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This Issue in the Journal

**Dog bite injuries**
L Marsh, J Langley, R Gauld

Dog bite injuries are a significant public health problem in New Zealand; a fact highlighted by the recent fatality in Dunedin. This study, a continuation of an earlier one, describes the problem in New Zealand from 1989 to 2001 when 1 fatality and 3119 hospitalisations due to dogs were recorded. Compared to other locations, most dog attacks (30%) occurred in the victims’ homes (not necessarily their own). Injuries to the head were significantly more common in children, while arm and hand injuries mostly occurred in those persons aged over 15 years. Males, and children less than 9 years old had the highest rates of injury. Ongoing monitoring is necessary to determine whether current dog-control policies and procedures are reducing injury.

**Infantile subdural haematoma in Auckland, New Zealand: 1988–1998**
P Kelly, I Hayes

In a child under the age of two, traumatic bleeding over the surface of the brain (subdural haematoma) may result from accidental injury or child abuse. In the latter case, the condition is widely known as ‘shaken baby syndrome’. This study reviews 64 cases, and describes features that may help to differentiate one cause from the other. More research is needed into this problem, which is likely to be a significant cause of death and disability in New Zealand children.

**Co-morbidities in trauma patients: common and significant**
C-P Tan, A Ng, I Civil

Trauma or traumatic injuries are very common and affect all age groups. While quality of hospital care for patients who have sustained trauma can be easily measured and evaluated, it is much more difficult to look at how a trauma patient’s health status (eg, presence of any significant health issues such as diabetes) affects their overall outcome from the trauma. From previous studies, we know that only patients aged 40 years and over admitted into the Auckland City Hospital following traumatic injury were found to have co-morbidities or prior significant health issues. We collected data from 105 patients admitted into the hospital following a traumatic injury and found that patients with pre-existing health issues tended to stay longer in hospital following an accident. Our study is a part of a larger study where we plan to incorporate patient’s pre-existing health issues into an already existing scoring system to predict overall outcome of patients involved in traumatic injury.
Impact of concomitant trauma in the management of blunt splenic injuries
A Lo, A-M Matheson, D Adams

Both non-operative and operative management have established roles in the management of blunt splenic injuries. In this study, a 96% success rate of non-operative management (in patients who are haemodynamically stable) was achieved. Appropriate patient selection is the most important element of successful non-operative management. However, in the presence of concomitant trauma, patients with blunt splenic injuries are more likely to require operative management if they have an injury severity score (ISS) ≥16, hypotension, Glasgow coma score (GCS) ≤13, and requirement for blood transfusions.

Head injury and associated maxillofacial injuries
D Goodisson, M MacFarlane, L Snape, B Darwish

This study looked at 2307 head injury patients admitted to Christchurch Hospital’s Neurology Department from 1995 to 2002, inclusive. Five percent of these patients also had a documented maxillofacial injury (ie, facial-bone fractures, including the nose and jaw); 75% of these maxillofacial-injury patients were male (average age: 27 years). The most common cause of maxillofacial injury was motor vehicle accident (MVA) (32%), with assaults (20%) and falls (17%) the next most common causes. Significantly, one-third of these MVA patients were not wearing seatbelts. MVAs were the main (70%) cause of serious head and facial fractures injuries, whereas physical assaults were the main cause in those with mild head injuries (predominantly young men who had been drinking alcohol). An audit showed there were no significant delays in referring patients with head injuries and associated maxillofacial injuries to maxillofacial surgeons for treatment of their facial injuries.

Information provision after mild traumatic brain injury (MTBI): a survey of general practitioners and hospitals in New Zealand
C Moore, J Leathem

A study of the information sheets about mild head injury (given by GPs and hospital emergency departments to their patients) revealed that most were not too difficult to read, contained accurate information, and were up-to-date. In some exceptions, however, wording was overly complex, words were illegible due to poor copying, and the contact information incorrect. More people with mild head injury were seen at emergency departments, which generally provided better information sheets than GPs.
Vascular trauma in New Zealand: an 11-year review of NZVASC, the New Zealand Society of Vascular Surgeons’ audit database
I Thomson, G Muduioa, A Gray

A review of 11 years’ work by vascular surgeons in New Zealand found 549 cases of injuries to blood vessels. This study revealed that younger adult males were more likely to suffer vascular trauma. Elderly patients, especially females, were most at risk of vascular injury from medical interventions. Complication rates reported by vascular surgeons in New Zealand were comparable to results in international reports.

Cost analysis of traditional follow-up protocol versus MRI for radiographically occult scaphoid fractures: a pilot study for the Accident Compensation Corporation
A Gooding, M Coates, A Rothwell

A study was performed in conjunction with Accident Compensation Corporation (ACC) to assess the cost-effectiveness of using medical resonance imaging (MRI) in the acute setting of a suspected scaphoid fracture that is not visible on initial plain X-rays. MRI has high sensitivity and specificity for scaphoid fracture detection and there are clinical advantages in making the correct diagnosis early. This study shows that it is cost-effective to use MRI in the routine investigative work-up, and that it will avoid the needless plaster immobilisation many patients receive from traditional protocols.
Trauma: still a problem in New Zealand

Ian Civil

This issue of the New Zealand Medical Journal highlights a number of facets of injury care as they affect patients and healthcare workers in New Zealand. Although we are entitled to congratulate ourselves over the reduction in overall injury rates (particularly in relation to road crash), trauma remains a significant component of healthcare delivery in this country.

For some injuries (for example, from dog bites—as highlighted by Marsh et al in this issue of the Journal), injury rates appear to be going up. Certainly, media reports about specific dog-bite injuries indicate how serious they can be, with a recent fatality in Dunedin.²

It follows therefore, that (regardless of the success of injury prevention initiatives) New Zealand’s healthcare system needs to be prepared to actively (and effectively) identify, transport, and treat injured patients. We should only be prepared to grade ourselves B-, however, particularly in comparison with Australia.

Although we often admire and emulate the effective road safety initiatives of our neighbours (in the state of Victoria in Australia in particular), we have done little to copy their major initiatives in the areas of trauma systems,³ quality assurance,⁴,⁵ and trauma registries.⁶

Effective treatment of trauma patients requires a well integrated trauma ‘system’—with in-hospital injury care well coordinated, and hospital care smoothly linked with both pre-hospital care and rehabilitation. Although pre-hospital care is in general well coordinated, the recent review of air ambulance services highlights the limitations in this crucial component of injury care.⁷

The fact that so many of the issues mentioned in this recent report⁷ are identical to the 1996 Cull report⁸ is another reason to limit any self-congratulation concerning improvements in trauma care delivery in New Zealand.

Rehabilitation is a crucial component of an effective trauma care system, yet only a minority of trauma care providers can access timely rehabilitation services. Many patients wait in hospital past their acute care needs while awaiting access to appropriate rehabilitation. Furthermore, as indicated in the papers in this issue of the Journal,⁹–¹¹ trauma patients have more comorbidities (and are older) than most people are generally aware of—and (both minor and major) head injury continue to be significant issues.

Both these groups (the elderly and those suffering head injuries) benefit significantly from timely coordinated care and early availability of rehabilitation resources, neither of which is available on a systematic basis throughout New Zealand. Although the ‘roadside to bedside’ concept¹² enmeshes relevant and significant principles, the institutional funding and corporate support for this concept has been largely missing.
Indeed, there is huge variability in the performance of the trauma system within New Zealand, and the principles of equity of access and equity of quality trauma care can quite simply not be guaranteed.

Of course, just how well or poorly we are doing in regards to trauma care within New Zealand (especially in comparison with Australian states) is a moot point—because in the absence of timely, clinically relevant information (available through a national trauma registry) we simply do not know.

Over the years there has been many examples of ‘talk the talk’ from politicians, the health ministry, and the Accident Compensation Corporation (ACC); however, there have been few examples of ‘walk the walk’. While trauma care in individual hospitals and units is probably satisfactory, in actual fact we don’t know—and the promise of an effective trauma system remains as much wishful thinking as it has ever been.

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References:


8. Cull A. A national air ambulance network for New Zealand: A scoping study for the ACC and combined RHAs; 1996.


In support of the consent process for organ donation from deceased persons

John Morton

‘Hello, my name is John Morton’, I said when the nurse took me to meet the relatives of a young man whose severe head injuries from a motor vehicle accident had progressed to brain death. ‘I’m sorry to find you in this sad situation—the neurosurgeons tell me that the outlook is hopeless for Bob—that the man that you knew and loved has gone—is that your understanding?’.

I was first put in that situation, without training or supervision, as a junior member of the transplant team in Edinburgh in 1969. I thought that it was my responsibility to get permission from relatives and next of kin for permission to use kidneys for transplantation. For a time, one dreaded the calls that led to similar grim scenes. There had been no training because cadaver transplantation (as it was then called) was new, the consent process had not been studied, and community and professional attitudes were then as mixed about transplantation, as are feelings about genetic engineering today. Sometimes we were referred to as ‘ghouls’ and ‘body snatchers’, and long survival after kidney transplantation was noteworthy.¹

Early antipathy towards transplantation stimulated pioneer surgeons’ interest in ethics, an early example of which thoughtfully examined the doctor’s responsibility towards an individual patient—The One—in relation to his responsibility to the community—The Many—of which he and his patient are members.² Transplant surgeons continue to examine what doctors do, what their patients expect of them, and how the expectations of both are not being met.³

Reflection on experiences with the first 100 grieving families, identified a basic problem. If the response to that first question was disbelief, denial, or anger at the messenger, then the gravity of the situation was not understood and further explanation was required. Before blaming the carer for this, it must be understood that detailed but devastating prognostic information is sometimes denied. Once this challenge was recognised, the counselling of families faced with the awful, unexpected predicament of a loved one’s certain death, became a fulfilling experience, rather than a dreaded burden. Predictably, the consent rate doubled when there was better understanding by both parties.

Only when the inevitability of death was understood and accepted was it reasonable to observe that: ‘as you may know, in these tragic circumstances when a previously healthy person is stricken in this way it is sometimes possible to help others by the use of organs for transplantation. It is my duty to discuss this option with you’. For many next-of-kin now, but not in 1969, the response is ‘we have talked about that’, and not uncommonly the prospect for organ donation is first raised by the next of kin, especially when it is known to have been the potential donor’s wish.

When the Edinburgh experiences were recounted to Christchurch School of Medicine students 30 years ago, and the need for objective study promulgated, a mature student
returned to say, ‘I would like to do that study’. When the outcome of his work was published in the British Medical Journal it had no references, because it was original. Leonard found that most had positive attitudes to transplantation that had been strengthened by experience, especially when they knew that they were fulfilling the donor’s wishes. Two-thirds of the relatives had gained some solace from knowing that others might benefit from their misfortune, but 1 in 10 reported adverse effects.

In identifying the factors that influenced them to grant permission or hesitate, relatives revealed defects in the way their permission had been sought. More than one-third did not clearly understand the donor’s hopeless prognosis until then, and some reacted adversely to the interviewers, finding them blunt and callous. Nevertheless, most were pleased that they had been asked.

In 1969, there were no intensive care units (ICUs)—as we now know them. As that discipline developed, making great contributions to the care of the critically ill, it was appropriate that ICU staff, who had cared for potential donors and established communication with their next of kin, should discuss the organ donation option with them.

Whilst ‘anything that can happen does eventually happen’, creating an anecdote to fuel speculation, this interviewer, in over 200 encounters, never met refusal for organ donation when it was known to be the potential donor’s wish. In the light of this experience, it is surprising that the possibility has become the focus of so much attention.

As long as training is provided, discussion about organ donation can be gratifying for all concerned. Audit of the experiences of surviving relatives, partners, and families provides information that is essential for training, and it measures the quality of the process. Everything that we know about the experience of organ donation has come from the precious resource provided by the experiences of living donors or the relatives and friends of deceased donors. The National Donor Coordinators require adequate resources for the research that is necessary to gain access to this resource and to provide enlightened training.

The debate about consent for cadaver organ donation illustrates the ‘know-do’ gap that can exist between what evidence shows is best practice and what is sometimes practiced or advocated.

Since the transplantation of organs from the deceased depends in a unique way on community understanding and support, it relies on the trust that has been earned by sound practice—a trust that might be diminished if the need for consent is removed.

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**References:**


Clinical trial registration: a statement from the International Committee of Medical Journal Editors

Catherine De Angelis, Jeffrey Drazen, Frank Frizelle, Charlotte Haug, John Hoey, Richard Horton, Sheldon Kotzin, Christine Laine, Ana Marusic, John Overbeke, Torben Schroeder, Hal Sox, Martin Van Der Weyden

Altruism and trust lie at the heart of research on human subjects. Altruistic individuals volunteer for research because they trust that their participation will contribute to improved health for others and that researchers will minimise risks to participants. In return for the altruism and trust that make clinical research possible, the research enterprise has an obligation to conduct research ethically and to report it honestly. Honest reporting begins with revealing the existence of all clinical studies, even those that reflect unfavourably on a research sponsor’s product.

Unfortunately, selective reporting of trials does occur, and it distorts the body of evidence available for clinical decision-making. Researchers (and journal editors) are generally most enthusiastic about the publication of trials that show either a large effect of a new treatment (positive trials) or equivalence of two approaches to treatment (non-inferiority trials). Researchers (and journals) typically are less excited about trials that show that a new treatment is inferior to standard treatment (negative trials) and even less interested in trials that are neither clearly positive nor clearly negative, since inconclusive trials will not in themselves change practice.

Irrespective of their scientific interest, trial results that place financial interests at risk are particularly likely to remain unpublished and hidden from public view. The interests of the sponsor or authors notwithstanding, anyone should be able to learn of any trial’s existence and its important characteristics.

The case against selective reporting is particularly compelling for research that tests interventions that could enter mainstream clinical practice. Rather than a single trial, it is usually a body of evidence, consisting of many studies, that changes medical practice. When research sponsors or investigators conceal the presence of selected trials, these studies cannot influence the thinking of patients, clinicians, other researchers, and experts who write practice guidelines or decide on insurance-coverage policy.

If all trials are registered in a public repository at their inception, every trial’s existence is part of the public record and the many stakeholders in clinical research can explore the full range of clinical evidence. We are far from this ideal at present, since trial registration is largely voluntary, registry data sets and public access to them varies, and registries contain only a small proportion of trials.

In this editorial, published simultaneously in all member journals, the International Committee of Medical Journal Editors (ICMJE) proposes comprehensive trials registration as a solution to the problem of selective awareness and announces that all eleven ICMJE member journals will adopt a trials-registration policy to promote this goal.
The ICMJE member journals will require, as a condition of consideration for publication, registration in a public trials registry. Trials must register at or before the onset of patient enrolment. This policy applies to any clinical trial starting enrolment after July 1, 2005. For trials that began enrolment prior to this date, the ICMJE member journals will require registration by September 13, 2005 before considering the trial for publication. We speak only for ourselves, but we encourage editors of other biomedical journals to adopt similar policies.

For this purpose, the ICMJE defines a clinical trial as any research project that prospectively assigns human subjects to intervention or comparison groups to study the cause-and-effect relationship between a medical intervention and a health outcome. Studies designed for other purposes, such as to study pharmacokinetics or major toxicity (eg, phase I trials), would be exempt.

The ICMJE does not advocate one particular registry, but its member journals will require authors to register their trial in a registry that meets several criteria. The registry must be accessible to the public at no charge. It must be open to all prospective registrants and managed by a not-for-profit organisation. There must be a mechanism to ensure the validity of the registration data, and the registry should be electronically searchable.

An acceptable registry must include at minimum the following information: a unique identifying number, a statement of the intervention (or interventions) and comparison (or comparisons) studied, a statement of the study hypothesis, definitions of the primary and secondary outcome measures, eligibility criteria, key trial dates (registration date, anticipated or actual start date, anticipated or actual date of last follow-up, planned or actual date of closure to data entry, and date trial data considered complete), target number of subjects, funding source, and contact information for the principal investigator.

To our knowledge, at present, only www.clinicaltrials.gov sponsored by the United States National Library of Medicine, meets these requirements; there may be other registries, now or in the future, that meet all these requirements.

Registration is only part of the means to an end; that end is full transparency with respect to performance and reporting of clinical trials. Research sponsors may argue that public registration of clinical trials will result in unnecessary bureaucratic delays and destroy their competitive edge by allowing competitors full access to their research plans.

We argue that enhanced public confidence in the research enterprise will compensate for the costs of full disclosure. Patients who volunteer to participate in clinical trials deserve to know that their contribution to improving human health will be available to inform health care decisions. The knowledge made possible by their collective altruism must be accessible to everyone. Required trial registration will advance this goal.

Author information: Catherine De Angelis, Editor-in-Chief, JAMA; Jeffrey M. Drazen, Editor-in-Chief, New England Journal of Medicine; Frank A. Frizelle, Editor, New Zealand Medical Journal; Charlotte Haug, Editor-in-Chief, Norwegian Medical Journal; John Hoey, Editor, CMAJ; Richard Horton, Editor, The Lancet; Sheldon Kotzin, Executive Editor, MEDLINE; Christine Laine, Senior Deputy Editor,
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Reference:

Dog bite injuries

Louise Marsh, John Langley, Robin Gauld

Abstract

Aims To describe the extent of the dog bite problem in New Zealand for the period 1989 to 2001.

Methods Fatalities and cases requiring public-hospital treatment identified from the New Zealand Health Information Service databases.

Results There was one fatality and 3119 hospitalisations, an average of 240 per year. Those most at risk were males and children under 9 years of age. The incidence rate of dog bites has continued to increase from that reported previously. There has been an increase in recent years but it is difficult to determine whether this is real effect or an artefact of coding.

Conclusions Dog bite injuries represent a significant public health problem in New Zealand. Ongoing monitoring is required to determine if dog control policies are having the intended effect.

Results of recent studies around the World have shown increasing trends in the incidence of fatal, hospitalised, and emergency department presentations of dog bites.\(^1\)

The only previously published study in New Zealand on the incidence of dog bites was by Langley in 1992\(^2\)—that study outlined the increasing incidence rate of hospitalisations for dog bites over a 10-year period (1979 to 1988). Interest in dog control heightened in February 2003 when several serious attacks were described in the media. Consequently, there were calls for a review of legislation pertaining to dog control.

In New Zealand there is a lack of recent and relevant data to determine the current extent of the problem and to make an informed decision about preventive methods to address the issue. The research described here sought to update earlier work—by determining trends in the incidence of serious dog bites in New Zealand from 1989 to 2001, inclusive.

Methods

We adopted a similar strategy to Langley\(^2\) for the identification of serious cases. This involved identifying fatal and public hospital inpatient victims from New Zealand Health Information Service’s (NZHIS) electronic mortality and morbidity data files using the external cause of injury and poisoning codes (E codes). Readmission for the same injury were excluded.

The NZHIS databases include a free text narrative of up to 70 characters for hospitalisations, and up to 90 characters for fatalities describing the circumstances of injury. The proportion of injury hospitalisations with useful information in this field has been low since 1995. Hospitalisations were restricted to those with a principal diagnosis of injury. Patients not staying at least one night, readmissions, and in-hospital deaths were excluded.
From 1989 to June 1999, the circumstances of injury were classified using ICD-9 E-Codes. For that period, cases with an E-Code of ‘E906.0: Other injury caused by animals – dog bite’ or a free text narrative including the words ‘dog’ and ‘bite’ were identified as dog bite injuries.

For the period 1989 to 1994, the number of struck by dog hospitalisations was estimated by identifying all cases with an E-Code of E906, or E906.9 where the free text narrative included the word ‘dog’ but not the word ‘bite’. From July 1999 onwards, the circumstances of injury were classified using ICD-10 codes.

For the period 1989 to 1994, cases with a code of ‘W54: Bitten or struck by dog’ were identified as dog bite injuries. The proportion of these dog bite cases were estimated as being equal to the proportion of bitten- or struck-by-dog cases from 1989 to 1994. Estimates of the total New Zealand and Maori populations, by gender and age group, were obtained from Statistics New Zealand.

The inpatient data was analysed using Stata 7.0 and SPSS software. Rates and 95% confidence intervals were calculated using negative binomial regression analyses. Rate ratios, calculated from the exponential of the beta coefficients from the negative binomial regression were used to compare rates between categories. Pearson’s Chi-squared analysis was used to test for differences in the distribution of categorical data.

The natural log was taken to normalise the distribution of the number of days stayed in hospital. The mean days stay and confidence limits were calculated on the logged scale and then back transformed by taking the anti log—this provides an estimate of the geometric mean and confidence limits on the original scale. Regression analysis was used to compare the mean number of days stayed by anatomical location of injury. Since the outcome variable had been log transformed, the exponential of the beta coefficients provide estimates of ratios of geometric means.

The distribution of age varies between Maori and non-Maori. Therefore direct standardisation was used to compare inpatient dog bite rates between Maori and non-Maori.

Results

From 1989 to 2001, 3119 potential dog bite hospitalisations and 1 dog bite fatality were identified. Of these 3119 incidents, 94 hospitalisations were estimated to have resulted from being struck by a dog rather than being bitten. Hence, for the period 1989 to 2001, there were an estimated 3025 hospitalisations and 1 fatality as a result of dog bites.

The incidence rates of dog bite hospitalisations by year are given in Figure 1. Rates for 1999 to 2001 have been adjusted to allow for the proportion of cases that were a result of being struck by rather than bitten by a dog. All other rates presented below were derived from the population of potential dog bites (n=3119) and, as such, are likely to be slight overestimates. Small numbers precluded reliable adjustments to these rates.

The data for ethnicity of dog bite victims was analysed for the years 1996 onwards (due to a different definition of ethnicity prior to this date). There were 1588 victims during this time, and New Zealand European victims represent 52% of the total bite victims, Maori 28%, and all other groups 20%. The age-adjusted incidence rates for Maori and non-Maori were 10.6 (9.4–11.7) and 5.9 (5.6–6.3) respectively.

Of those where a location was given (42%), 30% of the victims were bitten while at a home (not necessarily their own). For 6% of the victims, the bite occurred on the street or highway, and 1% were bitten while on a farm.

The upper limb, head, and lower limb were the most common regions to be injured, with the most common site of injury being the face. The results show evidence of a difference in the distribution of injury location by age group (Figure 2). Injuries to the head were significantly more common for the younger age groups; injuries to the
upper limb most commonly occurred in those aged over 15 years, and lower limb injuries were more consistently spread through the age groups.

Males, and children less than 9 years of age (Table 1) had the highest rates of injury.

Table 1. Demographic characteristics of dog bite victims in New Zealand (1989–2001)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>%</th>
<th>Rate per 100,000 population (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1886</td>
<td>60.5%</td>
<td>8.1 (7.7–8.5)</td>
</tr>
<tr>
<td>Female</td>
<td>1233</td>
<td>39.5%</td>
<td>5.1 (4.9–5.4)</td>
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<td>Age (years):</td>
<td></td>
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<td></td>
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<tr>
<td>0–4</td>
<td>741</td>
<td>23.8%</td>
<td>19.8 (18.5–21.3)</td>
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<tr>
<td>5–9</td>
<td>469</td>
<td>15.0%</td>
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<td>10–14</td>
<td>204</td>
<td>6.5%</td>
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<td>192</td>
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<td>7.3%</td>
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<td>25–29</td>
<td>219</td>
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<td>171</td>
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<td>70–74</td>
<td>59</td>
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<td>75–79</td>
<td>56</td>
<td>1.8%</td>
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<tr>
<td>80+</td>
<td>49</td>
<td>1.6%</td>
<td>4.1 (3.1–5.4)</td>
</tr>
<tr>
<td>Ethnicity (from 1996):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maori</td>
<td>445</td>
<td>28.0%</td>
<td>10.6 (9.4–11.7)</td>
</tr>
<tr>
<td>Non–Maori</td>
<td>1143</td>
<td>72.0%</td>
<td>5.9 (5.6–6.3)</td>
</tr>
</tbody>
</table>

The total number of hospital inpatient days incurred as a result of dog bites for the 13-year period was 9,450, with 3 days being the mean number of days in hospital. The longest time spent in hospital for a dog bite injury was 56 days. For a 1 year increase in age, there was an estimated 1% (1.0–1.3) increase in the number of days stayed (p=0.001). Victims with injuries to the lower limb were more likely to stay in hospital the longest, with a mean number of 5.6 days.
Figure 1. Incidence rates of dog bites in New Zealand (1989–2001)

![Incidence rates of dog bites in New Zealand (1989–2001)](image)

Figure 2. Age of victim and the main body region injured (1989–2001)

![Age of victim and the main body region injured (1989–2001)](image)
Discussion

One death occurred during the study period (1988–2001). This represents the only fatality identified in New Zealand since 1979. This result is consistent with other developed countries where death due to a dog bite has been very rare. The rates of serious dog bite injuries resulting in hospitalisations continued to increase following those reported by Langley for the period 1979 to 1988. Subsequent to the introduction of the Dog Control Act 1996, the rate dropped for the following 3 years but then increased to nearly pre-1996 levels.

The decrease in incidence rates from 1996 could be attributed to the public responding to publicity around dog control around this time coupled with the introduction and enforcement of strict dog control law in 1996. The elevated risk for 2000 and 2001 could represent a real change in risk or be an artefact of coding changes or a combination of both.

The overall incidence rate was similar to that observed in Australia of 7.7 for 1995 to 1996, but is much higher than the Canadian inpatient rate of 2.3 for 1993. Direct comparison with overseas studies may be limited, however, by the use of different research methods and different treatment/service delivery practices (which influence what is counted as a case).

The epidemiological characteristics of dog bite injuries over the period studied were similar to those found in other studies—with males and young children, particularly those under 10 years of age, disproportionately represented. High rates among children can probably be explained by their lack of physical strength or motor skills to ward off an attacking dog. Immaturity and lack of judgement may also sometimes lead children to act in ways that animals perceive as threatening or aggressive. Furthermore, it has been suggested that (prior to their injury) children under 5 years of age are significantly more likely to provoke animals than older children.

While younger victims did not stay in hospital as long as older victims, their injuries were often sustained to the head region, with very few being to the limbs. Data from elsewhere shows similar patterns. It may be that parents of injured children are more likely to seek medical attention, and young children and victims sustaining head injuries may be more likely to be admitted to hospital than other groups.

Victims aged 20 to 24 had the highest number of injuries to their upper limbs in this study. Other studies found this to be a common injury site, and the leg was also particularly likely to be injured for those in the 20 to 25 age group.

This study showed the Maori inpatient rate was 1.8 times the non-Maori rate. Previous research in New Zealand found the Maori rate to be 2.6 times that of non-Maori for the period 1979 to 1988. The rates ratios may be a real change or be a function differences in ethnicity classification over time.

Dog bites continue to be a significant problem—so ongoing monitoring is required to demonstrate whether dog control procedures are reducing injury.

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**References:**


Patrick Kelly, Ian Hayes

Abstract

Aim To review the Auckland experience of traumatic subdural haematoma (SDH) in infants under 2 years of age, with particular regard to features which might help to differentiate accidental from non-accidental injury (NAI).

Methods Retrospective review of the medical records of children under 2 years of age, coded for subdural haematoma (SDH) and retinal haemorrhage (RH) over a 10-year period.

Results Sixty-four cases of SDH were identified. Forty-one of these were due to non-accidental trauma, and 23 cases were accidental. Differences between these two groups related to the age of presentation, ethnicity, the type of explanation for the injury, and differences in aspects of the clinical presentation (apnoea, seizures, fractures, retinal haemorrhage). Mortality in the non-accidental group was far higher.

Conclusions Subdural haemorrhage is a significant cause of death and disability in infants presenting to hospital in Auckland. In the majority of cases, it is caused by child abuse, and there are certain features that are helpful in establishing this diagnosis. The long-term outcome in this group is unknown, but there is reason to believe that, in many cases, it is poor. There is considerable scope for further research.

In the 40 years since Henry Kempe\(^1\) first reminded the medical community of the fact of child abuse, subdural haematoma (SDH) in young infants has become increasingly recognised as a warning sign. There is now an extensive literature on the clinical presentation (often known as ‘shaken baby syndrome’), although debate continues as to the exact mechanisms of injury required.\(^2\)–\(^6\)

Auckland and Starship Children’s Hospitals provide general medical and surgical services to central Auckland. They also provide neurosurgery and intensive care for children from metropolitan Auckland (1996 population: 1,081,776) and elsewhere in New Zealand (1996 population: 3,618,300). This study was undertaken to characterise the infants we were seeing with SDH, and to identify features that might be helpful in diagnosis and management.

Methods

A retrospective study of those children under 2 years of age admitted to Auckland or Starship hospitals with subdural or retinal haemorrhage, from 1 January 1988 to 31 December 1998. We did not include infants that may have presented to National Women’s Hospital—the principal tertiary neonatal facility for metropolitan Auckland during that period. Nor did we include infants who may have presented in South Auckland, but were not transferred to Starship Children’s Hospital.

Cases were identified by ICD9 codes for SDH (8523, 8522, 8007, 8002, 8012, 8017) and retinal haemorrhage (RH) (3628.1). All six coding fields were included, so codes for child abuse were identified. However, these codes were not our primary search strategy. A trial run demonstrated clearly that the broader strategy identified more infants with SDH.
Medical records were analysed by standardised coding sheet, and data was entered onto a Microsoft Excel spreadsheet. Ethnicity was defined by enquiry from the infant’s family at the time of admission. Skull fractures were defined as ‘simple’ or ‘complex’—using Hobbs’ criteria of complexity (multiple or stellate fractures, non-parietal fractures, fractures involving multiple cranial bones, maximum fracture width >3 mm, growing fractures >5 mm, depressed fractures).

Radiological diagnoses and age of SDH were taken from the final radiologist’s report. Infants were assigned to two diagnostic groups: NAI (non-accidental injury), and accident. If the information was available, they were assigned on the basis of the diagnosis made by the admitting clinicians. Where data was coded, equivalent data sets were compared using the Chi-squared test.

Results

Eighty-four infants were identified. Twelve cases (coded for SDH) were excluded when review of the final computed tomography (CT) scan report found that SDH had not been confirmed. One case coded for SDH on the basis of the CT report was excluded because no SDH was found at postmortem. In three cases, medical records could not be found. Two infants with RH alone were excluded (one leukaemia, one penetrating trauma to the eye). Two postoperative SDH were excluded. There were no cases of SDH from bleeding disorder, inborn errors of metabolism, or hydrocephalus. After these exclusions, there were 64 cases of traumatic SDH over 10 years. Twenty-three were accidental and 41 were not accidental.

In 18 of the 23 accidental cases, the history was of major trauma. In five of the cases, the history was less clear—and these cases received a skeletal survey, fundoscopy, and social work assessment before the diagnosis of accidental injury was accepted. All diagnoses of accidental injury were made during admission.

We assigned 39 of the 41 infants in the NAI group on the basis of the diagnosis made during admission. In 7 of the 41 cases, there was a confession from the child’s caregivers. In 32 cases, the diagnosis was made by experienced paediatricians. In 2 further cases there was no paediatric or social work assessment, no skeletal survey, and no fundoscopy. One of these infants fell off a sofa and the other from a stationary motor vehicle onto grass. On our review, the history did not explain the injuries, and we analysed them as NAI.

Of the 39 cases who were diagnosed as NAI during the original admission, only 32 were coded as ‘child abuse’ at discharge.

There were no differences in gender (24/41 were male in the NAI group, 13/23 in the accidental injury group), region of Auckland, or source of referral.

The average age at which the injury occurred was 30.6 weeks in the non-accidental injury group, and 61.8 weeks in the accidental injury group.

There were comparatively more Maori in the NAI group (p=0.008), see Table 1.

Table 1. Ethnic breakdown of infants in the study

<table>
<thead>
<tr>
<th>Category of injury</th>
<th>European</th>
<th>Maori</th>
<th>Pacific</th>
<th>Unknown</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-accidental (NAI)</td>
<td>7</td>
<td>26</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Accidental</td>
<td>11</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
Mechanism (alleged) of injury

Explanations were given by caregivers in all 23 accidents and 30 NAI. In 11 NAI, there was no history of trauma. Five of the 11 cases had fractures and eight had RH (in 6 cases, bilateral). Three of these 11 cases died. Three of the 30 cases of NAI with a history also died. One caregiver blamed vigorous resuscitation following choking on a piece of bread, and the others blamed a minor fall and/or rough play.

Both groups often reported the mechanism of injury as a fall (14/23 accidents, 24/41 in NAI). However, falls less than 1 metre were far more common in NAI (p=0.0001), see Table 2.

Table 2. Height of reported fall

<table>
<thead>
<tr>
<th>Category of injury</th>
<th>Fall &lt;1 metre</th>
<th>Fall &gt;1 metre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non accidental (NAI)</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Accidental</td>
<td>2</td>
<td>12</td>
</tr>
</tbody>
</table>

Of the 16 cases of NAI who fell <1 metre, 10 had RH, and 6 had at least one fracture. There were 2 accidental SDH resulting from a fall <1 metre. One was a corroborated fall in an adult’s arms, the other a fall from a wheelchair 1 month after surgical craniotomy. Neither had RH or fractures.

Of the 12 accidental falls >1 metre, 9 were >2 metres. Of the 3 falls between 1 and 2 metres, one was a fall downstairs in a walker, one a fall of 2 metres onto concrete, and one an infant thrown out of a runaway pram 1.5 metre onto rocks.

Of the remaining 9 accidental SDH, one was an infant onto whom an adult fell at a party, in an incident corroborated by multiple witnesses. Eight were either passengers in a motor vehicle accident (MVA) or struck in a car versus pedestrian accident.

Multiple explanations were given in the non-accidental injury group (usually minor trauma from every day activities)—use of a car seat (2), baby bouncer (1), minor accidental impact against walls when being carried around (4), and ‘rough handling’ during normal play (4). In 3 cases, cardiopulmonary resuscitation (CPR) of an unconscious infant was blamed for the injuries.

There was a confession in seven NAI cases. One did not describe the mechanism of injury. Four caregivers admitted to shaking, and two to hitting. The offenders were: three mothers, three fathers, and one 14-year-old babysitter. There was no difference in the rate of RH or fracture compared with the rest of the NAI group (five RH, and three fractures).

Clinical presentation

Lethargy (2/3), irritability, and poor feeding before admission (in 50% of cases) occurred in both groups. Severe impairment in state of consciousness was present in approximately 50% of patients in both groups. In accidents, deterioration was directly linked to the episode of trauma. In contrast, many NAI had a vague history of being unwell for a few days, or being found at night deeply moribund after going to bed well.
No infant in the accidental injury group presented with apnoea, whereas 9 of the 41 NAI did have apnoea (p=0.009). Conversely, those infants with accidental injuries were more likely to have seizures (15/23 compared to 16/41 NAI; p = 0.01).

There was no significant difference between the two groups in Glasgow Coma Score at presentation; need for resuscitation in hospital (18/41 vs 7/23); or neurosurgical intervention with tapping, burr holes, or craniotomy (18/41 vs 4/23). There was no difference in the presence of bruising to the head (10/41 vs14/23)—even in those with skull fractures (6/11 in NAI, 12/18 in the accidental injury group; p=0.67).

Bruising to the body was documented in 11 of the 41 infants with NAI, and in 1 of those with accidental injury.

Significantly more NAI infants were in shock (16/36 vs 4/23; p=0.04), and required ventilation (24/41 vs 7/23; p=0.02). Average time of ventilation in NAI was 1.6 days as against 0.8 days in the accidental injury group (not statistically significant).

**Radiological findings**

All infants had skull X-rays. In infants with NAI, skeletal surveys were performed in 37 cases and bone scans in 16 cases. In the accidental injury group, skeletal surveys were performed in five cases and a bone scan in one case.

There were more skull fractures in the accidental injury group compared with the NAI group (18/23 vs 11/41; p=0.001). However, there was no difference in the ratio of complex fractures as defined above (10/18 in the accidental injury group, 6/11 in the NAI group; p=0.88).

In 5/6 of the complex skull fractures in NAI there was no history of trauma. In the accidental-injury group, the histories were as follows: 3 high-speed motor vehicle accident (MVA), 3 fall ≥3 m, 1 fall downstairs in a walker, 1 run over by a car, 1 propelled onto rocks from a runaway pram, and 1 fall in mother’s arms.

In NAI, there were 11 infants with rib fractures and 5 with metaphyseal fractures. In accidents, the only fracture outside the skull was a spiral fracture of one humerus in the infant whose uncle fell on him at a party in the presence of multiple witnesses.

All patients had a CT head scan. SDH was more often unilateral in the accidental injury group (p=0.04). Interhemispheric SDH did not differ between groups (3/23 accidental, 10/41 NAI). No accident had SDH of different ages. Twenty-two cases of NAI had SDH which were either non-acute or (when multiple) of greater than one age.

<table>
<thead>
<tr>
<th>Category of injury</th>
<th>Unilateral</th>
<th>Bilateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non accidental (NAI)</td>
<td>12</td>
<td>29</td>
</tr>
<tr>
<td>Accidental</td>
<td>17</td>
<td>6</td>
</tr>
</tbody>
</table>

Relatively few infants had magnetic resonance imaging (MRI) (10/41 NAI and 1/23 accidental), and gradient echo sequences were performed in only 2 of these infants.
We are therefore unable to comment on the presence or absence of haemosiderin deposits in the parenchyma, which may be a manifestation of previous injury.\(^8\)

Cerebral oedema (8/23 versus 24/41) was more common in the NAI group (\(p=0.01\)). Massive global brain injury (for which diffuse axonal injury could be one possible explanation) was seen in 7 infants. All were in the NAI group. Five of these infants died prior to discharge, but the CT appearance could only be correlated with postmortem findings in two cases. In one there was global ischaemia, and in the other diffuse brain injury consistent with shaking.

There was no significant difference in subarachnoid (6 NAI, 2 accidental) or extradural haemorrhage (3 NAI, 4 accidental), nor in the overall frequency of all other cerebral injuries combined. However, the numbers in each subcategory of these other cerebral injuries were too small for meaningful statistical analysis. For example, evidence of focal or diffuse cerebral atrophy (suggestive of previous cerebral injury) was seen in 4 infants in the NAI group but in none of those with accidental injuries.

An ophthalmologist examined 39/41 of the infants suspected of NAI, but only 5/23 of those with accidental injury. 27 infants with NAI had RH (21 bilateral, 6 unilateral). Five of 6 infants with unilateral RH had bilateral SDH. No infant with bilateral RH had unilateral SDH.

**Outcome**

All infants were alive on admission. There were no deaths in hospital in the accidental injury group, but there were 6 deaths in the NAI group (\(p=0.03\))—see Table 4. Postmortem reports could be found in only 2 of the cases included in the study.

The average length of stay was 7 days in the accidental injury group, and 12.6 days in the NAI group. 24/41 infants with NAI were followed up for an average time of 3.6 months (range 1 month to 4 years), and 12/23 infants with accidental injury were followed up for an average time of 9.1 months (range: 1 month–6 years). In survivors, there was no difference in medical outcome at discharge from hospital or at last outpatient visit.

**Table 4. Short-term neurological outcome**

<table>
<thead>
<tr>
<th>Category of injury</th>
<th>Unknown</th>
<th>Normal</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Dead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non accidental (NAI)</td>
<td>13</td>
<td>11</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Accident</td>
<td>9</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

We defined impairment as follows:

- **Mild** (some neurological deficit but can perform most age-appropriate functions).
- **Moderate** (some impairment of feeding and/or mobility).
- **Severe** (tube-fed and/or wheelchair-bound).

For example, a child with a unilateral 3rd nerve palsy and some persistent upper motor neurone signs but essentially normal function was classified as *mild*; a child with a hemiplegia starting to resolve at 4 months as *moderate*; and a child with
hemiplegia unable to walk, blindness in one eye, seizures and developmental delay as severe.

The limitations of a retrospective review did not permit a more detailed assessment of neurological outcome.

Discussion

This is one of the larger published series of infantile SDH, and is subject to all the usual methodological flaws associated with retrospective studies based on clinical records. There was a marked disparity in the use of skeletal surveys, fundoscopy, and social work assessment between the two groups.

There is a further problem associated with all studies of suspected child abuse. That is, there is no ‘gold standard’ diagnostic test. Uncorroborated histories from the caregivers as to mechanism of injury cannot be accepted at face value. The criteria used to diagnose NAI must perforce be derived from the biological implausibility of trivial mechanisms causing major injuries, and from the scientific literature.

The findings of this study accord both with the literature on infantile SDH and with the known biomechanics of infantile injury:

- Infants with accidental SDH were older (in this study, twice the age).
- Skull fracture was much more likely in those infants with accidental injury—the same finding has been reported by Feldman. It is consistent with the consensus that SDH resulting from accidental injury (in infants with normal brains) requires major trauma. Major trauma involving impact would reasonably be expected to increase the risk of skull fracture.
- Infants with NAI were younger, with histories of trivial trauma and often no external injuries. Despite this, their clinical findings were major: shock, need for intubation, cerebral oedema, often multiple skeletal injuries, and a high mortality from global brain injury. They often had bilateral SDH of different ages, consistent with the hypothesis that their caregivers were not describing all episodes of injury. The frequency of skull fractures was similar to that previously reported.

The difference from the accidental injury group with respect to skull fracture supports the hypothesis that the mechanism of injury in abusive SDH does not necessarily require impact. That is, it is consistent with the hypothesis that many of our infants were in fact shaken. However, when skull fracture did occur, it was no more likely to be complex than in the accidental injury group. This is consistent with the obvious point that in both groups, major impact is required to produce the combination of skull fracture and SDH. It is in contrast to Hobbs’ classic paper, but his group of abused infants was much more severe (19 of his 29 cases died).

- Other studies have shown that infants who ‘fall’ short distances are more likely to die than those who fall from a greater height. These and other authors have suggested that, rather than a peculiar biological effect of low falls, the problem is false histories. Our findings support this. Two who died ‘fell’ from less than 1 metre, and 3 of the remaining 4 came with no history of trauma at all.
• Apnoea is a particular feature in abusive SDH. The reason for this is a matter of ongoing debate.\textsuperscript{5,16} It is not surprising that several caregivers administered CPR, and attributed the infant’s injuries to the resuscitation itself. Apart from the improbability of injury from infantile CPR,\textsuperscript{17,18} this always begs the question: what induced the apnoea in the first place?

This is the first publication on infantile SDH in New Zealand—a comparable Australian study identified 21 cases of NAI over a 10-year period.\textsuperscript{9} Our study identified 41 cases, suggesting that the extent of our problem is certainly no less. The incidence figure for ‘shaken impact syndrome’ in infants less than 1 year of age in Wales was estimated at 21 per 100,000,\textsuperscript{11} and in Scotland: 24.6 per 100,000.\textsuperscript{19} Our study cannot provide a reliable incidence but we are addressing this with a prospective study.

Our data raise the possibility that Maori may be at greater risk of abusive SDH. Our search strategy should have avoided the risk of ethnically biased coding.\textsuperscript{20} However, the data in the clinical records was inadequate to control for the many risk factors for child abuse that may confound this result. These include the age and educational status of the mother, the number of children in the household, the presence or absence of the biological father, poverty, domestic violence, mental illness, and drug and alcohol abuse.\textsuperscript{21} Although a Japanese author suggested a predisposition to SDH after minor trauma in Japanese infants,\textsuperscript{22} and one English retrospective study hypothesised that non-Caucasian infants were more susceptible to SDH after trivial trauma,\textsuperscript{23} these articles appeared uncritically to accept uncorroborated histories.

One recent US study found no predictive effect of ethnicity.\textsuperscript{24} There is other evidence that Maori are disproportionately represented in statistics for child abuse.\textsuperscript{25} The reasons for this are debated, and could not be adequately addressed within the scope of this study.

The international literature shows that abusive infantile SDH has a worse prognosis than accidental injury.\textsuperscript{26} It is concerning, therefore, that our study suggested a relatively short duration of follow-up for abused infants. We were unable to assess the reasons for this short follow-up, although it may be connected with the same factors that contributed to the risk of abuse in the first place—complicated by the addition of multiple changes of residence and social worker for infants in alternative care. Our group would be suitable for a long-term follow-up study, which could address these questions and assess outcome in greater detail.

The trauma we have described is a major cause of mortality and morbidity. The scope of this problem cannot be determined from hospital discharge data. Our study shows clearly that such data are inaccurate. In addition, the literature suggests that the diagnosis of abusive head injury is often missed in infants who present to doctors,\textsuperscript{27} and the true incidence of infantile SDH presenting in Auckland in the years of this study may well have been higher.

It is important that health practitioners who see young children are aware of the possibility of head injury presenting with non-specific symptoms, absent or minimal external signs of injury, and a false or misleading history. Physical signs that are reliable indicators of risk for head injury in general, become unreliable when the risk is posed not only by the direct effects of any previous trauma, but by the risk that any earlier trauma will be repeated. Increasingly, the literature suggests that in infancy, a
CT scan and ophthalmoscopy should be as much a part of the work-up of possible child abuse as a skeletal survey.\textsuperscript{28} Although not available for many of the infants in this study, MRI offers a modality far more sensitive in the detection of small SDH, and should be considered whenever there is a high degree of clinical suspicion.\textsuperscript{8}

Finally, there is an urgent need not only to provide better diagnosis and follow-up for those who have been injured, but also to research and apply preventive strategies for those who have so far escaped injury.\textsuperscript{29}

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Acknowledgements: We thank Dr Teuila Percival (who first began to audit these cases in 1993); Sue Guthrie, Susan Grieve and Miriam Rea from Clinical Records (who gave invaluable assistance with coding and tracking files); and John Thompson from the Department of Paediatrics, University of Auckland (who kindly provided his statistical expertise).

This data was first presented at the Paediatric Society of New Zealand Conference in Napier, New Zealand in November 2000.

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References:


Co-morbidities in trauma patients: common and significant
Chuan-Ping Tan, Alex Ng, Ian Civil

Abstract

Introduction Trauma is a heterogeneous ‘disease’ that affects all age groups with varying degrees of severity. While injury severity, time to definitive care, and the quality of care in trauma patients have been quantified, it has been much more difficult to quantify pre-existing health status or ‘host factors’ in trauma patients and relate them to trauma outcome. Numerous studies have attempted this task, but none have succeeded in producing a simple system to quantify co-morbidities. As a prelude to developing a simple Abbreviated injury scale (AIS)-like’ score, the incidence of major and minor co-morbidities (and outcomes) in a cohort of admitted trauma patients ≥40 years of age were evaluated.

Methods A prospective review of the Auckland Trauma Registry of trauma patients age ≥40 years that were admitted to Auckland Hospital between 1 January 2003 and 3 March 2003 was performed. Among the data collected were the patient’s co-morbidities. The co-morbidities were divided into major and minor co-morbidities: major co-morbidities were defined by criteria found in the APACHE 2 PIC system, whereas minor co-morbidities were all the other co-morbidities not included in the APACHE 2 PIC system.

Results A total of 105 patients were included. There were 57 males and 48 females in this study. Overall, 71% of the population had pre-existing co-morbid conditions, with 23% having a major co-morbid condition. Major trauma [injury severity score (ISS) of 15] was seen to decrease as age increases. The mortality rate in this group of patients was 4.7%.

Discussion Co-morbidities were surprisingly common in trauma patients. Trauma outcome in patients with co-morbidities is difficult to predict and is not well addressed by any of the existing injury scales. The possibility of developing single ‘AIS-like’ co-morbidity score merits ongoing evaluation. The prevalence of co-morbidities in trauma patients ≥40 years of age suggests that the influence of co-morbidity on outcome should be considered in a much greater cohort than is currently the case.

Trauma is a heterogeneous ‘disease’ that affects all age groups with varying degrees of severity. Factors that affect trauma outcome include the severity of the injury, pre-existing health status, time to definitive care, and the quality of care.

While injury severity, time to definitive care, and the quality of care in trauma patients can be easily quantified, it has been a lot more difficult to quantify pre-existing health status (or ‘host factors’) in trauma patients and relate these to trauma outcome.

The trauma literature gives little credence to co-morbidities seen in trauma patients. In most trauma outcome analyses, the surrogate of age is used to represent co-morbidity.
In the most commonly used trauma outcome analyses, age >55\(^1\) is used as a single co-morbid surrogate.

In an earlier analysis of co-morbidity in trauma patients admitted to Auckland Hospital,\(^2\) co-morbidities were seen in patients aged as young as 40 years of age.

As part of a larger study designed to establish a single abbreviated injury scale (AIS)-like grade for co-morbidity (where the clinical severity of the patient’s co-morbidity is graded like the AIS),\(^3\) the authors evaluated the incidence of all major and minor co-morbidity in a cohort of trauma patients aged ≥40 years admitted to Auckland Hospital.

**Methods**

**Study type**—A prospective study of the incidence of co-morbidities in trauma patients aged ≥40 years who were admitted to the Auckland hospital was undertaken.

**Study population and period**—Between 1 January 2003 and 3 March 2003, data was collected on all trauma patients admitted to Auckland Hospital. The primary inclusion criterion for the study were patients who had suffered a significant traumatic event that required a period of hospitalisation under the trauma team. The second inclusion criterion was that the population to be studied had to be 40 years of age or greater.

**Data collected**—The data was collected using a customised trauma registry available to the Auckland Hospital trauma team.\(^4\) We also recorded major and minor co-morbidities from these patients. The APACHE 2 PIC (pre-injury conditions) system\(^5\) was used to define our criteria for major co-morbidities, whereas minor co-morbidity was any other ongoing condition recorded in the patient clinical record or noted by the first author.

**Data collection method**—Patients were identified by checking Auckland Hospital’s Trauma Registry daily. The first author then reviewed the case notes; and if the case notes were unclear, the patient would then be interviewed. A simple questionnaire with the data points stated above was used to facilitate data collection. Data was also collected from the Auckland Hospital Discharge Database.

**Results**

During the study period (1 January 2003 to 3 March 2003), 105 patients who fitted the above study criteria were reviewed. Of these 105 patients, 57 were males and 48 were females. Their demographics, co-morbidities, ISS (injury severity score), and outcome data are broken down into the various age groups as seen in Table 1.

**Table 1. Demographics table**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Gender</th>
<th>Major co-morbidities</th>
<th>Minor co-morbidities</th>
<th>ISS&gt;15</th>
<th>Mortality</th>
<th>Home</th>
<th>SNF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>M</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40–50</td>
<td>12</td>
<td>20</td>
<td>2 (6.3%)</td>
<td>11 (34.4%)</td>
<td>6</td>
<td>26</td>
<td>4</td>
</tr>
<tr>
<td>51–60</td>
<td>12</td>
<td>17</td>
<td>3 (10.3%)</td>
<td>17 (58.6%)</td>
<td>5</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>61–70</td>
<td>7</td>
<td>9</td>
<td>7 (43.8%)</td>
<td>9 (56.3%)</td>
<td>3</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>71–80</td>
<td>13</td>
<td>7</td>
<td>8 (40%)</td>
<td>14 (70%)</td>
<td>1</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>81–100</td>
<td>4</td>
<td>4</td>
<td>4 (50%)</td>
<td>4 (50%)</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

ISS=injury severity score; SNF=specialised nursing facility; LOS=length of stay
Co-morbidities were seen in all age groups in both genders. Overall, 71% of the population had pre-existing co-morbid conditions; 23% of the study population had major co-morbidity described in the APACHE 2 PIC system (Table 2).

**Table 2. APACHE 2 Pre-injury criteria (PIC)**

<table>
<thead>
<tr>
<th>Co-morbidity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatic dysfunction</td>
<td>Biopsy proven cirrhosis or presence of portal hypertension</td>
</tr>
<tr>
<td>Cardiovascular co-morbidities</td>
<td>New York Heart Association Class 4 (angina at rest)</td>
</tr>
<tr>
<td>Respiratory co-morbidities</td>
<td>Chronic restrictive, obstructive or vascular disease resulting in exercise limitation</td>
</tr>
<tr>
<td>Renal co-morbidities</td>
<td>Receiving haemodialysis or CAPD</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Type 1 or 2 diabetes</td>
</tr>
</tbody>
</table>

CAPD=chronic ambulatory peritoneal dialysis.

Examples of the minor co-morbidities are shown in Table 3.

**Table 3. Minor co-morbidities**

- Back pain
- Gout
- Peptic ulcer disease
- Bipolar disorder
- Hypertension
- Alcoholism
- Peripheral vascular disease
- Atrial Fibrillation
- Rheumatoid arthritis

An ISS of >15 is classified as major trauma. Injury severity in patients admitted to Auckland Hospital was found to decrease as age increases.

The mortality rate in this study population was 4.7%. All deaths were due to unsurvivable head injury.

The mean length of stay for the cohort of study patients was 8 days (range 1–61 days), and there was an association between major co-morbidities and the length of stay.

When we compared the length of stay between those with and without co-morbidities, their length of stay in hospital was 11 days (range 1–61 days) vs 6.8 days (range 2–35 days).

Twenty-one percent of the patients were discharged to a specialised nursing facility (ie, other hospitals, nursing homes, or rehabilitation facility). Of these 21% who were discharged to a specialised nursing facility, 33% had an ISS of >15.

**Discussion**

The results of this study showed that co-morbidities are very common in trauma patients admitted to Auckland Hospital. The prevalence of co-morbidities in the various age groups seen in this study is similar to that seen by Mittal et al in their
They noted that 53.3% of patients aged ≥60 years had co-morbidities compared with our study where we found that 58% of patients aged ≥65 years had co-morbidities.

One of the limitations in our study was the small number of patients so we cannot draw any statistically significant conclusions—but when we analysed the data, we found that those patients with major co-morbidities tended to have a longer hospital stay [11 days (range 1–61 days)] compared to those without co-morbidities [6.8 days (range 2–35 days)].

Morris et al (in their study of the effect of pre-existing conditions on mortality in trauma patients) showed that 8.8% of all trauma patients admitted into all acute care hospitals in California in 1983 had co-morbidities. When they analysed their data by breaking the patients up into various age groups they found that 25% of all patients aged ≥65 years had co-morbidities compared to our study which is about 58%. One of the limitations of the study by Morris et al is that they depended on the discharge medical records for their study data, which could have grossly under-reported the incidence of co-morbidities in these patients.

A similar study by Milzman et al prospectively evaluated the effect of pre-existing disease on the mortality of trauma patients, and found that 16% of their study population of 7798 patients had one or more co-morbidities. On further analysis of their results, they found that the mean age of patients with co-morbidities was 49.2 years, whereas the mean age for those without co-morbidities was 30.6 years. When they reanalysed their results according to age groups, they found that 48.8% of all co-morbidities occurred in the age group ≥65 years.

In Table 1, we also note that, as age progresses, the number of major co-morbidities increases—whereas that of the minor co-morbidities decreases. This trend is surprising as we would expect the number of minor co-morbidities to increase as well. This could be due to the fact that younger patients may have had fewer medical records to go through, hence data collection of co-morbidities would be easy.

In contrast, the older age group may have had extensive medical records and minor co-morbidities in this group might have been overlooked. The minor co-morbidities seen in this older age group are shown in Table 3. Some of the minor co-morbidities (such as atrial fibrillation and peripheral vascular disease) although not life threatening on their own, could contribute significantly to the patient’s morbidity and mortality when included in the trauma scenario.

Undoubtedly, severe co-morbidity in a young patient (<40) is likely to affect outcome, but the likelihood of such co-morbidities in this age group is low. Existing trauma scales (using age as a surrogate) effectively draws a line at 55 years of age and suggest that co-morbidity above 55 will affect the outcome of the patient—whereas below 55, co-morbidity is relatively uncommon.

Similarly we drew a line at the age of 40 (based on our previous pilot study), however we believe that analysis of specific co-morbidities, rather than age, will allow us to apply a ‘severity factor’ to any injured patient, regardless of age.

Some studies have investigated the effect of co-morbidities on a trauma patient outcome. All of these studies found that the presence of co-morbidities worsens the outcome of the trauma patient, but unfortunately they suffered from methodological
problems, such as flaws in the classification of minor vs major co-morbidities (studies using ICD 9 classification versus the APACHE system) and over-reliance on medical records in collecting study data which could have significantly under-reported the incidence of co-morbidities in the study populations.

Richmond et al\(^8\) found that pre-existing medical conditions did not contribute to mortality risk but the authors noted that their finding was inconsistent with the current literature and they believed the reason for their study finding was due to their inability stratify the medical condition by severity (which may have led to the above finding). However these methodological flaws were implicated in the study by Morris et al\(^4\) which found that the presence of co-morbidities worsens the outcome of the trauma patient.

The same study by Richmond et al\(^8\) showed that whilst co-morbidities did not influence mortality they increase the odds of experiencing a complication, and these complications significantly increased the odds of death.

Because of the modest numbers patients in our study, we were unable to observe any statistically significant association between ‘pre-existing co-morbidities’ and ‘mortality and final destination at discharge’. Indeed, co-morbidities in trauma patients are complex and not well addressed by any of the existing injury scales.

Our study shows that co-morbidities are surprisingly common in trauma patients and likely to impact on the outcomes—both in terms of survival and complications/length of stay. The results also suggest that it is feasible to perform a larger scale study at Auckland Hospital to further evaluate the effect of co-morbidities on the outcome of trauma patients. An appealing possibility would be the development of a modifier to the current ISS system that incorporates a single ‘AIS–like’ co-morbidity score.

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**References:**


Impact of concomitant trauma in the management of blunt splenic injuries

Albert Lo, Anne-Marie Matheson, Dave Adams

Abstract

Aims Conservative management of isolated blunt splenic injuries has become widely accepted for haemodynamically stable patients, but may be untenable in those with multiple injuries. A retrospective review was performed to evaluate of our cumulative experience with non-operative management of splenic injuries, and to identify the risk factors for operative management.

Methods Eighty patients were identified. Demographics, mechanism of injury, injury severity score (ISS), clinical signs at presentation, utility of computed tomography scans and methods of treatment (operative management vs conservative management) were documented and statistically analysed to identify predictors for operative management.

Results Initially, 45 patients (56%) were managed without operation, while 35 patients underwent urgent laparotomy—with 26 (74% in operative group) of these having splenectomy performed. Two patients (out of 45) failed conservative management and required delayed splenectomy, a 96% success rate for intended conservative management. Thus, overall rates of 54% non-operative management and 65% splenic conservation were achieved. The mean ISS of the operative management group (ISS=30) was higher than that of the non-operative treatment group (ISS=13, p<0.05), reflecting not only the grade of the splenic injury but also the severity of concomitant trauma. Risk factors for patients with blunt splenic injuries requiring operative management include ISS ≥16, hypotension, GCS =13, and requirement for blood transfusion (p<0.05).

Conclusions Appropriate patient selection is the most important element of non-operative management. Patients with splenic injuries who are haemodynamically stable can be managed non-operatively with acceptable outcome. However, in the presence of concomitant trauma, there is an increasing trend towards operative management.

Major changes have occurred in the management of blunt splenic injuries in the previous 50 years. The concept of universal splenectomy for splenic injuries remained unchallenged until King and Shumacker described (in 1951) life-threatening infections in paediatric patients after splenectomy.¹

The incidence of overwhelming post-splenectomy infection (OPSI) following splenectomy in the trauma setting is reported to be 0.5%, and can reach up to 20% in patients with haematological disorders.² The concept of conservative management of splenic injuries has become increasingly accepted by trauma surgeons, especially in the past two decades because of the development of modern imaging techniques.
However, in the presence of a tender, distended abdomen and other concomitant injuries, a rapid deterioration in a patient's haemodynamic condition presents a major challenge for clinicians trying to pinpoint the source of bleeding. These patients are often taken to theatre for exploratory laparotomy after positive findings on ultrasound (FAST) scan or diagnostic peritoneal lavage (DPL). Alternatively, if the patient's initial haemodynamic status is stable enough to allow for abdominal computed tomography (CT) imaging which shows splenic injuries, clinicians are faced with the dilemma of whether to operate or to monitor these patients with multisystem injuries, whose potential to withstand subsequent major haemorrhage may be compromised.

Conservative management remains the cornerstone of treating haemodynamically stable blunt splenic injuries. This study is undertaken to review our cumulative experience of non-operative management and to identify the risk factors for operative management in patients with blunt splenic injuries.

Patients and Methods

From September 1997 to February 2003, retrospective analysis of medical records of patients with blunt splenic injury treated in Middlemore Hospital, Auckland was carried out.

Data collected included patient demographics, mechanisms of injury, vital signs, blood results on admission, imaging and other diagnostic modalities, transfusion requirement, operative findings, postoperative course, duration of hospital stay, and follow-up. Details of immunisation such as Pneumovax®, *Haemophilus influenzae* type B vaccine, meningococcal vaccine, and further use of CT scans in re-assessment of the progress of splenic injuries were also recorded.

For each patient, an injury severity score (ISS) and grading of severity of splenic injury by CT scan (based on the organ injury scale [OIS]) were calculated. The ISS is an anatomical scoring system that provides an overall score derived by combining squared abbreviated injury scores from the three most severely injured body regions.

Patient management was categorised as:
- Operative management (OM),
- Non-operative management (NOM), or
- Failure of NOM, requiring splenectomy (F/NOM).

Statistical analysis of the data was performed with the Student's *t* test for age, ISS, and chi-squared test for comparison of parameters between patient groups.

Results

Eighty patients were identified. The overall mean age at presentation was 34.2 years (range 2 to 84 years). There were 52 males and 28 females patients (male:female ratio of 1.86:1). Seven of the patients were ≤15 years old.

As illustrated in Figure 1, there were 35 patients (24 male, 11 female) in the operative management (OM) group; 43 patients (27 male, 16 female) in the non-operative management (NOM) group; and 2 patients (1 male, 1 female) who required splenectomy after failure of conservative treatment (F/NOM).

The mean age of patients was 34.0 in the OM group and 34.3 in the NOM and F/NOM group. Stated ethnic origins were European: 54%; Maori: 23%; Pacific Island: 11%; and other ethnic groups (including Chinese and Indian) in the remainder.

Mechanism of injuries

Motor vehicle accident (MVA) was the most common (involving 57 patients) mechanism of injury, while 10 patients sustained splenic injuries from sports...
activities; 8 from falls, and 5 from various other mechanisms (e.g., assault, crush injuries).

Figure 1. Distribution of patients

80 patients

45 pts NOM & F/NOM

35 pts Operative (OM)

43 pts successful NOM

2 pts failure NOM

54% overall rate for NOM

96% success rate of conservative Rx

NOM=non-operative management, F/NOM=failure of non-operative management, Rx=treatment; pts=patients.

Among the patients involved in MVA, 38 patients were either passengers or drivers in a vehicle, while the remaining patients were pedestrians (n=9), motorcyclists (n=9), and a cyclist (n=1).

Pedestrians were the most severely injured group, with moderate-to-severe head injuries being noted in 78% of this group (Table 1). A higher proportion of pedestrians required operative management, although this did not reach statistical significance.

Table 1. Mechanism of injury in motor vehicle accident (MVA) patients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pedestrian (n=9)</th>
<th>Vehicles (n=38)</th>
<th>Motorcycle (n=9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCS ≤13</td>
<td>78%</td>
<td>24%</td>
<td>22%</td>
</tr>
<tr>
<td>Mean ISS</td>
<td>30</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Operative management</td>
<td>67%</td>
<td>46%</td>
<td>44%</td>
</tr>
<tr>
<td>Splenectomy</td>
<td>44%</td>
<td>32%</td>
<td>44%</td>
</tr>
</tbody>
</table>

GCS=Glasgow coma score; ISS=injury severity score; *p<0.05

Utility of CT scans on initial assessment of splenic injuries

All patients (100%) in the NOM group had a CT scan to determine the extent of splenic injuries; while only 48.6% of patients in the OM group had a CT scan. The remaining patients in the OM group were haemodynamically unstable after initial
fluid resuscitation. One patient (an 8-year-old male pedestrian hit by a car) was transferred to the operating theatre on clinical grounds alone, while the other subjects had positive findings either on diagnostic peritoneal lavage (34.3%) or focused abdominal sonography for trauma (FAST) exams (14.3%).

Half of those patients with positive diagnostic peritoneal lavage (DPL) were found to have other associated intra-abdominal injuries (eg, liver laceration, mesenteric tear, greater omentum tear).

The distribution of the severity of splenic injury (as determined by CT scan) for the operative management group and conservative treatment group is demonstrated in Figure 2. There is a trend towards increased severity of splenic injuries in the operative management group. For those patients who had successful conservative management of their grade 4 and 5 splenic injuries, associated injuries were limited to thoracic injuries such as rib fractures and haemopneumothorax.

**Figure 2. Distribution of severity of splenic injuries by CT grading**

![Bar chart showing the distribution of severity of splenic injuries by CT grading.](chart)

OM=operative management; NOM=non-operative management.

**Non-operative management (NOM)**

Forty-five patients (56%) were initially treated non-operatively, 43 (54%) of these had successful NOM. This is a 96% success rate of non-operative management. Thirteen patients (29% in the NOM group) were initially admitted to the intensive care unit (ICU) for observation, incurring an average length of stay of 2 days (range 1–11 days). There were no deaths in the NOM group.
Four patients (9%) required epidural anaesthesia for pain relief. Red blood cell (RBC) transfusion was given to three NOM patients (average: 3 units). Repeat CT scans (during both inpatient stay and outpatient follow-up) to examine the extent and progress of splenic injuries were performed on five patients (11% in the NOM group).

**Operative management (OM)**

A total of 28 patients (35% splenectomy rate) had splenectomy (26 of the 35 patients in the OM group and 2 patients in the F/NOM group). The remaining 9 patients in the OM group did not have splenic injuries, which were severe enough to warrant splenectomy. A variety of splenic conservation techniques were performed in these patients including Surgicel® wrap, suturing, and partial excision.

Five out of 9 patients (in OM group) who did not have splenectomy were found to have other intra-abdominal injuries such as small bowel mesenteric tear, liver lacerations, and ruptured bladder which required simultaneous surgical interventions. The mean operative time was 81 minutes.

Twenty-five patients (71.4% in the OM group) required intra-operative blood transfusion, with an average of 6.8 units transfused. Twenty-one patients (60% in the OM group) were admitted into ICU postoperatively for an average of 3 days.

**Mortality rates**

There were no deaths in the NOM group including those two patients with failure of NOM. However, there were 3 intra-operative deaths and seven postoperative deaths. Two patients succumbed to uncontrolled intra-abdominal haemorrhage intra-operatively, and the remaining death was due to the severity of combined intra-abdominal and thoracic injuries (haemopneumothorax and haemopericardium).

Causes of postoperative deaths included extensive brain injury sustained during trauma (three patients), coagulopathy (three patients) and multi-organ failure (one patient). This gives a mortality rate of 28.6% in the OM group (12.5% overall mortality rate).

**Failure of non-operative management (NOM)**

There were two patients in the F/NOM group. The first patient had re-bleeding from her splenic lacerations 5 days after admission to the general surgical ward. On admission, her GCS was 15, ISS: 13, and haemoglobin: 123 g/L. She had a grade II splenic injury on CT. However, on day 5, she became hypotensive (despite fluid resuscitation) and was found to have a reduced haemoglobin (93 g/L). She was taken to the operating theatre for emergency splenectomy.

The second patient was a 35-year-old female who was anticoagulated with warfarin for Factor V Leiden and previous deep vein thromboses (DVTs) (INR=2.2 on admission). She sustained right radius and left humerus fractures in a motor vehicle accident. She was haemodynamically stable with a haemoglobin level of 143 g/L. CT abdomen on admission did not reveal any splenic injury or other evidence of intra-abdominal bleeding.

Eight days post-injury she became hypotensive with signs of abdominal peritonism and her haemoglobin level dropped to 82 g/L. During emergency laparotomy, it was...
found that there was a small splenic capsular tear with 2 litres of free blood in the peritoneal cavity. Splenectomy was carried out.

Both patients had an uneventful recovery period. Due to the small number of patients, meaningful analysis of predictors for failure of conservative treatment was not possible. Neither of the patients in the F/NOM group had a repeat CT abdomen prior to emergency splenectomy.

**Operative versus non-operative management**

Table 2 highlights the differences between those patients who were initially planned for conservative treatment (NOM and F/NOM) and those who had emergency surgery (OM). Thirty-five patients were taken to the operating theatre for emergency laparotomy. The mean ISS of this OM group was 30, significantly higher (p<0.05) than conservative treatment groups, 13.

<table>
<thead>
<tr>
<th>Variable</th>
<th>OM (n=35)</th>
<th>NOM and F/NOM (n=45)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISS ≥16</td>
<td>89%</td>
<td>34%</td>
</tr>
<tr>
<td>Mean ISS</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td>Systolic BP &lt;100</td>
<td>37%</td>
<td>2%</td>
</tr>
<tr>
<td>GCS ≤13</td>
<td>40%</td>
<td>9%</td>
</tr>
<tr>
<td>Patients require blood transfusion in ED</td>
<td>40%</td>
<td>9%</td>
</tr>
</tbody>
</table>

OM=operative management; NOM=non-operative management; F/NOM=failure of NOM, requiring splenectomy; GCS=Glasgow coma score; ISS=injury severity score; BP=blood pressure; ED=emergency department; *p<0.05.

Put another way, the proportion of patients with severe injuries (as defined by ISS ≥16) was 89% in the OM group compared with 34% in the NOM and F/NOM group. The respective differences between these groups with regards to systolic hypotension (BP <100 mmHg): (37% vs 2%), severity of head injury (GCS ≤13): (40% vs 9%) and requirement of blood transfusion in ED: (40% vs 9%), were also statistically significant (p<0.05).

**Vaccinations**

All the patients who had splenectomy received pneumococcal vaccine. In addition, all except three of these patients were immunised against *Haemophilus influenzae* type b and meningococcal infections. Twelve patients in the NOM group received pneumococcal vaccine, the majority of whom had high grade (III-V) splenic injuries on their CT scans.

**Discussion**

Algorithms delineating the initial management of splenic injury recommend either observation or operation as acceptable initial therapeutic options in patients who are appropriately selected.6

A variety of operative techniques for salvaging injured spleens have been described, and splenorrhaphy is an accepted alternative to splenectomy when clinically and
technically feasible. Splenectomy is increasingly reserved for the conditions of haemodynamic instability or anatomic injury beyond repair. In this study series, both patients in the F/NOM group had splenectomy because of haemodynamic instability. Their splenic injuries did not preclude repair (grade II injury and capsular tear respectively), but rather their unstable haemodynamic conditions mandated the procedure.

We attempted non-operative management in 56% of patients, and achieved 96% success rate (54% overall rate of NOM). Two large series corroborate these results. Hunt et al, in a state-wide analysis of 2258 patients, found that conservative management rate increased from 33.9% to 46.3% over a 5-year period, with a success rate of 94%. A large, single institution study by Pachter et al of 190 consecutive patients reported 65% initial rate of NOM and 98% success rate. In an Australasia setting, the reported initial rate of NOM ranged from 46% to 75%.

Patients with blunt splenic injuries often have a variety of concomitant injuries (eg, head injuries, orthopaedic injuries, or other intra-abdominal injuries). There is no specific rigid treatment protocol for treating splenic injuries in our institution. Management is individualised for each patient and based on multiple variables. For persistent haemodynamic instability (or unresolved concerns about other concomitant injuries), operative management is the preferred treatment option. The mean ISS of OM group in our study series was 30, compared to 13 in the conservative treatment group.

Within the limitations of a retrospective study, ISS ≥16, hypotension, GCS ≤13, and requirement for blood transfusion were found to be significantly associated with operative management. Furthermore, a study of 226 patients by Shapiro et al over a 5.5-year period also identified ISS, GCS score, revised trauma score (RTS), and amount of RBC transfused as risk factors for patients sustaining blunt splenic injuries requiring immediate surgery.

These observations may lead to the suggestion that the responsible trauma surgeons have a selection bias for treating multi-system trauma patients operatively in a bid to decrease the proportion of patients likely to fail non-operative management without compromising the overall rate of successful non-operative management. Indeed, this problem of selecting appropriate treatment option for multi-system trauma patients will continue to exist in the absence of concrete, reliable predictors for failure of non-operative management. Age >55, degree of haemoperitoneum, ISS >15, and American Association for the Surgery of Trauma (AAST) injury scale of grade >III on CT scans are suggested by some authors to be contraindications for non-operative management of blunt splenic injuries. However, none of these predictors have proven to be completely reliable.

In this study, 9 patients (out of 35) in the operative group did not have splenic injuries which were severe enough to warrant splenectomy—but 5 of these were found to have other intra-abdominal injuries and were treated accordingly. One may argue that the remaining 4 patients (11.4% in OM group) should be given a trial of conservative therapy. However, their haemodynamic instability after initial fluid resuscitation, in whom concomitant intra-abdominal injuries cannot be definitely ruled out, mandated exploratory laparotomy.
The use of CT imaging has become an integral tool for the management of splenic injuries in patients who are haemodynamically stable. Several grading systems for the severity of splenic injuries are available.\textsuperscript{10,11,16,17} We used the OIS (organ injury score) because of its compatibility with the calculation of the ISS. Sugrue et al\textsuperscript{12} suggested that CT changes are predictive of outcome for non-operative treatment and that patients with more severe splenic injuries on CT grading should undergo early surgical intervention regardless of the cardiovascular status of the patient. On the other hand, Pachter et al\textsuperscript{9} reported their algorithmic approach to stable patients which includes a period of nonoperative management for all stable patients, regardless of the grade of injury.

Shapiro et al\textsuperscript{13} concluded that CT imaging underestimate the severity of injury, especially in the subset of patients who failed non-operative management because of progression of injury and continued bleeding. In the present series, there were 6 patients in the non-operative group with grade 4 and 5 splenic injuries on CT scans with successful conservative treatment.

Although CT imaging is a useful tool, the reported accuracy in determining the severity of splenic injury is variable.\textsuperscript{18} Therefore, we believe decision-making should not be dictated solely by the CT findings.

Conclusion

Both non-operative (NOM) and operative management (OM) have a role in the current treatment of blunt splenic injuries. The results of this study suggest that non-operative management of appropriately selected patients can be achieved with acceptable outcome. In the presence of concomitant trauma, patients with blunt splenic injuries are more likely to require operative management if they have ISS $\geq 16$, hypotension, GCS $\leq 13$, and requirement for blood transfusion.

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References:


Head injury and associated maxillofacial injuries

Derek Goodisson, Martin MacFarlane, Leslie Snape, Balsam Darwish

Abstract

Aims To review patients admitted with head injuries under a regional neurosurgical service, to document the incidence and features of associated maxillofacial trauma, and to assess any delay in referral to a maxillofacial surgeon for definitive management of facial injuries.

Methods The details of all patients admitted under the neurosurgical service at Christchurch Hospital over the preceding 7 years (1995–2002) were reviewed via that department’s database. The records of those patients noted to have a maxillofacial injury were requested, and the following data obtained: demographics, diagnosis, and mode of injury (including specific variables such as alcohol consumption and seatbelt usage in motor vehicle accidents).

Results 2307 patients were admitted under the neurosurgical service at Christchurch Hospital over a 7-year period. Five percent of those patients had an associated maxillofacial injury. Three-quarters were men, with an average age of 27 years. Motor vehicle accidents and assaults were the most common cause of injury. Nearly one-third of those persons in motor vehicle accidents were not wearing seatbelts. Alcohol was more frequently involved in mild and moderate head injuries and these patients were more likely to have been assaulted than those admitted with severe head injuries. There were no significant delays in referring patients admitted who had an associated maxillofacial injury to a maxillofacial surgeon.

Conclusions A small but significant number of patients admitted with head injuries will have an associated maxillofacial injury.

Approximately 20% of patients with maxillofacial injuries may have an associated head injury. Although head injury is well recognised in those patients admitted with maxillofacial trauma, there is little information available regarding those patients admitted with head injuries who also have maxillofacial injuries.

Schiltz et al only reported on patients with severe head injuries; they found that 20% had an associated maxillofacial injury. Their data was further limited to those patients who had undergone surgery for open head injuries, and did not include those with lower facial skeleton involvement or those with so called closed head injury. Other studies have focused on the incidence of head injuries in those admitted with maxillofacial injuries.1,3,4

Methods

Following Ethics Committee approval, the details of patients admitted over a 7-year period to the Neurosurgical Service at Christchurch Hospital were reviewed through the comprehensive Microsoft Access® database developed by that Service. The records of those patients noted to have a maxillofacial injury were then requested, and demographic details, diagnoses, and aetiology were all crosschecked with the database. The Ommaya classification of head injury5 was used which simply grades head injury into mild, moderate, or severe categories (based on the period of loss of consciousness and amnesia).
Maxillofacial trauma included trauma of the craniofacial skeleton (extending from the frontal bone to the mandible). Dentoalveolar trauma was included, but not minor soft tissue injuries. Pan facial fracture is defined here as three or more fractures of the craniofacial skeleton at two or more levels (mandible, Le Fort I, II, III, or frontal bone).

Patients who were not admitted under the Neurosurgical Service (including those not surviving intensive care or those seen briefly in the emergency department and discharged by them) were not included in the study.

Results

2307 patients were admitted with head injuries under the Neurosurgical Service over a 7-year period (1995–2002). Of these patients, 5% were documented as having an associated maxillofacial injury. Seventy-five percent of these patients were male. The average age was 27 years for men and 20 years for women, and the overall age range was 2–80 years.

Motor vehicle accidents (MVA) and assaults were the cause of injury in over 50% of patients with maxillofacial injuries in this series (Figure 1). Falls and sports accounted for another 30% of cases. When examined by degree of head injury, MVA and assault were predominant in mild head injuries—but as the head injury became more severe, motor vehicle accidents became the main cause (68% of severe head injuries).

When looking at all head injuries (regardless of cause), alcohol was involved in 18% of mild, 20% of moderate, and 8% of severe head injuries. When cause of injury was taken into account, 68% of those who had been assaulted and one-third of those in the MVA group reported alcohol use. Regarding those involved in MVA, seatbelt use was reported in the majority of cases (68%), revealing that one-third of patients were still unrestrained. When seatbelts were not used, head injuries were mostly mild (54%) or moderate (46%), and no cases of severe head injury were recorded when seatbelts were not worn.

The pattern of facial injuries was related to the degree of head injury. Those with lower (mostly mandibular), mid, or upper facial fractures in isolation were most likely to have a mild head injury (71%, 62%, and 61% respectively). All patients with pan facial fractures had severe head injuries. As the severity of head injury increased, the complexity of facial fracture increased, as did the fracture site (upper and mid face versus lower face) (Figure 2).

There was no significant delay in referring facial fracture patients to a maxillofacial surgeon. For those patients with mild head injuries, the median delay was 1 day (range 1–4 days); and for those patients with moderate head injuries, the median delay was 2 days (range 1–2 days). There were no delays in referral of facial fractures in those patients with severe head injuries (ie, they were referred at the time of admission).
Figure 1. Mode of injury in patients with head injuries and maxillofacial trauma

- MVA: 32%
- Fall: 17%
- Assault: 20%
- Sport: 13%
- Other: 4%
- Bicycle: 6%
- Work: 8%

Figure 2. Head injury versus distribution of facial fractures

Mild
- Upper: 42%
- Mid: 35%
- Lower: 23%

Moderate
- Upper: 47%
- Mid: 37%

Severe
- Upper: 33%
- Lower: 13%
- Pan: 21%
Discussion

Five percent of patients admitted to Christchurch Hospital’s Neurosurgical Service were found to have an associated maxillofacial injury. Motor vehicle accidents were the most common cause of injury, and MVA and assaults were responsible for over half of all cases -this is in contrast to maxillofacial admissions at the same hospital, where assault is outstandingly the most common cause of facial injury.6 This may reflect the different groups that each specialty serves, with assaults less likely to cause a head injury requiring neurosurgical admission.

The pattern of facial fracture varied with the severity of head injury; those patients with fractures of the lower facial skeleton were more likely to have sustained a mild head injury; those patients with fractures of the mid or upper facial skeleton were more likely to have suffered moderate head injuries; and those patients with pan facial fractures almost uniquely had severe head injuries—thus supporting the intuitive association between severity of facial injury and severity of head injury.

This is also reflected in the cause of injury; patients with fractures of the lower and mid facial skeleton were more likely to have been assaulted while those with upper or pan facial fractures involved in MVAs.

Unsurprisingly, alcohol use at the time of injury was more prevalent in those patients who had been assaulted. Somewhat disturbingly in a country with strictly enforced drink-driving regulations, one-third (of those patients involved in MVA) reported alcohol use at the time of injury.

Equally concerning is the finding that in nearly one-third of MVAs, seatbelts were not used. The rather paradoxical finding here of increased severity of head injury with seatbelt use may reflect that severe head injuries are often the result of high-speed impacts, occurring mostly on open roads in our hospital’s catchment area, and that these drivers are more likely to be restrained than those in lesser speed (possibly suburban) accidents, where a vehicle’s occupants would be expected to sustained less severe head injuries. It is also possible that patients not wearing seatbelts did not survive long enough to be admitted under neurosurgical care.

Reassuringly, there were no significant delays in referral of maxillofacial injuries, and in those 9% of cases where a delay was noted, this was not thought to have altered the patient’s outcome. This may reflect the close relationship between neurosurgical and maxillofacial services and also with intensive care, who would (in general) provide the initial care for patients with severe head injuries.

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References:


6. Personal correspondence with Mr L Snape with reference to Christchurch Hospital Maxillofacial Surgery Trauma Book 1995–2002; 2003
Information provision after mild traumatic brain injury (MTBI): a survey of general practitioners and hospitals in New Zealand

Catherine Moore, Janet Leathem

Abstract

**Aims** To determine the nature, extent, and quality of information provided by general practitioners (GPs) and hospital emergency departments to people after mild traumatic brain injury (MTBI).

**Method** A survey was distributed throughout New Zealand to a representative sample of GPs and emergency departments (EDs).

**Results** 244 valid surveys were returned, (229 from GPs and 15 from EDs), giving a return rate of 50.1%. Included with the returned surveys were 145 samples of information that these agencies typically provide after MTBI.

Overall, 45.9% of respondents (93.4% of EDs and 42.8% of GPs) provided an information sheet to patients with a confirmed or suspected MTBI. These generally covered signs and symptoms; when to seek medical attention; and advice about pain relief, driving, alcohol, and rest. Of the information sheets provided by EDs, 92.9% had a FRE score of over 61 (the level recommended to be able to be read by 70% of the population), compared to 56% of those provided by GPs. Information sheets ranged in length from ½ a page to 10 pages, with those provided by EDs generally longer than those provided by GPs (mean 33.6 compared to 12.9 sentences).

**Conclusions** Less than half of the GPs who returned questionnaires routinely provided information sheets about head injury and what to expect. Of the sample information sheets that were returned, just under half did not meet the criteria for being able to be read by 70% of the population.

Providing patients and their families/caregivers with appropriate information (at a suitable time, and in a format that they can understand) reduces their anxiety and use of health services overall (by 7–17%). It also improves compliance with medicines and other treatment interventions and recovery rates.

While it has been suggested that the information provided to patients should be examined to ensure that it is appropriate for the mean reading level of their population, research has shown that it is more often written at a university or postgraduate level and/or it is so technical that very few people can understand it. This may be due to the fact that nurses and other health professionals often receive training in verbal communication with patients, but not in how to write at an appropriate readability level.

In a recent survey of patient information leaflets in palliative care units in the UK, 64% of the leaflets were found to have a Flesch Reading Ease (FRE) score (the average sentence length in words and the number of syllables per 100 words) that
indicated they could only be understood by 40% of the population.\textsuperscript{8} This survey also revealed inadequacies in legibility—in terms of font size, contrast between text and paper colours, use of illustrations, and justification of text.

Dating of information leaflets to ensure they are kept up-to-date was also a problem, with only 19.5% of leaflets having a date on them somewhere. The leaflets scored well on the use of headings and bullet points, low levels of medical jargon, personal style of writing, and clarity of content.

People with mild traumatic brain injury (MTBI), are a group for whom the provision of information is very important. Not only are they a group increasingly likely to be treated in ambulatory care settings including general practitioners’ rooms, emergency departments, and accident and medical centres,\textsuperscript{10} but MTBI is associated with the risk of ongoing neurobehavioural symptoms—eg, headaches and dizziness to trouble performing cognitive tasks and intolerance to sensory stimuli.\textsuperscript{11}

The provision of educational material that emphasises aspects of self-management and where to get assistance if necessary, is a valuable tool to reduce ongoing problems. Despite this, the actual practice of providing such information upon discharge remains rather haphazard.\textsuperscript{12,13}

In New Zealand, guidelines produced by the ACC for providers of healthcare services for people with mild MTBI, recommend that all patients should be screened for post-concussive syndrome and provided with information and intervention to help them minimise their risk of developing ongoing difficulties in the long-term.\textsuperscript{11}

Leathem, Heath, and Woolley\textsuperscript{14} concluded (in a New Zealand study) that the amount, quality, and accessibility of information about current condition and possible outcomes of MTBI were very important to families/caregivers—as was information about hospital procedures, networks, and services available in the community, and advice on the resumption of activities such as driving, riding, sport, the importance of avoiding another MTBI, and the effects of alcohol. Moreover, it was recommended that information be made available in a variety of formats and languages—including pamphlets or brochures, books, videos, audiotape, and CD. This would allow families/caregivers to absorb information at their own pace and to refer back to it as necessary.

The aim of the current study was to examine the nature, extent, and quality of information provided by GPs and hospital accident and emergency departments to people after MTBI. It was expected that all hospitals and most GPs would have a basic information sheet about MTBI for distribution to patients, that hospitals would routinely inform GPs when a patient of theirs had experienced a MTBI, and that the information sheets returned would comply with readability standards (as measured by FRE\textsuperscript{9} score).

\textbf{Method}

\textbf{Participants}—The participants were representatives (in New Zealand) from public hospital emergency departments (EDs) and a random sample of general practitioners (GPs). The names of the public hospitals with an emergency department were taken from the ‘Hospitals and other healthcare providers’ section of the Telecom White Pages (1999/2000).

The sample of GPs was drawn from the Telecom White Pages (either the 1999 or 2000 edition; whichever was current in March 2000). Every fifth GP in the ‘Registered Medical Practitioners’ section was included in the sample. The total sample size was 487; consisting of 22 emergency departments
and 465 GPs. Eight questionnaires were returned due to incorrect mailing information or because the practice was no longer operating, and 244 valid questionnaires were returned, (229 questionnaires from GPs and 15 from hospital emergency departments)—giving a return rate of 50.1%. Sixty-five percent of the sample participants were from urban areas, 15% from rural areas, and 20% a mix of urban and rural areas.

**Procedure**—The questionnaire was mailed (with a stamped return envelope, and information sheet explaining the aims of the study, how the information collected would be used, and guaranteeing anonymity) to all participants. Participants were also asked to enclose with the questionnaire, a copy of the information that they typically had available for people with TBI.

The Hospital and General Practice Questionnaire asked what information was routinely provided to patients (with a suspected or confirmed MTBI attending an emergency department or their GP)—and asked some general demographic information regarding the number of people with MTBI they had seen in the previous month, the ratio of male to female patients, what other sources of information they used, and the services they had available to them for referral and community support services.

The information sheets returned were examined using the Flesch Reading Ease (FRE)\(^7\) and the criteria of the National Institute for the Blind.\(^7\) The commonly used Simple Measure of Gobbledygook (SMOG)\(^7\) was not used as over 50% of the information sheets did not contain the required 30 sentences for analysis.

**Results**

Figure 1 shows that more people with MTBI attended hospitals than GPs. Overall, agencies had seen a total of 69% (89) male and 31% (40) female patients with a new brain injury, a slightly different ratio (2.1 : 1) than is typically reported (3 : 1).\(^1\)\(^5\)

**Figure 1. Percentage of EDs and GPs seeing new MTBI presentations in the past month**

ED=emergency department; GP=general practitioner; MTBI=mild traumatic brain injury.
Routine notification from hospital (that one of their patients had presented to ED and was discharged home the same day with a diagnosed or suspected MTBI) was received by 57.4% of GPs. A further 20.5% sometimes received notification, and 18.9% never received notification at all. Two-thirds of hospitals always notified GPs if their patient came to the ED, 17% sometimes notified the patient’s GP, and 17% did not routinely inform GPs if their patients presented at ED.

Overall, 45.9% of respondents (93.4% of hospitals and 42.8% of GPs) gave an information sheet to patients with a confirmed or suspected MTBI. Although there was great variability in many aspects of the information sheets, they generally contained information about possible signs and symptoms; when to call the hospital or GP; and advice about pain relief, driving, alcohol, and rest.

All the leaflets were written in English. The mean FRE score was 67.81 for the hospital information sheets and 61.02 for the GP information sheets. The maximum score (most readable) was 80.2 for a hospital leaflet, and the minimum score (least readable) was 34.6 for a GP leaflet. Table 1 shows a comparison of FRE scores for hospital and GP information sheets.

<table>
<thead>
<tr>
<th>FRE Score</th>
<th>Reading difficulty</th>
<th>Percentage of leaflets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Hospital</td>
</tr>
<tr>
<td>0–30</td>
<td>Very difficult</td>
<td>0</td>
</tr>
<tr>
<td>31–50</td>
<td>Difficult</td>
<td>0</td>
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<tr>
<td>51–60</td>
<td>Fairly difficult</td>
<td>7.1</td>
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<tr>
<td>61–70</td>
<td>Standard</td>
<td>64.4</td>
</tr>
<tr>
<td>71–80</td>
<td>Fairly easy</td>
<td>21.4</td>
</tr>
<tr>
<td>81–90</td>
<td>Easy</td>
<td>7.1</td>
</tr>
<tr>
<td>91–100</td>
<td>Very easy</td>
<td>0</td>
</tr>
</tbody>
</table>

FRE=Flesch Reading Ease; GP=general practitioner; MTBI=mild traumatic brain injury.

While 92.9% of the hospital information sheets had a FRE score of over 61 (the level recommended in order to be read by 70% of the population), only 56% of the GP leaflets were in this category. The passive voice (‘the symptoms are’ rather than ‘you may experience’) was used in 92.9% of Hospital, and 70.7% of GP information sheets.

Almost all of the information sheets satisfied the recommendations of the National Institute for the Blind to use at least 12-point font (91.9%) and that the right margin should not be justified in order to make the text easier to read (74.3%). Headings and bullet points were used to emphasise important information, and to guide the reader in 86.5% of the information sheets.

Few sheets (17.6%) used illustrations or diagrams to enhance the information they were providing. Approximately one-third (33.8%) of the leaflets contained a spelling error or misuse of a word. The most common spelling mistakes were ‘vomitting’ and ‘persistent’, and ‘arouse’ was commonly used instead of ‘rouse’.

In general, the quality of the paper and photocopying of the hospital information sheets was of a better quality than the GP information sheets (28.6% compared to
53.3% poor quality). The quality of the photocopying in some of the information sheets was so poor that some of the words could not be read and others were distorted or unclear, especially when thermal fax paper was used (6.7% of the GP information sheets). The lines and marks transferred from the fax, as well as the distortion of the typeface led to very poor legibility.

Information sheets ranged from ½ a page to 10 pages in length. The hospital information sheets were generally longer (with a mean of 33.6 sentences, compared with 12.9 sentences for GP information sheets). However, both groups had a similar sentence length, with a mean of 14.6 words per sentence in the hospital information sheets and 13.2 words per sentence for the GP information sheets. Only 14.9% of the information sheets had a date on them (one had not been revised for over 10 years).

While 71.6% of the information sheets stated that they were for head injury, only 22.9% explained what that meant. Most of the leaflets were simply titled ‘Head Injury’, or ‘Advice for Head Injury Patients’. All the information sheets returned gave advice about important symptoms to watch for—such as severe headache, vomiting, weakness of arms or legs, visual disturbances or uneven pupil size, and the patient being unable to be roused.

A small number (5%) gave no advice about what to do if you noticed these symptoms, and 4% said to call an ambulance. Most (73.0%) of the sheets had a phone number on them, although several (4.0%) of these appeared to be incorrect. Advice about the appropriate use of pain relief medication was given in 71.7% of information sheets and advice to refrain from drinking alcohol in 38.3%.

Approximately half of the information sheets mentioned returning to normal activities; 61.7% gave advice about when the person could start driving again, 58.3% mentioned returning to sport or exercise, and 40% information about returning to school or work. Once again, the quality of the information varied. Many advised not to start driving again for at least 24 hours, with others leaving it up to individual judgment with statements such as ‘Do not drive your car or motorcycle until such time that you feel that your ability to judge distances and unexpected hazards have improved’.

The likelihood of ongoing problems for some weeks or months was identified in 43.3% of the information sheets, with 10% giving advice about what to do or who to contact if there was ongoing concern. Only one sheet (1.7%) left space where the treating professional could write specific advice for the individual for example about pain relief, return to school/work and physical activities.

Most GPs (77.4%) identified up to 3 known resources (mean 2.81) that they were able to access for their patients. One of the most common was verbal information from himself or herself (88.1%) or their practice nurse (54.1%).

Giving patients information (in the form of a discharge summary or summary of treatment) was also identified by 48.4% of respondents as a method that they would use to give information to patients. Only 37.3% of respondents knew of a Head Injury Support group (that they could refer a patient to, or tell a patient about if they felt it was appropriate).

Only 9% of respondents said they would use library or Internet resources as a source of information for patients. Indeed, there was evidence (from some of the information sheets) that they were used for personal reference.
sheets returned) that a search of the Internet had been used to find information for patients.

Most GPs could identify 1 or 2 other resources that they could refer patients to including hospital outpatient clinics (73.0%) and community activity or support groups (43.0%). A small number of respondents (11.5%) identified other community resources; for example, a residential placement service (for people with brain injuries) and community neurobehavioural treatment team. Rural GPs were more likely (57.2%), than either urban GPs (54.7%) or GPs from mixed urban and rural areas (39%), to identify 3 or more resources.

Discussion

While it is frequently recommended that patients should be provided with written information about their condition and any treatment they may receive, there are no New Zealand regulations to monitor the quality of such information and no figures indicating how often such information is made available. In general, individual hospitals and GP practices are left to make their own decisions about whether to provide written patient information, and what topics to include.

The hypothesis that all hospitals and most GPs have a basic information sheet about MTBI was only partly supported by the current study, with hospitals providing considerably more (90%) than GPs (42%). Many GPs commented that they saw very few patients with an acute MTBI (as patients generally went to an ED if they were concerned about their condition).

This perception of lack of need on the part of GPs may explain the small numbers that had information sheets available. However, given that many patients with minor MTBI are advised to return to their GP for a check-up, or if they are concerned, it is likely that GPs see these patients later in the recovery process. At this stage, patients (and particularly their families/caregivers) may need reassurance and advice about symptoms and may be more receptive to education about MTBI. Therefore, it is important that GPs have up-to-date patient information about MTBI to assist these families/caregivers.

Alternative methods of presentation of information (such as audiotape, videotape, and CD) were not used by any GP or hospital ED. In a hospital ED, staff often have insufficient time or facilities to convey information in this way to patients; although other areas (eg, occupational therapy [OT] departments, concussion clinics, and outpatient settings) do provide it.

Depending on the size and location of the practice, GPs may have difficulty justifying the purchase of such resources for a limited number of their patients; however, many local Head Injury Support groups have such resources available for loan to patients and their families/caregivers. The important role for the GP is to recognise when patients and their families/caregivers are having difficulties, and to direct them to an appropriate source of assistance. Previous research showing that ‘many patients/family members will not spontaneously ask for information about MTBI in the first few weeks, but appreciate it later when prompted’ suggests that GPs are well-positioned to explore this need with families/caregivers.

Many GPs belong to ‘Independent Practitioner Associations’ (IPAs), which function to assist GPs to collectively access resources for their patients in the local community.
IPAs could compile a list of local resources for people with MTBI that GPs could use when appropriate. Unfortunately, the drive for such projects comes from the members, and the evidence from this study suggests that (among GPs) the perceived need is low.

There was support for the hypothesis that hospitals would have a firm policy about notifying GPs—with the majority (83%) of hospitals saying that GPs were always notified. This also appeared to be the view of GPs. Several of the hospitals commented that they routinely notified a specialist staff member (such as an occupational therapist, head injury nurse, or paediatric outreach service) in case further follow-up was required. Some of these services, mainly in paediatrics, automatically contacted patients within 48 hours to assess the need for further assessment or intervention—while others were available only if the patient or their family sought further advice or assistance.

The readability of the information sheets, as measured by FRE score, was in line with an earlier study and slightly better than those reported by Payne et al. They were considerably higher than those reported in a recent study comparing readability of the BMJ and JAMA which were 31.5 and 27.8 respectively—ie, ‘difficult’ and ‘very difficult’ to read. However, this still means that a third of all patient information sheets were written at a level that could not be understood by the general population; however the proportion of these ‘unreadable’ sheets should continue to decrease as awareness of the need for readability increases.

The data supported the hypothesis that patient information sheets produced by hospitals are more accurate and more professionally presented. It seems logical that, as hospital EDs see the majority of acute MTBI patients who come to medical attention, they would have the greatest demand for information about MTBI and its consequences.

Two of the hospital information booklets used information adapted from a book produced by Gronwell, Wrightson, and Waddell, from the Department of Neurosurgery at Auckland Hospital. These were the most comprehensive booklets in the sample, giving clear advice about ‘what to do’ and ‘what not to do’ while recovering from MTBI, and ‘when to seek help’ and ‘who to approach’.

Poor quality photocopying was an issue for both GPs and hospitals. Even the best, most readable information is only useful if it is legible. In several instances, the quality of copying was so poor that it was difficult or impossible to read some sections. This may be due to not keeping a master copy of the document, poor photocopier maintenance, or using thermal paper (this problem will reduce as thermal-paper fax machines are phased out). Several patient information sheets also were so crooked that sentences were cut off, leaving the reader to try and guess what was missing.

The hypothesis that GPs in larger urban centres have access to more resources than GPs in rural areas was not supported by this study. Both GP groups identified a median of three resources in their local community for people with MTBI that they had knowledge about and access to. Few patient information sheets gave contact details for the local Head Injury Association or similar organisation that was able to provide support for patients and their families/caregivers.
The 51% response rate in the present study, while higher than similar studies\textsuperscript{7-8}, still raises doubt as to the extent to which the results can be generalised, and accordingly the conclusions should be viewed with some caution.

In conclusion, this study aimed to investigate the provision of information (by EDs and GPs in New Zealand) to MTBI patients and their families/caregivers. It found that most hospitals did have an information sheet to give to patients with a confirmed or suspected MTBI, and that these information sheets were more legible and had better readability scores than those from GPs. The proportion of GPs that had a similar information sheet (to other GPs) was less than expected and of highly variable quality. As expected, there were no participants who identified any alternative formats for MTBI information apart from verbal or written information. People with MTBI appear to be equally well supported in urban and rural communities. GPs in urban and rural areas were able to identify the same number of local resources for people with MTBI.

This study has raised several issues about MTBI that could be investigated by further research. It appears that hospitals frequently refer patients with MTBI back to their GP for ongoing monitoring and advice. Further studies could examine how well equipped GPs are to take on this role; this could include an assessment of the continuing education that GPs have received in this area (and the degree of clinical risk that this exposes them to), and how well they are supported and resourced to assess the sometimes complex and ongoing needs of these patients.

Another area that requires further work is the investigation of how well the needs of patients with MTBI and their families are met. A study that can recruit participants from a variety of sources in the first 6–8 weeks after MTBI would be invaluable for those planning and managing services for these people.

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References:


Vascular trauma in New Zealand: an 11-year review of NZVASC, the New Zealand Society of Vascular Surgeons’ audit database

Ian Thomson, Geoff Muduioa, Andrew Gray

Abstract

Aim To describe vascular trauma in New Zealand: its management and early outcomes.

Methods Patients suffering vascular trauma between January 1993 and December 2003 were analysed using data collected prospectively by the New Zealand Society of Vascular Surgeons’ database (NZVASC).

Results There were 549 cases of vascular trauma amongst 45,759 vascular admissions collected by the database in the 11-year period. This study confirmed the findings in international studies that younger adult males were more likely to suffer vascular trauma. Elderly patients, especially females, were most at risk of iatrogenic vascular injury, which accounted for 22% of cases in this study. Complication rates reported by rural vascular surgeons in New Zealand were comparable to results in the main centres and to international reports.

Conclusion While programmes to slow down and sober up road users help reduce injuries in the younger age groups, it lies in the hands of our own profession to reduce the iatrogenic injuries in the older patients.

Vascular trauma is a common cause of mortality and morbidity worldwide. Young males are at highest risk. In the United States, trauma is the most common cause of mortality and morbidity of adults under the age of 65 yrs. In that setting, where gunshot injuries are common, a large number of vascular trauma victims are declared dead at the scene. Trauma in Auckland had been well described by Civil et al and Gardiner et al; however, there has been no specific study of vascular trauma in New Zealand, which is the aim of this study.

Method

The NZVASC is a database started by the New Zealand Society of Vascular Surgeons in 1993. Most surgeons in New Zealand who practice vascular surgery have contributed to the database on a regular voluntary basis. During the period of this study, it became a quality assurance activity in terms of the Medical Practitioners Act 1995. To comply with the Privacy Act, personal details such as names of patients and surgeons were removed. No data on racial groupings was gathered.

Surgeons from three hospitals (in two major centres) have not contributed data during some years of this study, thus detracting from its completeness. A validity study of the database in 1999 showed a high rate of accuracy in a subset of patients having carotid surgery, but no validity study has been conducted on vascular trauma patients. Most hospitals do not have trauma databases against which this data could be checked.

All the entries with trauma codes on the Otago Audit System were extracted from NZVASC. The entries were then individually checked against the text fields, and final diagnoses were made to ensure that the coding was correct. Using an Access database (Microsoft), Excel spreadsheet (Microsoft) and
the statistical programme SAS (SAS Institute Inc), the data was analysed for certain variables. P<0.05 was regarded as statistically significant.

**Results**

From 45,759 vascular admissions of patients in NZVASC between January 1993 and December 2003, 549 patients with correct vascular trauma coding were extracted from the database. Of these patients, 8 presented twice and 5 patients presented 3 or more times as a consequence of their initial vascular trauma.

**Figure 1. Cases of vascular trauma in the NZVASC database (1993–2003)**

![Bar chart showing cases of vascular trauma per year from 1993 to 2003](chart.png)

NZVASC=New Zealand Society of Vascular Surgeon’s database

From 1993 to 2003 fifty cases of vascular trauma were reported (on average) each year from an estimated population of about 2.5 million or about 2 per 100,000 population. Some of the variation in numbers has been caused by incomplete contribution of data from some hospitals as mentioned above. However, New Zealand has experienced a reduction in the number of road casualties from 17/100,000 to 10.3/100,000 (during 1993 to 2002) as reported on the Land Transport Safety Authority government website at [http://www.ltsa.govt.nz/research/annual-statistics-2002/docs/historical-table-1.pdf](http://www.ltsa.govt.nz/research/annual-statistics-2002/docs/historical-table-1.pdf) which may be a factor in the lower numbers towards the end of the series.

The age of the patients varied from 0 years to 100 years, with a median age of 49 years. Vascular injuries were more common in males than females (by a ratio of 2.1:1), and these occurred most commonly in the 20–39 years age group—whilst, in
females, vascular injuries were more prevalent in the 60–79 years age group. In the over 80s age group, female vascular injuries outnumbered male injuries, see Figure 2.

Figure 2. The gender and age of vascular trauma patients in the NZVASC database

Figure 3 shows the percentage of injuries that were iatrogenic, and (as one would expect) showed an increase with increasing age as more operations and diagnostic procedures accessing the vascular system were performed. Fisher's Exact Test showed that there were highly significant associations between iatrogenic frequencies and sex (p<0.0001), and between iatrogenic frequencies and age category (p<0.0001). The data was not standardised for age against the general population, as it was uncertain whether the data was representative of the entire population of interest.

Seventy-two percent of cases presented acutely. The median hospital stay was 4 days (range 0–229 days). Fifty-two patients had injuries, which could be dealt with in the emergency department, including ligations of smaller vessels. Four patients (who remained over 100 days recovering from multi trauma) skewed the average length of stay to 9.6 days.
Figure 3. Percentages of iatrogenic vascular trauma patients in NZVASC by gender and age

NZVASC=New Zealand Society of Vascular Surgeon’s database

Mechanism of injury

A penetrating injury with laceration (34%) to the artery was the most common mechanism of injury, see Figure 4. The next most common cause was iatrogenic (22%), while blunt injury with occlusion or contusion of the artery accounted for 12% of cases. While a more precise mechanism (such as stabbing or road traffic crash) was given in text fields for some cases, in many cases it was unspecified, which has not allowed more detailed analysis. Knife injuries appeared far more commonly than gunshot wounds and blunt injuries were frequently caused by road traffic crashes.

The iatrogenic group of injuries was caused principally by angiography (40%) and cardiac catheterisation (28%), followed by operations (13%) by vascular and other surgeons. There was no apparent trend to increasing numbers of iatrogenic injuries with time.
Figure 4. The mechanism of vascular trauma

Figure 5: The vessels injured in vascular trauma
Which blood vessels were injured?

As shown in Figure 5, the most commonly injured vessel was the femoral artery followed by the brachial artery and other vessels (head and neck arteries, pelvic and retroperitoneal vessels, and haemodialysis fistulas).

Central, upper limb, and lower limb categories refer to significant venous injuries in the torso or extremity. Iatrogenic injuries tended to be to the femoral artery (57% of all femoral injuries) and neck vessels, which are the common sites of access for angiograms or central venous lines respectively. The brachial artery injury, which was the second most common vascular injury overall, is far less likely to be iatrogenic (3%).

Procedures

The most performed procedure (as a result of vascular trauma) was primary repair of injured arteries (Figure 6). The second most common procedure was an interposition graft—which in this series was autologous vein graft, either reversed or in situ. There were a similar number of explorations and simple suture closures of injured vessels. The primary amputation rate was 4.6%, usually where severe destruction of other structures in a limb had occurred rather than for ischaemia.

Figure 6: Procedure performed for vascular injury

‘Other’ in Figure 6 refers to procedures such as embolectomies, AV fistula repair, evacuation of haematomas, drainage of collections, and removal of foreign bodies.
Complications

The mortality rate in this study was 3.6%, arising mainly from injuries to the aorta, the inferior vena cava, associated head injuries, and ischaemic heart disease. There was one mortality directly following a iatrogenic injury to an iliac artery and a delayed death following iatrogenic injury to a subclavian artery. Seventeen percent of patients had complications. Figure 7 gives a breakdown of the complications.

Figure 7: Complications of vascular trauma in the NZVASC database

Wound, lung, urinary tract, and other infections accounted for 35% of the overall morbidity. Interestingly, compartment syndrome was reported for only 6% of the overall morbidity. The group ‘Other’ includes several different complications occurring at low frequency such as delayed bowel function, confusion, haematomas, and many others.

The workload

New Zealand vascular surgeons performed an average of 1.5 trauma procedures per year. Emergencies accounted for 42% of the procedures, 40% were urgent, and 18% were arranged procedures. Sixty-six percent of the procedures were major. The average duration of each procedure was 90 minutes.

Twenty-eight surgeons voluntarily supplied data to the database for the period that is reviewed here (January 1993–December 2003)—although, as already mentioned, three hospitals in major centres are under represented in some years. The primary consultant was not identified in seven cases.
Figure 8 is a scatter plot showing the number of patients (that were seen by each individual surgeon over the 11-year period of this review) and the rate of complications.

Nearly half (42%) of the surgeons who supplied data during the period of the study performed 5 or less procedures for vascular trauma over the 11-year period.

**Figure 8: Number of cases per surgeon and percentage having complications**

As shown in Figure 8, the complication rate for surgeons who performed 5 or less procedures per year was similar to those surgeons who performed more than 5 procedures per year. The types of complications were also similar—e.g., wound infection or chest infection.

There was an average of 17% complications for all vascular trauma patients, many of whom are very unwell before they reach hospital. At the left side of the graph, two surgeons who performed very few operations have 50% complication rates—although there is a high probability that this occurred by chance. Their circles lie below the 95% confidence interval line. No case mix risk adjustment was performed in this analysis.

One surgeon lies above the line but on closer examination of these cases one finds more conscientious reporting of minor complications and an unavoidable amputation—which, if excluded, would drop the circle below the 95% confidence interval line. The relationship between numbers of operations and complication rates was tested using a simple linear regression. The p value was 0.4275 indicating no relationship.
Discussion

Vascular trauma is a major problem facing surgeons internationally. It is easily diagnosed when there is pulsatile bleeding—but it can be missed when limb pulses or warmth are not compared, or when haemorrhage is hidden. The first few hours after injury can be critical for survival of limbs and avoiding death by haemorrhage.

The management of vascular trauma has changed markedly in the last 50 years. During World War 2, vascular trauma was managed by ligation of the affected vessel, resulting in high amputation rate. However during the Korean and Vietnam wars, rapid patient evacuation (by helicopter), advances in surgical technique, and vascular reconstruction allowed higher limb salvage rates.

Mechanisms and patterns of vascular injury vary between different populations. The most common cause of vascular trauma reported in New York and Durban was penetrating injuries from stabbing and firearms. On the other hand, blunt trauma was more common in Oxford, UK and Adelaide, Australia—usually from road accidents. Tobin et al also confirmed this finding in a retrospective study carried out in Victoria, Australia.

In New Zealand, the most frequent mechanism of vascular trauma in this study was lacerations followed by iatrogenic injuries. Iatrogenic injuries to arteries are potentially avoidable, but likely to increase, as invasive radiological procedures are more frequently used in vascular surgery and in cardiology. It appeared that women were at increased risk, perhaps because they have smaller vessels. Towards the end of this study, some centres were successfully thrombosing false aneurysms with thrombin injections as a ward procedure, thereby sparing the patient a visit to theatre to have a surgical repair—but this may have resulted in some under-reporting.

Given that vascular trauma is relatively uncommon in New Zealand, it could be argued that trauma surgery should only be done in major city centres (as experience is so limited) However this is often not possible because the geography of the country, its weather patterns, and the available infrastructure would lead to prolonged transfer times. These are unacceptable when dealing with ischaemic limbs or haemorrhage. At present, our limited comparison suggests similar results in both major and smaller centres.

How did New Zealand surgeons compare with international studies? The 17% complication rate in this study is comparable to 23% in Oxford, UK—and the mortality rate of 3.6% in this study compares well with 4.8% in Missouri, USA, 7.6% in Georgia, USSR, and 11% in Sweden. The results for surgeons who did not supply data for all their cases can not be commented on.

As NZVASC is a national database, it gathers information more quickly than single-centre databases—and it will show trends in disease and management at an earlier stage than single-centre studies. It can also allow comparison of results between centres—but a more detailed comparison requires casemix to be adjusted for (as some centres may handle more complex cases).

An audit study of this nature has its limitations, however. For example, the accuracy of surgeons’ audit reports could not be checked due to the unavailability of patients’ case notes throughout New Zealand. Indeed, the reporting of vascular trauma and its sequelae may not be complete, and the low number of fasciotomies reportedly

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performed over the study period is an indicator of this. Long-term outcomes are not known because only in-hospital data is collected. Furthermore, the degree of non-vascular injuries, such as nerve and bone injuries, which may have more effect on outcome than the vascular injury, is not collected in this database.

In conclusion, we found that the most common cause of vascular injury reported to NZVASC during the period of this study was lacerations, followed by iatrogenic injuries. The workload for any particular surgeon is not heavy, but vascular injuries appear to be dealt with competently, with acceptable complication rates by international standards. Improving techniques in percutaneous vascular access to vessels could potentially reduce the iatrogenic injuries, which were responsible for over one-fifth of the vascular trauma cases.

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NZSVS Members: 1993–2001:
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References


Cost analysis of traditional follow-up protocol versus MRI for radiographically occult scaphoid fractures: a pilot study for the Accident Compensation Corporation

Andrew Gooding, Mark Coates, Alastair Rothwell

Abstract

Aims Assessment of the cost-effectiveness of early magnetic resonance imaging (MRI) for suspected radiographically occult scaphoid fractures.

Methods Compare costs of patients presenting acutely with suspected scaphoid injuries (managed either with traditional follow-up radiographs and plasters) versus early MRI to exclude a fracture.

Results The average medical cost for the control group was NZ$470 versus NZ$533 in the MRI group. The cost to exclude a fracture was NZ$437 with MRI versus NZ$459 for the traditional protocol. Weekly compensation costs were comparable.

Conclusions The early diagnosis of clinical scaphoid fractures has clear clinical advantages. The use of MRI in this situation is cost-effective, and we recommend that it be offered as part of the routine investigative work-up available for this difficult, but common, clinical scenario.

Magnetic resonance imaging (MRI) of the skeletal system (in detection of radiographically occult fractures) is well established and widely practised. The accuracy of MRI in the detection of scaphoid fractures has been validated, and with sensitivity, specificity, and negative predictive values approaching 100%, it is superior to any other available modality.\textsuperscript{1–4} Furthermore, previous studies have shown a significant number of patients will have fractures (other than the scaphoid) and significant soft tissue injuries, all identifiable with MRI, but not detected on plain radiographs.\textsuperscript{4}

Clinical diagnosis of scaphoid fractures remains unreliable—with a positive predictive value of 13%–69% reported in the literature, giving a weighted average of 21%.\textsuperscript{4} Negative predictive value of negative initial radiographs in the setting of strong clinical suspicion range from 50%–87%, with a weighted average of 74%.\textsuperscript{4} This means that, with the use of traditional protocols, 3 out of every 4 patients undergo needless immobilisation, repeated exposure to ionising radiation, and further assessments.

To date, the cost of MRI has thought to be prohibitively expensive in this setting, and a traditional approach of repeated X-rays and assessments (while being immobilised as a precaution) has been the standard of care. MRI, however, has been shown to be cost-effective in the United States and United Kingdom.\textsuperscript{1,4} With the unique environment the Accident Compensation Corporation (ACC) provides in New Zealand, all costs related to the injury (including compensation for time off work) can be taken into account.
Method

Study patients were drawn from those presenting to the Emergency Department at Christchurch Hospital and subsequently assessed in the Orthopaedic Outpatients’ Department.

All patients presenting with new injuries consistent with possible radiographically occult scaphoid fractures (‘clinical scaphoid fractures’) were included. These patients had a traumatic history such as a fall onto an outstretched hand and had tenderness in the anatomical snuff box. Any patients with multiple injuries requiring hospitalisation, multiple injuries of the same limb, or those with contraindications to MRI scanning (if in the MRI group) were excluded from the study.

Presenting X-rays were reported by the attending Orthopaedic Surgeon as is normal practice in Christchurch.

The control group comprised 40 consecutive patients treated under the existing treatment protocol. This involved clinical assessment, a plain radiograph, and below-elbow plaster—followed by review after removal of plaster and X-ray at 10–14 days. Those who remained with signs of scaphoid fracture, but did not demonstrate a fracture again on repeat radiographs, were re-plastered and reviewed with a repeat X-ray after a further 2–4 weeks.

The next 50 successive patients in whom the presenting X-rays were negative, but whose clinical concern remained for a radiographically occult scaphoid fracture, were then treated based on the results of an MRI study performed within 1–3 days of initial presentation. Similar to the control group clinical assessment and plain radiographs were performed initially. A positive MRI study for a fracture resulted in the patient being appropriately treated with application of a plaster and follow-up as normal for scaphoid fractures. A negative study resulted in the patient being discharged. If other pathology was detected, patients received appropriate treatment.

MRI studies were performed on a 1.5 Tesla GE Signa Horizon LX (MRI scanner) at the private practice of Southern Cross Radiology Ltd. Using a dedicated wrist coil, localisers, coronal T2 FS, and coronal T1 sequences (only) were performed. The cost of the MRI scan was met by ACC as part of the study.

Information collected included patient demographical data, the number and results of radiographs, the number of plaster applications and assessments performed prior to patient discharge, and the ACC number for worker compensation costs.

The MRI was reported by the attending MRI radiologist at Southern Cross Radiology Ltd, and a result was promptly communicated to the referrer. As demonstrated in Figures 1 and 2, fractures were defined as a linear area of low signal intensity on T1 weighted images—with a corresponding area of high signal intensity on the T2 weighted images, which traversed bone from cortex to cortex. Areas of diffuse signal change (with no defined linear component) were designated as bone bruises.

Costs supplied for analysis were:

- X-ray scaphoid NZ$60
- Plaster NZ$125
- Assessments NZ$77
- MRI NZ$300

Note: Exclusive of goods and services tax (GST)

Figures 1 and 2 show an example of a waist of scaphoid fracture with a linear low T1 signal line traversing the bone from cortex to cortex with a corresponding area of increased T2 signal. The triquetrum shows a diffuse low signal area on T1 and high T2 signal without a defined linear line consistent with a bone bruise.
Figure 1. T1 coronal sequence

![T1 coronal sequence](image1)

Figure 2. T2 coronal sequence

![T2 coronal sequence](image2)
Results

**Control group (38 patients reviewed)**—Thirty-two patients were discharged after the 2-week assessment (following negative repeat radiography and no ongoing clinical concern).

Four patients remained sufficiently tender, and therefore clinically suspicious for fracture despite negative radiography, and they were subsequently re-plastered and reviewed at 4–6 weeks. After 4–6 weeks, no patients were proven to have fractures on plain radiographs.

One patient had a scaphoid fracture and one patient had distal radius fracture (both identified at 2 weeks).

Two patients were excluded—one patient should not have been entered into the study as they were already being treated for a known fracture, and the other patient was incorrectly added to the MRI group at 2 weeks.

As shown in Table 1, the average cost for medical treatment in the control group was NZ$470.

**Table 1. Medical costs for the control group**

<table>
<thead>
<tr>
<th>Number</th>
<th>Assessments</th>
<th>X-rays</th>
<th>Plasters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost (NZD)</td>
<td>81</td>
<td>81</td>
<td>54</td>
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<tr>
<td>$77</td>
<td>$60</td>
<td>$125</td>
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<tr>
<td>Subtotal cost (NZD)</td>
<td>$6237</td>
<td>$4860</td>
<td>$6750</td>
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</table>

NZD=New Zealand dollars.

**MRI Group (44 patients reviewed)**—Thirty patients had scans showing no fracture, however several (7) patients showed extrinsic ligamentous injury or bone bruise. No patient had an intrinsic ligament injury. All (30) patients were all discharged with none returning.

Fourteen patients had scans demonstrating fractures, comprising six waist of scaphoid fractures, three scaphoid tubercle fractures, one proximal pole scaphoid fracture, three distal radius fractures, and one radial styloid fracture.

Seven patients were excluded: three were incorrectly entered at the 2-weeks’ assessment, one was diagnosed as Kienbock's disease, one had a longstanding wrist problem, and two were complicated by fractures of other bones in the hand.

As shown in Table 2, the average cost for medical treatment in the MRI group (after exclusion of the seven patients outlined above) was NZ$533.
Table 2. Medical costs of MRI group

<table>
<thead>
<tr>
<th></th>
<th>Assessments</th>
<th>X-rays</th>
<th>MRI</th>
<th>Plaster</th>
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</thead>
<tbody>
<tr>
<td>Number</td>
<td>58</td>
<td>53</td>
<td>44</td>
<td>21</td>
</tr>
<tr>
<td>Cost (NZD)</td>
<td>$77</td>
<td>$60</td>
<td>$300</td>
<td>$125</td>
</tr>
<tr>
<td>Subtotal cost (NZD)</td>
<td>$4466</td>
<td>$3180</td>
<td>$13200</td>
<td>$2625</td>
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</table>

MRI=magnetic resonance imaging NZD=New Zealand dollars.

The cost to exclude a fracture in each group is demonstrated in Table 3 with the average in the control group being NZ$459 compared to the MRI group of NZ$437.

Table 3. NZD cost to exclude fracture

<table>
<thead>
<tr>
<th></th>
<th>Patients</th>
<th>Plaster</th>
<th>X-rays</th>
<th>MRI</th>
<th>Assessment</th>
<th>Average cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>N=36</td>
<td>$6250</td>
<td>$4500</td>
<td>$5775</td>
<td>$459</td>
<td></td>
</tr>
<tr>
<td>MRI group</td>
<td>N=30</td>
<td>$0</td>
<td>$1800</td>
<td>$9000</td>
<td>$2310</td>
<td>$437</td>
</tr>
</tbody>
</table>

MRI=magnetic resonance imaging NZD=New Zealand dollars.

Table 4 shows the total and average costs to ACC for weekly compensation for the two groups (with sub-grouping into those patients with and without fractures). These costs include fractures of bones other than the scaphoid in each group.

Table 4. Weekly ACC monetary compensation

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Total Cost (NZD)</th>
<th>Average Cost (NZD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group with fracture(s)</td>
<td>2</td>
<td>$2119</td>
<td>$1059</td>
</tr>
<tr>
<td>Control group without fracture(s)</td>
<td>36</td>
<td>$22822</td>
<td>$634</td>
</tr>
<tr>
<td>MRI group with fracture(s)</td>
<td>14</td>
<td>$5290</td>
<td>$378</td>
</tr>
<tr>
<td>MRI group without fracture(s)</td>
<td>31</td>
<td>$23250</td>
<td>$750</td>
</tr>
</tbody>
</table>

ACC=Accident Compensation Corporation; MRI=magnetic resonance imaging; NZD=New Zealand dollars.

Discussion

Prompt diagnosis of scaphoid fractures is important to reduce subsequent complications of non-union and avascular necrosis. This formed the basis for the traditional protocols where preventive immobilisation was used in lieu of a modality which could provide an accurate immediate diagnosis. However, clinical diagnosis of acute scaphoid fractures is unreliable, and three-quarters of patients with a suspected radiographically occult fracture will not have a fracture.4 These figures are supported by our data showing a documented fracture in only nine out of 82 patients. Only two fractures were identified in our initial control group of 40 patients, and one of these was a distal radius fracture. This meant 95% of patients in the control group underwent unnecessary immobilisation in a scaphoid plaster.

MRI (with superior sensitivity, specificity, and accuracy) offers a significant clinical advantage, and this was verified by this study—with 14 fractures detected in the
second (MRI) group not initially detectable on plain radiographs. The cost of MRI has been thought to be prohibitively expensive, and this used as the main basis to preclude its use. However, studies in the US and UK\(^1,4\) have shown initial MRI to be cost-effective, even without incorporating costs for compensation and time off work, and with the cost of MRI used in the USA study\(^4\) being over two times the price of the MRI examination being offered in New Zealand on an identical quality MRI machine.

Concerns regarding an increase in demand for MRI scaphoid examinations have been discounted by Raby who found no significant increase in requests for acute scaphoid imaging at a busy District General Hospital in Glasgow, Scotland when their protocol was changed to immediate MRI.\(^1\) The same study verified the advantages of scanning early (first 24 hours) with respect to both costs and clinical outcome, and this was the basis for the timing used in our study.

Actual medical costs to exclude a fracture using each protocol showed that there is a cost saving by using MRI early. Costs were NZ$437 in the MRI group compared to $459 with the traditional protocol. Once a fracture has been diagnosed, the treatment is standard, therefore the real advantage to MRI is early exclusion of a fracture and reduced needless immobilisation without increasing the costs.

In this study, the average cost of the patients treated using the alternative MRI protocol (NZ$533) was only NZ$63 more than the average cost of those treated conventionally (NZ$470). The anticipated significant reduction in overall medical costs resulting from early correct diagnosis was not present. Statistical review was problematic due to the data being so skewed by the different percentage of fractures in each group, which should have been similar. There were also relatively few patients in the study. A t-test value was used to obtain the p value of 0.03.

The MRI group had 14 fractures (30%), while the control group only had two fractures (5%). The discrepancy between the number of fractures in the MRI group is statistically significant with a p value of 0.002. The additional costs of fracture treatment including further specialist review, plasters, X-rays, and 6 weeks of immobilisation has skewed the data to much and has been unable to be corrected for. Given this fracture bias in the MRI group, the average cost difference between the two groups is minimal.

Workers’ compensation was anticipated to be much less in the MRI group due to reduced number of patients being needlessly immobilised. This, unfortunately, did not prove to be true principally due to the large number of fractures in this group.

Variability in compensation costs within both subsets of the fracture and non fracture groups highlights the peculiar environment of ACC workers’ compensation (where people are compensated based on their background income leading to huge potential differences in amounts claimed for the same injury). Due to patient confidentiality, we were unable to review the individual data held by ACC on costs, and subsequently were unable to correct for this significant potential skewing of data.

Some of the high compensation costs were incurred by patients discharged from the Orthopaedic Service with low-grade wrist sprains and normal MRI examinations (with subsequent medical expenses associated with local doctor visits). The majority of the 70% of patients (discharged after fracture exclusion on MRI) should not have required significant compensation for time of work.
Clinical and cost analysis performed in this and other studies confirm that the early use of MRI in the first 24 hours (to exclude suspected clinical scaphoid fractures) is warranted. There is a clear clinical advantage to obtaining the correct diagnosis early, and we have shown that it is cost-effective. Our recommendations to ACC based on this pilot study were to initially limit the referral base to those currently allowed to order MRI such as orthopaedic surgeons, hospitals, and sports physicians. As a large number of patients are treated by general practitioners, or 24-hour clinics, this group of referrers could be incorporated later as the potential savings may be even greater.

All costs, particularly related to compensation, would need to be reviewed at predetermined intervals. It is anticipated significant further cost-savings related to compensation will be able to be achieved. A larger patient group, and patient consent to enable clear separation of individual data, should allow these savings to become apparent.

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**Acknowledgement:** This study was partly funded by, and performed in conjunction with, the research division of the Accident Compensation Corporation (ACC).

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**References:**

Reform of ACC Medical Misadventure

Jonathan Coates, Kate Smith

On 2 August 2004, the Injury Prevention, Rehabilitation, and Compensation Amendment Bill (No. 3) (the Bill) was tabled in Parliament. This Bill is the culmination of the long-running Review of ACC Medical Misadventure (Review), undertaken jointly by New Zealand’s Accident Compensation Corporation (Corporation) and the Department of Labour. The proposed amendments have the potential to be the most significant legislative progression yet seen towards the practical implementation of the system approach theory of quality improvement, which health quality experts argue will assist in improving the quality of health services.\(^1\,^2\)

This article does not seek to provide a comprehensive analysis of all aspects of the proposed amendments contained in the Bill. Instead, it considers whether the proposed amendments will achieve the goal of the Review—overcoming the problems identified with the current medical misadventure criteria.

Overall, we support the proposed amendments and the new criteria for establishing cover for ‘personal injury caused by treatment’, primarily because the Corporation will no longer be required to make findings of fault in order to establish that a claimant is entitled to cover. Despite this support, we consider that the reporting obligations (that it is proposed will be imposed on the Corporation under the new regime) have the potential to undermine much of the good that the substantive amendments achieve.

How the Corporation interprets the reporting provision will be critical to the success of the new regime. We would also like to see express obligations on the Corporation to analyse information collected on medical injuries and to disseminate that information back into the health sector.

The Review and the proposed amendments

Key findings of the Review were that the current medical misadventure criteria in the Injury Prevention, Rehabilitation and Compensation Act 2001 are considered by both claimants and health professionals to be unfair, confusing, and arbitrary—and that agencies other than the Corporation should be responsible for addressing patients’ concerns about their health care, and for holding individual health professionals to account.\(^3\)

The Review found that the requirement to establish fault impacted on health professionals by creating an overly blaming culture (rather than a culture of learning from mistakes)—by focusing too much on the actions of individual health professionals, and by making health professionals uneasy about participating in the medical misadventure claims process for fear of the repercussions, particularly from inter-agency reporting.\(^4\)
The Review found that the consequences (which flowed onto patients from such impacts on health professionals) included there being less focus on the patient’s injury, less focus on the prevention of similar injuries, confusion over the Corporation’s role, and opportunities to learn (and therefore improve) safety being limited.4

The Bill proposes replacing the existing definition of ‘medical misadventure’, and the associated ‘medical error’ and ‘medical mishap’ criteria, with the concept of ‘personal injury caused by treatment’ or ‘treatment injury’.5 Under the new provisions, subject to certain exceptions, claimants will have cover for any personal injury that they suffer while receiving treatment from, or at the direction of, one or more registered health professionals.5 It is also proposed that (in recognition of the broad range of activities and processes that form part of the treatment process) the definition of ‘treatment’ be extended for the purposes of determining whether a treatment injury has occurred.

Cover for ‘treatment injury’ will not extend to personal injuries that are attributable to a claimant’s underlying health condition, or are an anticipated part, or consequence, of the treatment. There will be no cover where a claimant’s personal injury is solely attributable to resource allocation decisions.5 As under the existing regime, the fact that a claimant’s treatment did not achieve a desired result will not, of itself, constitute ‘treatment injury’.

Unlike ‘medical mishap’ under the current medical misadventure provisions, it is proposed that there will be no ‘seriousness’ criteria. This opens the door for minor injuries to be covered.

While the Corporation will not be required to attribute fault under the new regime, the Corporation will be obliged to inform claimants about the role that the Health and Disability Commissioner plays in investigating complaints.6

We support the proposed new criteria for establishing cover for treatment injury, and consider it to be a significant improvement on the existing medical error and medical mishap criteria—due mainly to the removal of the requirement to establish fault. The ‘treatment injury’ criteria is more closely aligned to the rest of the accident compensation scheme in which the ‘fault principle’ plays no part in the claims process.

It is hoped that the new regime will encourage health practitioners to co-operate and participate in the claims process, support claimants through the claims process, and provide the Corporation with the medical reports and advice that it requires to make decisions on claims. The information that the Corporation obtains for the purposes of assessing ‘treatment injury’ claims will also provide a wealth of information about medical injuries that can be analysed and disseminated back into the health sector, thus supporting and acting as a catalyst for quality/learning initiatives in the health sector. The importance of gathering, analysing and learning from data on adverse medical events is well recognised by quality health experts.

The Corporation’s obligation to report to other agencies

The most contentious issue during the Review was the Corporation’s use of information obtained during the claims process.7 Following the Review, it was accepted that the Corporation’s current reporting requirements encourage defensive
practice, and do not support an environment in which practitioners are encouraged to disclose things that go wrong as a means of learning from (and preventing) further injury.\footnote{7}

However, there was also a view (identified during the Review) that cross-agency sharing of information is necessary to ensure patient safety.\footnote{8} This latter viewpoint ultimately persuaded the Government that the Corporation should be required to share information in certain circumstances under the new regime. Accordingly, the Bill proposes that where the Corporation believes, from the information that it has obtained during the claims process, that there is ‘a risk of harm to the public’, the Corporation ‘must report the risk, and any other relevant information, to the person or authority responsible for patient safety in relation to the treatment that caused the personal injury’.\footnote{9} In practical terms, this ‘person or authority’ is most likely to be the health professional’s employer and/or the relevant registration authority.

There are obvious similarities between the reporting obligations that will be imposed on the Corporation under the new regime and the reporting obligations already imposed on registration authorities under the Health Practitioners Competence Assurance Act 2003 and the (amended) Health and Disability Commissioner Act 1994. In our opinion, the way that the Corporation interprets its obligation to report on the basis of ‘a risk of harm to the public’ will be critical to the success of the new regime in terms of moving towards a claims process that has the full support and cooperation of health professionals and subsequently allows the Corporation to achieve its over-riding goal of minimising (in this context medical) injuries.

The Corporation will be required to interpret the statutory reporting test, including defining a threshold at which it will report on the basis of a ‘risk of harm to the public’. This is likely to be a difficult balancing exercise. If the threshold is set too high, the Corporation will be at risk of being criticised for breaching its statutory obligation to report. On the other hand, if the threshold is set too low, health practitioners may remain reluctant to participate in the claims process and provide the information that the Corporation requires to make decisions on claims, because of the fear that the Corporation will report that information to other persons or authorities.

We consider that ACC should apply a high threshold when interpreting the ‘may pose a risk of harm’ test. Alternatively, consideration could be given to changing the statutory reporting threshold to one that requires a serious risk of harm. Either option would be consistent with the conclusions of the Review that ACC’s role is not accountability, and that the fear of inter-agency reporting is an obstacle to full disclosure and quality improvement initiatives.

**Collection, analysis, and dissemination of information**

The strongest argument for moving away from the current medical misadventure claims process is that the removal of the requirement to find fault will mean the removal of one of the main obstacles to creating an open, learning culture which will in turn assist in improving the quality of health services. The removal of the ‘fear of the consequences of disclosing mistakes and information about adverse outcomes’ should assist in creating the culture of safe reporting so sought after by quality improvement experts.\footnote{10} However the true benefits of creating such a culture will only be reaped if the information on adverse outcomes (and medical injuries disclosed) is
analysed and disseminated back into the health sector to assist prevent further medical injuries.

We see the Corporation as being ideally placed under the proposed new regime to play a central role in the collection, analysis, and dissemination of information on medical injuries back into the health sector to assist prevent further injuries. Despite the substantial gains promised by the proposed amendments, concern remains that not enough attention is being paid to this crucial matter, particularly given that firstly, the analysis and learning from adverse events is the principle justification for moving from a system which focuses too much attention on the actions of individuals, and secondly, preventing injuries is a primary function of the Corporation.11

The Bill is currently before the Health Committee. Submissions on the Bill close on 24 September 2004. To make a submission, see: http://www.clerk.parliament.govt.nz/Programme/Committees/Submissions/heinjury.htm

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References:

Over my dead body: the ethics of organ donation in New Zealand

Jennifer Ngahooro, Grant Gillett

Organ transplantation is a high technology medicine, which is used to intervene when the end stage of an illness is reached. However, unlike other medical technologies, organ transplantation depends on the generosity of other people—because without the donation of organs from other people, donation cannot proceed.¹

There is a global shortage of organs, but donor rates in New Zealand are among the lowest in the Western World (Table 1). There are currently around 400 people on the organ waiting list, 80% of whom need kidneys. Last year, 19 people died whilst on the list.

<table>
<thead>
<tr>
<th>Country</th>
<th>Donor rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain</td>
<td>39.6</td>
</tr>
<tr>
<td>Belgium</td>
<td>25.6</td>
</tr>
<tr>
<td>Austria</td>
<td>24.3</td>
</tr>
<tr>
<td>USA</td>
<td>22.3</td>
</tr>
<tr>
<td>Finland</td>
<td>19.9</td>
</tr>
<tr>
<td>Portugal</td>
<td>19.5</td>
</tr>
<tr>
<td>Norway</td>
<td>17.6</td>
</tr>
<tr>
<td>Italy</td>
<td>15.3</td>
</tr>
<tr>
<td>Switzerland</td>
<td>14.0</td>
</tr>
<tr>
<td>Hungary</td>
<td>13.8</td>
</tr>
<tr>
<td>United Kingdom/Ireland</td>
<td>13.4</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>12.6</td>
</tr>
<tr>
<td>Denmark</td>
<td>12.5</td>
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<td>Germany</td>
<td>12.2</td>
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<tr>
<td>Sweden</td>
<td>10.9</td>
</tr>
<tr>
<td>New Zealand</td>
<td><strong>10.6</strong></td>
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<tr>
<td>Australia</td>
<td>10.2</td>
</tr>
<tr>
<td>Poland</td>
<td>8.1</td>
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<tr>
<td>Greece</td>
<td>1.0</td>
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</table>

*Donor per million population

Currently there is much debate regarding the manner in which the procurement (or non-procurement) of organs is being facilitated in New Zealand. Following a private petition, a Government select committee has issued a report on the current situation, with recommendations for change (including the call for law change).

To understand why there appears to be such a great deal of ethical confusion in this area, I examine the current laws of transplantation, and analyse how our current practice interacts with these laws.
The law

According to English law, it has been long accepted that the dead body of a human being does not have an owner, and therefore cannot be the subject of property—a provision designed to stop the desecration, public display, or sale of the dead.² Although not legally bound by this view, New Zealand courts would likely be cautious about rejecting such a long-accepted approach to the law relating to dead bodies.³

There is, of course, temporary provision of limited rights to enable the procedure of an autopsy, or to be readied for burial. In the New Zealand context, this would also allow for decisions on whether the body can be viewed, and whether it can be held for a short time at a private home or on a marae (Maori meeting house).³

Despite the assertion from Brazier⁴ that the Human Tissue Act (1964) has endorsed (by legislation) a formal family veto over-riding the deceased’s directives, this is not the case—it is merely the way the Act is interpreted by the National Transplant Team. Although family may have the right to possession for burial purposes, they are usually not ‘lawfully in possession of the body’ at the time that authorisation is required under the Human Tissue Act (1964).

Where a medical use in being contemplated, the body is usually in a hospital where, by virtue of Section 2(2)(a) of the Human Tissue Act (1964), the person holding the crucial decision-making powers is actually the person in charge of the institution.³ New Zealand law does not currently distinguish between the bodies of people who are ‘brain dead’ but are being maintained on ventilators, and the more usual ‘dead’ bodies, which are not receiving any artificial maintenance of ventilation.⁵

In the majority of cases, the Human Tissue Act (1964) does not require familial or informed consent for body parts to be lawfully removed for medical purposes. Indeed, Section 3 of the Act (the main provision of current New Zealand law dealing with this issue) states that if the deceased has made a request for donation, the parts may be removed whatever the views of the family.³ Therefore, it is important that the ethics of organ procurement reflect this legal framework, recognises societal attitudes towards individual autonomy, and minimises the harm to donor families by doing so in a way that is both sensitive and realistic.

The praxis

To obtain organs and tissue for transplantation, a suitable donor must firstly be identified, and secondly, organs must be procured. This sounds simple enough, but the clinical reality is currently fraught with a minefield of obstacles due to the way in which practice has evolved in New Zealand.
Childress has identified six different methods of organ procurement used worldwide:

1. Express intent for donation by the individual whilst still alive, or by next-of-kin after death.
2. Presumed donation.
3. Routine removal or salvaging.
5. Abandonment.

The only option used in New Zealand is (1), although even this option is being hampered by the practice of ‘ignoring the express wishes of the individual if they conflict with those of the next-of-kin’—a situation that is arguably unethical.

Although there are many people who make provision for organ donation in their will, this is negated by the fact that procurement normally takes place after brain death, but before heart death—therefore the will reading is too late for identification purposes.

The main method of identifying donors is through the donor section of the drivers’ licence. There are currently 1.1 million people (around 42% of licensed drivers) who are registered as donors. However, as the drivers’ licences are regulated by the Land Transport and Safety Authority (LTSA), simply ticking a box on your licence is only taken as an indication of intent, and not a valid form of informed consent. However the ethical standard for proxy consent (of any kind) is that it should reflect what that individual would have wanted, if (per impossibile) he or she could be asked, and the role of relatives is only to help in ascertaining those wishes.

Therefore, where there is a conflict, the doctors should be guided by the best indication of the wishes of the patient and not those of any other person. Thus, medical practitioners are totally disregarding the provisions of the Human Tissue Act (1964) (and their ethical duty to their dead patient) when they fail to retrieve organs and tissue without the consent of next-of-kin.

This unethical stance is given spurious validation by donor information websites when they state ‘in New Zealand, organs and tissues will not be retrieved if the family has any objection. The family's wishes will always be respected’.

In fact, the official Government website of the LTSA accurately states ‘in reality, your wishes don’t legally count as ‘informed consent’, and family members, even distant relatives, can step in and prevent your organs being donated in the event of death’.

One cannot ethically defend this practice, which, in effect, over-rules the individual’s autonomous decision (when presumably in sound mind) and favours the emotionally fraught decision of a relative, made in a time of stress, and often with no or little background knowledge.
The conflict between law and praxis

It is obvious that we are dealing here with a serious disparity between law and ethics on the one hand, and clinical praxis on the other. The result is to intensify an ongoing problem surrounding the supply and retrieval of organs for donation.

For example:

- An editorial in the Otago Daily Times (in July 2004) has called our low donor rate ‘strange’, in a reasonable and coherent society with a tradition of mustering support for worthy causes. It states: *Our willingness to get behind other national campaigns, such as the call to recycle, or to save power, is in sharp contrast in this area where a person who has been tragically cut short is able to do something which is both generous and good.*

Transplant surgeons are currently calling for a payment of NZ$5,000 to cover costs and ease suffering for live-organ donors. It seems right that donors be recompensed for their expenses, but the idea has also raised concern about financial inducements for organ donation and harvesting.

- The Health Ministry is considering a proposal to create a new position at The National Transplant Donor Co-ordination Office, to undertake education and advocacy work with the purpose of ‘beefing up’ donation rates.

- A group of 1170 concerned citizens lead by Andy Tookey (whose daughter is going to need a liver transplant in the future) has petitioned parliament to examine the donor rates in New Zealand. This has resulted in a report from a Parliamentary Select Committee with recommendations as to future management of organ shortages.

- The above report (released 2003) has already been criticised by Professor Stephen Munn of the Liver Transplantation Unit on the basis that the setting up of a register will do no more than ‘bureaucratise’ a system that is not working.

- The Ministry of Health is currently reviewing the Human Tissue Act (1964), and a discussion document is due to be released in the next few weeks.

- A recent retrieval from Dunedin Public Hospital’s Intensive Care Unit (ICU) resulted in a father complaining that the Next-of-Kin Approval Form resembled a ‘shopping list’ and caused distress to the family.

These examples demonstrate that the current system is not working and may be creating unnecessary distress for relatives, but the answer suggested in the Parliamentary Report seems to miss the point. It is not the law that is at fault, because our practice, in addition to being arguably unethical, does not follow the law. The New Zealand Retrieval Team always make a concerted effort to give dominance of choice to the patient’s family/caregivers, but in so doing ignore the legal framework and their ethical duty to the patient.

The reason given is to prevent upsetting relatives in times of shock and grief, but that seems to be entirely false to the clinical reality, and merely reflects the discomfort of the clinicians involved in transplant situations. The distress and discomfort (affecting
both relatives and clinicians) need to be addressed, which I would argue, can be done in quite a simple manner.

To bring our practice in line with ethics and the law, we should change our approach to the donor’s relatives. We should remember that relatives are not only feeling their way about appropriate behaviour in a life-and-death clinical situation, but are also shocked by their sudden loss, and even sometimes unsure about the way they should show their love and respect for the dead. We can help in this fraught situation by saying something like:

*Your relative has indicated that he/she wanted to be an organ donor, is there any reason why that should not go ahead?*

This approach reflects the ethical duty of the doctor—to respect the wishes of the patient, and the law relating to healthy care decisions (which endorses the wishes of the patient as non-substitutable by any other wishes whatsoever). It also normalises the consent to donation, and lessens the emotional burden of decision on the relative.

That simple change in approach would, we believe, increase our donor rate and take a lot of the feelings of guilt and responsibility away from all of those concerned. By not changing, we are neglecting the patient’s right to autonomy in over-riding the intent signalled on the drivers’ license.

Indeed, it seems clear that the culture of fear and horror, perhaps generated from an aura of scavenging and body-snatching, shouldn’t be allowed to eclipse the clear wishes of everyday New Zealanders to help each other in mortal crises.

**Conclusion**

There is obviously a clear-cut ethical and legal case for a change of practice in organ donation. While legislative or other official change is unnecessary, we need to recognise that our practice must reflect (both the law and our ethical duty in the light of the psychological) realities of death and organ donation.

We must also educate the public in a nationwide campaign. This campaign should clearly state that when the organ-donation decision has been made, relatives have no valid role in overturning it (except in very special considerations). Clinicians should then follow both the letter and spirit of the law—obeying the voice of the individual as a final act of compassion, instead of a last lament for a lost opportunity.

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**References:**

Medical registration

"This extract is taken from a speech read by Dr G. Gore Gillon at the Annual Meeting in Auckland. It was published in the New Zealand Medical Journal 1905, Volume 4 (13), p160."

As you are doubtless aware, there are a number of medical practitioners settled in New Zealand who came out from the United States of America, and whose period of study in the States is under the length of the prescribed course of instruction in the schools of the British Empire. The term of study in the latter country is fixed at five years; in the United States of America a person may become a doctor after a course ranging from six months to three years or more.

Medical and surgical science has made vast strides since the Medical Act was passed in 1869, and, while three years was then considered a long enough course of study, at least five years are required now to secure a proper qualification. I wish to state here that I am fully aware that there are many excellent universities in the United States of America whose teaching is as good as any in the world, and which produce many graduates of world-wide fame, and in these colleges the term of study is five years. But, unfortunately, there are also many institutions in that country where diplomas or degrees are granted without an adequate period of study.

It is felt to be unfair to us in New Zealand that American doctors may come here and be registered in New Zealand under the existing Medical Registration Act of 1869, as according to that Act they have a perfect right to do if they can show they have studied for three years in their own country. If any British practitioner in our world-wide Empire goes to the United States of America to practise, he or she must first pass the State examination of the particular State he or she intends to settle in before becoming a registered doctor; but if an American comes here there is no such reciprocal restriction. This is certainly not "fair trade."
Natural or artificial?

A 75-year-old man underwent thoracic surgery approximately 40 years previously. He now presents with a left chest wall mass.

Figure 1 and Figure 2 show a computed tomographic (CT) scan performed on his recent presentation.

What surgery has he had?
What was the surgery performed for?
What is the cause of his current clinical presentation?

See the answers on the next page
**Answers**

The patient has undergone a plombage operation for cavitating tuberculous disease. Plombage involves stripping the parietal pleura from the chest wall and packing the space with inert Lucite balls. This treatment was to close a tuberculous a cavity protecting the remainder of the lungs.

The current complication is due to herniation of a Lucite ball through an iatrogenic defect in the chest wall.

The CT scan shows the Lucite balls, and the herniated ball can be seen in a left subpectoral location.
Avoidable hospital admissions?

Adverse drug reactions (ADR) are a well known cause of hospital admissions. Methuselah audited his general medical admissions three decades ago and found approximately 5% of his patients were admitted because of ADR—10% if drug overdose cases were included.

Apparently things have not changed much, as an audit of 18,820 adult patients admitted to two Liverpool (UK) hospitals included 1225 (6.5%) such patients—overdose patients were excluded. The overall fatality was 0.15%. Most reactions were either definitely or possibly avoidable. Drugs most commonly implicated in causing these admissions included low dose aspirin, diuretics, warfarin, and non-steroidal anti-inflammatory drugs other than aspirin, the most common reaction being gastrointestinal bleeding.

BMJ 2004;329:15–19

Playing God’s hand

Preimplantable genetic diagnosis (PGD) is well established for screening chromosomal abnormalities. More controversial, however, is the fact that a few clinics in the US have begun offering PGD to fertile couples who want to select the sex of their baby.

According to Jeffrey Steinberg, director of The Fertility Institutes in Las Vegas, one of the clinics offering the service, the transition happened because patients who were having PGD screening for chromosomal abnormalities started asking about the sex of the embryos. Now the clinic is providing the service to fertile couples who do not need IVF but are prepared to pay for it simply to make sure they get a boy or girl.

Not everyone sees this trend towards using PGD for sex selection as desirable. “I think the majority of us feel it is inappropriate for family balancing,” says fertility doctor Stan Williams of the University of Florida.

New Scientist, 12 June 2004, p7

Management of acute labyrinthitis

Vestibular neuritis (labyrinthitis) is the second most common cause of peripheral vestibular vertigo. Its assumed cause is a reactivation of herpes simplex virus type 1 infection. Therefore, corticosteroids, antiviral agents, or a combination of the two might improve the outcome in patients with vestibular neuritis.

Clinical researchers in Germany have recently reported on a prospective, randomized, double-blind trial in which patients with acute vestibular neuritis were assigned to treatment with placebo, methylprednisolone, valacyclovir, or methylprednisolone plus valacyclovir.
The results showed a significant beneficial effect for those treated with methylprednisolone (P<0.001) but not for those treated with valacyclovir (P=0.43). The combination of methylprednisolone and valacyclovir was not superior to corticosteroid monotherapy.

So much for the reactivated viral theory.


**Behind the scenes**

Ghost writers for sporting and presidential memoirs are well accepted but do we want professional writers ghosting scientific articles in our medical journals? The World Association of Medical Editors (WAME) has recently published guidelines which include the following—“If writers are provided by the sponsoring or funding institution or corporation to draft or revise the article, the name of the writer and their sponsoring organisation must be provided. Their names and contributions will be provided with the acknowledgments.”

Methuselah agrees—we don’t mind them doing it, but we want to know who they are.


**Funny honey?**

Apparently, bees (like any creature) can get sick; so beekeepers administer small doses of antibiotics. The less scrupulous overstep the limits by dosing hives with excessive levels or banned drugs.

In January this year 14,000 jars of honey labelled “Produce of India” were stopped for testing at Felixstowe (England) docks. The honey turned out to be contaminated with chloramphenicol, a wide-spectrum antibiotic banned in food production in most countries.

Commenting on the Felixstowe seizure, Vijay Sardana, head of the Indian trade body Cita, said that India believed Chinese honey was being smuggled into the country through Nepal, repackaged and then sold abroad.

The industry organisation Apimondia convened a world conference in Germany two years ago to discuss this problem, after a survey of the international honey industry reported that “sulfonamides were found in Canadian honey, tetracycline and streptomycin in American, Mexican and Argentinian honey, miticides and insecticides in American honey and chloramphenicol in Chinese and European honey”.

Guardian Weekly, 6–12 August 2004
Meningitis: tragedy, culture, and blame

Thank you for publishing the report of the Coroner regarding the tragic death of a young woman with meningococcaemia in Wellington. My sincere condolences to the family of Nileema Sharan. This disease regularly conspires to fool us, although it is worth observing that it fools us in New Zealand less commonly than elsewhere in the world. Three recurrent issues resonate in the report.

First, a constellation of clinical points in time can be linked together retrospectively to form a recognisable shape. Prospectively any shape was possible. Retrospective examination of events in this way, with the final diagnosis in mind, remains an extraordinarily poor examination of a prospective process laced with choices, probabilities and uncertainty.

Second, it is of concern that the authority of a document from the College of Physicians in the UK, describing communication between A&E and General Medical teams is used to critique the communication between an Emergency Department and a General Practitioner in New Zealand. If we are to get better at our retrospective examination of adverse outcomes we should at least get into the right context before we start.

Third, there is a focus on waiting times in the Waiting Room and management of those waiting. It is only mentioned cursorily that the Waiting Room was full of waiting patients because they could not access the next phase of their care. It was not mentioned at all that they could not access the next phase of their care because the epidemic of Emergency Department overcrowding was afflicting this hospital just as it afflicts most major Emergency Departments in this country. This epidemic has already caused deaths and concerns about it have been raised with the Ministry of Health repeatedly. Solutions require concerted and coordinated efforts backed by the authority of the Ministry and by wisdom gathered by them.

In summary, this tragic case is a consequence of two epidemics only one of which is being taken seriously in this country.

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Professor of Emergency Medicine
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References:


Skin infections of the limbs of Polynesian children

We thank Jones et al for drawing some issues to our attention.

We accept that our paper would have been better if we had addressed some of their issues in more detail. However, our prime interest was in making sure that such dramatic and clear results were put into the public arena, so that clinicians and other stakeholders in health services delivery would be able to take account of these major ethnicity/culturally associated findings. They need to be taken into account in research planning, health service delivery, and probably in other socioeconomic national activities.

For the record, ethnicity at Middlemore is recorded in the nationally accepted fashion of self-identification.

We stand by our final sentence indicating the importance of research, which explores genetic, social, and environmental circumstances—and could indeed cite many studies, which show contributions from these various factors to the incidence, presentation, and management of many illnesses. In that sense, we do not accept our critic’s view that genetic issues should not be explored.

We apologise for not specifically including reference to the relevance of household crowding, and for any lack of attention to our Treaty obligations.

Rocco P Pitto
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References:


Skin infections of the limbs of Polynesian children

I am surprised by the statement by Rhys Jones et al ‘that genetic differences cannot explain ethnic inequalities in health’. Heterozygosity for sickle haemoglobin has long been known to protect against severe malaria. Genetic susceptibility to infectious disease has also been documented for tuberculosis, leprosy, typhoid fever, hepatitis B, and HIV.\textsuperscript{1,2}

Economic deprivation was associated with increased rates of disease due to \textit{Neisseria meningitidis} in New Zealand, during 2002, for children under the age of 5 years, but there was no association between economic deprivation and disease incidence for those over the age of 5 years, despite the higher incidence of disease in Pacific and Maori people aged 5–20 years.\textsuperscript{3}

An Auckland study found a higher prevalence of nasopharyngeal carriage of \textit{N. meningitidis} in household contacts of patients with meningococcal disease if those contacts were of Maori ethnicity. The odds ratios for factors found to be significantly associated with carriage were: personal smokers (OR=2.5), passive smokers (OR=1.6), and Maori ethnicity (OR=2.2). In contrast, the number of persons per room (OR=1.11), educational level (OR=0.89), and income per household member (OR=0.85) were not significantly associated with carriage.\textsuperscript{4}

A large number of genetic polymorphisms have been recognised to contribute to the risk of disease due to \textit{N. meningitidis}.\textsuperscript{5} One study suggested that host genetic factors may contribute one-third of the total risk. I am not aware of any study to determine whether any of these genetic host factors contribute to the epidemiology of disease due to \textit{N. meningitidis} in New Zealand.

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References:

Antifungal susceptibility of non-albicans *Candida* species causing fingernail onychomycosis

*Candida* species are an infrequent cause of toenail infection but account for 51–70% of fingernail infections.\(^1\) Fingernail onychomycosis due to *Candida* species is more frequently seen in women, and usually associated with paronychia. Although *Candida albicans* is frequently isolated, *Candida parapsilosis* is emerging as an important fingernail pathogen.\(^2,3\)

Diagnostic Medlab is a community pathology laboratory in Auckland, which in the first 5 months of this year received 1058 fingernail specimens for mycological culture; 41% were culture positive, with dermatophytes and yeasts comprising 15% and 85% of positive cultures respectively. Most of the *Candida* isolates (57%) were non-albicans species.

Susceptibility testing is not routinely performed on fungal species isolated from non-sterile sites such as nails and there are limited data on the antifungal susceptibility of non-albicans *Candida* species in this clinical setting. We therefore performed susceptibility testing on 34 non-albicans isolates recovered from fingernails; *C. parapsilosis* (22), *C. tropicalis* (5), *C. lusitaniae* (2), and five other species; see Table 1.

All isolates were recovered from specimens that had fungal elements seen in direct microscopy. Yeast identification and susceptibility to amphotericin B, flucytosine, fluconazole, itraconazole, ketoconazole, voriconazole (by broth MIC), and miconazole, nystatin, clotrimazole, terbinafine, and griseofulvin (by disc testing) were performed by standard methods.\(^4,5\)

All isolates were resistant to griseofulvin and susceptible to clotrimazole and nystatin. All but one isolate, *C. parapsilosis*, were susceptible to flucytosine. There are no interpretative criteria for ketoconazole and voriconazole; all the MICs for these agents were less than or equal to 2 mg/L, with MIC\(_{90}\) of 0.03 mg/L and 0.125 mg/L, respectively. Susceptibility results for the other antifungal agents are shown in Table 1.

The majority (94%) of isolates were susceptible to fluconazole. Terbinafine resistance was seen in five (15%) isolates and intermediate susceptibility in four (12%). No isolate was resistant to itraconazole but eight (24%) had reduced susceptibility (dose-dependent).\(^4\)
Table 1. Antifungal susceptibilities of non-albicans *Candida* species (% susceptible)

<table>
<thead>
<tr>
<th>Antifungal</th>
<th>C. parapsilosis (n=22)</th>
<th>C. tropicalis (n=5)</th>
<th>C. lusitaniae (n=2)</th>
<th>C. guillermondi (n=1)</th>
<th>C. intermedia (n=1)</th>
<th>C. lipolytica (n=1)</th>
<th>C. pelliculosa (n=1)</th>
<th>C. famata (n=1)</th>
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<tr>
<td>Amphotericin B</td>
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<td>Dose-dependent</td>
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| MIC interpretation: amphotericin B: susceptible <1 mg/L, intermediate= 1–2 mg/L, resistant ≥2 mg/L; fluconazole: susceptible ≤8 mg/L, dose-dependent susceptible=16–32 mg/L, resistant ≥64 mg/L.
Our results extend on those of an earlier New Zealand report on the antifungal susceptibility of 375 Candida isolates. Most isolates, with the exception of C. krusei and C. glabrata (species not represented here and known to have reduced susceptibility), were susceptible or dose-dependent susceptible to the triazole antifungals and flucytosine.6

Current oral treatment options for Candida onychomycosis are itraconazole and terbinafine. The nail concentration of itraconazole (~1 µg/ml)3 should be sufficient to overcome the susceptible dose-dependant MICs, 0.25–0.50 mg/L. Our results suggest that, when fingernail onychomycosis is due to a Candida species, treatment with oral itraconazole is favoured based on in vitro data and greater clinical experience.3,6,7 Nevertheless, if contraindications to itraconazole exist, terbinafine treatment could be expected to achieve cure in ~65% of cases.8

Our results confirm the importance of C. parapsilosis in fingernail onychomycosis. We suggest that routine identification and susceptibility testing of nail isolates of Candida species is not necessary but could be considered for relapsing disease.

This study was funded by the Auckland Infectious Diseases Education and Research Trust.

Arlo Upton
Microbiology Registrar1

Karen Rogers
Laboratory Scientist1

Neil Wood
Laboratory Scientist2

Arthur J Morris
Clinical Microbiologist1,2

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References:


Sudden Infant Death Syndrome (SIDS)

At a Wellington inquest (reported 8 July 2004 in the NZ Herald) into the sudden deaths of 3-month-old twins in a cot, a perinatal pathologist Jane Zuccollo said evidence suggested hyperthermia, but this could not be proved.

The coroner was critical of lack of thorough investigation into sudden and unexpected deaths in the past. In Kaitaia, the coroner's finding (reported 1 July 2004) was accidental asphyxia (also known as suffocation, smothering, or overlaying).

A 3-month-old baby had shared a mattress with mother and two siblings aged 3 and 1. The reporter wrote: *One of the siblings had accidentally lain over the baby.*

On 12 July 2000, the concerns of Carol Everard of the Cot Death Association were reported:

> Vital information not collected could lead to incorrect coroners’ rulings, or inconclusive SIDS verdicts.......While the SIDS rate has fallen, there has been an increase in coroners delivering a ruling of accidental asphyxia, simply because baby died in bed with parents, and really has no scientific base.

In smothering cases over the years, can anyone at the event, or the pathologist later, prove this was indeed the true scenario? Everyone appears to blindly accept the idea rather than remain in lingering doubt.

Death caused by hyperthermia could be proved if the first medic on the scene immediately records the infant’s body temperature using a ‘ThermiScan’, and carefully observes, listens, and records. Any reading above 37°C would be very noteworthy—temperatures about 42°C and over are incompatible with life.

I have requested BRAUN, of Germany, to devise an instrument that would trigger an alarm to alert the parents if their sleeping infant’s temperature reached 38°C or above. If feasible, trial preventive studies could be undertaken.

Dr Robert J Dallas
Mount Maunganui
Bay of Plenty
Physiology, pseudoscience, and Buteyko

Comments by Holt and Beasley (N Z Med J. 2004;117(1188). URL: http://www.nzma.org.nz/journal/117-1188/754) concerning the Buteyko technique ignore an increasing body of evidence suggesting that the breathing re-education might have a therapeutic role in the management of lower respiratory tract disease.¹–³

Few studies are perfect. Instead of pouring vitriol on the study⁴ perhaps it might be appropriate to ask why people are able to decrease their asthma medication, not deteriorate significantly and maintain objective measures of lung function. As medical scientists, we should not become stuck in the comfort of the familiar but welcome observations that cannot be explained by current theories. They may hold the keys to new solutions.

While I personally disagree with some aspects of the Buteyko technique, perhaps it might be appropriate to briefly examine some of the Buteyko ideas.

The three basic tenets of the Buteyko technique appear to be:

- Encouraging nasal breathing.
- Slowing the respiratory rate.
- Possibly resetting arterial pCO₂ levels at a higher level through breath-holding.

Firstly, could the nose have a role in improving lower respiratory tract function? The nose is well known to have subtle influences on the lower respiratory tract thought to be due to the warming, filtering, and humidification of the incoming air. Patients, who have their jaws wired forcing them to breathe largely through their noses, not only have increases in residual volume (23%), functional residual capacity (13%), and total lung capacity (5%) but their PaO₂ also increases by 8%⁵. The reasons for such a change have been subject to debate; however, in asthmatics, the increased resistance provided by the nose may affect closing volumes and thus reduce the extent of physiological shunt.

Secondly, does changing the respiratory rate influence asthma? It might change the pattern of breathing. In my opinion, a deficiency of the Buteyko technique as opposed to yogic breathing techniques⁶ is that it does not emphasise the importance of diaphragmatic breathing.

West documents that the upper 7% slice of lung brings in 4 ml of oxygen per minute as opposed to a lower 13% volume slice bringing in 60 ml of oxygen per minute. The oxygen cost of quiet breathing using the diaphragm is less than 5% of total oxygen consumption—whereas, in voluntary hyperventilation, it can increase to up to 30% of total oxygen consumption.⁷ It makes physiological sense to breathe slowly using your diaphragm.

Most respiratory physiology books teach that expiration relies totally on the elasticity of the lung and chest wall. Careful observation proves them wrong. If you lie flat and breathe out the diaphragm lengthens eccentrically. If you lie flat, and breathe in and
out slowly and then relax after a normal inhalation, you will feel the air whoosh out faster, proving that some tension is held in the diaphragm during supine exhalation.\textsuperscript{6}

There is also a braking contribution from the laryngeal musculature. Weightlifters build up muscle strength more quickly through slow eccentric contraction. A slow breathing pattern might have a role in the maintenance of diaphragmatic strength.

Changing your breathing pattern to a slow abdominodiaphragmatic breathing pattern may also influence the sensation of dyspnoea\textsuperscript{8} and the need to use bronchodilators. There is a very poor correlation between measures of pulmonary function and dyspnoea. The sensation of dyspnoea correlates best to changes in respiratory rate, an increase in the inspiratory component of the respiratory cycle and the use of accessory respiratory musculature particularly the sternomastoid muscle. Bearing in mind the high prevalence of hyperventilation syndrome amongst asthmatic patients some asthmatic patients might be better off focusing on their breathing pattern before they resort to using bronchodilators.

The third puzzling question is whether it is possible to reset central pCO\textsubscript{2} receptors so that your arterial pCO\textsubscript{2} runs at a higher level. West teaches that the limbic system is able to alter the pattern of breathing.\textsuperscript{7} The limbic system would also appear to have the ability to independently override the pontomedullary respiratory centre, which maintains normal pCO\textsubscript{2} homeostasis. The ventilatory response to CO\textsubscript{2} is significantly lower in yoga practitioners and their end tidal pCO\textsubscript{2} (as a measure of arterial pCO\textsubscript{2}) is significantly higher (3.7 mmHg).\textsuperscript{9}

In contrast, people who are prone to anxiety attacks would appear to have lower arterial pCO\textsubscript{2} levels (5 mmHg on average) as compared to controls and their pCO\textsubscript{2} receptors are more responsive to changes in arterial pCO\textsubscript{2}.\textsuperscript{10} The physiological significance of changing the settings of central pCO\textsubscript{2} receptors remains to be determined.

Like all good studies, the Gisborne studies raises more question than it answers. The challenge is not to dismiss it out of hand but to extract from the Buteyko technique answers to our patients’ problems. As an ear nose and throat specialist, my knowledge of the lower respiratory tract is limited, but hopefully this letter offers some potential avenues that could be explored.

Jim Bartley
Otolaryngologist
Epsom
Auckland

References:


Population need and geographical access to general practitioners in rural New Zealand


The three Territorial Local Authorities that make up the West Coast had populations per General Practitioner quoted as between 439–900 people per GP (for Buller and Grey district councils), and 900–1150 people per GP (for Westland District Council). These data were calculated by using full-time equivalent GP data for the year 2000 provided by the Ministry of Health, and population data from the 2001 census. The highest population per GP ratio anywhere in New Zealand was quoted as 1500–234 people per GP.

Figure 1. District Health Board regions of active general practitioners, per 100,000 population, 2002

Source: New Zealand Medical Council. Rates have been calculated using the census-night populations (6 March 2001). Source for figure: http://www.nzhis.govt.nz/stats/genpracstats.html
An alternative source of information for population to GP ratios in New Zealand is the New Zealand Health Information Service (NZHIS), a division of the Ministry of Health. They produced Figure 1 above, on GP to population ratios in 2002. Active General Practitioner figures from the New Zealand Medical Council in 2002 were used, with population data from the 2001 census.

The NZHIS figures showed that the West Coast had the lowest number of active GPs per population of any area in New Zealand in 2002. The West Coast had 52.8 active GPs per 100,000 people, compared to the national average of 78.1 GPs per 100,000 people. This equated to 1900 people per active GP per 1900 people on the West Coast.

The number of active GPs may be more than the number of full-time equivalent GPs, which would further increase the difference in these figures. Of note, at the time of writing, the population per full-time equivalent GP ratio on the West Coast is 2380 patients per GP.

I would be interested to hear the authors’ comments on the differences in these information sources, and their implications.

Dr Carol Atmore
General Practice Liaison Officer
West Coast District Health Board

Response

In response to the letter from Dr Carol Atmore, West Coast District Health Board, we would like to thank her for identifying this discrepancy. The paper mistakenly says that full-time equivalent data was used. We think that the difference can be explained by our analysis treating every GP as working full-time, while the statistics provided by the NZHIS considers full-time equivalent workloads.

At the time this research was completed (January 2002), it was difficult to obtain national information on the location of GPs. The NZ Medical Council register of GPs appears to only contain information on the contact addresses of GPs and this does not necessarily refer to the addresses of the GP practices. An alternative data set (provided by the MOH) was used that did contain the addresses of GP practices; however, this did not contain information on full-time equivalent workload.

An important theme that the paper is trying to convey is that computer technology is now available for providing much more sophisticated models of geographical access than population per GP, and that there are a range of models and statistics that can be used. Given that sophisticated spatial analysis tools are available for calculating accessibility, it is ironic that data collection, which is relatively simple, is the problem.

We hope that the MOH and the NZ Medical Council can collaborate to maintain a current and geographically referenced database of active GPs. It is also hoped that a geographically referenced database of all health services is maintained. This will enable travel time information to be routinely calculated and help provide informed debate on the accessibility of health services in New Zealand.
Lars Brabyn
Lecturer
Department of Geography
University of Waikato
Hamilton

Ross Barnett
Associate Professor
Department of Geography
University of Canterbury
Christchurch
Acute Coronary Syndromes

Ellis and White on behalf of the New Zealand Acute Coronary Syndromes Audit Group have answered many of my concerns about their 2-week audit of acute coronary patients in New Zealand (NZ) hospitals, and in particular they very much agree that ongoing audit is important. A second audit is already being planned so that data can be compared with those from the first audit.

The problem remains, however, that although a second audit may show changes in practice in NZ hospitals generally, there will still be far too few data for comparison of performance among individual hospitals. As Ellis and White say, hospital league tables are invalid because they discriminate unfairly, but I am sure they will agree that in the present ethical climate confidence in health professionals must not interfere with efforts to improve outcomes for patients, and that some hospitals undoubtedly perform better than others.

Case selection should not be possible by hospitals which cater exclusively for a section of the population, so the problems of surgical audit are not relevant. The United Kingdom (UK) Myocardial Infarction Audit Project (MINAP)\(^2\) has devised a system (not necessarily the best) of ‘traffic lights’—green indicating compliance with an agreed standard; orange, near-compliance; and red, failure to comply. UK District General Hospitals cater for on average a population of 250,000, so there might be statistical problems for assessing performance of smaller NZ provincial hospitals, but these should not be insurmountable.

Returning to the question of which treatments should be audited, and accepting that thrombolytic treatment if started within 1 hour of symptom onset could reduce fatality for eligible cases by 50%,^3^ more deaths would still likely be prevented by resuscitation from cardiac arrest than by any other treatment because many lives saved would be of patients who would otherwise have died suddenly before coming under care.\(^4\),\(^5\) Inclusion of ambulance data is essential for proper audit of the acute ischaemic syndromes, and this is now being achieved by MINAP, despite initial difficulties (JS Birkhead, personal communication).

Professor White has commented generously and perceptively on the MINAP project.\(^6\) However, British colleagues would disagree that the budget is enormous. Individual MINAP hospitals receive no extra funding, but the project remains popular partly because it is perceived as healthy competition, and partly because electronic recording of data is less time-consuming for nurses than writing of longhand notes. MINAP experience would suggest that a similar project could be carried out in NZ, after initial setting up, by a single coordinator and one information technologist.

I believe that the Acute Coronary Syndromes Audit Group should seriously consider the establishment of a continuing comprehensive audit of treatments so that valid comparisons can be made among hospitals and ambulance services and best standards of practice established for the benefit of all New Zealanders.
Robin M Norris
Formerly Honorary Professor of the Auckland School of Medicine (and Consultant to the MINAP Project)
Auckland

References:

Sidney (Sid) Hawes

Sid Hawes, a well-known Timaru physician who had a long and varied career in medicine (mostly associated with Timaru Public Hospital), died on August 2, 2004. The impetus for studying medicine was his father, who died during his final year of medical school in Dunedin when Sid was 6 years old.

Sid was educated at George Street School in Dunedin and Otago Boys’ High School. He studied medicine at the University of Otago, and graduated in 1943 when he was 22 years old.

He then joined the staff of Dunedin Hospital before spending 2 years as a flight-lieutenant in the Royal New Zealand Air Force during World War 2. He served in the Pacific as a medical officer on the vessel Wanganella.

Following a further period at Dunedin Hospital and 18 months general practice in Outram, Sid became a senior house physician at the Central Middlesex and West Middlesex Hospitals in England. He was made a Member of the Royal College of Physicians, London, before being appointed at Timaru Public Hospital. In 1951, he became a Member of the Royal Australasian College of Physicians.

He embarked on further overseas study in 1954, and spent time in England (at the Hammersmith Hospital, the National Heart Hospital, and the National Hospital for Diseases of the Nervous System) and Scandinavia. In that year, he was graded a senior specialist and he was subsequently elected a Fellow of both the Royal College of Physicians and the Royal Australasian College of Physicians. In 1963, he was appointed Medical Superintendent of Timaru Hospital, and held this post for the next 18 years.

During the early years of Sid’s career there was a strong emphasis on chest medicine because of the high incidence of tuberculosis. It was also Sid’s major field of interest and he devoted a great deal of time to the chest block in Timaru as well as to running the Waimate Chest Clinic.

Polio was also a scourge at the time. The worst of a series of epidemics was in 1953, when there were about 40 cases at Timaru Hospital and only supportive treatment could be offered, with several iron lungs operating at once.

As these diseases disappeared due to developments in treatment, his focus shifted to the degenerative diseases—such as coronary artery disease, stroke, diabetes, and cancer. He considered that modern breakthroughs in technology such as antibiotics (used conservatively), the monitoring of respiratory and circulatory functions, and organ imaging were crucial advances—and (remembering the community’s fear of
polio and other childhood diseases, including their disastrous effects) he strongly advocated the vaccination of children for preventable diseases.

His philosophy that ‘prevention was very much better than cure’ extended to the hospital staff—and he encouraged (and was impressed by) the young house surgeons who kept fit by jogging in their lunch breaks.

Sid gave 31 years of full-time service to Timaru Hospital. During this period, while working as a physician and undertaking demanding administration, he taught medical and nursing staff, and wrote academic papers on a variety of subjects—including tetanus, tuberculosis, and hydatids.

He was also a member of the Abortion Supervisory Committee for 11 years, and was physician to the Claremont Trust—an organisation established to assist people with drug and alcohol problems. In addition, he was a foundation committee member of the Tuberculosis Association—and was involved in Alcoholics Anonymous, the Association for Mental Health, the Parents’ Association, and Full-time Medical Officers’ Association.

He spent several months in Vietnam at the Qui Nhon Hospital as Medical Officer of the New Zealand Colombo Plan Surgical Team, as well as a period in Tonga for the World Health Organization. After retiring as Medical Superintendent, Sid continued a close association with Timaru Hospital and continued to work there in a part-time capacity.

Apart from his strong and enduring interest in his profession, Sid had a great love of the outdoors, particularly the Canterbury landscape. For many years, he owned a small batch at Lake Clearwater. He enjoyed climbing and hunting, especially with his sons, and participated in search and rescue expeditions for injured climbers. He was Honorary Medical Officer and Vice President of the South Canterbury Deerstalkers’ Association and the South Canterbury Gliding Club. He had a lifelong interest in radio, having gained his radio operator’s licence when he was 14 years old. He also continued his membership of the South Canterbury Air Force Association.

Sid’s experiences of growing up during the Depression, and of practising medicine during World War 2 and in Vietnam, instilled in him a horror of war and of waste and destruction—and a strong hope that rational values would eventually prevail in human affairs. He will be remembered by his colleagues, friends, and patients as a compassionate and intelligent doctor, as well as a man of broad interests and knowledge.

He is survived by his four children, his sister, his grandchildren, and great-grandchildren.

This obituary is based on the article entitled Prominent physician, which appeared in The Press newspaper (Christchurch) on Saturday 21 August. We gratefully acknowledge the assistance of Mike Crean and Bruce Rennie of The Press.
Sport and Alcohol: Understanding the Mix (Conference)

The Centre for Studies in Sport and Exercise at Massey University are running a conference entitled ‘Sport and Alcohol: Understanding the Mix’ on February 8–10, 2005, in Palmerston North, New Zealand. The Conference is a joint undertaking between Massey staff involved in sport and exercise teaching across the colleges of Business, Science and Education.

The Conference will critically analyse and debate the relationship between New Zealand sport and alcohol especially in relation to:

- Social issues (eg, youth, gender, culture, socialisation)
- Health issues (social marketing, holistic health issues)
- Performance issues (the effects of alcohol on sport performance)
- Business issues (sponsorship, management, marketing, legal issues, event management, media)

Speakers include:

- Dave Currie – NZ Olympic team Chef De Mission
- Professor Wray Vamplew – Researcher from Stirling University in Scotland
- Greg Cox – Australian Institute of Sport
- Professor David Gerrard – Scholar and former NZ Olympic team Chef De Mission
- Andrew Martin – Former All Black Manager
- Glenda Hughes – Sports Agent and former sport manager
- Professor Gary Hermansson – NZ Olympic team sport psychologist
- Andrew Dawson – Sydney Olympic Stadium Manager
- Dr Farah Palmer – Scholar and dual World Cup Winning Captain of Black Ferns
- Graham Seatter – Commonwealth Games Athlete/Coach and Lion Nathan Sponsorship Director
- Norm Hewitt – Former All Black
- Doug Rollerson – Former All Black and North Harbour Rugby CEO
- Hugh McGahan – Kiwi Rugby League Great and former administrator
- Representatives from other relevant groups like Alcohol and Liquor Advisory Council (ALAC), the New Zealand Rugby Union (NZRU), and Lion Nathan.
A light-hearted debate between high-profile athletes, sports management personnel and media personalities is being organised for the conference dinner.

**Early Bird (3-day conference registration) Cost:** NZ$570 GST inclusive (before December 15, 2004).

**Full Cost:** NZ$680 GST inclusive (After December 15th, 2004).

**Single Day Registrations:** NZ$300 GST inclusive.

*Group registration discounts will be negotiated depending upon specific details.*

For more general and registration information please check out our website:

[http://www.sport-alcohol.co.nz](http://www.sport-alcohol.co.nz)

Proudly sponsored by: ALAC, The Institute of Food Nutrition and Human Health, Massey University Department of Management, Lion Nathan, Kingsgate Hotels and Resorts, Origin Pacific, The New Zealand Rugby Football Union
Highlights of the congress are:

One day post-graduate course on “clinco-patho- radiological decision making in Hepatology”, Three day core-meeting with emphasis on molecular, genetic and immunological basis of liver diseases and novel approaches to therapy, Parallel sessions on Pediatric Hepatology, Liver Pathology, Surgical Hepatology including liver transplantation, Radiology in Liver Diseases, Molecular Hepatology and Nutrition in Liver Diseases, AASLD – APASL session on “Epidemiology of liver diseases in Asia”, Workshop on “Endoscopic and Radiological procedures in Liver Diseases”, Free Paper – Presentations, Awards and travel bursaries for young investigators.

The confirmed invited International Speakers include:


APASL President: S.K. Sarin

Email: welcome@apaslindia2004.com ; Website: www.apaslindia2004.com
Medical Benevolent Fund

NZMA Members, and families of deceased Members, may apply for aid when in situations of financial hardship or distress.

Applications should be directed through the NZMA:

Central Office
P O Box 156
Wellington
Tel: 0800 656161
Cecil Textbook of Medicine, 22nd edition


New editions of major textbooks always produce a sense of hope that we will not just see a rehash of the previous versions with a few more details. The new edition of Cecil is anything but that. It contains some significant improvements in content together with major innovations in presentation to make it more user-friendly and give greater perspective on treatment to the reader.

The content has been expanded to include new parts on genetics, immunology and inflammation, and clinical pharmacology as well as substantially expanded parts on oncology and preventative and environmental medicine. There are 23 new chapters including pertinent surgical topics such as surgical treatment of joint diseases. 129 of the 478 chapters have new authors, which refreshes the material significantly. Throughout there is an increased emphasis on the genetic basis of disease that is presented in a suitable format for the non-specialist.

Needless to say, the authors are all eminent specialists, but with rare exceptions are American. The lack of international flavour may limit this book’s appeal in some locations because of differences in resourcing, culture, or medical practice.

The book is available in a single volume or as two volumes, but two volumes are preferable as the material now covers over 2,500 pages. Because of its size, the effort to improve presentation and ease of use by liberal use of colour is very welcome.

Each part can be identified by coloured page edging; and within each chapter, a coloured background has been used to highlight the sections on clinical manifestations and treatment. 1150 high quality illustrations (of clinical material) are used liberally throughout—cartoons of pathophysiological processes, reproductions of diagnostic images, and flow diagrams.

All of these features add to the reader’s interest and pleasure in opening the book, but other features are somewhat irritating. The symbol Rx has been used in addition to the heading for treatment, which seems unnecessary, and some of the subheadings are bolded in fonts that are quite hard to read because of the closeness of the lettering. References are included as negative images in a red block which makes them easy to identify but rather intrusive. The overall impression of the layout is of ‘busyness’ rather than elegance.

Two worthwhile innovations have been included to give the physician some perspective on the treatment recommendations. Firstly, a ‘grade A’ notation is used to identify high level evidence (randomised controlled trials) in both the text and reference section. This is useful for estimating the strength of available evidence. Secondly, the electronic version (on CD-ROM), that comes with the book, provides an immediate link to the cited reference, and this will be updated to incorporate subsequent Grade A information as it becomes available. This should improve reader access to the scientific basis of treatment options.
Overall, this book will be a welcome addition to the shelf of many specialist physicians who want a ready update on general internal medicine, and general physicians who want an updated reference text for their own specialty. The content is excellent and the presentation is innovative. Any criticism of the 22nd edition of Cecil is really minor and more a matter of taste than substance.

This is a superb book that is a significant improvement on previous editions, and is highly recommended to serious students and practitioners of medicine.

Stephen T Chambers
Clinical Director
Infectious Diseases Department
Christchurch Hospital