

Australasian Journal of Neuroscience

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Australasian Journal of Neuroscience

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Australasian Neuroscience

Nurses Association

Journal of Neuroscience Nursing

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Editorial

Editor - Vicki Evans

The *AJoN* is back!

Welcome to the 2010 edition of the *Australasian Journal of Neuroscience*. I thank those who have come to the aid of this publication and I am sure you will find the enclosed pages well worth the read.

The *AJoN* is your journal. It is only as good as what you submit. Take the time and effort to publish your work, it is then that you will reap the benefits. Tell us your story. We are interested in whatever you are doing in neuroscience – making a difference in the lives of the neuroscience patient and their families. There's help available if you need it. We are only an email away!

Each edition will have an editorial from a prominent neuroscience nurse. In the first edition of 2010, I would like to introduce you to Virginia Prendergast – President of the World Federation of Neuroscience Nurses. She is a wealth of knowledge, a breath of fresh air and always has something to say, to challenge you and to make you think outside the box.....

Cheers,

Vicki

Guest Editorial



Virginia Prendergast.

President, World Federation of Neuroscience Nurses.

It's A Small World

Have you ever been to Disneyland in California? Or maybe Disneyland in Paris or Tokyo? Perhaps Hong Kong? If so, chances are good that you found yourself on one of the most popular rides in Fantasyland – the boat ride. The ride has a theme of

global peace from a child's view and the memorable tune of "It's a small world" sung in different languages by over 300 animated dolls representing cultures from around the world.

I mention this because the very first WFNN Congress that I attended was in 1989 held at Disneyland! I remember being awe-struck by the neuroscience nurses from around the world that attended that Congress. I heard lectures by nurses in Japan detailing their early struggles with organ donation, guidelines for ICP management, and the nursing care required by patients with brain tumours. People I met at that meeting remain dear friends and trusted colleagues to this day. People like Paul van Keekan who is now President of the European Association of Neuroscience Nurses; Chris Eberhardie the foundress of the EANN, and Vicki Evans who is has been a key leader on the Executive Committee in WFNN for the past decade and the new editor of the *Australasian Journal of Neuroscience*. And naturally I remember going to Disneyland with several hundred other nurses and getting the tune of "It's a small world" downloaded in my hippocampus!

In the years since that 1989 Congress, I have had the opportunity to travel and meet with neuroscience nurses from around the world. Without the ease of modern day travel, the internet, and Skype the world's major cities would still be considered far-flung. All work and decisions would still rely on the mail service and months would lapse before any decisions could be made. Instead, communication is so much easier, real-time conversations and decisions can be made leading one to believe that there is truth in the expression "It's a small world."

Being involved in WFNN and attending any one of the Congresses, a person very quickly learns that the world is a small place. One learns that our patients and families experience common problems – regardless of where in the world they live. The problem of stroke doesn't result in a different type of language disturbance for a European compared to someone from South America. Likewise, the struggles faced by individuals diagnosed with multiple sclerosis are the same whether you are in Berlin or Bombay.

Just as patient's struggles are the same, so too are the challenges that confront neuroscience nurses. Through WFNN connections, one can learn how nurses in other countries have mastered orientation of novice nurses to

a neuroscience ICU, developed methods of treating fever, or explored relationships of nursing care to outcome for the patient with epilepsy.

The awareness that patient problems are not unique to a geographical location lends itself to building connections and maintaining relationships with nurses throughout the world. I invite you to explore the opportunities that exist for worldwide communication. Visit the web site for WFNN at www.wfnn.nu. You are welcome to contact any member of the board of directors if you have questions regarding patient care, patient or nursing education, or other issues related to the care of our patients.

And as the song goes:

There's so much that we share
that its time we're aware
its a small world after all...

Virginia

Virginia Prendergast, RN, CNRN, NP

President,

World Federation of Neuroscience Nurses

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Book Reviews

In an Instant: Lee & Bob Woodruff

The Woodruffs seemed to have it all – a happy marriage, good jobs and four children. Lee was a public relations executive and Bob had just been named co-anchor of ABC's *World News Tonight*. In an instant, that all changed...

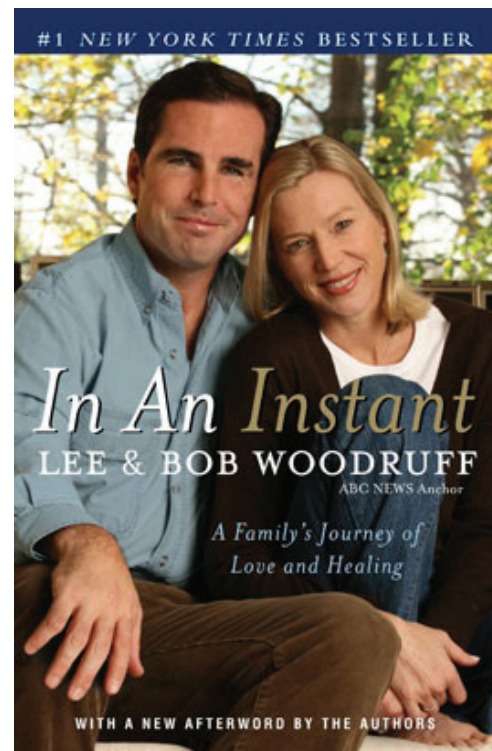
In January 2006, Bob was embedded with the military in Iraq and was preparing to film a segment in the open turret of an armoured personnel carrier. From his left, an IED buried under a mound of rocks detonated a 155-mm shell, launching shrapnel up toward him. The debris shattered his jaw, displaced his left orbit, and sheared his calvarium. It gashed into his back and neck, embedding a large stone just medial to his right carotid artery. The soil also left an inoculum of Iraqi

Acinetobacter, which would later cause sepsis. He was transported to a hospital in Germany, where his Glasgow Coma Score was 3 (three).

Subsequently, after multiple surgeries and many months of multidisciplinary rehabilitation, he slowly began to transform to the point where he was able to make it back to the ABC studios. Soldiers with injuries like this, in past wars, did not even make it off the battlefield.

Random House publishing explains that this book is "a compelling account of how lives came together, were blown apart, and then put together again". It is an excellent account for the neuroscience professional, of TBI and the ramifications it has on the patient, their relatives and their lives before, during and after traumatic brain injury.

Vicki Evans, Editor AJON



ANNA Conference Abstracts - 2009

<p>Decompressive Craniectomy for Head Injury: An inconvenient truth</p> <p>S Honeybul, KM Ho, CRP Lind, T Corcoran, GR Gillet</p> <p>Royal Perth Hospital and Sir Charles Gairdner Hospital, WA</p>	<p>The Genesis of Neuroscience Nursing: from philanthropy to primacy</p> <p>Jennifer Blundell</p> <p>University of Sydney, NSW</p>
<p>Background: There is currently a resurgence of interest in the use of decompressive craniectomy. As the procedure is used more frequently there is likely to be an increasing number of patients surviving a severe traumatic brain injury who would otherwise have died. A significant number of these patients have a dreadful outcome. The aim of this study was to determine whether we could predict those cases that fall into this category.</p> <p>Methods: We used the web based prediction model prepared by the CRASH collaborators and applied this to a cohort of patients who had had a decompressive craniectomy in the years 2006 and 2007 at the two major trauma hospitals in Western Australia. All clinical and radiological data was reviewed and entered into the model. Predicted outcome and actual outcome were compared.</p> <p>Findings: Analysis indicated that a significant cut off point appeared when the model predicted a 75% risk of an unfavourable outcome at six months. 19 of 27 patients with CRASH scores less than 75% returned to work whereas none of the 14 patients with higher scores achieved this degree of rehabilitation at 18 months. Statistical analysis of the outcomes in our cohort confirmed that the CRASH model reliably predicted unfavourable outcome.</p> <p>Interpretations: This study has demonstrated that there comes a point where a patient is so severely injured that intervention is not only futile but may not be in the patients best interests. Our ability to predict this has improved. We discuss the inconvenient ethical considerations.</p> <p>Objectives:</p> <p>This paper highlights for the first time that poor outcome can be predicted. This raises some interesting ethical and moral issues which require discussion amongst those involved in managing those patients with severe head injury.</p>	<p>The development of speciality nursing is usually thought to have developed following scientific and technological advances in the latter half of the twentieth century. The area of nursing, now known as the specialty of neuroscience nursing, has much earlier origins and has an association with the development of other health professionals.</p> <p>Using archival and published material an exploration of the influence on the development of neuroscience and neuroscience nursing is currently being undertaken. One such influence on neuroscience and neuroscience nursing, particularly in the English speaking world, that originated in London in the nineteenth century had it's genesis in a philanthropic endeavour.</p> <p>A history of the institution, the development of neuroscience nursing and education and its influence on neuroscience nursing, including Australasia, will be presented.</p> <p>Objectives:</p> <p>To present information on the historical antecedents of neurological and neurosurgical knowledge and neuroscience nursing</p>

<p>Every body hurts.....sometimes. But why?</p> <p>Sharryn Byers</p> <p>Nepean Hospital, NSW</p>	<p>An African Sleeping Beauty: a puzzling case study</p> <p>Katrina Mastello, Melissa Bartley, Katherine Schaffarczyk</p> <p>Westmead Hospital, NSW</p>
<p>It seems that for a very long time people have attempted to understand pain. Cicero (106-43 BC) wrote that 'all pain is either severe or slight, if slight it is easily endured; if severe, it will no doubt be brief'. Pain is not always brief in duration although it may be severe. Saint Augustine (354-430 AD) wrote that 'the greatest evil is physical pain' but makes no mention of the mental toll of pain. Charles Manson (1938-) wrote that 'pain's not bad, it's good. It teaches you things. I understand that'. But how do you understand another person's pain?</p> <p>'Pain is as diverse as man. One suffers as one can' (Victor Hugo 1802-1855). In 2007 the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine stated pain is an individual, multifactorial experience influenced by culture, previous pain events, beliefs, mood and ability to cope. Pain can be a feature of a patient's experience of illness. To treat pain we need to understand not necessarily the quality of the pain but how it is generated and how we can treat it.</p> <p>A patient for whom pain was neither easily endured nor brief, for whom pain was more than physical will provide us with an opportunity to develop a greater understanding of pain and while no teaching was obvious for the patient, hopefully there will be teaching from her experience for us.</p> <p>Objectives:</p> <p>Increased knowledge of the physiology and pathophysiology of pain.</p> <p>Increased knowledge of various treatment options of pain.</p>	<p>This is a case study that will explore the presentation, diagnosis, differential diagnosis's and multidisciplinary management and treatment of a 24 year old Sudanese woman who initially presented with confusion new onset complex partial seizures, with an associated two month history of weight loss, headaches and occasional left arm twitching.</p> <p>CT and MRI demonstrated extensive white matter changes, which was initially thought to be tuberculous meningitis and responded to tuberculous pharmacological therapy, which facilitated a discharge home.</p> <p>Subsequently she represented 15 days later with worsening of symptoms, these included; expressive dysphasia, generalised seizures increasing confusion, decreased mobility, low grade temperature and worsening tremor on right (greater than left) and necessitated an admission to a High Dependency Unit. MRB showed diffuse abnormal white matter T2 weighted images and she underwent surgery for a right frontal lobe biopsy.</p> <p>Provisional brain biopsy detailed a meningo-encephalitis with lymphocytes in the leptomeningitis; with Mott's morular cells containing IgM which are suggestive of African trypanosomiasis.</p> <p>Human African trypanosomiasis also known as the African sleeping sickness is caused by a protozoan parasite transmitted by the bite of the tsetse fly. There are 2 stages; early haemolymphatic and later stage the encephalitic stage, these stages are not always distinct but will be further explored as well of the lifecycle of the protozoan parasite and its infestation of its host.</p> <p>Objectives:</p> <p>To detail the presentation, diagnosis and treatment of such a case within an area health service which has an increasing Sudanese migrant population.</p> <p>To highlight the importance of broad diagnosis skills when treating migrant populations</p>

The Complex Nature of Rehabilitation in Brain Tumour Patients

Kellie Burgess

Princess Margaret hospital, WA

The prevalence of primary malignant brain tumours continues to rise, but with improvements in neurosurgical techniques and neuro-interventional techniques, radiation and chemotherapies, survival times are expanding. Despite several studies investigating the role of rehabilitation in brain tumour patients, there is still a significant void in services offered within both neuro-oncology and rehabilitative health care. It has been consistently identified that patients with primary brain tumours display and exhibit neurological deficits not dissimilar to that of stroke and traumatic brain injury (TBI) patients. Yet very little is offered to primary brain tumour patients from a rehabilitative perspective despite demonstrated evidence showing that this patient population's rehabilitation outcomes are similar, if not better functional gains to those of stroke and TBI patients.

The author exerts the impact of brain tumours within society to highlight that this unique patient population, despite their poor prognosis, still have the capacity and capabilities to potentially benefit from rehabilitative programs. The complexity of cares in terms of prognosis, physical and psychosocial issues of patients with primary malignant brain tumours and challenges they pose for rehabilitation specialists will also be explored in this paper.

Key Words

Brain tumour, brain cancer, rehabilitation, nursing

Objectives:

Raise awareness that patients with primary malignant brain tumours have the potential to benefit from rehabilitation programs, and should not be excluded.

Enhancing awareness of this, in a hope that more patients with brain tumours will be offered rehabilitation and thus enhance their quality of life.

Breakaway Technique Training with Neuroscience Nurses as a Measure of Increased Confidence in Managing Aggression

Alanah Bailey, Scott Lamont, Karen Woods

Prince of Wales Hospital, NSW

Background: Aggression in the healthcare workplace has been the subject of significant attention in the health care literature and by government bodies in determining its prevalence, effects and organisational ability to reduce its negative effects. Interventions have been primarily directed at; policy development, systems to record the incidence of aggression, increasing general awareness amongst health staff, patients and visitors, and extensive training programmes for staff. Neuroscience nursing is considered a high risk area for patient aggression as a result of neurological and neurosurgical conditions, with a high prevalence for reportable incidents

Aim: The aim of this paper was to trial breakaway technique training with neuroscience nursing staff as a measure of increased confidence and safety in managing aggression.

Method: A quasi experimental design was used with nursing staff (n=31) participating in 2 x 1 hour workshops. The initial workshop consisted of supervised skills training in safe breakaways from various; hand grabs, clothing grabs, hair pulls, chokes and strangles. Each participant then repeated this workshop post 2 - 4 weeks. A self administered pre and post intervention matched questionnaire measuring exposure to and confidence in dealing with breakaways was measured at 8 weeks post intervention.

Results: A total of n=24 post intervention questionnaires were returned. Statistically significant increases in confidence levels for safe breakaways were reported in all domains. Qualitative comments demonstrate desire for ongoing skills workshops.

Conclusion: Breakaway training should be incorporated into mandatory training programs for neuroscience nurses.

Objectives:

To highlight the high risk of aggression in neuroscience nursing.

To explain the technique we have trialled to increase nurses confidence in dealing with these patients and explain the outcome.

<p>Glasgow Coma Scale: Improving practice in non-neuro specialty wards. Lauren Rullis, Tracey Thornley</p> <p>The University of Notre Dame, NSW</p>	<p>Now You See it Now You Don't: a case of the vanishing bone flap Sharryn Byers, Denika Ready, Rachel White</p> <p>Nepean Hospital, NSW</p>
<p>The Glasgow Coma Scale published in 1974 was designed with simplicity in mind. The tool was developed for use in a wide range of clinical environments and for staff who had no specialised training (Teasdale and Jennett 1974) ensuring standardisation in assessment. Evidence (Waterhouse 2008) however suggests that there are ongoing problems in the use of the GCS assessment, and the impact that this might have on patient outcomes are unknown. Variations in practice have been found in all areas, including neurological specialty wards, however the skill level of nursing staff in non neurological areas is concerning with inconsistencies in application found. Education and training appears essential to ensuring an optimal understanding of how to use the scale (Palmer and Knight 2006) and there have been recommendations for additional education to supplement existing practice. Inexperienced nurses are often found to have difficulties using the scale (Baker 2008) and inter-reliability is not high in this group (Palmer and Knight 2006). Meaning that the tool may only be a reliable measure when used by nurses who are experienced in its use.</p> <p>This paper reports on the literature review undertaken as part of an Honours research study. The primary outcome of this study is the development of recommendations for practice change and an educational strategy in non neurological specialty wards. This research is well placed in the context of the Garling Report (2008), where there is a priority on the detection of the deteriorating patient.</p> <p>Objectives:</p> <p>Describe the issues that may affect the assessment of patients who have a decreased level of consciousness.</p>	<p>EZ is a 27 yr old male born overseas and recently married. Life plans were made which included the purchase of a house, planning and hoping for a family to fill the rooms in the house. However, we all know life sometimes doesn't go as planned! This is the case for EZ.</p> <p>It all started one day when EZ suddenly collapsed and it hasn't ended yet. During the last twelve months many challenges have faced EZ, his family and his many health care workers. A brief summary of the last twelve months will bring us up to date as we discuss one of the most recent challenges.</p> <p>In September, 2008 prior to his transfer to rehabilitation an autologous cranioplasty was performed. Initially there was a small defect near the temporomandibular joint that was considered sub optimal cosmetically, but created no concern about cranial integrity. Over the next months EZ's family continued to express concern about this defect and changes to the cranial contour. In May this year at follow up a significant deformity was evident.</p> <p>This presentation will explore the role of cranioplasty in the neurosurgical population, incidence of post-operative complications, normal bone healing processes and a possible case of vanishing bone.</p> <p>Objectives:</p> <p>Audience will gain an understanding of:</p> <ul style="list-style-type: none"> Bone storage/preservation options and associated risks Normal and abnormal bone healing processes including vanishing bone. Materials used to repair cranial defects Operative procedure and expected range of complications

<p>Tumefactive Multiple Sclerosis – a case study</p> <p>Therese Burke, Kerry Lenton</p> <p>Westmead Hospital, NSW</p>	<p>Continuous Practice Improvement Project to Improve the Management of Spinal Trauma Patients at Flinders Medical Centre</p> <p>Tonya Heard, Jenny Hill, Dr Matthew McDonald, Dr Nick Vrodos</p> <p>Flinders Medical Centre, SA</p>
<p>Multiple sclerosis (MS) is defined as a chronic, degenerative, neurological disease where multiple sclerotic plaques form within the brain or spinal cord or both. In tumefactive MS the radiological picture is of a solitary lesion more commonly seen with a diagnosis of brain neoplasm. The patient will go on to a pattern of Relapsing Remitting MS (RRMS) with future exacerbations, even if the mass-like demyelinating lesion has been excised. This type of MS is a rare form of the disease, estimated at 1-2/1000 cases of MS.</p> <p>Diagnosis of MS requires a combination of the following assessments. A detailed clinical examination of motor, sensory and visual pathways, a pathological examination of the cerebrospinal fluid to test for the presence of oligoclonal bands and magnetic resonance imaging with gadolinium contrast combine to present an overall picture. The diagnosis can follow a different pathway if the clinical picture deviates from the norm, as can be case with tumefactive MS.</p> <p>Once a diagnosis of MS is confirmed by the treating neurologist ongoing care can be continued within a private practice or through hospital based MS Clinics.</p> <p>A case of tumefactive MS in a 24 year old woman to who presented Neurosurgery Service of a tertiary referral hospital will be discussed as a case presentation.</p> <p>Key words: multiple sclerosis, tumefactive multiple sclerosis, relapsing remitting multiple sclerosis, exacerbation, oligoclonal bands, magnetic resonance imaging, MS Clinic</p> <p>Objectives:</p> <p>Define MS, tumefactive MS, Relapsing Remitting MS</p> <p>Discuss the diagnosis pathway of MS and how this varies in tumefactive MS</p> <p>Discuss how hospital based MS clinics factor into patient care</p>	<p>Our Continuous Practice Improvement Project commenced in May 2006 and our continuing aim is to improve the Management of Spinal Trauma Patients at Flinders Medical Centre.</p> <p>Our project mission statement was; within 6 months 100% of cervical spinal trauma patients on ward 5B will be managed according to the guidelines established by the neurosurgical clinical team. The guidelines developed by the project have now been utilised in all areas of the hospital where spinal trauma patients are managed.</p> <p>The project has demonstrated a marked improvement in the management of patients with spinal trauma by the multidisciplinary team at FMC. It has improved the quality of clinical documentation and the level of knowledge of spinal trauma throughout all relevant areas of the hospital.</p> <p>Objectives:</p> <p>Improved the Management of Spinal Trauma Patients at Flinders Medical Centre.</p>

SUDEP: A Protocol Changing Event David Tsui, Sharen Rogers Westmead Hospital, NSW	Adaptation Process among Post Intracerebral Haemorrhage Patients and Factors that Affect Adaptation Outcomes Sabarisah Hashim, Professor Khatijah Lim Abdullah, Professor Vickneswaran Mathaneswaran University of Malaya, Malaysia
<p>Sudden Unexplained Death in Epilepsy (SUDEP) is 40 times more common than sudden unexplained deaths in the general community. The death can be witnessed or unwitnessed with or without evidence of a seizure. But the nature of the death must be non-traumatic or non-drowning. The death must occur during benign or normal circumstances where the person with epilepsy is otherwise healthy and the autopsy cannot show a medical cause of death.</p> <p>In any Video EEG monitoring unit (VEM), patients are often sleep deprived, hyperventilated and/or withheld from their regular dosage of medications to induce seizure activity. This places the patients at a significantly higher risk of SUDEP.</p> <p>The aim of this presentation is to introduce the safety precautions and necessary changes that our department has implemented after our first and only experience of SUDEP since the commencement of our Video Telemetry Unit at Westmead Hospital. It will discuss how it impacted the morale of nursing staff, the impact it made on our nursing practice, our documentation and our protocols. Ultimately, the result of this presentation will use this incident as a learning experience to raise the awareness and understanding of SUDEP for neuroscience nurses and the general public.</p> <p>Objectives:</p> <p>To raise the awareness and understanding of SUDEP for neuroscience nurses and the general public.</p>	<p>This paper is a literature review of the longitudinal study to explore the process of people's response to stroke-related change, adaptation outcomes and also to determine factors that affect the probability of an adaptation outcome after three months in the rehabilitation phase. Intracerebral haemorrhage accounts for 10 to 15 percent of all cases of stroke and is associated with the highest mortality rate, with only 38 percent of affected patients surviving the first year (Broderick et al., 1999; Qureshi et al., 2001). Persons with intracerebral haemorrhage commonly may experience the phenomena of neurological change such as slurred speech, aphasia, hemiparesis or hemiplegia, seizures, ataxia, cranial nerve dysfunction, nystagmus, coma (Dobkin, 2005) and decline in functional activities (Samsa & Matchar, 2004).</p> <p>Adaptation after experiencing stroke is perceived as a process of patients responding to the physiological, functional, psychological, and social changes that occur with the onset of intracerebral bleeding and experience of living with a disability or associated treatment (Secrest & Zeller 2007). There are factors affecting adaptation of survivors with intracerebral haemorrhage. The research findings suggest that the severity of cerebral dysfunction (Qureshi et al., 2001), high functional disability (Samsa & Matchar, 2004), low stroke knowledge among caregivers (Rodger et al, (2001) and presence of post-stroke complications (Longhorne et al. 2000) are critical factors in determining adaptation to change.</p> <p>Key Words</p> <ul style="list-style-type: none"> • Intracerebral haemorrhage • Stroke • Adaptation • Post-stroke complication • Functional activity • Stroke knowledge

<p>FAST – Enough in Hospital</p> <p>Shae Millar</p> <p>Royal North Shore Hospital, NSW</p>	<p>Teaching Technology and Clinical Practice: making learning relevant</p> <p>Dr Richard Guy, Dr Peter Rich, Dr Tom Molyneux, Giovanni Mandarano, Cathy Leahy</p> <p>Presenter: Dr Heather R Pisani RMIT University, VIC</p>
<p>At a recent Stroke conference, the importance of early recognition of stroke and the impact of this on treatment and good outcomes was highlighted. In particular stroke symptom recognition in the general public was seen to be instrumental in patients in the community getting to hospital and subsequent treatment in a timely manner and access to time dependent treatment available for strokes. This is the basis of the FAST program promoted by the Stroke Foundation.</p> <p>It was also recognised that strokes happen in hospital. Patients in hospital for a non stroke condition or treatment can subsequently have a stroke particularly if they have the associated risks. In the same way that stroke symptom recognition in the general public was seen to be instrumental in improved outcome for patients in the community, it would follow that staff ability to recognise stroke symptoms could also improve the management and outcome for these patients.</p> <p>As an educator, I was interested in whether staff in non stroke areas would demonstrate knowledge of the symptoms of stroke and the desired intervention along the lines of the FAST program. I proposed doing an audit of 4 wards at RNSH to examine the knowledge about stroke symptom recognition in staff working on those wards. A simple survey would be used to gather information about staff knowledge in this area. I proposed to survey 2 wards where patients are likely to have stroke risk factors and 2 wards where this was less likely. The results of this survey could assist in identifying a potential area for training outside the Stroke unit.</p> <p>Objectives:</p> <p>Assess level of staff knowledge about stroke symptoms.</p> <p>Assess potential need for training.</p>	<p>Learning and teaching for clinical practice presents the profession an ever increasing range of challenges. Nowhere is this more evident than in Neuroscience Nursing Practice. Neuroscience clinical practice requires the assimilation of complex and often counterintuitive concepts, within an individualised and variable patient framework. This paper will investigate the development of an electronic interactive Learning and Teaching tool to support and enhance knowledge development in both the academic and clinical environment. The approach taken draws on Kirkpatrick's (1979) Training Evaluation Model which uses student interaction to enable the review, development and integration of learning from capability development, (clinical) implementation, to tangible outcome measures. The Interactive electronic Atlas (IeA) that the authors have developed uses images of cadaveric specimens and radiologic images of human clinical patients to provide a multi layered platform for discipline specific knowledge. The images are linked to text and web based multiple choice review questions and can be navigated horizontally and vertically. The ability to add content to meet learning specific requirements in both the academic and clinical learning environment is one of the main advantages of this tool. The Interactive Electronic Atlas (IeA) has been designed to provide students and clinicians with a self paced multi dimensional learning tool to support and guide self directed learning. The efficacy of its integration into Post Graduate Neuroscience Nursing education has been evaluated and the project team will aim to investigate the capacity of this tool to provide supported learning in the clinical neuroscience setting in the future.</p> <p>Objectives:</p> <p>To provide an overview of the learning milieu for the post grad neuroscience nursing clinician.</p> <p>To demonstrate the capacity to be innovative in providing a flexible supported learning environment for the student.</p> <p>To demonstrate the capacity to tangibly link theory to practice and highlight the inexplicable link between theory, research and practice.</p> <p>To celebrate positive outcomes.</p>

Management of Patients Undergoing Pituitary Tumour Removal via the Transsphenoidal / Transfrontal Approach

Kylie Wright

Abstract

Patients undergoing surgery for pituitary tumour removal via the transsphenoidal or transfrontal approach have complex needs that call for expert care and coordination from a multidisciplinary team of healthcare professionals.

Historically, patients undergoing transsphenoidal/transfrontal surgery were cared for in the intensive care setting, primarily because fluid balance secondary to diabetes insipidus (DI) is a common and potentially dangerous complication of the surgery. An innovative multidisciplinary clinical protocol developed at Liverpool Hospital, enables such patients to be successfully cared for post-operatively on an acute care neurosurgical unit rather than an intensive care / high dependency unit.

The aims of the management protocol were to provide the necessary information to appropriately monitor, assess and intervene in the care of patients who will undergo cranial surgery via the transsphenoidal or transfrontal approach for the management of pituitary tumours, and to prevent or minimise post-operative complications.

This paper will provide an overview of pituitary tumours, outline the management protocol, discuss some positive clinical outcomes, and demonstrate that transsphenoidal / transfrontal patients can be cared for safely, effectively, and efficiently in an acute care setting.

Key words: Pituitary, transsphenoidal, fluid and electrolytes, diabetes insipidus.

Background

A pituitary tumour (adenoma) is an abnormal growth of pituitary cells arising primarily from the anterior pituitary gland (adenohypophysis). They are most commonly classified into functional or non-functional according to endocrine function but are also classified according to microscopic appearance, microadenomas being less than 10mm in diameter and macroadenomas being greater than 10mm in diameter.

Pituitary tumours represent approximately 10% of intracranial tumours, although if autopsy studies are utilised the incidence is higher. They are most common in the third and fourth decades of life, and equally affect both sexes (Greenberg, 2001).

A patient with a pituitary tumour will usually present due to endocrine syndromes or mass effect where structures such as the optic chiasm, pituitary gland or cavernous sinus become compressed.

Patients with functional or secreting tumours produce abnormally high levels of normal pituitary hormones. These lesions may cause various symptoms depending on the type of hormone being secreted and can include Cushing's syndrome, acromegaly or hyperthyroidism. Non-functioning tumours usually enlarge within the sella turcica and then extend superiorly into the intracranial compartment, producing compression of the optic chiasm. Patients commonly present with deterioration of visual acuity and visual field defects, headaches or hydrocephalus. A small number of patients will present with pituitary apoplexy which is an abrupt onset of neurologic deterioration with acute catastrophic haemorrhagic

Questions or comments about this article should be directed to Kylie M. Wright, Clinical Nurse Consultant/ Case Manager, Liverpool Hospital at kylie.m.wright@sswahs.nsw.gov.au
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necrosis of a pituitary adenoma and gland (Greenberg, 2001). The reported incidence of pituitary apoplexy in published series varies between 0.6 and 10%, with a mean of 2% (Nawar, AbdelMannan, Selman & Arafah, 2008) and can present as precipitous visual loss/disturbance, usually associated with sudden, severe headache, and frequently collapse from acute renal insufficiency (Nawar et al, 2008; Laws and Thapar, 1999).

Surgical resection remains the most effective treatment for pituitary tumours. The transsphenoidal approach is used in 96% of pituitary adenomas (Laws and Thapar, 1999) and includes a transnasal transseptal approach, a sublabial transnasal transseptal, or an endoscopic transnasal approach. The latter is the approach adopted at Liverpool Hospital.

Patients undergoing surgery for pituitary tumour removal via the transsphenoidal/transfrontal approach represent a challenge to clinicians because of complex post-operative alterations in fluid balance secondary to diabetes insipidus (DI). DI can manifest within hours following surgery and is a common and potentially dangerous complication which can lead to severe dehydration if not managed carefully. Furthermore, patients must be carefully monitored for postoperative haemorrhage, visual loss, cerebrospinal (CSF) fluid leak and meningitis.

The development of a multidisciplinary management protocol at Liverpool Hospital enabled such patients to be successfully managed on the Neurosurgical ward thus avoiding unnecessary use of intensive care resources, and stress for patients and families.

Aims

To develop a protocol that provided information enabling clinicians to:-

- Appropriately monitor, assess and intervene in the care of patients undergoing cranial surgery via the transsphenoidal or transfrontal approach for the management of pituitary tumours.
- Prevent or minimise the complications of such surgery including bleeding, swelling and subsequent increased intracranial pressure (ICP), infection, and neuroendocrine disorders such as: DI, syndrome of inappropriate secretion of antidiuretic hormone (SIADH) and cerebral salt wasting (CSW).

Methods

Support from the Director of Neurosurgery and Endocrinology was obtained and development of the protocol was lead by the Neurosurgical CNC.

The management protocol, outlining pre and post operative management, was developed using evidence based practice, clinician expertise, and involved multiple drafts and input from over 30 expert clinicians from varied specialties.

The protocol was trialled and formally implemented after an extensive education program and evaluation process.

Major components of the management protocol are described below.

Management Protocol

Pre-operative Care:

- Ear, Nose & Throat (ENT) team review status of sinuses/nasal cavity.
- Endocrine team notification.
- Visual field examination.
- Nasal cultures - the procedure may be delayed if infection is detected.
- Pathology (to be taken prior to administration of any drugs- before 0800hrs if possible) - Prolactin, IGF1, Growth hormone (GH), Thyroid stimulating hormone (TSH), T4 loaded uptake (T4), T3 uptake (T3), Testosterone or Oestradiol, Luteinising hormone (LH), Follicle stimulating hormone (FSH), Alpha Subunit, Adrenocorticotrophic hormone (ACTH), cortisol (if Cushing's disease suspected, will need 4 hour UFC and further testing), UEC and Blood Glucose (BG).
- Steroids should continue when fasting and given with a sip of water.

Postoperative care:

Areas that may be affected by swelling and/or operative manipulation:

- Hypothalamus - may affect temperature, blood pressure and respiratory control.
- Optic Chiasm - visual deficits, blurred vision, eye pain and visual field loss.

- Cranial Nerves - particularly nerves that control eye movements.
- Pituitary Gland - posterior lobe is known as the 'neurohypophysis' - the main hormone that may be affected is Anti-Diuretic Hormone (ADH).

A decrease in ADH may lead to DI. Signs and symptoms include increasing urine output (>300mls for 2 consecutive hours) resulting in dilute urine and raised serum sodium levels.

Observations

- Glasgow Coma Score (GCS), temperature, pulse, respiration, oxygen saturations (SpO₂), and blood pressure hourly. Notify the Neurosurgical Registrar when there is a fall in the GCS by one point (other than eyes open to speech). An emergency should be called if there is a drop in GCS of 2 or more points.
- Visual field assessment hourly for 4 hours, then 2nd hourly for 4 hours, then 4th hourly thereafter - Inform the registrar about any visual deterioration.
- Strict hourly fluid balance.
- Blood Glucose Levels (BGLs) to be monitored 6th hourly for the first 72 hours.
- Observe for postnasal drip/excessive swallowing: may indicate cerebrospinal fluid (CSF) leak or bleeding.
- Analgesia (avoid aspirin).
- Nausea and vomiting are common; administer prescribed anti-emetics.
- Nurse the patient head up 30 degrees.

Fluid Balance / Sodium (Na) Balance

- Early polyuria including DI occurs in 31% of patients (Laws & Thapar, 1999)
- Late and prolonged DI occurs in 10% of patients
- Transient DI develops in 20-33% and permanent DI in 3-5% of patients

(Hensen, Henig, Fahlbusch, Meyer, Boehnert & Buchfelder, 1999).

First 24 hours post-operatively

- Intravenous (IV) fluids – 0.9% sterile sodium chloride at 80mL/hr → 1.5mL/kg/hr unless otherwise determined by the anaesthetist. After review, if patient is deemed to be tolerating oral fluids then IV fluids may be ceased. Follow medical officer's advice.
- UEC bloods must be obtained -
 - i. immediately post-op
 - ii. twice daily for the first 48 hours
 - iii. daily for the following five days
 - iv. once per day prior to discharge.
- Strict Fluid Balance documentation must be maintained.
- All patients will have an indwelling catheter (IDC) insitu which is usually removed when the patient is mobilising well and early DI has not occurred (2-3 days). Hourly urine measures must be performed and results documented on the fluid balance chart.

If urine output for 2 consecutive hours is >300mLs/hr, or for 1 hour is >400mLs, or for 3 consecutive hours is >600mLs in total

Management

Urgent serum sodium (Na), serum osmolality (S_{osm}), urine sodium, and urine osmolality (U_{osm}) - mark request as "Urgent" and send to pathology immediately. Call Endocrinologist / Neurosurgeon with results.

BGL to be obtained

Perform urinalysis for specific gravity and glucose

Change IV fluids to 5% Glucose at a rate to match urine output for the previous hour, for 1 hour only. When infusing large fluid volumes a warmer is required.

Early Diabetes Insipidus

If U_{osm} < S_{osm} and S_{osm} > 295 mosm/L and serum Na > 146 and urine output > 300mL or

Urine output > 400mLs/hr or

Urine output > 600mL in total for 3 consecutive hours

Administer Desmopressin 1.5 micrograms (ug) IM (Desmopressin/Minirin 1-4 micrograms (ug) – equivalent to 10-40 micrograms (ug) nasally)

Maintain IV 5% Glucose at a rate to match urine output for the previous hour, for 1 hour only then return to maintenance IV fluids eg. 100mL/hour if patient not drinking. If patient is drinking enough fluid per hour then cease IV fluids, keep IV cannula insitu and ask patient to continue drinking according to thirst.

If urine output remains at >300mL/hour at the 2nd hour after dose, another dose of Desmopressin may need to be considered. Seek advice from Endocrinology.

Check UEC in 4 hours

SIADH – Syndrome of Inappropriate Anti-Diuretic Hormone secretion

If serum Na<133 check S_{osm}, U_{osm}, and urine sodium and consider fluid restriction

Late Diabetes Insipidus – (few days post-operatively)

If polyuria, excessive thirst, nocturia – check serum and urine electrolytes and osmolality and re-commence strict fluid balance charting.

If the patient was prescribed Desmopressin pre-operatively then this should continue, but be administered at an equivalent subcutaneous dose.

Glucocorticoids

All patients are given IV hydrocortisone 100mg (or equivalent stress dose glucocorticoid as per anaesthetist's advice) intraoperatively and should be prescribed hydrocortisone in the postoperative period as follows:-

Day 0 - 100mg q 6hourly IV

Day 1 - 50 mg q 8hourly IV (if haemodynamically stable)

Day 2 - 25 mg q 8hourly IV (if haemodynamically stable)

Day 3 – 30mg q 12 hourly orally – dose reduce only if patient is stable

Day 4 - 30mg mane orally or if previously on prednisone – prescribe prednisone 10mg mane.

If previously on cortisone acetate - prescribe 25mg mane and 12.5mg in the afternoon.

Day 5 & 6 – keep on Day 4 regime

After day 6, if patient is haemodynamically stable reduce glucocorticoids over 2 days to usual baseline dose.

Table 1 Dose conversions (Kasper, et al, 2005)

	Glucocorticoid Equivalent Dose	Glucocorticoid Potency	Mineralocorticoid Potency
Hydrocortisone	100mg	1	1
Cortisone	125mg	0.8	0.8
Prednisone	25mg	4	0.25
Dexa-	3-4mg*	30-40	<0.01

(* The true Dexamethasone equivalent dose = 3.75mg www.globalrph.com/steroid.cgi Oral Dexamethasone is available in 4mg and 0.5 mg tablets).

The neurosurgical team may chart dexamethasone if required for oedema instead of hydrocortisone and must inform the Endocrine team when dosage is being weaned.

The Endocrine team will review the patient on a daily basis. The Neurosurgical Registrar on-call will liaise with Endocrinology on weekends should any problems arise.

All patients will be discharged with an appointment to see the Endocrinologist.

Follow the Endocrine team treatment/advice for postoperative steroids.

CSF Leak

Observe for post-nasal drip/excessive swallowing: may indicate CSF leak or bleeding.

Thick serosanguinous discharge from the nose is common after transphenoidal surgery and has no clinical significance. Inform the patient about this type of drainage and request they report this to their nurse. Inform the Registrar about any clear fluid drainage from the nose.

For the transnasal trans-septal approach or sublabial transnasal trans-septal approach - record the type and amount of drainage.

A request may be made to collect the nasal fluid and to send to pathology for Beta 2 - transferrin analysis.

Patients with CSF leak may be treated with external lumbar drainage and head elevation. If the leak continues after 5 days the patient may require further surgery to seal the leak.

Nasal Care (Packing) and Graft site

Patients who have had a transnasal trans-septal approach or sublabial transnasal trans-septal approach will have nasal packing inserted in theatre and left insitu approximately 2-3 days.

Medical staff will remove nasal packs. The patient may require sedation for this procedure.

If a graft of muscle/fat was taken from a donor site, the dressing is to remain intact for 3 – 5 days.

Caution:

- The patient is not to blow their nose or drink hot fluids.
- If nasal packs are dislodged accidentally, contact the ENT Registrar immediately.
- Patients who had an endoscopic transnasal approach will NOT have nasal packs insitu. These patients will be prescribed normal saline nasal spray 4 times a day and oral antibiotics for 5 days.
- The patient should have a follow-up appointment with the ENT surgeon before discharge.

Oral care:

- Patients are not to use toothbrushes or drink hot fluids for approximately 10 days (as this may disrupt clot formation).
- Use mouthwashes with lukewarm water.

General

- The patient may eat and drink as soon as awake, unless contraindicated by nausea and vomiting, inadequate cough reflex etc.
- The patient is to sit out of bed and mobilise when tolerating an upright position.
- Reconsider if the patient has increased headache despite analgesia
- Reconsider if the patient is drowsy, confused or has other signs of neurological deterioration.
- Most patients will be discharged on the 5th

postoperative day

Ongoing Pathology:

Morning serum cortisol, free T4, free T3 and TSH and EUC a day prior to discharge (or a week post-operatively – whichever is earlier). On that morning withhold the mane dose of glucocorticoid until after the blood test.

Patients should receive a pathology form to have bloods taken 4 weeks post operatively: to check EUC, TSH, free T3, free T4, prolactin, LH, FSH, total testosterone for male patients, oestradiol for female patients, morning cortisol (again instruct the patient to withhold the mane dose of glucocorticoid until after the blood test), IGF-1 and GH (if patient has acromegaly).

Results

From inception, this project worked on the principle that transsphenoidal surgery patients do not require a post-operative stay in an ICU. Following implementation of the management protocol, 46 patients underwent transsphenoidal surgery (between September 2006 - May 2009) and their fluid balance and post-operative care was managed successfully on the Neurosurgical ward with no patients requiring transfer to the ICU.

Post-operative complications occurred in 46% (21) of the patients and included dehydration (1), DI (4), electrolyte disturbances (8) and hyponatremia (8), all of which were identified, managed and resolved successfully by clinicians on the Neurosurgical ward following the management protocol. There was a 0% incidence of patients requiring management in the intensive care environment.

Through development and implementation of this management protocol, patient care has been successfully coordinated and accomplished through a team approach on the Neurosurgical ward.

Discussion

There is minimal nursing literature addressing the care of patients undergoing transsphenoidal surgery and even less describing care of these patients in the acute care setting. Cohen and Counsell (1996) evaluated the cost of post-operative care in a non intensive care setting versus an ICU and concluded the costs were 16% greater for the patient managed in the ICU. Post-operative complications were not addressed in this paper. Prather, Forsyth, Dale Russell and Wagner

(2003) described a program enabling patients to be cared for on an acute care unit for the entirety of their hospitalisation and concluded positive clinical and financial outcomes. Comparatively, similar clinical outcomes were concluded from the Liverpool Hospital project.

Neurosurgical nurses at Liverpool Hospital anecdotally believe this model of care eases patient and family anxiety, increases patient satisfaction, has reduced length of stay and avoids unnecessary use of intensive care resources. At average costs of AU\$ 2185 per day for an ICU bed compared to AU\$ 880 per day for an acute ward bed it is believed this project has resulted in avoidance of ICU admissions and has decreased costs to the institution.

Future directions of the project will include a formal cost analysis, patient satisfaction evaluation and ongoing collection of clinical indicator data.

Conclusion

The neurosurgical ward nurses at Liverpool Hospital were well grounded in routine neurosurgical care and successfully met the challenge and complexities of this patient population. Implementation of this protocol and the associated care of these patients has helped develop their knowledge base, and improve, and challenge clinical practice whilst producing good patient outcomes. Patient management is accomplished through a team approach involving nurses, neurosurgeons, endocrinologists and allied health staff. All team members have a clear understanding of patient progression postoperatively through to discharge.

The experience at Liverpool Hospital has demonstrated that patients undergoing surgery for pituitary tumour removal via the transsphenoidal/transfrontal approach can be cared for safely, effectively and efficiently in an acute care setting.

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Rehabilitation for Brain Tumour Patients: Why Not?

A Neuroscience Nurse Perspective

Kellie Burgess

Abstract

The prevalence of primary malignant brain tumours continues to rise but with improvements in neurosurgical techniques, neuro-interventional techniques, radiation and chemotherapies, survival times have increased. Despite several studies investigating the role of rehabilitation in brain tumour patients, there is still a significant void in services offered within both neuro-oncology and rehabilitative health care. It has been consistently identified that patients with primary brain tumours display and exhibit neurological deficits not dissimilar to that of stroke and traumatic brain injury (TBI) patients. Yet very little is offered to primary brain tumour patients from a rehabilitative perspective despite evidence that this patient population's functional gains from rehabilitation are similar if not better than those of stroke and TBI patients.

Key Words: brain tumour, brain cancer, rehabilitation, nursing

Introduction

Primary malignant brain cancer is a devastating illness. Although primary brain tumours account for less than 2% of all malignancies (Giordana & Clara, 2006; Yarbrough, Frogge, & Goodman, 2005), they are second only to stroke as a cause of death from neurologic disorders and have functional consequences that far outweigh their prevalence (Bell, O'Dell, Barr, & Yablon, 1998; Bohan, Gallia, & Brem, 2008). The estimated number of new cases of primary brain tumour in 2001 was 17 200 in the US population and 1332 in the Australian population, and estimated deaths 13 100 and 1422 respectively (Mukand, Guilmette, & Tran, 2003).

Despite the increasing incidence for primary brain tumours, mortality has decreased from 76.2% in the US population and 79.8% in the Australian population in 2001 to 68.1% and 73.8% respectively in 2005 (CBTRUS, 2008). This indicates that the cure rate for patients with such a diagnosis is poor with a limited life span that is characterised by significant morbidity as the disease progresses (Giordana & Clara, 2006; Mukand, Blackinton, Crincoli, Lee, & Santos, 2001; Sherer, Meyers, & Berglof, 1997). As treatments for the

cancer population improve and survival increases, the role of rehabilitation professionals will undoubtedly expand and evolve as the requirement for rehabilitation services will increase (Kirschblum, O'Dell, Ho, & Barr, 2001; Mukand, et al., 2001; Mukand, et al., 2003). Functional deficits associated with brain tumours result from primary tumour effects (destruction or compression of normal brain tissue and raised intracranial pressure), side effects of treatments (e.g. post-surgical loss and steroid myopathy), sedating effects of medications for pain or seizures and the immediate or delayed effects of radiation and chemotherapy (Giordana & Clara, 2006; O'Dell, Barr, Spanier, & Warnick, 1998). The major goal of cancer rehabilitation is to improve quality of life (QOL) by minimising the disability caused by cancer and its treatments and decrease the "burden of care" (Guo & Shin, 2005). Although there are many studies addressing the cancer survivorship, the importance of cancer rehabilitation before, during and after cancer treatment has not been fully recognized (Cheville, 2001; Guo & Shin, 2005). There is a paucity of published data examining rehabilitation management or outcomes in patients with brain tumours. There is a significant lack of published data within an Australian context and thus literature reviewed is from the international body of evidence available. Despite the lack of published Australian data on rehabilitation for brain tumour patients, the issues posed and outcomes are not dissimilar to those published in the literature sourced.

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The focus of this paper is to examine the issues and complex needs of primary malignant brain tumour patients as well as the challenges they pose for treating rehabilitation specialists.

Impact of Brain Tumours

Patients with malignant brain tumours develop cognitive and personality changes related to the area of the brain that the tumour invades and most experience progressive neurologic decline as their disease progresses (Bell, et al., 1998; Bohan, et al., 2008; Sherer, et al., 1997). The tumour, regardless of its extent or location, may affect the physical, social, vocational and emotional capabilities of the individual (Kirschblum, et al., 2001). Rehabilitation medicine primarily addresses the physical impairments that result in functional deficits such as, neurological muscle weakness, ataxia, aphasia, cognitive impairment, dysphagia, bowel or bladder dysfunction and spasticity (Cheville, 2001; Guo & Shin, 2005). In addition to focal neurological deficits patients can experience deconditioning from protracted illness, nutritional compromise and psychological stress (for both patient and family) (Cheville, 2001; O'Dell, et al., 1998). The goals of rehabilitation in brain tumour patients include the achievement of the highest functional status within the context of the disease and its treatments, a reduction in pain, the prevention of medical complications, an improvement in their QOL, and the long term prevention or minimisation of disability (Kirschblum, et al., 2001; Mukand, et al., 2003). Brain tumour patients can achieve functional gains and rates of discharge comparable to those of stroke patients and overall have a shorter length of stay compared to stroke patients (Giordana & Clara, 2006; Guo & Shin, 2005).

Death from brain tumours is the second leading cause of death from neurologic disease after stroke (Bell, et al., 1998; Bohan, et al., 2008; Sherer, et al., 1997). Many impairments (such as hemiparesis, aphasia and cognitive deficits) commonly seen in patients with stroke, cerebral aneurysm and traumatic brain injury are also seen in patients with brain tumours (Cheville, 2001; Kirschblum, et al., 2001). Despite these similarities and likelihood of good candidacy for rehabilitation programs, rehabilitation hospitals in the United States rarely treat patients with brain tumours (Boake & Meyers, 1993; Davies, Hall, & Clarke, 2003). It should be noted that when identified and offered rehabilitation, patients with brain tumours made functional improvements that were approximately equivalent to those of matched groups of patients with impairments from stroke and traumatic brain injury (Greenberg, Treger, & Ring, 2006; Marciniak, Sliwa, Heinemann, &

Semik, 2001; Mukand, et al., 2003). Traumatic brain injury units are a valuable resource in addressing the rehabilitation needs of patients with brain tumours (Bohan, et al., 2008). Current aggressive treatments offered to brain tumour patients for example surgery, radiation and chemotherapy, have resulted in longer survival with the disease and its associated neurologic consequences (Geler-Kulca, Gulsen, Buyukbaba, & Ozkan, 2009; Giordana & Clara, 2006; Sherer, et al., 1997). The literature suggests that brain tumour patients would benefit from access to the same level of rehabilitation services that are offered to stroke and traumatic brain injury patients, particularly as temporary deficits that have the potential to resolve independently of rehabilitative input improve more rapidly with intensive professional intervention (Bohan, et al., 2008; Greenberg, et al., 2006; Huang, Cifu, & Keyser-Marcus, 1998; Mukand, et al., 2003; Sherer, et al., 1997).

A study by Sherer et al. (1997), used a rehabilitative approach in patients with primary brain tumours that was originally developed for patients with traumatic brain injury. The average cost and length of treatment for the brain tumour patients in this study was significantly less than for traumatic brain injury patients. The authors argue that the direct benefit to the patient and family of increased community independence and employment, also offers significant societal benefit. The improved QOL and increased financial independence of patients may result in decreased need for health provider services and decreased use of community services and government programs. The evidence clearly states that patients with brain tumours undergoing inpatient rehabilitation appear to make functional gains similar to those seen in similar patients with traumatic brain injury or stroke (Greenberg, et al., 2006; Huang, et al., 1998; Kirschblum, et al., 2001; Mukand, et al., 2003).

Because of the brain injury caused by the tumour itself and subsequent injury from specific treatment strategies such as surgery, chemotherapy and radiotherapy, many brain tumour patients develop behavioural, emotional and intellectual difficulties that compromise their ability to live independently and return to work (Sherer, et al., 1997). It is likely that this contributes to specialised rehabilitative services not being provided for brain tumour patients. Despite the bleak outlook for some brain tumour patients, many have the ability to improve their ability to function at home and in vocational and leisure pursuits and enjoy an improved level of independence and QOL given the right support such as that available in rehabilitation programs (Giordana & Clara, 2006; Marciniak, et al., 2001; Sherer, et al., 1997). Re-

habilitation that is appropriately timed and paced within the scope of the patient's clinical status can result in improved functional outcomes for this patient population (Cheville, 2001; Marciniak, et al., 2001; Mukand, et al., 2001). Unfortunately, cognitive and vocational rehabilitation services are rarely provided to brain tumour patients as evidenced in a study by Davies, Hall and Clarke (2003), where no brain tumour patients had been referred to rehabilitation. This may be related to a lack of awareness on the part of primary oncologic settings about rehabilitation and/or that rehabilitation services may not target brain tumour patients as potential clients due to their prognosis and their lack of experience with this unique patient population (Meyers & Wefel, 2008; Sherer, et al., 1997).

The Process of Rehabilitation

Rehabilitation is described as being a process of relearning. It assists individuals to attain a meaningful life within their boundaries of an altered level of health by maximising their capabilities (Addison & Shah, 1998, pp. 147). The goals of rehabilitation are to improve the QOL, to optimise physical abilities, to promote health preservation and to decrease health service costs (Addison & Shah, 1998; Kirschblum, et al., 2001). The role of rehabilitation for brain tumour patients has only recently been studied. However, despite findings from several studies (Davies, et al., 2003; Gabanelli, 2005; Giordana & Clara, 2006; Greenberg, et al., 2006; Kirschblum, et al., 2001; Marciniak, et al., 2001; Mukand, et al., 2003; Tang, Rathbone, Dorsay, Jiang, & Harvey, 2008) identifying improvements in the patient's cognitive and functional status, rehabilitation is not routinely nor widely offered to patients with primary malignant brain tumours.

A fundamental concept of rehabilitation is to do *with* the patient and not *do for* or *to the* patient (Hickey, 2009). The role of rehabilitation nurses is to assist the patient to identify goals that are realistic and attainable and consider the patient's continuing accountability for optimal wellness within the limitations of their illness (Cheville, 2001; Hickey, 2003, pp. 257). However this role can be challenging in the setting of neuro-oncological patients, particularly when cognitive deficits are present. Assisting patients to maintain as much of their autonomy as possible is an essential achievement when implementing rehabilitation programs for brain tumour patients. In order to optimise patients functioning post-surgery and ultimately improve their quality of life once treatment is completed, early rehabilitation is imperative (Addison & Shah, 1998; Bohan, et al., 2008). However, it must be considered that

goals must be reviewed clearly and regularly within the trajectory of the illness particularly in advanced stages (Franklin, 2007). The rehabilitation management of motor, self-care, bowel and bladder impairments is approached in the same way as in other neurologic conditions, taking into account possible tumour progression (Bell, et al., 1998; Meyer & Snelling, 1998; Mukand, et al., 2001). Brain tumour patients with advanced disease should not be excluded from rehabilitative opportunities, but rather include family and caregivers in the process to focus on skills such as transferring, positioning and bladder and bowel management (Franklin, 2007; Lupica & Ditz, 2007). By providing this service the patient and family will be better able to maintain a degree of autonomy in decisions that will influence end of life care.

Many inpatient rehabilitation programs require a degree of supervision and assistance at discharge. Patients who were often independent on admission, now face giving up a large portion of their autonomy in exchange for personal safety as their disease progresses into the advanced stages (Guo & Shin, 2005). With appropriate support, education and provision of assistive devices patients can still progress to discharge home with hospice support services (Cheville, 2001; Lupica & Ditz, 2007), and as nurses we are significant contributors to improving a patient's quality of life at this point. Rehabilitation should also involve the family regardless of whether the patient returns home, remains in hospital or is admitted to a hospice (Addison & Shah, 1998; Lupica & Ditz, 2007). Active involvement in the rehabilitation process can potentially reduce the family's feelings of helplessness and stress but also provide them with some degree of control over a very intimate and stressful situation (Addison & Shah, 1998).

The rehabilitation process begins with a comprehensive functional assessment (Hickey, 2009). The Functional Independence Measure (FIM) is the most widely used standardised instrument, in neurological rehabilitation used to measure the severity of disability. It is based on functional assessment related to areas of self care, continence, transfers, locomotion, communication, and social cognition (Geler-Kulca, et al., 2009; Hickey, 2009).

O'Dell et al. (1998) compared outcomes in patients with brain tumours undergoing rehabilitation with patients with traumatic brain injury (TBI). In the brain tumour group the mean FIM gain (25.2 points) was not significantly greater than the FIM gain (34.6) found in TBI patients. The length of stay did not differ signifi-

cantly between the brain tumour patients (22.1 days) and the TBI patients (17.8 days). Similarly, Greenberg et al. (2006) compared a group of stroke and brain tumour patients which demonstrated similar findings to an earlier study by Huang et al. (1998). Both studies found no significant difference between the brain tumour (17.2 and 23.6) and stroke (21.8 and 29.1) populations respectively, in terms of FIM gains (refer figure 1). Both groups in both respective studies demonstrated a similar rate of discharge to the community, 88.1% of stroke patients and 87.2% of brain tumour patients (Greenberg, et al., 2006; Huang, et al., 1998). The brain tumour group's rehabilitation length of stay was significantly shorter than the mean of 34 days for the stroke group (Huang, et al., 1998).

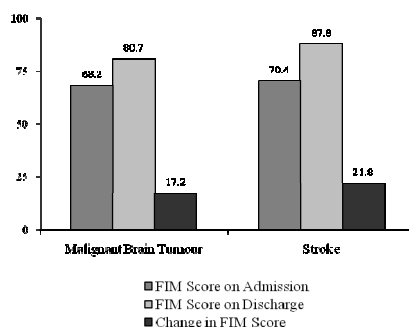


Figure 1: Functional Independence Measure (FIM) in patients with brain tumours vs. stroke (Adapted from: Greenberg, et al., 2006; Mukand, et al., 2003)

Mukand et al. (2001) completed a retrospective study that identified the incidence of neurologic deficit and rehabilitation in patients with brain tumours. Cognitive impairment (80%) was the most common problem, followed by hemi and tetraparesis (78%), visual-perceptual deficits (53%), sensory loss (38%), and neurogenic bowel and bladder dysfunction (37%) (Refer Figure 2). Long term cancer survivors may be left with a number of deficits which include physical, psychological and cognitive impairments (Guo & Shin, 2005). Other problems identified by Guo and Shin (2005) include sexual dysfunction, functional abnormalities and fatigue.

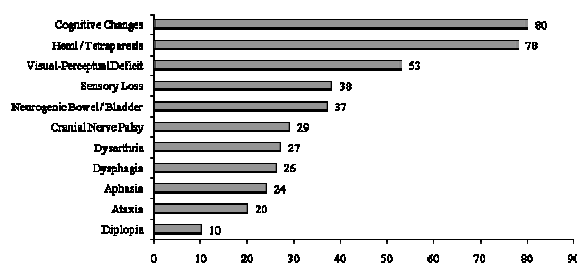


Figure 2: Neurologic deficits in patients with brain tumours. (Reproduced with permission: Mukand, et al., 2001)

Of these patients 74.5% had three or more concurrent deficits and 39.2% had greater than five deficits. The most common associated findings were cognitive and visual perceptual impairments, both which can have a profound effect on the rehabilitation process (Mukand, et al., 2001). Following inpatient rehabilitation significant functional gains were achieved and most (68.6%) of the patients in the study were able to return home (Mukand, et al., 2001).

A study of predominately ambulatory brain tumour survivors by Whitten et al. (1997) found that 90% of patients reported some type of morbidity affecting their health status and 80% reported multiple impairments, most commonly changes in sensation, cognition and emotional issues. Mukand et al. (2001) concluded that the awareness of the incidence of neurologic deficits, both single and concurrent, is important as it will help in development of individualised rehabilitation programs for these patients. Neurological impairments experienced by brain tumour patients are typically amenable to rehabilitation techniques as identified in stroke and TBI studies (Marciniak, et al., 2001). However, support needs to be directed to the provision of individualised rehabilitation programs aimed specifically at patients with brain tumours. As a result this may lead to improvements in their functional status, their discharge to community settings, and their QOL.

When considering the provision of rehabilitation services, inpatient rehabilitation is most suitable for patients with moderate to severe disability and ongoing medical needs (Kirschblum, et al., 2001). Other avenues include outpatient rehabilitation for those patients with mild cognitive deficit and no physical problems or for those patients with advanced or moribund disease treatment in a skilled nursing facility, sub-acute rehabilitation or a hospice setting (Kirschblum, et al., 2001). Patients with primary brain tumours made significant functional improvement after rehabilitation and the gains made did not differ from other types of cancer (Marciniak, et al., 2001). Patients receiving concurrent radiotherapy with rehabilitation made larger functional gains than those not receiving radiotherapy (Giordana & Clara, 2006; Marciniak, et al., 2001). Cognitive deficits prevent brain tumour patients from returning to a pre-morbid level of autonomy and occupation (Kirschblum, et al., 2001). Despite this, functional gains achieved may allow the patient to be discharged home and be the basis for continuing improvement in QOL (Giordana & Clara, 2006).

Scale	Table 1: The Karnofsky Performance Scale
100	Normal: no complaints, no signs or symptoms of disease
90	Able to carry on normal activity, minor signs or symptoms of disease
80	Normal activity with effort, some signs or symptoms of disease
70	Cares for self, unable to carry on normal activity or do active work
60	Requires occasional assistance, but is able to care for most of his / her needs
50	Requires considerable assistance and frequent medical care
40	Disabled, requires special care and assistance
30	Severely disabled, hospitalisation necessary, active supportive treatment necessary
20	Very sick, hospitalisation necessary, active supportive treatment necessary
10	Moribund, fatal processes rapidly progressing
0	Dead

(Source: Bell, et al., 1998, pp. S42; Hickey, 2009)

Quality of Life

Attempts have been made to quantify quality of life in survivors of primary brain tumours. The Karnofsky Performance Scale (above) is still the most widely used as a clinical and research outcome measurement (Bell, et al., 1998; Hickey, 2009).

Bell et al. (1998) identify that the FIM lacks correlation with cognitive function and quality of life. Commonly used rehabilitation scales, such as the Functional Independence Measure (FIM), may also be insufficient, as brain tumour patients have fewer motor and communication disorders as those in other neurological conditions such as stroke (Bell, et al., 1998). Problems like dysarthria and dysphasia challenge the understanding of the patient's subjective discomfort by distorting the awareness they have of their clinical condition and hindering communication between

physician and patients which can pose a significant challenge for rehabilitation specialists (Gabanelli, 2005, pp S52).

Factors that appear to adversely affect QOL include the extent of the tumour, poor performance status as per the Karnofsky Performance Scale, female gender, divorced status, undergoing chemotherapy, being unable to work and stage of diagnosis and treatment (Bell, et al., 1998). Bell et al. (1998) also identified variables that were related to a good QOL such as, an active social life, greater energy, freedom from depression and fewer symptoms. Age has not been found to be a significant factor. Rehabilitation interventions

are associated with significant improvements in functional status (Marciniak, et al., 2001).

During the rehabilitation process it is important to monitor and treat the adjustment of caregivers and family members. This may include informal counselling, education or referrals to mental health professionals for formal treatment (Lupica & Ditz, 2007; Mukand, et al., 2003). Mukand, et al. (2003) found in that marital status may affect psychological adjustment. For example, single and divorced patients exhibit greater anxiety than married patients with the most common fears being inactivity and financial difficulties. Conversely, married couples reported greater depression than single and divorced brain tumour patients with the main concerns identified as sex, finances, marital difficulties and inactivity (Mukand, et al., 2003). Many symptoms such as chronic pain, impaired communication (aphasia), sphincter (27%) and sexual (22%) dysfunction, and constraints such as daily observance of nutritional recommendations with steroid intake can lead to daily frustration and psychological morbidity in brain tumour patients (Taillibert, Laigle-Donadey, & Sanson, 2004).

In improving the patient's QOL, Gabanelli (2005) suggests that a protected and quiet context environment plays a determinant role in the recovery of mental and cognitive functions. Therefore visual, acoustic, motor and sensorial stimuli should be tolerable to someone whose reactions to various stimuli are not entirely recovered (Gabanelli, 2005). Gabanelli (2005) state that the phase of physical recovery in patients overburdened by a negative prognosis is often felt to be unimportant by physicians and is consequently neglected.

Discussion and Conclusion

There is a paucity of literature available that addresses the specific rehabilitation needs of brain

tumour patients though there are frequent comparisons made between stroke patients and traumatic brain injury patients and rehabilitative services offered to these patients. There is little evidence on the expected decline in cognitive and/or functional status that may eventually occur in brain tumour patients which then makes it more difficult for them to maintain an active role in their own rehabilitation. Despite expected deterioration in patient's status it should be expected that as health professionals nursing staff act as patient advocates to assist them through the rehabilitation process. Patients with brain tumours still have a right to maintain an optimal level of autonomy for themselves within the scope of their disability.

Families and health care professionals must act in a way that encourages patients to embrace their level of cognitive and physical functioning. Where cognitive deficits are severe the patient still has the right to the same level of care and access to services. Families should be supported and encouraged to participate in achieving the best possible health care outcome that the patient would want.

Although there are similar outcomes and gains in function following a period of rehabilitation for patients with brain tumours as stroke and traumatic brain injury, there is not the scope of advocacy of health care professionals promoting and interacting in such services for brain tumour patients. By affording the opportunity to these patients to participate in such rehabilitation services it may help them achieve a more optimal quality of life in the time they have left whether this be in a health care facility or in the community. Services for stroke patients and traumatic brain injury patients are well established. It would be a professional goal for nursing and allied health professionals to see the development and provision of similar services to patients with brain tumours. Research needs to be undertaken into the needs of patients and ability to provide services to meet these needs so that action can be taken to allow nursing staff to advocate for similar access to rehabilitation services as other brain injured patients receive. Brain tumour patients are unique in their needs and are thus a complex group of clients who warrant further investigation for provision of rehabilitative services rather than exclusion.

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CRITICAL THINKING AND THE NEUROSCIENCE NURSE

Sarah Hughes

Abstract

This paper identifies and evaluates what constitutes critical thinking in advanced neuroscience nursing practices. It examines and defends various critical thinking strategies, which can both, enhance and motivate critical thinking within a management and or clinical education role. It also identifies specific motivators and barriers to critical thinking within this advanced nursing specialty. In concluding this paper identifies some gaps in the literature, which may merit further research.

Key words: Critical thinking

What constitutes critical thinking?

Among advanced practice nurses there appears to be an ethos that the daily practice of critical thinking and problem solving is readily engrained into the application, theory and systematic assessment that constitutes nursing. It is apparent that nurses whom have chosen the pathway of specialisation, have already demonstrated incentives and the ability to think critically by making informed decisions to further their studies through life long learning and ongoing self-reflection. These skills may not only further their professional development but may also serve them well given the dynamic nature of healthcare organisations today.

There is an abundance of definitions surrounding what critical thinking entails and it could be suggested that thinking critically is multifactorial. It requires informed, purposeful, and reasoned judgments; a thorough understanding of the cognitive processes involved in thinking, intuitive thought and the process of reflection and conclusion, all of which are aspects of sound-decision making (Cise, Wilson & Martha, 2004; Daly, 1998; Hickey, 2003; Latrell, 1998; Martin, 2002; Oermann, 1997). It is imperative neuroscience nurses continually analyse and question the links between learned theoretical knowledge and nurse-orientated practice. Skills acquired over time are likely to further assist the advanced nurse practitioner in providing sound holistic care that is hopefully evidence based practice and thus patient centred.

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Critical thinking skills may also further serve the questioning nurse by increasing their knowledge and understanding about how political agendas may influence nursing practice and also encourage in them lateral thinking and systematic assessment. The advanced neuroscience nurse undertakes this course of action each shift (Simmons, Lanuza, Fonteyn, Hicks & Holm, 2003).

The Australian competency standards for the advanced nurse cite twelve standards to be upheld. A multitude of these entail multiple decision-making approaches and engaging in collaborative practices, all of which are done independently on a daily basis within nursing. Evidence suggests that diverse thinking and rationalisation are developed early in practice and that through self-reflection; critical thinking can be cultivated and achieved (Cise et al, 2004; Jasper, 1999 & Marquis & Huston, 2003/2009).

What are the strategies to enhance critical thinking in nursing?

John Dewey, an American philosopher whose ideas on pragmatism and functional psychology challenged education systems in the twentieth century, has been instrumental to the thinking of reflective practice. Some research articles reviewed have stated Dewey's phases of reflective thought based on problem solving and how this form of thought can achieve desirable outcomes for the critical thinker (Bailey, 2007; Pierson, 1998, Moloney & Hahessy, (2006); Daly, (1998) & Eraut, (2004). According to Taylor (2000) there are three main types of reflection: Technical, Practical and Emancipatory. Each of these can be used to focus on different aspects of the reflective process. The value of analysis however is imperative. The multifactorial needs of neuro-

science patients today require nurses to think quickly and think critically. Neuroscience patient's physiological variables can alter at a rapid rate and thus being able to think ahead and for-see what may happen regarding a patients condition can prevent disastrous patient outcomes.

If the advanced practice nurse is interested in learning more about the way people interact within the workforce, they may utilise one or more of these three types of the reflective process to further assist their learning of the process of reflection and self-analysis. For example: If human interaction was the primary focus then practical reflection might assist the nurse in further understanding human interactions, thoughts and feelings. As stated by Hamric et al., (Hamric et al, 2000, as cited in Dudley-Brown, 2004)... "being flexible and responsible to the changing health-care needs...", is of the utmost importance to an advanced practice nurse. Further utilising self-reflection and self-analysis, the nurse may gain a further insight into their practice by reviewing, re-thinking and re-strategising daily events. According to Bailey (Bailey, 2007 as cited in Brown & Libberton, 2007), thinking reflectively can assist in a solution for questions or doubt. This could bring about the process of change. For example: Empowering both academics and clinicians to agree on terminology, which will in turn encourage compliance.

As neuroscience nurses, it is a responsibility to develop a better understanding of generational differences in the nursing profession, that is, terms like nursing process & critical thinking. By encouraging better collaboration between education and clinical institutions, this may help further with the dual development of clinical simulation programs targeting critical thinking and practise scenarios (Alinier, Hunt, Gordon & Harwood, 2004). A willingness to learn and an insight into practice is very likely to aid in the development of educational strategies, such as revising nursing curriculums both undergraduate and graduate level to ensure that they cultivate an attitude of critical thinking in a pragmatic way. This may result in furthering the understanding that critical thinking is an integral part of every day practise and not just a separate skill to master (Alinier, 2003 & Alinier, Hunt & Gordon, 2004). Nurses need to understand that critical thinking is an evolutionary process of the mind that will develop over time and with much thought. Empowerment, group discussion, clinical debriefing, clinical simulation and reflective journals are all alternative strategies discussed throughout the literature reviewed which suggests that they may aid in the enhancement of critical thinking within the workplace.

What are the motivators and barriers?

According to Halcomb, Patterson, & Davidson (2006)... "Clinical leaders need to be fostered among the ranks of practice nurse clinicians to drive clinical practice development and the delivery of evidenced-based primary care". This statement alone warrants motivational thoughts for the advanced practice nurse to utilise their critical thinking skills in a positive way. For example: an aim to change practice and learn more about the political context of evidenced based primary care and how it affects nurses roles today. In addition, another way to motivate nurses to think critically is by encouraging them to question protocols, challenge theories and to utilise learned knowledge to aid and encourage the process of implementation of better practices. Another motivator is to facilitate the development of a culture, which actually supports clinicians to be critically thinking practitioners. (Cotton, 2001; Carlopio & Andrewartha, 2008, & Marquis & Huston, 2003/2009).

An interesting point of discussion discovered throughout the literature reviewed was the lack of confidence nurses felt in expressing their understanding and knowledge of nursing certain disease processes. In particular, reference was made to injuries or treatments to inpatients, such as, acute stroke patients co-morbidities and there treatments (i.e: dysphagia management or tracheotomy suctioning) and discussion with fellow health professionals within a hospital setting (Clancy, McVivar, & Bird, 2000). Perhaps the lack of exposure to opportunities to teach or share knowledge with peers may greatly influence this. For example; the importance of a multidisciplinary team scenario in neuroscience nursing and how fine-tuned this can be with input from all nurses on the ward and follow-up group discussions. Confidence may then be assured by creating these opportunities and in turn nurses may be more inclined to analyse, discuss and review practices. Therefore, encouraging all aspects of self-reflection and self-analysis.

Concerning barriers to critical thinking, the agreeable consensus throughout the literature reviewed, highlights a lack of teaching critical thinking in undergraduate programs. Further research of this area may provide undergraduate students with a better opportunity to learn these critical skills early on in their practice. Perhaps if critical thinking was expressed in a more meaningful and practical way throughout undergraduate programs then when nurses migrate into the hospital setting barriers such as peer pressure, attitudes, and misconceptions of workplace practices may all be perceived differently. This may then allow

nurses to begin viewing the world of nursing critically from their first graduate placement and furthermore allow them time to learn (Shell, 2001; Valente, 2003).

How do these apply to management and clinical education?

Critical thinking skills are essential to grasp and master early on in the nursing career path to ensure nurses have the ability to think diversely. In management and clinical education roles, a vast amount of time is spent on decision-making, problem solving, issue review, evaluation, and unit performance. Utilising critical thinking techniques as part of the management process may assist the incumbent to reduce the amount of time taken on these tasks, thus allowing more time to be spent educating peers on how these learned skills which are the essentials of critical thinking may be best applied to nursing theory. The Marquis-Huston Critical-Thinking Teaching model may be applied to nurses in these roles (Marquis & Huston, 2009).

The common principals of management: "... Responsibility, self-knowledge, creating opportunities such that the organisation's goals will be achieved, the need to make mistakes, all reality is subjective and people like to be liked..." (Carlopio & Andrewartha, 2008, p. 14; George, Collins & Gill, 1979). It is imperative that managers and clinical educators not just understand the importance of empowerment, and recognition of achievements within their staff, but also that they actually practice this to assist the learning and teaching process of critical thinking. This is seen as reward for effort, and as part of a team approach, which may further assist, with the integration of critical thinking as a *normal* part of nursing culture. Team building activities such as group discussion, clinical simulation scenarios and role-playing have been demonstrated to assist in the process of learning and teaching critical thinking and self-analysis.

In conclusion, it is evident that there is a considerable number of philosophical thoughts on critical thinking and how best to apply these principals to nursing practice. It is also apparent that critical reflection and self-analysis are topics that require thought and ought to be studied, practiced and taught. There is inconclusive evidence as to how these processes are implemented into neuroscience nursing theory and practice thus suggest these gaps in the literature warrant closer examination and research. There is a general consensus throughout the literature that nurses are lacking significantly in their ability to grasp the application of critical thinking and apply

this with value to their practice. Further research needs to be undertaken to ascertain if undergraduate nursing programs really prepare nurses to be critical thinkers within the clinical setting. Furthermore, perhaps a change in the way critical thinking is taught to nurses regardless of qualifications should be sought. Finally, implementing ways of teaching critical thinking that also explain the benefits to students about how best to apply these skills to the practice of critical thinking in real conditions would be beneficial. As is well supported throughout the literature, clinical simulation, may well be of great value to nurses of the twenty first century.

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NOgIN: Neuro Oncology Information Network – The Development of a Brain Tumour Specific Patient and Carer Support Group. A Three Year Review.

Diane Lear, Emma Everingham

Abstract

The diagnosis of a brain tumour can be devastating and the prognosis unpredictable to both the patient and their family members. Surgery, radiation therapy and chemotherapy for the management of brain tumours as well as the potential neurological deficits and psychosocial effects can have an enormous impact on the patient's quality of life.

The Clinical Nurse Consultants for Neurosciences at both Westmead Hospital and Westmead Private Hospital identified a lack of ongoing support for patients diagnosed with a brain tumour and their families. Existing general cancer information and support groups did not cater for the specific needs that arise from the unique challenges associated with neurological conditions. In July 2006 the Westmead Hospitals' brain tumour information and support group was implemented, aiming to provide practical and emotional support to patients and their family members.

This article highlights the process from impetus to the formal implementation of a nurse initiated brain tumour support group, including support from the neurosurgeons involved, financial and administrative support, program design, raising awareness of the group, achievements to date and future plans. The article will also demonstrate a team approach between public and private hospital nurses working together to improve the patients' quality of life. It is also anticipated that other neuroscience nurses will be motivated to implement similar initiatives.

The program continues to be evaluated on an ongoing basis with positive feedback gained from participants and the continued reinforcement of the necessity for ongoing information and support for this select group of patients and their families.

Key Words: *Cancer support groups, Nursing, Psychosocial care*

Introduction

The diagnosis and prognosis of a brain tumour can be devastating and unpredictable to both the patient and their family members, often having a major impact on their quality of life.

The Clinical Nurse Consultants (CNCs) for Neuroscience at Westmead Hospital and Westmead Private Hospital identified a lack of services for patients living in Western Sydney diagnosed with a brain tumour. This included practical and emotional support, as well as ongoing information to guide decision making. Initial meetings were convened with the Neurosurgeons to gain their support. We reviewed current cancer information, the literature and other cancer support groups and found existing groups did not cater for the specific

needs that arise from the unique challenges associated with neurological conditions.

Other Brain Tumour support groups in northern and south western Sydney, were also reviewed and the need for a local support group identified. Therefore a support group with information evenings were developed and introduced in July 2006 in western Sydney.

The aims for our support group include assisting patients and their families to cope with the diagnosis of a brain tumour and the ongoing care and treatment. By increasing their knowledge and awareness of brain tumours, patients are empowered to articulate their needs with their medical teams and navigate their way through the complex healthcare system. In addition, coping strategies are learnt, in a sensitive, empathetic, supportive setting which focuses on adapting to the changes or limitations in a patients' daily life. Peer support is also facilitated as the patients network with like patients.

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The information sessions continue to be held bi-monthly, at a meeting room within the hospital. These ground floor facilities promote easy access, are wheelchair accessible and free parking is provided. This was an essential prerequisite for the group as many patients are in the midst of treatment, hence easy access was paramount. Refreshments on arrival along with a light supper at intermission, promotes a friendly, caring and relaxed atmosphere, along with much needed nourishment for patients who are unwell and often travel quite a distance to attend. This facilitates casual discussion amongst attendees and presenters, and assists with concentration levels.

Invited speakers are selected on the basis of their expertise in neurosurgery and neuro oncology as well as their capacity to communicate complex information in easy to understand terms. Short sessions are provided to address the potential wide range of physical, cognitive, behavioural and emotional impairments of patients with a brain tumour. The speakers are primarily neurosurgeons, with guest speakers from the NSW Cancer Council, radiation oncologists, physiotherapists, speech pathologists, clinical psychologists and occupational therapists.

Topics presented to date include, neurological anatomy and physiology, types and grading of brain tumours, complications of tumours, chemotherapy and radiotherapy, RTA guidelines for driving, seizure management and overcoming changes to cognition and speech. Various complimentary handouts are also displayed during the sessions. In addition, power point handouts are provided. This has specifically been requested in questionnaires and presenters are encouraged to provide these.

The method used to recruit relevant patients is based on the databases collated by the CNCs from each hospital. This includes patients with all types of brain tumours, excluding pituitary tumours, acoustic neuromas and paediatric patients. The current number of patients on the data base is 180 for Westmead Private Hospital and 200 for Westmead Hospital. Following confirmation of formal pathology results, the patient is visited by the respective CNC, during this time, patients are provided with a Cancer Council support pack which includes a NOGIN brochure, program and newsletter. During this consultation any concerns about ongoing care are openly discussed and verbal consent is obtained for the patient to be included on the data base for future mail outs. Where patients are occasionally discharged prior to this consultation they are invited to the sessions by letter of introduction and brochure.

Prior to each mail out (2-3 weeks prior to a meeting) a list of patients on the data base is sent to the respective neurosurgeons for confirmation. This is required to assist in identifying deceased patients or to update contact details.

Nil costs are incurred by the program coordinators. Photocopying and mail outs are attended to internally by the CNCs and the speakers, venue, parking and supper is provided free of charge. Publishing and printing of brochures is sponsored by Westmead Private Hospital.

Literature Review

The databases reviewed were: Cochrane Database of Systematic Reviews (CDSR), Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medline and Exerta Medica cd-Psychiatry (EMBASE). Research studies have shown that psychoeducational support groups improve the overall quality of life for people living with cancer, with the educational component of the group leading to improved attitudes towards treatment and increased coping skills. Clinical practice guidelines for the psychosocial care of adults with cancer were developed by the National Health and Medical Research Council (NHMRC) in 2003. These evidence based guidelines provide recommendations on the provision of information, integration of quality of life issues, minimising the social and psychological impact of cancer on patients and their families and strategies for the identification and management of emotional distress and how these can be prevented, managed and treated by health professionals. Studies acknowledge that psychosocial support is as equally important as medical treatment for people living with cancer. Within the literature there is minimal brain tumour specific support group information. Peer support from sharing of experiences and helpful tips with others affected by the same illness, commonly known as "support groups" have been shown to reduce psychological stress and possibly increase survival rates. According to Johnson and Lane in 1999, a support group has four basic aims, to allow expression of feelings and experiences, facilitates mutual support among the participants, formally informs about the illness and its treatment options and helps the group members to discover ways to improve their coping mechanisms. In a study by Ahlberg and Nordner (2006), it was concluded that support groups offer an opportunity to share experiences, exchange information and are a source of emotional support and therefore improve the patient's quality of life.

Discussion

In 2007, our first complete year, there were over 90 participants who attended the six sessions. Promotional presentations were conducted across Sydney and at relevant conferences. A questionnaire was mailed out to all patients on the database (response rate 6.8%) to gain important information for the future direction of the group. Some of these included the time and venue for the meetings, future topics, what other resources would the patients find beneficial and at what point in the patient's illness would more information have proved helpful. Due to the low response rate, planning focused on the completed questionnaires from the six sessions held as the response rate was 72%.

The following year (2008) was another successful year, with increasing awareness of the group, attendance and positive feedback, with 138 participants attending the information evenings and the response rate from session questionnaires was 62%. A trust fund was established with the Westmead Medical Research Foundation and NOGIN donation brochures developed and printed. Feedback from the annual questionnaire and information sessions indicated a need for more patient friendly literature on brain tumours. The inaugural edition of NOGIN News was published in March 2008 and mailed to all patients on the databases. This newsletter provides a summary of each meeting including questions from the participants and answers from the invited speakers along with patient stories. This enabled us to provide valuable ongoing information to those patients and family members that are unable to attend the meetings. Production of a newsletter is supported by the NSW Cancer Council (2009) as a medium to communicate with members, health professionals, sponsors and the public. Presenters are also encouraged to provide handouts at the sessions for future reference for patients and their families. Other promotional activities included attendance at the NSW Oncology Group annual consumer conference in Sydney, where NOGIN promotional material was included in conference bags. The first fundraising event was held during International Brain Tumour Awareness Week in November. This was a very successful event, including a media release in the local newspaper. Funds raised contributed to our new trust fund for NOGIN.

Following participant evaluations nametags (first name only) were provided and a segment called patient stories was included one of the regular meetings.

The response rate to the annual questionnaire increased to 13%. Results concluded that the

venue, time frame and the frequency of the meetings was convenient, however those that had not attended a meeting stated it was primarily due to not wanting to attend meetings with like people, as it could be too depressing. This also supported the need to provide written material, such as NOGIN News, as an alternative option. Another theme from the questionnaire was more information on helping the family to cope. This has been addressed in future programs.

2009 was the third full year since the inception of NOGIN in July 2006. Another six information sessions were provided with increasing popularity. Our April meeting reached 73 participants, well over our usual expectations. On reflection, this was during a time of increased media attention, focusing on the causes of brain tumours, the topic we had chosen for the evening.

The second highlight for 2009 was promotional activities held during International Brain Tumour Awareness Week, November 1st to 7th. Staff across both hospitals purchased purple NOGIN polo shirts and held a fundraising barbecue and raffle for NOGIN. Patients also attended the barbecue and assisted in sourcing sponsorship for the raffle. Overall, the activities promoted a sense of purpose, uniting staff from both hospitals with patients, working towards a common goal: helping people whose lives are affected by brain tumours.

As a result of the extraordinary fundraising efforts NOGIN plans included a "NOGIN Nursing Scholarship" to assist neuroscience nurses in western Sydney to support patients with brain tumours either by conference or course attendance. Additionally a proposal has been developed for research on quality of life for patients diagnosed with a Glioblastoma Multiforme.

Conclusion

Our support group is both an educational and peer support model. At our inaugural meeting there were 12 attendees. Three years on, we have up to 70 participants at our meetings, each session being a combination of first time attendees and regular attendees. These meetings have also facilitated outside contact with patients and their families. This has occurred via phone, email and casual chats before and after meetings.

Due to the ongoing success of the program and the drive from our patients we continually plan for the future. One immediate priority is to initiate access to our NOGIN information via a website, this being an essential form of communication in today's society. Patients could access an up to

date program, newsletters, events and donation brochure, along with relevant web links. Another initiative is a special meeting to be held in response to participants' comments, a "carers only" night. This would give carers an opportunity to ask some of the more difficult questions whilst facilitating a connection among carers in a similar situation. A panel of expert clinicians will be included in the session.

In conclusion we believe that NOGIN has been a great success. The support of the neurosurgeons and our employers, in the initial program development, has been invaluable. These sessions have allowed for sharing of ideas, support and treatment experience, as well as the opportunity for networking among participants. The participants' comments have overwhelmingly justified the decision to continue with the program. In a letter from one of our patient's family members: "I wish NOGIN was around when I was diagnosed with a brain tumour years ago, it would have been most beneficial", another response from a patient "thank you for your insight and continual drive in NOGIN, it is truly appreciated". With comments from our evaluations including "What was most beneficial" including: knowing you are not alone with this hurdle, hearing about another patient's journey, and the questions and answers being openly discussed".

As health professionals, we can only imagine the turmoil our patients' go through when diagnosed with a brain tumour. So it is up to us to endeavour to provide these essential support services.

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TBI: A Consequence of Modern Warfare

Vicki Evans

Abstract

Injuries don't end at the perimeter of the country in which wars are being fought: they continue at home, around the globe. Injuries can be dramatic. They can be obvious. They can also be insidious.

Traumatic brain injury (TBI) as a result of the improvised explosive device (IED), is said to be one of the "signature injuries" of the conflict in Iraq and Afghanistan, and accounts for a larger proportion of troop casualties than in previous wars. Battlefield evacuation systems have become fine-tuned. Surgical advances have allowed for timely amputation and infection control strategies are activated quickly. However TBI, its sequelae and management need to be emphasised as the many hundreds of concussive blast casualties require specific interventions as a result of their injury once they are at home.

TBI is a major health and socioeconomic problem that affects all societies. Clinical management has become much more structured and evidence-based since the publication of guidelines covering many aspects of care. Survival rates may have increased but an acceptable quality of life after injury may be a different matter.

Keywords: TBI, IED, blast injury.

Introduction

Not having ever been to war, luckily, there is the need to understand the nature and surroundings in which our soldiers and colleagues find themselves. In 2003, Australia entered Operation Iraqi Freedom. Many medical military personnel were sent to a hostile environment. Their mission was to 'save lives' where around them, lives were being taken on purpose – soldiers, as well as some civilians.

Makeshift military hospitals are not like the big city hospitals in which most of us reside. In many cases, there is no air conditioning, dust covers everything, there is no 'red button' to push for the cardiac arrest team – but there are many casualties, horrific injuries, and much that we take for granted. Like, the vinyl floors we have compared

to a concrete slab – the latter, a floor that will 'soak up' fluids like urine, blood and vomit. These are snippets of the 'make-shift' conditions in



(L-R: Australian Military Field Hospital; trying to keep the dust out; TBI patients. Pictures courtesy of Malcolm Evans, private photos - Iraq 2004-5).

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which nurses, doctors and military personnel find themselves.

Battlefield care involves "damage-control" strategies including, stop the bleeding; remove the con-

tamination; restore blood flow; worry about the head; stabilise fractures and amputate early. It is widely observed now that multiple concussions are associated with a longer recovery period. This is highlighted in statistics showing that for every veteran whose brain injury is diagnosed and treated, there are many more whose injuries have not yet been recognised (Hoge et al, 2008).

Background

Dr Harvey Cushing managed casualties from WW1, but today's management is quite different. Damage from penetrating brain injury has advanced from the days of WW1 through WW2 and then the Vietnam and Korean Wars. Rosenfeld (2005) says that "the treatment of penetrating



cranial injuries in combat depends on the distance and time to neurosurgery and the range of available diagnostic tools and equipment".

Due to the improvements in protective equipment, soldiers can survive injuries that in previous wars would have been fatal (Okie 2005). Kevlar body armour and helmets are one reason that there are now more survivors of wars, compared to

'Signature injuries' from previous conflicts
Iraq:- TBI, *PTSD, amputations, severe burns
Vietnam:- PTSD
WWI:- Shellshock, amputation
First Gulf War:- Syndrome linked to vaccinations for countering chemical warfare
Falklands:- Severe burns
(*PTSD: Post Traumatic Stress Disorder)

even the Vietnam War. However they cannot protect from blast injuries and the shock waves that are produced.

The wars in Iraq & Afghanistan are very different to those of the past. Suicide bombers are many and the need to have small rapid surgical units quite near the frontline is in demand. Neurosurgery is not available in these small units but the rapid stabilisation and transfer there is refined. These casualties are then transferred to a field

hospital where neurosurgery is available. The sooner the person reaches neurosurgical assistance the better in their overall prognosis.

Although body armour and improved military tanks have saved many lives, the concussive effects of blast injuries can cause long-term or permanent brain injury. In previous wars these soldiers, who were close enough to the powerful explosions, simply would have died. Now, they are stabilised, treated and evacuated to Germany within days. In the Vietnam War, it would have taken weeks to repatriate a soldier.



Blast Injury

There is the need to understand the nature and patterns of bomb blast injury, particularly in confined spaces (Rosenfeld 2006). Those that may not be initially clinically apparent at first may have severe issues later. These injuries are often devastating and can overwhelm medical resources, both military and civilian trauma systems alike.

Blast injury is an increasingly common problem faced by military surgeons in the field. However, with the growing worldwide 'urban terrorism', blast injury is becoming more common in the civilian sector as well. City emergency departments and neurosurgical units need to be aware of and treat patients with these concussive effects.

Improvised Explosive Device (IED)

IEDs have created a new class of casualties that present a unique surgical challenge in neurosurgery. The injury pattern and severity are different from those seen in conventional trauma patients. Due to battlefield circumstances, patients are sometimes delayed significantly in their transport to a trauma centre, and they frequently arrive with hypotension, hypothermia and acidosis. Definitive care is delayed while the haemodynamic status and life-threatening injuries are stabilised.



An IED (left) consisting of 155 mm shells, Semtex plastic explosive and canisters of butane or barrels of gasoline can completely destroy a Humvee or turn a 70 tonne tank upside-

down. During the detonation of an IED, a solid or liquid is converted into a gas. This gas momentarily occupies the same volume as the "parent" solid or liquid, leading to an enormous increase in

air pressure. As a result, the gases expand heating and accelerating the air molecules and compressing the air surrounding the explosion. The high pressure blast waves generated by an IED travel at 500metres per second, and can be propagated for several hundred metres from the site of the explosion. This initial blast wave is followed by what is called a “secondary wind” - a huge volume of displaced air that returns to the site of the explosion, also under extremely high pressure. At this stage, air emboli can also form in blood vessels and travel to the brain causing infarcts. (Kaber et al 2006).

Blast wounds and high-velocity missile wounds are complex and are associated with a high degree of contamination – “more so than gunshot wounds” (Rogers 2007).



(Above: operative photograph showing comminuted fractured skull from blast-wave, courtesy Col. Jeffrey Rosenfeld)

Detonation of an IED always propels fragments of shrapnel at a high velocity. These fragments can cause damage to the brain if they penetrate the skull. Such injuries are “conventional” TBIs; they are easy to diagnose, because the shrapnel fragments leave entry wounds, and can be treated in

a standard way: foreign bodies are removed from the brain, and the patient is given a calcium channel blocker (eg; Amlodipine or Nifedipine), to prevent further damage to injured neurons. Diuretics may then be administered intravenously to prevent further swelling and, in extreme cases, a craniectomy can be performed.

This surgical procedure, which involves the removal of a part of the skull, allows continued swelling while preventing the swollen region of the brain from coming into contact with the skull, which would otherwise cause more damage. The skull flap is surgically placed in the abdominal cavity, for use later.

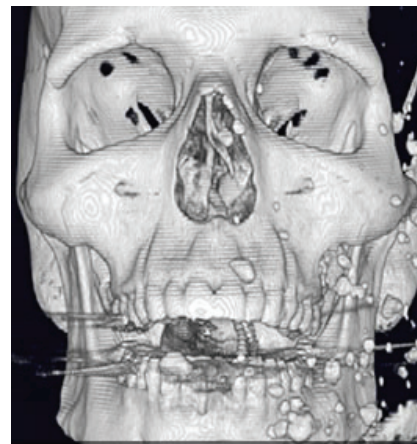
Traumatic Brain Injury (TBI)

TBI as a result of the IED, is said to be one of the

“signature injuries” of the conflict in Iraq & Afghanistan, and accounts for a larger proportion of troop casualties than in previous wars (Hoge et al 2008).

There are the issues of long-term effects of TBI & concussion from blast injuries that sometimes are not accounted for in the statistics of modern wars, as the delayed morbidity of these injuries are poorly understood.

The symptoms of TBI can be mild, moderate or severe, depending on the extent of damage to the brain. The severity of injury is sometimes determined by the period of time it takes for a patient to regain consciousness following their injury. Patients with mild TBI often experience memory loss, sleep disturbances, confusion, dizziness and blurred vision. Those with moderate or severe TBI may also show these symptoms, as well as vomiting, nausea, loss of coordination, weakness or numbness of the extremities and



(Above: IED shrapnel, lots of tiny rocks that were blasted into Bob Woodruff's face, Iraq 2006. Picture, courtesy Woodruff family).

seizures. It is not unusual to see blast injuries from an IED explosion cause a fractured skull,

blown out eardrums, eye injuries and severe brain contusions. Burst tympanic membranes are the most frequent blast-related injury, because the parts of the body most vulnerable to changes in air pressure are those in which there is an interface between air and fluid, such as the lungs, bowels and inner ear. (Rosenfeld 2008 & Okie 2008).

For example, in January 2006, ABC Journalist Bob Woodruff, was embedded with the military in Iraq and was perched in the open turret of a tank, preparing to film a report. From his left, an IED buried under a mound of rocks detonated. The left side of his face took the brunt of the explosion, resulting in a shattered jaw, displaced left

orbit, sheared calvarium, massive back & neck haemorrhaging, as well as embedding hundreds of stones into his face & a large stone medial to the right carotid artery. The embedded soil contained *Acinetobacter* - which would later cause life-threatening pneumonia & sepsis. From Iraq he flew with a critical care transport team to Germany, where his **GCS = 3**. Subsequently, he received multiple surgeries, including a hemi-craniectomy and removal of shrapnel from critical areas in his neck. Within a week, he was transported back to the USA, where over many months, with many therapists, he slowly began his rehabilitation process.

Injured soldiers, are taken firstly to cover, perhaps in a tank or something similar before being taken to a combat support hospital. Baghdad has neurosurgeons available. Usually Allied troops are evacuated to Landstuhl Regional Medical Center in Germany and then transferred to a Veterans Hospital back home. It is there that the power of the neurosurgical multidisciplinary team becomes involved.

Closed Head Injuries (CHI)

IEDs can also cause closed head injuries that are more difficult to diagnose. These occur as a result of the shock waves generated by a blast, which subject all the organs in the body to displacement, shearing and tearing forces. The brain is especially vulnerable to these forces - the fronts of compressed air waves cause rapid forward or backward movements of the head, so that the brain rattles against the inside of the skull. This jarring of the brain against the skull can cause subdural haemorrhage and contusions. Most often, these contusions are to be found in the anterior lateral and inferior aspects of the frontal and temporal lobes - less frequently, in the occipital lobe and cerebellum.

Shock waves are now known to damage the brain at the subcellular level, but exactly how remains unclear. It is thought that they damage the axons in the affected areas. This axonal damage begins within minutes of injury, and can continue for hours or days following the injury.

A study by Japanese researchers found that very brief exposure to high pressure shock waves, of the type that would be experienced upon detonation of an IED, led to contusions and hemorrhage in both cortical and subcortical brain regions. The shock waves also induced programmed cell death throughout the tissue surrounding the areas of hemorrhage, as well as leading to activation of microglial cells at the sites of brain injury.

Simply by being exposed to the blasts, even if they cause no visible injury, may be enough to cause brain damage (Addley & Taylor 2007). This in turn causes low level diffuse brain injury leaving the patient with subtle changes.

The IED causes an explosion and injury to the brain that has been likened to that of Shaken Baby Syndrome. Often the effects can be hidden or take months to become apparent. Added to this is the aimlessness of returning home – nightmares, depression, hopelessness, guilt are all real entities for these soldiers.

Troops with closed head injuries show no external signs of injury, and appear to be 'normal'. If they have sustained other obvious external injuries, the medics treating them may neglect to test for neurological damage. Subtle personality changes that may occur as a result of such injuries would only be noticed by relatives or close friends who know the patient well, and other symptoms could take months to develop. The effects of such injuries may therefore go unnoticed for years or even decades. The difficulty in diagnosis is further compounded by the fact that many of the symptoms of closed head injuries overlap with, or sound similar to, those of post-traumatic stress disorder (PTSD).



As depicted in the picture, (left), soldiers return home to find that they have suffered PTSD, poor general health, missed work days, medical visits,

depression and post-concussive symptoms – irritability, memory problems, headache, sleep difficulties, difficulty concentrating and sensitivity to light and noise. The most troubling symptoms are mood changes, depression, anxiety impulsiveness, emotional outbursts or inappropriate laughter.

As with a lot of neuroscience patients, soldiers who have suffered a TBI are not the same as before, personality-wise, and they may never be the same. It is a common thing to find that crowds make veterans uncomfortable. Also survivor guilt is real. They have been a part of a team, and they feel as though they have let the team down – by being safe, in hospital.

Neurologists affiliated with the military now estimate that up to 30% of troops who have been on active duty for 4 months or longer are at risk of some form of disabling neurological damage. This is partly based on the knowledge that closed head injuries far outnumber the penetrative head

injuries on which official statistics are based. (Addley & Taylor 2003; Hoge et al 2008).

Australian forces



(Left, Australian Defence Forces, Iraq 2007)

For Australian combat troops the war in Iraq is over. The Defence Force in southern Iraq formally handed over its

commitment to the United States, a commitment that fulfils the Rudd Government's election promise to withdraw Australia's combat troops from a deeply divisive war. Almost 14,000 Australian soldiers have served in Iraq in the past five years. The Defence Department suggests that this commitment has cost approximately \$2.3 billion.

Jonathan Pearlman, Defence Correspondent SMH June 2, 2008, writes that Australia will keep some personnel in Baghdad to protect the Australian embassy and will continue to patrol the Persian Gulf to protect the oil trade, as it did before the war under the UN oil-for-food program. The army's joint command headquarters for the Middle East was moved from Baghdad in late 2009 to allow a greater focus on the war in Afghanistan.

Conclusion

Traumatic brain injury is a major health and socioeconomic problem that affects all societies. In recent years, patterns of injury have been changing. Blast injuries have been identified as a novel entity with specific characteristics, not only associated with warfare.

Traditional approaches to the classification of clinical severity are the subject of debate owing to the widespread policy of early sedation and ventilation in more severely injured patients, and are being supplemented with structural and functional neurological imaging. Scientific research has greatly advanced our knowledge of the mechanisms involved in secondary damage, creating opportunities for medical intervention and targeted therapies. Clinical management has become much more structured and evidence-based.

As a result of the injuries seen in the Iraqi & Afghanistan Wars, TBI has been given a voice in world circles. Not only has the Military taken notice, taskforces have been established to study TBI. The US Congress recently authorised USD\$450 million from the Iraq spending bill for research into TBI. So have countries such as Germany, the UK and Australia.

The subtleties of the CHI patient need to be monitored. Military circles are increasingly aware of this and as blast injuries associated with urban explosions are becoming more of an issue, city hospital practitioners will need this education as well.

Acknowledgements

I would like to acknowledge the support of several people for this article -

Mr Malcolm Evans, veteran who supplied me with several pictures from his tour of duty as Nurse Manager ICU during "Operation Iraqi Freedom".

Brigadier Jeffrey V. Rosenfeld who sent me his personal perspective of life for a neurosurgeon in Iraq and allowed me the use of his pictures in this article.

Mrs Lee Woodruff, the keynote speaker at the American Association of Neuroscience Nurses Conference in Nashville USA 2008, whose inspiring story stirred me to write.

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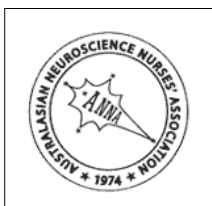
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