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EDITORIAL

It can be interesting where neurologic related research can be identified when carrying out data base searches for other seemingly non directly neurologic reasons. About five years ago I started to investigate the literature related to the neurologic events that occur during and following cardiac arrest. Through this I was led to the research being done into the use of hypothermia.

While I was familiar with the research into the use of hypothermia as a method to control recalcitrant elevated intracranial pressure as a focus of debate over previous decades, I found a number of studies at the time. These have since grown so that over the last three to four years there have been numerous studies carried out into the use of hypothermia in reducing neurologic injury following cardio-pulmonary arrest. It is thought that the better outcomes in the groups who received mild hypothermia relate to it's effect on the cascade of events that occur when cerebral ischaemia occurs. From this a number of recommendations about the use of mild hypothermia following cardiac arrest have been put out from North America and Europe.

This is an example of research in a seemingly tangential area that builds on and enhances knowledge in the area of neuroscience. I wonder at the fact that if I had not been searching, using what appeared at the time to be a mix of unrelated terms, I would possibly not have found the rich amount of research in this area. The moral of this story is that it behoves us to search broadly, rather than too narrowly when looking for evidence. Similarly we can gain from all research carried out by our colleagues and it is fitting that w encourage ourselves and others to disseminate the knowledge we have.

Multiple Sclerosis: Immunology, Immunotherapy and Complementary Medicines.

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ABSTRACT

Multiple Sclerosis (MS) is a chronic, demyelinating, degenerative disease of the central nervous system, and research has suggested strong links to an autoimmune process. Symptoms of this disorder include impairment of vision, sensation, muscle strength and coordination, and cognitive processes. Each patient is affected differently by the disorder, and the physical and emotional progression of MS is unpredictable. Understanding the possible immunological processes that may be occurring is becoming an important issue for nurses concerned in the care of people with MS. The immunomodulatory treatments that are used are based on immunological theories of the disease, and with many people with MS turning to complementary medicines, understanding the implications of these is an essential component to building a successful long term patient management relationship.

Key Words: Multiple Sclerosis, Autoimmune, Immunotherapy, Complementary Therapy

Introduction

Multiple Sclerosis (MS) is an immune-mediated disease of the central nervous system (CNS) of unknown aetiology. Patients experience a number of neurological signs and symptoms that may be transitory or permanent and arise from any number of sensory, motor and cognitive deficits. There are four (4) clinical subtypes of MS: Relapsing Remitting MS, Secondary Progressive MS, Primary Progressive MS and Progressive Relapsing MS (Goodin et al 2002, p.169). The immunomodulatory therapies currently available in Australia are only partially effective and eligibility on the PBS is limited to Relapsing forms of the disease. Despite the recent advances in these therapies, and perhaps because of the remaining limitations of them, many people with MS look to complementary medicines for relief from symptoms and disease treatment (Yadav et al. 2006, p.5). In order to thoroughly understand the disease and its treatments, both the neurological and immunological components of the disease need to be comprehended. This paper explores these concepts of the disease and aims to demonstrate that understanding of this is important for nurses to able to successfully educate patients on their disease and the potential treatment options they may be presented with.

Many "traditional" practitioners are both sceptical and cautious about the use of Complementary and Alternative Medicines (CAMs) in MS since there have been few scientific studies conducted in this area. Often a patient will not report to their Neurologist, MS nurse or even to their GP about what they are taking; due to the fear of a sceptical response. Reports vary from 35% (Nayak et al, 2003) to 84% (Yadav et al 2006) of people with MS having tried CAMs at some stage of their life. However of concern is the ***potential*** harm of CAMs in terms of 'boosting' the immune system and in interactions with prescription medications (Bowling and Stewart, 2004; Fowler & Newton 2006, p.264). The results of randomised controlled clinical trials demonstrate that glatiramer acetate and the interferon beta-1a/1b therapies are effective therapies for treating MS (Goodin et al 2002, Karussis et al 2006). As yet, no such comparable trials have been conducted on any complementary therapy used in MS and there is limited objective information on the use of complementary therapies in MS.

The purpose of this paper is to examine a number of factors involved with understanding the autoimmune nature of MS and the current immunotherapies, and to discuss the use of CAMs by people with MS. This paper will not address chemotherapeutic agents such as Mitoxantrone or

Cyclophosphamide that do not have an Australian Therapeutic Goods Administration (TGA) indication for MS.

The Immune System and Multiple Sclerosis:

There are several reasons to suggest that MS is an auto-immune disease. Elevated concentrations of antibodies and immune cells are observed in many patients with MS, and increased numbers of these immune cells have been documented in the CSF as well (Compston et al 2005).

> "Much of what is known of the pathologic immune response of MS is based on histology showing that lesions are discrete, circumscribed and relatively large, and that they surround a vein. ""These lesions appear to be the result of a highly selective and destructive process that is orchestrated by the immune system" (Porter et al 2004; p. 14.).

T Lymphocytes (T cells):

Initial T lymphocyte involvement in MS involves the 'helper' variety cells becoming reactive against myelin proteins. As myelin degeneration occurs, cytotoxic T cells (engaging in chemical attack) or suppressor T cells (suppressing the normal immune response) are more prominent at the plaque site (Hauser & Goodkin 2006; Lassman 2005). T lymphocytes require their target antigen to be presented to them. Antigen presenting cells digest the target antigen and then present it linked to Human Leucocyte Antigen (HLA) molecules so that it can be recognised (Hauser & Goodkin 2006). In actively demyelinating MS plaques, macrophages ingest myelin and then form close contacts with T lymphocytes. This probably provides an example of antigen presentation (Lassman 2005; Porter et al 2004; Playfair & Chain 2005).

B Lymphocytes (B cells):

B lymphocyte cells recognise a specific antigen, expressing an antibody which binds to that antigen. B cells essentially lie dormant until stimulated by the antigen to multiply. These cells then turn into plasma cells producing antibodies which freely search for the target antigen. Once the antibody binds to the antigen they assist complement to attack them and macrophages to engulf them (Porter et al 2004; Playfair & Chain 2005). T cell / B cell cooperation in MS occurs in both directions. T lymphocytes enhance B lymphocyte response, either directly or via the release of cytokines. B lymphocytes express HLA and then present these to T lymphocytes (Lassman 2005; Porter et al 2004).

Cytokines:

Cytokines are akin to a chemical 'messenger' and are vital in the successful functioning and communication of the immune system. They are small soluble proteins that can change cell characteristics and behaviour. Activated immune cells differentiate and secrete cytokines. Cytokines allow cells to regulate their own growth and behaviour, recruit other immune cells and identify sites of infection. Cytokines are small secreted proteins which mediate and regulate immunity, inflammation, and hematopoiesis. Responses to cytokines include increasing or decreasing expression of membrane proteins (including cytokine receptors), proliferation, and secretion of effector molecules (Porter et al 2004; Playfair & Chain 2005). Interferon Beta, which has 3 commercially available prescription preparations available for the treatment of Relapsing Remitting MS (RRMS), is a cytokine.

Certain immune cells secrete specific cytokines, giving them a distinct cytokine profile. This profile then dictates the function of the immune cells. Two types of Th cells are recognised based on distinct cytokine profiles: *Th1 cells* activate macrophages and produce interferon (INF) γ, Tumor Necrosis Factor (TNF) α, Interleukin (IL)-2 and lymphotoxin. *Th2 cells* activate B cells and produce IL-4, IL-5, IL-10, IL-13, INF-β and Transforming Growth Factor (TGF)-β (Porter et al 2004; Compston et al 2005).

Immuno-pathogenesis of MS

Clinical, imaging and pathological studies have provided insight into possible disease mechanisms operative in MS pathogenesis and have demonstrated that in most patients, MS is a disease with acute onset demonstrating active inflammation and demyelination. Although axonal degeneration can be seen early during the disease, the extent and chronicity of inflammation in MS is different from primary neurodegenerative disorders or acute brain tissue damage (Hemmer et al, 2002, p.227). The exact cause of the inflammation and the immune response that underlie MS is not known. While it remains to be demonstrated

conclusively, it appears that the MS pathogenesis has three phases: an initial inflammatory phase that meets the criteria for an autoimmune disease; a phase of selective demyelination and then a neurodegenerative phase. However, several lines of evidence suggest that immunopathological events, which may be autoimmune in origin, are responsible for the development of MS (Yong, 2002, Hemmer et al, 2002).

- Pre-existing autoreactive pro inflammatory CD4+ T cells in the periphery become activated. These cells exist in healthy individuals, but become activated only in MS patients and may reflect an immune regulatory defect.
- These autoreactive Th1 cells then migrate into the CNS. The blood-brain barrier (BBB) can be breached by lymphocytes if they are in a state of high activation.
- Once in the CNS, these T cells are reactivated by Antigen Presenting Cells (APCs) and secrete proinflammatory cytokines, inducing CNS inflammation via activation of macrophages, other T cells, and B cells. This in situ reactivation of myelin autoantigens stimulates an immune response.
- Th1 cells secrete proinflammatory cytokines, including interferon-γ or interleukin-2, inflammation by activating macrophages, other T cells, and B cells. Increases in Th1 cytokine levels often precede relapses.
- Macrophages and T cells attack the myelin sheath by cytotoxic mediators, including tumor necrosis factor–α, O2 radicals, and nitric oxide; B cells differentiate into plasma cells that secrete demyelinating antibodies. (Yong, 2002; pp.5-7; Hemmer et al, 2002; Galboiz & Miller, 2002; Porter et al, 2004)

Immunomodulatory Therapy in MS:

The disease modifying therapies (DMT's) include Interferon Beta 1a (Avonex® and Rebif®), Interferon Beta 1b (Betaferon®) and Glatiramer Acetate (Copaxone®). These drugs have been shown to reduce the frequency of relapses and *possibly* delay sustained disability progression in patients with Relapsing-Remitting MS (RRMS) and Secondary Progressive MS (SPMS) with superimposed relapses (Goodin et al 2002, Karussis et al 2006). It is important to note that the treatment eligibility criteria and accessibility to these treatments does vary from country to country and the information provided in this paper should be viewed in the context your own clinical practice. These medications require significant education and support in order to promote adherence with prescribed regimes, and to understand the role these therapies play as part of the overall management for people with MS.

Interferon Beta: Interferon beta is a naturally occurring chemical cytokine (protein) that is normally produced in response to a viral infection or other stimuli. Its exact mode of action in MS is unclear but it is believed to have multiple effects on the immune system including down regulation of interferon gamma and inhibiting stimulation of other pro-inflammatory immune cells, while increasing suppressor lymphocyte activity (Blagus et al 2004, Dhib-Jalbut 2002, p. S4-S5).

Several consistent Class 1 studies have demonstrated that interferon beta is effective in reducing the attack rate in relapsing remitting MS. It has also demonstrated beneficial effects on Magnetic Resonance Imaging (MRI) measures of disease activity and probably slows the development of sustained disability (Goodin et al 2002). Interferon beta has also shown to be of benefit in clinically isolated syndromes (CIS) in delaying the progression to a confirmed diagnosis of MS, and in secondary progressive disease (SPMS) (Goodin et al 2002), although the evidence in these areas is less robust. Again in CIS and SPMS treatment options and eligibility will differ from country to country.

Glatiramer Acetate: Glatiramer Acetate is a synthetic polypeptide of four amino acids (L-glutamic acid, L-alanine, L-tyrosine & L-lysine) that are found in myelin. The exact mechanism of action in MS is unclear but it is suggested they divert the immune response away from the myelin (Blagus et al). Glatiramer acetate binds to MHC class II molecules on antigen presenting cells. This binding then induces activation of Glatiramer acetate specific suppressor T cells. Once across the blood – brain barrier, reactivation by myelin antigens produces an inhibition of pro inflammatory Th1 cytokines and induces a bystander suppressive effect through anti-inflammatory Th2 cytokines (Neuhaus et al 2001, pp704-5; Dhib-Jalbut 2002, p. S5-S6).

Class 1 evidence has demonstrated Glatiramer acetate to reduce the attack rate in MS both clinically and on MRI

activity in RRMS, and there is possibly a sustained delay in the progression of disability (Goodin et al 2002).

Monoclonal Antibodies: Monoclonal antibodies are a new strategy for modulating the body's immune system by interfering with specific processes in the immune response against myelin. This is different from traditional immunosuppression by virtue of its selectivity (Blagus et al 2004). Natalizumab (Tysabri®) is one of the first in a new class of potential therapeutics known as alpha 4 integrin inhibitors. Natalizumab works by preventing migration of inflammatory cells from blood vessels to sites of inflammation (Biogen Idec 2006). Natalizumab, like current immunomodulatory agents, is a potential disease modifying treatment and not a cure for multiple sclerosis. However its introduction into international markets has been cautious, due to the potential increase in risk for developing Progressive Multifocal Leukoencephalopathy (PML), an opportunistic viral infection that can lead to severe disability or death (Biogen Idec 2006). Tysabri® was granted approval by the Therapeutic Goods Administration (TGA) for use in Australia in October 2006. A number of other monoclonal antibodies are currently in clinical trials as potential treatment for multiple sclerosis including Rituxumab, Alemtuzumab, Daclizumab, and CNTO 1275.

Complementary Medicines:

Complementary and Alternative Medicines (CAMs) cover a diverse range of approaches to both diagnosis and treatment of disease, not considered to be a part of conventional medicine (Barnes 2003, p.226; Fowler & Newton 2006, p.261). The use of CAMs among people with MS is significant with up to 84% reporting they have tried CAMs at some stage of their life with MS. It seems that CAMs are frequently chosen with a desire to experience holistic health care, but also out of dissatisfaction with conventional medicine and therapies (Nayak et al 2003, p.185). Pucci et al (2003, p.264) note that for people choosing to use CAMs, only 12.8% were referred by their physician to a CAM practitioner. Additionally, 82% did not consult their neurologist. The major source of referral noted was that by a friend. In spite of the apparent popularity of CAMs use amongst people with MS it has been noted that little is known about the efficacy and safety of many CAMs. (Apel et al 2005; Zajicek et al 2005; Nayak et al 2003)

Nayak et al (2003, p. 187) note symptom relief to be the main consideration for the use of CAMs (73.9%). Table 1 outlines the main reasons noted by Nayak et al (2003, p.187) for considering the use of CAMs by people with MS.

Table1: Reasons people with MS seek complementary medicines

Symptom Management	Percentage Reported	Disease management	Percentage Noted
Pain	59.9%	slowing down of MS progression	52.2%
Fatigue	57.8%	relapse prevention	33.6%
Stress	37.9%	inducing remission	26.7%

Reports on CAM use have indicated that people with MS are trying a wide range of unconventional therapies to manage their symptoms. Primarily people with MS draw on homeopathy, diet, and vitamins (Pucci et al 2003). The most frequently used treatment reported by Nayak et al (2003) was ingested herbs, with bee venom therapy and removal of mercury fillings rated poorly in frequency and efficacy. There has been limited research into the efficacy of CAMs, and some researchers who have systematically reviewed the literature note the need for more research into the efficacy and safety of CAMs (Nayak et al 2003; Huntley and Ernst 2000). Zajicek et al (2005) and Apel et al (2005) suggested further research is needed in regards to the motivation for the use of CAMs; and the efficacy and safety of those CAMs used alongside conventional medicine.

It needs to be acknowledged, however, that although there is a lack of scientific research in this area, there is also a lack of funds and patient pool to do robust clinical trials as are regularly carried out amongst conventional treatments. Some people in the MS community believe that we should not hide behind the notion of being purely evidence based and completely dismiss what is yet unproven as ineffective. It is well recognised that the use of complementary therapies are not taught in western medicine and nursing courses. They are not well understood by many nurses and doctors, and may

have not been scientifically researched to the same degree as pharmaceutical medicines (Haartsen, in Blagus et al, 2004).

Bowling and Stewart (2004) do offer caution however in that many complementary medicines may in fact be potentially harmful for people with MS. Many "dietary supplements" propose that they boost immune response, which may potentially also increase the proliferation and activity of immune cells known to play a roll in MS disease activity. Examples include Echinacea and Ginseng, which stimulate macrophages and T cells. This immune-stimulating effect poses theoretical risks in MS and may interfere with the actions of immune-suppressing and immune-modulating medications. Other supplements such as Chamomile and Sage have sedative properties and may worse MS fatigue or increase the sedative effects of prescribed medications.

A significant number of patients are turning to CAMs and the nurse involved in assisting the patient with interpreting the levels of evidence about a CAM can foster a greater therapeutic relationship; encourage nurses to think about treatments from a patient's perspective, and consider an alternate understanding of MS immunology and pathogenesis (Bowling and Stewart, 2004). Bowling (2004) suggests several guidelines should be followed when patients are considering CAM use:

- Consider conventional medicine first.
- Evaluate and directly address the reasons for wanting to use CAM.
- If CAM is chosen, direct the patient to keep the physician informed; monitor the response to the therapy; and discontinue therapy when appropriate.
- Stress caution to the patient – if it sounds too good to be true, or claims to treat and/or cure a multitude of ailments.

Conclusion:

MS is a chronic, demyelinating, degenerative disease of the central nervous system, and research has suggested strong links to an autoimmune process. Each patient is affected differently by the disorder, and the physical and emotional progression of MS is unpredictable. Understanding the possible immunological processes that may be occurring is becoming an important issue for nurses concerned with the care of people with MS. The immunomodulatory treatments that are used for MS are based on immunological theories of the disease and unfortunately some patients with be refractory to these therapies or ineligible for consideration of them. The nurse (and all health professionals) can play a crucial role in assisting patients make informed and safe decisions when considering the use of CAMs. Understanding the "traditional" levels of evidence can be confusing and even irrelevant to patients who conventional medicines have failed, especially in times of desperation. Importantly, with an understanding of the immunology of MS nurses can support patients education in the potential use of CAMs which may, theoretically, stimulate the immune system and potentially worsen the very things patients are trying to treat, but at the same time allow the development of a greater nurse / patient relationship.

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STROKE CARE PATHWAYS
A Mechanism for Driving Nursing Clinical Practice Improvement Projects

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ABSTRACT

In 2003 the Towards a Safer Culture (TASC) project was commenced at the Prince of Wales Hospital (POWH). The aim of the project was to provide a safer culture in hospitals departments by introducing evidenced based clinical pathways for the management of acute stroke. The pathway focuses on the early management of the stroke patient, predominantly in the Emergency Department (ED). The minimum data set captured from the pathway allows outcomes of care to be evaluated up until patient discharge. The data enables us to identify areas requiring clinical practice improvement (CPI). To date the POWH Acute Stroke Unit has undertaken three projects based on the results from the data reports. This report illustrates how pathways can be used as a mechanism to drive nursing CPI projects.

Key Words: Stroke, pathways, clinical practice improvement

Introduction

The use and effectiveness of care pathways in healthcare settings remains debatable. Beneficial effects of pathways are documented as having a positive impact on patient outcomes, such as, increased quality of care, patient satisfaction, and better continuity of patient education. Additional benefits include reducing the cost of care and reduced patient stay in hospital. However a recent Cochrane review concluded that there is currently insufficient supporting evidence to justify the routine implementation of care pathways for acute stroke management or stroke rehabilitation. Despite this the use and implementation of care pathways continues to occur. In 2003 the Towards a Safer Culture (TASC) project was commenced at the Prince of Wales Hospital (POWH). The aim of this project was to provide a safer culture in hospital departments by introducing evidenced based clinical pathways for the management of acute stroke. The pathway focuses on the early management of the stroke patient, predominantly in the emergency department (ED). The minimum data set captured from the pathway allows outcomes of care to be evaluated up until patient discharge. The data obtained from pathway use enabled us to identify areas requiring improvement and have been used as a mechanism to drive nursing clinical practice improvement (CPI) projects.

Aim of report

To demonstrate how the use of care pathways for acute stroke management facilitates the development of nursing CPI projects.

To provide evidence that care pathway data is a useful monitoring tool to measure the effect of CPI projects on outcomes

Method

A minimum data set was established by the stroke TASC expert working party. Examples of this data set include: Presentation date, time of symptom onset, type of stroke, swallow assessment within 24 hours, Scandinavian stroke score, stat antiplatelet administration, complications acquired in hospital, patient disposition and Modified Rankin score on discharge.

In addition, the POWH has established an access data base which is designed to capture other aspects of patient care at a local level. This compliments the TASC minimum data set. Some examples of this include; enteral feeding, indwelling catheter management, DVT prophylaxis, discharge destination.

On patient discharge the data collected is entered by the Stroke Clinical Nurse Consultant into an online verifying information system and is collated at NSW Health.

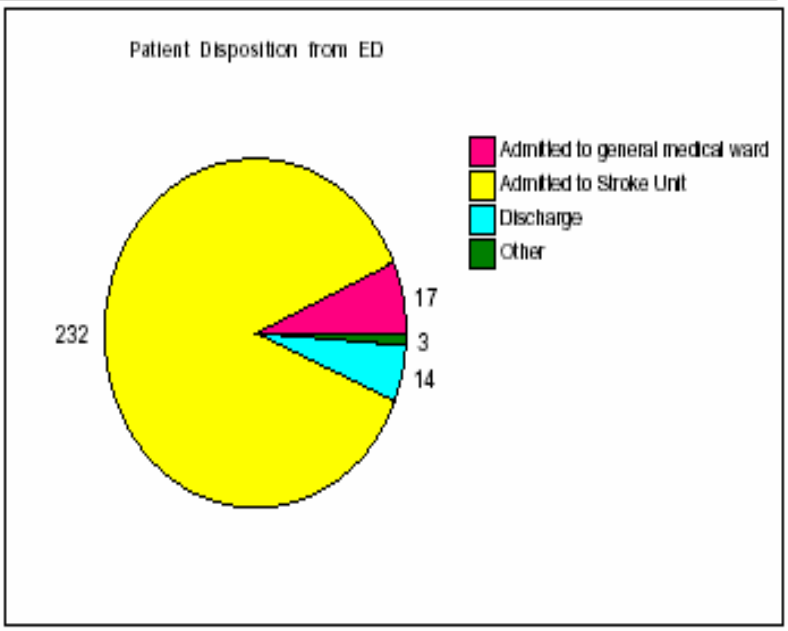
Data reports are then made available (privileged access) via the NSW Health TASC online website. An example of the front page of the data report is illustrated in Figure 1.

FIGURE 1: EXAMPLE OF FRONT PAGE OF DATA REPORT

Stroke ED Disposition, Age, Sex, Admit by year for C208 - Prince of Wales Hospital - Year 2005

Destination

Disposition	Patients
Admitted to general medical ward	17
Admitted to Stroke Unit	232
Discharge	14
Other	3
Total Patients	266



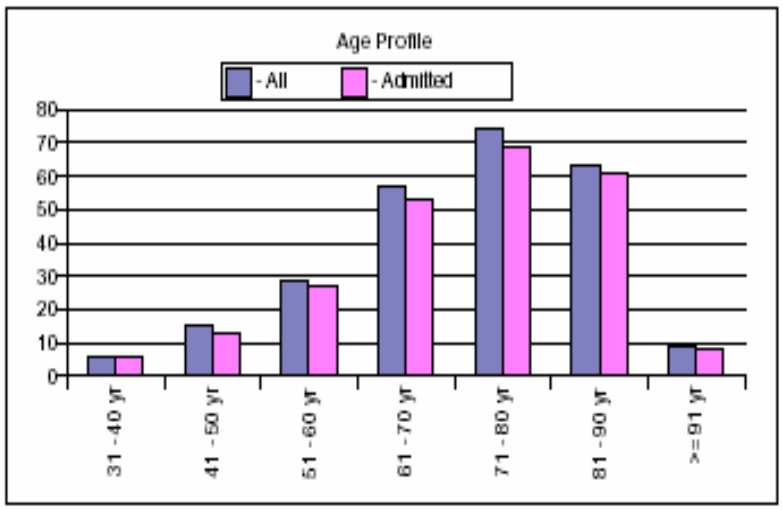
Admitted

Admitted

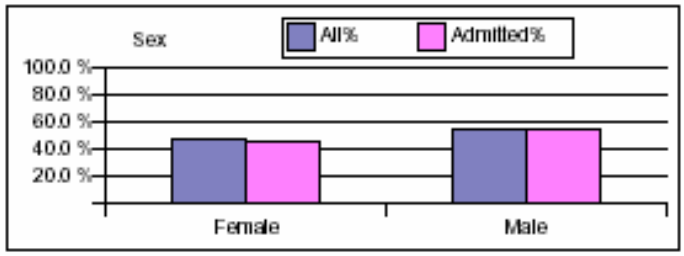
Total Admitted	249
% Admitted	93.6 %

Age Profile

Age Profile	All	Admitted
31 - 40 yr	6	6
41 - 50 yr	15	13
51 - 60 yr	29	27
61 - 70 yr	57	53
71 - 80 yr	74	69
81 - 90 yr	63	61
>= 91 yr	9	8
Average Age	71.96	72.08

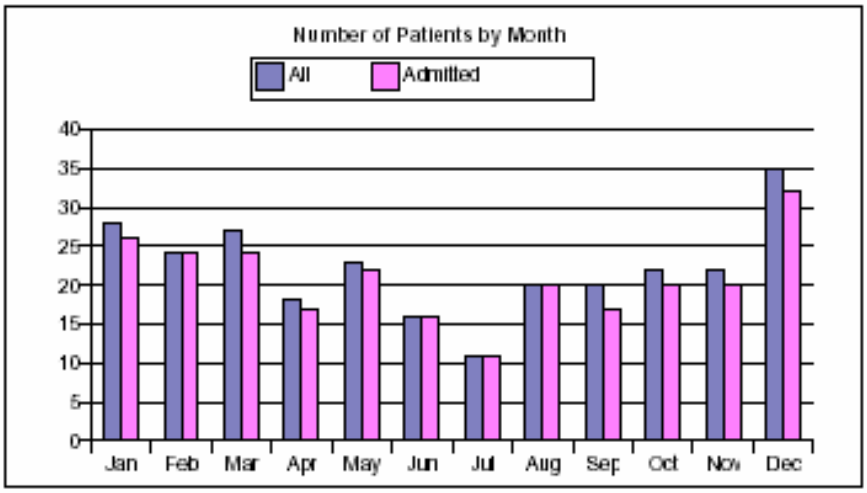


Sex	All	All%	Admitted	Admitted %
Female	117	46.2 %	108	45.6 %
Male	136	53.8 %	129	54.4 %
Data Missing	13	4.9 %	12	4.8 %



Time Distribution Year: 2005

Month	All	Admitted
Jan	28	26
Feb	24	24
Mar	27	24
Apr	18	17
May	23	22
Jun	16	16
Jul	11	11
Aug	20	20
Sep	20	17
Oct	22	20
Nov	22	20
Dec	35	32



Run Date : 28 Aug 2006 16:05:36 H_09TC2000 Stroke ED Disposition, Age, Sex, Admit by year Page 1 of 1

T

Data outcome trends were reviewed by the nursing team and areas of patient management requiring improvement were identified. These included:

- Less than optimal number (74%) of stroke patients being admitted directly to the acute stroke unit (ASU).
- Increased incidence rate of urinary tract infection (UTI) at an annual average of 6.3%.
- Decreased occurrence of swallow screening within the first 24 hours. Decreased by 14% since first being introduced in 2003.

The impact these areas could have on patient outcomes was considered and the nursing team identified specific stroke nursing CPI strategies that could potentially improve outcomes. These included:

- The development of an ASU Bed Management Policy and increased awareness of staff involved in bed management.
- Introduction of an infection control type of indwelling catheter (IDC) and improved staff awareness of limiting IDC use and early IDC removal.
- Introduction of nurse initiated swallow screening on the ASU.

The projects were implemented and ongoing data trend monitoring is undertaken to observe the impact of the CPI projects on outcomes.

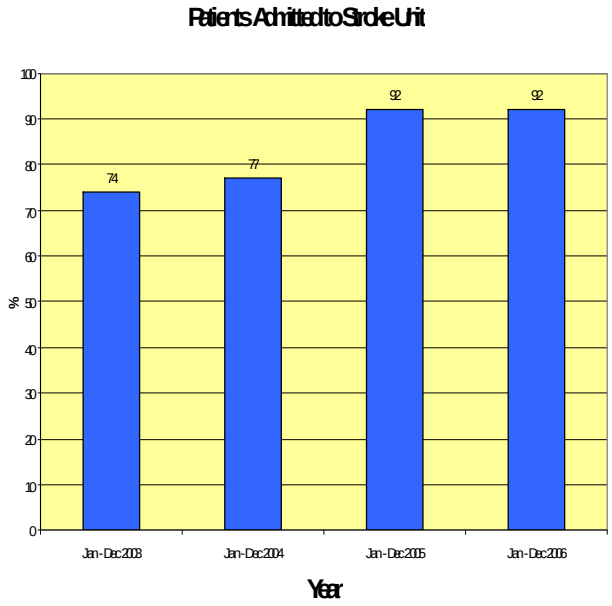
Data trends to date have shown an improvement in outcomes for two of the three areas where nursing CPI projects have been undertaken (patients admitted directly to the ASU and UTI rates).

Results

The nurse initiated swallow screening is the most recent strategy to be implemented and as this project is in its early stages results are not yet available. It is predicted that this will result in patients being unnecessarily kept nil by mouth (NBM) for extended periods of time and will limit the number of patients being fed unsafely prior to their swallowing ability being ascertained. Results of this project will be forthcoming in the near future.

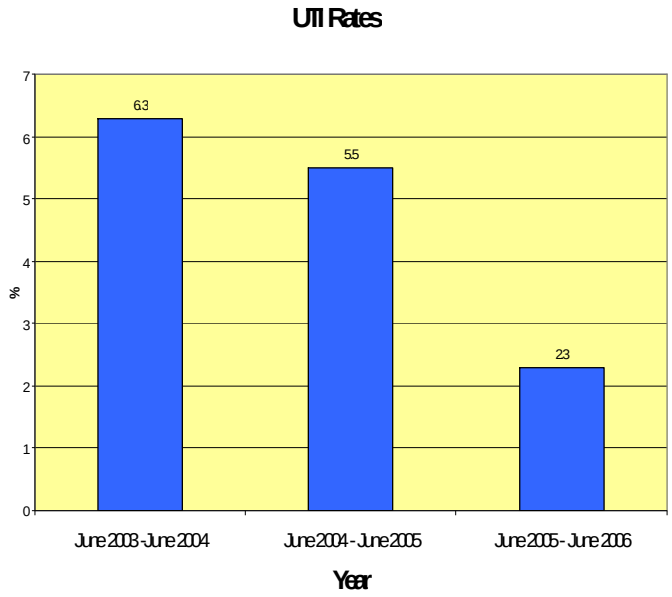
Table 1 and Table 2 demonstrate how after the implementation of nursing CPI projects data trends for Admission to ASU and UTI rates have shown an improvement.

TABLE 1: Patients admitted to Acute Stroke Unit



Patients admitted directly from the ED to ASU prior to the implementation of CPI strategies over the first 2 year period were 74% and 77%. After the introduction of the CPI strategies the rate has increased to 92%. This has been an overall improvement of 18%. This was seen to be an important domain to improve as the literature supports that patients treated in an ASU have decreased morbidity and mortality and overall better outcomes then those treated in general ward areas.

TABLE 2: UTI infection Rate



Prior to the implementation of CPI strategies the average yearly UTI incidence rate was 6.3%. After the introduction of the CPI strategies the average rate has decreased to 2.3%. Demonstrating an overall four percent decrease (4%). UTI is known to be associated with poorer patient outcome, increasing the patient's length of hospital stay and increasing healthcare costs. This was an important domain to improve for stroke patients as the secondary effects of UTI, such as pyrexia are known to be detrimental to injured brain cells. The discomfort also associated with UTI is an unwanted side effect for the patient.

CONCLUSION

The use of pathways in the care of stroke patients is an area that quality research is lacking. From our experience we have found them to be beneficial in providing data trends that allow easy identification of areas requiring improvement in patient management. At the POWH ASU the nursing team have undertaken three CPI projects to improve patient outcomes. To date, two of these projects have been well established and the data results are now showing the positive impact of these strategies on patient outcome. That is the total number of patients being admitted directly to the ASU and UTI incidence rates have improved.

This journey has highlighted how the use of clinical pathway data is invaluable in monitoring the effects of CPI projects on patient management and outcomes.

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Towards Neurosurgery Nurse Practitioner Part 1. The journey so far.

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ABSTRACT:

Nurse Practitioner is still a relatively new concept in Australia with many within and outside the health profession not fully understanding its complexity and potential. The following article describes the experience so far of the first Nurse Practitioner candidate in neurosurgery in Victoria Australia in achieving the qualifications for and securing a position. The article will also provide insight to the roles, processes and difficulties that face nurses taking on and developing an advanced role.

Keywords: Neurosurgery, Nurse Practitioner, clinical scope of practice, nursing, Australia

Introduction

The Nurse Practitioner (NP) in neurosurgery is not a new concept. The NP role itself has been developing in the United States of America for 40 years (Pearson, 2008), Canada for over 20 years (Canadian Institute for Health Information, 2006), and the United Kingdom for many years but expanded in the 1990s (Horrocks, Anderson, & Salisbury, 2002). The role within neurosurgery in Australia is still in it infancy with only two authorised NPs at Royal North Shore Hospital in New South Wales (since 2004) and one candidate at Austin Health in Victoria (since 2007). There are many differences between the two Australian neurosurgery models and these include the process which nurses go through to become an NP, which was best outlined in N3ET report (The National Nursing and Nursing Education Taskforce N3ET, 2005) as well as the context in which they practice. The following article explores the experience of Victoria's first Neurosurgery Nurse Practitioner candidate at Austin Health and how the role came in to being.

Nurse Practitioners

The international definition of a Nurse Practitioner is a registered nurse who has acquired

- an expert knowledge base
- complex decision-making skills
- clinical competencies for expanded practice
- Master's degree is recommended for entry level.

(Nurse Practitioner/Advanced Practice Nurse network, 2008)

Within Australia there are numerous state nursing governing body interpretations of the role of Nurse Practitioner (NP). However all adhere to the Australian Nursing and Midwifery Council's definition as a registered nurse educated and authorised to function autonomously and collaboratively in an advanced and extended clinical role (Australian Nursing and Midwifery Council, 2006). In Victoria, a Nurse Practitioner (NP) has five extensions of practice, which differentiates their role from an advanced nursing role such as a Clinical Nurse Consultant. These extensions are: prescribing from a limited formulary; initiation of diagnostics; admission/discharge rights; direct referral to

specialty units and the writing of absence from work medical certificates (Nurse Practitioner Implementation Advisory Committee, 2004).

Nurse practitioners are all highly skilled clinical nurses who have chosen to remain clinically active. The NP role provides a clinically focused career advancement option within nursing, as opposed to the traditional pathways of Management, Education, and Research. All these traditional career pathways, tend to lead the nurse away from the clinical area creating a potential vacuum of knowledge and experience from direct patient care

The Austin neurosurgery experience

In April 2005, a comprehensive review of neurosurgery services at Austin Health was conducted. Recommendations from this review included the expansion of the current service, building on core strengths, and establishing others, as well as the need to implement the role of a Neurosurgery Nurse Practitioner (NNP) to assist in this expansion (Donnan et al., 2005). It was thought that implementing such a role would provide consistency and quality of care and an increase in patient throughput through limited substitution or delegation of some medical roles allowing for efficient utilisation of medical officer time.

In 2005 Austin's current candidate commenced a Masters of Nursing Science with the view of pursuing a career pathway in education. Concurrently Austin Health received funding from Victoria's Department of Human Services for a Nurse Practitioner Project officer whose role included identifying potential specialties and candidates for the role of NP, to determine cost/benefits of the role and to establish a structure for the process to become a NP at Austin Health (Rickhard, 2006).

After discussions with the Nurse Practitioner Project officer and Head of Department of Neurosurgery, it was obvious that the candidate fulfilled all selection criteria except academic qualifications to become a Nurse Practitioner (see Table1). In fact all that was required for the current candidate to be considered a candidate for Nurse Practitioner was to reconfigure the units of study in the Masters of Nursing Science to include a Therapeutic Medication Module.

In 2006 the Austin candidate changed the academic enrolment to include a Therapeutic Medication Module and by the end of 2006 all academic (Completed MNS), clinical and non-clinical requirements to become a Nurse Practitioner were achieved. All that was needed was a funded position and unit defined Clinical Practice Guidelines, the development of which could only commence when the position was funded.

Table 1:Criteria for Nurse Practitioner in Victoria

- Evidence of current registration
- Curriculum vitae
- Basic Nursing Qualifications Degree
- Further Specialist Nursing Qualifications (if applicable)
- Advanced Training
- Educational background and a minimum of 5 years clinical experience relating to the nurse practitioner role for which the applicant seeks endorsement
- Evidence of independent involvement in research activities in relation to their practice
- Evidence of significant leadership in the practice area in which they are applying for endorsement
- Masters Degree (or equivalent)
- Successful completion of an approved Therapeutic Medication Management module
- Evidence of safety and competency with the completion of an approved medication management module
- Clinical Practice Guidelines authorised by the institution
- Evidence of professional indemnity insurance from employing organisation.

(Nurses Board of Victoria, 2006)

In May 2007 initial seeding funding for the position for 2 days a week, but limited to the end of the financial year was received. The reason for this short period of funding was to establish the role and to gain momentum for a formal application to the hospital executive for more sustainable and ongoing funding for the position. The position was promptly filled and once established the Neurosurgery Nurse

Practitioner candidate (NNPc) researched the role and surveyed multidisciplinary staff to understand where best a NNP could be would be utilised. The NNP also commenced a supervised advanced practice role in outpatient's clinics and inpatient ward rounds as well as the development of Clinical Practice Guideline and policies directly relating to patient care. However to do the latter the clinical scope of practice for the NNP needed to be formalised.

Clinical scope of practice

The role of the NNP is envisaged to augment the Austin's current neurosurgical service through limited substitution or delegation of some traditional medical roles, thus, allowing for better utilisation of clinician time, increasing patient throughput, providing for consistency and quality of care and thereby facilitating the expansion of the service.

The main factors that required addressing within the neurosurgical service were:

- Out patient clinics (new, discharge, carpal tunnel)
- Inpatient care (trajectory of care especially discharge planning)

Outpatient clinics

Neurosurgery outpatient clinics at Austin Health consist of two primary outpatient clinics held on Monday and Friday mornings. These clinics see a large number of new patient referrals as well as review postoperative patients. This has caused non-urgent outpatients waiting list times for neurosurgery to extend to 6-months, leading to waiting times outside the national norm for neurosurgery (Australian Institute of Health and Welfare, 2007). The NNPc's involvement in general neurosurgery clinics is specifically for uncomplicated postoperative reviews (i.e. single level laminectomy or micro-discetomy) or to carry out neurosurgical registrar or neurosurgeon designated screening of new neurosurgery patients. This significantly frees up consultant and registrar time to dedicate to complicated new referrals and postoperative patients. If deemed by the NNPc to require further specialty input patients are referred to other specialties, or if requiring further neurosurgical input the patient is presented to the attending registrars or consultants for further input at their time of appointment and therefore do not require another referral.

Austin Health's Neurosurgery Carpal Tunnel Clinic is an unsupported, stand-lone clinic seeing preoperative and post surgical patients. The neurosurgical registrars traditionally ran this service. Currently the Carpal Tunnel Clinic is a nurse led clinic run by the NNPc. The NNPc through specific assessment can assist in diagnosis of Carpal Tunnel Syndrome or determines the need for further investigation to rule out other possible differential diagnoses. At this time education is provided to the patient in regards to the NNPc's findings and an appropriate plan for surgical or conservative treatment is discussed and implemented with the consent of the patient. Postoperatively, patients are seen to assess the success of the operation and to determine any further management or referral, which maybe required.

Inpatient care

Ward 6 west is a 32 bed multiple specialty ward at Austin Health comprising of mainly neurosurgery and vascular surgery. Over the past few years emergency presentations at Austin Health have increased exponentially every six months since 2004 (Metropolitan Health and Aged Care Services Division, 2005a, 2005b, 2006a, 2006b, 2007). With this acuity and sheer number of presentations also comes an increased emphasis on efficiency in practice to be able to accommodate these patients. This in turn places pressure on all multidisciplinary clinical staff, especially nursing to provide optimal care in limited timeframes. Ideally early discharge for all patients who are physically well to an appropriate setting is required, be it home or a specialty rehabilitation unit for ongoing recuperation after an acute hospital stay. In a recent survey of nursing and allied health staff (n=25) involved in care of neurosurgical patients the vast majority strongly agreed or agreed that a NNP would benefit the service in areas of patient management and the trajectory of patient care (Scanlon & Fabinyi, 2007). How the role of the endorsed NNP could improve the current service included not only the area of discharge planning but also the utilisation of evidence based practice, clinical support for all disciplines, inpatient management, patient education as well as other specific but not yet defined tasks and priorities for the NNP (Scanlon & Fabinyi, 2007).

Expectations of junior medical staff are multiple commitments of service to the hospital including inpatient care, outpatient processes and their own educational needs.

At times, devotion to one comes at the expense of another, particularly in neurosurgery, where there are multiple priorities of numerous preadmission clinics as well as emergency transfers, ongoing patient management and discharge planning and paperwork. This cohort of staff have a relatively fast turn over (10 weeks) during which time they are expected to not only learn the service intimately but also gain valuable experience (theatre as well as supported in clinics) for their current educational requirements and their future career. It is also a requirement for hospitals to be able to provide at least one elective theatre session per week for basic surgical trainees (The Royal Australasian College of Surgeons and The Specialist Surgical Associations and Societies of Australia and New Zealand, 2005). This can be very difficult to accommodate at times. Currently the model suggested to overcome this strain is one of shared responsibility where the NNP provides support to the junior medical officer (technically in the performance of skills and by substitution of their role in some aspects) to assist them in obtaining a balance (Murphy, 2007). To realise the full potential of the NNP however requires full authorisation by the hospital as well as the Nurses Board of Victoria, as explained later in this article.

Medical Emergency Team (MET) call data has shown an overall increase in utilisation of this service by ward staff (Resuscitation Committee, 2007b). On the neurosurgical service recent data indicates that the majority of MET calls occurred within business hours and that the patients remained on the ward after the call (Resuscitation Committee, 2007a). This indicated that further input to patient care and treatment was required rather than admission to, or intervention from the Intensive Care Unit. Anecdotal evidence from senior nursing staff suggested that these MET calls were made due to lack of availability of appropriate medical staff. Once fully endorsed the availability of a NNP could lessen the reliance on MET calls for ongoing patient care needs by providing ready access to an appropriate clinician (NNP or junior medical staff).

By August 2007 the role of NNP in neurosurgery was approved by the hospital to continue at 4 days a week. This allowed for the formal development of Clinical Practice Guidelines to define how the NNP or NNPc would define their practice.

Clinical Practice Guidelines

To facilitate the clinical scope of practice, Clinical Practice Guidelines (CPG) for neurosurgical patients were required to define the practice of the NNP and NNPc, where it is dependent on the following extensions to practice:

- Writing medicate certificates
- Admission and discharge from hospital
- Referral
- Ordering of diagnostic tests

And for (endorsed) NNP only

- Prescribing

The NNP and NNPc scope of practice is defined by the Clinical Practice Guidelines, which describe how the extensions of practice will be performed. Originally totalling 13 guidelines they were later condensed into two areas:

- Neurosurgical Inpatient management
- Neurosurgical outpatient management

Once the CPGs are authorised by the hospital an NNPc can perform all extensions of practice authorized by the hospital except prescribing from a limited formulary.

Prescribing

To prescribe from a limited medication formulary requires the authorisation of Clinical Practice Guidelines and the approval of the Drugs & Therapeutics Committee at Austin Health, as well as the Nurses Board of Victoria. Only when these three authorizations are obtained can an NNPc proceed to be known as a NP.

There are three pathways (all of which still require an Expert Panel interview) towards full endorsement and thus prescribing rights. Pathway 1 requires successful completion of an approved Master of Nurse Practitioner degree, which is full fee paying for the student and can cost the individual up to $18, 000. Pathway 3 is one of Mutual Recognition where if the NP has been practicing in that role in another state or in New Zealand they are formally recognised by the Nurses Board of Victoria (NBV).

However these pathways were not available to the Austin candidate and thus the application will proceed under pathway 2 which requires meeting all the criteria within

Table 1 as well as two meetings (Nurses Board of Victoria, 2006).

The first meeting is with the Nurse Practitioner Advisory Committee Preliminary Interview Panel during which time the application is reviewed and is allowed to proceed to the next meeting if the panel deems them worthy. The second interview is with the full Nurse Practitioner Advisory Committee, which is an Expert Interview Panel which, in this case, will comprise of a Neurosurgeon, Neurosurgery Nurse Practitioner or Clinical Nurse Consultant if no NNP is available, a clinical pharmacologist and a representative from the Nurses Board of Victoria. During this interview, the panel is presented with a number of case studies demonstrating the extensions of practice and knowledge of the applicant. If the panel then deems the applicant worthy the recommendation for prescribing rights is forwarded to the Victorian Minster for Health and the Department of Human Service for ratification.

In May 2008 despite being put forward by the preliminary panel and requiring two (not just one) Expert Panel interviews and a lot of hard work, the NNPc at Austin Health was unsuccessful in obtaining full endorsement for NP. It was a recommendation of the Expert Panel that further consolidation of practice would be required before the candidate resubmitted in one year's time.

Although a personally devastating result, the NNPc had already made plans for further development both clinically and academically through the enrolment in Columbia University's (New York) School of Nursing's Doctor of Nursing Practice (DNP) program. This intensive Doctorate level program recognises the complexity of current and future patient care delivered by NPs and the standard of care that we as a discipline expect of ourselves (American Association of Colleges of Nursing, 2006). The expertise gained from this program and the clinical experience will then be implemented in the Australian context to further advance NP models here.

Conclusion

It has been a long, sometimes frustrating ongoing process to pursue the title of NP. Each day presents new barriers and issues, which are sometimes beyond one's control requiring patience and diplomacy. However, despite this initial failure to achieve NP status, it is the opinion of the author that the role is worth fighting for and he will do that for as long as it takes. As in the long run any gains made now would not only assist the current NNPc but also those who in the future will be involved in developing similar roles, whether in neurosurgery or other related neuroscience specialties such as stroke or epilepsy.

In part two, the author will explore his unique experience in the DNP program at Columbia University, its academic and clinical rigor and hopefully the ultimate career goal of NP status.

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"SPIN & SPEW"

Vertigo and the role of the NeuroOtology Nurse

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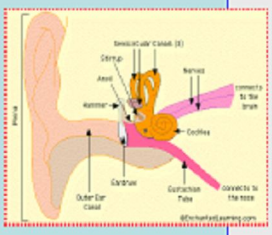
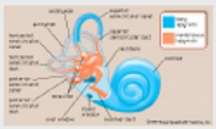
CNC Neurosciences - Area SSWAHS Eastern Zone



In the NeuroOtology, Hearing and Balance Clinic RPAH, there are 3 main conditions seen causing vertigo:

1. Meniere's Disease - also called endolymphatic hydrops, is a disorder of the inner ear associated with change in the volume of fluid inside a portion of the inner ear called the Attacks can last minutes to hours. The underlying cause of Meniere's Disease is still unknown.



Symptoms of Meniere's Disease include: dizziness, nausea and/or vomiting, unsteadiness, a sense of fullness (blocked) in one ear, ringing (tinnitus) in one ear, hearing loss or fluctuating hearing loss in one ear as well as some abdominal discomfort.

Treatment of Meniere's Disease: strictly eliminating salt (sodium) from the diet, alcohol and coffee, sometimes medications, such asdiuretics, are given to reduce the fluid build-up in the labyrinth, intra-tympanic Gentamicin and surgery.

2. Benign Paroxysmal Positioning Vertigo (BPPV) – is the most common cause of intermittent bouts of vertigo. The inner ear consists of 3 semicircular canals that contribute to a sense of balance. Particles in the inner ear can break off and accumulate in one of the semicircular canals, most commonly the posterior canal. Therefore, when moving or positioning your head in certain directions, this may cause the particles to rub against the hair-like sensors in your canals, triggering a dizzy attack (spinning). The attacks can last seconds to minutes.

3. Symptoms of BPPV: are brought on by typical head movements, usually looking upwards, bending over or rolling over in bed to one particular side, and for this reason, it is frequently first noticed at night getting into bed or when getting up from bed in the mornings.

Treatment of BPPV: a non-invasive positioning procedure called a Particle Repositioning Manoeuvre (PRM), is performed to clear the crystals out of the canal and deposit them back into the part of the inner ear where they belong.

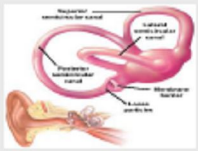
3. Migraine Headaches - is a form of a vascular headache, usually very intense and disabling, lasting hours to days. The headache can be on one side of the head only or on both sides.

These headaches may be accompanied by one or more of the following symptoms: nausea, vomiting, increased sensitivity of the eyes to light (photophobia), increased sensitivity to sound (phonophobia), dizziness, blurred vision, cognitive disturbances, numbness on one side of face or bo and/or pins and needles down one side of face or migraines do not include headache and are more women than in men due to hormonal changes.

Trigger Factors: specific foods (cheese, chocolate, alcohol, tea, coffee), lack of food, changes in sleep pattern, hormonal changes in women, menstruation, pregnancy, stress, travelling, bright and flickering lights and weather changes.

NeuroOtology:

Role of the Vestibular Nurse:

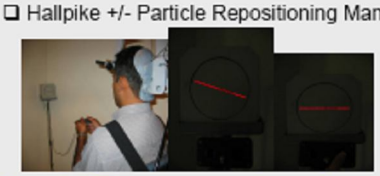


- ❑ History assessment.
- ❑ Perform a Clinical Examination.
- ❑ Perform Clinical Testing:
  - ➢ **SVH (BIAS)** → test of utricular function.
  - ➢ **Rotation test** →mid-high frequency responses of lateral canal.
  - ➢ **VEMP** → test of saccular function.
  - ➢ **Caloric test** → unilateral low frequency responses of the lateral canal.
  - ➢ **Head impulse testing** →high frequency responses.
  - ➢ **Pure Tone audiograms**.
- ❑ Diagnostic assistance of acute patients (assessments & testing).
- ❑ Data Interpretation.
- ❑ Treatment and Education.

Clinical Testing:

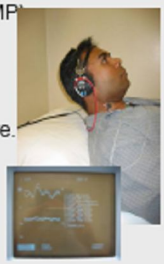
Level 1 Testing consists of:

- ❑ Takes 1 hour.
- ❑ History taking and full vestibular examination.
- ❑ Spontaneous Nystagmus Recording.
- ❑ Electro Nystagmagram (ENG) Caloric Testing.
- ❑ Hallpike +/- Particle Repositioning Manoeuvre.



Level 2 Testing consists of:

- ❑ Takes 2 hours.
- ❑ Vestibular Function Testing (Rotation Chair).
- ❑ BIAS.
- ❑ Vestibular Evoked Myogenic Potential (VEMP)
- ❑ Also includes a Level 1 history, vestibular examination and Spontaneous, ENG and Caloric testing.
- ❑ Hallpike +/- Particle repositioning Manoeuvre.



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October 2007

Abstracts from the 2007 Scientific Meeting

The abstracts for the 2007 Scientific Meeting are presented below. They provide you with a snapshot of the research and practice that neuroscience nurses are engaged in, as well as case study presentations.

The abstracts for most of the papers and posters presented in this edition can be found here.

"It is Like Living with a Stranger!" Addressing the Cognitive and Behavioural Sequelae of Adults with Brain Tumour

Kylie Wright*, Dr Grahame Simpson, Rochelle Firth, Teresa Simpson
*Liverpool Health Service, NSW

Quality of life for people with brain tumours (BT) and their families can be significantly reduced as a result of the cognitive and behavioural impairments arising as a result of the tumour. Research has suggested that such sequelae are more disabling than physical or speech impairments 1. Clinical experience from BT support groups in Sydney, New South Wales suggest that people with a BT and their family members find these impairments deeply distressing but minimal assistance is available.

Specifically,

(i) there is limited data on the prevalence of such sequelae, particularly behavioural impairments

(ii) there are few reports on approaches to the treatment of such sequelae after BT

(iii) existing information resources provide little guidance on strategies for managing such impairments, and

(iv) many staff in neuro-oncology and neurosurgical services have limited knowledge or skills to assist people with BT and their families to minimise the impact of such impairments on their daily lives, community participation and quality of life.

In comparison, substantial research and knowledge exists on the management of these impairments within service systems treating people with other forms of brain impairment, namely traumatic brain injury (TBI).

This presentation will expands upon the above issues and presents a four-phase neuro-oncology pilot project currently being conducted in parallel with a Brain Injury Rehabilitation initiated state-wide prevalence study of challenging behaviours among people with TBI. The rationale for the project will be illustrated through case studies, and the 'Behaviour Consultancy Model' used to address cognitive and behavioural impairments will be explored.

1. Bell, K. R., O'Dell, M. W., Barr, K., & Yablon, S. A. (1998). Rehabilitation of the patient with brain tumour. *Archives of Physical Medicine and Rehabilitation*, 79 Suppl 1, S37 - S46.

Luke's Story – Maintaining Optimism Living with Acute Demyelinating Encephalopathy

Kristina Cassels-Brown
Auckland City Hospital, NZ

This study used a phenomenological approach uncovering the lived experience of a man with acute demyelinating encephalomyeopathy undergoing treatment in a New Zealand hospital this year. Luke (name changed for confidentiality) described his feelings during the acute phase and this is followed by his rehabilitation journey up to the present.

Additionally the story of his care by those close to him at that time is woven into his account so that an impression of the work of those close to him at the time is valued. Included are the experiences of those closest to him during the acute phase. These people include his wife, his dog, his doctors, nurses, physiotherapists, occupational therapist and social worker.

It is a story which uncovers the deep feelings and emotions of those involved in an illness which strips a human of their independence and leaves them in a place where the future can be viewed as bleak beyond belief.

Helmet… Which Helmet?

Katrina Mastello
Westmead Hospital, NSW

Large cranial defects result from decompressive craniectomy performed for refractory intracranial hypertension for head trauma and spontaneous haemorrhages. While recommendations and practice commonly treat skull defects 3 months after the craniectomy with a cranioplasty there may be delays of up to 6 months for limited patient groups. This poses unique challenges for nursing staff and family who provide care and therapy during an acute admission, prior to discharge home or to rehabilitation for a patient with a large skull defect.

The purpose of this presentation is to explore the use of commercial helmets in the acute care setting and discuss the experiences using these helmets within one service.

A Review of the Care Needs of Older Stroke Patients in the Acute Care Setting: Implications for Neuroscience Nurses

Linda Baker*, Prof Anne Gardner, A/Prof Maxine Duke
*Cabrini-Deakin Centre for Nursing Research, Victoria

Background

Victorian Government policy, Australian Government strategy and the National Research Priority detail the need for research to improve care in older people. For older Australians stroke is one of the most common reasons for hospital admission. Numerous studies have identified that older people now constitute the core business in acute hospitals and that the risk and incidence of stroke increase with age. Further, almost all stroke patients are disabled immediately after the stroke, incur the major burden of care in the acute stage, and are most dependent with their highest care needs in the acute care setting.

Aim

To review the literature with regard to the care needs of older stroke patients in the acute care setting.

Findings

Although several studies have examined the care needs of older patients in hospital, further work is required to examine the older patient's perceptions of their needs. In terms of stroke, research has examined the management of stroke in the months after diagnosis from both the stroke survivor and healthcare professionals' perspective. However, healthcare professionals know little about how patients manage recovery after a stroke in the acute care setting. Communication breakdown and discrepancies between healthcare professionals and stroke survivors' expectations of treatment also confound the issue of care provision to this group. Further analytic attention is required to ascertain how healthcare professionals can best meet the needs of older stroke patients in the acute setting. Implications for neuroscience nurses will be presented.

Conclusion

This review indicates a gap in the research with regard to the care needs of older stroke patients in the acute care setting.

Effective Nursing Management of Deep Brain Stimulation for Patients with Movement Disorders

Melissa Bartley*, Sharen Rogers*, Sharon Woodland
Westmead Hospital, NSW

Deep brain stimulation (DBS) is the application of electrical stimulation to a specific area of the brain, which is causing abnormal movements. DBS is a procedure that has been successfully performed for symptom management of specific movement disorders for the past fifteen years throughout the world. Taking this into consideration DBS is still relatively new and rarely performed in the NSW public health sector. The 30,000-60,000 dollar price tag is a large determination factoring in it's availability to patients with movement disorders. In the past St Vincent's Private and Royal North Shore Private hospitals have performed DBS, However recently Westmead hospital received funding for four public patients's to undergo DBS surgery.

Literature searches reveal Parkinson's disease as the foremost identifier with DBS. The majority of patients who received the DBS surgery at Westmead were patients with Parkinson's disease. With the introduction of DBS, nursing staff were required to undertake specialised education which would enable effective management of patient with a movement disorder undergoing DBS.

DBS is widely used for the treatment of symptoms of Parkinson's disease, but it is also used in the treatment of other movement disorders such as dystonia and essential tremor. One of the most publicised Australian cases using DBS for treatment of dystonia was that of Luke Wilmot, publicised by the Sydney Morning Herald and later appearing on the ABC television show Catalyst where alternate and effective use of DBS was demonstrated. Current research is looking at DBS for treatment of depression and hypertension as well as movement disorders.

Dystonia is a debilitating neurological condition that not only affects an individual but also carers, family and friends. Dystonia is a movement disorder characterised by muscle contractions, which can often oppose each other causing twisting and repetitive movements or abnormal postures. Dystonia is often misunderstood and misdiagnosed which can lead to inadequate treatment. This presentation will provide

a holistic view that demonstrates the uses of DBS for a 20 year old man suffering from severe generalised dystonia and his journey through Westmead neuroscience unit after under going DBS surgery.

A Coordinated Approach to Tracheostomy Care

Violeta Sutherland
SSWAHS, NSW

An Interdisciplinary Trache Team (ITRACT) comprising of Clinical Nurse Consultants (CNCs) from Intensive Care Unit (ICU) and Neurosciences, Speech Pathologists from ICU, Neurosciences and Respiratory/Cardiovascular and Physiotherapists from ICU, Respiratory and Cardiovascular was set up in January 2005 with a variety of aims, in response to the realisation that patients with a tracheostomy require a multidisciplinary approach to achieve effective care.

This presentation advocates that a team approach to tracheostomy care achieves:

1. Earlier weaning;
2. Reduced incidences of complications;
3. More focused tracheostomy training for Nursing and Allied Health Staff, and
4. More consistent tracheostomy management.

Since 2005 our group has expanded with the inclusion of an Intensive Care Specialist. Further, the group in discussions with other hospitals has identified a growing trend towards the establishment of similar multidisciplinary teams to manage tracheostomy care. This further supports the assertion that patients benefit from an integrated and focused approach to their care.

Negotiating Care with the Fragility of a Sick Brain: A Case Study Exploring Nursing Care of a Person with Severe Traumatic Brain Injury

Suzy Ladanyi*, Doug Elliott
University of Technology Sydney, NSW

In Australia approximately 66 000 people are hospitalised with traumatic brain injury (TBI) annually. Following extreme blunt trauma, the severely injured brain behaves in a way that is challenging and often confronting to members of the healthcare team. Precise clinical decision-making, rapid and aggressive interventions and intensive care in the initial stages of management are of paramount importance to an injured person's prognosis and recovery. During the acute phase, all physiological systems require support that is delicately balanced and focused on the needs of a sick brain. Carefully orchestrated nursing care based on comprehensive knowledge and sound understanding allows clinicians to best facilitate optimal outcomes during the continuum of care.

Case studies are an effective learning tool facilitating understanding through conceptual visualisation and application of theory. A case study approach is used to explore Peter's story, a young man who sustained severe TBI following a motor vehicle accident. The accident scene, pre-hospital care, primary and secondary surveys bring context to Peter's individualised case presentation and informed diagnosis. The subsequent negotiation and balancing of clinical parameters involved in preserving and maintaining cerebral function in the acute phase of care is explored. Peter's complex clinical challenges are described within the context of autoregulatory dysfunction, with the hypoperfusion, hyperaemic and vasospastic phases illustrated graphically. Clinical parameters and progress is tracked and superimposed over this knowledge, characterising the complex nature of severe TBI. Psycho-spiritual, socio-cultural and family considerations are blended throughout Peter's physiological nursing care.

NOGIN: The Neuro Oncology Information Network

Diane Lear, Emma Everingham
Westmead Hospital and Westmead Private Hospital, NSW

The diagnosis and prognosis of a brain tumour can be devastating and unpredictable to both the patient and their family members. The diagnosis and management of brain tumours as well as the psychosocial effects can have a major impact on the patient's quality of life.

Existing general cancer information and support groups do not cater for the specific needs that arise from the unique challenges associated with neurological conditions. 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. Hence the Westmead

Hospitals' brain tumour information and support group (NOGIN) was implemented in July 2006 with the aim to provide practical and emotional support to patients and their family members.

This presentation describes the process from the impetus of a brain tumour support group to the formal commencement of the group, including Neurosurgeon support, financial and administrative support, program design, raising awareness of the group, our achievements to date and plans for the future.

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.

Clinical Guidelines for Acute Stroke Management: Update of the Evidence and Revision of Recommendations

Elizabeth O'Brien*, B Warrick, Kelvin Hill, Sandy Middleton

* Royal North Shore hospital, NSW

Neuroscience nurses provide a central role in the specialist care of people with stroke. The Clinical Guidelines for Acute Stroke Management[1] are useful for neuroscience nurses in planning, directing and managing care in many varied settings. The multidisciplinary guidelines encompass the gamut of acute stroke and transient ischemic attack management ranging from pre-hospital care, acute management through to rehabilitation, discharge and community support.

These guidelines have recently been reviewed and updated. A consultation process is currently underway with the National Health and Medical Research Council to seek endorsement of the guidelines. There is clear evidence that stroke care needs a multidisciplinary team approach. Hence of the 148 recommendations in the updated guidelines, 83 (56%) have implications for nursing practice. Furthermore, nurses have a lead role in 31 (21%) of the 148 recommendations. An explanation of the levels of evidence and NHMRC ratings of recommendations will be presented to ensure neuroscience nurses are well placed to use this valuable resource. Accurate interpretation and implementation of recommendations will broaden the knowledge and skill base of the specialist Neuroscience Nurse.

Reference

1. National Stroke Foundation (2007). *Clinical Guidelines for Acute Stroke Management (2nd Edition)*, NSF.

Case Study: Identifying the multidisciplinary Management of a Sub-arachnoid Haemorrhage with Complex Sequelae

Erin Bensley, Michelle Seaton

Christchurch Public Hospital, NZ

This case study begins by exploring the initial presentation of the patient and her subsequent deterioration on admission to the emergency department. The medical and nursing management plan for the patient will be explored to include a brief overview of the endovascular treatment of the aneurysm, and the use of MgSo4 as an adjunct to nimodipine in the prevention of vasospasm. The secondary complications including; acute hydrocephalus necessitating an extra ventricular drain; prolonged coma and near coma state; and diabetes mellitus, will be addressed. Finally, a summary of the post-acute phase rehabilitation will be identified.

A Literature Review: Increasing Body Temperature in Neuropathologies

Samantha Clarke*, Bette-Anne Hine

Royal Brisbane and Women's Hospital, QLD

Nursing clinicians assigned to the care of neurosurgical patients are responsible for monitoring, assessing, reporting and intervening with elevations in body temperature. Clinicians should be aware of existing evidence to support an appropriate decision making process and rationale if a neurosurgical patient they are caring for has an increased body temperature.

The editorial and scientific literature was examined critically. Responses to high temperatures can be described as beneficial or detrimental to the patient; scientific evidence exists to support both arguments. In recent years a substantial

body of evidence has developed which indicates that increased body temperature adversely affects outcomes in ischaemic and/or haemorrhagic stroke. Some evidence exists in other brain pathologies.

'Spin and Spew'. Vertigo and the Role of the NeuroOtology Nurse

Marilia Pereira
Royal Prince Alfred Hospital, NSW

The aim of the NeuroOtology department based at Royal Prince Alfred Hospital (RPAH), Sydney is to categorize vestibular dysfunction into five different diagnostic categories; normal, unilateral peripheral vestibular lesion, bilateral peripheral vestibular lesions, central vestibular lesion or a combination of peripheral and central vestibular lesions.

The nurses in the NeuroOtology department, play a significant role in assessment, performing full vestibular examinations and clinical testing, commonly called "the spin and spew test" by the ward nurses. The role also includes diagnostic assessments and testing of acutely ill patients, data interpretation, treatment, education and research.

The most common cause of vertigo seen at the NeuroOtology department is a condition called benign paroxysmal positioning vertigo (BPPV). The treatment for BPPV involves a procedure called particle repositioning manoeuvre (PRM) or the Epley manoeuvre. For the majority of patients with BPPV, the nurses are the ones that perform the PRM for their treatment.

RPAH is the only unit in Australia who have Neurosciences Nurses assess, perform NeuroOtological testing and treat vestibular patients.

Multidisciplinary Brain Tumour Clinic – Princess Alexandra Hospital

Amanda Garrad, Prue Cervetto
Princess Alexandra Hospital, Qld

Management of brain tumours has evolved to be a multidisciplinary approach. Previously, our patients were managed separately through individual outpatient clinics of Neurosurgery, Radiation Oncology and/or Medical Oncology. There was no standardisation of follow-up of this vulnerable group of people with specific care needs. Our Department of Neurosurgery believes the best standard of care and service delivery can be achieved in a cooperative multidisciplinary clinic setting. Hence in April 2006, the Multidisciplinary Brain Tumour Clinic (MDBTC) was born. The fortnightly clinic provides a formal forum for discussion of people who have the presumed or actual diagnosis of a parenchymal brain tumour. The discussion involves radiological and neuropathological findings, treatment plans, and current research. The second part of the clinic is where the patient and their family are seen by all the specialities together, who are involved in their care.

This presentation outlines the journey of setting up the clinic, benefits for patients/families and nursing staff, barriers faced, highlights and achievements and future plans of this collaborative initiative.

The Knight Within: A Case Study about a Young Woman with Osteogenesis Imperfecta and Basilar Impression

Emma Everingham*, Davina Knight*
Westmead Private Hospital, NSW

Osteogenesis imperfecta (OI), also known as Brittle Bone Disease, is a rare genetic disorder affecting collagen type 1. This rare, connective tissue disorder can cause various complications, including bones to fracture from little or no trauma, scoliosis, unequal leg length, dentinogenesis imperfecta and rarely, brainstem compression by the odontoid process – basilar invagination. This presentation outlines the journey of a 26 year old registered nurse with type IV OI. With a history of more than 300 fractures and the various complications listed, a world first endoscopic transnasal approach for treatment of basilar impression will be described.

Presenting signs and symptoms, plus pre-operative workup, will be overviewed. A summary of the endoscopic transnasal resection of clivus, C1, C2 and posterior foramen magnum, followed by a cervical fusion, will be explained. Her progress during the two week admission for this first surgery and the recovery stages will be described and enhanced with use of radiographic images and photographs. A second admission,

four months later, will be outlined and includes surgery for a duraplasty and insertion of a ventriculo-peritoneal shunt. Subsequent admissions in recent months for various complications will also be explained.

In conclusion, the incredible life and internal strength of this young woman will be summarised in a thought provoking slide show of photographs selected by her and her family.

The Role of Parkinson's Disease Nurse Specialist in the UK and its Potential for Australia

Victor McConvey
Parkinson's Victoria, Vic

Parkinson's is the second most commonly occurring neurological condition in Australian communities, with 15 people being diagnosed each day. The illness tends to be highly individual in both its aetiology and treatment and is a condition associated with significant morbidity, and reduction in community access and quality of life of those who are affected.

Despite the relative prevalence people living with Parkinson's in Australia generally access heath and community care through generic services, often enduring lengthy waits. What specialist services that exist are small and invariably metropolitan based, significantly limiting access.

The condition has a similar incidence in the United Kingdom; however most people living there with Parkinson's Disease have the benefit of being supported by a Parkinson's disease Clinical Nurse Specialist. Currently there are over 400 Parkinson's Disease Nurse Specialist's in the United kingdom, with the Parkinson's Disease Society UK aiming to have over 600 Parkinson's Disease Nurse Specialist's by 2010. This specialism; that is either community health or hospital based has developed a unique model of care responsive to the needs of People Living With Parkinson's with in the communities that they are located with in.

In the UK this model has proven to be of significant benefit to People Living With Parkinson's and their families, increasing quality of life and improving care outcomes. And both the development of this role and its benefit will be illustrated through a case study.

Developing a role similar to that of the Parkinson's Disease Nurse Specialist in the United Kingdom potentially provides huge opportunities to increase well being, reduce avoidable hospital admissions and increase the quality of life of People Living with Parkinson's.

Residential Care and Huntingdon Disease: Evidence for Practice?

Angela Lownie*, Elizabeth E McClusker
Westmead Hospital, NSW

A shortage of suitable accommodation for those with moderate to advanced Huntington Disease (HD) has been documented by health professionals (Barczak et al. 1987, Skirton and Glendenning 1997, Nance & Saunders, 1996; Smith 1998; Lownie 2005, and McCusker and Lownie, 2007) as well as HD organizations.

This ethics approved study from the SWAHS HD Service, provides information on rates, type and length of institutionalisation of 122 (90%) deceased HD patients. Carer details, lifespan, cause and place of death, and relocation history were also sought.

A review of patient records (Jan 1996- June 2005) from the multidisciplinary HD service, Westmead Hospital, Sydney, included most HD patients in New South Wales. Missing data was obtained from previous hospital files, various involved professionals and patients' families.

122 people spent an average of 5.3 yrs in care, range, 0.02 - 20.5. Lifespan: mean 60.5, range 27-91 with shorter lived group (27 – 61yrs) spending 10% of life in care, longer lived only 7%. Of 122, 103 (84%) died in aged care; 12 (10%) in an acute hospital (general or psych) and 9 (7%) in the HD specialist unit. Inanition and gradual deterioration were most frequent cause of death, then pneumonia, sudden collapse (6) and head injury (5). One death followed complications from planned surgery. No death was due to choking. 10 (8%) had PEG feeding. (Of a total of 119, those with a carer (78, 66%) spent an average of 1 year (19% of total) less in permanent care than those with no prior residential carer.

Baseline data is essential for planned improvements for care for this vulnerable group. Problems leading to relocation (the "Cuckoo in the Nest") are mitigated by HD specialist assistance.

Neurosurgery Nurse Practitioner. The Long Hard Fought Road

Andrew Scanlon*, Cherie Cheshire*
Austin Health, Vic

In 2005, a comprehensive independent review of the neurosurgery services at Austin Health was conducted. Recommendations from this review included the expansion of the current service, building on core strengths, establishing others as well as the need for the implementation of the Neurosurgery Nurse Practitioner (NNP) role to assist in this expansion. The NNP role was envisaged to augment the current service through limited substitution or delegation of some traditional medical roles, thus, allowing for better utilisation of clinician time, increasing throughput, providing for consistency and quality of care and as a result facilitating the expansion of the service.

This presentation will outline how a (Victorian) Nurse Practitioner is different from other senior nursing roles, the process of establishing the NNP role, key areas for the NNP service, as well as future directions for the role the at Austin Health.

The Role of Parkinson's Clinical Nurse Consultant in the Community

Mary Jones
Peter James Centre, Vic

Parkinson's is a complex, progressive neurological condition affecting approximately 70,000 Australians. The incidence increases over the age of 70 but 15% of people are diagnosed before they are 50 years of age. 25 new cases are diagnosed every day and of those 4 will be under 50. Parkinson's is best managed by a multidisciplinary team because of its multifaceted nature.

In Europe and the United Kingdom there is an extensive network of nurses working in community settings with Neurologists and other health professionals to assist people living with Parkinson's. Studies show that people with early access to a Nurse have long term benefits in the progression and management of their disease.

Peter James Centre a member of Eastern Health in Melbourne conducts a multidisciplinary Movement Disorders Program for people with Parkinsonism.

In 1995 a Parkinson's Clinical Nurse Consultant was appointed to work independently to see people who did not currently need full multidisciplinary care particularly those who were newly diagnosed or receiving advanced medical treatment. People from throughout Victoria have accessed the service, many referred by the Neurologist. In the past 12 months 97 new patients have been seen and 361 review appointments have been conducted. With telephone consultations and research studies included over 800 occasions of service have been recorded.

This paper addresses the benefits to patients and families and the health service of a Parkinson's Clinical Nurse Consultant working in the community to ensure safe functional independence for a person with Parkinson's.

Poliomyelitis? In Australia?

Elizabeth Mackay, Maria Sakkas
Box Hill Hospital, Vic

In June 2007 a 22 year old student presented to Box Hill Hospital Emergency Department with fever, myalgia, nausea, vomiting, diarrhoea and lower limb weakness. The patient had very recently arrived in Australia from northern Pakistan, one of the few remaining areas in the world in which poliovirus remains endemic. An initial diagnosis of myelitis and query poliomyelitis was made, and the patient was placed in isolation whilst awaiting results of pathology and radiology.

On confirmation of the poliomyelitis diagnosis, there was great excitement within the hospital and very quickly within the wider community. The Department of Human Services (Health Department) issued urgent calls via the national media in which fellow airline

passengers were advised to seek medical advice. Flat-mates of the patient were isolated, and a large immunization campaign was undertaken within the hospital community for all exposed to the patient. This case study will give an insight into the thought processes behind the making of the initial diagnosis, whilst awaiting radiology and pathology results, and the subsequent care of this patient and the wider community once the diagnosis was confirmed. This case study will investigate the course of this patient's poliomyelitis, discussing the affect of the polio viruses on the motor neurons of the brain and spinal cord. It will also review the current incidence and prevalence of polioviruses worldwide, following almost world-wide immunisation campaigns to eradicate the disease.

POSTER ABSTRACTS

The RPAH – Epilepsy Service

Violeta Sutherland, Marilia Pereira
Royal Prince Alfred Hospital, NSW

Our poster will present the unique Epilepsy Service that is offered at Royal Prince Alfred Hospital (RPAH), Sydney, Australia.

In NSW there are about 60,000 people with epilepsy, 60% of these people have what is known as partial seizures. The majority of these seizures originate in the temporal lobes and about 20% of these patients cannot be adequately controlled by medication.

Patients with medically intractable seizures may obtain substantial benefit or total cure as a result of surgery. Although there are a large number of potential surgical candidates, there are only a few centres in Australia with the necessary specialised EEG procedures. The Department of Neurophysiology at RPAH has extensive experience with long term EEG video monitoring and has developed a programme for the comprehensive evaluation of patients who may be suitable for surgery.

Nurses working in the Neurophysiology Department are unique and provide not only the ability to carry out technical testing but offer a holistic approach to individual patient needs.

Stroke Units Emerging from Beneath the Haze!

Alison Wilson, Violeta Sutherland
Concord Hospital, NSW

This poster showcases current and future stroke services at Concord Hospital.

Concord Hospital began operating as a dedicated Stroke Unit in 1996. The process of establishing the unit was coordinated by A/Prof Corbett, Head of the Neurology Department & Area Director of Stroke Services. It was one of the first stroke units established in NSW.

Randomized, controlled trials have shown that geographically co-locating stroke patients in monitored beds with a dedicated multidisciplinary team improves patient outcomes compared with conventional care. Our team consists of stroke neurologists, Stroke Case Manager, Neurosciences CNC, experienced neurology nursing staff, physiotherapist occupational therapist, speech pathologist, social work, die titian, pharmacist, clinical psychologist, Neurophysiologist, Geriatricians and rehabilitation specialists.

Dramatic changes have occurred in stroke management in NSW over the past 5 years. With the introduction of Greater Metropolitan Clinical Taskforce (now known as Stroke Services NSW), funding for a Stoke Case Manager position and capital equipment was initiated. Clinical management has expanded with the licensing of thrombolytic therapy to achieve better neurological recovery and less disability. Concord Stroke unit implemented thrombolytic therapy in 2004 in line with evidence based practice.

Deep Brain Stimulation for Parkinson's Disease, Essential Tremor and Dystonia – a Functional, Interchangeable and Progressive Education Tool for Patients and Staff

Karen Morrison, Lyndsey Jones
North Shore Private Hospital, NSW

Deep Brain Stimulation (DBS) is currently used as a therapeutic tool in treating Parkinson's disease (PD), essential tremor (ET) and dystonia at North Shore Private Hospital.

Three principle DBS targets are used, the sub thalamic nucleus (STN), globus pallidus intermus (GPI) and ventral intermediate nucleus of the thalamus (VIN). .Process of suitability for surgery includes an extensive patient workup, assessment of L- dopa responsiveness, MRI screening, check for significant co – morbidity, motor assessment, cognitive and psychiatric tests.

The objective for this poster is two-fold
1.Patient Education; We acknowledge that the patient is well informed regarding their disease process so the poster is modified to focus on the admission process, surgical procedure, post operative care illustrating their involvement and expected outcomes thereafter. The aim is to keep the patient well informed, minimize anxieties and enhance the importance of their co-operation throughout the process to maximize the expected outcome of their surgery.
2. Staff Education; The same poster will conform to staff's requirements, focusing more on the disease process, criteria for DBS, surgical procedure, post operative care, side effects of surgery and ongoing statistics showing effectiveness of surgery in terms of reduction of symptoms of the disease and side effects of medications.

Signs / prompts are fixed to the poster and used in combination with a power point presentation. Being a mobile educational unit it will allow for easy travel in and out of patients / seminar rooms.

<u>Objectives</u>
To ensure the patient is kept well informed regarding the process from admission to discharge, ensuring their co-operation throughout, to allay any anxieties and to achieve their expectations.
To provide ongoing education for the staff, as techniques may vary and statistics changes the poster be adjusted accordingly.

Huntington Disease: Outcomes in Advanced Disease

Angela Lownie, Dr Elizabeth McClusker
Westmead Hospital, NSW

Objective: Review outcomes in advanced Huntington Disease (HD) patients; service uptake, institutionalization and death.

Background: HD has a prolonged course of up to 17 years, often longer. Death is usually in an institution when hospital based clinic follow up may be impractical. There is a need for more information about the service requirements for the advanced stages to allow improved chronic and palliative care.

Design/Methods: Review of confidential data base and service records 1996-2005 for patients known to the comprehensive multidisciplinary HD service based at Westmead Hospital in Sydney that allows contact with and follow up for most patients in NSW. Demographic data, outcomes of service uptake, institutionalisation, place and cause of death were analysed.

Results: Results: 450 HD patients were followed over 10 years.150 died, most in an institution. Mean life span was 59 years (range 25-90). Fifty were aged over 65 years. 128 resided in institutions. The HD inpatient unit provided care to only 14%, most care was provided in aged care facilities. Those in the community used services from 172 sources. Cause of death was known in 98. Inanition and gradual deterioration were most frequent (49 deaths). Pneumonia accounted for 23 deaths. Head injury was the cause in 8. No death was due to choking. There was a low rate of 4 suicides.

Conclusions/Relevance: This review captures a profile of advanced HD, service provision, institutionalization and death. The need for HD specific follow up in the often prolonged advanced stages is highlighted. The low suicide rate of 1%

may be attributable to the close monitoring of this group in the HD clinic as well as within the community.

Neurosurgery Nursing @ Austin Health. Experience, Support and Opportunity

Andrew Scanlon, Cherie Cheshire, Wendy Steele, Melissa Driscoll
Austin Health, Vic

The purpose of the poster is to highlight;
Experience amongst Austin Neurosurgery Nursing staff, as well as the neurosurgical conditions and procedures Austin Neurosurgery is renowned for.

Support provided by Clinical Support Nurse and Clinical Nurse Teachers as well as Nurse Practitioner.

Opportunity in regards to educational courses run by the Neuroscience Unit, as well as affiliated with University and career pathways available at the Austin.
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BOOK REVIEW

The Legacy of Harvey Cushing: Profiles of patient care

Cohen-Gadol AA & Spencer DD (Eds) 2007
Thieme Medical Publishers Inc., New York

Harvey Cushing, whose work laid the foundations for the development of modern neurosurgery kept meticulous records of his work and the patients he treated. Included in this was a Brain Tumour Registry of more than 2200 cases dating from 1887, including specimens, microscopic slides, notes and negatives of photographs.

In this book is a record of patients Cushing saw between 1905 and 1930, encompassing an impressive 800 images. The book contains photographs, slides and drawings illustrating each case and these had been stored in the library at Yale University, Massachusetts, U.S.A. for many decades.

Cushing's case notes describe the preoperative and postoperative presentation of each patient and the authors have enhanced them by the use of the illustrations for each case. The first three chapters of the book cover brain tumours, chapters 5 and 6 spinal and posterior fossa tumours. Chapter 4 presents cases of cerebral aneurysms and arteriovenous malformations. Chapter 6 also contains presentation of cases of other assorted pathologies including tumours of cranial and peripheral nerves, torticollis, and hydrocephalus.

The final section of the book contains photographs of Cushing in the operating room and other clinical areas, teaching slides and other sketches of operative procedures. This book is a fascinating glimpse into the early days of the development of neurosurgery. Many of the patients presented with diagnoses that are common today. However the reader will also find descriptions of cases that would not be seen in Australia or other countries with well financed health systems and modern diagnostic tools and technology today.

For those who have worked in centres before the advent of much of the technology that is taken for granted today, or where patients presented from other areas of the world the records, photographs and descriptions are a reminder of how things were. It is also a reminder of the brilliance of many past surgeons whose correct diagnoses were governed by meticulous assessment and their accumulation of knowledge and experience, and those many patients who 'did well' despite the lack of modern technology.

This book is the ideal gift for those with a historical interest in the development of neurosurgery or aspiring to work in the area, or as a reference book.

This book is available from Elsevier, Australia

TURN A POSTER INTO A PAPER

There are three ways that a poster presentation can be published or turned into a paper

1. A poster may stand alone and be in a format, such as PowerPoint so it is able to be resized to fit into the journal format. However this may mean loss of the clarity of some, or all, illustrations, and This approach is used if the poster has many illustrations or complex illustrations that are unable to be copied easily or if the content of the poster would be too small to be read if resized.

2. To maintain the integrity of a poster it is better if the content of the poster is reformatted and presented in the form of a report, especially if it is a poster of a research project. (See example of the paper based on a research report by Karen Tuqiri, and Sharon Eriksson on page 9 of this edition)

3. The content of a poster may be rewritten as a paper by the author/s. This allows inclusion of information that may not have been able to be fully included or expanded on due to the poster format, or that may have been provided a san extra information sheet with the poster. Thus providing the reader with the answers to any questions that they may have from the poster.

f you are interested in pursuing any of the above three options then the editor can provide assistance.

Contact the editor on: editor@anna.asn.au

RECENT PUBLICATIONS

Behan, L.A., Ostwald, S., Davis, S., Hersch, G., Kelley, C., Godwin,K.M. (2008) Evidence-based educational guidelines for stroke survivors after discharge home, *Neuroscience Nursing*, Vol.40, No.3: 173-179, 191.

Behan, L.A., Phillips, J., Thompson, CJ, Agha, A. (2008) Neuroendocrine disorders after traumatic brain injury, *Journal Neurology, Neurosurgery, Psychiatry*, Vol.79: 753-759.

Ross, A., Hackbarth, N., Rohl, C.,Whitmyre, K., (2008) Effective Multiple Sclerosis management through improved patient assessment, *Journal of Neuroscience Nursing*, Vol.40, No.3:150-157.

Stuifbergen, A.K. 92008) The influence of positive experiences on depression and quality of life in persons with multiple sclerosis, *Journal Holistic Nursing*, Vol.26:41-46.

Williams Z, Chan R., Kelly, E. (2008) A simple device to increase rates of compliance in maintaining 30-degree head-of-bed elevation in ventilated patients, *Critical Care Medicine*, Vol.36, No.4:1155-1157.

Wongvatunya, S., & Porter, EJ. (2008) Helping young adult children with traumatic brain injury: The life-world of mothers, *Qualitative Health Research*, Vol.18, No.8:1062-1074.

Wright. (2008) Non-narcotic options for pain relief with chronic neuropathic conditions, *Journal for Nurse Practitioners*, Vol.4, No. 4: 263-270.

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