THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

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This Issue in the Journal

New Zealand National Acute Stroke Services Audit 2009: organisation of acute stroke services in New Zealand
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In New Zealand, stroke is the third most common cause of death after heart disease and all cancers combined, and is the major cause of long-term adult disability. There were approximately 6000 first ever and 2000 recurrent strokes in New Zealand in 2009. This audit of all District Health Boards shows that there is a need for New Zealand to lift the care of people with stroke—as there is significant regional variation in the provision of stroke care and the level of stroke unit care is low by international standards.

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Valerie Looi, Melanie Mackenzie, Philip Bird

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Michael Davis, Heather MacDonald, Christopher Sames, Kushma Nand

Cyclophosphamide, a drug used widely in cancer and connective-tissue disease, may cause bleeding from the bladder (haemorrhagic cystitis) due to a toxic metabolite excreted in the urine. Rarely, this bleeding is so severe as to be life-threatening. Because radiation cystitis often responds to hyperbaric oxygen therapy (HBOT), and the changes seen in the bladder wall under the microscope in cyclophosphamide

cystitis are similar, it has been suggested that HBOT would be effective in treating this problem. Between 2000 and 2007, six such patients were treated with HBOT in the three hyperbaric medicine units in New Zealand and all had complete cessation of bleeding on at least one year's follow-up.

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Vaccination to prevent otitis media in New Zealand

Tony Walls, Emma Best, David Murdoch, Nikki Mills

Otitis media (OM) is the most common illness requiring medical consultation in children less than 3 years of age.[1] On 1 July 2011 the New Zealand Immunisation schedule changed to include a new generation pneumococcal conjugate vaccine with the potential to significantly reduce the burden of disease due to OM. We outline the recent changes and their implications for New Zealand children.

Otitis media can generally be thought of as a spectrum of disease, ranging from acute otitis media (AOM) through to chronic otitis media with effusion (OME). There are no systematic epidemiological studies looking at the burden of otitis media in New Zealand. Estimates of the incidence of AOM from other developed countries suggest an incidence of between 0.125 and 1.2 episodes per child year.[2] In this setting, between 10 and 20% of children experience at least 3 episodes of OM in the first year of life. A high proportion of these children will have asymptomatic OME that lasts for 3 months or more.[2]

In New Zealand, approximately 828/100,000 children aged less than two years are admitted each year for medical or surgical admissions related to OM, estimated from 2006 -7 hospitalisation data.[3] Incidence rates of medically managed OM in children <2 years of age were highest in Maori and Pacific Island children, suggesting this group is likely to have the highest incidence rates of AOM as well. The overall costs of otitis media management in hospital were approximately 45% of the total costs for all invasive pneumococcal disease, much of this relating to surgical management of OM.[3]

Streptococcus pneumoniae (*S.pn*), non-typeable *Haemophilus influenzae (NTHi)* and *Moraxella catarrhalis* are established as the main pathogens associated with AOM and recurrences.[4] Unfortunately no data on the bacterial aetiology of AOM are available in New Zealand. However, the microbiology of OME has been prospectively evaluated in an Auckland study in 1995.[5] This demonstrated bacterial pathogens in 36% of 105 middle ear aspirates with *H. influenzae, M. catarrhalis* and *S.pn* accounting for 35%, 27% and 18% of isolates respectively.

The introduction of a 7-valent conjugate pneumococcal vaccine (PCV7; *Prevenar*) to infant vaccination schedules in many developed countries has had a significant impact on the incidence rates of invasive pneumococcal disease (IPD). In most surveillance systems IPD is defined as an infection occurring at a normally sterile site, and does not include OM. The introduction of PCV7 to the NZ immunisation schedule in 2008 also has had significant impact on the rates of IPD. For children <2 years of age the annual incidence rates for IPD fell sharply from 104.6/100,000 in 2006 to 46.4/100,000 in 2009.[6] This mirrors closely the effects seen in other countries around the world.[7]

Although IPD has been impacted by PCV7, internationally the overall impact on OM has been less, despite *S.pn* being identified as a major pathogen in this disease. In

Finland, a 57% reduction in was seen AOM episodes due to pneumococcal serotypes contained in PCV7, yet only a 6% reduction (95% confidence interval -4 to 16%) in the overall number of episodes of AOM(8). Similarly, in the Kaiser Permanante study in the USA Fireman et al found that PCV7 reduced visits to primary care physicians for otitis media by 7.8%.[9]

Following introduction of PCV7 some studies have demonstrated a shift in the proportions of causative pathogens of OM. Eskola et al found a decrease in episodes of AOM in Finland due to vaccine serotypes of *S.pn* and an increase the proportion due to non-vaccine *S.pn* serotypes in a Phase III clinical trial of a 7-valent pneumococcal conjugate vaccine.[8] At the same time they noted an increase in the proportion of AOM episodes due to *NTHi*. Other studies have seen a similar changes in the proportions of bacteria isolated from the middle ear and the nasopharynx of children with AOM, with *NTHi* becoming a more frequently isolated pathogen and replacement with non conjugate vaccine *S.pn* serotypes.[10–12]

Therefore it may appear that the modest reductions in incidence rates of OM since introduction of PCV7 can in part be explained by increases in non-vaccine related pneumococcal serotypes causing disease and increasing prevalence of disease due to other pathogens. These changes have significant implications for the treatment of AOM as *NTHi* and *M. catarrhalis* have higher rates of resistance to commonly used antibiotics.

Yet as AOM is an extremely common infection even a small reduction in disease by PCV7 has meant many thousands of cases may have been prevented. Despite this a Cochrane review in 2009 concluded that this effect was insufficient to recommend universal pneumococcal vaccination with PCV7 purely to prevent otitis media.[13]

In New Zealand the Ministry of Health was presented with two options for replacing PCV7 with its upcoming removal from the global market: a 13-valent pneumococcal conjugate vaccine (PCV13; *Prevenar 13*) and a 10-valent pneumococcal conjugate vaccine (PHiD-CV or PCV10; *Synflorix*). The decision was made to use PHiD-CV for the routine immunisation of infants and to fund PCV13 only for children under 5 years of age at highest risk of IPD.[14]

Therefore, the vast majority of infants in New Zealand will from now receive PHiD-CV as part of their routine immunisations. This vaccine provides protection against all the pneumococcal serotypes included in PCV7 and an additional 3 serotypes that commonly cause IPD.

In addition, PHiD-CV has the potential benefit over other pneumococcal conjugate vaccines of reducing infections caused by *H. influenzae* strains other than *H. influenzae* type B. This is particularly relevant for otitis media where *NTHi* is a leading cause of infection. This additional property is due to the presence of protein D, a cell-surface lipoprotein found on all *H. influenzae*, in PHiD-CV.[15]

A RCT of an 11-valent PHiD-CV vaccine (the prototype for the 10-valent vaccine) demonstrated a 35.3% vaccine efficacy for AOM caused by *NTHi* and a 57.6% efficacy for any episode of AOM.[16] At the same time it was shown to produce a significant (42.6%) reduction in nasopharyngeal carriage of *NTHi* in children under 2 years of age.[17] However, further post-licensure studies will be required before we can draw firm conclusions about the impact of PHiD-CV on the incidence rates of OM.

One potential drawback of the choice of PHiD-CV for the national immunisation schedule is that fewer pneumococcal serotypes are covered in comparison to PCV13. Other countries have seen the emergence of IPD due to serotypes 19A and 3 which are contained in PCV13 but not PHiD-CV,[18] and it is possible a similar pattern could emerge in New Zealand.

The introduction of PHiD-CV has increased the number of pneumococcal serotypes covered by the New Zealand primary infant immunisation schedule and has the advantage that it may provide increased protection against OM because of the anticipated impact on *NTHi*. The flipside of the coin is lessened *Spn* serotype coverage with potentially emergent serotypes 19A and 3.

We wait with great interest to see the effects the new immunisation schedule will have on both IPD and OM in this country.

Competing interests: The authors have received an unrestricted study grant of $237,567 from GlaxoSmithKline (GSK) to investigate the microbiology of otitis media with effusion (OME) in New Zealand. GSK had no involvement in the preparation of this article and had not viewed it prior to it being accepted for publication.

Author information: Tony Walls, Senior Lecturer and Paediatric Infectious Diseases Specialist, University of Otago, Christchurch; Emma Best, Paediatric Infectious Diseases Specialist, Starship Children's Hospital, Auckland—and Senior Lecturer, Department of Molecular Medicine, University of Auckland; David Murdoch, Professor and Head of Pathology, University of Otago, Christchurch—and Clinical Microbiologist, Canterbury Health Laboratories, Christchurch; Nikki Mills, Otolaryngology Consultant, Starship Children's Hospital, Auckland

Correspondence: Tony Walls, Department of Paediatrics, University of Otago, Christchurch, PO Box 4345, Christchurch Mail Centre, Christchurch 8140, New Zealand. Fax: +64 (0)3 3786355; email: Tony.walls@otago.ac.nz

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Stroke Services in New Zealand: should where you live determine the quality of stroke care you receive?

John Gommans

Every day more than 20 people in New Zealand (NZ) will suffer a stroke and 90% of them will be admitted acutely to hospital expecting to receive the best possible care. Unfortunately, less than half will be alive and independent at one year.

Much of this death and disability could be avoided, as there is ample evidence that strokes can be prevented and outcomes for those with acute stroke significantly improved by appropriate management.[1] However, ensuring that all New Zealanders with stroke receive appropriate care remains a vexed issue that has occupied a number of editorials in this Journal in the last 10 years.[2–4]

The key message of the 2010 NZ Clinical Guidelines for Stroke Management is:

"…the two most important recommendations in this guideline have not changed since 2003, and the critical areas of stroke management where a change in practice would make an important difference to outcomes for people with stroke remain.

1. *All District Health Boards (DHBs) should provide organised stroke services.*
2. *All people admitted to hospital with stroke should expect to be managed in a stroke unit by a team of health practitioners with expertise in stroke and rehabilitation.*

Implementation of the evidence-based practice described in this guideline is critically dependent on provision of these services by DHBs."[1]

Back in the last millennium the Stroke Unit Trialist's collaboration first confirmed the benefit of stroke units and organized stroke services.[5] As anticipated people with an acute stroke did better if they were admitted to an area dedicated to their problems and cared for and rehabilitated by people with appropriate expertise and interest in stroke. Cardiologists have never needed to prove the benefit of their Coronary Care Units and every major hospital has one; it would be unthinkable not to! So why did the latest NZ stroke guidelines need to repeat an old message? What, if any, progress have we made with provision of stroke units and stroke services by DHBs in this millennium?

In 2002 a survey of all NZ hospitals admitting acute stroke patients identified that only four provided a stroke unit, and no major metropolitan hospital did so.[6] The accompanying editorial commented that these findings *"… reveal the continuing failure to implement best practice guidelines in New Zealand, despite the overwhelming evidence of the benefits"*[2] Subsequent editorials lamented the lack of progress but remained hopeful for future service improvements.[3,4]

In this issue of the *Journal*, Child et al publish the results of yet another audit of acute stroke services provided by DHBs.[7] This 2009 audit has several advantages over the earlier surveys and provides important new information.

First, it used an audit tool developed and trialled in Australia that was administered by trained auditors in a standardised way across all NZ DHBs, in conjunction with an audit of Australian hospitals. This provides for more reliable results, robust comparisons within NZ and with services provided across the Tasman, and a baseline for serial audits over time to better track changes in service delivery.

Second, this organisational audit was accompanied by a health records audit reviewing the actual care received by up to 40 consecutive acute stroke patients treated by each DHB in the last 6 months of 2008.[8] This patient care audit allows us to assess what stroke services were actually delivered to people with stroke as opposed to those reportedly available in a DHB, according to a survey. Each DHB has been provided with their individual audit results and comparisons against unidentified similar sized DHBs and Australian hospitals. It is unknown what, if any, actions DHBs have taken upon receipt of this information.

The audit results provide both good and bad news. In the seven years from 2002 to 2009 the number of stroke units in NZ DHBs doubled to eight but five large and medium sized DHBs still did not provide stroke units and there were only 83 dedicated stroke unit beds across the whole country. Given this, it was not surprising that on the audit day only 39% of stroke patients across NZ were being managed in a stroke unit compared with 51% in Australia. Neither country can be proud of their results as reportedly around 74% of stroke patients in the UK and more than 80% in Scandinavian countries could expect to receive care in a stroke unit.[1]

The Trans-Tasman difference was almost entirely due to inadequate service provision in many larger metropolitan NZ hospitals and this should be of major concern to people living within the boundaries of those unidentified DHBs. Of further concern, a third of stroke inpatients managed by DHBs that provided a stroke unit were not receiving their treatment within this stroke unit. This suggests that existing stroke units/services are inadequately resourced or organised as all people with stroke benefit from management within a stroke unit regardless of their age, sex, ethnicity, stroke severity or stroke type.[1]

The DHBs performed as well as Australian hospitals in terms of access to brain imaging, composition of multidisciplinary teams and assessment of rehabilitation needs despite the inadequate provision of stroke units. Half of the DHBs did not manage Transient Ischaemic Attacks (TIA) urgently as they failed to provide either an "admit all with TIA" policy or rapid access TIA clinics; representing a lost opportunity to prevent strokes.

All large and medium sized DHBs should provide an acute stroke thrombolysis service.[1] For every seven patients thrombolysed within three hours of acute stroke onset, one is saved from death or disability; a better result than achieved by thrombolysis for acute myocardial infarction, and the eligible time window is now up to 4.5 hours. While more than 80% of the New Zealand population is served by a DHB that says it provides an acute stroke thrombolysis service, it is disappointing that only 3% of acute stroke patients admitted to hospital in 2009 actually received this treatment. It is no consolation that Australia achieved a similarly poor result as numerous international studies have demonstrated that rates of up to 20% are a realistic target.[1]

This audit, like others over the last 10 years, has demonstrated further progress, albeit painfully slow progress, in implementing guideline recommendations for best practice in stroke services. Despite this, the quality of available stroke care still depends on where you live and lags far behind that delivered to people with ischaemic heart disease.

The reasons for the ongoing neglect of this important, feared, expensive and disabling condition are not explored in these audits but, to quote an earlier editorial, are likely to include both health professional and health management attitudes to stroke.[3] The small pool of clinicians with expertise in stroke who can provide leadership, facilitate education and promote evidence-based practice is growing steadily but without clear direction to DHBs from the Ministry mandating provision of stroke units and organized stroke services in all but the smallest hospitals, these clinicians will struggle to further develop local stroke services.

How many more New Zealanders will suffer unnecessarily while we wait? Would change occur faster if each DHB's audit results were identified publicly, as we do with the current health targets?

Competing interests: Audits referred to in this editorial were co-ordinated by the Stroke Foundation of New Zealand (SFNZ) under contract from the Ministry of Health and I am Vice President of the National Council of the SFNZ and an honorary medical advisor to the Central Region of SFNZ.

Author information: John Gommans, General Physician and Geriatrician, Hawke's Bay DHB; Vice President of Stroke Foundation of NZ; and member of NZ Stroke Guidelines Reference Group

Correspondence: Dr John Gommans, Hawke's Bay Hospital, Private Bag 9014, Hastings, New Zealand. Fax: +64 (0)6 8781319; email: john.gommans@hawkesbaydhb.govt.nz

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New Zealand National Acute Stroke Services Audit 2009: organisation of acute stroke services in New Zealand

Nicholas Child, P Alan Barber, John Fink, Shelley Jones, Kevin Voges, Mark Vivian

Abstract

Aims To characterise the nature of acute stroke services provided by District Health Boards (DHBs) in New Zealand.

Methods An audit of all 21 DHBs was carried out in 2009 via an online survey examining the structural and process elements of acute stroke service provision. A clinical audit involving a retrospective review of consecutive admitted stroke patients is reported separately.

Results The organisational survey found that most patients (82%) are admitted to hospitals in the 13 large and medium DHBs. Only 8 DHBs had stroke units and 5 of the large and medium DHBs did not have stroke units. On audit day, only 39% of all New Zealand patients were being managed in a stroke unit, compared with 51% of all Australian patients. Even in the 8 DHBs with stroke units, only 64% of patients were actually being managed in the stroke unit on the day of the audit. New Zealand compared favourably with Australia in aspects of TIA management and in access to brain imaging.

Conclusion There is significant regional variation in the provision of organised stroke care and the level of stroke unit care is low by international standards. This audit provides a benchmark against which to compare future changes in the delivery of stroke care.

Stroke is the third most common cause of death after heart disease and all cancers combined, and is the major cause of long term adult disability. There were approximately 6000 first ever and 2000 recurrent strokes in New Zealand in 2009. Ninety percent of people with stroke are admitted to hospital.[1]

The annual lifetime costs of stroke to New Zealand is estimated to be $450 million.[2] The Diabetes and Cardiovascular Disease Quality Improvement Plan 2008 (QIP) identified improvement of stroke services as a healthcare priority.[3] However, there was little information on the provision of stroke services, hampering evaluation and benchmarking of DHB service provision. In 2009, the Ministry of Health contracted the Stroke Foundation of New Zealand (SFNZ) to undertake an audit of all DHBs and we present here the results.[4]

Methods

The 2009 National Acute Stroke Services Audit (2009 Audit) was an initiative of the SFNZ and was carried out in collaboration with the Australian National Stroke Foundation (NSF). The audit determined the resources available to support the delivery of evidence-based care and examined conformance of clinical practice with evidence-based best practice recommendations.

Audit questions were developed by the Australian National Advisory Committee, on which there were New Zealand representatives, and question terminology was revised to reflect the New Zealand

situation. The audit was comprised of two parts: an organisational survey of structural and process elements of acute stroke care service provision; and a clinical audit involving retrospective review, via patient record, of up to 40 consecutive stroke patients admitted, treated and discharged from acute care in individual DHBs. The results of the clinical audit will be reported separately.

All 21 DHBs were contacted inviting them to participate in the audit. All 21 DHBs participated in the organisational component of the audit and 20 participated in the audit of acute stroke care delivery. A stroke unit was defined as a discrete ward, or beds within a ward, with a dedicated specialised multi-disciplinary team (MDT) and could include acute stroke units that discharge patients to a rehabilitation service, or an integrated acute and rehabilitation unit.

An audit team was established within each DHB and consisted of medical, nursing, and allied health professionals. An hour of on-line training was provided via teleconference, by the NSF National audit program manager and project officer. Responses could only be recorded where there was documented evidence for process of care indicators. Data was entered online by the person carrying out the audit.

DHBs were split into three groups on the basis of population served and the predicted number of stroke admissions per year. These groups were: Large, with a population catchment >200,000 people, Medium with a population of 120,000–200,000 and Small with a population of <120,000. Data from DHBs with more than one acute hospital was aggregated and reported for the whole DHB. The audit was conducted in Australia at the same time and was identical with the exception that audits were carried out in individual hospitals and not DHBs with the results reported by hospital size.

DHB data sets were de-identified and analysed using PASW Statistics Version 18.0. Organisation data from DHBs was aggregated to provide national estimates with results divided into DHB category (large, medium or small) and stroke unit status. The median (50th percentile) and interquartile (25th percentile) ranges were reported for continuous data. Data collection was carried out from April to August 2009

Results

There were 7 large, 6 medium and 8 small DHBs (Table 1). There were 6194 stroke patients admitted in the 12 months prior to the audit and 176 patients in hospital on the day of the audit. Eight of 21 DHBs had stroke units; 5 acute and 3 integrated stroke units. The 8 stroke units were in 5 of 7 large, and 3 of 6 medium DHBs and none of the small DHBs. On the day of the audit, 39% of all New Zealand patients and 51% of all Australian patients were within a stroke unit.

Table 1. DHB and stroke unit characteristics

Variables	Total N	Large	Medium	Small	SU	No SU
Number of DHBs	21	7	6	8	8	13
Stroke admissions	6194	3862	1347	985	3493	2701
DHB stroke admissions*	258	500	256	100	401	116
DHBs with stroke unit	8	5	3	0	8	–
Stroke unit beds*	11 (5–15)	12 (10–15)	6 (5–10)	– –	11 (5–15)	– –
Stroke inpatients on audit day	176	121	36	19	107	69
Patients in a stroke unit on audit day	68 (39%)	54 (45%)	14 (39%)	0 (0%)	68 (64%)	0 (0%)

*Median; SU: Stroke unit; Large: population catchment > 200,000; Medium : population catchment of 120,000–200,000; Small: population catchment of <120,000.

Stroke patients were first admitted to medical assessment units or directly into stroke units in large DHBs, and general medical wards or stroke units in medium DHBs (Table 2).

Table 2. Admission ward, transient ischaemic attack (TIA) services and thrombolysis

Variables		Total (N=21)	Large (N=7)	Medium (N=6)	Small (N=8)	SU (N=8)	No SU (N=13)
Usual admission ward							
Stroke unit	NZ	29%	43%	50%	0%	75%	NA
	Aust	27%	81%	39%	1%	81%	NA
General medical	NZ	52%	0%	50%	100%	0%	85%
	Aust	54%	13%	42%	81%	13%	75%
Medical assessment unit	NZ	19%	57%	0%	0%	25%	15%
	Aust	11%	4%	16%	6%	4%	14%
TIA services							
TIA pathway	NZ	67%	71%	83%	50%	75%	62%
	Aust	42%	–	–	–	76%	25%
'Admit all' TIA patients policy	NZ	5%	0%	17%	0%	13%	0%
	Aust	30%	–	–	–	24%	33%
Outpatient TIA clinic	NZ	43%	57%	50%	25%	50%	39%
	Aust	19%	–	–	–	48%	3%
Thrombolysis							
Thrombolysis offered	NZ	67%	100%	50%	50%	87%	54%
	Aust	28%	77%	29%	11%	65%	9%
Patients thrombolysed past year	NZ	128	101	14	13	95	33
	Aust	711	–	–	–	648	63
Rehabilitation service access							
Routine assessment of need for further rehab	NZ	62%	86%	50%	50%	100%	39%
	Aust	63%	88%	82%	52%	85%	52%
Community based rehabilitation access	NZ	81%	100%	83%	62%	87%	77%
	Aust	74%	88%	84%	73%	82%	70%
Early supported discharge access	NZ	24%	29%	17%	25%	37%	15%
	Aust	16%	27%	18%	11%	28%	9%

All patients in small DHBs were admitted to general medical wards. There was a lower proportion of patients in large DHBs admitted to a stroke unit compared to large hospitals in Australia, but the results for medium and small DHBs were comparable to medium and smaller sized Australian hospitals.

Fourteen DHBs routinely offer stroke thrombolysis, including all eight large DHBs and half of all medium and small DHBs (Table 2). DHBs with stroke units were more likely to offer stroke thrombolysis than those without a stroke unit. In the preceding 12 months, 128 patients had been thrombolysed compared with 711 Australian stroke patients and these figures are roughly equivalent based on relative national population size.

All DHBs had onsite access to computed tomography (all with 24 hour access) and carotid Doppler ultrasonography and, at the time of the audit, all but two small DHBs had onsite magnetic resonance imaging (MRI).

Stroke patients were managed by a team that included "stroke specialists" in nine DHBs and general physicians in the remaining 12 DHBs (Table 3). Geriatricians, general physicians and neurologists were more likely to be part of the stroke MDT than in Australia and all DHBs had MDTs with physiotherapists, occupational therapists, speech language therapists, social workers and dieticians.

Advanced trainees, clinical nurse specialists and stroke nurse educators were more common in DHBs with stroke units. All MDTs met regularly; twice per week in DHBs with stroke units and once per week in those without stroke units.

Just under two thirds of DHBs provided routine assessment of all patients for the need for further rehabilitation, including all DHBs with stroke units but only 39% of DHBs without stroke units (Table 2). There was provision of community based rehabilitation in almost all DHBs, but few DHBs provided early supported discharge.

Table 3. Access to MDT by DHB category and stroke unit status

Variables	Australia	NZ (N=21)	Large (N=7)	Medium (N=6)	Small (N=8)	SU* (N=8)	No SU (N=13)
"Stroke specialist"	**17%**	**43%**	71%	67%	0%	88%	15%
Neurologist	**34%**	**52%**	100%	50%	12%	75%	38%
Geriatrician	**38%**	**81%**	86%	100%	62%	87%	77%
General physician	**59%**	**95%**	86%	100%	100%	87%	100%
General practitioner	**52%**	**5%**	0%	0%	12%	0%	8%
Rehabilitation physician	**44%**	**52%**	57%	33%	62%	37%	61%
Advanced trainees	**22%**	**19%**	43%	17%	0%	37%	8%
Clinical nurse specialist*	**32%**	**52%**	57%	50%	50%	62%	46%
Stroke nurse educator	**11%**	**29%**	57%	17%	12%	50%	15%
Specialist research nurse	**–**	**9%**	29%	0%	0%	25%	0%
Dietitian	**89%**	**100%**	100%	100%	100%	100%	100%
Occupational therapist	**90%**	**100%**	100%	100%	100%	100%	100%
Physiotherapist	**96%**	**100%**	100%	100%	100%	100%	100%

*Stroke Unit.

Discussion

There is overwhelming evidence that stroke unit care significantly reduces death, disability and need for institutional care compared with care in general wards.[5–7] Only 18 patients need to receive organised inpatient stroke care to prevent one from dying or being dependent at one year.[8] New Zealand stroke guidelines have stated that "the most important intervention that can improve outcomes for all people with stroke is the provision of organised stroke services, an important component of which is a stroke unit.

Without an organised stroke service, adherence to recommendations about specific interventions is likely to have little impact on outcomes for people with stroke.[9, 10] It

is, therefore, of concern that only 8 of the then 21 DHBs had a stroke unit, and only just over one third of stroke inpatients in New Zealand were being managed in a stroke unit on the day of the audit.

The exact makeup of a stroke unit varies from hospital to hospital, but the key components include a geographical unit with a multidisciplinary team (MDT) of clinicians, who are specialists in looking after stroke patients and who work together as a coordinated team. The exact nature of organised stroke care will vary according to the expected number of stroke admissions per year and New Zealand guidelines recommend levels of organisation for DHBs based on population size.[9] Thus all large and medium DHBs should have stroke units and smaller DHBs should manage patients in consultation with a stroke clinician and have input from an MDT knowledgeable and enthusiastic about stroke.[9]

Most people with stroke (84%) are admitted to hospitals in large and medium DHBs and it is therefore of concern that there were five of 13 large and medium DHBs without stroke units. Even in the eight DHBs with stroke units, only 64% of patients were actually being managed in the stroke unit on the day of the audit. Development of stroke units in the five large and medium DHBs without them, and ensuring that all patients admitted to DHBs with stroke units actually receive stroke unit care, should be seen as a priority.

It is now more than 15 years since the National Institute of Neurological Disorders and Stroke (NINDS) trial found rt-PA within 3 hours of symptom onset is of benefit to patients with ischaemic stroke.[11,12] The therapeutic window for rt-PA has subsequently been extended out to 4.5 hours[13]. One person is saved from death or disability for every seven patients thrombolysed within 3 hours and for every 14 patient's thrombolysed between 3–4.5 hours. It is therefore encouraging that most people with stroke are admitted to DHBs that provide a thrombolysis service. However, very few stroke patients (approximately 3%) are actually treated with stroke thrombolysis. Improving the rate of stroke thrombolysis should be a top priority for all stroke service providers: organised acute stroke services should be established where currently lacking, and the performance of existing services must be improved.

Public awareness of stroke, including recognition of acute stroke in the community and the need to call emergency services for rapid transport to hospital must also be improved if stroke thrombolysis rates are to be improved substantially.

In recent years it has become clear that the risk of stroke following TIA is higher than previously thought. In the population-based OXVASC study, stroke risk following a TIA was 8% at one week, increasing to 18.2% at 3 months.[14] Early intervention following TIA may reduce this risk of stroke by up to 80%.[15,16]

New Zealand guidelines recommend that TIA patients at high-stroke-risk be assessed by a specialist and all investigations completed within 24 hours.[17] It is therefore discouraging that only half of DHBs have either an "admit all" TIA policy or provide TIA clinics. This represents a lost opportunity to prevent stroke following TIA.

This audit has found that there has been some improvement in the provision of organised stroke services in recent years. In hospital based surveys of acute stroke rehabilitation in 2002, only one large urban and four medium sized regional hospitals out of 41 had stroke units, and only one hospital had a dedicated stroke rehabilitation

unit.[18, 19] The situation had improved by 2007, when seven hospitals serving 48% of the population, had stroke units, and seven hospitals serving 49% of the population had designated areas for stroke rehabilitation for patients older than 65 years.[20]

The current audit shows that there has been further improvement since this time. However, further gains are unlikely without the leadership of clinicians driving the development of organised stroke services within their DHB. Conversely, it is unlikely that organised stroke care will develop in hospitals until physicians with a special interest and expertise in stroke are identified.

This audit allows comparison between stroke services provided in New Zealand and Australia. More Australian patients are admitted to stroke units (51 % vs 39 %) than New Zealand patients. However, New Zealand compares favourably with Australia in other areas including the use of pathways for assessing patients presenting with TIA and a higher use of a TIA stroke risk stratification tool to guide treatment decisions[4].

All DHBs had access to onsite CT compared to only 77% of Australian hospitals and a higher rate had access to MRI within 24 hours[4]. The proportion of patient's thrombolysed is similar across the two countries although thrombolysis is offered 24 hours, 7 days per week in more Australian hospitals.

This audit has a number of limitations. Surveys offer a convenient means of examining clinical practice in a large number of organisations. However, the most appropriate individual may not be targeted and responses to a survey may not reflect actual practice. While data was subjected to a comprehensive logic check prior to analysis, we did not attempt to verify responses, but made it clear that individual DHBs would not be identified.

This audit provides a comprehensive overview of the organisation of stroke services in New Zealand and it is reasonable to assume that the responses reflect the current state of stroke management. It provides a benchmark with which to measure improvements over time and against our international peers. It is clear that the implementation of best practice guidelines for stroke care has been patchy and there is significant regional variation.

The reasons why a DHB may not have a stroke unit were not explored in this audit and need to be addressed in future studies. However, it is clear from an earlier survey that New Zealand clinicians recognise the clear benefits of stroke units.[21] The evidence in favour of organised inpatient care is overwhelming, and achieving this goal should be the highest priority. The situation will hopefully improve in coming years and the numbers of advanced trainees working in stroke units provides some cause for optimism.

The full audit report is freely available at http://www.stroke.org.nz/stroke-health-professionals

Competing interests: None.

Author information : Nicholas Child, Registrar, Neurology Department, Auckland City Hospital, Auckland; P Alan Barber, Director of the Auckland City Hospital Stroke Service, Neurology Department, Auckland City Hospital, Auckland; John Fink, Neurologist, Neurology Department Christchurch Hospital, Christchurch; Shelley Jones, Guidelines Project Coordinator, Stroke Foundation of New Zealand; Kevin Voges, Senior Lecturer in Marketing, Department of Management, College of

Business and Economics, University of Canterbury, Christchurch; Mark Vivian, Chief Executive Officer, Stroke Foundation of New Zealand

Correspondence: Professor Alan Barber, Neurology Department, Auckland City Hospital, Park Road, Grafton, Auckland, New Zealand. Fax :+64 (0)9 3754309; email: a.barber@auckland.ac.nz

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THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

Quality-of-life outcomes for adult cochlear implant recipients in New Zealand

Valerie Looi, Melanie Mackenzie, Philip Bird

Abstract

Aim There were two aims to this study: to investigate the effect of a cochlear implant (CI) on quality-of-life (QOL) for adult recipients in New Zealand; and to determine which aspects of life that these changes are most noticed.

Method There were two groups of participants: CI Group – 94 postlingually deafened adult CI recipients; and WL group – 70 postlingually deafened adults on the waiting list (WL) for a CI. Two questionnaires were developed for this study.

Results The results showed that cochlear implantation had a significant positive impact on QOL for recipients. The CI group had significantly higher ratings in all areas of QOL and satisfaction compared to the WL group.

Conclusion Overall, high QOL and satisfaction ratings were obtained from CI recipients. The significantly lower ratings from those on the WL for an implant highlight the difficulties experienced by those with a significant hearing impairment. Assessment of CI outcomes should include QOL measures in order to provide a more holistic picture.

Evaluating quality-of-life (QOL) is essential post cochlear implantation in order to provide a holistic picture of the effect a CI has had on a recipient. The World Health Organization (WHO) has defined QOL as an "Individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns"[1]. Although much of the current literature has suggested that CIs have a large positive impact on recipients' lives, particularly for improving speech perception and communication, such changes cannot be assumed to have follow-on effects to their overall QOL.

Frequently reported improvements post-implantation have included speech perception in quiet, environmental sound perception, psychological benefits, socialisation, reduced levels of hearing handicap and reduced levels of depression. For example, in a study by Proops et al,[2] 100 new recipients completed the Revised Denver Communication Scale, and a self-rating depression scale. For the former measure, 86% of participants reported lower hearing handicap levels 9 months post-CI compared to pre-CI; 45% of participants responded that the CI had improved their QOL "enormously," 41% responded "greatly," and 12% responded "slightly."

For the self-rating depression scale, it was reported that 28% of patients would have been classified as clinically depressed pre-implant, with a significant reduction in mean depression ratings at 9 months post-implant ($p<0.001$). Similar results were found by Mo et al[3] who found a reduction in levels of depression, anxiety, and feelings of burden in CI recipients.

Hogan et al[4] used the Assessment of QOL instrument (AQoL), and the Participation Scale (PS), to assess how CIs affected levels of handicap in the social, psychological, physical, emotional, and hearing domains for 202 participants (148 implantees and 54 non-implantees). For the PS, the CI recipients' mean score was higher than the non-recipients. However, for the AQoL, only the differences in the physical domain were significant (34%; $p<0.01$).[4]

In contrast to the above generic QOL questionnaires, a 'disease-specific' questionnaire for the CI recipient population, the Nijmegen Cochlear Implant Questionnaire (NCIQ), was developed by Hinderink et al,[5] and subsequently used to compare 45 CI recipients to 46 postlingually deafened adults on the waiting list (WL) for a CI. The greatest differences between the groups were in the basic and advanced sound perception subdomains where CI recipients scored better than non-recipients. Differences in the other four subdomains were smaller, but still significant. Similar findings were also reported by Hirschfelder et al[6] where the largest differences in mean pre-to-post CI scores on the NCIQ for 56 adults were also for the basic and advanced sound perception subdomains.

Overall, these and other questionnaire-based studies have found that CIs provided recipients with improved sound perception, which in-turn facilitated greater communication abilities, improved psychological well-being, increased socialisation, greater independence, and better vocational opportunities, along with decreased levels of hearing handicap, depression and anxiety.[2,3,7,8] The studies that used the NCIQ[5,6,9,10] reported positive changes in QOL for physical, psychological, and social functioning.

The overall aim of this study was to examine the effect of cochlear implantation on QOL for New Zealand (NZ) adult recipients. There are no recently published studies on outcomes for only NZ recipients and no published outcomes for the Southern CI Programme. Further, this is the first study conducted in NZ where a disease-specific QOL instrument formed the basis of the participant questionnaires. In order to measure the effect of implantation across a range of domains relating to daily life, questionnaires were developed for each participant group.

The responses of recipients were compared to those on the WL for a CI. In addition, the responses from a subgroup of CI participants who were implanted during the course of this study were compared to give direct pre-to-post-implant QOL outcomes.

There were two aims to this study:

- To investigate the effect of a CI on QOL for adult recipients in NZ; and
- To determine which aspects of life that these changes are most noticed. It was hypothesised that the CI group will have higher QOL ratings than those on the WL for a CI.

Methods

Ethical approval for this study was obtained from both the NZ Health and Disability Ethics Committee, and the Human Ethics Committee at the University of Canterbury. All procedures performed were in accordance with these ethical approvals.

Participants

There were two groups of participants for the present study:

- Postlingually deafened adult CI recipients (CI group);
- Postlingually deafened adults on the waiting list for a CI (WL group);

It was recognised that some of the participants from the WL group would be implanted during the course of this study, and that this subgroup would provide true pre-to-post results. This subgroup is referred to as the 'CI-New' group; the results of these individuals are also included in the WL group's data.

Questionnaires—The CI group's questionnaire consisted of 71 items. The first 60 of these were derived from the Nijmegen Cochlear Implant Questionnaire (NCIQ). The NCIQ has three general domains (physical, psychological, and social functioning), classified into six subdomains (basic sound perception, advanced sound perception, speech production, self-esteem, activity limitations, and social interaction).

A 5-point Likert response scale is used with scores ranging from 0 (very poor) to 100 (optimal). The second part of the questionnaire (Q 61-70) was based on the Cochlear Implant Satisfaction Questionnaire (CISQ), developed by Harsymczuk & Deane.[11] The CISQ combined sections from the Satisfaction in Daily Life (SADL) Questionnaire,[12] and the Client Satisfaction Questionnaire-8 (CSQ).[13] For the present study, the original 4-point response scale was modified to a 5-point scale where: 5='a lot'; 4='a moderate amount'; 3='a little'; 2='very little'; 1='not at all'; or 0='N/A.' As with the NCIQ, higher ratings were indicative of greater satisfaction with the CI. For the CI group, the questionnaire was administered once in a retrospective format. The questionnaire was also completed by the CI-New group post- implant.

The WL group's questionnaire consisted of 66 items. The first 60 items were the same as the CI group's questionnaire, with the wording modified to suit the WL group. Items 61-65 were open-ended questions asking about the participant's expectations of the CI such as the perceived benefits, concerns, and impact that the CI may have in their life.

Both questionnaires were informally pilot tested to ensure that the questions, response modes, and the time taken to complete the questionnaire were appropriate. The questionnaires took approximately 30 minutes to complete.

Procedures—Questionnaires were mailed out to all current patients of the Southern CI Programme in NZ, including those on the WL for a CI. For those implanted during the course of the study (the CI-New group), an additional follow-up questionnaire was issued to them at approximately 2 to 3 months post-surgery. The numbers of questionnaires posted were: CI Group – 160; WL Group – 113.

Data analysis—Two-tailed statistical analyses were performed with a 'p' value of ≤ 0.05 being regarded as statistically significant. Correlational analyses used Spearmans' rho calculations. The responses from the 5-point rating scale were converted as follows: 1=0; 2=25; 3=50; 4=75; and 5=100, as described by [5]. Therefore possible scores were 0 (worst), 25, 50, 75 or 100 (best).

An overall score for each of the six subdomains (Q1-60) was calculated by summing the scores from the 10 questions in each subdomain and dividing this by the number of completed items. To give a general view of overall QOL, mean ratings were calculated for 'QOL' (Q1-60) and 'satisfaction' (Q61-66 and Q69-70 of CI questionnaire; Q27 of WL questionnaire). During analyses it was discovered that the advanced sound perception and speech production categories were incorrectly labelled data in the article[5]; these were relabelled for the present study.

Results

Response rates and demographics—A total of 94 responses (58%) were received from current CI recipients and 70 responses (62%) from those on the WL. All returned questionnaires were sufficiently completed for inclusion in the analysis. Demographics of the CI and WL participants are provided in Table 1, with Table 2 listing the CI devices, speech processors, and processing strategies utilised, and Table 3 providing the speech discrimination scores.

Speech discrimination is measured using HINT (Hearing In Noise Testing) sentences in two different situations. Auditory plus Visual means that the participant is played sentences on a screen with both auditory and visual input so they can hear the messages and potentially lip read the speaker. Auditory alone involves the same information but with no visual presentation so that the participant has to rely solely on their hearing. The mean speech discrimination scores of the CI group for HINT sentences Auditory alone after cochlear implantation was 75% which compares favourably with our overall published mean post CI results for the same tests of between 74% and 81% depending on the length of follow up [14].

Mean unaided and aided pure tone thresholds, along with the average loss for the CI and WL groups are shown in Figures 1 and 2, respectively. For the WL group, mean unaided and aided pure tone thresholds are shown in Figure 2. For these calculations the limits of the audiometer were taken to be 110 dB HL at 250 and 8000 Hz, and 120 dB HL at 500 to 4000 Hz; for audiograms where a 'NR' (no response) was recorded, these maximum values were entered.

Table 1. Demographic characteristics of CI and WL participants

Variables	**CI (N=94)**			**WL (N= 70)**		
Male	36			32		
Female	58			38		
	Mean	SD	Range	Mean	SD	Range
Age at study	56y, 6m	14y, 6m	20-83y	56y, 5m	15y, 3m	20-86y
Age at CI/HA*	51y, 11m	15y, 3m	5-83y	30y, 6m	20y, 9m	1-78y
Age reported HL◦	25y, 5m	20y, 4m	0-72y	26y, 10m	21y, 10m	0-80y
Duration HL **	32y, 7m	18y, 4m	3 -72y	29y, 8m	17y, 6m	2-67y
Duration HA/CI use♦	4y, 1m	4y, 4m	1m–21y	24y, 10m	14y, 6m	3-60y

* Age at CI/HA is the age (years) at first CI or HA use.

◦ Age (years) relating to when participant reported losing their hearing. Nine CI recipients did not state this information on the questionnaires.

** Duration of hearing loss refers to current age of participant minus age at which they first reported having a hearing loss. Nine CI recipients did not state this information on the questionnaires.

♦ Duration of HA/CI for CI recipients this was calculated as the difference between the date implanted and 1/06/08 which was the approximate date the questionnaires would have been completed. For the WL group, the duration of HA use as reported by the participants on the questionnaires.

Table 2. CI device details for CI group

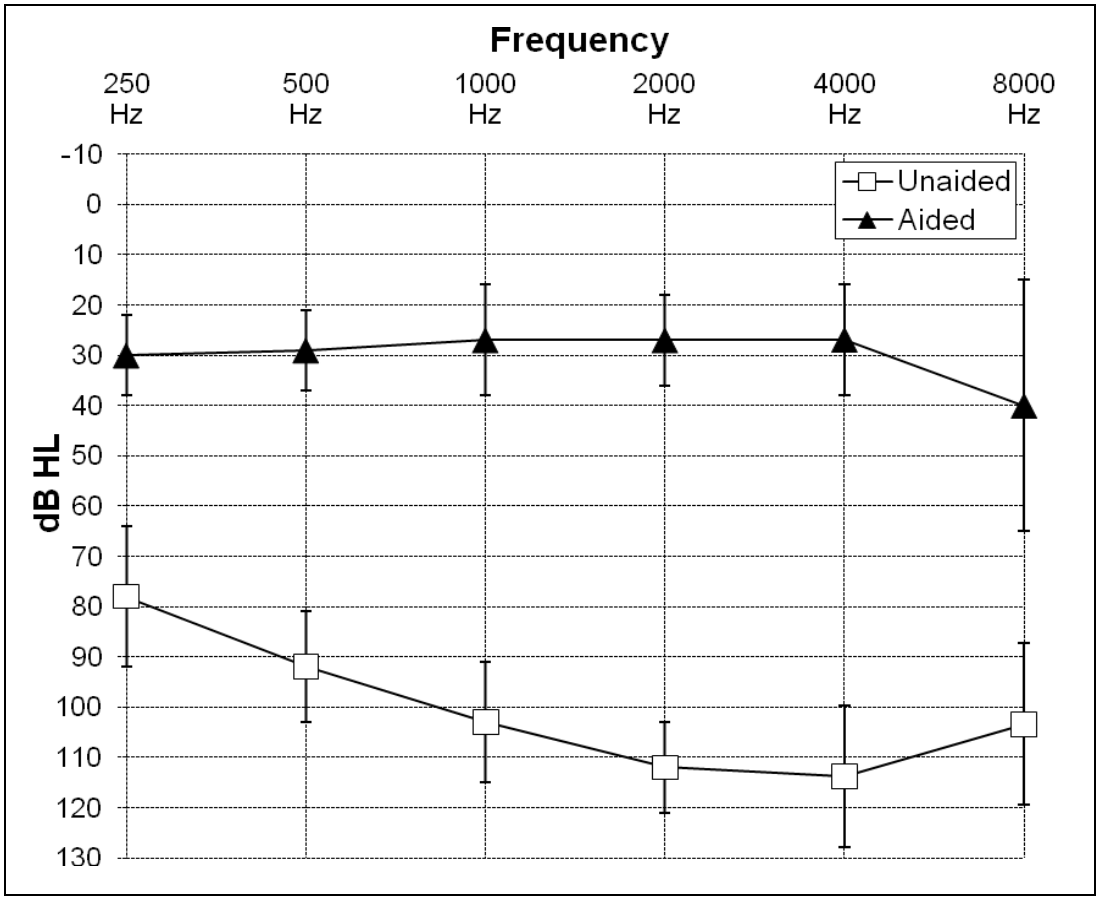
CI device (manufacturer)	**(N=94)**	**Speech Processing Strategy**
ESPrit 3G (Cochlear Ltd)	34	ACE
ESPrit 22 (Cochlear Ltd)	3	SPEAK
Freedom (Cochlear Ltd)	54	ACE
Freedom (Cochlear Ltd)	1	SPEAK
Opus 2 (MED-EL)	2	HD-CIS/FSP

Table 3. Speech perception details for CI and WL participants

		Pre-CI Speech Perception Measures**	Post-CI Speech Perception Measures**
CI **Mean (SD)** (n=79)	HINT Auditory + Visual HINT Auditory Alone	67% (32) 17% (17)	95% (34) 75% (31)
WL **Mean (SD)** (n=43)	HINT Auditory + Visual HINT Auditory Alone	72% (38) 32% (29)	NA NA

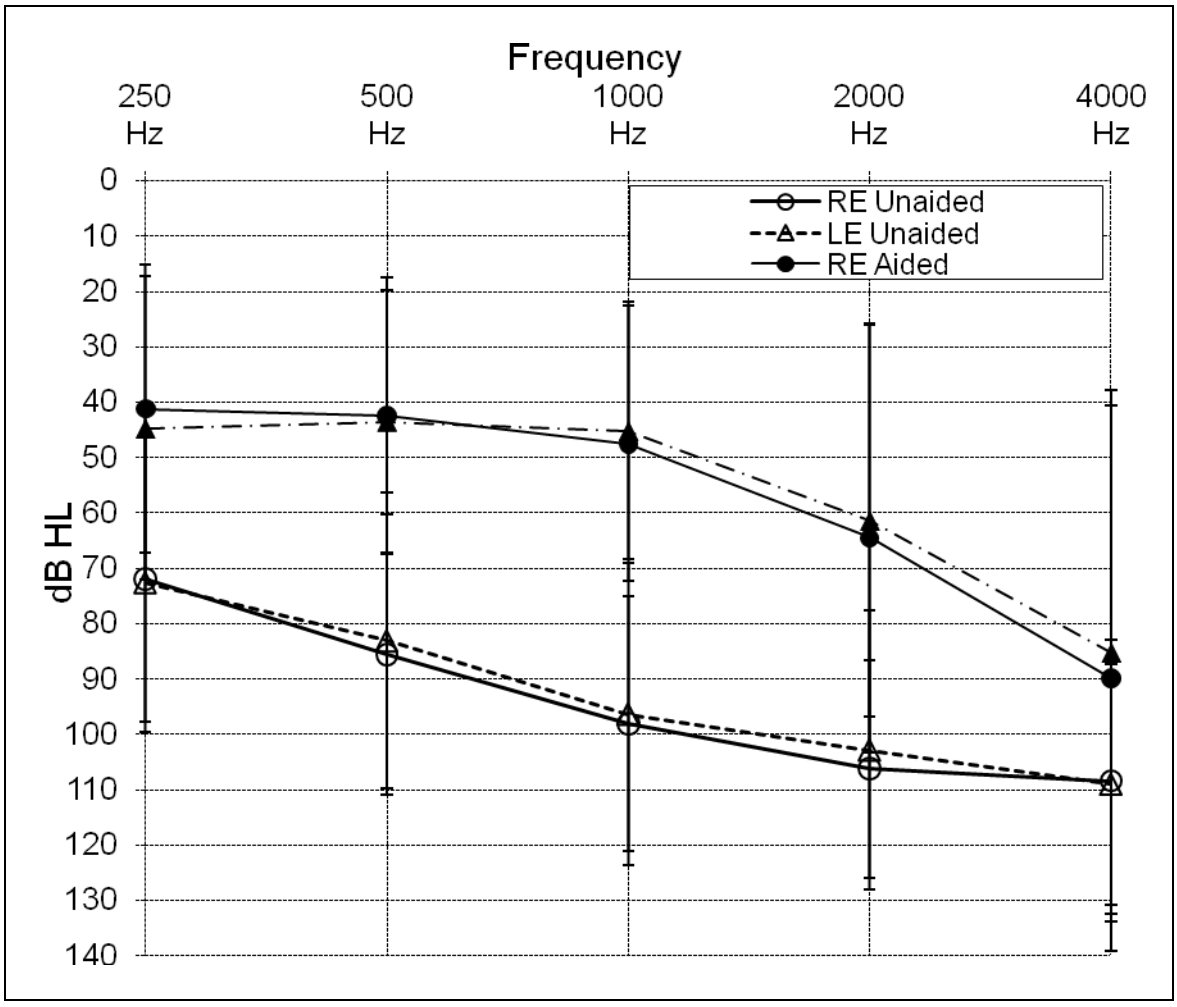
** %-correct score in their best aided condition

Figure 1. Mean unaided (implanted ear pre-surgery) and aided (implanted ear post-surgery) pure tone thresholds



(n=85; error bars=1SD)

Figure 2. Mean unaided and aided pure tone thresholds for both ears for WL participants



(n=60; Error bars=1SD)

CI-Group Questionnaire—The range of possible scores for all ratings was 0 -100. The overall mean QOL rating (Q1-60) was 69.97 (SD=15.54), and the mean satisfaction rating (Q61 & 62) was 74.33 (SD=22.54). The highest rated QOL subdomain score was speech production (M=80.68; SD=15.56), followed by social interaction (M=73.00; SD=18.87), activity limitations (M=70.63; SD=21.07), basic sound perception (M=68.66; SD=17.95), self-esteem (M=64.97; SD=18.22), and finally advanced sound perception (M=61.79; SD=19.86).

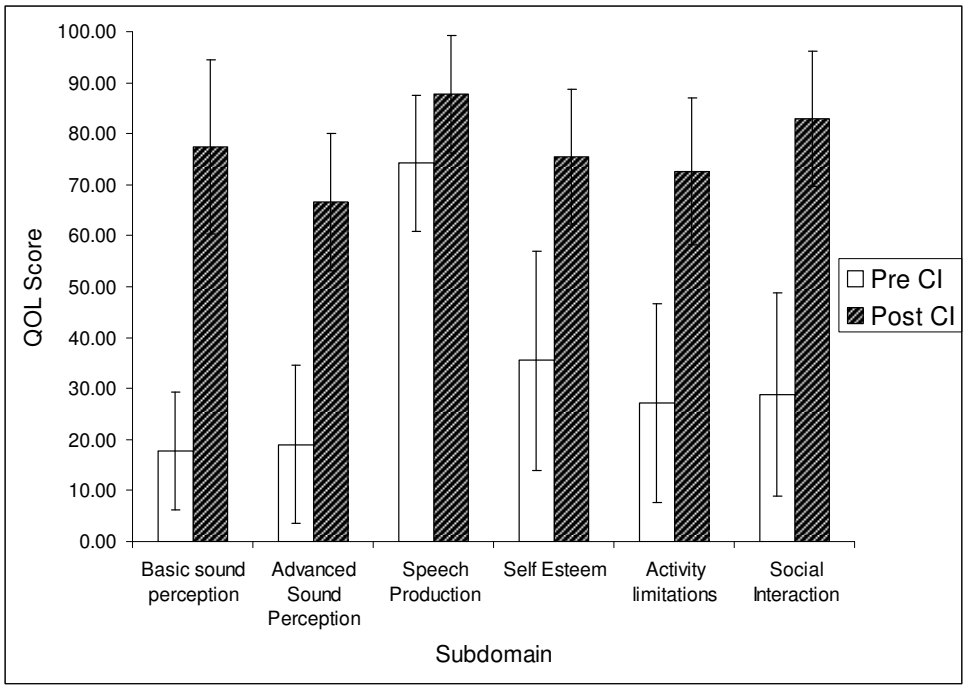
A one-way Analysis of Variance (ANOVA) with post-hoc Bonferroni corrections showed that there were significant differences between the highest-rated subdomain of speech production, and all other subdomains except for the social subdomain ($p<0.01$). There were also significant differences between activity limitations and advanced sound perception ($p=0.019$); social interaction and advanced sound perception ($p=0.001$); and social interaction and self-esteem ($p=0.050$).

Overall satisfaction ratings were high, with the highest ratings being for interconnectedness (M=86.94; SD=22.87), communication with others (M=85.99; SD=26.14), and family life (M=84.62; SD=23.80). The lowest rated areas were for the radio (M=55.00; SD=34.77), concert (M=57.54; SD=39.31), and music (M=62.64; SD=34.36). Questions 63-66 and 69-70 of the CI questionnaire also related to participants' satisfaction with their CI.

The following results are reported as the percentage of participants who provided the highest ratings (4 or 5). All but one recipient would recommend a CI to other hearing impaired people who were in a similar situation (Q69), 88% reported that the CI had met "most" or "all" of their expectations (Q65), and 83% reported that the CI had met "most" or "all" of their needs (Q66). Overall 91% rated the quality of results obtained from their CI as "good" or "excellent" (Q64), and 97% were "mostly" or "very" satisfied with their CI (Q70).

For the CI-New group (the seven individuals implanted during the course of this study), there was a difference between QOL ratings pre- and post- implant. The highest rated subdomain pre- and post-implant was speech production (pre: M=74.17, SD=13.35; post: M=88.15, SD=11.62), and the lowest subdomain post- implant was advanced sound perception (M=66.70, SD=13.47). Non-parametric Wilcoxon Signed Ranks tests showed that all subdomain means were significantly higher post- than pre-implant, as shown in Figure 3. The greatest amount of change pre-to-post implantation was for the basic sound perception (59.66) and social interaction (54.10) subdomains.

Figure 3. Pre-to-post subdomain scores for the CI-New group



Overall, the results from the CI questionnaire showed that recipients rated speech production as the highest QOL subdomain, with the highest rates of satisfaction being reported for the areas of work, shopping, and family life. Moreover, since receiving their CI, recipients rated that they experienced increased interconnectedness with the world, communication with others, and independence. For the CI-New group, it was found that each subdomain was significantly higher post-implant, where the highest rated subdomain was for speech production, and the lowest was for advanced sound perception.

WL-Group Questionnaire—The overall mean rating of the WL-group questionnaire was 41.24 (SD=13.88). The highest rated subdomain score for the WL group was speech production (M=66.64; SD=20.72), followed by self-esteem (M=42.67; SD=18.74), activity limitations (M=38.35; SD=19.78), social interaction (M=36.79; SD=16.88), advanced sound perception (M=32.12; SD=16.92), and basic sound perception (M=30.85; SD=18.92).

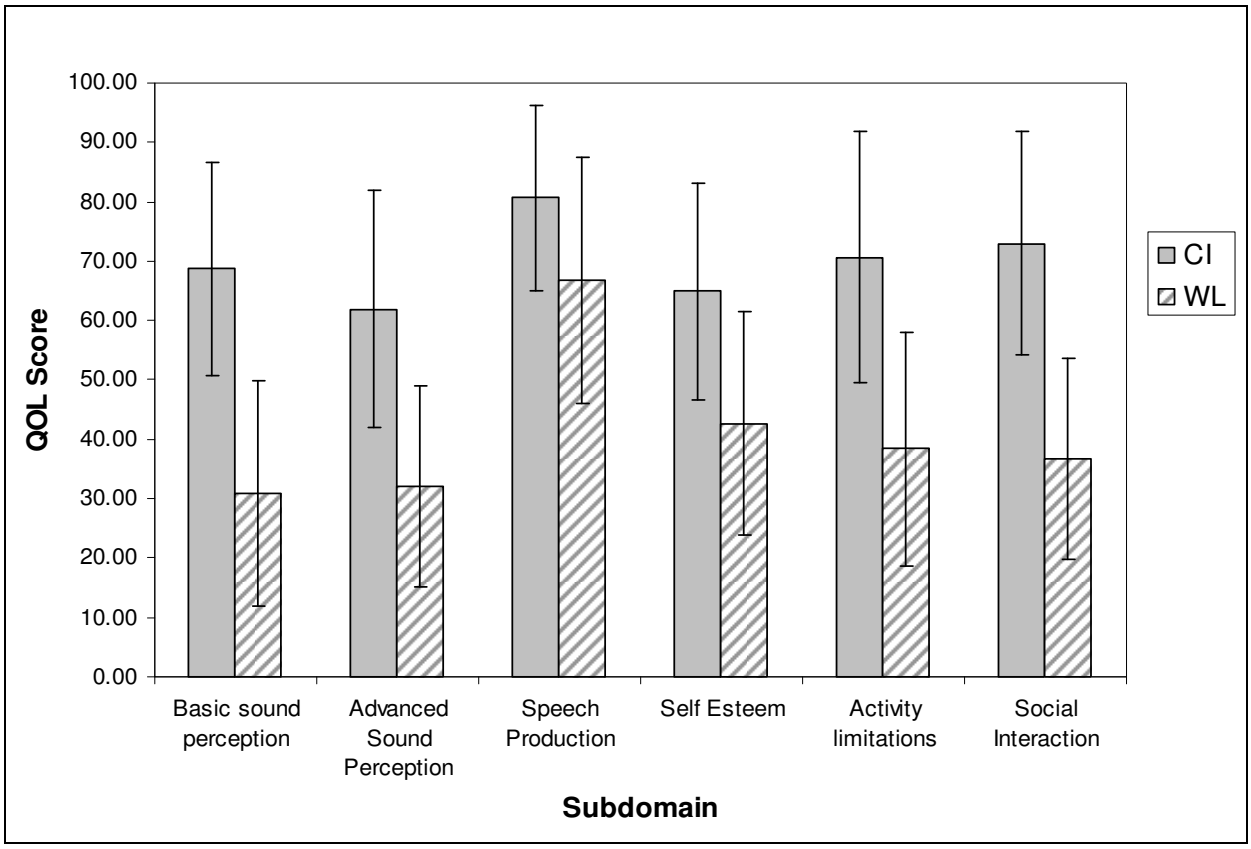
There were significant differences between the highest rated subdomain of speech production and all other categories ($p<0.001$ for all comparisons), as well as between basic sound perception and self-esteem ($p=0.003$), and advanced sound perception and self-esteem ($p=0.014$) (one-way ANOVA with Bonferroni corrections).

The main findings from the qualitative questions (i.e. Q61-66) were that the WL participants expected their lives to become easier following implantation, that they hoped the CI would allow them to be more sociable, and that it would decrease the stress levels in their lives.

Comparison of CI and WI Groups—The QOL subdomain scores from the CI and WL groups were compared to investigate for differences between CI recipients and HA users. As can be seen in Figure 4, CI recipients scored significantly higher (better) than those on the WL for all subdomains ($p<0.001$ for all comparisons; independent samples t-test), with the largest differences being for the subdomains of basic sound perception (difference=37.81), social interaction (difference=36.21), and activity limitations (difference=32.27).

Results from a two-way repeated-measures ANOVA showed that there was a significant difference for the between-subjects factor of group (i.e. CI vs. WL; $p<0.001$), and a significant difference for the within-subjects factor of subdomains ($p<0.001$), as well as a highly significant interaction between these two factors ($p<0.001$). In view of the highly significant interaction, independent samples t-tests were conducted to compare the CI and WL groups; there was a significant difference between the groups for all six subdomains ($p<0.001$ for all comparisons).

Figure 4. Mean comparison of subdomain scores between the CI and WL groups



Correlations—For CI recipients, correlations were calculated for potential associations between QOL ratings or satisfaction with the CI, and the subject factors of: age, post-CI speech perception scores, pure tone average for the implanted and non-implanted ear (both pre-CI), and time with CI, as reported in Tables 1 and 3.

There was a significant weak correlation between speech perception scores and satisfaction with the CI (rho=0.300, p=0.006), and a significant strong correlation between QOL and satisfaction with the CI (rho=0.885, p<0.001). This suggests that although improved speech perception provided by the CI is associated with greater satisfaction and QOL, there are other factors that also contribute to QOL and satisfaction. No other significant correlations were found.

For the WL group, the only significant correlation was between duration of HA use and QOL ratings (rho=0.331, p=0.006), where greater duration of HA use was associated with increased QOL. No other significant relationships were found.

Discussion

This study investigated the effect of CIs on QOL for adult recipients in NZ. The results supported the original hypothesis that the CI group will have higher QOL ratings than those on the WL for a CI; both overall ratings as well as all of the mean subdomain scores were significantly higher for the CI than the WL group.

The Physical Domain encompassed the basic sound perception, advanced sound perception, and speech production subdomains. Speech production was the highest rated subdomain for both groups, and the greatest overall difference in QOL ratings between the groups was seen in the Physical Domain.

Seventy-nine percent of recipients could hear soft sounds such as keys on a keyboard of a computer and the microwave beeping (Q31), compared to only 14% of those on the WL. Being able to hear footsteps (Q7) was reported by 67% of CI recipients compared to less than 10% of the WL group. CI recipients were better able to hear background and environmental noises than the WL participants. For example, nearly all (93%) could hear the vacuum cleaner (Q1), and 87% could hear the telephone or doorbell ringing (Q13), compared to 47% and 30%, respectively, for the WL group.

These findings were expected, given that those on the WL would have a severe to profound hearing loss and may not have been able to reliably identify these sounds, even with HAs. Thus, a CI may allow recipients access to sounds that most individuals on the WL are no longer able to hear, which may contribute to positive changes in QOL ratings. Looi and Arnephy[15] reported a 17.5%-points improvement in environmental sound perception pre-to-post surgery for their newly implanted adults.

For advanced sound perception, there was a marked difference in ratings between the groups for the ability to hold a conversation with two or more people in quiet situations (Q11). Whilst 79% of CI recipients reported being able to carry this out, only 29% of those on the WL reported this skill. Further, 51% of CI recipients reported they could use the telephone (Q60), compared to only 14% of those on the WL. Again, these lower scores for those on the WL were anticipated, given that these individuals would have more limited access to sounds in the speech frequency range. Other differences noticed between group ratings in the advanced sound perception subdomain were that 46% of CI recipients stated they could understand strangers without lip reading (Q40), whilst only 4% of those on the WL reported being able to do this. Moreover, only a quarter of CI recipients felt tired when listening (Q50), compared to 58% of those on the WL.

Those with a significant hearing loss often use auxiliary skills to supplement the auditory input, such as lip reading, or as some participants in this study commented, by writing things down. These alternatives may be taxing and more time consuming, and hence increase the effort required for communication.

The Psychological Domain encompassed the self-esteem subdomain. The significantly higher mean ratings from CI recipients in this subdomain may have been due to being better able to accurately perceive and participate in conversation, allowing for increased conversational independence and confidence. Seventy-four percent of CI recipients reported experiencing improved self-confidence after receiving their CI (Q54).

The Social Domain was divided into two subdomains, activity limitations and social interaction. Again, both mean subdomain scores were significantly higher for the CI group. For the activity limitations subdomain, the CI was associated with increased participation in employment and leisure. For example, 51% of the WL participants felt that their hearing impairment caused difficulties in their work or studies; this was the case for only 5% of CI recipients (Q6).

The CI was also associated with improved job satisfaction, broadened future employment opportunities, and improved the quality of leisure activities such as watching television. Only 24% of CI recipients reported experiencing problems when watching television (Q36) compared to 80% of those in the WL group; most of the latter group said that they were unable to watch television without subtitles.

For the social interaction subdomain, further differences between the two groups were apparent (mean difference=36.21). This was consistent with Hogan et al.[4], who reported a 27% difference in mean scores between CI recipients and non-recipients for social interaction on the Participation Scale questionnaire. In group situations, 31% of CI recipients in the current study experienced communication problems compared to 82% of those on the WL.

The above-mentioned comparisons to the WL group also highlight the difficulties experienced by those with a significant hearing loss, and the consequential impact on their life. The mean QOL rating for the WL group was 41.24, on a scale from 0-100, where the CI recipients had a mean QOL rating of 69.97. The issues faced by those with a hearing loss are reported in more detail by Stark & Hickson[16], and Stephens et al.[17]

For current recipients, despite the generally high ratings across most areas, music (including listening to the radio and concerts) was one area that received low satisfaction ratings. The difficulties CI recipients have in listening to music are well documented in the literature,[18,19] with recipients reporting music to sound significantly different (i.e. poorer) than would be expected for a normal hearing listener.[20]

The results from the CI-New group (the seven individuals implanted during the course of this study), also supported the original hypothesis. Large changes in QOL ratings pre-to-post implant were apparent for all subdomains, and non-parametric Wilcoxon Signed Ranks tests showed all of these improvements to be statistically significant. Pre-implant, the mean questionnaire score across all subdomains was 33.75; post-implant the overall mean rating increased by 43.38 to 77.13. This is in accordance with current literature reporting positive effects of implantation.[6,9,10,21–26] The largest differences were seen for the basic sound perception, social interaction, and advanced sound perception subdomains. Hirschfelder et al[6] gained retrospective responses from 56 adult CI recipients and found the largest differences in ratings pre-to-post-implant were for the basic and advanced subdomains of the NCIQ.

It could be speculated that improvements in QOL could be primarily attributed to improved communication. For example,[9] showed that the improved auditory benefit that the recipient obtained from their CI allowed them to communicate with more confidence which resulted in improvements in QOL. This was reflected in this study with the CI enabling new recipients improved conversation in quiet (Q11; difference pre- to post-CI of 81.50), as well as more-frequent communication opportunities (Q26; difference of 67.86), along with telephone use.

However, as also acknowledged by Baumgartner et al,[27] the ‘Hawthorne effect’ needs to be accounted for in interpreting the results of the current, and other similar studies. The Hawthorne effect in these situations would be where the receipt of a new, sophisticated device (the CI) results in an over-enhanced perception of improvement.

For the CI-New group, a large significant improvement in QOL pre-to-post implant was observed; an unknown portion of this improvement may have been due to the Hawthorne effect, as opposed to genuine improvements experienced by the recipient.

Summary and Conclusions

QOL is comprised of a host of factors that people deem to be important to their lives. It is subjective, personal, and incorporates social, cultural, personal and environmental considerations. This study aimed to investigate the effect of cochlear implantation on QOL for postlingually deafened adults implanted in NZ using specifically developed questionnaires. The results showed that CIs had a positive impact on the QOL of recipients, with significant positive changes reported for all subdomains. In particular, recipients reported improvements in family life, interconnectedness, and communication.

Recipients' satisfaction with their implants was also shown in that all but one would recommend a CI to others, with 88% of reporting that the CI had met their expectations, and 83% reporting that the CI had met their needs. Overall, 97% of recipients were satisfied with their CI. The CI-New subgroup (those implanted during the study) also reported improved confidence, self-esteem and independence, compared to pre-implant. They felt better able to participate in conversations, and reported improved vocational prospects, with decreased feelings of loneliness, depression, and social isolation.

Nevertheless, satisfaction with the CI was diminished for some areas over others. It was apparent that satisfaction for listening to music, as well as when in noisy environments was lower than for other areas. This corroborates with a host of other studies that have identified music and background noise as problematic issues for recipients, despite the advances in implant technology. The results from the WL group also identified the areas where those with a significant hearing loss experience the most difficulty. These included hearing various environmental sounds, communication in a range of situations, talking on the telephone, and participating in leisure or social group activities, to name only a few.

Assessment of CI outcomes should include both disease-specific and generic QOL measures, in addition to the usual speech perception tests, in order to obtain a holistic picture of the effect of implantation. Optimally these should be conducted both pre- and post-implantation, and used to inform counselling, habilitation and ensuring realistic expectations that are neither unachievable, nor too conservative. Overall, this study has shown that CIs have made vast differences in many recipients' lives, providing them with a better QOL. As CI recipient #161 wrote: "It has given me back my life."

Competing interests: None.

Author information: Valerie Looi, Department of Communication Disorders, University of Canterbury, Christchurch; Melanie Mackenzie, Department of Communication Disorders, University of Canterbury, Christchurch; Philip Bird, Department of Communication Disorders, University of Canterbury, Christchurch, Southern Cochlear Implant Programme, Christchurch—and Department of Surgery, University of Otago, Christchurch

Acknowledgements: The authors thank Beth Kempen, Penny Monteath, Lisa Scott, and Dona Jayakody for their assistance with subject recruitment and collation of audiological information. They also thank all of the participants involved.

Correspondence: Philip Bird, Otolaryngologist, Department of Otolaryngology, Christchurch Hospital, Private Bag 4710, Christchurch 8140, New Zealand. Fax: +64 (0)3 3640273; email: phil.bird@chchorl.co.nz

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THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

Patterns of ophthalmic referral and emergency presentations to an acute tertiary eye service in New Zealand

Divya Perumal, Rachael Niederer, Sue Raynel, Charles N J McGhee

Abstract

Background To establish demographics, referral patterns and clinical characteristics of patients attending an emergency eye service within a major public tertiary teaching hospital and to identify possible targets to improve delivery of patient care.

Methods Retrospective study of all patients (N=504) attending an acute eye clinic over a representative 2-week period within Greenlane Clinical Centre, Auckland.

Results Mean age was 42.4±20.6 years with mean visual acuity of 6/10. Referrals came from: general-practitioners (GP) (26.2%), self-referrals (18.6%), hospital medical-officers (7.4%), accident and emergency clinics (6.6%) and optometrists (2.2%). 39.1% of patients were follow-up reviews. Main presenting symptoms were pain, red eye and reduced vision. Average waiting-time was 119±98 min. Major diagnoses were trauma, uveitis and adenoviral keratoconjunctivitis (AKC). Males were more likely to present with ocular trauma, whereas females were more likely to exhibit uveitis, contact-lens related keratitis and AKC. Outcomes included follow-up (48.2%), referral to speciality ophthalmology care (19.0%), referral to other clinics (5.75%), and discharge (33.7%).

Conclusion A significant proportion of presentations could have been appropriately referred to outpatient departments or potentially managed by primary healthcare providers. Potential initiatives to manage excessive workload demands might target prevention of ocular trauma, improved contact-lens education, limiting the spread of AKC and improved GP education.

Overcrowding is a serious issue confronting emergency services world-wide and is the biggest barrier to appropriate delivery and provision of emergency care.[1] Overcrowding cannot be readily defined scientifically, but is characterised by situations in which the demand for service exceeds the ability to provide care within a reasonable time.[2] Ophthalmic emergency departments frequently provide services far in excess of defined functions.[3,4] Potential effects of overcrowding include compromised clinical care, reduced clinical productivity and decreased staff and patient satisfaction.[2]

The New Zealand publically funded health care system is similar to, but predates the UK National Health Service (NHS) with potentially infinite demands but limited resources. The optimisation of service provision requires knowledge of patient presentation and their clinical characteristics. Few studies have been published to assess the patient load in emergency eye services. These studies have highlighted that waiting times may be unacceptable, ranging from 30 min to 5 hours, with non-urgent problems accounting for 70% of cases.[4]

Importantly, self-presenting patients make up a significant load ranging from 56% to 89%.[5,6] Preventable conditions such as trauma contribute to the significant demand, representing 65% of ophthalmic emergencies in one study.[6] Kumar et al showed a higher prevalence in men, older patients, and anterior segment problems as the most common presentation to a Sydney ophthalmic emergency department.[7]

In the current study, we aimed to establish the patient demographics, clinical presentations, referral patterns, diagnoses and management of patients presenting to an emergency eye service within a major tertiary teaching hospital in New Zealand. We address the clinical questions of identifying the characteristics of patient attendance, their management and determine those cases which could have been managed by general practitioners. We believe that the results from this study will help identify measures to increase the efficiency of emergency eye care provision to patients.

Methods

Subject recruitment and assessment—The acute eye clinic (AEC), based in the Ophthalmology Department, Greenlane Clinical Centre, Auckland, provides 24-hour ophthalmology service for all patients in the Greater Auckland Metropolitan region (population approximately 1.3 million). It is part of the largest public hospital ophthalmic department in New Zealand. The eye service is staffed by 33 consultants (19.92 full-time equivalents-FTE), 10 junior medical-officers (10 FTE) and 71 nurses (52.46 FTE).Staffing at the AEC during normal hours may include one consultant, up to five junior medical-officers (one registrar, two non-training registrars and two house-surgeons), one nurse-practitioner, up to three clinical nurse-specialists and up to three registered-nurses. However, typically the number of clinicians-present per session was between 3 and 5.

A retrospective study of all patients who attended the AEC, between 19th March 2007 and 1st April 2007 was conducted. Patients were identified through an electronic database (CHIPS version 5.7.37). Clinical notes were reviewed using a standardised data collection spreadsheet, which included patient demographics, presentation, clinician seen, referral source, diagnoses, management, previous attendance, previous ocular surgery and outcomes (follow-up within the emergency eye service, referral to a speciality ophthalmology clinic, referral to other clinics or discharge to general practitioner (GP) care).

Triage was based on the Manchester Triage system.[8] This system triages patients based on symptoms with '1' being the highest priority and '6' the least. However, the associated categories had been modified in line with the Australasian triage system which is used within the local district hospital. Hence, the highest in the AEC is Triage 2, which corresponds with acute chemical eye injury.

Patients were seen by combinations of ophthalmic nurses, house-surgeons, non-training registrars, registrars or consultants. Snellen visual acuity was converted to LogMAR values for the purpose of statistical analyses. Follow-up could be completed at the AEC or patients could be referred to specialist ophthalmology outpatient clinics. Patients were excluded from the study if the records were incomplete, or if the patient self-discharged before clinical assessment. For the purposes of this study, discharge to GP implied that no further hospital review was warranted.

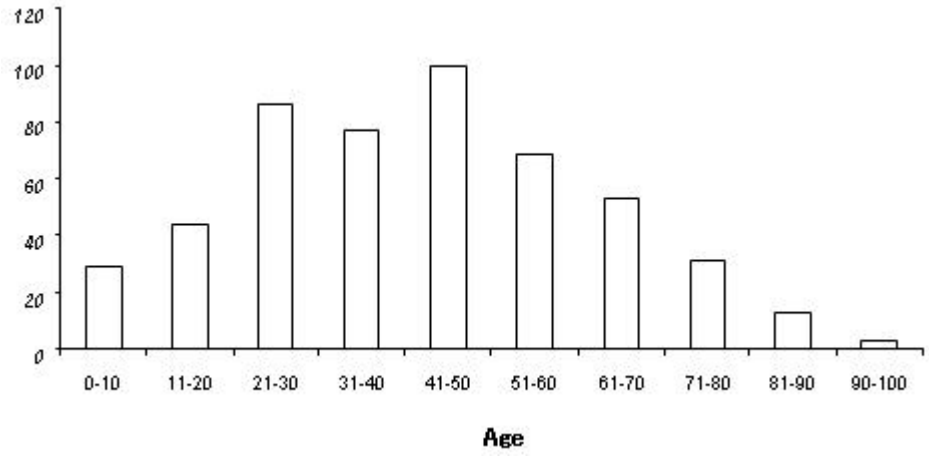
Statistical analysis—Statistical analysis was performed in SPSS Version 15 for Windows (Chicago, IL, USA). Basic descriptive statistics were calculated on all data gathered and values are reported as mean±standard deviation or n (%) as appropriate. Normal distributions of continuous variables were confirmed using the Kolmogorov-Smirnov test. Correlations between continuous variables were examined by calculating Pearson's correlation-coefficient, Spearmann's rho or Kendall's tau as appropriate. Student's independent t-test, Mann-Whitney U test or Fisher's exact test were used to compare values between groups. All tests were two-tailed and a $p<0.05$ was considered statistically significant.

Results

Demographics—A total of 516 patients were reviewed within the two week period. Twelve (2.33%) subjects were excluded from further analyses due to incomplete consultation records (n=2) or self-discharge prior to consultation (n=10). Therefore, 504 patients were included in this study for the purpose of analyses.

The mean age was 42.4±20.6 years (mean ± standard deviation) and was normally distributed (Figure 1), with 247 (49.0%) male and 257 (51.0%) female patients. Male patients presenting to the AEC were younger than female (38.8±18.7 vs. 45.9±21.7 years, p<0.001). The mean visual acuity was 6/10 (mean logMAR 0.241±0.415).

Figure 1. Age distribution of patients attending "acute eye" clinic



Forty-nine percent (n=248) of patients had previous attendances at the AEC (mean 1.7±4.0 SD visits). A minority (n=81, 16.1%) had previous outpatient speciality ophthalmology consultations, with an average interval of 7.0±12.8 months between outpatient and AEC presentation. Only 13.1% (66) of patients had previous ocular surgery with the most common surgical procedures being cataract surgery (n=37, 39.8%) and retinal detachment surgery (n=20, 21.5%).

Referral patterns—General practitioners initiated the referrals of 132 patients (26.2%), other hospital medical officers 37 patients (7.4%), accident and emergency (A&E) clinics 33 patients (6.6%) and optometrists 11 patients (2.2%). Self referrals made up 94 patients (18.6%), of which 45 patients had no previous contact with the ophthalmology service. The remaining 197 patients (39.1%) were pre-arranged acute eye clinic follow-up cases.

The presenting symptoms are listed in Table 1, with some patients presenting with more than one symptom. Pain was the most common symptom (n=115, 30.0%). Symptoms for referral varied between referring practitioners. GPs referred more than half of the referrals for red eye (n=48, 52%), flashes and floaters (n=12, 57%) and lid lumps (n=4, 80%). Painful eye was the main presenting symptom for referral from A&E (n=9, 27.3%) and hospital medical officers (n=13, 35.1%), whereas reduced

vision was the main referral symptom from optometrists (n=5, 45.6%). Self referred patients were also older compared to A&E (48.1±21.5 years vs. 34.1±19.1 years, p=0.009) and follow-up patients (48.1±21.5 years vs. 40.2±19.7 years, p=0.049).

Table 1. Referring source and primary presenting symptom(s)

Symptoms	Referral Source					
	General practice	Self	Hospital	Accident and Emergency	Optometry	Total
Pain	42	50	13	9	1	115
Red eye	48	32	8	4	1	93
Reduced vision	24	16	5	6	5	56
Trauma	10	4	8	6	0	28
Foreign body	11	2	1	7	1	22
Flashes and floaters	12	5	2	1	1	21
Watery eye	8	5	3	0	0	16
Foreign body sensation	4	3	1	0	1	9
Swollen eye	2	2	3	2	0	9
Eyelid lumps	4	1	0	0	0	5
Others (distorted vision, diplopia, headache)	3	5	1	0	1	10

NB. Some patients had more than one presenting symptom.

Table 2. Average waiting time and referral sources with respect to triage grade

Triage	Expected waiting time (min)	Average waiting time (min)	Percentage meeting triage (%)	Referral source					
				General practice	Optometry	Self	A&E	Hospital	Follow up
2	10	52.0 ±32.0	0	3	0	0	1	0	0
4	60	52.2 ±31.5	81.8	6	0	3	0	4	3
5	120	102 ± 64.7	59.8	52	7	35	18	12	165
6	180	170 ± 127	65.8	52	3	39	6	9	4

Note: Triage 2 consists of presentations with chemical eye injury; Triage 4 consists of presentations with severe pain, perforating eye injury and complete loss of vision; Triage 5 consists of presentations with recent reduced vision, moderate pain and follow-up; Triage 6 consists of presentations with mild pain, red eye, foreign body sensation or diplopia. There is no Triage 3.

Presentation—Details of ocular presentation within each triage score are detailed in Table 2. Only 218 (43.3%) cases were considered in determining duration of wait, as only these had accurately recorded clinician examination time. The average waiting time was 119±98 min. Most patients were in Triage 5 (n=289, 49.2%) and these were mainly follow-up consultations. Triage 2 was not used for comparison due to a small number of subjects (n=4, 0.79%). There was a difference in triage patterns by referral source (p<0.001), with GP referrals making up the majority of Triage 6.

Of those patients with triage and accurate ‘examination’ log on time documented, 61.8% had been seen within triage target times. Several other factors associated with waiting time were identified (Table 3).

The mean visual acuity Triage 2 was 6/8 (mean logMAR 0.13±0.19), Triage 4 was 6/60 (mean logMAR 0.99±1.1), Triage 5 was 6/10 (mean logMAR 0.21±0.34) and Triage 6 was 6/9 (mean logMAR 0.16±0.27). There were no significant associations between triage and time of the day of patient presentation.

Table 3. Factors statistically associated with waiting duration prior to full consultation

Factors		Duration of wait (min)
Referral source	General practice	115 ±74
	Accident and Emergency †, ‡	74 ± 56
	Optometry †	183 ± 190
	Self referrals ‡	149 ±124
	Other hospital medical officers	95 ± 71
Clinician seen after triage	Consultants	67 ± 59
	Non training registrar	107 ± 74
	House officer	130 ± 95
	Nurse specialist	139 ± 80
	Registrar	178 ±172

†Significant association of duration of wait with referral source (p = 0.009, Kruskall Wallis). Post hoc Tukey test showed a significant difference in wait between A&E referrals and optometry (p = 0.043) and ‡A&E referrals and self referrals (p = 0.016). Significant difference in waiting duration between groups (p = 0.029, Kruskall Wallis).

Diagnosis—The leading diagnoses were ocular trauma (n=123, 24.4%), uveitis (n=61, 12.1%) and adenoviral keratoconjunctivitis (AKC) (n=53, 10.5%). Eight cases were related to ocular manifestation of systemic disease, which included migraine (n=5), giant cell arteritis (n=1), papilloedema (n=1) and recurrent sinusitis (n=1). A complete list of primary diagnosis made is shown in Table 4.

Table 4. Primary diagnoses in patients attending the acute eye clinic

Primary diagnosis	No of Cases	% of total
Trauma		
Corneal foreign body	30	5.95
Eyelid trauma, fracture to orbit, trauma to the globe, chemical injury	79	15.7
Corneal abrasion	14	2.78
Corneal pathology		
Corneal abnormality (recurrent corneal erosion syndrome, other keratitis, keratoconus)	29	5.75
Contact lens related keratitis	30	5.95
Marginal keratitis	10	1.98
Corneal ulcer	3	0.60
Conjunctivitis		
Adenoviral keratoconjunctivitis	53	10.5
Other conjunctivitis	29	5.75
Vitreoretinal		
Posterior vitreous detachment	8	1.59
Retinal detachment/hole/tear	14	2.78
Macular pathology	7	1.39
Vitreous haemorrhage	6	1.19
Vascular pathology (e.g.CRAO, GCA)	7	1.39

Primary diagnosis	No of Cases	% of total
Uveitis	61	12.1
Herpes Simplex Virus keratitis/ keratouveitis	22	4.37
Lids (Lid pathology, blepharitis, meibomian gland cysts, chalazion)	13	2.58
Dry eye	6	1.19
Scleritis	6	1.19
Orbital Cellulitis	6	1.19
Glaucoma	6	1.19
Others	39	7.74
No apparent cause/ unknown	26	5.16

The accuracy of referrals was assessed by comparing the diagnosis in the referral letter with the final diagnosis (Table 5). Only 68.9% of GP referral letters offered a tentative diagnosis, of which 56.5% were accurate. GPs were most likely to accurately diagnose lid pathology, AKC and retinal detachment/tear/breaks. The most common diagnosis made for conditions with no provisional diagnosis offered by GPs was AKC (n=9, 21.4%). A&E centres were most likely to refer foreign body and conjunctivitis correctly.

Table 5. Diagnostic accuracy of referrals

Final Diagnosis	General Practitioners		Accident and Emergency		Hospital Medical Officers	
	n	%	n	%	n	%
Trauma						
Corneal foreign body and abrasion	11	72.7	7	100.0	0	
Eyelid trauma, fracture to orbit, trauma to the globe, chemical injury	15	80.0	12	50.0	12	75.0
Corneal pathology						
Corneal abnormality	4	50.0	0		1	0.0
Corneal ulcer	8	12.5	0		1	0.0
Contact lens related keratitis	1	100.0	0		1	100.0
Conjunctivitis						
Adenoviral keratoconjunctivitis	4	100.0	0		1	100.0
Other conjunctivitis	8	62.5	2	100.0	3	0.0
Vitreoretinal						
Posterior vitreous detachment	2	50.0	0		1	100.0
Vascular pathology (e.g. CRAO, GCA)	4	50.0	0		0	
Retinal detachment/hole/tear	2	100.0	1	0.0	2	100.0
Vitreous haemorrhage	2	0.00	0		1	100.0
Lids (Blepharitis, Meibomian gland cysts/abscess/ chalazion)	4	100.0	0		1	100.0
Uveitis	8	0.00	0		0	
Herpes Simplex Virus keratitis/ keratouveitis	4	75.0	0		0	
Orbital cellulitis	3	33.3	0		1	0.0
Others	10	40.0	2	0.0	2	0.0
Total cases	**90**	**56.5**	**24**	**50.0**	**27**	**51.9**

Note: Percentages expressed as % of primary diagnosis confirmed by ophthalmology consultations. There were eight optometry referrals providing diagnoses, with an overall accuracy of 42.9%.

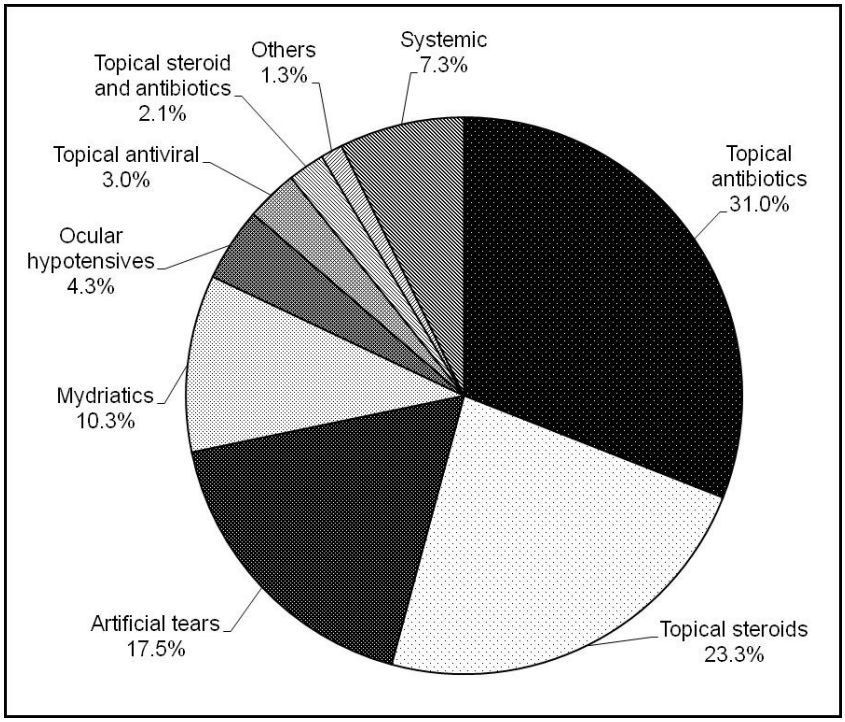
There was an association between the primary diagnosis and gender ($p<0.001$). The most common diagnoses for females were; uveitis (n=33, 12.8%), contact-lens related keratitis (n=28, 10.9%) and AKC (n=34, 13.2%). The most common diagnoses for males were; trauma (n=64, 25.9%), uveitis (n=28, 11.3%) and foreign body (n=27, 10.9%).

Management—A total of 701 medications were prescribed for patients in this study (Figure 2). Most patients received topical medication only (n=356, 70.6%) with a few patients receiving systemic medication only (n=18, 3.57%). A combination of topical and systemic medication was prescribed for 31 patients (6.15%).

Factors associated with treatment modality included referral source ($p<0.001$), triage category ($p=0.015$), diagnosis ($p<0.001$) and history of previous ocular surgery ($p=0.044$). Patients most likely to receive topical medication were follow-up patients, with no prior ocular surgery history, in Triage 5, with the diagnosis of either: glaucoma, herpes zoster ophthalmicus, episcleritis, dry eye, blepharitis, meibomian gland pathology, marginal keratitis or scleritis. Those least like to receive topical medication were: referred by optometrists, with a previous history of ocular surgery, in Triage 4, and diagnosed with a refractive error, optic nerve pathology, nerve palsy, cataracts or cellulitis.

No association was observed with time of presentation, age, duration of wait or vision. The majority of patients did not have any procedures performed (n=434, 86.1%). However, the most common procedure was removal of foreign body (n=24, 4.76%) followed by pseudomembrane removal (n=16, 3.17%).

Figure 2. Medications prescribed to patients



Note: Systemic medications include antibiotics (3.8%), analgesia (1.8%), anti-allergy, corticosteroid, ocular hypotensives and anti-migraine medication (1.66%). Percentages shown are relative to total number of drugs prescribed.

Outcome—Patients could have a combination of outcomes. Most patients were followed-up within the AEC (n=243, 48.2%). Other outcomes included: discharge

from the AEC (n=170, 33.7%), referral to speciality ophthalmology care (n=96, 19.0%), and referral to other clinics [e.g. orthoptics, optometry, neurology] (n=29, 5.75%). Factors associated with discharge included better visual acuity (p<0.001), referral source (p=0.004) and diagnosis (p<0.001).

Discharged patients had better VA compared to non-discharged (VA 6/8 (logMAR0.10±0.22) vs. VA 6/12 (log MAR0.31±0.47)) (p<0.001). A&E and GP referrals were more likely to be discharged compared to optometry and follow-up patients. Conditions most likely to be discharged were herpes zoster, episcleritis, and lid pathology.

Self referrals—Self referred patients are those who presented without prior clinician referral (Table 6 & 7). These patients were older (47.9±21.6 years vs. 41.2±20.1 years, p=0.007), more likely to be female (23.3% vs. 76.7%, p=0.006), wait longer (148.8±123.9 min vs. 107.7±84.7 min, p=0.012) and seen by a nurse practitioner/specialist (p=0.004). They were also more likely to have had previous ocular surgery (p<0.001) and no prior AEC consultations (p<0.001). Some patients had previous outpatient clinic consultations (n=39, 41.5%), with the average duration of 4.9±7.1 months from outpatient clinic to presentation.

Table 6. Symptoms at presentation by self referrals compared to other referrals

Symptoms	Other referrals n (%)	Self referral n (%)
Pain	65 (56.5)	50 (43.5)
Red eye	61 (65.6)	32 (34.4)
Reduced vision	40 (71.4)	16 (28.6)
Trauma	24 (85.7)	4 (14.3)
Flashes and floaters	17 (77.3)	5 (22.7)
Foreign body	20 (90.9)	2 (9.1)
Watery eye	11 (68.8)	5 (31.3)
Foreign body sensation	6 (66.7)	3 (33.3)
Swollen eye	7 (77.8)	2 (22.2)
Lumps	4 (80.0)	1 (20.0)
Diplopia	4 (100)	0 (0.00)
Distorted vision	1 (25.0)	3 (75.0)
Others	0 (0.00)	2 (100)

The symptoms for presentation by self referred patients was different compared to other referrals (p<0.001, Chi square). Percentage expressed to number of patients presenting with the particular symptom.

Table 7. Diagnoses of self-referred patients

Final Diagnosis	n	%
Trauma		
Corneal foreign body	6	6.38
Eyelid trauma, fracture to orbit, trauma to the globe, chemical injury	8	8.51
Corneal abrasion	1	1.06
Keratitis		
Other keratitis	8	8.51
Contact lens related keratitis	2	2.13
Marginal keratitis	2	2.13
Conjunctivitis		
Adenoviral keratoconjunctivitis	5	5.32
Other conjunctivitis	7	7.45
Vitreoretinal		
Posterior vitreous detachment	2	2.13
Retinal detachment/hole/tear	1	1.06
Macular pathology	4	4.26
Vitreous haemorrhage	3	3.19
Vascular pathology	2	2.13
Lids (Blepharitis, Meibomian gland cyts, abscess, chalazion)	5	5.32
Dry eye	5	5.32
Uveitis	9	9.57
Others	12	12.8
No obvious disease	12	12.8

Note: Percentage expressed over total diagnoses.

More than a third of self referred patients were discharged (n=33, 35.1%). Other outcomes included AEC follow-up (n=29, 30.9%), speciality ophthalmology follow-up (n=32, 34.0%), and referrals to other services (n=7, 7.45%). Self referred patients were less likely to be followed up at the AEC ($p<0.001$) and 39 patients (41.5%) could have been managed adequately by their GP.

Discussion

To the best of our knowledge, this study is the first to examine patterns of acute presentations to a dedicated ophthalmology emergency clinic in New Zealand. We conducted a retrospective study of all patients who attended AEC at Greenlane Clinical Centre, Auckland, during a 2-week period 19 March 2007 to 1 April 2007. This period did not coincide with any public or school holidays and therefore was representative of a 'normal' workload for the clinic. The results of this study are likely to be applicable to metropolitan speciality ophthalmology services in New Zealand.

Male patients presenting to the AEC tended to be younger than females. This may be due to higher rates of ocular trauma in young men, as highlighted in previous studies.[4,5,7,9] Most patients were in their 4th decade reflecting a younger group with higher tendency for acute ophthalmic problems when compared to the elderly with a higher tendency of chronic ophthalmic problems. This finding is consistent with previous studies.[3,7,10]

Particular trends emerged when comparing the referral patterns from the various referral sources. The most common referral reason from A&E, hospital medical officers, and GP was pain, whereas reduced vision was the most common reason for optometry referrals. This may reflect a difference in patient presentation patterns or, alternatively, it is possible that many patients reporting to optometry practices with minor ocular conditions are being managed by the local optometrist, without requiring further AEC assessment. Indeed, a survey of Queensland optometrists found that most optometrists were comfortable treating minor conditions of ocular surface problems.[11]

Several studies have shown that a significant proportion of 'acute' ophthalmic presentations could be appropriately referred to routine ophthalmology outpatient clinics or managed by GPs.[3-5,12] Previous studies have studied the agreement between GP and ophthalmologist in the diagnosis of ocular pathology.[13] One study indicated non-accord in the diagnosis of 42% of cases but only potentially serious misdiagnosis in 1%; that the most commonly confused conditions were conjunctivitis, blepharitis and dry eye; and that most ophthalmic diseases in general practice did not require specialist equipment for diagnosis.[14] In the current study, the accuracy of GP referrals was just over half and 28.6% of patients could have been managed in general practice, without the need for specialist knowledge or equipment. These conditions include refractive error which warrant optometry referral, shingles with no ocular involvement, minor corneal abrasions, conjunctivitis, episcleritis, AKC without significant visual loss, dry eye, blepharitis, meibomian gland dysfunction and subconjunctival haemorrhage. The reasons for such referrals may include a) lack of confidence and experience – ocular disease may account for only 1.5% of GP consultations;[15] and b) limited specific clinical training in ophthalmology.[16] Improving ophthalmic knowledge by offering specific courses and education in ophthalmology within GP practices and providing ophthalmic posts during GP vocational training may be a solution.[15]

Similar to earlier studies, the most common diagnoses were; trauma, uveitis, AKC and contact-lens related keratitis.[5-7,12] Particular conditions such as AKC vary in prevalence during the year.[17] Allergies and uveitis are associated with summer peaks whilst upper respiratory tract infections and conjunctivitis are associated with winter peaks.[6] As many of these conditions are preventable, potential initiatives to decrease presentations to acute eye clinics may include public education towards prevention of ocular trauma such as the use of safety glasses and improving education of contact lens wearers.

We report a greater association of AKC with female gender, which is consistent with a New Zealand Ministry of Health report published in 2007.[18] Adenovirus serotype 8 (Ad-8) was implicated in 75 cases from July-2006 to March-2007. This was the largest Ad-8 outbreak ever reported in New Zealand.[18] Many of these cases of AKC could have been managed by GPs or therapeutically trained optometrists thus reducing the risk of hospital cross-infection.

There was a wide range of waiting times within each triage category and whilst the average waiting time met the local triage requirements, notably only 61.8% of patients met the requirement of specific categories. Duration of wait may not be an accurate representation of waiting time as patients in Triage 2 with severe chemical eye injury may have had irrigation commenced immediately with detailed examination later.

Patients referred from A&E waited for a shorter duration compared to optometry and self-presenting patients. This could be related to triage, as self-presenting patients were mainly allocated to Triage 6, compared to A&E patients who were mainly allocated to Triage 5. It is difficult to ascertain the significance of the delay in seeing optometry referrals due to the limitation of numbers. Registrars had the longest waiting time whilst the shortest waiting times were for consultant initial acute assessments. The longer waiting time for registrars may be due to the additional supervision provided by them to other staff. Formulating guidelines to manage common ocular conditions has been suggested to improve efficiency.[10,19] One recent innovation undertaken to improve efficiency in the AEC is the implementation of a clinic dedicated to follow-up of iritis cases run by a clinical nurse practitioner. Preliminary results from a study showed a significantly reduced waiting time for these patients (unpublished data, Carol Slight, August 2009). Indeed, in this context, a number of studies have shown that ophthalmic nurse practitioner/specialist led clinics are both cost effective and safe.[13,16,20,21] Similarly, optometrists working in A&E departments have also shown consistency in both diagnosis and management plans with consultant ophthalmologist.[22]

Not surprisingly, topical medication without any procedural intervention was the most common management. Follow-up patients contributed to 39.1% of presenting patients during the study period and 48.2% of all patients needed AEC follow-up. Iritis was the most common reason for follow-up consultations. In contrast, a study by Fenton, Jackson et al, [4] identified that corneal foreign body was the most frequent cause of multiple attendances. This difference could be due to population characteristics or seasonal distribution with an inflammatory disease more likely to become chronic or recurrent compared to minor trauma.[6] Effective measures to reduce AEC load should include reducing the number of follow-up consultations, by either discharging patients to primary eye care or specialised outpatient ophthalmology care.

There were a smaller percentage of self referred patients in this study compared to previous UK based studies.[3,5,6] Although the NZ public health system is very similar to the UK NHS, the differences in presentation may represent differences in health seeking behaviours in patients. The most common diagnosis of self referred patients in one study was superficial keratitis and subconjunctival haemorrhage.[5] Self referrals formed the majority of patients presenting with pain. This may be a reflection that individuals consider ocular pain to warrant immediate attention. Patients with previous ocular surgery were also more likely to self refer to the acute clinic, possibly due to familiarity with the eye service.

We determined that 41.5% of self referrals could have been potentially managed by their GPs. These conditions include refractive error, lid pathology, dry eye, minor corneal abrasions, conjunctivitis, AKC without significant visual loss and ‘no obvious disease’. Although beyond the scope of this study, it would be beneficial to determine the reasons for patient preference in presenting to an ophthalmology acute clinic rather than directly to GPs. One reason could be cost, since hospital attendance is free of direct charge, whereas, attendance at general practice attracts a fee in New Zealand.

The National Health Service in the UK is primary care led, and partly involves the delegation of aspects of patient care out of the hospital and skill mix of allied health professionals taking on some of the doctors workload.[15] Future studies could evaluate

the potential roles of specialised ophthalmic nurses and qualified therapeutic optometrists in NZ as other means to access primary eye care with therapeutic interventions. A prospective case series based in Wales found optometry led primary eye care service to be clinically and cost effective. [23] The assessment of the accuracy of optometry referrals in this study is limited by the number of referrals.

Whilst this study is only a "snapshot" undertaken at one centre, the results are likely to be applicable not only to metropolitan speciality ophthalmology services, but also in other areas where emergency departments undertake acute ophthalmic care in public hospital settings. Ultimately, successful planning of future acute eye service provision in public hospital settings must be by better understanding of the multifactorial influences on, and demands of, patients presenting to services such as these reported.

Competing interests: None.

Funding: Funding was provided by Auckland District Health Board.

Author information: Divya Perumal, Research Fellow; Rachael Niederer, Corneal Research Fellow; Sue Raynel, Research and Development Manager; Charles N J McGhee, Maurice Paykel Professor of Ophthalmology; The Department of Ophthalmology, Greenlane Clinical Centre, Auckland District Health Board, Auckland—and The Department of Ophthalmology, New Zealand National Eye Centre, Faculty of Medical & Health Sciences, The University of Auckland

Acknowledgements: The authors thank Auckland District Health Board for financial support for this study and the clinical and administrative staff of the Department of Ophthalmology, Greenlane Clinical Centre, Auckland, New Zealand.

Correspondence: Professor Charles McGhee, Department of Ophthalmology, Faculty of Medical & Health Sciences, The University of Auckland, Private Bag 92019, Auckland, New Zealand. Fax: +64 (0)9 3677173; email: c.mcghee@auckland.ac.nz

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THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

Severe cyclophosphamide-induced haemorrhagic cystitis treated with hyperbaric oxygen

Michael Davis, Heather MacDonald, Christopher Sames, Kushma Nand

Abstract

Aim Cyclophosphamide-induced haemorrhagic cystitis (CHC) is an uncommon but well-recognised condition caused by a metabolite, acrolein, which is toxic to the urothelium. Based on similarities in the histopathology of radiation- and chemotherapy-induced haemorrhagic cystitis, benefit from hyperbaric oxygen therapy (HBOT) has been proposed. HBOT produces an increased oxygen partial pressure diffusion gradient between the circulation and surrounding tissues, which enhances neutrophil function and fibroblast and macrophage migration into damaged hypoxic soft tissue, promoting collagen formation, fibroblast growth, angiogenesis and white-cell bacterial killing. There are only isolated case reports of HBOT for CHC, in the literature so we reviewed the New Zealand experience with HBOT in CHC.

Method The case records of all patients with CHC referred to the three hyperbaric medicine units in New Zealand between 2000 and 2007 were reviewed retrospectively.

Results Six patients, with life-threatening haemorrhage at the time of referral for HBOT weeks or months after initial presentation with CHC, were identified. Cessation of bleeding occurred in all six patients after 14 to 40 HBOT, without complications. All patients remained clear of haematuria at 11 to 36 months follow-up.

Conclusions We recommend the use of HBOT in the management of intractable cyclophosphamide-induced haemorrhagic cystitis as an effective and low-risk therapy.

Haemorrhagic cystitis is a recognised, common complication of cyclophosphamide chemotherapy that may occasionally be fatal.[1,2] Treatment is often unsatisfactory in severe cases, prompting a search for new therapies (Table 1).[1,2]

Hyperbaric oxygen therapy (HBOT) has been used successfully in the treatment of soft-tissue radiation-induced injuries.[3,4] Since the histological changes in radiation- and chemotherapy-induced cystitis are similar, with diffuse mucosal oedema, telangectasia and submucosal haemorrhage, HBOT has been used in a number of cases of cyclophosphamide-induced haemorrhagic cystitis (CHC) with apparent success.[5–14]

HBOT usually consists of breathing 100% oxygen for 1 to 2 hours at a pressure of 203–243 kPa (2.0–2.4 bar) in a pressure chamber, daily to a total of 20–40 treatments, depending on the nature and severity of the problem being treated and the response of the individual patient.

We reviewed the New Zealand experience with HBOT for CHC.

Table 1. Drugs used for the treatment of severe haemorrhagic cystitis (modified from reference 1)

Intravesical
Alum
Formalin
Carboprost (15-methyl-prostaglandin F2α)
Dinoprost (prostaglandin F2a)
Silver nitrate
Sorbitol
Intravenous
Conjugated oestrogens
Tranexamic acid
Recombined factor VIIa
Other
Neodynium: YAG laser therapy
Hyperbaric oxygen

Method

The case records of all patients with CHC referred to hyperbaric medicine units in New Zealand from January 2000 to December 2007 were reviewed retrospectively. Six patients, with various underlying, often complex pathologies, being treated with cyclophosphamide and presenting with life-threatening CHC, were identified and are reported here. Each patient or a parent provided written consent for data from their medical records to be used anonymously.

Case reports

Case 1—A 15-year-old female suffering from severe proteinuria secondary to grade 5 lupus nephritis (membranous), for which she had been receiving oral cyclophosphamide for 4 months, was admitted with grade 4 haematuria (Table 2) in haemodynamic compromise. Other pathologies included thrombocytopenia and haemolytic anaemia, and a past history of an upper GI bleed and reduced level of consciousness and convulsions, bilateral pulmonary emboli secondary to inadequate anticoagulation and spontaneous bilateral pneumothoracies.

MRI showed multiple brain infarcts and CT-scan of the abdomen revealed bilateral renal vein thrombosis. She was on anticoagulants despite the risk of bleeding with low platelets. She was treated with continuous bladder irrigation and cystoscopy and clot evacuation, but bleeding persisted. Bladder biopsy showed changes consistent with cyclophosphamide toxicity.

Two weeks after the onset of haematuria she was referred for HBOT. Because of her history of pneumothorax, she was considered high risk for pulmonary barotrauma with hyperbaric treatment. Despite this risk and given her life-threatening condition, HBOT was commenced and she received 30 90-minute sessions at 203 kPa in a monoplace chamber uneventfully. Macroscopic haematuria settled after 15 and microscopic after 22 HBOT. Follow-up at a year revealed no further haematuria.

Table 2. Grading of haemorrhagic cystitis

0 = No symptoms of bladder irritability or haemorrhage **1** = microscopic haematuria, urine frequency and dysuria **2** = macroscopic haematuria **3** =macroscopic haematuria with small clots **4** =Massive macroscopic haematuria requiring instrumentation for clot evacuation and/or causing urinary obstruction

Case 2—An 82-year-old male with chronic myeloma had been receiving weekly oral cyclophosphamide 600 mg for 4 months when he developed grade 4 haematuria with clot retention and bladder spasms. Haemoglobin on presentation was 55 g L^{-1} and his coagulation profile was normal. Flexible cystoscopy showed diffuse bladder-wall oedema and haemorrhage consistent with CHC. Despite oral tranexamic acid and bladder irrigation with Alum 1% solution, bleeding continued and he was referred for HBOT several weeks after admission.

During 38 treatments, haematuria ceased 5 weeks after the start of therapy, by which time he had received a total of 35 units of resuspended red cells. Bilateral myringotomies were necessary as he was unable to effectively equalise pressure in the middle ear. The urinary catheter was removed prior to discharge with preservation of reasonable bladder function. He remained well until a short terminal illness 19 months later.

Case 3—A 65-year-old female with Churg-Strauss vasculitis and a worsening peripheral neuritis was on prednisone 40 mg and had been on cyclophosphamide 100 mg daily for about a year. She also had α-1 antitrypsin deficiency. The combined disease processes had resulted in severe emphysema and exercise limitation; she presented with grade 4 CHC requiring transfusion, continuous bladder irrigation and tranexamic acid. Bleeding continued, and she was referred for HBOT from another centre 2 weeks after admission.

She was considered at high risk for pulmonary barotrauma because of her emphysema. Breathing was occasionally laboured at pressure (203 kPa), and during two treatments she was switched to a 50/50 helium/oxygen mix (less dense and, therefore, easier to breathe at pressure) for short periods. Otherwise, treatment was uneventful. After 17 HBOT, her urethral catheter was removed. After 26 HBOT, haematuria was mild and she was discharged back to her referring hospital. She required a total of 18 units resuspended red cells, 12 prior to HBOT. At one-year follow-up she was free of bleeding apart from an episode at 3 months post HBOT associated with a urinary tract infection.

Case 4—A 64-year-old female suffering from systemic lupus erythematosis, cirrhosis and portal hypertension had been on cyclophosphamide for 10 years when haematuria started. She was also on prednisone 10 mg daily. Cyclophosphamide was ceased, but she continued to bleed and 4 months later she presented with grade 4 haematuria and in acute urinary retention, with haemoglobin 58 g L^{-1}. She was started on continuous bladder irrigation, tranexamic acid, transfusions and received two Alum bladder instillations.

Cystoscopy confirmed typical appearances of CHC. Haematuria continued and she was referred for HBOT from another centre. She required a total of 17 units resuspended red cells, 13 prior to HBOT. After 10 HBOT, she underwent laser diathermy, and she continued on HBOT as an outpatient to a total of 28 treatments. She also required drainage of 5 litres of ascites. She remained free of haematuria for 3 months, when it recurred. However, at one-year follow-up she was again free of bleeding and had required no further transfusions after the HBOT course.

Case 5—A 19-year-old male underwent a bone marrow transplant for acute myelocytic leukaemia. Cyclophosphamide was part of the pre-transplant regimen. He had been an inpatient for 4 months when referred to a free-standing hyperbaric facility for HBOT, in severe pain from bladder spasms, requiring morphine PCA via a PIC-line in very large doses per day (he needed 30 mg per 2-hour session at start of HBOT course); almost daily blood and platelet transfusions and had undergone multiple bladder evacuations for clot retention. He received four 2-hour HBOT at 243 kPa in the multiplace chamber but HBOT had to be suspended for 12 days because of a recurrent pneumonia. The remainder of his 30 treatments was at 203 kPa in a monoplace chamber.

He was discharged 1 week after completion of his hyperbaric treatment; urine macroscopically clear. He was placed on a morphine withdrawal programme which he completed successfully over one month. Six months later he was admitted to another hospital with haematuria, but this settled on antibiotics and a further platelet infusion. On follow-up at 11 months post-HBOT, he was fit and well, and in employment.

Case 6—A 40-year-old male with Wegener's granulomatosis had been on pulsed and then oral cyclophosphamide therapy for 10 years. He presented with grade 4 haematuria and underwent cystoscopy for evacuation of clot and bladder irrigation; bladder biopsy showed changes consistent with cyclophosphamide toxicity. Gross haematuria settled; however, he continued to have macroscopic haematuria (grade 2). Three months later, the patient had a further episode of grade-4 CHC requiring hospitalisation.

Despite conservative management, haematuria continued and he was referred for HBOT 3 months after presentation. He underwent 10 60-minute sessions of 100% oxygen at 203 kPa. Gross haematuria settled, but grade 2 CHC persisted. A further 10 HBOT resulted in complete remission of haematuria. There was no recurrence of haematuria, and annual cystoscopy for 3 years has shown no recurrence of CHC.

Discussion

Cyclophosphamide is an oxazaphosphorine alkylate drug, widely used as an anticancer and immunosuppressive agent. Cyclophosphamide is metabolised in the liver and produces acrolein, which is excreted in urine, and is toxic to the urothelium.[15–16] A viral aetiology has also been postulated.[2] In a detailed review article, the reported incidence of CHC is quoted as 2–40% with oral therapy and up to 75% with intravenous use, but there does not appear to be a clear dose-related relationship.[2]

The incidence of life-threatening CHC is estimated to be low, but the associated mortality is high.[2] In one series of 440 patients given low-dose cyclophosphamide

quoted in this review, the incidence was 10%, of whom 10 patients died from CHC.[2,17]

The majority of cases can be managed by adequate hydration and stopping the drug. An antidote, 2-mercaptoethanesulfonate (Mesna), binds and detoxifies acrolein within the urinary collecting system resulting in an inert thioether which is passed innocuously in the urine.[18,19] Prior to HBOT referral, Mesna had not been used in any of these six patients.

Other available therapies in severe CHC (Table 1) are fraught with variable success and toxicity.[1,2] HBOT was used as a non-surgical treatment of last resort in these six patients.

HBOT is a relatively safe, non-invasive therapy. Its efficacy in the treatment of chronic, non-healing wounds has been reported in a large number of studies, but there are relatively few randomised controlled trials.[3,4] Experimental studies have shown hyperbaric oxygen to be effective in CHC.[20–23] The increased oxygen partial pressure diffusion gradient between the circulation and surrounding tissues enhances neutrophil function and macrophage migration into the damaged, hypoxic soft tissues promoting collagen formation, fibroblast growth, angiogenesis and neutrophil bacterial killing.[24–26]

The commonest clinical management problem of HBOT is middle ear and/or sinus barotrauma. This is usually minor and with good management rarely interferes with the HBOT course.[27] About 5% of patients may require myringotomies to facilitate pressurisation (Davis FM, unpublished observations, 2008). Myopia, usually reversible, is a dose-dependent side effect of HBOT.[28]

Oxygen-induced convulsions at pressures of 243 kPa or less are rare, with an incidence of approximately 1:6,000 treatments.[29] Two of our patients were at high risk of pulmonary barotrauma because of pre-existing lung pathology, but completed their HBOT without complications.

To date, there are only isolated case reports of CHC being successfully treated with HBOT.[5–14] All six of our patients received cyclophosphamide as part of a chemotherapy regimen or as conditioning prior to bone marrow transplantation. Conservative treatment had been unsuccessful and referral to a hyperbaric unit was made 2 to 12 weeks after the onset of severe (grade 4, Table 2) haematuria. Complete cessation of bleeding occurred in all six patients after 14 to 40 HBO treatments, without complications related to pressurisation. All the patients were free of haematuria at 11 to 36 months follow-up. Whether HBOT is indicated in less severe cases of CHC remains unknown.

Since severe CHC is a relatively rare presentation in any one centre's experience and responses to various therapies are uncertain, it would be useful to develop a prospective database for these patients. This would certainly be possible where HBOT in Australia and New Zealand is concerned, given the close links between hyperbaric units through the Australian and New Zealand Hyperbaric Medicine Group (a sub-committee of the South Pacific Underwater Medicine Society).

Conclusions

With their underlying pathologies, patients with CHC often present management challenges for HBOT. All six patients we report had failed to respond to conventional non-surgical therapy for grade 4 CHC over weeks or months. They were referred for HBOT as a treatment of last resort, to which they all responded with cessation of haematuria after 14 to 40 treatments. We recommend HBOT in the management of severe chemotherapy-induced haemorrhagic cystitis as an effective and low-risk therapy, even if it means transfer to another centre.

Competing interests: None.

Author information (at the time these patients were treated)**:** Michael Davis, Medical Director, Hyperbaric Medicine Unit, Christchurch Hospital, Christchurch; Heather MacDonald, Director, Hyperbaric Health, Auckland; Christopher Sames, Senior Medical Officer, Slark Hyperbaric Medicine Unit, RNZN Hospital, Auckland; Kushma Nand, Registrar in Nephrology, Auckland City Hospital, Auckland

Correspondence: Dr Michael Davis: C/- Hyperbaric Medicine Unit, Christchurch Hospital, Private Bag 4710, Christchurch, New Zealand. Fax: +64 (0)3 364 0187; email: mike.davis@cdhb.govt.nz

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THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

Spinal manipulation: an update of a systematic review of systematic reviews

Paul Posadzki, Edzard Ernst

Abstract

Objectives The aim of this update is to critically evaluate the evidence for or against the effectiveness of spinal manipulation in patients with any type of clinical condition.

Design Four electronic databases were searched to identify all relevant systematic reviews of the effectiveness of spinal manipulation in any condition published between 2005 and January 2011. Reviews were defined as systematic, if they included an explicit and repeatable inclusion and exclusion criteria for studies.

Results Forty-five systematic reviews were included relating to the following conditions: low back pain (n=7), headache (n=6), neck pain (n=4), asthma (n=4), musculoskeletal conditions (n=3), any non-musculoskeletal conditions (n=2), fibromyalgia (n=2), infant colic (n=2), any medical problem (n=1), any paediatric conditions (n=1), carpal tunnel syndrome (n=1), cervicogenic dizziness (n=1), dysmenorrhoea (n=1), gastrointestinal problems (n=1), hypertension (n=1), idiopathic scoliosis (n=1), lateral epicondylitis (n=1), lower extremity conditions (n=1), pregnancy and related conditions (n=1), psychological outcome (n=1), shoulder pain (n=1), upper extremity conditions (n=1) and whiplash injury (n=1). Positive or, for multiple SR, unanimously positive conclusions were drawn for psychological outcomes (n=1) and whiplash (n=1).

Conclusion Collectively these data fail to demonstrate convincingly that spinal manipulation is an effective intervention for any condition.

Spinal manipulation (SM) is a manual technique commonly used by chiropractors, osteopaths, physiotherapists, physicians or bone setters. The aim usually is to correct misalignments or subluxations of the spinal joints.[1] However, subluxations have repeatedly been found to be an invalid concept.[e.g.2;3] Therefore, the use of spinal manipulation as a means to adjust subluxations is of debatable biological plausibility. Despite its implausibility, SM is still widely used for a broad range of conditions.

Numerous clinical trials of SM have been published. Their data are often less than uniform. In such a situation, systematic reviews (SRs) might provide the most conclusive answer regarding the effectiveness of SM. In 2006, a SR of SRs pertaining to spinal manipulation was published.[4] In this article, we were able to include 16 SRs published between 2000 and May 2005. Our conclusion was that "we have found no convincing evidence from systematic reviews to suggest that SM is a recommendable treatment option for any medical condition".[4] Since then, numerous new SRs have been published which necessitates an update of our original SR.

The aim of this update was to critically evaluate the data from SRs of SM as a treatment for any human condition.

Methods

Electronic literature searches were conducted to identify all systematic reviews of SM for any indication published between May 2005 and January 2011. Searches were conducted in the following electronic databases: Medline, Embase, AMED, Cochrane Database. The following search terms were used: [Chiropract* OR spinal manipul* OR manual therap* OR osteopath*] AND [systematic ADJ review]. No language barriers were imposed.

Abstracts of reviews thus located were read and those appearing to meet the inclusion criteria were retrieved for further evaluation by both authors (EE, PP). Systematic reviews were defined as articles that included an explicit and repeatable literature search method and if there were explicit and repeatable inclusion and exclusion criteria for studies. To get included, systematic reviews had to pertain to the effectiveness of SM for any type of medical condition and to include evidence from at least two controlled clinical trials. Complex packages of therapeutic interventions that included SM as one of several treatments were excluded. Reviews that depended upon previous systematic reviews for their primary data were also excluded.

Two authors independently extracted the data from the identified articles according to pre-defined criteria (Table 1). Disagreements were resolved through discussions between the authors.

Results

After removal of duplicates, the searches generated 59 articles. Thirteen articles were excluded (Figure 1). The reasons for exclusion were: based on previous systematic reviews (n=3), practise guideline (n=2), protocol only (n=1), no explicit exclusion and inclusion criteria (n=5), no conclusion regarding effectiveness (n=2). Forty-five SRs met the above inclusion criteria.[5-49]

Key data of these reviews are summarized in Table 1. These SRs related to the following conditions: low back pain (n=7), headache (n=6), neck pain (n=4), asthma (n=4), musculoskeletal conditions (n=3), any non-musculoskeletal conditions (n=2), fibromyalgia (n=2), infant colic (n=2), any medical problem (n=1), any paediatric conditions (n=1), carpal tunnel syndrome (n=1), cervicogenic dizziness (n=1), dysmenorrhoea (n=1), gastrointestinal problems (n=1), hypertension (n=1), idiopathic scoliosis (n=1), lateral epicondylitis (n=1), lower extremity conditions (n=1), pregnancy and related conditions (n=1), psychological outcome (n=1), shoulder pain (n=1), upper extremity conditions (n=1) and whiplash injury (n=1). There was some overlap between these categories.

The SRs included chiropractic or osteopathic manipulations as well as manual therapy or any type of SM. Twenty SRs included more than 10 primary studies;[5;8;10;12;20-24;28;30-32;36;39;41;42 47 48;49] and 6 included a meta-analysis.[5;20;22;40;41;48] The conclusions drawn from most SRs were frequently cautious or negative (Table 2). For instance, for low back pain three SRs arrived at positive conclusions,[10;40;49] one arrived at equivocal conclusions[37] and three arrived at negative conclusions.[5;12;20] For asthma three SRs arrived at negative conclusions[7;15;25] and one arrived at equivocal conclusions.[27] For headaches two reached positive conclusions [9;19] whereas three reached negative conclusions[6;18;29]

For infant colic both reviews arrived at negative conclusions.[17;26] There is insufficient evidence to determine whether SM can be beneficial in upper extremity conditions [24;30;31] For lower extremity conditions, one review arrived at positive conclusions.[8] Thus there was an undeniable degree of contradiction between these SRs.

Table 1. Systematic reviews of spinal manipulations published since 2000

Legend: NSAIDs–Non Steroid Anti Inflammatory Drugs; SM–spinal manipulation; RCT–randomised clinical trial; TTH–tension type headache.

First author (year) [ref]	Interventions	Condition treated	n	Meta-analysis	Overall result (quote)	Direction of conclusion	Comment
Assendelft (2004)[5]	Any type of SM	Low back pain	39	Yes	No evidence that SM is superior to other standard treatments for acute or chronic low back pain	(-)	RCTs of mobilization were also included
Bronfort (2004)[10]	SM and mobilization	Low back pain and neck pain	69	No	. . . recommendations can be made with some confidence regarding the use of SM and/or mobilization as a viable option for treatment of both low back pain and neck pain	(+)	Conclusions based on 43 RCTs meeting admissibility criteria for evidence
Dagenais (2010)	SM	Acute low back pain	14	No	Several RCTs have been conducted to assess the efficacy of SMT for acute LBP using various methods	(+)	
Ernst (2003)[12]	Chiropractic SM	Low back pain	12	No	Effectiveness . . . not supported by compelling evidence from the majority of RCTs	(-)	Focus exclusively on SM as performed by chiropractors
Ferreira (2002)[19]	SM	Chronic low back	12	Yes	(SM) . . . is not substantially more effective than sham treatment in reducing pain, nor is it more effective than NSAIDs in improving disability in chronic low back pain patients. It is not clear whether . . . (SM) . . . is more effective than NSAIDs in reducing pain in chronic low back pain patients	(-)	Mostly moderate quality data was included
Licciardone (2005)[40]	Osteopathic manipulative therapy	Low back pain	6	Yes	Osteopathic manipulative therapy significantly reduces low back pain. The level of pain reduction is greater than expected from placebo effects alone and persists for at least 3 months.	(+)	Significant heterogeneity of meta-analysed data
Stuber (2008)[37]	Chiropractic care	Pregnancy-related low back pain	6	No	However, the low-to-moderate quality of evidence of the included studies preclude any definitive statement as to the efficacy of such care	(+/-)	Quasi-experimental design, case series, and cross-sectional case series study included
Astin (2002)[6]	Any type of SM	Headache disorders	8	No	The data available to date do not support . . . that SM is an effective treatment for headache	(-)	Rigorous systematic review
Bronfort (2001)[9]	SM	Chronic headache	9	No	SM appears to have a better effect than massage for cervicogenic headache . . . an effect comparable to commonly used first line prophylactic prescription medications for tension-type headache and migraine	(+)	Only 9 primary studies included

					headache. This conclusion rests upon a few trials of adequate methodological quality. Before any firm conclusions can be drawn, further testing should be done.		
Fernandez-de-las-Penas (2006)[18]	Any type of manual therapy including SM	Tension type headache	6	No	The author found no rigorous evidence that manual therapies have a positive effect in the evolution of TTH. The most urgent need for further research is to establish the efficacy beyond placebo of the different manual therapies currently applied in patients with TTH.	(-)	Different manual therapy modalities were included
Fernandez-de-las-Penas (2005)[19]	SM	Cervicogenic headache	2	No	Spinal manipulative therapy might be effective in reducing headache intensity, headache duration, medication intake (level 1), and headache frequency (level 3) in patients with CeH.	(+)	Low quantity of the data
Lenssinck (2004)[29]	Physiotherapy and/or spinal manipulation	Tension type Headache	8	No	. . . there is insufficient evidence to either support or refute the effectiveness of physiotherapy and (SM) compared to other treatments	(-)	Included five RCTs of SM including two high quality RCTs of chiropractic with contradictory results
Ernst (2003)[13]	Chiropractic SM	Neck pain	4	No	The notion that chiropractic SM is more effective than conventional exercise . . . was not supported by rigorous trial data	(-)	Focus exclusively on SM as performed by Chiropractors
Gross (2004)[22]	Any type of SM and mobilization	Neck problems	33	Yes	The evidence did not favour manipulation and/or mobilisation done alone or in combination with various other physical medicine agents; when compared to one another, neither was superior. There was insufficient evidence available to draw conclusions for neck disorder with radicular findings.	(-)	42% of the included data was of high quality
Gross (2010)[41]	SM or mobilisation	Neck pain, headache, whiplash injuries	27	Yes	Cervical manipulation and mobilisation produced similar changes. Either may provide immediate- or short-term change; no long-term data are available. Thoracic manipulation may improve pain and function. Optimal techniques and dose are unresolved. Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.	(+/-)	Low to moderate quality evidence was included
Vernon (2005)[38]	SM, manual therapy	Acute neck pain not	4	No	There is limited evidence of the benefit of spinal	(-)	Combination of modalities included

	and TENS	due to whiplash			manipulation ... in the treatment of acute neck pain not due to whiplash injury.		
Hestbaek (2010)[46]	Chiropractic care	Musculoskeletal conditions in children and adolescents	3	No	Although the major reason for paediatric patients to attend a chiropractor is spinal pain, no adequate studies have been performed in this area.	(+/-)	
Posadzki (2010)[32]	Osteopathic manipulation	Musculoskeletal pain	16	No	The notion that osteopathic manipulative therapy alleviates musculoskeletal pain is currently not based on the evidence from independently replicated high quality clinical trials.	(-)	Various quality RCTs were considered
Vernon (2009)[39]	Chiropractic care	Myofascial trigger points and myofascial pain syndrome	112	No	Manual-type therapies and some physiologic therapeutic modalities have acceptable evidentiary support in the treatment of MPS and TrPs.	(+)	Physical therapies were also evaluated along SM
Balon (2004)[7]	Chiropractic care	Asthma or allergy	6	No	No evidence to support the use of chiropractic SM	(-)	Four of the six trials tested SM; three of these studies were negative
Ernst (2009)[15]	SM	Asthma	3	No	Spinal manipulation is not an effective treatment for asthma	(-)	Rigorous systematic review; included the highest quality RCTs
Hondras (2002)[25]	Manual therapy	Asthma	5	No	Insufficient evidence to support the use of manual therapies	(-)	Both trials of chiropractic spinal manipulation were negative
Kaminskyj (2010)[27]	Chiropractic SM	Asthma	8	No	The evidence suggests chiropractic care should be used as an adjunct, not a replacement, to traditional medical therapy.	(+/-)	case series, case studies, surveys, and randomized controlled trials included
Ernst (2003)[14]	Chiropractic SM	Non-spinal pain syndromes	8	No	The claim that SM is effective for such conditions is not based on data from rigorous clinical studies	(-)	Conditions included fibromyalgia, carpal tunnel syndrome, infantile colic, otitis media, dysmenorrhoea and chronic pelvic pain
Hawk (2007)[23]	Chiropractic care	Nonmusculoskeletal conditions	179	No	Evidence from controlled studies and usual practice supports chiropractic care (the entire clinical encounter) as providing benefit to patients with asthma, cervicogenic vertigo, and infantile colic.	(+)	Various clinical conditions like asthma, cervicogenic vertigo, and infantile colic and research designs
Ernst (2009)[16]	Chiropractic SM	Fibromyalgia	3	No	There is no evidence to suggest that chiropractic care is effective for fibromyalgia	(-)	Poor quality and low quantity of the primary data
Schneider (2009)[36]	Chiropractic care	Fibromyalgia syndrome	17	No	Several nonpharmacologic treatments and manual-type therapies have acceptable evidentiary support in the treatment of fibromyalgia syndrome	(+)	Systematic reviews, meta-analyses, published guidelines, and consensus document included

Shaw (2010)[47]	Chiropractic care	Whiplash-Associated Disorders	27	No	There is a baseline of evidence that suggests chiropractic care improves cervical range of motion and pain in the management of Whiplash-Associated Disorders.	(+)	Low level of scientific evidence only
Ernst (2009)[17]	Chiropractic SM	Infant colic	3	No	The totality of this evidence fails to demonstrate the effectiveness of this treatment.	(-)	Poor quality and low quantity of the primary data
Husereau (2003)[26]	Any type of SM	Infant colic	4	No	No convincing evidence	(-)	Most trials were of low methodological quality
Gotlib (2008)[21]	Chiropractic SM	Paediatric conditions	57	No	The health claims made by chiropractors with respect to the application of manipulation as a health care intervention for paediatric health conditions continue to be supported by only low levels of scientific evidence	(+/-)	Case studies, observational studies were included in this review along with RCTs.
McHardy (2008)[30]	Chiropractic manipulation	Upper extremity conditions	64	No	There is a small amount of chiropractic research into upper limb conditions that is comprised mostly of low level of evidence	(+/-)	Case reports and clinical trials included
Herd (2008)[24]	SM or mobilisation	Lateral epicondylitis	13	No	Currently, limited evidence exists to support a synthesis of any particular technique whether directed at the elbow or cervical spine.	(-)	The presence of consistent methodological flaws was reported
Hunt (2009)[44]	Chiropractic SM	Carpal tunnel syndrome	1	No	There is insufficient evidence to suggest that chiropractic is effective for the treatment of CTS. Therapy should continue to focus on the use of NSAIDs, corticosteroid injection, splinting and surgical release of the median nerve. Further research into the utility of chiropractic for CTS is required.	(-)	
Pribicevic (2010)[31]	Chiropractic manipulation	Shoulder pain	30	No	The evidence for chiropractic management of shoulder pain is limited to low level evidence in the form of case reports and case series and 1 small controlled trial.	(+/-)	Only two articles of reasonably sound methodology were included
Brantingham (2009)[8]	Manipulative therapy	Lower extremity conditions	39	No	There are a growing number of peer-reviewed studies of manipulative therapy for lower extremity disorders.	(+/-)	Low level of scientific evidence
Ernst (2008)[43]	Chiropractic SM	Hypertension	4	No	Until evidence to the contrary emerges, chiropractic spinal manipulation cannot be considered an effective treatment for hypertension	(-)	
Ernst (2011)[45]	Chiropractic care	Gastrointestinal problems	2	No	There is no supportive evidence that chiropractic is an effective treatment for gastrointestinal disorders.	(-)	

Proctor (2001)[33]	Any type of SM	Primary and secondary dysmenorrhoea	5	No	There is no evidence that SM is effective	(-)	Four of the five RCTs were of high velocity, low amplitude thrusts
Khorsan (2009)[50]	SM	Pregnancy and related conditions	12	No	Overall, this body of evidence is best described as emergent.	(+/-)	Limited evidence available
Reid (2005)[35]	Manual therapy mainly Manipulation and mobilisation	Cervicogenic dizziness	9	No	. . . there is limited evidence at present to support the use of manual therapy in treating cervicogenic dizziness	(-)	Only one of the trials was randomized
Romano (2008)[34]	Manual therapy	Idiopathic scoliosis	2	No	The lack of any kind of serious scientific data does not allow us to draw any conclusion on the efficacy of manual therapy as an efficacious technique for the treatment of adolescent idiopathic scoliosis.	(-)	Uncontrolled trials were included
Lisi (2005)[42]	Chiropractic manipulation	Lumbar disc disease	16	No	The evidence is limited, and definitive conclusions on safety and effectiveness cannot be made	(+/-)	Case reports and case series mainly
Williams (2007)[48]	SM	Psychological outcomes	12	Yes	There was some evidence that spinal manipulation improved psychological outcomes compared with verbal interventions	(+)	
Ernst (2001)[11]	SM	Any condition	8	No	The most rigorous of these studies suggest that SM is not associated with clinically-relevant specific therapeutic effects	(-)	Included only sham controlled, double-blind RCTs

Table 2.Conditions with multiple SRs

Condition	Conclusion		
	Positive	Negative	Neutral or unclear
Asthma		3	1
Fibromyalgia syndrome	1	1	
Headache	2	3	1
Infanant colic		2	
Low back pain	3	3	1
Musculoskeletal conditions	1	1	1
Neck pain	1	3	1
Nonmusculoskeletal conditions	1	1	

Table 3. Quality ratings for included systematic reviews of spinal manipulations for any medical condition

Legend: Scoring: Each Question is Scored as **1**, **0**, or **-1**.

1 means that: (a) the review states the databases used, date of most recent searches, and some mention of search terms; (b) the review searches at least 2 databases and looks at other sources; (c) the review states the criteria used for deciding which studies to include in the overview; (d) the review reports how many studies were identified by searches, numbers excluded, and appropriate reasons for excluding them; (e) the review states the criteria used for assessing the validity of the included studies; (f) the review reports validity assessment and did some type of analysis with it; (g) the report mentions that quantitative analysis was not possible and reasons that it could not be done; (h) the review performs a test for heterogeneity before pooling or does appropriate subgroup testing, appropriate sensitivity analysis, or other such analysis; (i) the conclusions made by the author(s) are supported by the data and/or analysis reported in the review.

0 means that the above mentioned criteria were partially fulfilled.

-1 means that none of the above criteria were fulfilled.

***** Operationalisation of the Oxman criteria[51], adapted from reference.[52]

Study, Year [Ref]	Search Methods? (a)	Search Comprehensive? (b)	Inclusion Criteria? (c)	Bias Avoided? (d)	Validity Criteria? (e)	Validity Assessed? (f)	Methods for Combining Studies? (g)	Appropriately Combined? (h)	Conclusions Supported? (i)	Sum
Assendelft (2004)[5]	1	1	1	1	1	1	1	1	1	9
Astin (2002)[6]	1	1	1	1	1	1	1	1	1	9
Balon (2004)[7]	1	-1	-1	-1	-1	-1	-1	-1	1	-7
Brantingham (2009)[8]	1	1	1	-1	0	0	-1	-1	-1	-1
Bronfort (2001)[9]	1	1	1	1	1	0	1	0	1	7
Bronfort (2004)[10]	1	1	1	0	1	1	1	0	0	6
Dagenais (2010)[49]	1	-1	0	1	1	1	-1	-1	0	1
Ernst (2001)[11]	1	1	1	1	1	1	1	-1	1	8
Ernst (2003)[12]	1	1	1	1	1	1	1	-1	1	8
Ernst (2003)[13]	1	1	1	1	1	1	1	-1	1	8
Ernst (2003)[14]	1	1	1	1	1	1	1	-1	1	8
Ernst (2008)[43]	1	1	1	1	1	1	-1	-1	1	7
Ernst (2009)[15]	1	1	1	1	1	1	1	-1	1	8
Ernst (2009)[16]	1	1	1	1	1	1	-1	-1	1	7
Ernst (2009)[17]	1	1	1	1	1	1	1	-1	1	8

Ernst (2011)[45]	1	1	1	1	1	1	1	-1	1	8
Fernandez-de-las-Penas (2006)[18]	1	1	0	0	1	0	1	1	1	6
Fernandez-de-las-Penas (2005)[19]	1	0	-1	-1	1	0	-1	-1	-1	-3
Ferreira (2002)[19]	1	1	1	1	1	1	1	1	1	9
Gotlib (2008)[21]	0	0	0	0	-1	-1	-1	-1	0	-4
Gross (2004)[22]	1	1	1	0	1	1	1	1	1	8
Gross (2010)[41]	1	0	1	0	1	1	1	1	1	7
Hawk (2007)[23]	1	1	0	1	1	1	-1	-1	-1	2
Herd (2008)[24]	1	1	1	1	0	0	0	0	0	4
Hestbaek (2010)[46]	1	0	1	-1	-1	-1	-1	-1	0	-3
Hondras (2002)[25]	1	1	1	1	1	1	1	1	1	9
Hunt (2009)[44]	1	1	1	1	1	1	1	1	1	9
Husereau (2003)[26]	1	1	1	1	1	1	1	1	0	8
Kaminskyj (2010)[27]	1	1	0	-1	0	0	-1	-1	0	-1
Khorsan (2009)[50]	1	1	1	1	1	0	-1	-1	1	4
Lenssinck (2004)[29]	1	1	1	1	1	1	1	0	1	8
Licciardone (2005)[40]	1	1	1	0	-1	-1	1	1	-1	2
Lisi (2005)[42]	1	1	0	0	0	0	-1	-1	-1	-1
McHardy (2008)[30]	1	1	0	0	0	0	-1	-1	0	0
Posadzki (2010)[32]	1	1	1	1	1	1	1	0	1	8
Pribicevic (2010)[31]	1	1	0	0	0	0	-1	-1	0	0
Proctor (2001)[33]	1	1	1	1	1	1	1	0	1	8
Romano (2008) [34]	1	1	0	0	-1	-1	-1	-1	0	-2
Reid (2005)[35]	1	1	0	0	1	1	1	0	0	5
Schneider (2009)[36]	1	1	0	0	0	0	-1	-1	-1	-1
Shaw (2010)[47]	1	1	0	-1	0	-1	-1	-1	-1	-3
Stuber (2008)[37]	1	1	0	0	0	0	-1	-1	0	0
Vernon (2005)[38]	1	1	0	-1	0	0	0	0	0	1
Vernon (2009)[39]	1	1	0	-1	0	0	0	0	0	1
Williams (2007)[48]	1	1	1	1	1	1	1	1	1	9

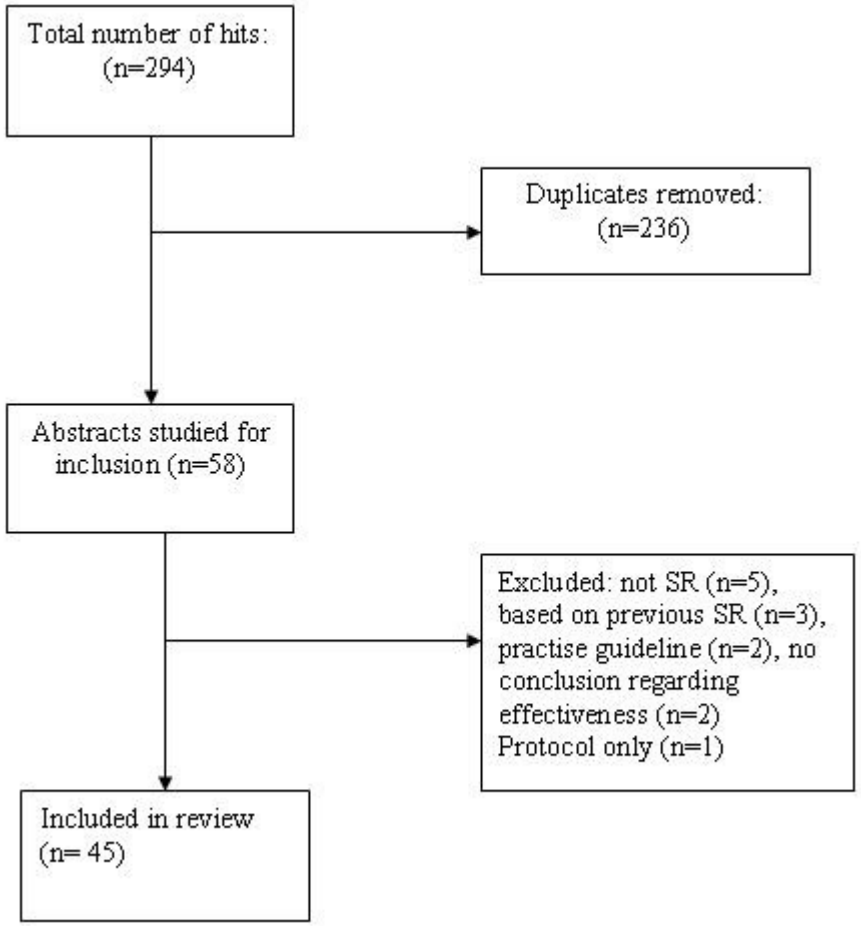
Table 4. Summary of findings

Legend: score 5–9 indicates high quality; score 4 or less indicates low quality; (-) negative; (+) positive; (+/-) equivocal

Study (year) [ref]	Published since May 2005 to January 2011	Quality of systematic review (Oxman criteria)	Chiropractors or osteopaths as 1st authors	Conclusions
Assendelft (2004)[5]		9	No	(-)
Astin (2002)[6]		9	No	(-)
Balon (2004)[7]		-7	Yes	(-)
Brantingham (2009)[8]	✓	-1	Yes	(+/-)
Bronfort (2001)[9]		7	Yes	(+)
Bronfort (2004)[10]		6	Yes	(+)
Dagenais (2010)[49]	✓	1	Yes	(+)
Ernst (2001)[11]		8	No	(-)
Ernst (2003)[12]		8	No	(-)
Ernst (2003)[13]		8	No	(-)
Ernst (2003)[14]		8	No	(-)
Ernst (2008)[43]	✓	7	No	(-)
Ernst (2009)[15]	✓	8	No	(-)
Ernst (2009)[16]	✓	7	No	(-)
Ernst (2009)[17]	✓	8	No	(-)
Ernst (2011)[45]	✓	8	No	(-)
Fernandez-de-las-Penas (2006)[18]	✓	6	No	(-)
Fernandez-de-las-Penas (2005)[19]	✓	-3	No	(+)
Ferreira (2002)[19]		9	No	(-)
Gotlib (2008)[21]	✓	-4	Yes	(+/-)
Gross (2004)[22]		8	No	(-)
Gross (2010)[41]	✓	7	No	(+/-)
Hawk (2007)[23]	✓	2	Yes	(+)
Herd (2008)[24]	✓	4	No	(-)
Hestbaek (2010)[46]	✓	-3	Yes	(+/-)
Hondras (2002)[25]		9	Yes	(-)
Hunt (2009)[44]	✓	9	No	(-)

Husereau (2003)[26]		8	No	(-)
Kaminskyj (2010)[27]	✓	-1	Yes	(+/-)
Khorsan (2009)[50]	✓	4	No	(+/-)
Lenssinck (2004)[29]		8	No	(-)
Licciardone (2005)[40]	✓	2	Yes	(+)
Lisi (2005)[42]	✓	-1	Yes	(+/-)
McHardy (2008)[30]	✓	0	Yes	(+/-)
Posadzki (2010)[32]	✓	8	No	(-)
Pribicevic (2010)[31]	✓	0	Yes	(+/-)
Proctor (2001)[33]		8	No	(-)
Romano (2008)[34]	✓	-2	No	(-)
Reid (2005)[35]		5	No	(-)
Schneider (2009)[36]	✓	-1	Yes	(+)
Shaw (2010)[47]	✓	-3	No	(+)
Stuber (2008)[37]	✓	0	Yes	(+/-)
Vernon (2005)[38]	✓	1	Yes	(-)
Vernon (2009)[39]	✓	1	Yes	(+)
Williams (2007)[48]	✓	9	No	(+)

Figure 1. Flowchart of eligibility assessment and inclusion



Discussion

In the last decade, dozens of systematic reviews have assessed the value of SM in a wide variety of clinical conditions. Our own SR is now out-dated,[4] and the present article is an attempt to update it. Twenty nine SRs have been published[8;15-19;21;23;24;27;28;30-32;34;36-49] since our previous assessment. [4] Nine of those 29 SRs suggested that SM is effective[8;19;23;36;39;40 48 47;49] and twenty failed to do so.[15-18;21;24;27;28;30-32;34;37;38;41-46] Therefore, most of these SRs failed to produce convincing evidence to suggest that SM is of therapeutic value.

We have previously shown that the conclusions of SRs of SM for back pain appear to be influenced by authorship and methodological quality. Osteopaths or chiropractors tend to publish low methodological quality systematic reviews associated with positive conclusions (Table 3 and 4). Seven (38%) of the 18 SRs published either by chiropractors or osteopaths arrived at overtly positive conclusions[8;9;23;36;39;40;49] and 11 (62%) arrived at negative or equivocal conclusions.[7;10;21;25;27;30;31;37;38;42;46] Twenty four (88%) of the 27 SRs by independent research groups reached negative or equivocal conclusions.[5-8;11-18;20-22;24-35;37;38;41-46] Only three (12%) arrived at positive conclusions.[19;47;48]

The present analysis has several limitations that should be considered when interpreting its conclusions. Even though a thorough search strategy was employed, there is no guarantee that all relevant articles were located. The validity of conducting a SR of SR has its limitations; all SRs are prone to publication bias within the primary research data which they include and therefore any such bias may have been inherited in our study. Thirteen of the SR were from our unit; this fact might have introduced bias in our evaluation.

In conclusion, the notion that SM is an effective treatment option for any condition is currently not based on the evidence from rigorous SRs.

Competing interests: None.

Source of funding: PP has a Fellowship from Pilkington Family Trust.

Author information: Paul Posadzki, Honorary University Fellow; Edzard Ernst, Director; Complementary Medicine, Peninsula Medical School, Universities of Exeter & Plymouth, Exeter, UK

Correspondence: Paul Posadzki, Complementary Medicine, Peninsula Medical School, Universities of Exeter & Plymouth, 25 Victoria Park Road, Exeter EX2 4NT UK. Fax: +44 (0)1392 427562; email: Paul.Posadzki@pcmd.ac.uk

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THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

CPR in New Zealand hospitals: an alternate perspective on lawfulness and ways to improve practice

MaryLeigh Moore, Kate Grundy

Abstract

The current approach to CPR in New Zealand hospitals is that it is attempted on all patients in cardiac arrest unless a DNR order is in place. Concern has been raised that this approach results in some "unlawful" CPR on the grounds that it is not in the patient's best interests. It has been suggested that policy change is required and one suggestion is a move away from DNR orders to mandatory "For CPR" orders. Ensuring lawfulness of CPR and more importantly quality care for patients is however more likely to be achieved not by policy change but by improved understanding by doctors and patients of the nature of these decisions, and by training programmes and work environments which value and facilitate difficult conversations, mutually respectful relationships and shared decisions.

The article by McLennan et al[1] provides an instructive summary of the development of CPR and the current policies and practice in relation to CPR and DNR orders in New Zealand (NZ) hospitals, and along with the accompanying editorial by Freebairn[2] highlights some significant issues.

The standard approach as outlined by those authors is "for CPR to be attempted on all patients having a cardiac arrest unless a DNR order is in place." The authors suggest that the current approach is "not consistent with New Zealand law." Their main concern appears to be that "current policies do not direct clinicians to consider whether CPR is clinically indicated or appropriate at time of arrest" and as a result they suggest that some CPR provided in NZ is unlawful. The basis for this claim is that CPR on at least some occasions fails to meet legal requirements which justify its provision because it "cannot reasonably be regarded as in the patient's best interests".

The authors conclude that policies should be reviewed so that they are "in accordance with criteria provided by New Zealand law" and brought "into line with the Code of Rights and the New Zealand law generally", although do not suggest how this could be done. Freebairn suggests a policy change involving a move from DNR orders to a "For CPR" policy where all potentially resuscitatable patients are identified at admission.

Before considering the merits and limitations of legal arguments in relation to CPR it is useful to consider the clinical context. Decisions about CPR are different from other clinical treatment decisions mainly because cardio-respiratory arrest is the most time-critical of all clinical scenarios. Patients in arrest can never make decisions for themselves and so clinicians must make decisions on their behalf. The decision, in order to maximise the chance of the best outcome, needs to be made instantly and there is no time to consider clinical matters, let alone legal ones. Hence the default

position is to start CPR unless there is clear previously established justification for not doing so.

The time-pressure and the seriousness of these decisions make it sensible for both clinicians and patients to make decisions in advance where possible. DNR orders are advance decisions which authorise rejection of the default position. Practically these DNR orders must be able to be relied on by clinicians at the time of arrest without consideration of their origin. The recommendation by McLennan et al that two separate forms are used, distinguishing patient-initiated from medically-initiated orders, would have no practical impact as each would still result in CPR being withheld. The distinction however remains important for other reasons and will be discussed later.

Advance CPR/DNR decisions present a major challenge for both clinicians and patients given that they involve future predictions, probabilities rather than certainties, and value judgements. If clinicians and patients are to make them together, potentially challenging conversations are required. In his editorial Freebairn provided two powerful and poignant examples of poor practice which illustrate just how difficult these decisions and conversations are, and perhaps also confusion and ambivalence among clinicians about best practice.[3–5]

Historically, clinical decisions including those relating to CPR have been seen as predominantly or exclusively medical decisions. However views about this are changing and clinical practice is also changing in some areas. This is in part in recognition that outcomes cannot be reliably predicted or objectively described. Acceptability and "appropriateness" of risks, probabilities, treatments and outcomes are determined not only by medical values but also by patients' values. As discussed later this is important in both clinical and legal determinations of patients' "best interests". Also, in the case of CPR these decisions potentially involve that most profoundly personal of matters—one's own death. The literature on patient and clinician preferences, both in relation to CPR and to conversations about CPR, confirms this.[6–10] It is full of inconsistency and contradiction and therefore of limited use other than to reinforce the fact that highly personal and variable views should be expected from both patients and clinicians.

Legal considerations:

Relevant law can be summarised as follows:[11]

- A competent patient has the right to refuse treatment (including CPR) but has no corresponding right to receive treatment which is not offered.
- Refusals of treatment (generally) can be contemporaneous or made in advance.
- Treatments may be lawfully not offered by providers (individuals and organisations) based on clinical grounds and on resource limitations.
- CPR may be lawfully provided without the contemporaneous consent of the patient provided there is legal justification for proceeding, but in the absence of such justification will be unlawful.
- CPR will be unlawful in the face of a valid advance patient refusal.

- CPR may be lawfully withheld where there is lawful excuse for failing to provide it, such as a valid patient refusal and/or where it is in keeping with good medical practice.
- Withholding CPR will be unlawful in the absence of such a lawful excuse.

Patients, clinicians and legal authorities face different questions at different times and will therefore have different approaches to answering them. Generally speaking patients and doctors make both contemporaneous and advance (prospective) decisions. Clearly patients can never make contemporaneous decisions about CPR, and therefore the only way patients can influence these decisions is by making advance (prior or anticipatory) decisions.

By comparison, the courts and the Health and Disability Commissioner mostly make retrospective decisions. Decisions are reached after the fact whether an act was unlawful or breached the Code of Rights. Prospective decisions are made by the courts, but are uncommon. Where no prospective decision has been made lawfulness is determined after the event.

Providing CPR

Given the impossibility of contemporaneous consent, CPR may only be provided where legal justification exists for proceeding without consent, referred to legally as an exception (to the normal requirement for consent). In relation to CPR, justification is found both in the common law and in the Code of Rights. The common law exception involves what is known as the "principle of necessity". The basis of this doctrine is that "acting unlawfully is justified if the resulting good effect materially outweighs the consequences of adhering strictly to the law."[12] In those circumstances "The doctor is justified, and should not have any criminal or civil liability imposed upon him, if the value which he seeks to protect is of greater weight than the wrongful act he performs—that is, treating without consent."[13]

Provision of CPR without consent seeks to protect life and places greater value on this than on consent per se. In reference to necessity as a defence Justice Tipping stated that it involves "a hard choice between competing values and the sacrifice of one to the other."[14] This appears to perfectly capture the essence of current policy and practice in relation to CPR. It should not however be regarded as abolishing the right of a patient to refuse treatment and should not therefore be relied upon to justify CPR in the presence of a known valid advance refusal of CPR.

The relevant exception under the Code of Rights is where a patient (consumer) is incompetent and therefore unable to provide consent. Treatment is allowed in those circumstances although other requirements also need to be met for the treatment to be lawful. These are outlined in Right 7(4) of the Code and include a requirement that the treatment (service) is in the "best interests" of the patient. It is this best interests requirement that is the source of concern to McLennan et al and the basis of the assertion that some currently performed CPR is unlawful.

There is no reason to challenge the legal requirement that a treatment provided to a patient in the absence of consent should be in that patient's best interests. It should also be uncontroversial as a guiding ethical principle. This does not however mean that it is unproblematic in its application. Just as advance decisions are difficult

because they require future predictions and involve value-judgements, so too best interests determinations are inherently difficult.

Legally as well as ethically they are regarded as incorporating not only medical judgements but also consideration of patients' values and perspectives. Case law supports interpreting the best interests principle as involving a broad assessment of both medical and non-medical interests. A two stage approach is recommended where firstly doctors must act in accordance with proper professional standards, and second they must act in the best interests of the patient where "best interests encompasses medical, emotional and all other welfare issues."[15]

There will often be doubt as to whether or not attempting CPR is in the best interests of a patient. Proceeding with CPR when it is clearly not in the patient's best interests should indeed be unlawful. It is also both unethical and bad medicine. It may be true as McLennan et al suggest that current policy results in CPR being commenced with no consideration of best interests but it is far from clear or established that this makes it unlawful especially given that in the event of arrest there is simply no time to consider this. Best interests should however be considered once CPR has been commenced when deciding whether to continue CPR and for how long. Best interests can and must also be considered in circumstances where time permits, such as when making advance decisions on behalf of incompetent patients and in conjunction with competent patients.

Withholding CPR

Under common law and the Crimes Act 1961 CPR may be regarded as a "necessary of life" and doctors therefore as having a legal duty to provide it unless there is a lawful excuse not to. DNR orders are the most common mechanism by which advance clinical decisions to withhold CPR are made and communicated. DNR orders can be categorised as "patient-initiated" and "medically-initiated" and each can be made by either party alone or by both parties together. Ideally they are "by mutual agreement" although of course this is not always possible. Not uncommonly, the process and participants in the decision are not apparent. In addition some forms and orders are poorly constructed, confusing and contradictory.

Patient-initiated orders enable patients to refuse CPR. Where valid they provide lawful excuse for CPR to be withheld. Valid advance refusals by patients should be considered as having the same legal force and authority as valid (informed, competent and voluntary) contemporaneous refusals of treatment. Notwithstanding the added difficulty of establishing the validity of an advance refusal, in the absence of reasonable grounds to doubt its validity it should ordinarily be honoured. This is the reason that CPR provided in the face of a known valid advance refusal of consent, as represented by a patient-initiated DNR order or other advance directive (AD), will be unlawful.

Establishing the validity of an AD is however no easy matter, and there is no specific NZ case law or clear guidance from case law in other jurisdictions. There are in legal terms four requirements for an AD to be valid: the individual had to be competent to make the particular decision at the time the decision was made, the decision had to be free from undue influence, the individual had to intend the directive or choice to apply to the present circumstances (this criterion likely incorporates the requirement that the

individual was sufficiently informed at the time of making the AD) and the existence and validity of the AD must be clearly established.[16,17] It is easy to see how advance directives (including DNR orders) if made by patients in isolation from health professionals are, and should be, vulnerable to both legal and ethical challenge. For this reason, as well as others, shared decision-making models have distinct advantages.[18–20]

Debatably, more interesting questions however arise in relation to DNR orders (whether termed medically-initiated or not) made by doctors in relation to competent patients in isolation from the patient concerned. These orders pose interesting questions in terms of their authority and legal validity and therefore also in terms of their currency as providing lawful excuse for withholding CPR. DNR decisions made unilaterally by doctors have been largely accepted as consistent with good medical practice and subjected to much less scrutiny than advance decisions made by patients. Additionally the withholding of CPR of itself (as well as the practice of making unilateral decisions) is defended on the grounds that it is consistent with good medical practice, and of course in very many circumstances it is.

Several justifications have been offered for both these practices. It is claimed that doctors are better informed to make CPR/DNR decisions than patients.[21] However if it is accepted that these decisions should take account of patients' best interests and best interests are determined by patients' values and preferences as well as medical judgements then this justification loses some force on the grounds that doctors making decisions in isolation from patients are inadequately informed.

Another justification offered is that there is no general requirement to seek consent from a patient to not receive a treatment which is not offered, including where it is not offered on clinical grounds. Patient consent is not sought or required to not receive other non-indicated or not "appropriate" treatments, for example such as antibiotics in viral infection. In addition there is no requirement for other advance "Not for treatment" orders. There are flaws however in these arguments. Firstly, the majority of other treatment decisions ordinarily allow time for discussion with patients meaning there is no need for decisions and orders in advance. Secondly these arguments continue to present the decisions as if they are clear cut objective medical decisions in which there is no place for patient preferences. While this might be true in some circumstances it is certainly not true in all.

Not only do unilaterally made DNR orders in relation to competent patients raise important questions about their moral and legal authority and validity as providing lawful excuse for withholding CPR, they also potentially breach patients' rights to information under Right 6 of the Code. They appear to warrant at least as much, if not more, critical consideration as the concerns raised by McLennan et al. Of additional concern are the potential impacts on relationships between doctors and patients. Decisions made in isolation from competent patients not only remove opportunity for discussion but also potentially undermine trust. Shared decisions by comparison build relationships based on mutual respect and trust and are likely also to improve patient care.

The proposal for policy change

The policy change proposed by Freebairn involves a move from DNR orders to "For CPR" orders in those cases where it is considered that CPR should be performed. If a policy encouraged "For CPR" orders in patients to be resuscitated, but did not require mandatory orders to be made in advance in all patients, whether to prevent or to mandate CPR, then it would be unlikely to alter current practice. Where there was no pre-existing order the urgency and uncertainty would likely result in CPR continuing to be commenced as a default until the situation could be clarified. In addition there could be a risk that the existence of "For CPR" orders in some would delay the initiation of CPR while the form was being sought. This could result not only in poorer outcomes as a result of delays in commencing CPR but also in the ultimate harm of preventable deaths of individuals who would have benefited from timely CPR.

The other major implication of such a policy would be in relation to conversations with patients. Should a conversation be mandatory with any patient for whom the doctor intends to complete a "For CPR" order? If so, there would be many debatably unnecessary and token conversations with patients confirming a commitment to preserving their lives and well-being. If not, then we continue to fail to respect the rights of patients to be involved in decisions about their own health care and to presume we know what our patients want. Regardless, a "For CPR" policy and conversations targeted at these orders would do nothing to facilitate the more difficult and important conversations with patients where potentially life-prolonging treatments might be either unwanted or unsuccessful or the benefits unclear.

Those patients most in need of and deserving of time and discussion about their diagnosis, prognosis, treatment options and wishes may well continue to be relatively neglected because of both the difficulty of these conversations and persisting beliefs that they are medical decisions which need not involve patients.

An alternate way forward to improve practice

The arguments that current CPR policy and practice are inconsistent with NZ law, that some CPR is unlawful, and that policy should be changed are intriguing but unconvincing. If the intention of the authors was to provoke change and improve practice there are almost certainly better ways to achieve this.

Conversations and decisions in relation to CPR are without doubt difficult, but they are necessary. Conversations about CPR should rarely if ever occur as isolated stand-alone discussions. They belong within wider conversations where patients are provided the opportunity to appreciate the seriousness of their situations, to share their fears, concerns and hopes, and to plan and share in decisions about their future care. Genuine fears by doctors that such conversations can be harmful to patients need to be balanced by an appreciation that patients are also harmed, debatably to a greater extent, by being denied these conversations.[22]

Reluctance by doctors to discuss these issues because they feel inadequately prepared and find them simply too difficult would be resolved by increased education, training and support such that doctors become more skilled, competent and confident. Education and training should be directed at communication skills and the legal and

ethical issues and frameworks for decision-making. Strategies for education and training, along with attention to the quality of documents recording both patients' preferences and clinical decisions are currently being considered by, amongst others, those promoting Advance Care Planning (ACP)[23,24] in New Zealand.

None of the questions posed above in relation to advance decisions (DNR orders) is intended to suggest that doctors and their professional judgements should be less present in CPR/DNR decisions. Ideally these decisions will be made as shared decisions. Where that is not possible, but time and circumstance permit, decisions should be motivated by careful consideration of patients' best interests, and where that is not possible, made at least with compassion and respect. The practical constraints of the clinical context and work environment will always impact on practice and warrant consideration not only by clinicians when contemplating their own and their colleagues practice, but also when clinical practice is subjected to legal and ethical scrutiny.

It is unknown, and debatably unknowable, whether CPR in New Zealand is being performed too much or too little, or in keeping with best practice. There will always be room for scrutiny and debate, and for improvement. We should not lose sight of the fact that CPR remains a potentially life-prolonging medical treatment with potential to produce both great good as well as harm.[25]

As with all treatment interventions, decisions should ideally be made on an individual basis. The time-critical nature and predictive uncertainty of CPR/DNR decisions will always produce imperfect decisions and require policy and advance orders to guide action. In an arrest where the situation is instantly life-threatening and there is genuine doubt if intervening (commencing CPR) is in the patient's best interests the presumption in favour of intervention should stand.

Competing interests: None.

Author information: MaryLeigh Moore, Senior Lecturer – Medical Law and Ethics, University of Otago, Christchurch: Kate Grundy, Palliative Medicine Physician and Clinical Director, Christchurch Hospital Palliative Care Service, Christchurch

Correspondence: Dr MaryLeigh Moore, Senior Lecturer – Medical Law and Ethics, University of Otago, Christchurch, PO Box 4345, Christchurch 8140, New Zealand. Email: maryleigh.moore@otago.ac.nz

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A large tricuspid valve mass associated with rectal carcinoma

Kugathasan Nadarasa, Victor H T Chen, Sean Galvin, Antje van der Linden

We describe a case of a large mass attached to the tricuspid valve in a patient with rectal carcinoma with some problematic diagnostic and management issues posed.

Case report

A 65-year-old female was admitted acutely to a surgical ward with rectal bleeding for 2 days, shortness of breath, and fevers with constitutional illness for several weeks. On examination, the patient had fever to 39°C, tachycardia of 100/min, and blood pressure 110/80 mmHg. Cardiovascular examination revealed nailbed splinter haemorrhages, elevated jugular venous pressure (JVP) with abnormal Kussmaul's sign, and a new 3/6 pansystolic murmur loudest in inspiration at the lower left sternal border.

Lungfields were clear to auscultation but there was heart failure with marked congestion of lower limbs and abdomen. Her liver was enlarged, tender and pulsatile. She was without other significant abdominal findings, masses but rectal examination revealed a fragile bleeding polypoid mass.

Laboratory findings were of a microcytic anaemia, haemoglobin concentration 88 g/L, MCV of 78fL, white blood cell count was 12×10^9/L with a neutrophil leucocytosis. CRP was 370 mg/L. Urine and eight sets of blood cultures all grew penicillin-sensitive *Streptococcus agalactiae* (MIC<0.025mg/L).

Figure 1

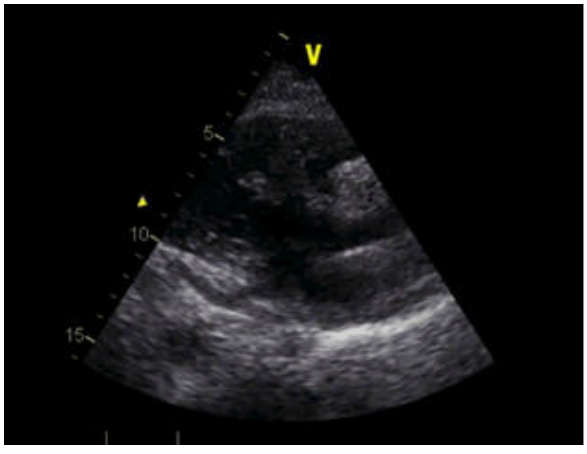
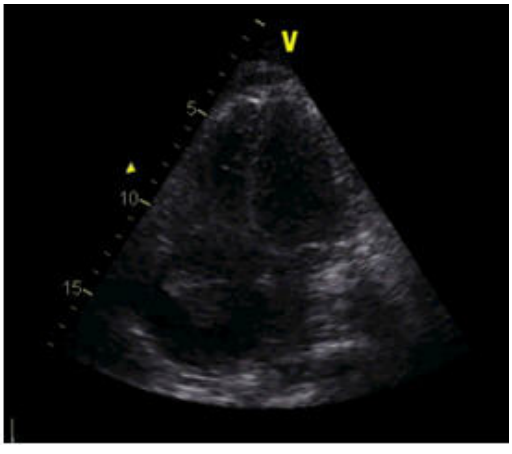


Figure 2



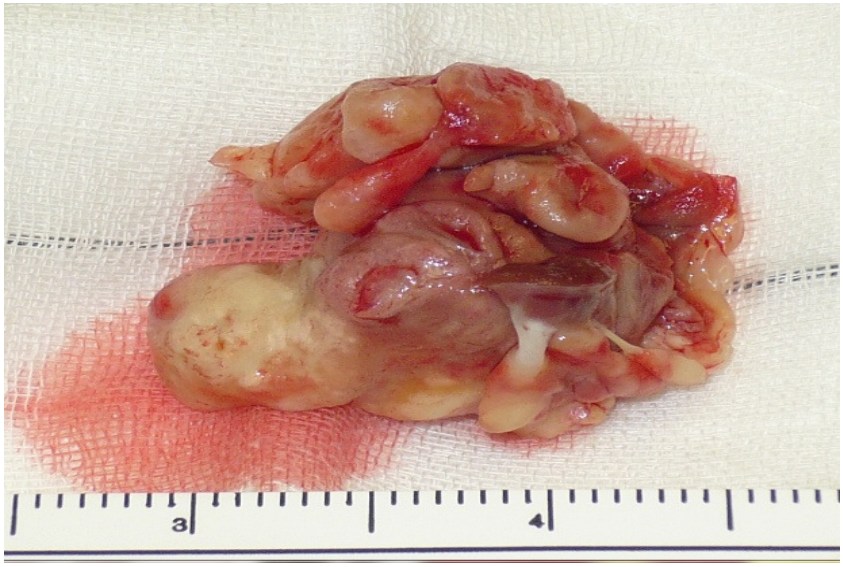
A transthoracic echocardiogram showed a large (5×4 cm), lobulated, mobile mass, partially obstructing the tricuspid valve, prolapsing into the right ventricle during diastole (Figure 1). There was severe 4+ tricuspid regurgitation with systolic flow reversal in the hepatic vein, features of marked elevation of right atrial pressure, and right ventricular systolic function was mildly impaired.

The mass (vegetation vs metastasis) seen in right atrium in the echo four-chamber view had attachment to the septal leaflet of the tricuspid valve (Figure 2).

The patient was treated for native valve *S. agalactiae* endocarditis but without any interval change of the cardiac mass on echo, and with persisting 4+ tricuspid regurgitation and no resolution of heart failure signs, lower limb and abdominal congestion. Rectal cancer staging and grading suggested possibility of cure apart from uncertainty about the cardiac mass. The dilemma was whether to proceed to definitive surgical management of the rectal cancer or the cardiac lesion first.

After discussion, the patient initially underwent cardiac surgery with resection of the tricuspid valve and replacement with a 31 mm Mosaic (Medtronic) porcine heterograft. At surgery, appearance of the mass was thought atypical for endocarditis (Figure 3) microscopic examination and histology showed Gram-positive cocci with no features of malignancy and tissue culture continued to grow *S. agalactiae*.

Figure 3



She underwent subsequent successful surgical management of rectal carcinoma with preoperative radiotherapy. She remains disease-free of cardiac and cancer problems at 12 months' follow up.

Discussion

Cardiac metastases from colorectal cancer is uncommon but has been previously described, usually representing very disseminated advanced disease.

S. agalactiae is an uncommon cause of native tricuspid valve infective endocarditis (IE) in the absence of predisposing conditions such as intravenous drug abuse, diabetes mellitus, alcoholism, or pregnancy.[1] However, the demographic characteristics and outcome of *S. agalactiae* IE have changed over time.

The overall incidence of *S. agalactiae* IE is 1.7% with a range of 1.2%–1.9% among hospitalised patients. The median annual prevalence of *S. agalactiae* IE is 1.3 cases per 1,000,000 inhabitants.[2] In a detailed review with 145 cases of *S. agalactiae* IE by Sambola et al, the mitral valve was the most frequently involved valve (85%), the least affected valve was tricuspid (11%) and there was a high mortality rate (85%).[3]

S. agalactiae IE is an aggressive disease with a high rate of local and systemic complications. The incidence of emboli is very high (50%) compared with other IEs. Cardiac surgery is usually required because of heart failure and embolism. Another important characteristic of *S. agalactiae* is that it is uniformly susceptible to penicillin (MIC<0.1μg/ml).[4]

The association between *S. agalactiae* IE and villous adenoma of the rectum was first reported by Alan et al in their two case reports.[5]

It is well known that *Streptococcus bovis* bacteraemia or IE is associated with colonic villous adenoma or carcinoma. This prompted to screen all patient with IE due to *S. bovis* with colonoscopy.[6] As far as we know this is the first case report of rectal carcinoma that is associated with *S. agalactiae* IE. This raises a question of need for routine colonic screening in these cases.

Author information: Kugathasan Nadarasa, Advanced Trainee and Research Fellow in Cardiology, Department of Cardiology, Dunedin Public Hospital, Dunedin; Victor H T Chen, Interventional Cardiologist, Department of Cardiology, Dunedin Public Hospital, Dunedin; Sean Galvin, Registrar, Department of Cardiothoracic Surgery, Dunedin Public Hospital, Dunedin; Antje van der Linde, Senior Lecturer, Department of Pathology, Dunedin School of Medicine, University of Otago, Dunedin

Correspondence: Dr N Kugathasan, Department of Cardiology, Dunedin Public Hospital, 201 Great King Street, Dunedin 9016, New Zealand. Email: kuganvenu@yahoo.com

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THE NEW ZEALAND MEDICAL JOURNAL
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A case of tricuspid valve endocarditis due to *Burkholderia cepacia* complex

Deborah A Williamson, Stephen J McBride

Abstract

Burkholderia cepacia complex organisms are environmental Gram-negative bacteria which rarely cause disease in otherwise immunocompetent individuals. We describe a case of tricuspid valve endocarditis secondary to *B. cepacia* complex in an injecting intravenous drug user in Auckland, New Zealand.

A 44-year-old man was admitted to Auckland City Hospital (Auckland, New Zealand) with a history of several days of fever, rigors and right-sided pleuritic chest pain. His past history was remarkable for long-standing and ongoing intravenous drug use.

On examination he was afebrile, and his other observations were within normal limits. On palpation, there was significant right-sided chest wall discomfort, and auscultation revealed a soft pan-systolic murmur. Initial investigations revealed a mild anaemia (haemoglobin 128 g/L; normal range 132–172 g/L) and mild neutrophilia (total white blood cell count 13.66×10^9/L (normal range 4.10–11.20×10^9/L), segmented neutrophils 11.88×10^9/L (normal range 1.9–7.5). A chest X-ray showed right basal atelectasis, and intravenous amoxicillin-clavulanate and oral roxithromycin were commenced for presumed community-acquired pneumonia. Blood cultures were not taken prior to the initiation of therapy.

In view of his history and clinical findings, a transthoracic echocardiogram was arranged. On several images, thickening of the anterior leaflet of the tricuspid valve was observed, with associated tricuspid regurgitation. No other significant abnormalities were demonstrated. Echocardiogram images were thought to be consistent with, but not diagnostic of, tricuspid valve endocarditis.

In order to establish the causative pathogen, intravenous antibiotics were stopped, and multiple blood cultures were taken over the following days. The patient remained afebrile and his symptoms settled. He wished to leave hospital, and was therefore discharged eight days post-admission, at which time his blood cultures remained sterile.

Three days later however, two of the sets of blood cultures grew Gram-negative bacilli, and he was recalled to hospital. On examination, he was febrile at 38.1°C with no other new findings. Further blood cultures were obtained and he was commenced on empirical therapy with ceftriaxone and gentamicin.

The following day, the isolate grew aerobically on blood and MacConkey agar as a non-pigmented, non-lactose-fermenting, oxidase-positive Gram-negative bacillus. Using the API 20NE kit (bioMerieux), the organism was identified as belonging to the *Burkholderia cepacia* complex.[1] The isolate was sent to a reference laboratory for

analysis of the *recA* gene sequence. This identified the organism as *Burkholderia lata*, a recently described member of the *B. cepacia* complex.[2]

Antimicrobial susceptibility testing was performed using the agar dilution breakpoint method, which demonstrated resistance to gentamicin, ceftriaxone, ticarcillin/clavulanate, tobramycin, and colistin, intermediate susceptibility to amikacin, and susceptibility to cotrimoxazole, ciprofloxacin and meropenem.[3] In light of these findings, therapy was altered to intravenous meropenem and cotrimoxazole. Both antibiotics were given for a total of 42 days.

In all, five sets of blood cultures taken over a 24 hour period grew *B. cepacia* complex. In view of the clinical findings, echocardiograph abnormalities and persistently positive blood cultures, a definite diagnosis of native tricuspid valve endocarditis was made according to the modified Duke criteria.[4]

The patient left hospital following completion of treatment, and has not re-presented to Auckland City Hospital.

Burkholderia cepacia complex (formerly named *Pseudomonas cepacia*) organisms are a group of nine closely-related species of aerobic environmental Gram-negative bacteria.[5] They are most frequently encountered as pulmonary pathogens in patients with cystic fibrosis, but have also been reported to cause outbreaks of nosocomial infection, often attributed to contaminated medical devices or solutions.[6,7]

B. cepacia complex organisms are extremely rare causes of endocarditis, with only eleven cases reported to date in the English language literature.[8] Seven of these infections occurred on native valves, and in six instances, patients were intravenous drug users. It seems probable that these patients acquired their infections due to injection of environmentally-contaminated material.

Nosocomial cross-transmission of *B. cepacia* complex causing prosthetic valve endocarditis has been suggested in one case series, but to date there have been no documented epidemiological links between cases of native valve *B.cepacia* complex endocarditis.[9] This scenario, however, is conceivable if drug-using equipment was shared between intravenous drug users.

In summary, this report describes a case of infective endocarditis caused by an unusual pathogen, and illustrates the need for multiple blood cultures to be obtained prior to commencing antibiotic treatment in intravenous drug users and in patients who present with clinical signs of endocarditis.

Author information: Deborah A Williamson, Microbiology Registrar, Department of Microbiology, Auckland District Health Board, Auckland; Stephen J McBride, Infectious Diseases Physician, Department of Infectious Diseases, Counties Manukau District Health Board, Auckland

Correspondence: Deborah A Williamson, Microbiology Registrar, Department of Microbiology, Auckland District Health Board, Auckland, New Zealand. Email: dwilliamson@adhb.govt.nz

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THE NEW ZEALAND MEDICAL JOURNAL
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Cutaneous manifestation of decompression sickness: cutis marmorata

Mesut Mutluoglu, Hakan Ay, Gunalp Uzun

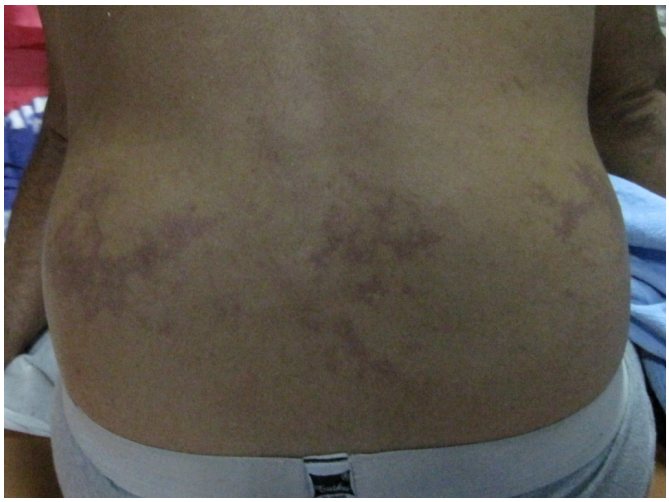
A 39-year-old male commercial diver, who developed neurologic symptoms after diving, was transferred to our department 5 hours after the onset of the symptoms.

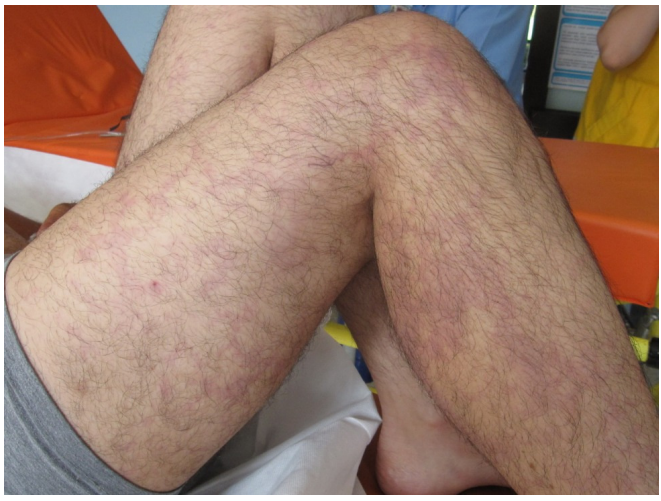
The diver performed two repetitive dives to a depth of 27 metres (90 feet); 50 minutes bottom time for each dive. He had omitted the usual surface interval (resting near the surface) between the dives; the dive profile was otherwise unremarkable.

On examination, he had sharp joint pain, hypoesthesia and weakness of his lower limbs, hearing loss and a widespread marbling rash (cutis marmorata) on his epigastrium, thighs and lower limbs (Figures 1 & 2).

He was diagnosed as Type II Decompression Sickness and treated with United States Navy Treatment Table 6. Joint pain and hearing loss resolved and the rash significantly faded after the recompression therapy.

Figures 1 & 2. Widespread marbling rash on his back and legs





Cutis marmorata is a distinct cutaneous manifestation of decompression sickness. It is easily recognised by its typical mottled, marbling violaceous appearance. It may start as an intense multifocal itching that is followed by a generalised hyperaemia which in turn progresses to irregular dark violet or purple patches.

Although not fully established, it is accepted that cutis marmorata is caused by vascular congestion which in turn is thought to be triggered by vascular inflammation secondary to the development of intravascular gas bubbles.[1]

Cutis marmorata is usually transient and does not require any means of treatment in itself; however, because it is a warning sign of a more severe manifestation of decompression sickness it needs close follow-up.[2]

Author information: Mesut Mutluoglu, Underwater and Hyperbaric Medicine Specialist; Hakan Ay, Associate Professor; Gunalp Uzun, Associate Professor; Department of Underwater and Hyperbaric Medicine, Gulhane Military Medical Academy Haydarpasa Teaching Hospital, 34668, Uskudar, Istanbul, Turkey

Correspondence: Dr Gunalp Uzun, GATA Haydarpasa Egitim Hastanesi, 34668, Uskudar, Istanbul, Turkey. Fax: +90 216 3487880; email: gunalpuzun@gmail.com

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New Zealand's shocking diabetes rates can be reduced—9 urgently needed actions

New Zealand has alarmingly high rates of diabetes and compares very poorly with other OECD countries, as reported in the *Lancet* in June.[1] Diabetes is a burden borne disproportionately by Māori, Pacific and low-income New Zealanders. Yet, obesity, which alone accounts for more than 80% of preventable diabetes in New Zealand,[2] is not being vigorously addressed in this country, despite good evidence about effective interventions.

Between 1989 and 1997 the average weight gain in adult New Zealanders was 3.2 kg,[3] and the results of the latest Adult Nutrition Survey, to be released in September, are likely to show that this harmful trend is continuing. The results of the 2006/07 Health Survey showed that 63% of New Zealand adults were either overweight or obese.[4]

The direct healthcare costs of obesity are estimated to be between 2–7% of the annual healthcare budget,[5] and this will balloon out of control if New Zealand's weight gain is not reversed. In New Zealand, population approaches to reduce the burden of obesity have been systematically cut in the last 3 years; for example, the National Healthy Eating Health Action Strategy is no more, Mission On has disappeared, and the requirement for schools to provide healthy food has been abolished. On the other hand, bariatric surgery is booming.

Organised, effective action is desperately needed to address obesity. We have identified the following:

- First, develop and implement a national nutrition and physical activity strategy as World Health Organization (WHO) advises.[6]
- Second, reinstate the requirement for schools to sell healthy food. While there has been no systematic evaluation of the impact of this requirement, several pieces of information suggest that it was having a positive impact on school food environments and that it enjoyed widespread support.[7,8]
- Third, support the introduction of a simple front-of-pack traffic light nutrition labelling system as recommended in the Review of Food Labelling Law and Policy (the Blewett Report).[9] This would encourage the food industry to reformulate their products[10] and provide labelling easily understood by all New Zealanders.[11,12]
- Fourth, ensure low-income New Zealanders have enough money to purchase a healthy diet. This could include ensuring beneficiaries receive their full and correct benefit entitlements[13] and providing the In-work Tax Credit for families with children regardless of their employment situation, as recently suggested by the Child Poverty Action Group.[14]
- Fifth, continue work on promoting physical activity and reducing sedentary behaviour. Since the mid-1990s New Zealand has enjoyed strong national

leadership and guidance in physical activity health promotion from Sport and Recreation New Zealand (SPARC). Now, SPARC has focussed on sport, including high-performance sport, leaving no leadership in this area for the vast majority of New Zealanders. This includes the loss of the highly-successful Push Play programme.

- Sixth, continue the excellent healthy nutrition social marketing campaigns undertaken by the Health Sponsorship Council and extend them to physical activity.
- Seventh, ban the marketing of junk food to children. There is overwhelming public support for such intervention.[15] This should include regulation of the current self-regulatory system governing advertising which has been described by public health experts as 'wolves guarding the henhouses'.[16]
- Eighth, pushing for change in the food and beverage industry, including strengthening national regulation, as recommended for the September United Nations General Assembly high-level meeting on prevention and control of non-communicable diseases worldwide.[17]
- Ninth, all these initiatives need to be considered in the light of policies aimed at reducing health inequities in New Zealand, particularly those related to child health.[18]

These actions are urgently needed. Failure to address them and reduce obesity will be; costly to governments because of the immense associated health costs and losses in human productivity; costly to business through failure to maintain a healthy workforce; but ultimately the greatest cost will be to individuals who suffer the burden of poor health and earlier death.

Louise Signal
Director, Health Promotion and Policy Research Unit
University of Otago, Wellington

Riz Firestone
Centre for Public Health Research, Massey University

Jim Mann
Director of the Edgar National Centre for Diabetes and Obesity Research
University of Otago, Dunedin

Cliona Ni Mhurchu
Clinical Trials Research Unit, University of Auckland

Ross Lawrenson
Department of Primary Care, University of Auckland

Rinki Murphy
Diabetes Physician, Senior Lecturer in Medicine, University of Auckland

Grant Schofield
Director of the Centre for Physical Activity and Nutrition
Auckland University of Technology

Norman Sharpe
Medical Director, National Heart Foundation, Auckland

C Murray Skeaff
Department of Human Nutrition, University of Otago, Dunedin

Rachel Taylor
Edgar National Centre for Diabetes and Obesity Research
University of Otago, Dunedin

Robyn Toomath
Spokesperson for FOE (Fight the Obesity Epidemic)
Department of Internal Medicine, Wellington Hospital

Mat Walton
Lecturer, School of Health and Social Services, Massey University

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THE NEW ZEALAND MEDICAL JOURNAL
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The chiropractic profession: a response to Shaun Holt's letter

The letter by Professor Shaun Holt[1] adds to the list of disappointingly referenced and inadequately researched commentary that he has provided.[2] It deserves a response.

Chiropractors are registered healthcare professionals covered by the Health Practitioners Competence Assurance Act 2003 (HPCA) and the Health and Disability Commissioner Act 1994 (HDC).

Any individual practitioner's aberrant behaviour, as alluded to by Dr Holt, is subject to scrutiny within these Acts. An examination of the results of investigations by the HDC and the Health Practitioners Disciplinary Tribunal (HPDT) will reveal that the chiropractic profession is not alone among health professions in having outliers to accepted clinical practice.[3,4]

Professor Holt should exercise caution in isolating the chiropractic profession for criticism as other individual healthcare professionals may well evidence poor judgement in the areas of marketing, practice management and clinical behaviour.

Corrian Poelsma

President
New Zealand Chiropractors Association (NZCA)

Tasman Bay Chiropractic
Richmond, Nelson

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Chiropractor code of ethics: the importance of setting a good example

The purpose of a code of ethics is to define acceptable behavior for those to whom the code applies—in a healthcare setting, codes of ethics therefore play an important role in the protection of both patient and practitioner. When codes of ethics are breached, intentionally or otherwise, those contravening them may be called to account.

The chiropractic industry in New Zealand has its own 'Code of ethics and standards of Practice' published by the New Zealand Chiropractic Board (NZCB),[1] which "...comprise a guide to the rules governing the professional conduct of all registered Chiropractors...". Section 2.3 of the chiropractic code states that, "...use of the title 'Doctor' must be qualified, for example, John Doe, Dr of Chiropractic or Dr John Doe, Chiropractor.

Failure to qualify the use of the title 'Doctor' may contravene the provisions of this Code." Interestingly, this provision appears to be a watered-down version of a recommendation made by the 1979 NZ Inquiry into Chiropractic, in which it was recommended that any chiropractor who is not a registered medical practitioner should not provide any material to the public using any of the terms, "Dr, Doctor, or Doctor of Chiropractic".[2]

Our concern is that when a chiropractor uses the title of doctor, members of the public might infer that a Dr John Doe holds a general medical qualification **AND** specialises in chiropractic. Such an inference might lead people to consult chiropractors for problems outside of the scope of care supported by high quality evidence and thus best dealt with by general medical practitioners (e.g., asthma). Indeed, in the case of asthma, delays in seeking out effective conventional treatment may even endanger lives.

If a code of ethics is to be taken seriously by practitioners, it seems reasonable that not only those are the professional voice of NZ chiropractic, the New Zealand Chiropractic Association (NZCA), and those who teach chiropractic in New Zealand, the New Zealand Chiropractic College (NZCC), would be fully compliant with its rules.

To explore what example is being set to chiropractic practitioners, a brief and non-systematic review of information provided by the New Zealand Chiropractors Association and the New Zealand College of Chiropractic was conducted. The following are indicative examples of non-compliance that were observed in the public domain:

- On their homepage, the NZCA assert that chiropractors are entitled to use the title Dr.[3] However, as no mention is made that the title must be qualified, this information is misleading to practitioners as it is not consistent with the code of ethics. Another example of non-compliance occurs on the webpage of the executive and council members where there are nine instances of the use of the title doctor without qualification (and no examples of use with qualification). Finally, when searching for 'find a chiropractor,' if your area is

Auckland Central, then each of 49 names returned uses the title of Dr with no qualification.

- On the homepage of the NZCC, the president twice fails to qualify use of the title doctor.[5] (Although the president is not currently a NZ registered chiropractor and does not have to comply with the code, it seems reasonable that he too should set a good example.) Similarly, the NZCC list 15 faculty members, each of whom uses the title of Dr without qualification.[6]

We acknowledge that it is possible some of the above examples may be NZ registered general medical practitioners, although we were unable to locate any of their names on the NZ register of medical practitioners. It is also possible that some are holders of a PhD, although there have also been calls for holders of PhDs not to use the title of Doctor in a healthcare setting.[7]

Our quick and somewhat informal review of the World Wide Web (www) pages of the NZCA and the NZCC suggests that those ideally placed to set an example by complying fully with the NZ chiropractor code of ethics are falling short, at least insofar as their compliance with Section 2.3. We therefore urge the NZCB to ensure that compliance with the code is effectively enforced, given its role in protecting both patient and practitioner.

Andrew Gilbey
Palmerston North

Jose Perezgonzalez
Palmerston North

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Improvement in the accuracy of hospital ethnicity data

Improving the quality of ethnicity data within health and disability organizations is an issue of both international and national concern. Ethnicity information aids in the planning and evaluation of services, the monitoring of health status and disparities, and is used in the funding models for some Primary Health Organisations (PHOs). Improving the accuracy and completeness of ethnicity data is of particular importance to NZ Māori, who have been systematically undercounted in numerous health datasets over the past decades,[1,2] and providing accurate ethnicity data is an ethical and legal obligation under the Treaty of Waitangi.

Recent studies have described inaccuracies in the recording of ethnicity information in primary care. Riddell et al[3] assessed the quality of ethnicity data in primary care medical records, with the comparison of self-identified ethnic group obtained through questionnaire with administrative records in 665 members of a large Auckland Primary Health Organisation. They described concordance between the PHO records and the survey answer for only 64.9% of Māori, compared with 90.9% of NZ Europeans.

In 2003 Swan et al[4] compared the self-identified ethnicity of 3,500 Waikato patients with diabetes (obtained via survey) with their hospital-recorded ethnic group. There was concordance between the two sources for 99.3% of non-Māori patients, but only 71.2% of Māori participants had their ethnic groups accurately documented.

We assessed the accuracy of ethnicity recorded in routine hospitalisation data identified through the National Minimum Data Set (NMDS) by comparing them with data collected by patient survey. We identified 2541 NZ Māori and NZ European patients discharged from Christchurch, Waikato, and Wellington hospitals between November 2008 and August 2009 using NMDS data. These data includes the primary ethnicity of the healthcare user (the most highly prioritised of up to three ethnic groups) as recorded by the facility. Over 2009, the study population was sent a standardised questionnaire, including the ethnicity question employed in the 1991 NZ Census, as per current recommendations regarding ethnicity data collection.[5,6]

Of the 1105 eligible subjects (47.2% Māori and 52.8% NZ European) who returned this questionnaire with completed ethnicity information, there was concordance between the NMDS and self-identified ethnic group in 95.7% of patients. When the data are analysed according to ethnic group, the rates of misclassification for Māori and NZ European patients are approximately the same (4.0% and 4.3% respectively). Of the 26 people who were recorded as NZ European in the NMDS data but chose an alternative ethnicity in the survey, 20 self-identified as NZ Māori and 6 as another ethnic group in the questionnaire. The majority of 21 participants who were classified as NZ Māori in the NMDS but did not identify as such in the survey selected NZ European (n=17) as their primary ethnic group in the latter.

The low response rate to this survey limits the generalisability of this result to the wider hospital population. However, given the previous evidence of differential inaccuracies in the recording of ethnicity in hospital datasets, it is encouraging that this discordance is both small, and approximately the same for both ethnic groups. It

is also likely that some of the individuals who were Māori and misclassified as NZ European in the NMDS (and vice versa) represent people who identify with multiple ethnic groups, of which one is variously classified as their primary ethnicity. Research by Carter et al. demonstrated that 8% of their cohort of 17,625 adults changed their primary ethnic group over 3 years.[7]

Given the recent directives by the Ministry of Health (such as those noted in the Health Information Strategy for NZ 2005) to improve the quality of its information systems and to obtain accurate ethnicity data, it is probable that the findings of this research represent a true improvement in the quality of the hospital databases since that study, and that differential misclassification of ethnicity in hospital facilities may be a smaller problem than previously thought.

Juliet Rumball-Smith
Research Fellow and Public Health Physician
Department of Public Health & General Practice
University of Otago, Christchurch
juliet.rumball-smith@otago.ac.nz

Diana Sarfati
Senior Lecturer and Public Health Physician
Department of Public Health, Wellington School of Medicine and Health Sciences
University of Otago, Wellington
diana.sarfati@otago.ac.nz

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The need for a uniform approach to paediatric pain management in emergency departments (EDs)

Pain is a subjective feeling, which is difficult to define. This is especially true for paediatric patients who compared with adults have lower pain thresholds and poor central modulation.[1] It is well recognised that pain in this group of patients is often under-recognised and sub-optimally managed.[2]

Many organisations have developed pain score tools and pain management protocols to help ameliorate the issues around managing pain in children, such as the guidance developed by the UK College of Emergency Medicine.[3] However, not all general emergency departments have adopted pain management tools.

We conducted a survey of 24 emergency clinicians of all grades from senior house officer to Consultant at the Emergency Department, Wellington. The aim was to analyse their approach to pain management in this group of patients.

Our results showed that most clinicians are aware of the use of the pain score tool; however most do not use or document a pain score. Only one-third of respondents were aware of pain management guidelines.

Clinicians regarded the behaviour of the child and the mechanism of injury as the most important parameters when assessing pain, followed by parent's input. Despite the low proportion of clinicians that document a pain score, 63% of respondents regarded a pain score as important when assessing pain.

Doctors were confident at managing mild and moderate pain. In severe pain, SHO level doctors were not confident at prescribing opiate based analgesia.

Most respondents felt there was a need for guidelines on the management of pain in children.

We believe these findings can be generalised to all emergency departments, and advocate the use of locally agreed assessment and treatment algorithms. We would welcome the development of a New Zealand guideline that could be adapted for local use in all emergency departments.

Tom Jaconelli
Specialist Trainee 1, Emergency Medicine
Emergency Department, York District Hospital
York, UK

Daniel Watson
Consultant Emergency Physician
Emergency Department, Wellington, NZ

Richard Bowditch
Specialty Registrar, Emergency Department
Ninewells Hospital, Dundee
Scotland, UK

(This work was carried out while Dr Jaconelli and Dr Bowditch were working at Wellington Hospital Emergency Department.)

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A better night's sleep: an audit of medications used to treat insomnia in a psychiatric inpatient unit

Medications for the treatment of insomnia are widely used in psychiatric patients. There are many to choose from and while all have licensed dose ranges, higher doses are sometimes prescribed. Concerns over the use of these higher doses warrant further investigation. We decided therefore to carry out an audit of medications used for insomnia in an inpatient psychiatric unit at Hillmorton Hospital, Christchurch, New Zealand.

The aim of this audit was to assess what the most commonly prescribed medications for insomnia were, at what doses and whether they complied with those listed in the local Preferred Medicines List.

Data from inpatients on three adult acute psychiatric inpatient wards between June and July 2010 were collected. A "snapshot" medication chart review was conducted of one hundred consecutive patients who were prescribed, and had taken at least one dose of, a medication for the treatment of insomnia. The data collected included patient demographics, the drug(s) and the prescribed and administered doses. Data were entered into, and analysed using, a Microsoft Excel™ spreadsheet.

Exactly 100 patients were recruited. Of these, 66 (66%) were male. The mean (range) [95%CI] age was 36 (18-70) [33.83-38.59] years. There were a total of 108 (i.e. 1.08 per patient) prescriptions for medications used to treat insomnia in this cohort. 78 (72%) were for zopiclone, 11 (10%) for temazepam, eight (7.5%) for quetiapine, seven (6.5%) for promethazine, two (2%) for chlorpromazine and one (1%) for lorazepam. 79% of patients had their medications prescribed as required only. 82% of prescriptions complied with local Preferred Medicines List for medicines to be used in the treatment of insomnia (i.e. zopiclone, temazepam).

The zopiclone group were prescribed a mean (range) [95% CI] maximum dose of 13 (3.75-15) [12.52-13.96] mg at night and received a dose of 11 (3.75-15) [10.49-12.19] mg at night while the temazepam group had a mean prescribed maximum dose of 29 (10-40) [22.66-35.52] mg at night and received a dose of 26 (10-40) mg (19.54-33.18). As the remaining drugs were prescribed to a smaller number of patients these were not analysed for dose.

Zopiclone is a cyclopyrrolone derivative. It is not a benzodiazepine and is structurally unrelated to other hypnotics although its pharmacological actions are like those of the benzodiazepines.[1] 72% of prescriptions in this study were for zopiclone. This is high when compared to other reported rates of prescribing although these other rates were in a different group of patients (i.e. not psychiatric inpatients).

In a 2004 study of hospitalised general medical patients 29% were prescribed zopiclone[2] while in a second study in 2005, 11% of outpatient prescriptions in Taiwan were for zopiclone.[3] In the USA, between 1997 and 2002, zolpidem and zaleplon, (similar drugs to zopiclone) accounted for 60% of prescribed hypnotics for outpatients.[4]

Temazepam is a benzodiazepine hypnotic.[5] Ten percent of prescriptions in this study were for temazepam which is low when compared to other studies. In a 2002 study of elderly inpatients, 94% were prescribed temazepam.[6]

The more frequent use of zopiclone rather than of temazepam should be expected. Zopiclone has lower abuse potential than the benzodiazepines and is a relatively safe hypnotic.[7,8] Zopiclone and temazepam are the only hypnotics listed in the local preferred medicines list. Compliance was high with the preferred medicines list at 82%.

Doses used of zopiclone and temazepam were high. Zopiclone has a maximum licensed hypnotic dose of 7.5mg at night.[1] This was less than the observed mean prescribed and administered doses of 13 and 11 mg at night respectively. The maximum licensed hypnotic dose of temazepam is 30mg at night.[5] The observed mean prescribed dose and administered doses were close to this at 29 and 26 mg respectively.

79% of the patients in this study were prescribed drugs used in the treatment of insomnia on an as required rather than a regular basis. This is close to the 68% of psychiatric ward patients who had hypnotics prescribed on an as required basis in one study.[9] This way of prescribing may allow either the patient or the nurse to decide whether or not a hypnotic is required on a particular night.

It is interesting to note that 7.5% of the prescriptions for insomnia were for the antipsychotics quetiapine and 2% were for chlorpromazine. Chlorpromazine and quetiapine are not licensed for use in insomnia although an understanding of their pharmacology would indicate a sedative effect of both.

There were several limitations to this study. As this audit was of medication chart review only, the medical notes were not consulted. It was not recorded if other drugs used for insomnia were used prior to those captured or if dose adjustments had occurred.

Victoria Kershaw
Clinical Pharmacist
Pharmacy Department
Christchurch Hospital, Christchurch

Jane Vella-Brincat
Drug Utilisation Review/Preferred Medicines List Pharmacist
Clinical Pharmacology
Christchurch Hospital, Christchurch
janevb@cdhb.health.nz

Andrew McKean
Senior Pharmacist
Pharmacy Department
Hillmorton Hospital, Christchurch

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The treatment of functional diseases of the stomach: part 3

Excerpt of an article that appeared in NZMJ May 1912;9(42):117–24. Continued from part 2 at http://www.nzma.org.nz/journal/124-1339/4801

View part 3 excerpt at http://journal.nzma.org.nz/journal/124-1340/4821/content.pdf

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Breast cancer prevention in post-menopausal women

Some women can be identified as having a moderately elevated risk of developing breast cancer. Over recent years, chemoprevention of breast cancer has focused on the selective estrogen-receptor modulators tamoxifen and raloxifene, which exert antiestrogenic effects on the breast. These drugs are effective but under-used because of adverse reactions. Tamoxifen increases the risks of endometrial cancers and venous thromboembolism; raloxifene does not increase the risk of endometrial cancers but does cause similar toxic effects. The aromatase inhibitors offer an alternative appropriate therapy and this study reports on a randomised trial comparing exemestane 25mg daily with placebo. 4560 post-menopausal women at moderate risk were randomised and at a median follow-up time of 35 months exemestane was so superior that the trialists unblinded the study and offered exemestane to the women in the placebo cohort.

The trialists' conclusion is that exemestane significantly reduced invasive breast cancers in post-menopausal women who were at moderate increased risk for breast cancer. During a median follow-up period of 3 years, exemestane was associated with no serious toxic effects and only minimal changes in health-related quality of life.

N Engl J Med 2011;364:2381–91.

Another treatment option for Hodgkin's lymphoma?

Hodgkin's lymphoma is one of the great success stories in oncology. Early stage disease can be cured with radiotherapy and since the introduction of combination chemotherapy advanced disease can usually be cured. The break through came with the introduction of the regimen of mechlorethamine, vincristine, procarbazine, and prednisone (MOPP). Although efficacious, the toxic profile of MOPP was troublesome as, in addition to short-term adverse reactions, the regimen caused infertility and a predisposition to second malignancies. Subsequently the regimen of doxorubicin, bleomycin, vinblastine and dacarbazine (ABVD) was introduced in the mid-1970s as treatment for advanced Hodgkin's lymphoma and became the standard of treatment for this disease after trials showed that ABVD was as effective as MOPP but lacked its more serious adverse effects.

This report concerns a randomised trial comparing a new candidate regimen, BEACOPP, an intensified regimen consisting of bleomycin, etoposide, doxorubicin, cyclophosphamide, vincristine, procarbazine, and prednisone, against ABVD in patients with advanced disease. BEACOPP proved to be slightly better than ABVD in tumour control. But its adverse effects included treatment related deaths, some secondary leukaemias and infertility. Sounds like ABVD remains the standard treatment

N Engl J Med 2011;365:203–12.

Comparative effectiveness and safety of medications for type 2 diabetes

This report from the prestigious Johns Hopkins Medical School & Hospital points out that there is no shortage of drugs available to treat type 2 diabetes. Their list includes metformin, second-generation sulfonylureas, thiazolidinediones, meglitinides, dipeptidyl, peptidase-4 (DPP-4) inhibitors, and glucagon-like peptide-1 receptor agonists. Their aim was to evaluate the benefits and harm associated with each of thee agents when used alone or in combination.

The study reviewed 140 trials and 26 observational studies of head-to-head comparisons of monotherapy or combination therapy that reported intermediate or long-term clinical outcomes or harms. They report that most monotherapies reduced hemoglobin A_{1c} levels by similar amounts. But metformin therapy reduced body weight compared with thiazolidinediones and sulfonylureas. Another finding was that the sulfonylureas produced a four-fold higher risk of hypoglycaemia than metformin alone.

The authors note that the thiazolidinediones increased the risk for congestive heart failure compared with sulfonylureas and increased risk for bone fractures compared with metformin. Finally, they conclude that the evidence supports metformin as the first line agent to treat type 2 diabetes. Interestingly the review found little evidence on the relative effects of the various treatments on long-term clinical outcomes.

Ann Intern Med 2011;154:602–13.

Disease-modifying anti-rheumatic drug usage in rheumatoid arthritis

This paper is from Australia and it concerns over 1000 consecutive patients with rheumatoid arthritis (RA) who were diagnosed and treated at two private clinics over a one year period. They note that RA may be treated with conventional disease-modifying anti-rheumatic drugs (DMARD), such as methotrexate (MTX), leflunomide (LEF), sulfasalazine and hydroxychloroquine either alone or in combination. The advent of so called ‘biologic’ DMARD (bDMARD) has provided further treatment options for those whose disease is imperfectly controlled with conventional treatment. This group of drugs includes medications directed against tumour necrosis factor alpha (TNFα), such as adalimumab, etanercept and infliximab as well as abatacept, which modulates T-cell stimulation and rituximab, a monoclonal antibody that causes B-cell depletion.

The authors report that 85% of their patients were treated with single or combination DMARD compared with 15% on a biological DMARD either alone or in combination. Apparently this rate of biological DMARD treatment is the usual. However, as they found that 47% of the patients had persistent moderate disease activity they recommend that the biologicals should be used more. The impediment is the Australian prescribing regulations which sound to be similar to those imposed by PHARMAC. They conclude that benchmark may be too high.

Int Med J 2011;41:450–55.

Glycated haemoglobin A (HbA_{1c})—new units

We have been using HbA_{1c} for over a decade as an aid to establish how well the diabetes has been managed over the last several weeks. And recently it has been suggested that the HbA_{1c} could replace the more usual diagnostic techniques—fasting blood sugar and glucose tolerance tests as it is much less cumbersome. Be that as it may we have been used to the HbA_{1c} being reported as a percentage and usually advise our patients that 6.5% might be their target. However, that changed in July as it was recognised that laboratories were producing quite variable reports thus invalidating the test. So the International Federation of Clinical Chemistry (IFCC) have altered the units in which HbA_{1c} is reported by replacing the traditional percentage units with an IFCC-standardised mmol/mol measurement.

And furthermore, guidelines from the American Diabetes Association and the new WHO guidelines propose the measurement of HbA_{1c} as a diagnostic criterion for diabetes, suggesting a cutoff of greater than or equal to 48 mmol/mol as being diagnostic. As it happens 48mmol/mol equals 6.5% on the old scale.

Lancet 2011;377:1476–7.

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Journal of the New Zealand Medical Association

Grants Awarded July 2011

At the July meeting of the Scientific Advisory Group of the National Heart Foundation, a total of 33 grants were awarded. The awards included 5 Project Grants, 12 Fellowships/Scholarships, 7 Small Project Grants, 1 Grant-in-Aid and 8 Travel Grants. A total of 7 Summer Studentships were also awarded to the Medical Schools at the University of Otago and the University of Auckland.

Project Grants

Assoc Professor Vicky Cameron
Christchurch Cardioendocrine Research Group, University of Otago, Christchurch
Genetics of NZ families with premature coronary heart disease.
$99,534 for 2 years.

Professor Tim David
Centre for Bioengineering, University of Canterbury
Interactions of coronary geometry and cellular dynamics as biomarkers for early lesion growth.
$162,678 for 2 years.

Dr Debbie Hay
School of Biological Sciences, University of Auckland
The adrenomedullin peptide family and cardiovascular disease; developing new therapies by deciphering adrenomedullin binding to its receptors.
$29,862 for 1 year.

Dr Martin Than
Department of Emergency Medicine, Christchurch Hospital
Assessment of the diagnostic accuracy of 4 hour serial cardiac troponins for the detection of acute myocardial infarction in the Emergency Department.
$147,378 for 1 year.

Dr Gillian Whalley
Faculty of Social & Health Sciences, Unitec
International normal echocardiography measurements amalgamation study.
$74,500 for 18 months.

Fellowships

Dr Geoffrey Lee
An Overseas Training & Research Fellowship (for 1 year) was awarded to Dr Geoffrey Lee. Dr Lee will work as a cardiac electrophysiological fellow at Barts and the London NHS Trust, UK.

Dr Jen Li Looi
An Overseas Training & Research Fellowship (for 1 year) was awarded to Dr Jen Li Looi. Dr Looi will work as a Clinical Imaging Fellow at the Prince of Wales Hospital, The Chinese University of Hong Kong.

Mr Roy Hoerara
A Maori CV Research Fellowship (for 1 year) was awarded to Mr Roy Hoerara, Te Pūmanawa Hauora - Research Centre for Māori Health & Development, Massey University.

Ms Anna Rolleston
A Maori CV Research Fellowship (for 2 years) was awarded to Ms Anna Rolleston, Faculty of Medical & Health Sciences, University of Auckland

Ms Helen Eyles
A Research Fellowship (White-Parsons) (for 3 years) was awarded to Ms Helen Eyles, Clinical Trials Research Unit, University of Auckland.

Dr Nicole Moreland
A Research Fellowship (for 3 years) was awarded to Dr Nicole Moreland, School of Biological Sciences, University of Auckland.

Dr Anne von Zychlinski-Kleffmann
A Research Fellowship (for 3 years) was awarded to Dr Anne von Zychlinski-Kleffmann, Biochemistry Department, University of Otago.

Dr Loretta Wigg
A Research Fellowship (for 3 years) was awarded to Dr Loretta Wigg, Cardiothoracic Surgical Unit, Department of Medicine, University of Auckland.

Ms Louise Foley
A Research Fellowship (for 3 years) was awarded to Ms Louise Foley, Clinical Trials Research Unit, University of Auckland.

Ms Katrina Poppe
A Research Fellowship (for 3 years) was awarded to Ms Katrina Poppe, Department of Medicine, University of Auckland.

Dr Harriet Watkins
A Research Fellowship (for 3 years) was awarded to Dr Harriet Watkins, School of Biological Sciences, University of Auckland.

Mr Paul Roberts
A Postgraduate Scholarship (for 3 years) was awarded to Mr Paul Roberts, Auckland Bioengineering Institute, University of Auckland.

Small Project Grants

Dr Anthony Hickey
School of Biological Sciences, University of Auckland
Can the gut alter cardiac function in shock?
$14,940 for 2 years.

Dr Jamie Voss
Cardiology Department, Middlemore Hospital
Early prevent pilot: Toward the systemic use of dispensing records to prevent treatment gaps early after acute coronary syndromes.
$14,950 for 1 year.

Ms Jane Stephen
Social & Community Health, Centre for Tobacco Control Research, University of Auckland
Are NZ resident Samoan women increasingly smokefree or free to smoke?
$8,940 for 2 years.

Dr Jichao Zhao
Auckland Bioengineering Institute, University of Auckland
Critical regions of persistent atrial fibrillation.
$13,000 for 18 months.

Dr Ralph Maddison
Clinical Trials Research Unit, University of Auckland
Controlling ventricular rate in atrial fibrillation.
$14,985 for 8 months.

Dr Rachael McLean
Department of Medicine, Dunedin School of Medicine, University of Otago
Measuring salt in urine study.
$15,000 for 6 months.

Assoc Professor Anne La Flamme
School of Biological Sciences, Victoria University of Wellington
The effect of remote ischaemic preconditioning on the immune response in healthy volunteers.
$11,500 for 2 years.

Grant-In-Aid

Dr Mark Wallace-Bell
Health Sciences Centre, University of Canterbury
Attendance at the International Training of New Trainers (TNT) in Motivational Interviewing & at the Motivational Interviewing Network of Trainers (MINT) forum, Sheffield, UK.
$4,717

Travel Grants

Assoc Professor Nathan Consedine
Department of Psychological Medicine, University of Auckland
5th International Congress on the (Non) Expression of Emotion in Health and Disease; and the 13th World Congress of PsychoOncology, Turkey.

Ms Nina Dickerhof
Biochemistry Department, University of Otago, Dunedin.
9th Australian Peptide Conference, Hamilton Island, Australia.

Dr Raina Elley
Department of General Practice & Primary Health Care, University of Auckland
17th WONCA (World Congress of Family Doctors) Europe Conference, Warsaw, Poland.

Dr Leigh Ellmers
Department of Medicine, University of Otago
European Society of Cardiology Congress, Paris, France.

Ms Cheryl Gammon
Institute of Food, Nutrition & Human Health, Massey University, Albany
11th European Nutrition Conference, Madrid, Spain.

Professor Felicity Goodyear-Smith
Department of General Practice & Primary Health Care, University of Auckland
North American Primary Care Research Group (NAPCRG) 39th Annual Meeting, Alberta, Canada.

Dr Vili Nosa
Department of Pacific Health, University of Auckland
Oceania Tobacco Control 2011 Conference, Burying the habit: moving to a tobacco free future, Brisbane, Australia.

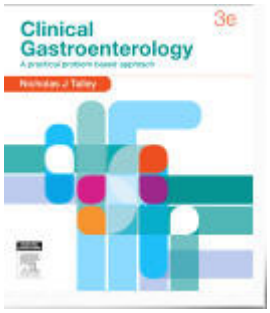
Ms Ruth Teh
Department of General Practice & Primary Health Care, University of Auckland
9th Asia/Oceania Regional Congress of Gerontology and Geriatrics, Melbourne, Australia.

THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

Clinical Gastroenterology: a practical problem based approach (3rd edition)

Nicholas J Talley. Published by Churchill Livingstone Australia, Dec 2010.
ISBN 9780729539487. Contains 405 pages. Price AU$80.96

This is the third edition of this textbook intended for medical students, specialist trainees and practitioners.



As its title suggests, it aims to take a problem-based approach rather than a diagnosis-based approach to gastroenterology. Such an approach is excellent for those learning the specialty, who are confronted by patients with problems that need to be diagnosed and managed, rather than diagnoses that need to be learnt for exams.

This edition has been expanded with more information on inflammatory bowel disease and reflux.

The algorithms have also been improved to provide more guidance where appropriate. The anatomical diagrams are simple and demonstrate anatomical or physiological phenomena well and could be easily used for patient education. Excellent radiological images also provide the reader with practical help regarding signs that may be difficult to find examples.

Increasing the accessibility of textbooks is essential for modern medical practice. This textbook is available online allowing its owner to use it in more locations and even to annotate and bookmark sections of interest. This is improves its use as a teaching tool whereby images may be used as examples in teaching for students.

There are also excellent descriptions of the plethora of investigations available to gastroenterologists allowing trainees to understand the pathophysiology behind a range of disorders. The use of a case at the start of each chapter helps to cement the clinical approach taken and the links to the theoretical knowledge that follows.

While the textbook is aimed at a broad section of health practitioners, the key target is gastroenterology trainees and junior staff, for whom this textbook should be the first book they buy when starting in Gastroenterology. GPs will also find the textbook useful given the large proportion of patients who present (and those who do not present) with gastrointestinal symptoms. The symptom-based approach is particularly useful for this group. While medical students will benefit from this book, it may be slightly too specialised for many.

Overall this is an excellent improvement on a previously well-written textbook.

Richard B Gearry
Department of Medicine, University of Otago, Christchurch, and
Department of Gastroenterology, Christchurch Hospital
Christchurch, New Zealand