PRE-DISCHARGE PLAN FOR SECONDARY STROKE IN PATIENTS WITH
STROKE OR TRANSIENT ISCHEMIC ATTACK

By
Renee HultzBrown
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_______________________________
SIGNED: Renee M. HultzBrown

APPROVAL BY MASTER’S PROJECT DIRECTOR

This Master’s Project has been approved on the date shown below:

____________________________________
Leslie Ritter, PhD, RN May 9, 2008
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DEDICATION

This project is dedicated to Nancy Ann Brown who was an educator and supported my pursuing higher education. She would have loved to see me graduate with this degree.
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ABSTRACT

While it is known that the use of practice guidelines for patients with acute stroke or transient ischemic attack (TIA) results in improved health outcomes, few hospitals systematically use these guidelines. Donabedian’s quality improvement model was used to describe an urban southwest hospital system of care for stroke, measure standard benchmarks for the assessment of second stroke, and develop an education plan for prevention of second stroke and TIA. Results indicate that, while the hospital does not systematically use stroke guidelines for the assessment of risk for second stroke, all of the necessary system elements to implement the guidelines are available. The pre-discharge implementation plan provides guideline-driven information that could potentially decrease the incidence of second stroke.
CHAPTER ONE PURPOSE AND SIGNIFICANCE

Introduction

Each year the United States spends an estimated $43 billion on the care of stroke patients. Direct medical costs are estimated at $28 billion and the indirect costs from lack of productivity and other factors are approximately $15 million per year (American Heart Association [AHA], 2006). Stroke is also the leading cause of adult disability. Most stroke patients are left without a vocational way of earning an income, a third need help with activities of daily living, and a quarter are unable to ambulate without assistance (Tuhrim, 2003). Of the 700,000 yearly stroke victims; 200,000 are recurrent stroke patients (AHA, 2006).

Eighty-five percent of all strokes are transient ischemic attacks (TIA) or major ischemic strokes. Fifteen percent are hemorrhagic strokes (Tuhrim, 2003). This project addresses only major ischemic stroke or TIA. A second stroke can be either a second TIA or ischemic stroke (Sacco, et al, 2006). The highest incidence for a second stroke is within the first seven days after an ischemic event, a TIA or “mini-stroke” (Sacco, et al., 2006). TIA is currently defined as a brief focal neurological deficit in the brain or retina that lasts less than 24 hours without evidence of infarct. The prevalence for cerebral infarct after TIA is 11% at the ages of 55 to 64, 22% between the ages of 65 to 69, 28% at the ages of 70 to 74 years, 32% between 75 to 79 years and 40% at ages 80 to 85 years (Rosamund, et al., 2007). TIA’s are the precursor in 15% of all strokes and if unrecognized, can represent the greatest morbidity and mortality for stroke patients in the first thirty-ninety days after their first TIA (Lovett, et al, 2003). Fifty-percent of patients
who experience a TIA fail to notify their healthcare provider. Approximately one-third of TIA’s would reveal as a true ischemic event by diffusion-weighted magnetic resonance imaging. Within the first year of having their first TIA, 25% of patients will die (Rosamund, et al., 2007). While TIA itself has short term effects, the significance is that this can herald a major stroke, which is why it requires timely and aggressive treatment to prevent death and disability.

Studies have demonstrated that in-hospital programs that utilize standard guidelines for the prevention of a second stroke can improve outcomes by reducing risk factors for second stroke (LaBresh, et al., 2007; LaBresh, et al., 2008). A quality assurance system that analyzes performance parameters and uses the analysis for improving care is a necessary component for in-hospital secondary stroke prevention programs (Schwamm, et al., 2005). For example, using medical chart review and primary care physician surveys, one study showed that although 95% of primary care physicians intended to treat elevated cholesterol in their patients, fewer than 18% actually reach low density lipid cholesterol (LDL-C) treatment goals (LaBresh & Tyler, 2005). It is known that lowering high levels of LDL-C reduces stroke risk significantly. Systematic changes to improve guideline adherence are necessary to improve outcomes by healthcare professionals (Sacco, et al., 2006).

It has been shown that stroke and transient ischemic attack (TIA) patients alike decrease their secondary stroke risk considerably by learning about their own cardiovascular health maintenance, risk assessment and lifestyle behaviors (Greenlund,
et al., 2002). Despite the fact that the assessment of risk for secondary stroke patients is recommended by hospital accreditation and national agencies, there remains a gap across the country regarding how hospital patients learn about their second stroke risks (Roe & Durham, 2004; Sacco, et al, 2006). Some of this gap is related to a fragmentation of evidenced-based stroke care. The current guidelines from the American Heart (AHA) and American Stroke Associations (ASA) include a risk assessment of each patient to determine their educational, pharmacological and rehabilitation maintenance needs. Effective coordination and collaboration among experienced multidisciplinary health professionals is paramount to provide an integrative, multifactorial approach to secondary stroke prevention (Schwamm, et al., 2005).

Problem Statement

While it is known that the use of in-hospital standard guidelines will reduce second stroke, the implementation of these guidelines remains underutilized. A need persists for collaborative multidisciplinary team use of standard guidelines for prevention of second stroke. Identifying risk factors, initiating treatment plans and patient education for TIA or stroke patients before discharge from the hospital can significantly reduce risk for second stroke. (LaBresh, et al., 2004).
Purpose of Project

The aims of this project are to:

1) Describe the system of care for stroke, in an urban, Tucson, Arizona hospital.

2) Describe the hospital’s data from the “Get with the Guidelines” (GWTG<sup>SM</sup>) Stroke Patient Management Tool, for the prevention of second stroke. The Joint Commission (JC) has developed a skill set and disease specific care based on the American Heart Association (AHA) and American Stroke Association (ASA) national guidelines for the care of acute stroke patients for Primary Stroke Center certification for hospitals. The GWTG<sup>SM</sup> Stroke Patient Management Tool gathers a data set for hospitalized stroke patients. This quality assessment tool for stroke and TIA inpatients, gathers performance data measuring adherence to AHA/ASA guidelines. Performance measures pertinent for this project are the use of antithrombotics in-hospital, diabetic and hypertension medication at discharge, lipid management upon discharge, addressing modifications for lifestyle based on a body mass index (BMI) score [greater than or equal to 25kg/m<sup>2</sup>] and smoking cessation counseling on discharge.

3) Develop a hospital plan for implementing in-hospital stroke guidelines for prevention of second stroke for patients with TIA or stroke.
Significance to Nursing

The advanced nurse practitioner is in a unique role for the assessment and integration of a comprehensive stroke care model. Advanced practice nursing is built upon a complete approach to patient care through thorough history taking, physical assessment and complex disease management. It is known when providers of healthcare, including nurse practitioners, take the time to educate patients about health, diet and exercise, lifestyle behaviors of patients can improve (Greenlund, et al., 2002). There is evidence that patient’s are more apt to continue recommendations about their health care and medications when the education occurs in the hospital setting. This is a window of opportunity for the nurse practitioner when the risks become real to patients and their families (LaBresh & Tyler, 2005). The in-patient setting offers a setting for the nurse practitioner (NP) to counsel the patient about their risks that could extend to primary care for follow up on secondary stroke prevention (Alberts, et al, 2005). Nurse practitioner evaluation of secondary stroke risk and subsequent patient education can empower patients by providing a goal-oriented, treatment plan when they leave the hospital. Nurse practitioner evaluation of secondary stroke risk and subsequent follow up can lead to research which will provide evidence of improved patient outcomes after stroke.

Definition of Terms

Primary Prevention: refers to the management of established disease processes and cardiovascular disease risk factors that could lead to a patient’s first stroke. This includes
pertinent history taking, monitoring and treatment of blood pressure, serum glucose, cholesterol, body weight, exercise, healthy diet and smoking cessation (Schwamm, et al., 2005).

**First Stroke:** First TIA or major ischemic stroke.

**Secondary Prevention:** Refers to the initiation of stricter management of primary interventions once diagnosed with a stroke or TIA along with tighter treatment of underlying disease. This includes the use of appropriate hypertensive medications, a lipid lowering agent, and use of an antiplatelet adhesion/anticoagulant agents. (Halkes, et al., 2006).

**Second Stroke:** Second TIA or major ischemic stroke.

**Get With The Guidelines (GWTG^SM):** “is the premier hospital-based quality improvement program for the American Heart Association and the American Stroke Association. It empowers healthcare provider teams to consistently treat heart and stroke patients according to the most up-to-date guidelines.” (AHA, 2008).

**Stroke Center Certification:** A hospital certification designated by the Joint Commission meeting criteria for quality of care in stroke treatment based on recommendations from the Brain Attack Coalition and the American Stroke Association for comprehensive stroke center requirements (Alberts, et al., 2005). Hospitals are evaluated and receive a certification designation based on an assessment of: 1) Compliance with consensus-based national standards, 2) Effective use of primary stroke center recommendations and
clinical practice guidelines to manage and optimize care and 3) Performance measurement and improvement activities (Joint Commission, 2004).

**Risk reduction (RR):** a term used to describe the overall benefit of modification of stroke risk reduction which is this plan for implementation goal.

**Advanced Practice Nurse (APN) or Nurse Practitioner (NP):** must be defined due to its ambiguous nature in the hospital setting (Gardner, Chang & Duffield, 2007). Role definition is important to impart in this model because it is not only a case management, leadership role. The APN practitioner provides a direct clinical service to stroke patients with focused care that is evidenced based (Gardner, Chang & Duffield, 2007). The use of guidelines for their practice is implemented along with the multidisciplinary team to carry out the clinical stroke pathway of care (Alberts, et al, 2005). The APN practitioner will use a professional practice model that includes a complete history and physical, review of labs, tests, determining cardiovascular system risk assessment, including the source of stroke and associated secondary stroke risks.

**Theoretical Framework**

The theoretical framework for this project is Donabedian’s model which is based on the principles of health care quality assurance. Avedis Donabedian developed a theoretical framework in the 1980’s emphasizing a dynamic process of improvement cycles that look at system structure, process intervention of care and the outcome effects. Donabedian’s model posits three main components: 1) structure quality, 2) process quality and 3) outcome quality (Chin & Muramatsu, 2003). Structure is the
organizational design of how a health system runs. Structure relates to how the culture of health professionals are utilized within a health care setting, the characteristics of the providers, resources, tools, staffing ratios, etc. (Chin & Muramatsu, 2003). For Aim 1 of this study, an evaluation of hospital structure will be to identify stroke multidisciplinary team members, identify stroke protocols for assessment of secondary stroke risk and administrative support that is currently in place at the time of this study.

For Aim 2 of this study, the process of care is the set of activities that occur between patients and their providers that is being measured. This will be an analysis of AHA/ASA’s “Get with the Guidelines” (GWTGSM) for Stroke Patient Management Tool via the internet which measures the national guidelines for secondary stroke care. Data will be obtained on measured benchmarks of care that follow the guidelines and descriptive data on a patient population.

Donabedian has described similarities in his model and a quality improvement model; in practice these two models are combined as a dynamic process (Donabedian, 1992). Quality or process outcome is improved in cycles by analyzing an improvement intervention in patient care, studying the effect of that care and finally using that data to repeat the cycle (Chin & Muramatsu, 2003). Process outcomes are a logical assumption by nature; however they are dependent upon the functional use of the measure and whether or not its use is an adequate indicator. Measures show clinician’s accountability to set standards of care, improvement of care performance and informative information to consumers (Chin & Muramatsu, 2003).
Finally, the third part of this model is outcome quality: the change in the patient’s health status or as a result of care provided (Donabedian, 2003). In this project, the model is used to evaluate the information obtained from Aim 1 and 2 to develop an implementation plan for collaboration of secondary stroke care provided in this hospital setting for stroke patients prior to discharge that could improve patient outcomes.

Rhee, Donabedian & Burney (1987) used a hospital emergency room structure to exemplify the workings of this framework. The structure “level and scope of concern” is important in determining the appropriate elements that are to be assessed. In example, all collaborative health professionals who are providing health care to an individual within a unit structure are part of the quality assessment (Rhee, Donabedian, & Burney, 1987). The quality assessment itself can be “any given strategy of care with a given impact on health…” that may be observed from three different levels of service: 1) the healthcare relationship provided or “the amenities of care,” 2) the greatest improvement in health of the individual within the limitations of the patient’s capacity to improve, or 3) the value of the strategy of care that was provided that is presumed to provide the most benefit (Rhee, Donabedian & Burney, 1987). There are “favorable attributes” that were defined by the authors that focus on features we still deem pertinent to what quality assessment should focus upon. These features, now more commonly called benchmarks or standards of care include: timeliness of care, the appropriateness, reliability and validity of diagnostic and therapeutic interventions, clinician skill in executing care decisions, maintenance of continuity of care for referral or next level of care, accuracy in
documentation, patient education, motivation and prevention (Rhee, Donabedian & Burney, 1987).

Donabedian (2003) describes a quality monitoring cycle that includes: 1) obtaining performance data, 2) pattern analysis of data, 3) interpretation of this data that might provide a hypothesis of the pattern observed, 4) taking preventative, corrective, promotive action based on the causative hypothesis and 5) obtain subsequent performance data to determine the conclusion of the action taken (Donabedian, 2003). A proportionate representative sampling of cases, either gathered by simple or random technique primarily related to a diagnosis is one way that is described as the most frequently used for assessment (Donabedian, 1988). The measurement of the quality is based on set standards of care or criteria that are scientifically evidenced based. While national health standards of quality for specific disease categories are used, many times individual cases are best measured based on the limited short term goals of care that have been shown to be clinically effective (Chin & Muramatsu, 2003). Quality action or adjustments, for example, could be education, procedure, training or tools that improve on the desired outcome (Donabedian, 2003).

Summary

Donabedian’s theoretical framework is applicable for this project, as described in Figure 1-1. The framework describes a quality assurance process with which the author utilizes to examine the acute stroke care in a 309 bed, urban community hospital. The data obtained pertains to a small unidentifiable, convenience sample with acute ischemic
stroke or TIA and the evidenced based care they received. Accordingly, the first aim of this project will be to describe the stroke structure of care within the hospital, and then secondly, the process of care will be to analyze GWTG’s Patient Management Tool data performance measures for secondary stroke care. And finally, the third aim of this project will be to make an implementation plan of second stroke risk for inpatients prior to discharge.
Figure 1-1 Theoretical Framework Describing Secondary Stroke Prevention

**Structure**
- Hospital’s Medical, ICU and Telemetry Units
- Hospitalist /Physicians, Specialists, Nurse Managers, Nurses
- Policy for stroke team assessment of secondary stroke risk
- Identify Stroke Multidisciplinary Team
- Training, expertise and continuing education of staff
- Resources: Administration, Staff Support
  - Education of Secondary Prevention Strategies via Stroke Team
- Equipment: Technological Infrastructure

**Process**
- AHA/ASA GWTG for Stroke Patient Management Tool
- Data collection concurrently reviewed by Quality Assurance RN
- Measuring national standard benchmarks in secondary stroke care
- Individualization of care relationship prior to discharge by NP
- Coordination of care between units and next level of care
- Analysis quarterly of inpatient stroke data by stroke team

**Outcome**
- Secondary Prevention Education available to patients prior to discharge
- Staff collaboration on standards of stroke care
- Competencies are improved
  - Follow-up with primary stroke patients who have statistically reduced their overall secondary stroke risk and maintaining treatment goals
- Long term follow up shows decreased incidence of second stroke
CHAPTER TWO REVIEW OF THE LITERATURE

Introduction

The review of the literature will follow Donabedian’s model. Structure, process and outcome that support using this framework for this project will be reviewed. The hospital with a dedicated stroke unit has been defined as having clinical expertise of a multidisciplinary team, standard policy for stroke care, administrative support and technological resources. This is evidenced by increased emphasis on quality standards set forth from expert panels from AHA, ASA and the Brain Attack Coalition (Adams, et al., 2007; Alberts, et al., 2005; Schwamm, et al., 2005). Current research on comprehensive stroke unit outcomes, primarily from European studies, has shown reduced rates of stroke morbidity and mortality (Adams, et al., 2007). These European units have skilled neurological professionals, regular collaborative communications, coordinated care and standardized orders to improve best practices for clinical treatment of stroke patients (Adams, et al., 2007).

Structure

Good structure quality provides consistent treatment by providers, tools, resources and supportive organizational structure (Chin and Muramatsu, 2003). In a consensus statement from the Brain Attack Coalition (BAC), the current comprehensive stroke center requirements were defined based on literature review of clinical trials, meta-analyses, care guidelines, scientific guidelines and other relevant clinical research (Alberts, et al., 2005). Primary and comprehensive stroke centers differ in the level of
care that can be provided to an acute stroke patient. Certified primary stroke centers (PSC) have the necessary clinical staff, infrastructure and program to treat most stroke patients, but cannot handle complex diagnostic procedures or specialty neurosurgical stroke services. Comprehensive stroke center (CSC) certification is based on a system structure that has 4 key components: 1) Personnel with clinical expertise, 2) specialized diagnostic, surgical and interventional treatments, 3) facility infrastructure and 4) program outreach and education (Alberts, et al., 2005). CSC components were also compiled from a national questionnaire survey from leaders in the field of cerebrovascular disease. Professional personnel for a (CSC) include: 1) Center director who is a board certified, neurosurgeon or neurologist, 2) Staff neurologists and neurosurgeons, 3) interventional and diagnostic radiologists, 4) intensive hospitalists, 5) neuroscience nursing staff, 6) advanced practice nurses, 7) therapists in stroke rehabilitation and 8) case managers and social workers. The nurse practitioner is a key team member involved in stroke patient care, clinical care pathway, research, stroke registry, educational programs, and quality assurance (Alberts, et al., 2005).

In a first ever quantitative study of Donabedian’s structure, process, outcome model, Kunkel, Rosenqvist, and Westerling (2007) surveyed 386 hospital department heads in Sweden. Quality structure, process and outcome analysis was made to determine components of quality, relationship of the components and the implications of the relationships. Data was analyzed using exploratory factor analysis, confirmatory factor analysis and structural equation modeling. The survey was piloted for reliability and validity of results. Results strongly indicated a significant relationship between structure
characteristics; defined as quality improvement competence with documented routines, task responsibilities, available colleague support, administrative support, and clear policy and procedure with process and outcome. Kunkel, Rosenqvist, and Westerling (2007) concluded that the better the quality improvement within the structure, the more interrelationship of peer, collegial support within the process and this was translated to a higher outcome. It was also theorized from their data that adequate resources and administrative support, may play an important role in system quality improvement.

In a two year, prospective, observational study of 11 VA medical centers, Hoenig and colleagues (2002) gathered data on 288 post acute stroke patients. Their hypotheses questions were: 1) how do system structure, staff expertise and technological infrastructure relate to process of care in stroke patients? And 2) if process is adjusted, is structure related to different stroke outcomes? Subjects were excluded if they did not get sub-acute care. Those included in the study (n=167) were followed 6 months post stroke care using the Functional Independent Measure motor subscale (FIM). Structure statistical variables were classified in 1 of 3 domains: 1) systematic organization, 2) staff expertise, and 3) technological sophistication. Structure was measured by a numeric rating scale in each area according to: 1) a VA rehabilitation bed unit vs. a post acute setting with a protocol for stroke care in place on a common ward, 2) expertise of the staff and diversity of provider types, 3) presence of a clinical nurse specialist, 4) presence of a medical rehabilitation director, 5) amount of continuing education received by specialty rehabilitation providers in stroke care 0-4 times a year and 6) technological infrastructure. The results showed a significant association between all 3 domains of
structure that were examined. Unadjusted analyses of patient FIM outcomes at 6 months demonstrated a relationship in systemic organization, staff expertise and process of care. There was a direct relationship demonstrated between low organizational structure and staff expertise with poorer outcomes and higher organizational structure and staff expertise with higher FIM scores (Hoenig, et al, 2002).

Process

Process quality is the set of activities that occur between the provider and the patient; it can include the measurement of care provided, the improvements necessary to perform that care or information provided to empower patients to make their care decisions (Chin and Muramatsu, 2003). In this section, a description of what is known from the research about determining risk factors in TIA or stroke patients and the guidelines necessary for treatment. This information is important in the process of treating these patients and preventing second stroke.

Determining Risk Factors for Stroke

There are non-modifiable risk factors that create some of the individual risk for primary and secondary TIA and stroke. These risk factors include age, gender, race/ethnicity, low birth weight, and genetic predisposition (Goldstein, et al., 2006). Well supported by the research, modifiable factors that place persons at higher risk for stroke are TIA or ischemic stroke, hypertension, cardiovascular disease; including atherosclerosis, heart failure, peripheral arterial disease, valvular disease, atrial fibrillation, carotid artery stenosis, as well as diabetes, hyperlipidemia, smoking or breathing second hand smoke, poor diet, lack of
physical activity, obesity, body fat distribution, sickle cell disease and post-menopausal hormone therapy (Goldstein, et al., 2006). Evaluation through a personal history with the patient can provide the necessary factors that can be incorporated in an individualized treatment plan.

Guidelines for Prevention of Secondary Stroke

The Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure that is based on current publication of studies, recommends a thiazide diuretic with an ACEI and a combination of two or more lifestyle modifications to enhance antihypertensive drug efficacy and decrease average stroke risk by 35-40%. These lifestyle modifications include weight reduction, a cardiovascular diet with sodium reduction, physical activity, smoking cessation and moderation of alcohol use (National Heart, Lung and Blood Institute [NHLBI], 2003; Sacco, et al., 2006). National trends as of 1999-2000 from the National Health and Nutrition Examination Survey showed that only a third of the persons who are diagnosed with hypertension were adequately controlled (NHLBI, 2003). The Perindopril Protection against Recurrent Stroke Study (PROGRESS) randomized 6,105 patients with stroke or TIA for ACEI alone or ACEI and a diuretic combination therapy. The combination therapy showed a 43% risk reduction for recurrent stroke and the ACEI alone showed no significant benefit (Sacco, et al, 2006).

Diabetic Type I and II patients appear to benefit the most from primary prevention of stroke risk (Sacco, et al., 2006). Secondary prevention in these patients is also multifactorial and includes closer monitoring of target goals for a Hemoglobin A1c less than or at 7%, blood pressure at or less than 130/80, and LDL-C at or <70 mg/dl to reduce overall cardiovascular and cerebrovascular risk. Epidemiological studies of diabetic
patients have shown that a continual reduction in blood pressure between 120/80 to 140/80 can reduce the relative risk of stroke by 44% (Sacco, et al., 2006). This was best accomplished by behavioral counseling, the use of a lipid lowering statin agent and an antiplatelet drug as appropriate, as well as a angiotensin converting enzyme inhibitor (ACEI) or a angiotensin receptor blocker (ARB) for blood pressure control. These hypertension medicines are also recommended by the American Diabetes Association and JNC-7 recommends a thiazide diuretic combined with the ACEI or ARB which reduces the microvascular disease of the kidneys, retinas and peripheral nervous system (NHLBI, 2003; Sacco, et al., 2006)

The National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Cholesterol in Adults (NCEP-III) is recommended for comprehensive management of lipids in persons who experienced a stroke or TIA. Statin agents are recommended in all patients with stroke and TIA, cardiovascular heart disease, elevated cholesterol or atherosclerotic origin for their stroke for a target LDL-C <100mg/dl. Lowering LDL cholesterol reduces stroke and cardiovascular morbidity and mortality (Sacco, et al., 2006). Based on the Stroke Prevention by Aggressive Reduction in Cholesterol Levels (SPARCL) trial, we know that patients with no coronary artery disease who have had a stroke or TIA that go on 80 mg of atorvastatin, a HMG-CoA reductase inhibitor, will significantly reduce their stroke risk and cardiovascular events (Amarenco, et al, 2006).
Long term anticoagulant therapy with warfarin is recommended for all patients with atrial fibrillation, structural heart disease, prosthetic valve, previous embolic events and over the age of 55. This patient population needs adjusted dosing to keep their target International Normalized Ratio (INR) range of 2.0-3.0 for the best reduction of recurrent stroke. Younger patients or older patients who cannot tolerate warfarin can use enteric coated aspirin 325 mg per day. Patients with a stroke from a myocardial infarction or ischemic coronary artery disease should be on 162 mg of aspirin per day as well as warfarin therapy (Sacco, et al., 2006).

Antiplatelet therapy should be used in all patients with stroke or TIA. Currently the recommended dose of aspirin is between 50-325 mg per day alone or combined with extended release dipyridamole or clopidrogel 75 mg/day alone are all safe for initiation of therapy to decrease secondary stroke. Clopidrogel is recommended for patients who cannot tolerate aspirin therapy and is not recommended to be used with aspirin therapy (Verro, Gorelick & Nguyen, 2008). All of these are acceptable options for the beginning use of antiplatelet medication for discharge from the hospital.

Recommendations for healthy lifestyle modifications must be individual specific and open to cultural concerns so they are successful. Blood pressure control rates are poorest in Hispanic Americans and Native Americans (NHLBI, 2003). African Americans are the most affected by heart disease and stroke in the United States and they are usually not controlled on one hypertensive medication (US Department of Health and Human Services, 2003). These patient populations need diuretic and antihypertensive
medications in combination to provide adequate control initially, with frequent follow up to ensure adequate control, monitoring and education of lifestyle factors. Recommendations for this type of medication management, dietary and lifestyle guideline factors require a clinician or nurse practitioner to follow through with all stroke or TIA patients for patient education and adherence prior to discharge (Alberts, et al., 2005).

Outcome

Outcome is the change in the patient’s current health status related to healthcare decisions by the provider. In this section, current research will be presented from studies examining the outcomes of quality measurements for stroke and TIA that has reduced their risk for second stroke. This research is still beginning to analyze best practice outcomes for secondary stroke risk.

Hackam & Spence (2007) performed a meta-analysis of strategies in secondary stroke care by performing a review of 106 randomized control trials of secondary prevention strategies. They found the five most common risk reducing strategies among these studies were comprehensive dietary modification, exercise, aspirin, HMG-CoA Reductase inhibitor (Statin), and antihypertensive medication therapy. Using the Life Long after Cerebral Ischemia (LILAC) study population of over 210,000 patients, a longitudinal, 5 year relative risk reduction was calculated for recurrent vascular events in patients with a TIA or stroke. In those who implemented these strategies, risk was reduced by 80% and TIA patients had a significantly lower 10 year vascular event rate of 35.8%. Results from this study showed that with intensified management of the strategies in addition to aspirin-dipyridamole, intensive blood pressure
lowering and high dose statins provided a 90% risk reduction and a risk reduction of 94% when done in combination with a carotid endarterectomy. In conclusion, they found that by combining 3 medications with dietary modifications and exercise, recurrent cardiovascular events were reduced by 1 out of 5 hospitalized patients with cerebrovascular disease (Hackam & Spence, 2007). These large meta-analyses were conducted to examine outcomes when organized system structure is in place.

AHA/ASA’s Council on Stroke statement publication for healthcare professionals, “Guidelines for Prevention of Stroke in Patients with Ischemic Stroke or Transient Ischemic Attack” provided the framework for the current use of secondary stroke treatment guidelines used in this project. These guidelines included an evaluation of atherosclerotic disease risk factors, lifestyle assessment, body mass index, lipid screening and guidelines for statin, hypertensive, and antiplatelet medication use and protective antithrombotic administration (Sacco, et al., 2006).

Use of these guidelines to monitor stroke specific care was initiated at the hospital level by the Joint Commission in 2004 by setting quality of care measures for stroke inpatient care. The guidelines require documentation of evidenced based care, along with evaluation of risk and providing multidisciplinary team care (Joint Commission, 2004). In 2000, a pilot for The Get with the Guidelines for cardiovascular disease (GWTG CAD) Patient Management Tool was started. This is an internet-based, data entry tool developed from the AHA and ASA’s secondary prevention performance measures and the Joint Commission’s core measures, the first collaborative interactive data base for the GWTG CAD tracks clinical based care of inpatients (LaBresh, et al., 2003). The GWTG CAD
benchmarks for measuring care have improved secondary cardiovascular practices in one year follow up for the GWTG\textsuperscript{CAD} pilot hospital groups.

LaBresh and colleagues used a collaborative learning model that included interactive learning sessions, electronic webcasts to facilitate multidisciplinary teams in a variety of settings, the tools with which to implement change for guideline use between hospital staff in 24 hospitals. This was followed with risk measurement of 1,738 patients admitted for coronary artery disease during July 2000-June 2001. Data was obtained on lipid lowering treatment, aspirin use, other antithrombotics, beta-blockers, ACEI’s, risk factor management, lifestyle changes, diabetes care, hypertension care, physical activity, smoking cessation and weight management. Based on the data obtained at follow-up at 10-12 months with these patients, there was significant improvement from baseline in smoking cessation counseling, lipid measurement and treatment, aspirin, and improving blood pressure treatment medications at discharge (LaBresh, et al., 2004).

There is a necessity to demonstrate that standard use of secondary stroke based guidelines in the hospital can further reduce ischemic cardiovascular disease, stroke risk and improve quality of life outcomes for primary stroke or TIA patients (LaBresh, et al., 2004). This research is still in its infancy and there is little documented evidence about patient outcomes that are significant for secondary stroke care education in the literature.

During a one year, investigative study, the GWTG\textsuperscript{SM} for stroke was used to assess quality adherence in 99 volunteer community and teaching hospitals throughout the U.S. The study included 18,410 patients hospitalized for stroke and TIA (LaBresh, et al., 2008). Data was collected using the GWTG\textsuperscript{SM} for stroke, during a pre-intervention
baseline period of three months. After this baseline period from April 2003 to March 2004; data was collected at quarterly intervals covering acute care and secondary prevention measures with hospital staff training and support. (Table 2-1 GWTG℠ Stroke Quality Measures). Using the collaborative learning model, 7 pre-specified core performance measures were used in an all or none provision for eligibility of patients to be in the study. These included: 1) early thrombolytic medications presenting within the first two hours of symptom onset, 2) antithrombotics medications administered within the first 48 hours of admission, 3) deep vein thrombosis (DVT) prophylaxis, 4) antithrombotics at discharge, 5) anticoagulation at discharge for patients with atrial fibrillation, 6) lipid treatment for LDL-C > 100 mg/dL, and 7) smoking cessation counseling (LaBresh, et al, 2008). Eligible patients for the all or none measure were defined as the percentage of patients that received all of the seven performance measures. There were significant gradual increases from baseline in all individual secondary prevention measures. This was the first large study of its kind to show quality improvement of stroke patients in the hospital for secondary stroke protective measures. Other collaborative hospital studies have been smaller and have looked at other quality care measures for acute care (LaBresh, et al., 2008). The study population for this project differed from the LaBresh et al, (2008) study in that it included the use of hypertensive medication at discharge as a performance measure.
<table>
<thead>
<tr>
<th>Table 2-1 GWTG Stroke Quality Measures</th>
<th>Definitions for Eligible* Patients for (DC) Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Antithrombotics</td>
<td>Antithrombotic therapy prescribed at discharge.</td>
</tr>
<tr>
<td>Anti-hypertensive medication at DC</td>
<td>Patients who have a hypertensive agent at discharge.</td>
</tr>
<tr>
<td>Atrial fibrillation (AF)</td>
<td>Anticoagulation therapy for patients with AF that are documented during the hospitalization.</td>
</tr>
<tr>
<td>Smoking</td>
<td>Cessation intervention (appropriate medication and/or counseling) provided at discharge.</td>
</tr>
<tr>
<td>LDL Cholesterol (LDL-C)</td>
<td>A LDL-C measured in the hospital as the highest first 48 hours after admission, non-fasting is okay. If available, a fasting sample within the last 3 months prior to admission in the outpatient record.</td>
</tr>
<tr>
<td>LDL 100</td>
<td>Lipid lowering agent for LDL&gt;100 prescribed at discharge or documentation that patient was taking a lipid lowering agent on admission.</td>
</tr>
<tr>
<td>Lipid Rx</td>
<td>Statin agent prescribed at discharge for all patients except those patients with untreated levels of LDL&lt;100 mg/dL.</td>
</tr>
<tr>
<td>Weight Management</td>
<td>Recommendations at discharge for reducing weight for those patients with Body Mass Index (BMI) at 25 or greater. (Calculated as weight in kilograms divided by the height in meters²).</td>
</tr>
<tr>
<td>Diabetes Management</td>
<td>Patients who have diabetes or are taking oral hypoglycemics prior to admission that are discharged while receiving diabetic medication (oral hypoglycemics agents or insulin).</td>
</tr>
</tbody>
</table>

*Eligible patients are those without any medical contraindications e.g. treatment intolerance, excessive risk or adverse reaction, patient refusal, terminal illness, and comfort care only are documented as reasons for non-treatment for each of the applicable measures. Discharge measures exclude patients who die, are discharged to hospice care or other short term general hospital, leave against medical advice or whom a discharge destination is undocumented or undeterminable. (LaBresh, Reeves, Frankel, Albright, Schwamm, 2008).
Summary

Treatment of care options for stroke or TIA must be timely and aggressive to reduce future stroke risk. There has been current research that has demonstrated value for acute care stroke patients to be treated using a multifactorial treatment plan prior to discharge to avoid a gap in care. Translating the individual risk for patients is the bedside clinician or NP’s goal in developing a treatment plan for secondary stroke care in these patients. The GWTG℠ Patient Management Tool provides the structure for hospitals to monitor quality measures and implement changes to improve secondary stroke quality of care.
CHAPTER THREE PROJECT IN DETAIL

Introduction

This chapter will describe the procedures used to accomplish the project aims. Aim 1 is to describe the stroke structure of care within the hospital, in an urban southwest hospital. Aim 2 will be to describe the process of care by analysis of GWTG\textsuperscript{SM} Patient Management Tool data performance measures for secondary stroke care on 30 TIA and stroke inpatients. Then, Aim 3 will be to discuss steps for implementing a secondary stroke plan for patients prior to their discharge.

Procedures

The first aim of this project is to describe an urban Tucson, AZ community hospital system for acute stroke care. The author was involved in the initial phases of neuroscience administrative meetings. Information was obtained through attending these meetings, conducting interviews with hospital staff, viewing the hospital website and discussion with the medical director in determination of current hospital structure with respect to staff and neuroscience pathway for stroke care.

Aim 2 was to describe the data from the “Get with the Guidelines” (GWTG\textsuperscript{SM}) Patient Management Tool that is related to the prevention of second stroke. GWTG\textsuperscript{SM} is managed by a secure internet data management company called Outcome Sciences, Inc (LaBresh, et al., 2008). The hospital uses the GWTG\textsuperscript{SM} as a quality assurance tool. As part of the quality assurance process, the quality R.N. case manager entered the GWTG\textsuperscript{SM} chart data retrospectively in January 2007 for the last quarter; October through December 2006. A random computer sample was used to identify 30 cases of ischemic stroke or TIA, based on the International Classification of
Diseases, Ninth Revision (ICD-9) diagnosis codes. There are no identifiers in the GWTG™ Outcome Sciences (2007) database. The author obtained permission to use the 30 patients’ data from the hospital’s administrative staff and stroke neuroscience medical director. GWTG™ data was accessed via Outcome Sciences Inc. (2007) password protected website. Cases within the GWTG™ database Patient management tool are identified only by number. In order for the author to become familiar with the database, the author and the quality assurance RN attended a GWTG™ for stroke teleconference over the internet for an hour and a half on data entry technique. Each case was entered through a series of screens that ask information about the performance indicator questions to be answered with a drop down answer. This information determines how each case will be included or excluded in that particular field’s numerator of data. All cases were summarized for each performance indicator related to second stroke risk. The GWTG™ tool reflects performance indicators related to all areas of acute stroke care; including those related to risk for second stroke. There were seven performance indicators for this project, 1) management of lipids prior to discharge, 2) antithrombotic and or 3) anticoagulant use and 4) antihypertensive medications prescribed for discharge, 5) body mass index (BMI) calculations and lifestyle modification, 6) smoking cessation counseling and 7) diabetic medications prior to discharge.

Analysis of GWTG dataset was performed according to the recommendations of GWTG, AHA/ASA. Patient cases were excluded if there was insufficient chart documentation to validate for certainty whether that measure was performed. They were excluded if the patient expired, was transferred to another hospital, or left against medical advice or if there was a contraindication for not meeting the performance standard. The numerator is the subset of patients who meet the criteria that the measure is analyzing. The denominator of patients is the total number of patients that are eligible to be analyzed. Using numerator and denominator
values, the data is expressed as the percent compliance for a given performance measure. The core set of seven descriptors for performance measures are based on evidence and clinical trials. In most pilot studies of this process; a patient was excluded from analysis if all seven descriptors were not addressed (by documentation) for an eligible patient’s care (LaBresh, et al., 2008). However for this project, the author specifically wanted to know if the performance indicators related to secondary stroke risk was performed. Therefore, the author used all 30 cases. Those cases with documentation related to performance indicators of secondary stroke risk was the numerator, and the denominator included all patients that would have been eligible for that performance measure.

Based on the information obtained from Aims 1 and 2, examination of the hospital structure for this project and the GWTG\textsuperscript{SM} data on performance measures were analyzed to obtain the information necessary to describe an implementation plan for the prevention of secondary stroke in hospitalized patients prior to discharge.

Results

The first aim of this project was to describe the hospital system for stroke care in an urban Tucson, AZ community hospital. This project takes place in a 309 bed sub-acute bed and acute care urban hospital with 440 active and provisional physicians and 1700 employees. The hospital is in the process of obtaining their stroke center certification. The units responsible for the care of these patients are spread throughout the hospital including the emergency room, intensive care, telemetry and medical surgical units. Members of the acute stroke team include a medical director who is a neurologist, neurosurgeon, hospitalist internal medicine physicians, staff neurologist(s), vascular specialists, therapists, nurse managers and nursing staff that provide direct clinical care. A quality assurance RN case manager was the data entry staff person and
described to the author how she used the GWTG SM template data collection for each case.

Stroke patients are triaged based on level of need and bed availability by house supervising nurse, floor nurse managers and attending hospitalist physician. The hospital has regular continuing education yearly for hospital staff according to their specific area of primary assignment within the hospital. Over the last two years, there has been skills offered for training on neurological assessment based on the National Institute of Health Stroke Scale (NIHSS), charting and protocols have been presented for hospital staff in anticipation of a designated primary stroke center certification by the Joint Commission. At the time of this study, there were a number of stroke protocols in the process of being formalized in all areas of the hospital. The emergency unit had a standing order sheet in place for rapid assessment and initiation of orders and tests for possible administration of intravenous thrombolytic (t-PA). Laboratory services were working on a more streamline process for the emergency room to receive lab results on stroke patients within 45 minutes. A neurologist is available for consult within 45 minutes of a call from the ER to see a patient 24 hours per day. A neurosurgeon, neurointerventional and neuroradiologist are on staff and available when it is deemed necessary. There were no standard secondary stroke treatment protocols in place at the time of this project. The hospital has done a primary stroke check fair and a cardiovascular outreach education session for the community twice yearly.

The purpose of aim 2 was to describe the data from the “Get with the Guidelines” (GWTG SM) Patient Management Tool that is related to the prevention of second stroke. As shown in Figure 3-1, the demographics of the patient population consisted of 30 patients between the ages of 45-92 with a mean age of 75 years of age. There were 16 females and 14 males; 25 were Caucasian, 3 Hispanic patients and 2 African Americans. With respect to final disposition after discharge, 14 were discharged to home and 14 were discharged to a sub-acute facility. There was one death prior to discharge and 1 transfer to an inpatient hospice unit. With respect to stroke type, there
were 21 patients with ischemic stroke, 3 patients with transient ischemic attack and 6 patients were discharged with stroke of unknown type.
Figure 3-1 Patient Population Demographics
Of the twenty-three patients who were ischemic stroke type and included in the denominator as eligible for the need of a hypertensive medication; all received these medications (100%). See Figure 3-2 Patient Discharge Treatments on 30 inpatients. Of the twenty-seven patients who were eligible to receive antithrombotic, e.g. ASA, warfarin, or antiplatelet medication, 100% were discharged with one of these medicines. This included 7 patients who had either paroxysmal or persistent atrial fibrillation who were discharged on warfarin. There were 13 patients out of 21 eligible who had a documented lipid measurement prior to discharge (61.9%). Two of these eligible patients in the lipid lowering population went home with dietary instructions for a low fat diet (9.5%). Ten out of 21 patients, who were eligible, received a statin medication prior to discharge (47.6%). Qualification for this inclusion was LDL-C of > 100 mg/dl. Of the seven eligible patients who had diabetes, no patient (0%) went home with diabetic medications. Of the six smokers who came in with stroke or TIA, 5 received smoking cessation medication with counseling and 1 patient received antismoking medicine only (100%). There were 0% Body Mass Index (BMI) calculations or lifestyle recommendations in 14 patients that were discharged to home. The exception was for documentation of 2 (9.5%) out of 21 patients were told to lower dietary fat intake. BMI calculation inclusion was those patients with a BMI greater than or equal to 25 kg/m² who receive recommendations at discharge for a weight reducing diet and/or increasing physical activity. See Figure 3-2 on Patient Discharge Treatments on 30 Inpatients.
Figure 3-2 Patient Discharge Treatments on 30 Inpatients
The goal of Aim 3 was to develop a plan for implementing in-hospital stroke guidelines for prevention of second stroke for in patients with stroke or TIA based on the information obtained in Aims 1 and 2. Figure 1-1 “Theoretical framework for secondary stroke prevention” describes the structure, process and outcome that could improve secondary stroke prevention using the GWTG℠ Patient Management Tool. The information in Figure 1-1 forms the basis of the Implementation Plan.

Steps in Implementation Plan

1. Establish administrative support for stroke team efforts.
   a. Invitation to stroke meetings and informative trainings.

2. Identification of multidisciplinary stroke team members.
   a. Neuroscience medical director, collaborative hospitalist(s) and nurse practitioner, rehabilitation therapist and nurse manager.

3. Establish regular meeting schedule for Stroke Team and administrative support staff
   a. For example, a meeting every other Wednesday at noon.
   b. Professional participation in webcast GWTG for stroke trainings regularly.

4. Develop policy and procedures.
   a. Standing orders for inpatient second stroke risk protocol for evaluation of cardiovascular, medical and lifestyle risk and family history.
b. Establish an electronic charting form for individual secondary risk education by team.

c. Establish a standardized guideline tool for bedside evaluation of cardiovascular and cerebrovascular risk scoring with treatment protocol for providers.

5. Identify Quality RN for concurrent stroke and TIA case review prior to discharge.

6. Quality evaluation of GWTG\textsuperscript{SM} Review of inpatient data at quarterly meetings by stroke team.

7. NP and stroke team education of stroke and TIA patients and families:

   a. Identification of individual cardiovascular and lifestyle risk and counsel of modifications, including smoking cessation and moderation of alcohol use.

   c. Evaluation of individual BMI scoring with appropriate exercise and dietary recommendations.

   d. Education of comorbidity disease risk and prevention for second stroke.

   e. Medication counsel and importance of statins, antihypertensives, antiplatelet and anticoagulants, etcetera.

   f. Signs and symptoms of stroke.

   g. Establish follow up program with primary care offices.

   h. Establish community support group for stroke patients and their families.
CHAPTER FOUR DISCUSSION AND CONCLUSION

The results from Aim 1 demonstrated that the structure for this plan is in the initial phases of development at this hospital. The hospital was in the beginning phases of identifying the key administrative staff that were in places of leadership. Some of the written protocols for care of stroke and TIA patients were being developed. System wide planning is important in providing the structure necessary to sustain a quality improvement program in alignment with the AHA, ASA guidelines, and the Joint Commission’s standardized core measure set. The system structure efficiency is enhanced with strong stroke center leadership, a stroke team, collaboration among primary physicians, specialists and nursing staff, hiring of experienced cerebrovascular staff that is supported by technological and administrative support. Administrative support is absolutely necessary to establish the stroke care policy and procedure that follow current guidelines for secondary inpatient care.

The results from the GWTG\textsuperscript{SM} Patient Management Tool showed that among the 28 patients (excluding 1 death and 1 hospice patient) there was a minimal amount of secondary prevention performed among hospital staff that was documented and therefore included for this project. Guidelines for lipid lowering dietary and lifestyle recommendations on most patients was very limited, for many there was no inclusion for the project because their BMI was not calculated or lipids were not evaluated during their hospital stay by a clinician. Although most patients benefit from receiving lifestyle recommendations from a provider such as monitoring their blood pressure, physical activity, smoking cessation and dietary modifications, there was very little of this
documented for this patient population. For the 7 diabetic patients in this project, they either had all their diabetic medications prior to admission established, or there was a deficit in documentation by hospital staff. For all patients in the study group that admitted they were smokers, there was appropriate treatment given. In summary, overall the measures for second stroke with regard to medications were done well, however all measures were not met. The technological resource that is available through GWTG<sup>SM</sup> tool provides convenient, evidenced based, systematic evaluation for hospital compliance with standards of secondary stroke care. The use of this tool can improve patient outcomes, close the gap in care between hospital discharges and follow up in primary care and decrease the incidence of second stroke occurrence.

The author plans to present the results of this study for review to the neuroscience medical director and clinical care manager for review of planned implementations. It is from the outcome of this study, the author hoped to create an evidence base with which to work from in establishment of the GWTG<sup>SM</sup> tool and initiate a plan for a quality stroke system of care within the hospital setting.

The limitations of this study were that this was a pilot study of a small group of patients prior to any policy or procedure for secondary stroke education was in place for this hospital. The GWTG<sup>SM</sup> patient management tool was in place for one quality assurance RN to gather post discharge data on a part time basis. At the time of this study, data collected was limited based on how this information was being utilized to gain improved quality in secondary stroke care measures. It is possible that the focus was
more on the acute stroke care measures instead of the secondary prevention measures since the author did not personally review charts and enter data. Another limitation based on the group size was there may have been demonstrable improvement in compliance with quality measures with a larger group or longer analysis time frame.

The strength of this study was that it identified gaps in practice in this institution’s structure and quality process that would improve outcomes for secondary prevention of stroke if addressed. Infrastructure administrative support that establishes primary stroke team members and concurrent quality data prior to discharge via the GWTG tool can demonstrate the improvement on an ongoing basis. The literature has demonstrated that the follow up care of these patients shows improved risk reduction for second stroke with maintenance of medications and lifestyle modifications for up to a year after their primary stroke. The GWTG\textsuperscript{SM} Patient Management Tool provides education information of individual secondary stroke risk that can be obtained via the internet for use. AHA/ASA’s provide ongoing professional teleconferences and webcasts for education and support to train staff. This ongoing education effort by professional organizations improves the user-friendliness of the tool, which in turn can increase the efficiency of its use.

The professional nurse practitioner role in this plan for implementation is grounded in the importance of a stroke system of care within the community. The NP’s training to evaluate a patient’s history, medications, diagnostic studies, laboratories and physical assessment allows them to evaluate secondary stroke risk. NP collaboration with stroke
team members, nursing staff and providers of stroke care could improve the streamlining and accuracy of documentation of care. The establishment of NP initiated individual secondary stroke care treatments within the hospital could extend to follow-up care after discharge, serving to bridge the gap that now exists between the patient’s hospital discharge and appointment with their primary care physician or nurse practitioner. Finally, NP efforts to formalize stroke care using established guidelines may reduce the incidence, mortality, and disability from stroke or TIA.

Areas for future research from this study are to examine inpatient stroke care concurrently using a broader population of patients whom have had secondary stroke education using the GWTG\textsuperscript{SM} tool. Observations of future groups at quarterly interval review periods would increase the knowledge base of organizational changes that can improve adherence to guidelines using the GWTG\textsuperscript{SM} tool. Clinicians need tools such as GWTG\textsuperscript{SM} to increase bedside efficiency in using evidenced based care. As we move toward healthcare efficiency with reliance on technological tools, there will be a need to show through research that the improvement can be demonstrated.
REFERENCES


