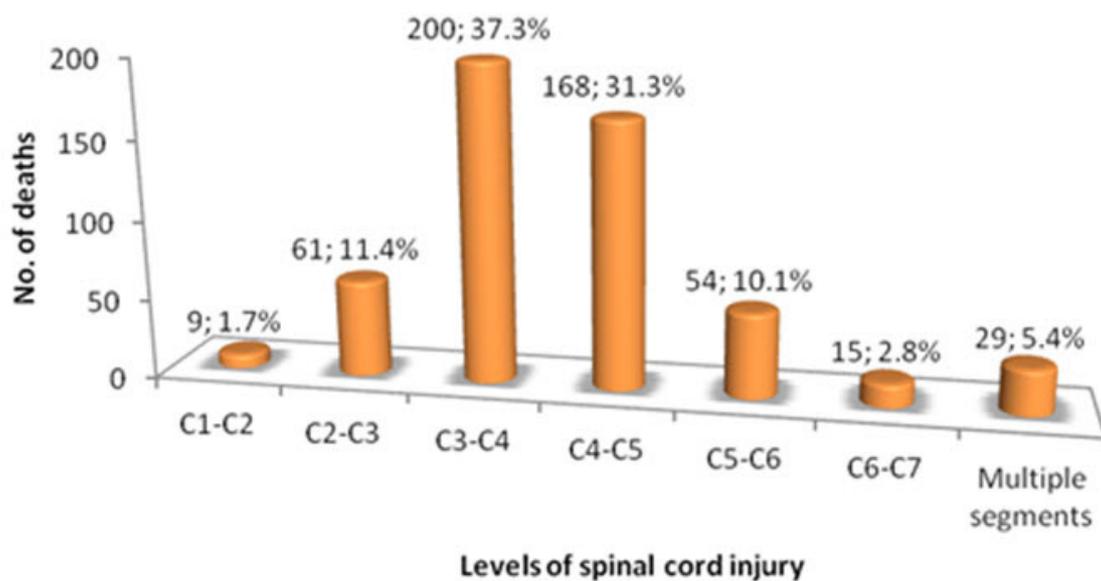
without any fracture and 288 cases (53.7%) had both fracture and dislocation. 6 cases (1.2%) had no bony abnormality but soft tissue injury only. Operative fixation is done for vertebral injury cases only and not the soft tissue injury cases.

So, if the vertebral injury cases could have been stabilised in an urgent basis with operation, then the mortality can be reduced. For this reason, these vertebral injury cases have been separately analyzed. 473 cases (89.2%) out of remaining 530 were males and 57 cases (10.8%) were females. Victims were categorised as children and adolescents (up to 19 years), adults (20–59 years) and elderly (60 years or more).

Majority of the cases were adults (469; 88.5%). Proportion of only dislocation among children and adolescents was significantly higher (67.5%) as compared to others. However the proportion of fracture as well as fracture with dislocation was significantly higher among adults as compared to younger age group.

In contrast to this among elderly victims, no case of only dislocation was observed. All the cases of this age group suffered from fracture, either with or without dislocation.

Figure 1. Distribution of study population according to level of spinal cord injury (n=536)



Proportion of fracture without dislocation was higher among male victims than females (36.6% versus 19.3%). On the other hand, female dominance was observed in cases of only dislocation (15.8% versus 10.4%) as well as dislocation with fracture (64.9% versus 53.1%). These differences were statistically significant (p=0.029).

Victims of this study died from different mode of injury. There were mainly three distinct of mode of injury, namely road traffic accident (RTA), railway accident and fall from height. Rests were categorised as others.

Road traffic accident was most common (52.2%) mode of injury. Proportion of only fracture was significantly high (77.6%) among 'fall from height' cases ($p < 0.001$).

Figure 2. Distribution of study population according to the day of deaths (n=536)

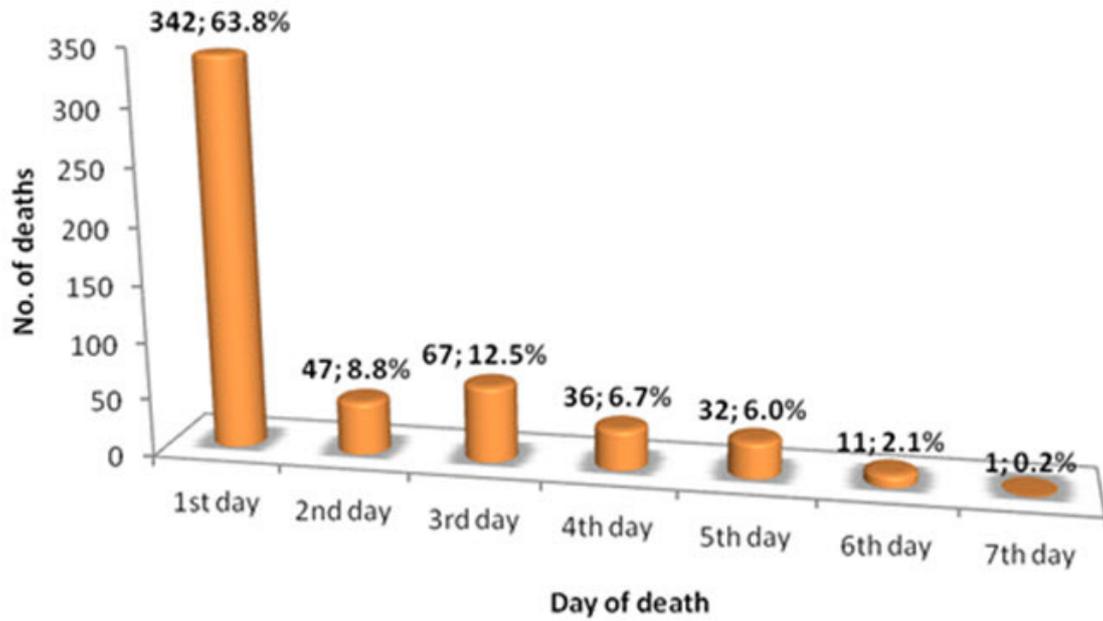


Figure 3: Distribution of study population according to months (n=536)

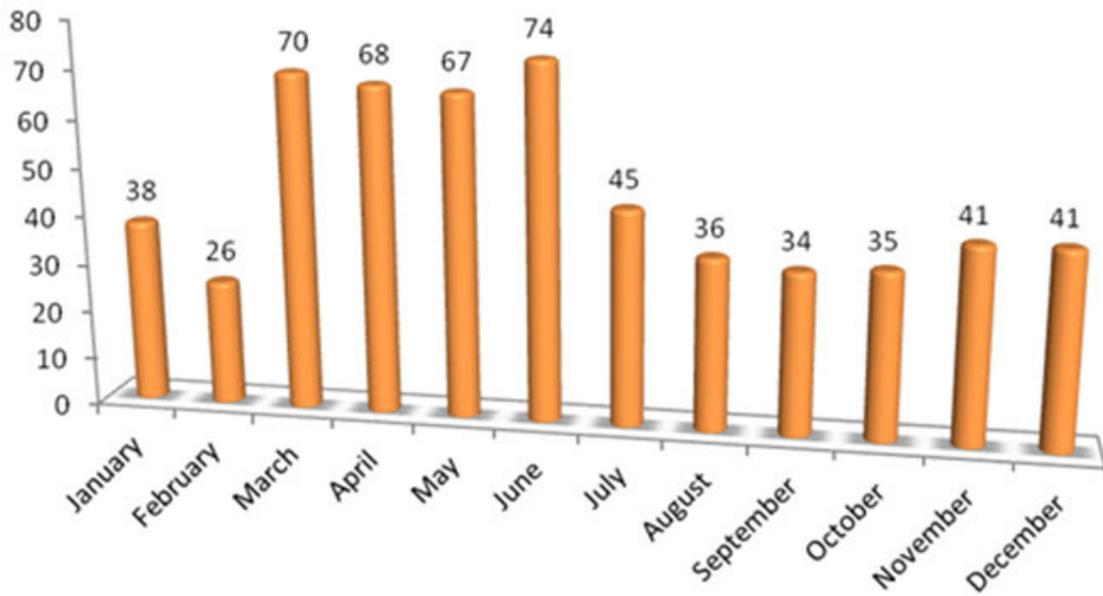
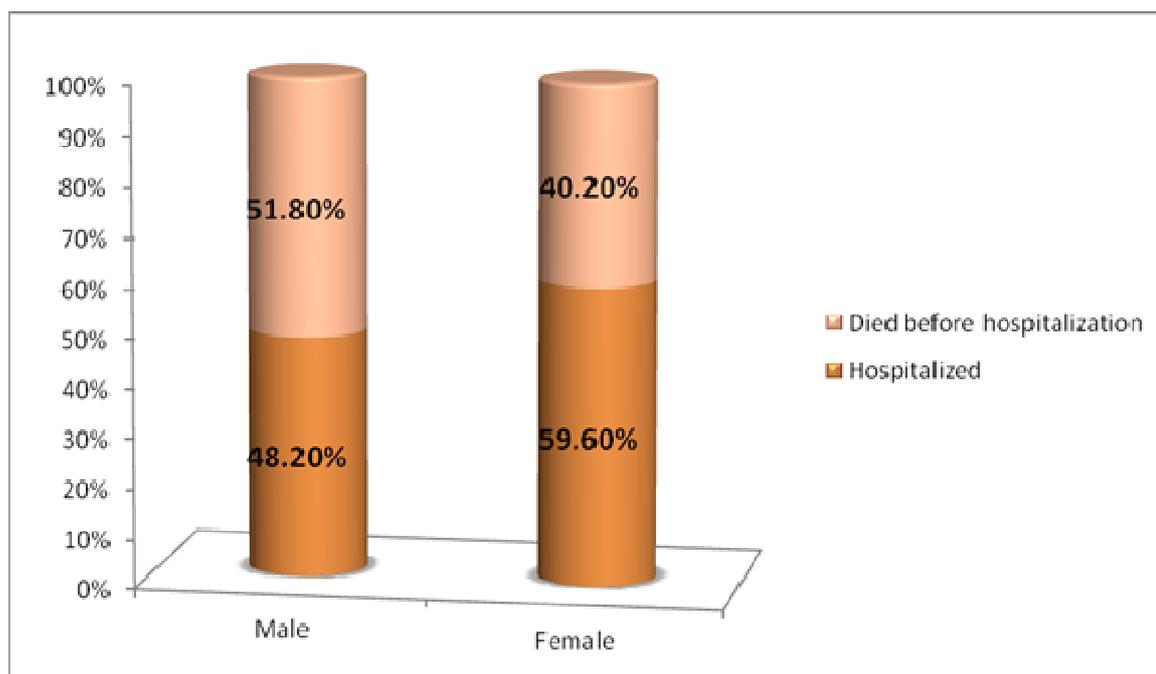


Figure 4. Comparisons of hospitalisation between males and females



Discussion

In India as well as in the state of West Bengal, the national registry for spinal cord injury is absent. The deaths due to cervical spinal cord injury are mainly due to respiratory arrest. The secondary causes may be due to head injury and also due to hemorrhage.

Analysis of the cases “died due to cervical spinal cord injury” clearly indicates that it mainly affects the adults. This is the productive age group of a society. More than 60% victims were young adults aged between 20-39 years. So the productivity of a nation is greatly hampered due to this condition.

On the other hand these deaths are sudden events due to accidental nature. The death comes like a blow to the family members, adversely affecting them mentally as well as financially; without giving them a time to cope up with the situation. In a study named “Epidemiology of traumatic spinal cord injury in Tianjin, China” by Ning et al the mean age of the victims of cervical spinal cord injury cases was found to be 46 years with a standard deviation of 14.2 years.⁹

On the contrary victims were of younger age in the present study with a mean of 33.5 years (Age Mean \pm S.D. = 33.5 \pm 12.8). This age distribution of the victims is corroborative with the findings of Parent et al.¹⁰

The median age of the present study is 31 years. This also shows involvement of younger age group contrary to the findings of the study named “Epidemiology of spinal cord injury: trends and future implications” by DeVivo where median age was 36.9 years.¹¹

Occurrence of fatal injury to spine is rare in pediatric age group. Parent et al found only 4% of the victims of all SCI belonged to under 15 age category.¹⁰ This study also revealed proportion of children and adolescent victims is around 4%. Literature review showed that the proportion of injury of cervical spinal cord is increasing in older age group.¹² The rapid increase in the life expectancy all over the world has been attributed to this fact.

Studies also highlighted that the pace of increase in proportion of the cervical spinal cord injury in old persons is higher than the pace of increase in life expectancy.¹¹ Study by DeVivo showed that the proportion of elderly persons was 13.2% of the total victims.¹¹ This proportion in the present study is only 3.9%. Here lies the difference of the finding between a developed and a developing country.

In India persons aged 60 years and more comprises 7.7% of the total population. But in developed countries, which are in fourth or fifth stage of demographic cycle, the proportion of geriatric population is much higher. That may be the main reason of the differences in the proportion.

Almost 90% of the victims in the present study were male. Male dominance of the cases of cervical spinal cord injury is seen in almost all studies throughout the world.^{2,3,13} But the male female ratio (8.43:1) is not so high in the other studies. It varied from 4.4:1 in some study² to 5.63:1 in others.³ But these findings are from developed countries.

In a country like India, most of the women are homemakers and the proportion of ladies going out of home regularly is less; hence the chance of road traffic accident is less among females. Various studies revealed that male female ratio in pediatric age group is lesser, nearly 1:1.^{14,15} But the male female ratio in the pediatric age group of this study is similar to adults.

According to Goldberg et al the most common site of cervical spinal injury was atlanto-axial joint.¹⁶ Brown et al documented 68% injuries between C1-C4.¹⁴ But in the present study most common site involved was between C3 and C4 followed by C4-C5.

Maximum number of injuries occurred during day time. Frequency of events showed two spikes during office hour rush period at morning between 6 a.m. to 9 a.m. and at evening between 3 p.m. to 6 p.m. Least number of events occurred between 12 midnight and 3 a.m.

Mondal et al has documented maximum number of road traffic accident occurred between 3 p.m. to 6 p.m. followed by 9 a.m. to 12 noon; least cases occurred between 12 midnight to 3 a.m.¹⁷

As majority of the study population in the present study are victim of road traffic accident, the time distribution pattern is corroborative with findings of Mondal et al. He also documented rise of road traffic accidents between months of May and June. Present study also highlighted increased frequency between the months of March to June. This period is the time of highest activity in India and that may be the cause for highest frequency in this period but the exact cause could not be established in the present study.

Majority of the cases in the present study died within 24 hours of injury. This clearly indicates that the deaths were sudden. Cervical region particularly, is very important as far as the vital functions are considered. So, injury to this region causes disturbance in the vital functions of the body ultimately leading to death. Even almost half of the cases died before hospitalisation.

A large number of severe injury cases die before hospitalisation. The unawareness of the people regarding the need of early hospitalisation in case of injury is an important factor in the developing country like India for death before hospitalisation. Many people do not know the importance of early hospitalisation. This causes delay in taking decision and ultimately when they finally decide to bring the victim to the hospital, it is already too late.

It has often been seen that the rural people have strong faith on the practitioners of traditional medicine and on persons treating them without any professional qualification (quack). The present study revealed many people were hospitalised long after the time of injury and not surprisingly a large proportion of this group died within sometime after hospitalisation. This finding indicates the lack of awareness and improper health seeking behaviour of the persons.

Fracture of the cervical vertebra is almost a constant phenomenon in cases of death due to cervical spinal cord injury. Fracture was observed with or without associated dislocation in about 90% of the victims in the present study. Just 10.8% of the study population had only dislocation. Such a big proportion of fracture associated with cervical SCI demands proper analysis to find out the association of different independent factors with it.

In younger age group 67.5% suffered from only dislocation. This may be attributed to more elasticity of the bones as well as the ligaments in this age group. As the age increases the elasticity decreases. Calcification of the ligaments ultimately leads to decreased mobility; that's why chance of dislocation is less in older age group.

On the other hand, decreasing bone elasticity and increasing demineralisation leads to fracture in this age group after sustaining trauma over the bone. Similar findings were also observed in the present study, i.e. in elderly people all cases suffered from fracture. While analysing the association of bony injury with sex, it was found that dislocation was significantly more common among female victims. Female ligaments are more elastic as compared to male of the same age; so, only dissociation without fracture is more common in females.

The study revealed that 52.2% cases were attributed to road traffic accident alone. This finding was corroborative with the findings of Brown et al though his study was limited only to pediatric age group.¹⁴ As per the study by Knutsdottir et al based on 35 years data, most common cause of traumatic SCI was road traffic accident (42.5%) followed by fall from height cases (30.9%).¹⁸ Similar finding was also described by Pickett et al.¹⁹

In the present study, commonest mode of injury was road traffic accident followed by fall from height (25.0%); though the proportions were a bit different. On the other hand Chiu et al in their review article on epidemiology of traumatic spinal injury showed leading cause in developed countries is road traffic accident but in developing countries it is fall from height.²⁰

Being an autopsy based study, survival data was outside the purview of this study. Data regarding the epidemiology and prognosis of the survivors could not be gathered. This is a major limitation of the study.

In spite of the above limitation, detailed epidemiological analysis of the autopsy confirmed cases of SCI at cervical region were documented in this study. It shows a remarkable difference in the age distribution pattern of the cervical SCI victims of this area in comparison to other areas.

The victims are younger than those in other areas. Marked high male gender dominance of the event has also been noted. A national level spinal cord injury database in India would have been of much help in establishing the differences of the epidemiological pattern of the SCI in the country. In absence of such database, this study can be used as a surrogate data.

The identified level, type of injury in these fatal cases would help to train the upcoming spinal surgeons around the world concentrating particularly in these level and types of injury. This may help in designing spinal surgery instruments and implants after gaining an idea about the common level and type of injury in these fatal cases.

The injury time, hospitalisation and the death time analysis may also help the emergency care of the fatally injured patients by encouraging early, safe transportation to medical care institutions.

Competing interests: Nil.

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Medical students' and clinical teachers' perceptions of Māori health teaching

Rhys G Jones, Marcus A Henning, Ralph Pinnock, Boaz Shulruf, Susan J Hawken

Abstract

Aims To investigate the views of medical students early in their clinical training and their clinical teachers with respect to Māori health teaching and learning.

Method A survey approach was used to appraise responses from 276 students early in their clinical training and 135 clinical teachers. All participants were asked to respond to a set of questions about the teaching and assessment of Hauora Māori (Māori health). These responses were analysed using descriptive statistics and inspection of the distribution of responses (skewness and kurtosis). A further open ended question was asked about suggested changes to the medical school and the responses relating to Hauora Māori were analysed using a summative content analysis system.

Results The distribution of the data revealed strongly skewed responses in the direction of disagreement in relation to four of the six student questionnaire items indicating that most students question the quality of Hauora Māori teaching and assessment. Also, two of the five items from the clinical teacher questionnaire were strongly skewed to the disagreement option suggesting that many clinical teachers felt underprepared to teach this aspect of the curriculum. The content analysis identified a range of views, often polarised, with responses at the negative end of the spectrum revealing a degree of resistance to Māori health teaching and learning.

Conclusions The findings of this study raise concerns about the extent to which medical students are supported to achieve Hauora Māori learning outcomes. The consistency between medical student and clinical teacher findings points to systemic issues, and the solutions are likely to be multi-layered. At the institutional level, Māori health needs to be consistently presented as a legitimate and critical area of medical education. At the educational level, it is important that all teachers are supported to provide high quality teaching, learning and assessment of Hauora Māori across the curriculum.

The field of cultural competence has emerged as a way of improving the knowledge, attitudes and skills of clinicians caring for diverse populations.¹⁻³ Betancourt¹ asserted that understanding the sociocultural dimensions related to a patient's health values, beliefs and behaviours is critically linked to good clinical practice and should be embedded within undergraduate medical curricula.

Cultural competence is taught in New Zealand's undergraduate medical programmes and forms part of the New Zealand Medical Council's standards framework.⁴ In Aotearoa/New Zealand it is particularly important that health professionals are able to meet the challenge of addressing Māori health and reducing inequalities.⁵

Teaching and learning of Hauora Māori (Māori health) in medical curricula is therefore critical, yet significant challenges exist in this educational domain. Jones et al⁶ identified several aspects of Hauora Māori teaching and learning that require attention including assessment, teaching capacity and the hidden curriculum.

The need for more effective education in this area is also highlighted by studies examining health professionals' talk about Māori health and the health care experiences and outcomes of Māori. For example, non-Māori general practitioners have been shown to draw on explanations that blame Māori for their poor health status,⁷ which stands in direct contradiction of contemporary Māori health scholarship.^{8,9}

Māori patients' experiences reveal a lack of cultural competence in health services¹⁰ and there is evidence that Māori receive poorer quality care in a variety of clinical contexts.¹¹ International literature suggests that the causes of these inequities include health system, patient and clinician factors.

In order to advance this domain of medical education, it is instructive to identify factors that either support or undermine effective learning. The purpose of this paper is to explore the views of medical students early in their clinical training and their clinical teachers with respect to their perceptions of the teaching and learning of Hauora Māori.

The research question driving the study was, "How do medical students at the University of Auckland and associated clinical teachers perceive the teaching, learning and assessment of Hauora Māori?"

Method

Study design—The research process was exploratory and employed a survey approach to understanding the perceptions of medical students and clinical teachers. We sought responses to a set of items using Likert response options and additionally asked students and teachers to make open-ended comments.

These survey items were administered in conjunction with a Dundee Ready Educational Environment Measure (DREEM) questionnaire,¹⁴ an internationally validated inventory for exploring students' perceptions of their educational environment. The complete DREEM questionnaire was administered to students; an abbreviated version was used with clinical teachers.

The analyses in this paper are restricted to the Hauora Māori-specific questionnaire items and responses to the open-ended question that relate to Hauora Māori teaching, learning and assessment. Analysis of the DREEM questionnaire responses and its adaptation to the clinical teacher cohort have previously been reported.^{15,16}

Student questionnaires—Medical students were asked to fill in a six-item questionnaire about Māori health teaching, learning and assessment, and to answer an open ended question, "if you could change three things about medical school what would they be".

The questionnaires were distributed at the start of a 2-week block of lectures and we emphasised that we were seeking their views on the clinical rotation which they had just completed. To establish consistency of duration of rotation, exclusion criteria for short clinical rotations were put in place and only those rotations of 6 weeks were considered.

The six Hauora Māori items (see also Table 1) were:

- (1) The teachers help facilitate my learning of Hauora Māori;
- (2) The supervisors help facilitate my learning of Hauora Māori;
- (3) Teaching of Māori health issues is consistent across all parts of the programme;
- (4) Assessment of Hauora Māori is fair and appropriate;
- (5) I get good feedback about my achievement in the Hauora Māori domain; and
- (6) I feel comfortable interacting with Māori patients and whānau.

Each response option (strongly disagree to strongly agree) was converted to a numerical value (0 to 4) to enable statistical analyses.

Clinical teacher questionnaires—Clinical teachers were asked to fill in a five-item questionnaire about Hauora Māori teaching, learning and assessment, and to answer an open ended question, “If you could change three things about medical school - what would they be?”

The clinical teacher questionnaires were mailed to the clinical centres associated with the University of Auckland Faculty of Medical and Health Sciences and distributed to clinical teachers within those centres. As with student data, to establish consistency of duration exclusion criteria for short clinical rotations were put in place and only those rotations of six weeks were considered for the subsequent analyses. An exception was made for primary care in order to include the perspectives of clinical teachers based in the community.

The five Hauora Māori items (see also Table 3) were:

- (1) It is important for students to learn about Māori health;
- (2) I feel prepared to teach students about Māori health;
- (3) I feel well prepared to assess students in the Māori health domain;
- (4) I have a clear understanding of the Hauora Māori health learning outcomes; and
- (5) Assessment of Hauora Māori is fair and appropriate.

Each response option (strongly disagree to strongly agree) was converted to a numerical value (0 to 4) to enable statistical analyses.

Ethics—The study was approved by The University of Auckland Human Participants Ethics Committee.

Data analysis—Statistical analyses were conducted to appraise the participants’ responses using SPSS version 18 software.¹⁷ Numerical data were described in terms of medians, means, standard deviations, skewness and kurtosis (and standard errors for the latter two).

Skewness describes the symmetrical or asymmetrical nature of the distribution¹⁸; hence a positive value indicates a long right tail (and with negative values the opposite applies). Additionally, if the absolute value of skewness divided by its standard error is greater than 2, then we can assume significance. Kurtosis estimates the level of ‘peakedness or flatness’ of the distribution¹⁸; positive values suggest a longer and more pronounced tail than expected in a normal distribution (and negative values suggest the opposite).

Additionally, if the absolute value of kurtosis divided by its standard error is greater than 2 then the assumption of normality is violated.

The open-ended comments were analysed utilising a summative content analysis system.¹⁹ We identified and qualified relevant text with the purpose of extracting meaning associated with the contextual use of the words and content; ‘Hauora Māori’ or ‘Māori’ or ‘Maori’ or ‘culture’ or ‘ethnicity’ were used as key words to locate comments on these areas of the curriculum.

We used both a manifest system of analysis by inspecting the appearance of the word structures and content, and a latent content approach by employing interpretation through analysing and considering the word usage within the statements. Therefore, the intent was to explore the underlying meanings of the statements and consider them in line with the literature.

Results

Participants—From a total of 344 medical students, 276 (80.2%) responded. The response rate was slightly higher from year 4 students (83.7%) than from Year 5 students (76.2%). In addition, 135 of the 197 (69%) clinical teachers completed a short questionnaire. This sample has been previously described in depth in other studies.^{15,16}

Medical student responses—Following exclusion, the medical student data were considered across four clinical sites (Auckland, 101; Counties Manukau, 60; Waikato, 31; and Waitematā, 38) and five clinical rotations (medicine, 79; obstetrics and gynaecology, 21; paediatrics, 28; psychiatry, 41; surgery, 61).

The reliability of the six items on the teaching of Hauora Māori was established (Cronbach alpha = .82).¹⁷ As shown in Table 1, issues of skewness were observed with items 5 and 6; and kurtosis for items 1, 2, 3, 4, and 6.¹⁷ Moreover, these findings demonstrate that students: (a) disagreed with items 1, 2, 3 and 5; (b) agreed with item 6; and (c) were noncommittal about item 4.

Table 1. Descriptive statistics (median, mean, standard deviation, skewness, kurtosis, and standard errors) for the six items related to Hauora Māori for medical students

Items		Median	Mean (SD)	Skewness (SE)	Kurtosis (SE)
1	The teachers help facilitate my learning of Hauora Māori	1.00	1.51(1.13)	.24(.16)	-.94(.32)
2	The supervisors help facilitate my learning of Hauora Māori	1.00	1.50(1.10)	.22(.16)	-.88(.32)
3	Teaching of Māori health issues is consistent across all parts of the programme	1.00	1.42(1.10)	.30(.16)	-.89(.32)
4	Assessment of Hauora Māori is fair and appropriate	2.00	1.58(1.12)	.07(.16)	-1.00(.32)
5	I get good feedback about my achievement in the Hauora Māori domain	1.00	2.87(1.04)	.54(.16)	-.58(.32)
6	I feel comfortable interacting with Māori patients and whānau	3.00	3.87(.86)	-1.17(.16)	1.96(.32)

Notes: 'SD' = standard deviation; 'SE' = standard error.

According to students' responses cited in Table 2, four emerging themes were identified: (1) some students feel there is too much Hauora Māori content; (2) there is a need for other cultural teaching; (3) more indepth and applied teaching within the clinical environments; and (4) a need to review the styles and content of the teaching material.

Table 2. Qualitative comments from medical students in relation to the teaching of Hauora Māori

Theme	Example participant responses (from a total of 20 comments)
Too much Hauora Māori	Too much Hauora Maori teaching – repeated every year! While practical teaching is short-changed. Decrease the amount of Hauora Maori teaching.
Need more on other cultures	Focus on Pacific Health as well as/as much as Hauora Māori. Less Māori teaching or rather more broad teaching in cultural terms (not only Māori).
Teaching on clinical attachments	Better teaching of Māori health while on clinical; attachments, e.g., practical advice.). Many of the topics in PD [professional development] need to more practical, e.g., Māori health – interacting with patients with supervision and guidance is more relevant than much of theory.
Style and content of Māori health teaching	Dampen the ‘over enthusiasm’ about Māori inequalities and more particularly the aggressive, no-room for discussion model used to discuss this important issue. Stop this annoying discrimination. More racism class[es] to be held.

Note: Each bullet point signifies one student’s comment

Clinical teachers—Following exclusion, the clinical teacher data were considered across five clinical sites (Auckland, 46; Community Primary Care, 34; Counties Manukau, 16; Waikato, 9; and Waitematā, 9) and six clinical rotations (primary care, 34; medicine, 15; obstetrics and gynaecology, 14; paediatrics, 17; psychiatry, 10; surgery, 24).

The reliability of the five items on the teaching of Hauora Māori was established (Cronbach alpha = .83).¹⁷ As shown in Table 3, issues of skewness were observed with items 1, 3, 4, and 5; and kurtosis for items 1 and 2.¹⁷

Moreover, the findings presented in Table 3 established that clinical teachers: (a) disagreed with items 3 and 4; (b) agreed with item 1; and (c) were noncommittal about item 2 and 5.

Table 3. Descriptive statistics (median, mean, standard deviation, skewness, kurtosis, and standard errors) for the five items related to Hauora Māori for clinical teachers

Items	Median	Mean (SD)	Skewness (SE)	Kurtosis (SE)
1 It is important for students to learn about Māori health	3.00	2.82(1.00)	-.95(.23)	.97(.45)
2 I feel prepared to teach students about Māori health	2.00	1.61(1.02)	-.03(.23)	-.92(.45)
3 I feel well prepared to assess students in the Māori health domain	1.00	1.19(1.05)	.50(.23)	-.54(.45)
4 I have a clear understanding of the Hauora Māori health learning outcomes	1.00	1.25(1.01)	.46(.23)	-.41(.45)
5 Assessment of Hauora Māori is fair and appropriate	2.00	1.73(.88)	-.53(.23)	.08(.46)

As with the students' views presented in Table 2, four emerging themes were identified from the clinical teachers' responses cited in Table 4, which could be categorised using similar labels to those identified for students above.

Table 4. Qualitative comments from clinical teachers in relation to the teaching of Hauora Māori

Theme	Example participant responses (from a total of 14 comments)
Too much Hauora Māori	More anatomy. It is somewhat pointless having young doctors who understand Hauora Māori if they don't actually know what is in the human body or how it works. Remove the racist assessment of Māori health. This is politically correct nonsense – maybe appropriate in community health study – of no relevance at all in the teaching of general surgery.
Recognise other cultures	Maori healthy is important, but must be kept in the valid context of community health status and needs of non Māori and ESL [English-second language] patients.
Need for more training	More specific on requirements of Hauora Māori assessment criteria/learning outcomes. Teaching teachers and students about Māori health.
Teaching and learning methods / culture	Maori health could be specifically taught and assessed by Māori health specialist. Encourage students to be proactive in finding interesting cases, presenting for the purpose of teaching and sharing knowledge, and regarding this as normal teaching culture.

Note: Each bullet point signifies one clinical teacher's comment

Discussion

The findings of this study highlight a number of concerns in relation to Hauora Māori education in clinical settings. The responses from both clinical teachers and students clearly indicate that Māori health teaching, assessment, feedback, and supervision require attention.

We found that the majority of students surveyed had concerns in relation to Hauora Māori: with their teachers or supervisors, fairness of assessment, and the quality of

feedback on their work. Similarly, most clinical teachers felt inadequately prepared to teach or assess students in the area of Hauora Māori.

The correspondence between the student and teacher findings is consistent with the observations of Jones et al ⁶ and implies a need for more formal training and support for those teaching medical students in Aotearoa/New Zealand.

In another component of this study that focused on generic aspects of the learning environment, students were more concerned with issues such as time, stress, lecture exposure and the need for more bedside teaching and clinical exposure. ¹⁵

It is apparent that concerns about teacher competence were raised particularly in relation to Hauora Māori but not in other areas of the curriculum. This is not unexpected given that many doctors' explanatory models and discourse may be at odds with current theory and practice in Māori health. ⁷

The qualitative findings provide a window into understanding the problems associated with teaching, assessment, feedback and supervision. It is important to recognise that these comments may not necessarily be representative of the total sample: there were only 20 responses from students and 14 from clinical teachers that specifically addressed the Hauora Māori curriculum.

It is further acknowledged that these views may reflect more extreme views at either end of the spectrum, rather than embodying the views of the majority. For example, some participants indicated an appetite for more education and training in Māori health, while others (both teachers and students) expressed a level of resistance to the Hauora Māori curriculum, arguing that it distracts from more important subject areas. This is consistent with the findings of other studies that have reported student and teacher perceptions of cultural competence curricula. ^{20,21}

Our findings clearly indicate scope for further research into this area of the curriculum. As noted, the open-ended comments need to be interpreted with care as they represent only a minority of respondents' views. However the existence of such opinions and discourses among teachers is of concern, as they likely contribute to a hidden curriculum that can inhibit students' learning and undermine effective cultural competency development. ²²

The diversity of responses also has implications for professional development activities such as teach-the-teacher outreach programmes. ²³ Tailored approaches will be required to ensure that all clinical teachers are supported to teach and assess Hauora Māori effectively.

It is important that the outcomes of this study are not seen as critical of clinical teachers, but rather are viewed in a broader organisational and systemic context.

Concerns raised about the teaching and assessment of Māori health in clinical settings indicate failures at the level of the curriculum and the institution. They reflect a lack of incentives and requirements for educators to develop competence in teaching and assessing this area. Faced with a demanding workload and resulting time constraints, clinical teachers will naturally prioritise continuing educational activities that are either mandatory or associated with some tangible benefit.

Similarly, teacher (and learner) resistance should be viewed as a systemic issue, not as a reflection of individual qualities. It is driven by a tendency for only those areas of the curriculum which align with the institution's dominant tacit values to be considered important.²⁴

While Hauora Māori may be ostensibly valued by virtue of its prominence as a curricular domain,²⁵ the results of this study in relation to the quality of clinical teaching and assessment suggest that it is not afforded a high priority. The lack of attention to staff capability in this area sends a message to both students and teachers that it is not considered a critical aspect of professional competence; in this context, a degree of resistance could be seen as a natural response.

This illustrates the value of considering the impact of the 'institutional curriculum'²⁶ on the education of students in Hauora Māori. When viewed through this lens, it is not surprising that graduates may be inadequately prepared to meet the challenge of advancing Māori health.

Curricular reform will be required to ensure that future generations of medical professionals are equipped with the knowledge, attitudes and skills required to provide culturally safe care and to contribute to eliminating health inequities.²⁴

Conclusion

The present study raises concerns about the extent to which medical education in Aotearoa/New Zealand supports students to achieve Hauora Māori learning outcomes. While clinical teachers are generally supportive of including Māori health in the curriculum, the quantitative findings point to systemic issues relating to the value accorded to Māori health at the institutional level.

The qualitative findings suggest a degree of polarisation among both students and teachers in relation to their views on Hauora Māori in medical education. This clearly indicates the need for further research in this area; we recommend in-depth interviews or focus groups to draw out the underlying issues.

The solutions to the issues identified in this study will necessarily be multi-layered. At the educational level, it is important to review how Māori health is taught and assessed throughout the entire curriculum.

In clinical settings, more professional development in this area is warranted to promote quality teaching, learning and assessment. At the level of the institution, systems and policies need to ensure that Māori health is consistently addressed, legitimised and valued.

Competing interests: Nil.

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Why do potential body donors decide against donating?

Kathryn McClea, Mark D Stringer

Abstract

Background The Department of Anatomy at the University of Otago has been accepting body bequests for anatomical study for about 70 years. Donated bodies are used to teach anatomy to medical and dental students and surgical trainees and a wide range of other undergraduate and postgraduate students rely on body specimens to learn anatomy. Maintaining a robust body bequest programme is essential for these educational programmes. The profile of our body donors is reasonably well understood but little is known about why individuals who are interested in body donation decide not to complete the registration process.

Aim To investigate the reason(s) why applicants request bequest information but do not complete the registration process.

Methods In March 2012, an anonymous questionnaire was sent to 142 individuals who had contacted the Department between January 2010 and August 2011 requesting bequest information but had not completed the registration process.

Results Eleven questionnaires failed to reach the intended recipient reducing the sample size to 131. Seventy eight respondents (60%) completed the questionnaire. The prime motivation for enquiring about body donation was a desire to aid medicine. The commonest single reason for not completing the registration process was our donor weight restriction of 90 kg, cited by 25% of respondents. Other reasons included objections by a family member and restrictions related to potential prion disease. Fourteen respondents had lost their registration form, and a further 15 hadn't yet made up their mind whether to donate; 18 of these have since completed the registration process.

Conclusions Restrictions on the acceptance of a body at the time of death deter some interested individuals from body donation. About 40% of respondents to this survey had either lost their form or were still considering body donation, many of whom were prompted to complete the registration process by this survey. Bequest programmes should consider sending a follow-up letter to individuals who request information but subsequently fail to register within a few months.

The Department of Anatomy at the University of Otago's Medical School has used cadavers to teach anatomy to health science and science students since 1874. In the early years the Department received unclaimed bodies from mental institutions and poor houses around New Zealand. This tradition continued until 1943 when the first written bequest to the Department was made.¹

The success of the bequest programme is wholly dependent on the generosity and altruism of the people who donate their body to medical science. Previous studies of our donor programme have focused on the background and motivation of our body donors.¹⁻⁴

The Department receives bequest enquiries from about 200 people each year. Approximately 50–60% of these individuals register as body donors but the remainder do not complete the registration process.

The Department completely respects an individual's decision not to donate but we were interested to explore the reasons why those interested in donation fail to complete the registration process. This knowledge could assist us in maintaining a robust bequest programme, which provides such a strong foundation for anatomy education and research. It may also be of interest to General Practitioners with whom patients sometimes discuss body donation.³

Methods

In March 2012 a postal questionnaire was sent to 142 individuals (64% female, 36% male) who had requested information about body donation from the Department between January 2010 and August 2011 but who had not completed the registration process. An information sheet explained that participation was purely voluntary and that responses were anonymous. A freepost reply envelope was included.

The questionnaire comprised a total of 15 questions related to the following: personal information about the respondent (gender, ethnicity, age, marital status); whether they had discussed their plan to donate their body with anyone; the main reason(s) for requesting bequest information; the main reason(s) for deciding not to donate their body; attitudes to current restrictions to donation (Table 1) they would most like to see removed; the possible influence of past moratoria on the acceptance of bodies; the utility of bequest literature sent to them; and whether they would be likely to become a body donor in the future. Finally, participants were invited to add any additional comments.

This study was approved by the University of Otago Ethics Committee (12/020) and the Ngāi Tahu Research Consultation Committee.

Table 1. Current departmental restrictions on the acceptance of a body

Restriction	Reason for restriction
Body weight >90 kg	Health and safety of staff who handle the bodies
Infectious diseases: hepatitis B or C, Creutzfeldt-Jakob disease, active tuberculosis, HIV	Embalming does not eliminate risks of these infections
Recent (<1 month) complicated and/or extensive major surgery	Insufficient healing of wounds
Rapid or recent (<6 months) onset of dementia	Risks of prion transmission
Lived in the UK, France or Republic of Ireland for a cumulative period of ≥6 months between 1980 and 1996	Relates to the outbreak of bovine spongiform encephalopathy and the risk of human prion infection
Post-mortem examination required	Renders the body unsuitable for anatomical study
Death outside catchment area (Invercargill, Dunedin, Christchurch, Nelson regions)	Logistic reasons of needing to embalm the body within 24 hours of death

Results

Response rate—Eleven forms were marked “return to sender” indicating that the recipient no longer lived at the address. Seventy-eight (60%) of the remaining 131 individuals returned a completed questionnaire.

Gender, ethnicity, age and marital status—Fifty-two respondents (67%) were female, a similar proportion to the overall survey cohort. The majority of all respondents (n=74 [95%]) identified themselves as being of New Zealand European descent, with the remaining four respondents being of Māori, New Zealand Moriiori, European, and American descent, respectively.

Most respondents were aged in their 60s (n=21 [27%]) or 70s (n=23 [29%]); seven (9%) were in their 80s and the remainder (35%) were younger (two in their 20s, 11 in their 40s, and 14 in their 50s). Forty-two respondents (54%) were married or in a long-term relationship, 18 (23%) were divorced or separated, 10 (13%) were widowed, and the remainder were single. Sixty-one respondents (78%) had discussed their wishes with at least one other person prior to requesting information.

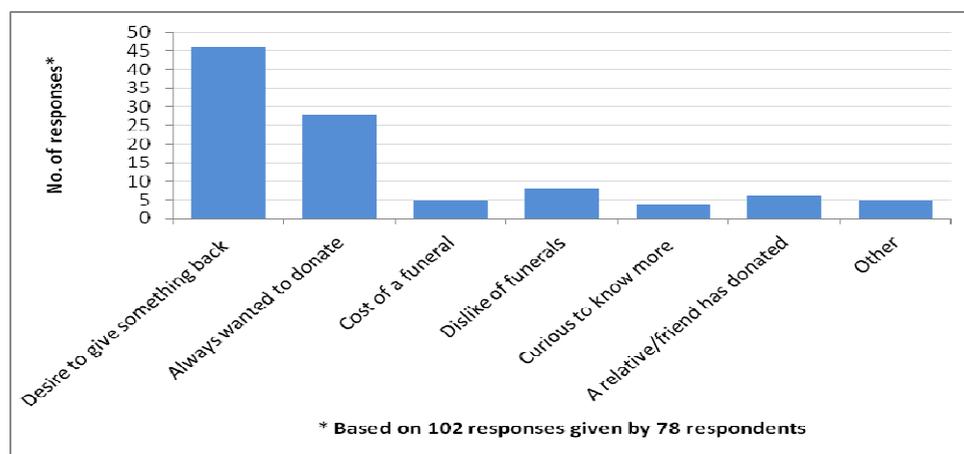
Main reason(s) for requesting bequest information—A total of 102 main reasons were given by the 78 respondents, 17 respondents giving two or more reasons. The main motivation for more than half of all respondents (n=46 [59%]) was a desire to give something back to the medical profession (Figure 1). Another 28 (36%) respondents echoed this altruistic theme by indicating they had always wanted to donate their body to medical science.

Some respondents added comments about specific health problems that they and/or their family members had experienced and their desire to assist with the training and education of future health care professionals. One respondent indicated that she had a rare condition that she thought would be interesting for the students.

Only thirteen (17%) respondents indicated that their main reason for requesting information was because they did not want their estate to pay funeral expenses, or that they did not like funerals. One respondent made the following comment: “I have been to a funeral where the body went to Dunedin [Otago School of Medical Sciences] and this was one of the best funerals I have been to.”

Other reasons for wanting bequest information included the 2009 and 2010 airing of the documentary *Donated to Science* on TV3,⁵ and a general desire to know more about body donation.

Figure 1. Main reason(s) for requesting bequest information



Main reason(s) for deciding not to donate—A total of 83 responses were given by 70 respondents, with 12 people giving more than one reason. Eight people declined to answer this question.

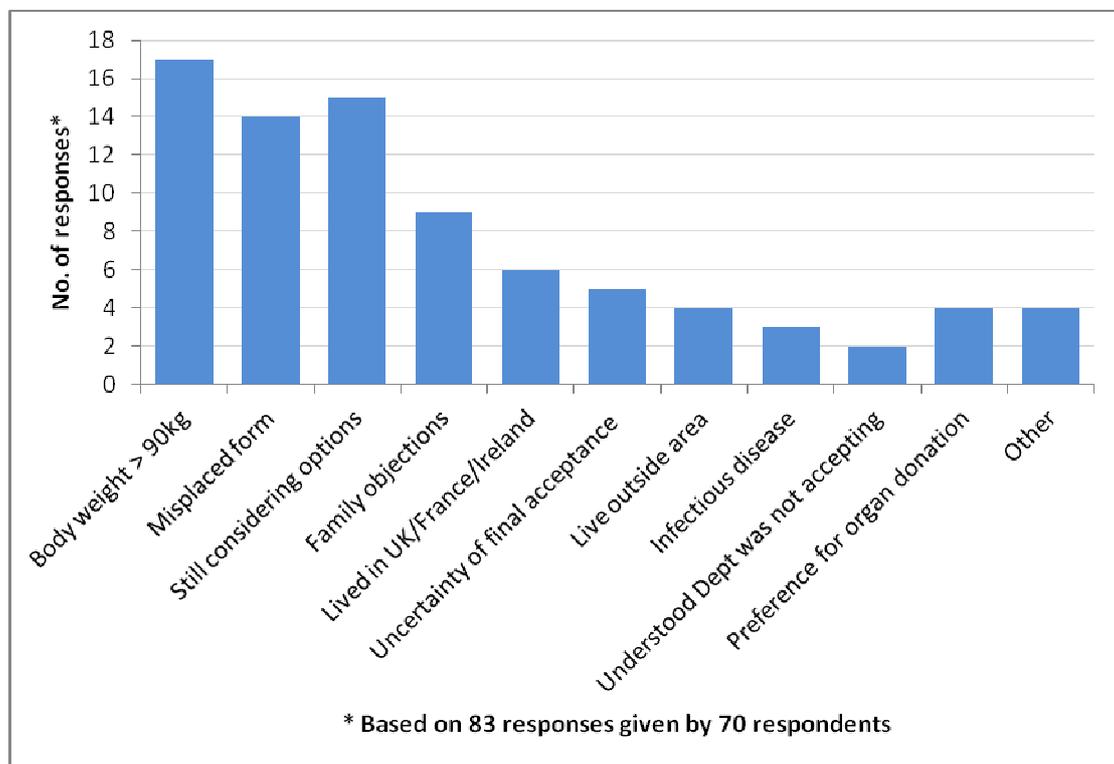
Seventeen (24%) respondents indicated that their current body weight was the main reason for not proceeding (Figure 2). Fourteen (20%) respondents stated that they had lost or misplaced the registration form, eight of whom requested a further form.

Fifteen (21%) respondents indicated they were still considering body donation but had not yet reached a decision. Six respondents were unable to register because they had lived in the UK, France or Republic of Ireland for a cumulative period of 6 months or more between 1980 and 1996.

Nine respondents indicated they had rejected donation because of objections by family members. Five respondents stated that the uncertainty of not knowing until the time of death whether their body would be accepted was the reason they had not proceeded.

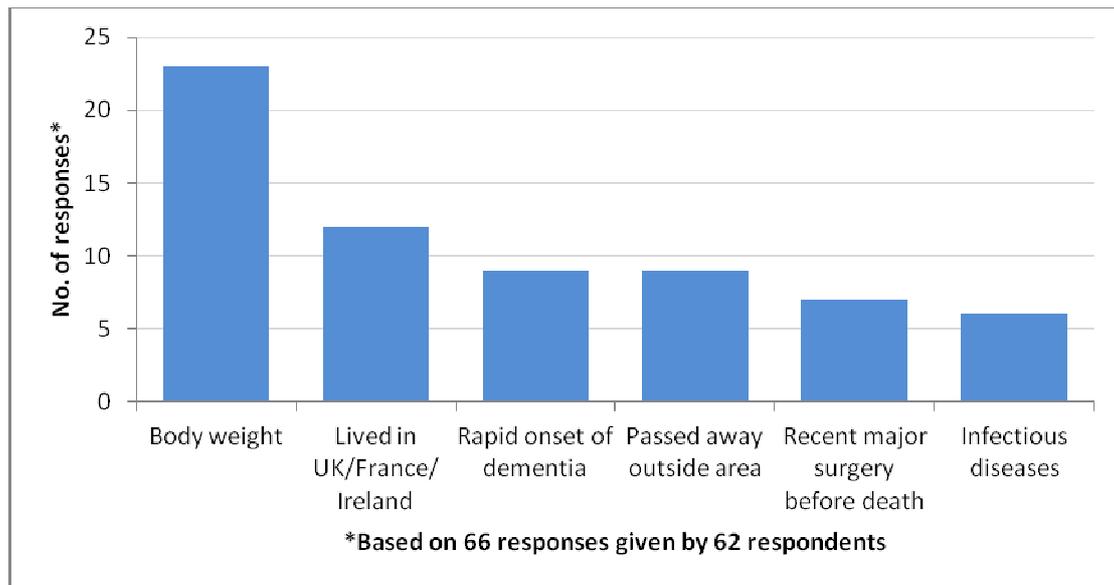
Four “other” responses were given: one respondent wanted his body to be used specifically for research into polio and chronic fatigue syndrome which is not within the Department’s remit; another wished to donate but was allowing his family more time to accept his decision; one respondent considered that he would be ineligible for donation after an anticipated knee replacement; and another stated that her Bahai faith did not allow the body to be cremated (which is carried out after dissection).

Figure 2. Main reason(s) for not proceeding with body donation



Attitudes to restrictions—Forty-five respondents (58%) stated they would think more positively about donating if there were not so many restrictions on the acceptance of bodies. Sixty-two listed the restriction(s) they would most like to see removed (Figure 3); in 23 instances this was the body weight limit.

Figure 3. Restrictions on body donation respondents would most like to see removed



Past moratoria—The Department previously placed a moratorium on the acceptance of bodies on two separate occasions when it reached its capacity to store bodies. In 1993, the moratorium lasted for a period of 18 months, whereas in 2008 it was for 6 months only. Registration of bequests continued to be accepted during both periods. Half of the respondents (n=38 [49%]) were unaware of these events, 27 (35%) did not answer this question, and only two of the 13 respondents who had been aware of past moratoria indicated that it had influenced their decision not to donate.

Utility of bequest information literature—Seventy-three (94%) respondents indicated that the bequest information pamphlet they received from the Department was helpful in making a decision about donating their body; the other five did not answer this question. Four respondents commented on additional information they would like to see included: two wanted to know exactly how their body would be used, another asked for an easy step-by-step instruction guide on how to donate, and the fourth stated they had previously contacted the Department to ask if suicide would affect their bequest.

Likelihood of future body donation—Of the 64 respondents who answered this question, 41 stated that they may yet decide to donate their body, 12 ruled this out, and 11 were uncertain. Eleven commented that they would reconsider donating if they could reduce their body weight to within the Department’s limit.

Five respondents commented on the restriction imposed by living overseas e.g. “I would be very happy to sign-up if there was some way around the residency in the UK condition” and one questioned why the Department would not be able to accept their body if they committed suicide.

Discussion

To our knowledge, this is the first study to explore the reasons why individuals expressing an interest in body donation do not complete the registration process. The 60% response rate to our questionnaire was gratifying given that the participants had not replied previously to bequest information sent to them.

The Department endeavours to accept all body bequests, but there are inevitable restrictions centred around the safety of staff and students and the logistics of body donation, and it appears that these are a significant factor for some individuals considering body donation.

Reasons for not completing the bequest registration process:

- This survey showed that the commonest single reason for not proceeding with donation was a body weight greater than 90kg; this was cited by a quarter of those who answered this question. All bequest programmes in Australia and New Zealand have a donor weight restriction because of health and safety concerns for staff who are required to lift and turn the bodies. As the mean body weight of New Zealand adults increases⁶ this restriction will have a progressively greater impact on our bequest programme.
- It was interesting to note that 29 (42%) respondents had not actually decided against donating their body and were either still considering donation or had lost their registration form. Eighteen of these respondents have since completed the bequest registration process, suggesting that bequest programmes would benefit from contacting non-respondents with a single follow-up letter.
- Encouragingly, past moratoria do not appear to have had a major impact on this group of potential donor’s perceptions of the bequest programme. Only two respondents stated that this had played a part in their decision not to donate. Nevertheless, bequest programmes should ideally have the necessary infrastructure to accommodate fluctuations in the number of body donations, without the need for potentially disruptive temporary moratoria.
- One in eight potential donors in this survey did not complete the registration process because of objections by a family member. Despite there being a next-of-kin's co-signature on the registration form, the Department is unable to accept a body at the time of death if a near living relative objects to the bequest. Several respondents indicated that they were still hoping that family members would change their minds and support their wish to donate. One respondent went so far as to state that they would like to see legislation preventing relatives from overriding the wishes of the donor. This is also a controversial issue in organ donation.⁷ The law governing body donation to New Zealand schools of anatomy was revised in 2008 (Human Tissue Act 2008)⁸ so it is unlikely that any such changes will be made in the near future.

- The donor restriction related to living in the United Kingdom, France or Republic of Ireland for 6 months or more between 1980 and 1996 relates to the European outbreak of bovine spongiform encephalopathy (BSE or "mad cow disease") during that period and the possibility of human prion infection. Prions are not eliminated by conventional embalming agents.⁹ This criterion is the same as that used by the New Zealand Blood Service¹⁰ and other bequest programmes in Australasia but the evidence is largely circumstantial. These same individuals are eligible to donate organs and corneas for transplantation but not heart valves, skin or other tissue.^{11,12}
- The issue of suicide and body donation was raised by two respondents. A coroner's post-mortem in such cases renders the body unsuitable for anatomical examination. This is common to bequest programmes throughout Australasia. An increasing awareness of physician-assisted suicide¹³ and its possible greater acceptance in society in the future could therefore become an issue for bequest programmes.

As in previous retrospective^{2,3} and prospective⁴ studies of registered body bequestees at our medical school and similar studies in other countries,^{4,14} the overwhelming motivation to donate was a desire to aid medicine. A common misconception about bequest programmes is that the avoidance of funeral expenses is an important driver.

Only five (6%) respondents in this study indicated that their main reason for requesting bequest information was to avoid funeral expenses. This is an identical proportion to that found in our retrospective study of 140 registered body bequestees.³

While the pros and cons of maintaining a body bequest programme continue to be debated, there is some evidence that access to human specimens is a crucial factor in maintaining high standards in anatomical education and research.¹⁵

Respecting and understanding our body donors should be part of this privilege. This study offers new insights into our potential donor population and suggests that bequest programmes might benefit from following up individuals who express an interest in body donation but fail to complete the registration process.

Competing interests: Nil.

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“Serious” but not “imminent”: genetics and the disclosure of health information to at-risk relatives

Joanne Lee

Abstract

The most recent amendment to the Health Information Privacy Code (HIPC) permits disclosure of health information to third parties where there is “serious” risk to the life and safety of an individual or to others. In this article, I discuss the complexities that arise in the application of the new test for “seriousness” to genetic information and why this standard is subjective and a threat to patient privacy.

Health care practitioners are obliged to maintain the confidentiality of a patient’s health information with very few exceptions. There are strong public health and personal interests in maintaining health privacy and unauthorised disclosure carries serious consequences.

In New Zealand, information privacy principles of the Privacy Act 1993 previously permitted the disclosure of information held by an agency to third parties where there was a “serious and imminent” threat to a person’s life or health or to public health or public safety. This standard was recently amended by the Privacy (Information Sharing) Bill 2011 which has modified the threshold for the disclosure of information to third parties to occasions where there is a “serious” threat to a person’s life or health or to public health or public safety.¹

This change to the Privacy Act 1993 was similarly recommended by the Privacy Commissioner for the Health Information Privacy Code (HIPC) in which the information privacy principles are mirrored.² Health care practitioners now have a wider statutory exception to the common law obligation of medical confidentiality. This amendment has significantly broadened the exceptions where a threat to public safety or an individual justifies disclosure and may override an individual’s privacy interests.

This change was supported by many in New Zealand, particularly those with concerns for the safety of vulnerable children. Previously, information regarding children whose long-term safety was a concern could not be disclosed unless the threat of harm was both “serious” and “imminent”. Removing the need for imminence has broadened the scope of permissible disclosure and grants health practitioners and other agencies the discretion to disclose information where there is serious concern for the safety of children but no urgent threat.

Another argument supporting this new threshold is the disclosure of genetic information to at-risk relatives where there is risk of “serious” harm but where harm may not eventuate for many years. Many feel that the requirement for imminence is too strict, especially since symptoms of genetic disorders sometimes take years to manifest.

Removing imminence from the standard has significantly altered the moment at which health practitioners may be exempted from the obligation of absolute medical confidentiality and may legally disclose sensitive health information. This change to the HIPC now grants health professionals the discretion to make disclosures to third parties, without the consent of a person, where necessary. However, as discussed by Richmond Wee, medical professionals remain bound by professional standards and guidelines that place responsibility on practitioners to seek guidance and exercise due care before making disclosures.³

Although many believe that this amendment will create more benefit than harm, I argue that this new standard is too simplistic and subjective when it comes to complex genetic conditions. This new threshold grants health practitioners too much discretion and too little guidance in their assessment of “seriousness” and increases the risk of unjustified breaches of patient privacy.

The test for “seriousness”

Currently, disclosure to at-risk relatives is permissible if it is one of the purposes for which the information was collected in the first place.⁴ Thus, provided the practitioner informs the patient prior to testing, disclosure to at-risk relatives may take place if the need ever arises. This is often the case in genetic counselling. However, complications arise when an incidental result is produced and a patient refuses to inform at-risk relatives, despite the potential for serious harm.

Rule 11(2)(d) of the HIPC now permits the disclosure of health information where it is necessary to prevent or lessen a “serious” threat to the life or health of another individual. A “serious” threat is one where an agency—or in this case, a health practitioner— “reasonably believes to be a serious threat having regard to all of the following:

- (a) the likelihood of the threat being realised; and
- (b) the severity of the consequences if the threat is realised; and
- (c) the time at which the threat may be realised.”⁵

Proponents of the amendment argue that the third limb of this test retains the need to consider the imminence of threat. While this may be true, this change merely requires a practitioner to have regard for the time of the threat (or its imminence).

Provided a practitioner has reasonable belief that the threat is severe and likely enough to occur, disclosure may occur and the time at which the threat may occur is not an absolute requirement. There is no guidance on how to judge “likelihood”, “severity” and the timing of the threat and I discuss (using conditions like familial adenomatous polyposis, Alzheimer’s disease and familial breast/ovarian cancer) how this may become problematic for genetic conditions where there are often multiple variables at play.

A genetic condition is a very broad term. It can refer to an FAP mutation that almost certainly guarantees cancer for carriers of the mutation and it can also refer to a slightly higher apolipoprotein E level that has been linked to an increased risk of late-onset Alzheimer’s disease. It is widely accepted that with the exception of a handful of high penetrance diseases, the likelihood of carriers of genetic mutations developing

a disease is dependent on many other non-genetic factors and that a carrier status carries with it more probable risk than certain risk.

As our understanding of genetics and disease advances, it is likely that more links between genetics, disease and other factors will be uncovered. The development of a genetic disease can rightfully be regarded as a serious threat to one's overall health and wellbeing. If disease progresses, it may also become a threat to life. However, the multifactorial nature of these diseases, the diversity of harms, its likelihood, as well as the time at which the disease occurs (if at all) all contribute to a very complicated (and uncertain) picture — one that I argue is not easily assessed by the test for “serious” risk.

Likelihood of threat being realised—“imminent” versus “lifetime” risk

Familial Adenomatous Polyposis (FAP) is an inherited disorder caused by a genetic mutation in the APC gene. Without early intervention, FAP eventually causes cancer of the large intestine and rectum and the child of an FAP sufferer caused by mutation of the APC gene has a 1:2 chance of inheriting the disorder. This is similarly the case for Huntington Disease. In these high penetrance diseases with quantifiable risks, at-risk relatives of a sufferer have a very high likelihood of being a carrier and carriers are at imminent risk of disease.

Besides high penetrance diseases, other genetic mutations arguably carry a much more variable risk of developing into a genetic condition. Examples include BRCA mutations that predispose carriers to breast, ovarian and other cancers. BRCA1- and BRCA2-mutation carriers have a 45-80% lifetime risk of breast cancer; and either a 56-60% risk of ovarian cancer for BRCA1-mutation carriers or 11–35% risk of ovarian cancer for BRCA2-mutation carriers.^{6,7}

While BRCA mutation carriers have a significant lifetime risk of cancer, whether or not a relative is at risk of being a carrier and whether genetic screening is a cost-effective means of determining this is dependent on a number of factors.⁸ This precise assessment of genetic risk in a patient and in his or her relatives is a skill that requires the expertise of a geneticist (or similarly qualified specialist) who is abreast with the latest evidence.

Another example of a risk not fully quantifiable is the apolipoprotein E (APOE) gene that has been linked to an increase in an individual's risk for developing late-onset Alzheimer disease. Although various hypotheses have been discussed, it is still uncertain how the gene contributes to this increased risk of disease. However, what is known is that the APOE gene is a major genetic risk factor for the disease and sufferers who carry this allele are associated with an increased number of amyloid plaques in their brain tissue.⁹

Many genetic mutations have been associated with an increased risk of disease. In a small number of cases, risks are nearly half-certain. However, in most of them, the risks are variable with risks ratios that can indicate “lifetime risks” — anything from a strongly confirmed but little understood association to a stronger predisposition towards disease. My examples of genetic mutations that are linked to debilitating

conditions highlight the vast difference in risk and likelihood that different mutations have.

Even though certain genetic mutations may predispose a person to certain conditions, at which point does a predisposition or “lifetime risk” turn into a “likely” threat? Right or not, the removal of the requirement for imminence suddenly permits genetic conditions with very small “lifetime” risk to enter into consideration in the determination of a “serious” threat to the life and/or health of others.

Severity of the consequences if the threat is realised

Most genetic conditions carry with it symptoms or a knowledge that goes on to affect the quality of a person’s personal and family life. With knowledge of a person’s status come decisions on lifestyle, available interventions, family planning and the impact of disclosure on family dynamics. In addition, the severity of the consequences depends on the availability and realistic possibility of interventions.

Some genetic conditions do not have a cure yet. Currently, sufferers of Alzheimer disease seek treatment to manage their symptoms although progression of the disease is inevitable. The consequences of AD are severe both on a patient and the family and the disease can sometimes instil a sense of fear and hopelessness of the inevitable. Furthermore, its hereditary pattern dramatically impacts the lives of a patient’s children. For some children of AD sufferers, knowledge of whether one is a carrier can be empowering. However, some children of sufferers, knowing their potential of carrying the mutation and its consequent inevitability, prefer not to undergo testing and would rather live ignorant of their status.

In FAP, people with known mutations for the disease can be closely observed so that immediate action can be taken when polyps begin to develop in the colon. Eventually, removing the colon is necessary and this significantly reduces a sufferer’s overall risk of cancer. The severity of the effects of FAP can be dramatically reduced by early aggressive intervention. However, even intervention involves major surgery that is known to potentially trigger desmoid tumours developing in the surrounding region. The consequences of FAP are severe but interventions are available that reduce its severity.

Similarly, BRCA mutation sufferers are offered both prophylactic intervention options and treatment options where cancer has developed. Interventions range from regular mammography and prophylactic mastectomy to chemotherapy and radiation for cancer patients. The severity of consequences for carriers of BRCA mutations are diverse and the risk of harm to a person depends significantly on how much intervention a person is willing to take on (for example, mammography versus the more invasive preventative mastectomy) as well as how advanced the disease is.

In genetic conditions, assessing the severity of consequences is complicated and dependent on numerous external and personal factors. It is diverse and not fixed and the potential for a threat to severely impact a person depends on a permutation of factors that vary with each disease. In some cases—especially where the outlook is grim—choosing to remain ignorant of one’s own genetic status may even be the less severe option.

The time at which the threat may be realised

This is perhaps the most controversial limb of the test in the assessment of a “serious” threat. In high-penetrance genetic conditions, carriers have a high likelihood of developing a condition at a certain time of their lives (in FAP, the onset of polyps occur in a person’s 30s;¹⁰ in early-onset HD, the disease can begin in childhood or adolescence).¹¹ However, in the majority of conditions linked to genetic mutations, knowledge of a predisposition to disease generally offers only a vague indication of risk and makes it very hard to assess when a threat may actually be realised. A “lifetime risk” is vastly different from an “imminent risk”, the latter reflecting the near certainty in which something will arise in the future.

However, it is for the conditions in which there may be a “lifetime risk” (such as BRCA mutations) but no “imminent risk” that concern arises. At which point of “lifetime risk” is the legal threshold met thus permitting unauthorised disclosure to take place? Should the existence of a predisposition to a disease like cancer justify informing at-risk relatives even in the absence of consent? Furthermore, does the importance of a person having knowledge about a potential condition justify the stress and anxiety that is attached to that knowledge?

A subjective standard

This change to the HIPC broadens the scope of permissible disclosure of health information to third parties where there is “reasonable belief” of a “serious threat”. With respect to the disclosure of genetic information, it is argued that there are very few occasions where a condition is so certain and severe enough to justify a breach of patient privacy in favour of informing at-risk relatives. Furthermore, such a situation is unlikely as informed consent is normally sought during genetic counselling and before testing begins.

However, as our understanding of genetics and disease advances, it is likely that new situations will arise that the law may be insufficiently prepared for. At present, a health practitioner with knowledge of a person’s genetic risk is left with the responsibility of assessing the seriousness of the condition and whether it justifies a disclosure against the wishes of the patient. The field of genetics is fast-paced and changing and evidence is constantly being updated.

Making an assessment of the seriousness of a genetic condition and whether it justifies unauthorised disclosure to at-risk relatives requires special expertise and should be a role for specialists with full knowledge of genetics. Assessing the genetic risk of a person and his or her extended family requires knowledge of the condition and the latest evidence, its risk factors and the available intervention. Furthermore, an assessment also requires a consideration of the personal factors of each patient and the impact (or how “serious” a threat may be) on an at-risk relative.

When a practitioner considers whether to alert at-risk relatives without a patient’s consent, he faces the dilemma of balancing the privacy interests of a patient, the public interest in maintaining patient confidentiality and the health interest of a third party. This is a heavy burden on the practitioner and an equation I argue only gets more complicated with our increased understanding of genetics.

Conclusion

This change to the HIPC has created a new standard that removes the requirement for imminent danger and instead replaces it with a test that requires an assessment on the basis of severity, likelihood and time of danger. I argue that this test is subjective and too simple for the assessment of genetic conditions and its risk to relatives, especially when this standard marks the threshold in law where a person's privacy may legally be set aside for the sake of another person's health.

Besides the guidelines and standards of the Medical Council of New Zealand that apply to good medical practice, there is little else to guide practitioners on this highly consequential decision. In the care of vulnerable children, the amendment to the HIPC is helpful and a reasonable measure. However, in the area of genetics, this blows open the possibilities of practitioners legally revealing genetic information to third parties against the wishes of a patient and the impact this may have on our wider understanding of privacy.

Competing interests: Nil.

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The importance of anatomy in a new iatrogenic disease: Yttrium microsphere-induced gastritis

Peter Stiven, Frank A Frizelle

Abstract

We describe a patient who underwent selective interventional radiation therapy (SIRT) for inoperable colorectal cancer liver metastases and who developed gastritis as a direct result. The Yttrium microspheres are seen in the biopsy. The anatomical basis for the complication is presented. New treatments result in new iatrogenic complications.

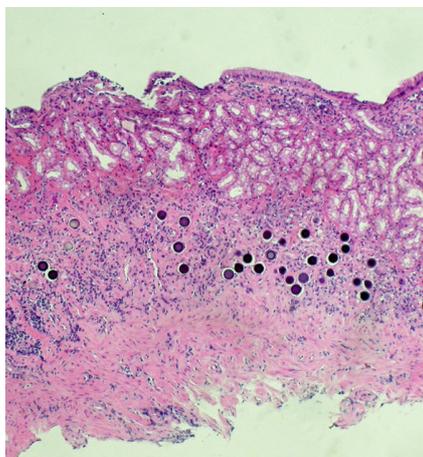
Case report

A 56-year-old man underwent selective interventional radiation therapy (SIRT), for inoperable colorectal cancer liver metastases. The technique utilises the pure β -emission of ^{90}Y incorporated into resin microspheres directed to the liver via selective angiography. It gives targeted radiation to a maximum penetration of 11 mm over an effective duration of 14 days.

Following the procedure the patient complained of gradually progressive upper abdominal discomfort, nausea and intermittent vomiting. A gastroscopy performed 2 months later demonstrated inflammation and superficial ulceration of the distal stomach.

A repeat gastroscopy 17 months after SIRT confirmed persistent ulceration of the distal stomach and duodenum. Biopsies of gastric antrum showed ulceration, active chronic gastritis with multiple purple SIR-spheres in the deeper lamina propria (see Figure 1).

Figure 1. Yttrium microspheres (small purple spheres, H&E stain, $\times 100$)



There were atypical stromal cells and plump endothelial cells lining ectactic vessels consistent with chronic radiation-induced gastritis second to iatrogenic delivery of the Yttrium microspheres to the stomach via the right gastric artery.

Discussion

The right gastric artery is a small branch which arises most commonly from the proper hepatic artery (50–68%), left hepatic artery (28.8–40.5%), common hepatic (3.2%), as well there are number of less frequent variations. Though the Yttrium microspheres are injected either under radiological control or introperatively into the hepatic artery, the anatomic variations of the right hepatic artery can result in radiation-induced gastritis especially when the origin right gastric is left hepatic artery.

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Recurrent pancreatitis in an icodextrin-based peritoneal dialysis patient. Yet another case report

Ashik Hayat, Pavan Thaneeru, Pauline Priest, Robin Wilson

Acute pancreatitis (AP) is an infrequent and severe complication in peritoneal dialysis (PD) patients especially those using icodextrin exchanges. Establishing the diagnosis of acute pancreatitis in PD patients is difficult because the clinical features of AP are very similar to that of PD associated peritonitis in addition to unreliability of serum amylase as marker in diagnosing AP in these patients.

There are very few published case reports of AP in peritoneal dialysis patients using Icodextrin in the literature. Here we present a case of recurrent pancreatitis in a patient on PD using icodextrin.

Case report

A 27-year-old obese female with end stage renal disease (ESRD) secondary to IgA nephropathy presented to the Emergency department with complaints of diffuse, persistent non-radiating pain abdomen associated with nausea and vomiting without any history of fever or loose motions.

She has been on peritoneal dialysis since June 2007 with a regimen consisting of continuous cycling PD (CCPD) alternating between 1.5% and 2.5% dextrose solutions plus a daytime long dwell using 7.5% icodextrin solution. Her transporter status is high average.

On examination she was haemodynamically stable, with tenderness over the epigastric area. Her PD fluid was clear with no evidence of infection. Her amylase levels were persistently normal 11–20 units/litre (U/L; normal <100 U/L). Her upper gastrointestinal endoscopy was normal. A CT scan of the abdomen revealed Necrotising Pancreatitis. Serum lipase done later was elevated at 529 U/L, with normal ranges 8–78 U/L.

She was managed conservatively for acute pancreatitis and was discharged home after about one and a half weeks of hospital admission. The patient had no history of smoking, alcohol or illicit drug abuse and a review of medical records didn't reveal any evidence of hypercalcemia or hypertriglyceridaemia. Her symptoms resolved rapidly and she tolerated food intake well and she was discharged home.

The patient was re-admitted 3 weeks later with identical symptoms. Her total amylase was low throughout the whole presentation, between 9–22 U/L, however her lipase was elevated at >600 U/L. A repeat CT scan abdomen revealed a necrotising pancreatitis with pseudocyst formation. MRI scan confirmed the CT abdomen findings of necrotising pancreatitis with pseudocyst formation.

She had a prolonged hospital stay with insertion of the pancreatic drain. We failed to transfer her over to haemodialysis because of inability to secure a vascular access. She had a previously failed left arm brachiocephalic AVF with moderate stenosis of both

of her internal jugular veins related to her previous catheters for interim haemodialysis.

She was discharged on her usual PD prescription and had three more admissions thereafter with recurrent pancreatitis over a period of 6 months with similar chief complaints of abdominal pain nausea and vomiting without any evidence of peritonitis and negative fluid cultures and elevated lipase levels. After each admission, her GI symptoms will resolve rapidly with conservative measures.

Following her last admission we entertained the idea of icodextrin-induced pancreatitis. The patient was subsequently discharged home with elimination of icodextrin from her CCPD regimen. During the further outpatient follow-up, she remained free of recurring symptoms of nausea, vomiting and abdominal pain now for last 4 months.

Since she is on nocturnal intermittent peritoneal dialysis now with a short daytime dextrose dwell, she is not meeting her targets for dialysis adequacy. She is booked for review with vascular surgeon for creating a possible vascular access as soon as possible.

Discussion

AP is a serious and an infrequent complication in PD patients. The clinical picture of AP in PD patient often resembles that of infectious peritonitis, abdomen pain, vomiting and cloudy dialysate can occur in both the cases, furthermore, the serum amylase is not a reliable marker for AP in patient with icodextrin-based PD, because it competitively interacts with the substrate in the amylase assay and lead to a dose dependent decrease in amylase activity in such patients.¹⁻⁶

The diagnosis of AP with renal failure is confounded by the observation that serum concentration of amylase and lipase are generally elevated in ESRF in absence of AP. Thus an abnormally high levels of pancreatic enzymes does not necessarily mean pancreatic pathology.

Schoenicke et al reported that serum amylase activity was reduced by 90% in PD patients using icodextrin compared to those using glucose and lipase activity was not significantly altered after adding varying concentration of icodextrin to serum samples from control patients.⁴

Current literature suggest that PD is a risk factor for AP. Quraishi et al. presented data suggesting that adult patients on PD were 15 times more likely to develop AP compared to the general population in the state of Michigan.³ Although number of mechanism were postulated for increased incidence of AP in PD patients, one of the mechanisms could be composition and volume of the fluid administered causing chemical irritation. Furthermore calcium in the peritoneal dialysate could diffuse through the peritoneum causing local hypercalcemia of the pancreas even if the systemic calcium levels are within normal limits.

Thus in this subset of patient population the development of acute pancreatitis may represent the cumulative result of multiple coexisting noxious insults—i.e. uraemia, secondary hyperparathyroidism with hypercalcemia, hypertriglyceridaemia, polypharmacy, or the dialysis process itself.

Our patient had always used dialysate with 1.5 mmol/l calcium bath, and both her systemic calcium and calcium × phosphate product remained under good control. Our patient showed no major risk factor for acute pancreatitis with elevated lipase levels and negative imaging studies and so far no more acute pancreatitis for last 4 months made us consider the possibility of a chemically-induced pancreatitis and potential for a causal link between AP and icodextrin use.

Icodextrin was first used in late 1980s, is a relatively novel colloid osmotic agent, predominantly used for long daytime dwells in patients with low net ultra filtration and high peritoneal transport properties. With an average molecular weight of about 17,000 Da, Icodextrin shows very little diffusion across the peritoneal membrane. However it is absorbed into the systemic circulation mainly via lymphatics.⁶

Generally icodextrin is well tolerated its major side effects, as described in the literature include cutaneous allergic reactions⁷ and metabolic derangements such as hyponatremia and decreased plasma amylase activity.⁶ Sporadic cases of abdominal pain and sterile peritonitis^{8,9} have been described in the literature, but those episodes have been the result of manufacturing defects or microbial contamination.¹⁰

In last couple of years few case have been reported related to the higher incidence of recurrent pancreatitis in PD patients using icodextrin, however no cause and effect has been documented neither any pathophysiologic process contributing to AP in these patients is known.

Conclusion

Chemically-induced pancreatitis should be considered in PD patients with recurrent unexplained pancreatitis with non-contributory imaging studies, and peritoneal dialysis fluid negative for infection. It is worthwhile discontinuing icodextrin in these patients before a cause and effect can be established.

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Rare disseminated infection post renal transplant

Suceena Alexander, Promila M Raj, Santosh Varughese, Vinoi G David, Tamilarasi Veerasamy, Chakko K Jacob

Clinical—A 21-year-old male had live related renal transplant surgery. He received basiliximab induction and standard triple immunosuppressive therapy. He had early steroid resistant rejection and was treated with antithymocyte globulin. Three months post transplant, he developed fever, headache and cough. Cerebrospinal fluid (CSF) analysis showed polymorphonuclear leucocytosis. Further investigations are shown below.

What is the diagnosis?

Figure 1. Multiple hyperintense lesions with central hypointensity in cerebral hemispheres seen in T2W MRI brain

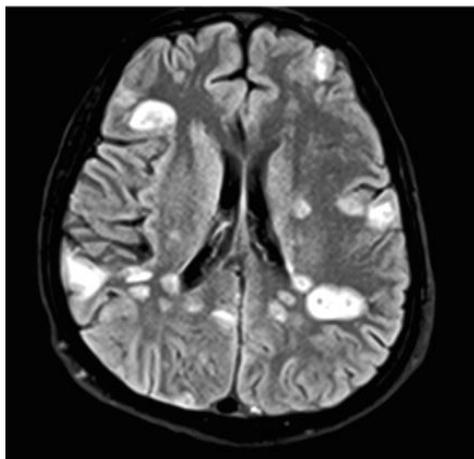


Figure 2. High resolution CT thorax showed peripheral basal consolidation with adjacent ground glass opacity in the right lower lobe



Figure 3. Microscopy showed pleomorphic short branching filaments, rod-shaped and coccoid forms that were partially acid-fast in modified Kinyoun stain ($\times 1000$ magnification)

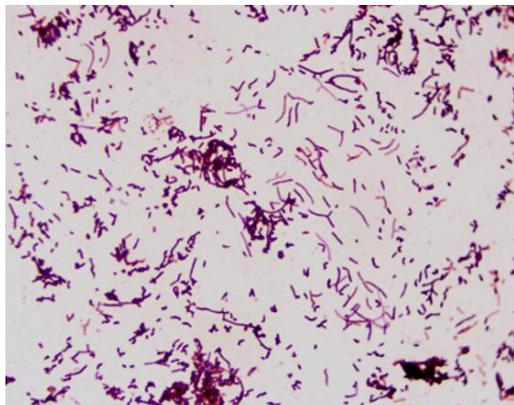


Figure 4. Bone marrow aspirate grew chalky white colonies in Sabouraud's dextrose agar becoming orange with further incubation. The colonies classically had a wrinkled or heaped-up appearance



Answer—Disseminated infection with *Nocardia asteroides*.

Discussion—*Nocardia* is a filamentous, Gram-positive, exclusively aerobic, slow-growing bacterium of the Actinomycetaceae family. *N. brasiliensis* and *N. asteroides* account for the majority of infection.

Twenty-seven out of 1968 renal transplant patients over a 30-year period developed nocardiosis in our centre.¹ Nocardiosis can cause ring-enhancing lesions in the brain (Figure 1).

Pulmonary involvement is usually the most common primary focus (Figure 2).²

Microscopy (Figure 3) and culture (Figure 4) descriptions are characteristic of *Nocardia*. His CD4 + T cells were 86 cells per mL and CD3 + T cells were 204 cells per mL reflecting high net immunosuppression.

He received high-dose cotrimoxazole along with intravenous clindamycin and ceftriaxone for 6 weeks. This was followed by oral antibiotics for 1 year. He remains asymptomatic 18 months post transplant.

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Splenosis of Glisson's capsule

Mehmet Incedayi, Muzaffer Saglam, Guner Sonmez, Ali Kemal Sivrioglu

Clinical—A 42-year-old woman was sent to our radiology department for evaluating masses at right suprarenal location and in the hepatic parenchyma. She had been misdiagnosed as right adrenocortical carcinoma with multiple hepatic metastases in another institution due to sonographic and magnetic resonance imaging (MRI) findings.

Ultrasonographic examination revealed four lesions at the right suprarenal location and three lesions in the right lobe of the liver (Figure 1). Lesions all showed the same intensity on all MRI sequences.

Figure 1. Oblique sonogram reveals solid, well-defined and homogeneous, hypoechoic mass (arrows) compressed the liver parenchyma and Glisson's capsule is seen as linear hyperechoic band



Diffusion weighted imaging (DWI) revealed multiple hyperintense lesions and on apparent diffusion coefficient (ADC) map images, lesions showed decreased ADC values similar to the normal splenic tissue (Figure 2a,b).

Tc-99m labelled heat-damaged erythrocytes scintigraphy revealed the presence of multiple lesions of uptake in the hepatic parenchyma, right suprarenal location and left upper quadrant (Figure 3).

So, the diagnosis of intrahepatic and intraperitoneal splenosis was made, without any invasive procedure.

Figure 2a. DWI shows multiple ovoid hyperintense lesions in the right lobe of the liver, suprarenal location and left upper quadrant



Figure 2b. On ADC map image, lesions show decreased ADC levels (arrows)

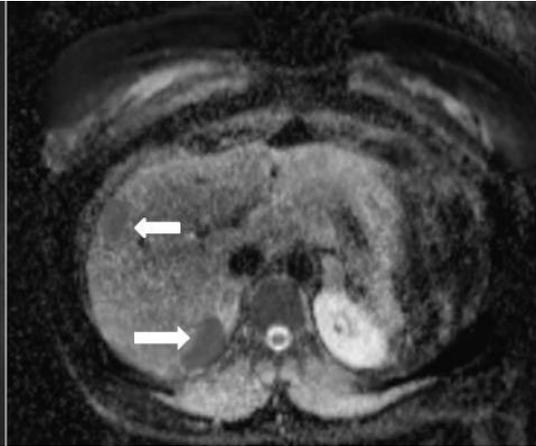
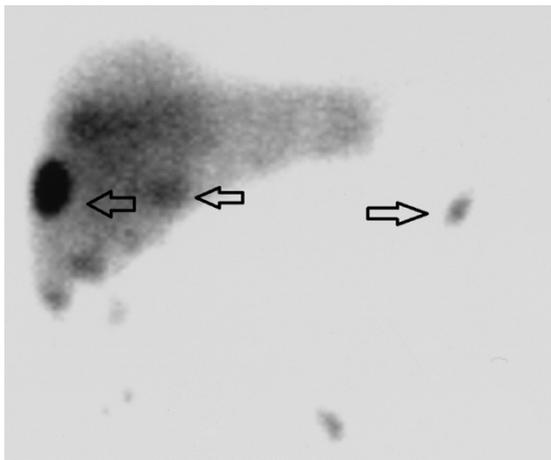


Figure 3. Tc-99m heat damaged erythrocytes scintigraphy, Multiple lesions of uptake in the hepatic parenchyma and left upper quadrant are seen (arrows)



Discussion—Splenuis is the heterotopic autotransplantation of splenic fragments following splenic surgery or trauma. It has been shown to develop in up to 67% of splenic injuries.¹⁻⁴ Implantation of splenic tissue occurs at the time of splenic rupture or splenectomy, when the splenic pulp disperses into the peritoneal surfaces.^{5,6}

On non-enhanced MRI, the mass is homogenously hypointense on T1-weighted images, and hyperintense on T2-weighted images. The mass is hyperintense on DWI images and hypointense on ADC map images.

So the term "hepatic" is not true for these lesions and we suggest using the term "splenuis of Glisson's capsule" in stead of the term "hepatic splenuis".

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Hand in chronic arsenicosis

Ankit Shrivastav, Gouranga Sarkar

Clinical—A 46-year-old male, resident of a known arsenic endemic area in India, presented with progressive tingling and numbness of both lower limbs for last 3 years. He also had hyperpigmentation, nodular hyperkeratosis of both palm, and auto amputation of the right index finger (see Figure 1).

Figure 1. Both hands showing nodular hyperkeratosis (thick arrow) and autoamputation of index finger of right hand (thin arrow)



Figure 2. Right hand showing hyperkeratosis (thick arrow), autoamputation (thin arrow), and basal cell carcinoma (broken arrow) on tip of middle finger



There was a non-healing ulcer at tip of right middle finger (Figure 2) which turned out to be basal cell carcinoma on biopsy. Nerve conduction study revealed bilateral symmetrical axonal sensory neuropathy of both lower limbs consistent with chronic arsenicosis. Arsenic levels were high in hair and nail clippings of the patient.

Discussion—Arsenical hyperkeratosis predominantly involves palms and soles. The involved skin has an indurated, grit-like character with papules less than 2 mm in size which are better palpated, progressing to raised, punctate, wart-like keratoses >2–5 mm in size that are readily visible.¹

Skin cancer in chronic arsenicosis can arise in non-kerotic as well as hyperkeratotic areas. Skin lesions are frequently multiple and involve covered areas of the body; unlike non-arsenical skin cancer, which usually presents as a single lesion and which occurs frequently on the exposed parts of the body.

Arsenic exposure has been associated with Bowen's disease, basal cell carcinoma and squamous cell carcinoma.

The Ganges Delta region of India/Bangladesh and some other countries have naturally occurring arsenic contamination in some groundwater supplies where wells are deep.

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Response to letter from the ANZSPM Aotearoa executive by Dr Sinead Donnelly and Dr Murray Hunt

As a Hospice doctor for decades, I am passionate about the value of Hospice/Palliative Care (H/PC). With respect, I think that the issue of End of Life Choice (EOLC, I use this term as it is the title of Maryan Street's Bill, currently in the ballot box) deserves to be discussed in depth, rather than by resorting to organisational position statements.

This issue is not new. We were discussing the possibility as students in London nearly 50 years ago. Nor is it likely to go away. It is a broad discussion in many jurisdictions, not just here in New Zealand, where the Horizon Poll 2012 shows that about 63% of the community support EOLC; only 12% are firmly against. Good legislation, which has been introduced elsewhere, is seen as compassionate and protective.

In Australia the support is reportedly even stronger and they may well introduce legislation before we do. Dr David Leaf, from the University of NSW, in a letter to the editor of the BMJ concludes: "Safe laws are working worldwide." He also comments: "Opponents of voluntary euthanasia often muddy the waters with words and concepts that evoke really bad connotations. They are wilful misrepresentations of the facts."

I have now been working in a counselling role outside H/PC for over a decade; part of my practice involves working with the surviving family and friends of people who have endured unbearable suffering and died horrible deaths. I sometimes struggle to listen to the stories of feeling powerless, of futile medical interventions and the perceptions that 'the doctors did not listen', and did prolong suffering. Many more of us die outside H/PC than within it.

When I was working within Hospice I did not see these patients, nor did I have to listen to these stories, these are not Hospice stories. Now, I cannot ignore them. While the actual number may be small, the suffering is not. The Horizon poll 2012, found that 16.2% of New Zealanders, currently know someone whose medical condition is terminal, irreversible and making their life unbearable, and overall about 2.1 million know or have known someone like this.

Professor Sam Ahmedzai¹ travelled to Oregon, USA to explore the situation there. As a result he has radically shifted his position from anti to neutral, and supports the move to encourage Doctors' professional organisations to do the same. He comments:

"It is patronising to say that a few people should suffer unbearable distress and indignity because Palliative Care preaches that it values all lives—regardless of how meaningless they have become to their owners. It is inconsistent for Palliative Care to boast how it enables people to face the reality of dying and decide the place of care but then deny the choice for timing of death.

Moreover it is hypocritical to deny competent patients who are acknowledged to be dying, the right to die in the manner of their choosing while allowing doctors and nurses to choose when to put them on a so called pathway, which often entails increasing sedation and withdrawing fluids—unintentionally leading to a protracted form of assisted dying, but one that is medically determined.”

If we truly are a compassionate and democratic society, respecting individual autonomy and human rights—concepts embedded in the Bill of Rights 1990 and subsequent Health and Disability Consumers’ Rights legislation—I think it is no longer credible to pretend that Assisted Dying is outside current professional boundaries, Doctors face this difficult dynamic every day, I am well aware of the denied reality that it happens and I think the current unregulated system is unsafe for patients, families and clinicians.²

As Dr Fiona Godlee³ has commented: “Legislation is a decision for society not for doctors.” We are lucky in NZ, at this time we have a wealth of good international experiential data, research and models to inform our decisions; we have the means to create good, safe, compassionate legislation of our own, in response to expressed community need, just as we have created good H/PC services over the last 30 years.

It is worth noting that where End of Life Choice is legal, this has resulted in better funded and improved H/PC services.

In Oregon all patients accessing their Death with Dignity legislation get a Hospice referral, and 95% of those who use it are on a Hospice programme at the time (<½ of 1.0% of deaths per annum). Belgium has successfully integrated the two services.

I am, now, a member of End of Life Choice NZ.

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Reduction mammoplasty and resource allocation—response

We wish to congratulate the authors of the paper¹—*Reduction mammoplasty and resource allocation—are patients being treated fairly? An examination of the current New Zealand situation, and looking towards the future*—and add some additional comments.

Achieving more consistent prioritisation of patients was a recommendation made by the Office of the Auditor General in their review of scheduled (elective) services.² Papers such as this reinforce the importance of prioritisation tools and the role of engaging clinicians, managers and IT departments in supporting the implementation of prioritisation tools.

Already 98.5% of patients accessing elective surgery do so after being assessed against a nationally recognised prioritisation tool.

Embedding these tools in the clinical process and making them consistently the basis for management of available capacity has proved, at times, to be more challenging than the initial development.

There is nothing like a slow computer or repeated outages to kill enthusiasm to persevere with a new way of working.

The development of the ‘new generation’ prioritisation tools as described requires clinical leadership, commitment and input from clinicians in a working group, in this case plastic surgeons under the umbrella of the New Zealand Association of Plastic Surgeons, with facilitation and support by the Ministry of Health.

Prioritisation of patients who would benefit from elective surgery by their relative ranking is based on need and ability to benefit, and includes the determination of an appropriate clinical timeframe in which to see the patient. This allows services to manage demand and provide a prompt and efficient service in a fair, transparent and equitable way.

The patient derived impact on life questionnaire as a device to quantify patient need arose from a patient focus group and is proving to have applicability over a range of specialties beyond plastic surgery. It may be the basis for a multi-specialty prioritisation framework for assessment of priority for first specialist assessment.

Clinical Service Directors are encouraged to provide audit and peer review of the clinical prioritisation process to improve consistency and reduce variability.

Clinical review of the content of prioritisation tools and relative weight of categories and criteria are a planned part of the development to account for changes in clinical practice and new developments. Clinical review and tool development working groups are convened by the Ministry in collaboration with the relevant professional associations.

New Zealand clinicians and their professional organisations are active participants in many projects across the spectrum of health, in their home DHBs, regionally and

nationally, to improve the quality and safety of the services we provide for patients. Their continued involvement over many years in the iterative development and implementation of prioritisation tools has been successful in improving the equitable access for patients requiring elective surgery.

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Why a new plain packaging law should also cover cigarette design

To achieve the New Zealand Government's Smokefree Nation Goal of 2025, the country probably needs major strategies that go beyond business-as-usual (as suggested by recent modelling work¹).

These strategies could include higher tobacco tax increases every year to 2025, or various other tobacco endgame strategies (e.g. a nicotine phase-down,² a sinking lid on supply,³ or a smoker's license⁴). But supplementary initiatives such as plain packaging of tobacco products are also likely to help achieve the nation's smokefree goal—and these are supported by New Zealand⁵ and international evidence.^{6,7}

However, we suggest that any new plain packaging law for New Zealand should also incorporate the design of cigarettes itself. To illustrate this need, Figure 1 shows a recent addition to the New Zealand cigarette market. The cigarette contains a compressible capsule of menthol within the filter that releases menthol into the cigarette upon crushing it (see arrow, Figure 1 and Figure 2).

Figure 1. Cigarette pack and sample cigarette obtained on the New Zealand market with both extra foil and menthol switching capacity (the top arrow indicates the detachable piece of foil that can be used to cover the pictorial health warning, the lower arrow indicates where the cigarette filter is pressed to crush the internal menthol capsule)

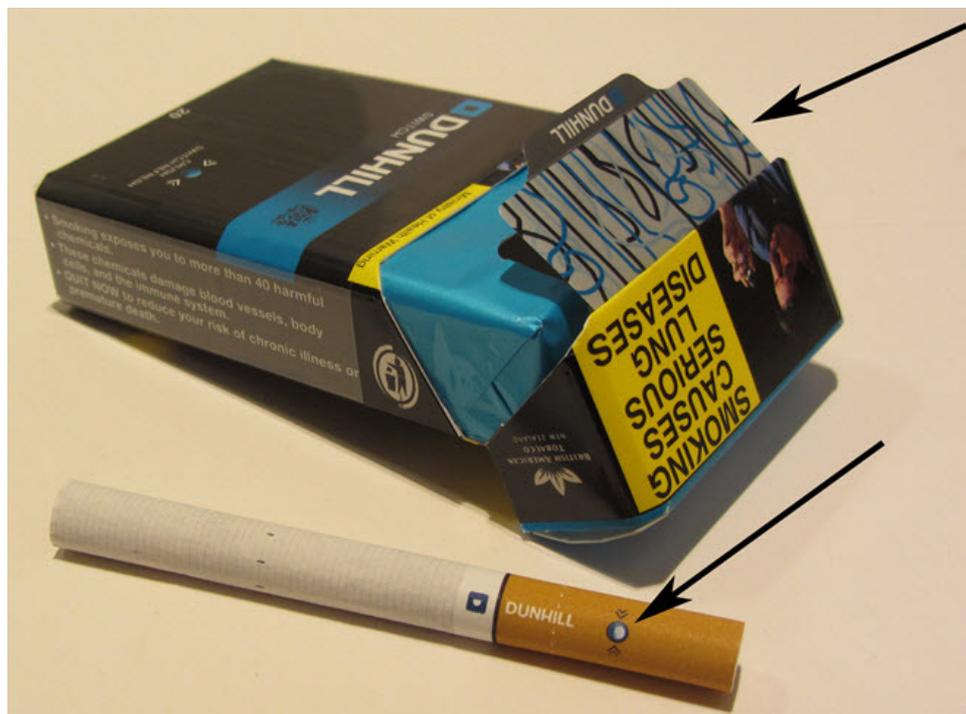


Figure 2. Cut-away detail of the “menthol switch” style cigarette shown in Figure 1, revealing the menthol capsule (the arrow indicates the compressible menthol capsule inside the filter)



This gives the smoker the option of “switching” from non-menthol to menthol on a per cigarette basis. Such a device is completely counter to the public health goal of making cigarette products less appealing to youth who might experiment with smoking. Indeed, a recent New Zealand study showed that almost a quarter of young adolescent smokers choose to smoke menthol cigarettes.⁸

Menthol itself is a highly problematic ingredient as it disguises the original bitter taste of nicotine and its cooling properties appear to prevent or reduce respiratory irritation from inhaling cigarette smoke.⁹⁻¹¹ These features can make the overall smoke experience more pleasant.

To reduce the attractiveness of cigarettes, menthol should be prohibited as a cigarette additive. In fact, New Zealand should probably follow the lead of Brazil¹² and prohibit all additives to tobacco products.

This menthol crush cigarette pack also shows another relatively new cigarette package design feature which is a colourfully designed piece of foil (see top arrow, Figure 1). This piece of foil can be removed and then re-applied so as to paste over the pictorial health warning on the cigarette pack.

Whilst most smokers do not seem to bother with using this foil to cover pictorial warnings (based on our observations of discarded cigarette packs on Wellington streets), we have actually observed the usage to obscure the pictorial warning (cigarette pack on the table in a garden bar in Wellington, see Figure 3).

It is quite ironic that the tobacco industry claims that pictorial health warnings are not effective,¹³ and yet they do develop features that can be used to cover these warnings. Novel cigarette pack designs are more appealing to smokers than plain packs or

regular branded packs and not effective in convincing young people not to start smoking or motivating smokers to quit.¹⁴

Hopefully, New Zealand policy-makers will therefore ensure that any new plain packaging law will also require standardised pack design so as to prevent such novel pack features.

Figure 3. Cigarette pack found on the table in a garden bar in Wellington on right side of the image (the arrow indicates the detachable piece of foil that was used by a smoker to cover the pictorial health warning on the back of the pack). On the left side of the image for comparison, a typical uncovered pictorial health warning



In summary, any new tobacco product law in New Zealand should be used to the utmost to remove all attractive features of both packaging and also the cigarettes themselves. Such steps are some of the many that will be required to ensure that the New Zealand Government achieves its Smokefree Nation goal by 2025.

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Continued debate on “Is censorship of films a useful solution to the problem of covert tobacco advertising?”

Maubach et al in their response to Paynter and Chapman¹ state that we ignore scientific consensus that exposure to smoking in movies causes youth smoking. We referenced several examples of such studies. R-rating aims to reduce young people’s exposure to smoking in movies.

We agree that this would end depictions of smoking in movies currently rated less than R, and reduce the total exposure “dose”. But to assume all elements in the total dose are equivalent is questionable. Indeed if “dose” is important, by this logic, films that fleetingly show a background character smoking once over 90 minutes, should not be rated as severely as those with major characters repeatedly smoking.

In every field of media communication some messages are known to be ineffective and others far more effective. But Maubach et al say that all smoking depictions are somehow equally as pernicious and equivalent in their influence. Unlikeable or pathetic characters seen smoking in film may in fact be prompting an anti-smoking message.²

Maubach et al liken an objection to an R-rating for smoking in movies to abandoning both age restrictions on tobacco sales and plain packs. These analogies are misleading. If tobacco could be openly sold to children, not only would many more buy it but any society allowing this would have many other characteristics conducive to youth smoking.

Moreover, large proportions of children watch R-rated movies but incomparably smaller fractions of smokers decant cigarettes into more appealing packs. The paper cited³ shows that 39% of all smoking scenes seen by young adolescents were in R-rated movies. Such a substantial degree of exposure hardly befits a conclusion that youth see age-appropriate films “most of the time”.

We note that Maubach et al chose not to consider why it should be acceptable to continue to depict real historical figures smoking but that it would be OK to “airbrush” smoking from whole societies or historical eras when smoking was widespread. To allow depictions of historical individuals who smoked but not historical eras where smoking was common is historical revisionism.

Restrictions on sex, violence and illegal drug use in movies mirror restrictions on those activities in public life. People are not free to have sex in public, use illegal drugs openly, or be violent.

We doubt that very many people would see the sight of smoking, seen daily, as equivalent to the sight of a prolonged vicious assault, or having young children see close-up, detailed sexual acts. Few parents usher children away from the sight of smoking whereas many turn off a film containing unexpected high level violence. We think that advocating for such equivalence is considerably out-of-touch with how most see smoking—including many working in tobacco control.

We don't dispute that the tobacco industry has used movies in marketing. Where this happens, it should be exposed and prosecuted when against the law. However, most tobacco industry document revelations about product placement are old. To our knowledge, there has been no recent evidence of this practice still occurring. There are likely to be many people in Hollywood hostile to such arrangements who would be delighted to expose it. This has not happened.

Smoking in movies will sometimes reflect actions of the tobacco industry, but the argument that every smoking scene can be traced to their influence is as improbable as arguing that every gun scene is traceable to firearm manufacturers, every drinking scene to the drinks industry, or every sight of cars to the automobile industry.

People smoke, eat, drive and use all sorts of commercially available products. Sometimes manufacturers place these products in films, but mostly movie directors depict use of these products because it is simply real.

It is easy to find many examples of gratuitous depiction of smoking in movies and we have no problems with criticism of these and raising awareness about it. But we do not agree with the statement that "Film makers' presentation of smoking in society solely benefits the tobacco industry."

We believe that the ability of film makers to depict life's rich tapestry, warts and all, benefits society as a whole. It is a fundamental error, in our opinion, to assume that the movie industry is there as a state-sanctioned arm of health promotion, and so subject to the censorious views of people who see it as a means of promoting health.

Tobacco packaging and advertising is commercial speech, not cultural speech. Courts have often emphasised this important distinction in allowing governments to restrict commercial speech while upholding the sovereignty of free speech. We have no concerns about censoring the commercial free speech of the tobacco industry, including in films where evidence shows product placement or scripting.

There is a very long history of applicants wanting to impose their standards on communities by censoring cultural products (film, art, literature) Some authoritarian societies enforce widespread restrictions on free speech and cultural expression in the name of protecting their citizens. Others treat free speech far more importantly.

Maubach et al are critical of our 'slippery slope' reasoning, saying it is also used by British American Tobacco. They argue that smoking is the only behaviour depicted in movies where there is evidence of bad consequences. We agree that slippery slope reasoning can often be fallacious. But it can serve as an important device to enable examination of reasoning and inconsistencies that arise.

The influence of smoking in movies has been extensively studied because tobacco control has had a large amount of research attention directed at it. Depictions of smoking are unlikely to be magically capable of influencing smoking while depictions of other exotic, exciting, clandestine behaviours are not. Yet Maubach et al appear to be arguing this.

Are they really suggesting that (for example) fast and dangerous driving in films is incapable of ever putting the idea in young heads that such driving might be fun; or that depictions of alcohol drinking with relaxation and humour would never get young

people thinking that it might be fun to have a few drinks, with all the consequences that can occur with both of those two behaviours?

Obesity is a rising global health problem poised to rival the health effects smoking. Public health experts within the obesity prevention movement look to tobacco control as a best practice model in combatting the commercial interests that influence health.

Product placement in films by energy dense, nutrition poor food and beverages is rampant in Hollywood films. Would banning this form of commercial speech to R-rated films be acceptable to the authors? And would they have reservations about showing overweight and obese characters in roles where their body was not the focus of pejorative associations and remarks?

There is also a need for public health researchers to be highly sensitive to the importance of not seeing their important work as being so important that it should be allowed to over-ride other principles that are highly valued by many citizens in democracies. The tobacco control field ought to be mature enough to recognize that like all fields, debate about complex policy options is important and healthy.

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Acute tetanus, successfully treated by injections of diluted carbolic acid

Excerpt of case report by Dr. Stewart, Dunedin Hospital, published in NZMJ 1913 Feb;12(45):344.

S.W., aet. 12 years, admitted 1/10/12, with a history that 6 days previously, while playing, he jumped upon a wooden pitch-fork, which ran into the sole of his left foot. This fork was being used for stable work, etc. The night before admission he found the muscles of his jaw become stiff and he was unable to open his mouth. He was seen by Dr. Gilmour, of Roxburgh, who at once ordered him into hospital.

STATE ON EXAMINATION.

Marked trismus, Risus Sardonius, rigidity of neck and back muscles, opisthotonos, abdominal muscles with board-like feel. Every few minutes he was getting violent and painful spasms, causing him to call out. Any noise would bring on these spasms.

TREATMENT.

He was immediately given 10 ccs of antitetanic serum and 4 hours later 20 ccs serum intra-spinaly. The boy showed no improvement after several hours and the carbolic acid treatment was decided upon. He was given 3iii of a 1 p.c. solution carbolic acid subcutaneously. His respirations in the meantime became more rapid and shallow and difficult—at 5 p.m. they reached 75 per minute—and he was becoming cyanosed. Oxygen inhalations for 5 minutes every half-hour were commenced and continued for 12 hours. This reduced his respirations to 40 per minute.



Proceedings of the 217th Scientific Meeting of the Otago Medical School Research Society, Wednesday 19 June 2013

Movement-related neuronal activity in the motor thalamus is strongly impaired in a Parkinson's disease rat model. C Bosch¹, B Hyland², L Parr-Brownlie¹.

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Parkinson's disease (PD) is a neurodegenerative disease, characterised by dysfunctional neuronal activity throughout the basal ganglia network, that causes movement deficits in 1% of the population over 60 years of age. Current treatments targeting the basal ganglia are effective, but also have devastating side effects. There is a critical need to improve the quality of life for patients by finding better treatments. Here, we aim to examine the potential of motor thalamus, which is strategically situated between the basal ganglia and motor cortex, as a new site to treat PD.

Neuronal activity in the motor thalamus was recorded in control rats and in a 6-hydroxydopamine lesion model of parkinsonian rats while they perform a skilled forelimb-reaching task that has functional correlates to reaching in humans. In control rats, neuronal activity was sequentially modulated during the reaching with a decrease-increase-decrease firing rate pattern. Parkinsonian rats executed significantly fewer reaches with their dominant forepaw (control $76 \pm 4\%$, $n = 30$ sessions; parkinsonian $24 \pm 2\%$, $n = 28$ sessions, $P < 0.001$; Mann Whitney test) and movement deficits were associated with a drastic attenuation of the second decrease in firing rate (control $-36 \pm 5\%$, $n = 35$ cells; parkinsonian $-9 \pm 4\%$, $n = 22$ cells; $P < 0.001$, t-test). In addition, the occurrence of "high frequency bursts", which are characteristic of control thalamic neurons (3.4 ± 0.4 bursts/min, $n = 31$ cells), was significantly reduced in parkinsonian rats (1.8 ± 0.2 bursts/min, $n = 22$ cells, $P < 0.01$, Mann Whitney test). Finally, the low level of synchronised oscillatory activity in control rats ($10 \pm 3 \mu\text{V}$, $n = 31$ cells) was significantly increased in parkinsonian rats ($44 \pm 16 \mu\text{V}$, $n = 22$ cells, $P < 0.05$, Mann Whitney test). Altogether, the data show that reaching-related neuronal activity is strongly impaired in the motor thalamus in parkinsonian rats.

In conclusion, changes in motor thalamus neuronal activity are likely to have profound effects on motor cortex activity, which could disrupt the movement plan that is sent out to muscles. Finding strategies to normalise motor thalamus activity in PD holds great potential to improve the quality of life for patients in the future.

Memory formation and retrieval without newborn neurons – are they necessary?
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A few stem cells in the hippocampus are sufficient to generate neuronal progenitor cells which supply the dentate gyrus with thousands of newborn neurons daily throughout adulthood. These new neurons integrate into circuits of the hippocampus. Considerable effort has been made over the last decade to elucidate the role of these newly born neurons in learning and memory, and the question is now being tackled with ever more refined techniques. This study combines genetic tools with lentiviral delivery technology to enable the reversible switching off of the activity of newly born neurons to study their function in memory formation and retrieval.

Lentiviral vectors were used to deliver a modified chloride channel that is sensitive to Ivermectin (IVM) to the hippocampus of nestin-Cre transgenic mice. The expression of the channel was restricted to adult-born neurons using a combination of Cre-lox system and cell type-specific promoter.

The efficacy of the constructs to silence neuronal activity *in vitro* was assessed using primary neuronal cultures from nestin-cre mouse pups (P0-2, independent cultures from 3 pups). Cells were transduced with the IVM-sensitive channel and treated with 10 nM IVM overnight. The number of transduced cells expressing Zif268 (a marker of neuronal activity) was reduced by 80% as compared to a mock-treated control ($P = 0.024$, $n = 3$, t-test). Higher concentrations of IVM were also effective in reducing Zif268 expression. The efficacy of the constructs in suppressing Zif268 expression *in vivo* is currently being tested.

Combining genetic and pharmacological approaches to restrict expression of the channel to a very specific set of cells and then being able to inactivate them in a reversible manner provides a valuable tool for many other neurological research questions.

Prophylactic penicillin to prevent recurrent leg cellulitis

Most infections that affect intact skin are thought to be due to streptococci, although other organisms may be responsible if the integrity of the skin is compromised. This randomised trial evaluates whether low-dose oral penicillin (250mg twice daily) is efficacious in preventing recurrent leg cellulitis. 274 patients who had a recurrent episode of leg cellulitis within the previous 24 weeks were eligible for inclusion. Previous leg ulceration, penetrating trauma and allergy to penicillin were exclusion criteria.

The 274 patients were randomised to oral penicillin or placebo for 12 months. During the prophylaxis phase 22% of the penicillin treated patients had a recurrence compared with 37% of the placebo group. Over a 3 year follow-up, 119 of the penicillin group had a recurrence versus 164 in the placebo group. The researchers conclude that in patients with recurrent cellulitis of the leg, penicillin was effective in preventing subsequent attacks during prophylaxis, but the protective effect diminished progressively once drug therapy was stopped.

N Engl J Med 2013;368:1695–703.

Ultrasound imaging for lumbar punctures and epidural catheterisations

Apparently many randomised controlled trials have evaluated the role of ultrasound imaging for lumbar punctures and epidural catheterisations, but none was powered to show a significant effect on the ability to reduce failed procedures.

This report sets out to clarify this issue. Data from 12 randomised trials is included in this meta-analysis. There were 6 failed procedures of 624 in the ultrasound group compared with 44 failed procedures of 610 in the control group. The reduced risk of failure in the ultrasound group was statistically significant ($P < 0.001$). The number needed to treat with ultrasound imaging to reduce one failed procedure was 16. Convincing.

BMJ 2013;346:f1720.

Effect of longer term modest salt reduction on blood pressure

Salt reduction can lower blood pressure and thereby reduces cardiovascular risk. A recent meta-analysis of randomised trials implied that salt reduction had adverse effects on hormones and lipids, which might migrate any benefit that occurs with the reduction in blood pressure.

This meta-analysis examines this implication by reviewing trials that involve a modest salt reduction for longer periods. 34 trials involving 3230 participants were included. With an average reduction of 4.4 g/day of salt intake meta-analysis showed that the mean change in systolic blood pressure was -4.18mmHg and -2.06mmHg for

the diastolic pressure. No adverse effects were noted in blood lipids or hormones. The falls in blood pressure were seen in both hypertensive and normotensive individuals irrespective of sex and ethnic group.

BMJ 2013;346:bmj1325.

Professional Misconduct – Inappropriate Relationship (Med10/157P)

Charge

A Professional Conduct Committee (PCC) charged that the Doctor was guilty of professional misconduct.

The charge was amended by consent and in its amended form alleged that between April 2008 and July 2008 the Doctor entered into an inappropriate emotional relationship with the Patient while she was a recent former Patient of his.

Finding

The Doctor admitted the charge of professional misconduct following the amendment to the charge. The Tribunal considered the Doctor's conduct amounted to both malpractice and the bringing of discredit to the profession. Accordingly, the charge of professional misconduct was established.

Background

The Patient was a patient of the Doctor for three consultations in April 2008, for the purposes of issues relating to unexpected treatment. The evidence confirmed that she was very shocked at the situation. Additionally, she was exhausted, lacked routine, and was struggling to cope with young children.

Following the Doctor's treatment, they commenced a relationship from sometime after 23 April 2008, which continued until late July 2008. Although the relationship was one where the two were friends, it subsequently developed into an emotional relationship including some sexualised text messages between them:

- Between 3 April 2008 and 6 August 2008, there were a total of 31 successfully connected phone calls made from the Doctor's phone to the Patient's phone, totalling over 4 hours of call time;
- Between 16 April 2008 and 6 August 2008, there were a total of 361 text messages sent from the Doctor's phone to the Patient's phone;
- Between 1 May 2008 and 25 May 2008, there were phone calls made, or text messages sent, every day from the Doctor's phone to the Patient's phone;
- On 3 May 2008, there were 10 text messages sent from the Doctor's phone to the Patient's phone – the first at 8:44am and the last at 10:07pm;
- On 9 May 2008, there were 12 text messages sent from the Doctor's phone to the Patient's phone between 8:23pm and 10:10pm; and
- On 11 May 2008, there were 14 text messages sent from the Doctor's phone to the Patient's phone between 12:38am and 8:27pm.

Reason for Finding

The Tribunal was satisfied that the Patient was extremely vulnerable in the weeks preceding the commencement of the emotional relationship with the Doctor.

The Patient was a recent former patient. Almost immediately after the final consultation on 23 April, the Doctor was in regular text and phone contact with the Patient.

The Patient was not referred to independent counselling. The Medical Council has stated that it may be appropriate for a doctor to help a patient obtain independent counselling in circumstances where a relationship is being considered. There was no evidence that this advice was given to the Patient.

There was a lack of insight. The Doctor acknowledged to another practitioner that he had had an emotional relationship with a former patient, on 23 May 2008. It was clear from the evidence that the relationship did not end at this point, but continued until July 2008. The Tribunal considered the statement to the colleague to be revealing. It indicated the Doctor must have realised the relationship was inappropriate, yet he did not address the issues. He maintained the friendship. The Tribunal concluded that he was putting his own interests first, and did not have sufficient regard for the professional issues involved, and the best interests of the Patient.

The Tribunal was satisfied that there was a significant disregard for proper boundaries between a doctor and a recent former patient. For those reasons, it concluded that the matter was so serious as to warrant discipline.

Penalty

The Tribunal considered the following aggravating factors:

- The Patient was extremely vulnerable.
- There was an intense professional relationship between doctor and patient, where the Doctor was in a position of power, and the Patient was not.
- There was evidence that the relationship did harm to the Patient. The Patient and her partner separated between late June 2008 and early July 2008, but then reconciled. Her partner then discovered the text messages of a sexual nature from the Doctor, stored on the Patient's phone. After the Patient's partner discovered the text messages, the parties separated again.
- The type of work the Doctor does requires him regularly to be consulted by vulnerable women. The Tribunal considered it to be absolutely essential that appropriate boundaries be maintained at all times and this obligation must obviously apply when dealing with vulnerable patients.
- The Doctor's lack of insight.
- The way in which the inappropriate emotional relationship developed:
 - The communications were somewhat secretive in nature, and obviously intended not to be seen by the Patient's partner.
 - Many of the texts were sent or telephone conversations took place outside working hours.

- There was a significant frequency in the communications.
- The communications occurred over a period of months. This was far more than a “one off” lapse of judgement.
- Some of the communications were of a sexual nature.

The Tribunal considered the following mitigating factors:

- There had been no previous complaints or adverse findings against the Doctor.
- There was a guilty plea at the hearing.
- The Doctor voluntarily consulted a psychologist when this matter came to light, and consultations apparently continued to the end of 2009.
- The Doctor had demonstrated sufficient insight to obtain professional assistance at the time of the hearing.
- Good references were supplied, indicating the Doctor is well thought of by a range of colleagues, to whom he had been open about the present circumstances.
- A significant factor was the support that he has from his wife, notwithstanding the difficulties that have arisen.
- He is vocationally registered as a GP, and thereby subject to recertification.

The Doctor was censured, fined \$15,000 and ordered to pay \$50,000 costs. The Tribunal further ordered the following conditions of practice:

- The Doctor meet with a mentor, approved by the Medical Council, who should focus on boundary issues for a period of three years. The Doctor was ordered to meet with the mentor monthly for the first six months of the mentoring period and for at least every two months thereafter.
- The Doctor attend counselling with a psychologist or psychiatrist monthly for at least 12 months to manage personal vulnerability issues. Confirmation of the identity of the counsellor and verification of the counselling sessions was to be provided to the Medical Council every six months

The Tribunal directed that a copy of this decision and a summary of it be published on the Tribunal’s website. The Tribunal further directed that a notice stating the effect of its decision is to be placed in the New Zealand Medical Journal.

The full decisions relating to the case can be found on the Tribunal web site at www.hpdt.org.nz
Reference No: Med10/157P

Professional Misconduct – Inappropriate Claims to the Ministry of Health (Med11/200P)

Charge

The Professional Conduct Committee (PCC) charged that Dr Paul Henderson (the Doctor) was guilty of professional misconduct. The particulars of the charge were that:

Between November 2008 to April 2010 the Doctor submitted or was responsible for submitting claim forms to the Ministry of Health claiming funding as the lead maternity carer for one or more patients when he knew or ought to have known, that he was not the lead maternity carer for those patients.

Finding

The Doctor admitted the charge and that it amounted to professional misconduct. The Tribunal was satisfied that the admission was correctly made and the Doctor was guilty of professional misconduct.

Background

The Doctor was a director and obstetrician at KSM, a midwifery and specialist obstetrician company. The Doctor's business partner at KSM is a midwife. The KSM website at the relevant time showed there were 12 midwives profiled offering services and a "pregnancy consultant".

Around April 2010 the Ministry of Health noticed data that suggested non-compliant claiming by the Doctor of the First and Second Trimester First Partial Fee (First Partial Fee) as the Lead Maternity Carer (LMC).

In the Ministry of Health and Primary Maternity Services Notice 2007 (the Notice), the LMC is defined as being the person selected by the woman to provide her lead maternity care.

The Notice sets out that:

- A maternity provider may claim on the first partial fee (\$175 excluding GST) if the woman first registered with the maternity provider, but changed maternity provider before the start of the 18th week of pregnancy.

The Doctor contacted the Ministry of Health Audit and Compliance unit on 26 May 2010 regarding the proposed on-site audit. At that time the Doctor confirmed that he made First Partial Fee claims as a representative of KSM and he did not see the woman for whom he was named as LMC at their first appointment. Instead the patients saw a "pregnancy consultant" who was delegated to see patients on his behalf.

Following the Ministry of Health audit of KSM it was determined that there were 357 registration forms recording the Doctor as the woman's LMC and a corresponding payment of the First Partial Fee paid.

241 of the First Registration forms had the name of the midwife recorded in handwriting on the form itself, but not in the space for recording the LMC.

315 of the Second Registration forms recorded a change of LMC from the Doctor to a KSM midwife. Of these, 286 of the forms were dated to correspond with the transfer of the LMC prior to the 18th week of pregnancy. In almost all cases a further claim for full first and second trimester care was paid to the new midwife LMC.

On or around 26 June 2010 a small sample of the women who had used KSM were contacted to determine their understanding of who they had selected as their LMC following their initial visit with KSM. Each of the women confirmed they had seen a “pregnancy consultant” at the initial visit and had not seen the Doctor. Each of the women believed they had selected the midwife discussed at their appointment as their LMC, not the Doctor.

Reason for Finding

The Tribunal noted that the Doctor had been open and frank and acknowledged he was not entitled to claim the monies. He had repaid the full amount of money that he was not entitled to receive (\$62,825).

The Tribunal found that the Doctor acted outside of the standards by claiming monies, or by setting up processes at KSM which enabled the claim of monies, beyond that to which he or KSM was entitled.

The Tribunal was satisfied that the charge was made out and did warrant disciplinary sanction for the maintenance of standards, protection of the public and to punish the Doctor.

Penalty

The Doctor was censured and ordered to pay a fine of \$5,000 and costs of \$20,000.

The Tribunal directed that a notice stating the effect of its decision be published in the New Zealand Medical Journal and the decision and a summary be published on the Tribunal’s website.

The full decisions relating to the case can be found on the Tribunal web site at www.hpdt.org.nz
Reference No: Med11/200P

Errol Everard Hannah

21 Sept 1929 – 7 June 2013; MBChB (NZ) 1952, MRCP (London) 1955, FRCP 1975, MRACP 1958, FRACP 1969

Errol was born in Christchurch, the second son of Leonard and Emily Hannah. He was educated at Redcliffs and St Albans Primary Schools and St Andrews College from 1942 to 1946.



He did well academically, was a school prefect and a member of the First XV which in 1946 won the intersecondary school competition.

He demonstrated his powers of endurance by winning the junior mile race.

His musical talents found their expression as a drummer in the Pipe Band which in 1946 won the National B Grade Competition including the Drum Major's Display (led by Evan Musgrove) and a Street March through the streets of Timaru.

Entry to the Otago Medical School in those Post-War days was highly competitive but this was no problem for Errol who graduated in 1952 and won the Ardagh Memorial Prize for the outstanding final year student at Christchurch Hospital.

In 1954 he married Zeta Parnham who shared his life until her death in 2006. Zeta was very beautiful, a fine nurse, and greatly admired by all who knew her.

After one year as a house surgeon at Christchurch Hospital, Errol travelled to England, undertook a course in medicine at the Royal Postgraduate Medical School and held house physician and medical registrar posts at St Stephen's and Bolingbroke Hospitals in London. He became a member of the Royal College of Physicians in 1955 and of the Australasian College in 1958.

He returned to New Zealand in 1957 and, after some months in general practice, was appointed Senior Medical Registrar and Tutor at Christchurch Hospital and in 1961 Visiting Physician to the North Canterbury Hospital Board. He was based first at Burwood Hospital, then Christchurch, and in 1973 at The Princess Margaret Hospital where his duties were in general medicine and cardiology. For 17 years he was responsible for reporting all electrocardiograms at Christchurch Hospital.

Errol began private practice as a consulting physician in 1961 and continued until 1997. He was always in demand, readily available to general practitioners and surgeons and to help in the care of doctors' families.

Colleagues have described him as “the physician’s physician” and “without peer in Christchurch.” He was elected FRACP in 1969 and FRCP in 1975. When the Christchurch Clinical School was established Errol was a Clinical Lecturer and later promoted to Clinical Reader, a rare distinction. He was an Examiner in Medicine for the University of Otago and from 1980–1986 a member of the Board of Censors for the Royal Australasian College of Physicians. His teaching skills were also recognised by the Christchurch School of Nursing for whom he was a lecturer for many years.

Errol undertook more than his fair share of administrative and committee work for the Board and his profession. He was an active member of the Postgraduate Society and for 19 years a member of the New Zealand Postgraduate Federation as Treasurer and finally Chairman.

With the writer, he organised in 1961 a course in cardiology featuring Dr Paul Wood of London which indirectly led to the formation of the Department of Cardiology in Christchurch. A variety of other committees included the NCHB Medical Advisory Committee, the NCHB Medical Appointments Advisory Committee and Chairman of the Medical Advisory Committee of the Canterbury Medical Research Foundation. He brought to these posts balanced judgement, total respect for the medical ethics and the ability to work productively with others.

After his retirement was for 8 years Medical Officer to the Mary Potter Hospital and Home for the elderly residents. For over 40 years he was a Medical Referee under the Cremation Act.

His interests outside medicine were in sport, especially tennis, gardening and reading.

Errol Hannah was an outstanding general physician who devoted his life to his family and to medicine. At a time when medicine has become more and more specialised and mechanised, Errol has clearly shown that there is still a most important place for the general physician. He was a tireless worker, very knowledgeable and astute, humble and considerate. Always of primary importance was the patient’s history and a careful physical examination. He inspired confidence, respect and loyalty from patients, colleagues and his students.

Errol died peacefully after a long illness endured with courage and optimism. Zeta died in 2006 and he is survived by his three daughters, Elizabeth, Rosemary, and Sarah, and six grandchildren.

Sir David Hay wrote this obituary.