Ischemic Stroke Management

Neuroscience Nurses as Primary Stroke Responders

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Introduction: Rapid response nurses from the hospital stroke unit have proven over seven years to provide accurate assessment of the entering acute stroke patient. In addition, these stroke response nurses have collaborated successfully with neurologists and emergency physicians in the decision-making process for the treatment of the acute stroke patient.

Hypothesis: Nurses experienced in neurological assessment can provide rapid identification of acute stroke and mobilize the acute stroke team. Method: The use of nurses as stroke responders has been with the completion of the IPA trial and was initially begun by research nurses who were expert in application of the NIH Stroke Scale. Neuroscience nurses who were well respected for their expertise were trained in the use of the NIH Stroke Scale. Their passion in the care of the stroke patient and their interpersonal skills aided them in this assertive role. Physician respect and comfort with nurses in this role grew from the IPA trial as the program expanded to include response to all stroke patients presenting to the Emergency Department. A senior neuroscience nurse trained the staff in the application of the NIH Stroke Scale and worked to institutionalize the certification and recertification process. In addition, these nurses are then bridges across the continuum of care for the stroke patients.

Results: This nursing model of stroke response has been active for seven years in our 633-bed hospital with nurses responding to all acute stroke patients in the Emergency Department and within the hospital. This nursing model has been adopted by two other hospitals, with 339 and 222 beds, within our health system. This has been done with variations tailored to these institutions.

Conclusions: This nursing model is one approach to the enhancement of the rapid response team. Various components and variations to this original model can be adapted at other institutions.

Successful Delivery of Thrombolytic Therapy Using a Nurse-Initiated and Coordinated “Code Stroke” System

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Background and Aim: To reduce the burden of stroke, thrombolytic rates need to be maximised. In March 2003, Box Hill Hospital (BH) implemented a nurse initiated and coordinated “Code Stroke” screening process for potential thrombolytic candidates. Trigga nurses activate a “Code Stroke” for paramedic stroke pre-notification and other suspected acute stroke patients. The Acute Stroke Nurse (ASN) responds and coordinates the required screening and diagnosis. The ASN is National Institutes of Health Stroke Scale (NIHSS) and modified-Rankin scale (mRS) accredited. The aim of this study is to assess the effectiveness of this process.

Methods: Prospective audit of stroke patients admitted to Box Hill Hospital from March 2003 to Mid-August 2005. Results: Over the 29-month period, “Code Stroke” was activated 322 times. Of these, 66 of 69 (98%) eligible patients received thrombolytic therapy (14% ischaemic strokes in the last year). Two eligible patients, with no “Code Stroke” activation, were excluded due to lengthy inhospital delays and one eligible patient refused.

Results of this process included: 66 of 69 (96%) eligible patients received thrombolytic therapy and 60 were un-ruptured saccular aneurysm, nine fusiform aneurysm and one posttraumatic aneurysm. Angiographic total or subtotal occlusion rate was achieved in 76% of cases and in 96% at last follow-up. Aneurysm recanalization was observed in 14% mean follow up of 12 months, and 18% of aneurysm were retreated. Clinically revelent complications occurred in 6.0% resulting in procedure related morbidity of 0.6% and 0.6% mortality at 6 months. No aneurysm bleeds over a cumulative 1,347 months of observation. Given the most recent advances in neuro-interventional device design, most intracranial aneurysm, including challenging lesions can be efficiently and safely treated by an endovascular approach. The morbidity and mortality remain low given the sophisticated and complex procedures. Our success in achieving complete occlusion and minimizing recanalization was high, even with very complex lesions. Further progress is needed to achieve higher complete and persistent aneurysm occlusion rates.

Best Practices/Stroke Program Development

The Role of an Acute Stroke Nurse Practitioner: Practice Outcomes

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Background: We recognized an increasing demand for acute stroke providers and a shortage of stroke specialists available to meet patient demands. As one creative solution, we developed and implemented the role of the Brain Attack Team (BAT) NP in 1996. A nurse practitioner (NP) is master’s prepared and board certified to assess and treat patients with a variety of medical conditions. After rigorous specialty training, BAT NPs provide direct and independent care to acute stroke patients. Treatment by the NP stroke specialist has been well received by patients and hospital staff. We wished to investigate patient outcomes specific to this role.

Methods: We conducted a retrospective review of our prospectively maintained database for patients seen by BAT NPs between October 1996 and December 2004. Specifically, we captured data related to the baseline stroke severity, time to treatment, rates of intracranial hemorrhage, and 3 month outcomes. Results were compared between the BAT NPs and the cerebrovascular fellows during a two year period.

Results: 3 NPs and one stroke fellow practiced with the BAT between July 2000 and Dec 2002. The NPs evaluated 158 patients compared with the 161 evaluated by the stroke fellow. Mean baseline NIHSS of patients evaluated by the NPs and stroke fellow were 14.4 and 11.8 respectively. 161/165 (10.1%) patients received IV tPA by a NP and 23/161 (14.3%) by the stroke fellow. “Door to needle times” averaged 51.9 minutes for NP treated patients and 84.3 minutes for the stroke fellow. There were 0% symptomatic intracranial hemorrhages for either group. 3 month modified rankin scores were 1.53 for NPs and 1.90 for stroke fellow. Conclusion: Our data suggests that BAT NP outcomes are comparable to that of the stroke fellow, and potentially faster from patient arrival to treatment. Thus, stroke specialty NPs, working collaboratively with acute stroke neurologists are a feasible alternative for the provision of emergency neurology care. With intensive training, the NP safely performs many of the functions previously thought only available through a stroke neurologist. Future study will evaluate a formal NP fellowship for stroke nurse practitioners nationally.

Hemorrhagic Stroke Management

Advances in Endovascular Aneurysm Treatment

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Endovascular coil embolization of intracranial aneurysms has gained broader acceptance and increased utilization since the introduction of the Guglielmi detachable coil (GDC) in 1991. The recent large ISAT trial (International Subarachnoid Aneurysm Trial) and the ISUIA (International Study of Unruptured Intracranial Aneurysms) indicate that endovascular therapy may be more appealing than classical neurosurgical treatment for many patients with ruptured and unruptured aneurysms. It has been demonstrated that surgery has long-term durability, but that is due to a lack of follow-up of patients managed by coil embolization. Several new reports indicate excellent occlusion rates with coil embolization. Our center performed a retrospective review of clinical and radiological records of patients treated from October 2001 to July 2004. The number of patients was 154 with 142 aneurysms. Of the 142 aneurysms, 72 were ruptured and 60 were un-ruptured saccular aneurysm, nine fusiform aneurysm and one posttraumatic aneurysm. Angiographic total or subtotal occlusion rate was achieved in 76% of cases and in 96% at last follow-up. Aneurysm recanalization was observed in 14% mean follow up of 12 months, and 18% of aneurysm were retreated. Clinically revelent complications occurred in 6.0% resulting in procedure related morbidity of 0.6% and 0.6% mortality at 6 months. No aneurysm bleeds over a cumulative 1,347 months of observation. Given the most recent advances in neuro-interventional device design, most intracranial aneurysm, including challenging lesions can be efficiently and safely treated by an endovascular approach. The morbidity and mortality remain low given the sophisticated and complex procedures. Our success in achieving complete occlusion and minimizing recanalization was high, even with very complex lesions. Further progress is needed to achieve higher complete and persistent aneurysm occlusion rates.

Implementing Stroke Best Practice Across the Continuum of Care Through the Ontario Stroke Strategy: Developing a Cycle of Continuous Improvement

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The Ontario Stroke Strategy, in collaboration with the Heart and Stroke Foundation of Ontario, introduced Best Practice Guidelines for Stroke Care across the entire continuum of care in 2003 in all 11 Ontario Stroke Strategy Regions, including Southeastern Ontario (SEO). SEO is an area of 20,000km² with a population of 500,000 and 11 hospital sites. Funded by the Ontario Ministry of Health & Long Term Care, the Ontario Stroke Strategy is the expected way to organize stroke care in the province of Ontario. Its aim is to decrease the incidence of stroke, decrease stroke mortality and decrease residual disability through program and staff development. The purpose of this presentation is to share the development and implementation of a continuous improvement framework that is being used in SEO to support Stroke Best Practice Guideline implementation. This framework integrates the use of knowledge translation theory with stroke care program development within a process of continuous improvement. The guiding principles being used throughout this process includes to embed best practice stroke
Extending Acute Stroke Trials to the Aerial Interhospital Transfer Setting: Preliminary Feasibility Study

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Background: Recruitment in acute stroke trials is difficult throughout rural America where patients are too far away to reach a center in time to be enrolled in a study. One option would be to use tertiary-center based helicopter flight nurses as co-investigators. In this way patients could be enrolled at the local emergency room (ER) immediately after the tertiary flight nurses assumed the care of the patient. In addition, acute interventions might be started. However, the feasibility of performing acute stroke trials in this setting is not known. Methods: Flight nurses of a University-based medical helicopter transport service were recruited through lecture presentation to become IRB-certified investigators for clinical research. A prospective survey was conducted by flight nurse investigators of all cerebrovascular patients and other medical transfers. Data collected included time between onset of symptoms and helicopter arrival to the outside emergency room, Glasgow Coma Scale, and availability of surrogates to provide consent. Results: 12/12 (100%) of the flight nurses successfully completed the IRB training. At the time of this report data were collected in 105 helicopter transports. Of those, 17 (16%) were strokes (7 ischemic, 10 hemorrhagic). The mean time from onset of symptoms to arrival to the outside ER was 162 minutes (45–342) for Intracerebral hemorrhage (ICH) and 213 minutes (90 –342) for Ischemic Stroke (IS). The times for myocardial infarction (184, 114 –362), other medical (341, 44 –930) and trauma (157, 32–577) were similar. In 15/17 of the stroke patients there was a relative available (12 spouse, 3 adult children). All transferring hospitals performed CT and blood tests prior to transfer. Conclusion: Clinical research is feasible during the inter-hospital aerial transfer of stroke patients. Flight nurses reach stroke patients in a time window that would permit starting therapy enroute, and are willing to conduct clinical research in this unexplored setting for trials. Relatives are frequently available to provide surrogate consent in this setting.

What You Don’t Know About Stroke Signs and Symptoms Could Hurt You and Those You Care For

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Background: Public awareness of stroke warning signs is poor. Up to 20% of the public report that they obtain information about stroke from a healthcare professional, yet the awareness of stroke signs and symptoms in healthcare providers has not been reported. We investigated the stroke knowledge of healthcare professionals and their responsiveness to stroke education. Methods: Three groups of healthcare professionals were surveyed with open-ended questions before and immediately following training about Stroke signs and symptoms and risk factors. Correct answers for this study were based on 3 of the Brain Attack Coalition (BAC) list; sudden one-sided weakness or numbness of Face or Arm, slurred Speech or difficulties in understanding. The training included both the full list of BAC signs and symptoms and the mnemonic FAST (F—face, A—arm, S—speech, T—time to call 911). One group participated in a 3-month follow-up. Results: 84 health care professionals (70 Registered nurses, 10 medical assistants, 2 dental assistants and 2 pharmacists) were included; 18 nurses participated in the 3-month follow-up. Assessment was at baseline and immediately following a 60 minute educational session. Fewer than 50% had knowledge of all 3 FAST signs and symptoms at pre-test (p<0.001), >50% at post-test (p<0.001), and a trend toward >50% at 3-months (p=0.06). See table for details. Conclusion: It is imperative that healthcare providers be educated about stroke if they are to educate the public. There is a clear need for education within the health care community, as only a third of those initially surveyed knew three key signs and symptoms of Stroke at baseline. Healthcare providers are very responsive to education, and this knowledge gain appears to be sustained.

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Oral Presentations

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