Welcome to the winter/spring 2010 edition of the Stroke Center Newsletter. As always, AMH strives to be a leader in stroke care in the Delaware Valley and remain on the leading edge of service and technology for our patients and the community. This issue covers a number of areas where we have moved closer toward achieving our goals.

Acute Stroke
We continue to work toward achieving more rapid therapy to open occluded vessels with rt-PA or mechanical methods. The success in providing intravenous rt-PA is measured by the “door-to-window” time which has shortened considerably over the years. One of the exciting developments has been partnering with EMS, specifically the Second Alramer’s Rescue Squad, to identify stroke victims in the field, assess their severity, and notify the Emergency Trauma Center staff prior to arrival so that immediate diagnostic studies and treatment can be obtained. Captains Chris Reif and Brad Nash have been instrumental in moving this program forward, adopting a pre-hospital scale developed at AMH. As a result of these efforts, AMH has exceeded the national average for IV rt-PA administration for acute stroke.

Until recently, patients who wake up with stroke have been excluded from receiving rt-PA therapy because of the unknown time of onset. With the expansion of the time window for IV therapy to four and one-half hours for selected patients, and the ability to treat other patients with intra-arterial therapy beyond four and one-half hours, we are striving to provide some of these patients with the opportunity for additional therapy. Qaisar Shah, M.D., and Osman Kozak, M.D., have been working to screen patients for rapid admission to the catheterization lab, in hopes that they will benefit from intra-arterial therapy. The decision is based on the clinical exam and CT angiography to determine if there is salvageable brain tissue and vessels can be safely opened.

While this therapy is still considered experimental by some, it is expanding rapidly throughout the country. AMH is fortunate to have the only stroke center in Montgomery County with 24/7 availability of this type of interventional therapy on-site. Without the support of staff from EMS, the Emergency Trauma Center, neurosciences catheterization lab, CT, Neuroradiology, and Neuro-Critical Care this would not have been possible.

Recognizing and treating strokes that develop in the hospital has been a challenge for hospitals throughout the country. Education on the floors, availability of the MET team, and protocols to speed up delivery of diagnostic studies and therapeutic intervention has resulted in a considerable increase in inpatient stroke...
recognition. In 2008 only three patients were identified. In 2009 this number grew to 20.

Hospital-based Evaluation and Therapy
With the arrival of Laramie MacKenzie, M.D., a neurointensivist trained at the University of Pennsylvania, we have instituted new and additional procedures to evaluate critically ill patients, including Licox® therapy. In order to capture subclinical seizures and changes in cerebral function, there are now plans for placing 24-hour EEG monitoring in the ICU. Two units in the ICU/STU have transitioned and merged to form a new Neuro-Critical Care unit. We also welcome Dan Gzesh, M.D., former director of the Stroke Service at Drexel University, who will be participating in our program.

Beginning March 1, three beds on the 3WW Stroke Unit are designated for more intensive monitoring by nursing. This Neuro Intermediate Unit will be available for patients being transferred out of the neuro ICU but who need frequent neuro assessments. They will also serve as beds for patients being admitted from the ETC who need frequent neuro assessments but may not require an ICU bed; e.g. very small intracranial hemorrhages.

On the rehab side, therapies are in place and have been providing great success and satisfaction for patients recovering from stroke. These include Nintendo Wii® therapy, Bioness® for arm and leg movement, Parrot® for speech therapy, Vital Stim® for swallowing therapy, Novavision® for patients with visual field loss and Lite Gait®.

Prevention/Education
Community and staff education remains a priority for our stroke program. We had an extremely successful Stroke Community Conference on October 15, where physicians, EMS and patients spoke about stroke and their experiences. Another community conference is planned for May 11, to coincide with National Stroke Month.

The October conference was followed, on October 16, by a spectacular regional Stroke Neurovascular conference organized by Qaisar Shah, M.D. Renowned speakers attracted a full house. The first issue of a new journal, Abington Annals, was distributed, with original articles written by AMH staff. Another conference is planned for October 1, 2010. Special thanks to the conference planning committee: Beth Ann Neill, Barbara Vasco, Kathy Esmond, Nancy Gogal and Debi Murphy, C.R.N.P.

For the pediatric age group, the Stroke Center continues to be involved in the Poppy Bear program, designed to help children overcome their fear of being in the hospital. Visits to the Stroke Unit are an integral part of this program.

A revised and updated version of our Stop Stroke DVD is now available and continues to provide information about acute and chronic stroke care, as well as prevention. If any practices wish to obtain copies, please call Debi Murphy, C.R.N.P., at 215-481-3627.

continued on page 3
In order to meet the Joint Commission’s educational requirements, we counsel patients and the public to:
1) know the warning signs of stroke;
2) call 911 immediately for signs of stroke;
3) know their risk factors for stroke;
4) know the medications prescribed for them; and
5) follow up with their physician after discharge.

Stroke Clinical Trials
AMH continues to actively participate in stroke trials and registries. We are currently enrolling in the Alias Trial—administering albumen versus placebo to patients with acute stroke. David Weisman, M.D. is the principle investigator for that study.

We are about to begin the Point Trial—evaluating high-dose clopidogrel (Plavix®) in patients with TIA and mild stroke. Dan Gzesh, M.D., is the principle investigator.

Qaisar Shah, M.D., and Osman Kozak, M.D., are maintaining a registry of patients in the Sapphire Trial. In addition, they have been approved for the START trial to evaluate endovascular therapy in patients with moderate to severe stroke who are not candidates of IV rt-PA.

Recognition
We are proud and delighted to receive the American Stroke Association’s Gold Performance Award and Gold Plus Award. The huge efforts by Debi Murphy, C.R.N.P., coordinator, Stroke Center; Andy Years, R.N., neurology and research nurse; and many other members of the staff have not only enabled us to “Get With The Guidelines” but to achieve national recognition as a Stroke Center.

Abington Memorial Hospital again participated in the Delaware Valley Stroke Council (DVSC) fund raisers, sponsoring two tables at their “Stars for Stroke Gala” in November and providing a huge crowd for their “Strides for Stroke” walk in June. Bonnie Klenk, R.N., did a great job in organizing this event.

Finally, we are looking forward to the Joint Commission’s visit in March, so that we can, once again, achieve re-certification and recognition for the huge efforts by our stroke team and administration.

Be on your toes.
Know the signs of stroke.
Pick up a refrigerator magnet or DVD and we are ready to go!
Patients with Acute Wake-Up Stroke (WUS)

Because we are now able to treat selected patients beyond the three-hour window with intra-arterial therapy, with some consideration being given to patients up to eight hours, it makes sense to evaluate patients who wake up with stroke symptoms. Many of these patients will have had their stroke a short time before awaking, and would have been candidates, if they had known when their stroke began.

Selecting patients for this type of delayed therapy must be done cautiously to provide maximum benefit and minimum harm. The selection of patients should certainly not exceed those already chosen by the neurology and neurovascular service to institute delayed therapy. In fact, the criteria for treatment should probably be more restrictive to start.

The rapid evaluation of these patients depends in large part upon the recognition of the ETC physicians and staff of wake-up stroke (WUS). When this occurs, immediate CTA and CTA-perfusion study, in patients with a history consistent with normal renal function, or documented normal renal function, should be performed. In patients where renal insufficiency may be present, a stat MRI/MRA and perfusion study should be ordered. The patient should be hydrated with IV saline immediately upon arrival and prior to the CTA or MRI. Most of these patients have had no fluids for more than eight hours.

In order to qualify for treatment, there must be occlusion of a large intracranial artery in the distribution of symptoms, with no evidence of hemorrhage. Large infarcts—greater than one-third of the distribution of the vessel involved—should be excluded regardless of the interpretation of the perfusion study. A perfusion/diffusion mismatch must be present. The National Institute of Health Stroke Scale (NIHSS) should be greater than four. Blood pressure should match IV rtPA standards.

The family and, if possible, the patient must understand that this protocol does not conform to the FDA approved use of rtPA and a consent will need to be completed. This should include discussion of intra-arterial therapy as well as the higher mortality in this population (15% in the study).

Finally, this approach obviously lends itself to a prospective study, as noted in the article "Thrombolytic Therapy for Patients Who Wake Up with Stroke," Stroke 2009;40;827-832.

AMH Case Study

Upon awakening, an 86-year-old female experienced acute onset of right-sided weakness, visual field loss, and loss of language comprehension. The patient was transferred by EMS to AMH where she was quickly assessed and found to have an NIHSS of 20. The NIHSS assesses neurological deficit on a scale of 0 to 42. The higher the NIHSS is, the worse the deficit. Because the time of onset was unknown, the patient was not considered a candidate for IV rt-PA, which has a zero- to three-hour window from time of symptom onset. In some instances IV rt-PA can be administered up to 4.5 hours from symptom onset. The patient was taken to CT imaging where she underwent CT angiography and CT perfusion tests.
**Wake-Up Stroke** continued from page 4

**Clinical Findings**
CT perfusion showed a mismatch between the cerebral blood volume (CBV) and the mean transit time (MTT), demonstrating that there was ischemic tissue at risk of infracting which could be saved if blood flow was restored to the at-risk area. This patient was taken emergently to the catheterization lab where she was immediately prepped for cerebral intervention.

**Intervention**
CT angiography confirmed an occlusion in the distal segment of the left middle cerebral artery (MCA) with cerebral perfusion loss. Two vessel passes with the Merci® clot-retriever device resulted in complete revascularization to the left MCA. The time of patient presentation to AMH to fully restored cerebral blood flow was one and one-half hours.

**Outcome**
The patient remained in the neuro ICU for 24 hours. Her neurological examination at 24 hours showed significant improvement. She was discharged to rehab three days later. At the time of discharge, the patient demonstrated minimal disability in language skills, complete ability to eat, good strength and movement of her four extremities and normal vision. Her NIHSS at discharge was 2.
Quick triage to AMH provided this patient who woke up with a stroke a chance to recover from severe disability.

**Delaware Valley Stroke Council—Strides for Stroke 5K Run/Walk**

The Delaware Valley Stroke Council held its annual *Dr. Howard Mazar Strides for Stroke Run/Walk* at the Philadelphia Art Museum on June 14, 2009. The AMH team came prepared with a great name—*Stroke Busters*. They sported Stroke Center caps, t-shirts, and an AMH *Stroke Buster* sign.

We have serious competition every year and we are always looking to increase our team. You can run or walk the 5k which will be held this year on June 6.

So please join our team! Contact Bonnie Klenk at extension 7440, or Debi Murphy at extension 3627, to sign up for a fun time and support stroke.

**AMH team name:** *Stroke Busters*

**AMH team captain:** Bonnie Klenk, R.N.

**Team awarded one medal:**
Winner—Sherri Williams, runner
In May 2009, Abington Memorial Hospital’s Stroke Center again was awarded the American Stroke Association/American Heart Association’s Gold Performance Award and Gold Plus Award. AMH was recognized for sustained performance (two or more years at 85% or higher adherence) to all performance measures for stroke care under their Get With The Guidelines stroke program. This is difficult to sustain and takes true commitment, motivation and dedication of the stroke team.

Abington Memorial Hospital, along with other leaders in stroke care, was recognized in an article in the July 2009 “America’s Best Hospitals” edition of U.S. News & World Report. All of the recognized hospitals are acknowledged at the International Stroke Conference, on the ASA website, and in advertisements in the American Heart Association’s two journals, Circulation and ASA Stroke.

This is quite an honor for all of us, including our patients. Providing excellent patient care is the best recognition a hospital can get. Congratulations and thank you all for your commitment, motivation and passion in supporting this program, and for taking such great care of our patients!

Thanks to Andy Years for assisting in the collection and recording of stroke data over the past year! The stroke census covers approximately 85 to 92 patients per month, reflecting the four quarters of 2009.

Seven ASA Performance Indicators
—Percent of acute ischemic stroke patients who arrive at the emergency department of the hospital within two hours of the onset of stroke symptoms, who receive IV t-PA within three hours of the onset of stroke symptoms (100%)
—Percent of ischemic stroke or TIA patients who receive antithrombotic medication within 48 hours of hospitalization (99.6%)
—Percent of ischemic stroke or TIA patients discharged on antithrombotics (warfarin, aspirin or other antiplatelet drugs) (99.4%)
—Percent of ischemic stroke or TIA patients with atrial fibrillation who are discharged on anticoagulation therapy (warfarin/Coumadin® or heparin/heparinoids) unless an absolute or relative contraindication exists (97.6%)
—Percent of patients at risk for deep-vein thrombosis (DVT) who received DVT prophylaxis by the second hospital day (99.3%)
—Percent of ischemic stroke or TIA patients with LDL>100 mg/dL and discharged on a statin if not contraindicated. GREAT JOB!!! Last year 86% (90.2%)
—Percent of smokers who receive smoking cessation advice or medication (e.g., Nicoderm® or Zyban®) at discharge (96.8%)

continued on page 7
As a certified primary stroke center, AMH is responsible for monitoring eight Joint Commission stroke-specific measures.

—DVT prophylaxis

—D/C on antithrombotics

—patients with AF receiving anticoagulant therapy

—rt-PA administered

—antithrombotic therapy by end of hospital day two

—discharge on statin medication

This is one indicator we continue to improve. We have done a great job—up to 90.2% compliance for the year!

—Stroke education must include: activation of 911, need for follow-up after discharge, medications prescribed, personal risk factors for stroke, and warning signs and symptoms of stroke. All five components must be documented to include in numerator.

—assessed for rehabilitation

Documenting the five components of stroke patient education: this measure has been and continues to be our challenge. Our goal is to improve this to greater than 90% and maintain it. We are slowly getting there!

Quarter 1 2009 79.8%
Quarter 2 2009 74.8%
Quarter 3 2009 78.4%
Quarter 4 2009 85.6%

Fiscal stroke census #ais total iv tpa amh national year in gwtg in gwtg patients average average
2003 434 233 7 3.0% 2 to 3%
2004 599 351 15 4.2% 2 to 3%
2005 653 351 13 3.7% 3%
2006 750 421 25 5.9% 3 to 5%
2007 750 436 43 9.8% 3 to 5%
2008 824 450 50 11% 3 to 5%
2009 501 (July to Dec) 256 23 8.9% 3 to 5%
From a Hieroglyphic to the Diamond

Though it is believed that medicine began in roughly 3000 BC with the ancient Egyptians, some of today’s modern medical practices have more recent beginnings. Emergency Medical Services (EMS) have become an integral part of the provision of life-saving medicine in the chain of survival, and most recently have taken a more proactive role in stroke identification, care and notification thanks in part to the work of B. Franklin Diamond, M.D., director, Stroke Center. Oliver Wendell Holmes once said: “The great thing in the world is not so much where we stand, as in what direction we are moving.” As such, it is important to understand where this project has come from and is now going.

Ambulances have only been transporting the sick and injured since 1865 starting at Cincinnati General Hospital. In their humble birth they had “ambulance drivers” staffing vehicles with limited medical training and few supplies. The days of the ambulance driver have long since passed, and the modern paramedic has evolved, as did the education, responsibilities and scope of practice associated with this unique medical provider. Second Alarmers Rescue Squad, the Pennock Emergency Trauma Center, and the departments of Neurology and Neurointerventional Care have partnered together to develop the critical role that EMS will play, and focus the untapped abilities of the modern paramedic in dealing with the acute stroke patient.

Traditionally, the nationwide standard of care taught to EMS providers for the assessment of acute stroke patients includes a very basic assessment done with a Cincinnati or LA stroke scale. Years ago, Diamond recognized the need for a better field assessment tool and developed the Abington pre-hospital stroke scale. The Abington pre-hospital stroke scale is a modified version of the National Institute of Health stroke scale (NIHSS) which compresses the original NIHSS and includes additional criteria and indicators important for rapid field assessment of the acute stroke patient. A select team of senior paramedics has been actively piloting a program with the Abington pre-hospital stroke scale to field test this revolutionary assessment tool. This pilot program has helped refine the scale and has now moved this exceptional tool from concept to a practical application ready for full use by EMS.

Paramedics from Second Alarmers Rescue Squad have received detailed in-services on Abington Memorial Hospital’s stroke program from Diamond and Qaisar Shah, M.D., in four separate training sessions. Additionally, over half of the company’s paramedics have voluntarily completed training and become certified on the National Institute of Health stroke scale (NIHSS) program all in an effort to become more proficient in stroke assessment. These providers have willingly chosen to take on the gold standard of training established by the American Stroke Association to help provide the best stroke assessments possible. This research study was submitted and approved by Abington Memorial Hospital Institutional Review Board.

continued on page 9
Abington Memorial Hospital

ACUTE STROKE TREATMENT  continued from page 8

As of August 1, 2009, every emergency call for the Second Alarmer’s Rescue Squad that involves a potential acute stroke patient will receive an Abington pre-hospital stroke scale assessment by a qualified paramedic. The program will be maintained by internal quality assessment (QA) and continuous quality improvement (CQI) programs in addition to sharing performance information with the Stroke Center to ensure that the highest level of excellence is being provided to patients.

Dr. Diamond; Dr. Shah; Debi Murphy, C.R.N.P.; Captain Brad Nash; and Captain Chis Reif are investigators for this research study.

Medicine continues to evolve and advance at an astounding rate. Though EMS is still in its infancy, paramedics can be an extremely effective tool in the recognition and treatment of the acute stroke patient. This exciting partnership only exemplifies the crucial need for pre-hospital and intra-hospital services to work together. Dr. Diamond’s vision for reliability and consistency in an assessment tool was far ahead of its time, but fortunately its time has come.

PEDiatric ORIENTATION PROGRAM

Abington Memorial Hospital’s Stroke Center participates in the Pediatric Orientation Program. Children, ages four to six years, learn a very important lesson: if they ever need to come to the hospital, everyone here will take good care of them and they don’t have to be afraid.

Children enjoy seeing, discussing and handling a brain model. Nurses demonstrate how the brain works by doing a brief, very interactive neuro exam and test of the cranial nerves. Children are asked to identify different smells with their eyes closed. They are given age-appropriate stroke coloring books and a colorful AMH Stroke Center stress brain. Although it may sound intimidating, this is truly a fun experience for all.

Pictured left to right are: Captain Christopher Reif; Paramedic Jonathan Detweiler; Lieutenant Renee Bates; Paramedic Todd Vreeland; Paramedic Tara Tashjian; Lieutenant Ken Davidson; Captain Brad Nash; and Paramedic Bruce Chew.
Community Health Services provides a variety of screenings for employees and the community throughout the year. From July 2009 thru December 2009, Abington Health conducted 1,371 blood pressure screenings at 60 events, and 400 stroke risk assessments at 33 events.

Heart and stroke risk assessments are offered at numerous locations throughout the community. Participants are offered an opportunity to speak with healthcare professionals to address their specific concerns. Health information is distributed to raise awareness and increase knowledge of cardiovascular diseases and health risks that can lead to heart disease and stroke. Healthy nutrition and lifestyle changes are discussed, as well as locations for care that address the needs of the uninsured.

New to our cadre of health professionals are two registered nurses who are fluent in English and Korean. Cynthia Echewa, R.N., community health outreach nurse, coordinates efforts to provide health education programs and prevention screenings for diverse populations in the Abington, Warminster and North Wales communities. In 2009, a number of new sites were added.

Screenings are now provided at the Giant® food stores in Montgomeryville, Willow Grove, Blue Bell and Warminster. All screening locations, dates and times are posted on www.amh.org, as well as in Ideas for Healthier Living/Touching Your Life.

On February 5, Community Health Services, the Comprehensive Heart Failure Program, and Public Relations and Marketing offered Go Red for Women, a program to raise awareness that heart disease is the number-one killer of women, and stroke is the third cause of death in women. Health information, blood pressure screenings and heart and stroke risk assessments were provided.

Also in February, Wednesday for Women, a heart-disease prevention event was held at the Willow Grove and Plymouth Meeting malls. These events offered information about heart disease, heart screenings and an opportunity to question cardiologists about heart health. Stress-reducing tips, mini-massages, dark chocolate and one glass of red wine were also part of this exciting program. Approximately 175 women attended this event.

In order to better serve our community, a review of data gathered during community screenings was initiated by Marianna Calabrese, director, Community Health Services. Pat Anasiewicz, R.N., Community Health Services; Sue Wendell, R.N., CQI; Chris Ockenlaender, Community Health Services, teamed up to analyze and compile data that will assist in targeting cardiovascular disease prevention services more effectively.

Stroke risk assessments are obtained by checking pulse, blood pressure and listening for carotid bruits. These assessments include a review of controllable risk factors (high blood pressure, atrial fibrillation, high cholesterol, diabetes, tobacco use, smoking, alcohol use and obesity) and uncontrollable risk factors (age, gender, race, family history, previous stroke or TIA).

continued on page 11
In reviewing statistics for the stroke risk assessments, it was discovered that 46% of participants currently have a history of hypertension and 84% are taking medication. At the time of screening, 45% were considered pre-hypertensive (systolic 120 to 139, diastolic 80 to 89). In addition, 49% had a history of high cholesterol, but only 73% were taking medication.

While the prevalence of hypertension and high cholesterol mirror results found in the community and the nation, it serves to reinforce the importance of educating the public. Each of us can and should play a role in bridging this knowledge gap. In a nation where someone dies of a stroke every three to four minutes on average, we can’t afford to do less.

**Making a Difference in Our Community**
Abington Memorial Hospital continues to make a difference in our community. On more than a few occasions, a simple health screening produced a life-saving outcome.

During a screening at the Willow Grove Park mall, a middle-aged man complained of chest pain. The nurse questioned him about his symptoms and monitored his blood pressure and other vital signs. Based on her observations, it became clear that this man needed immediate treatment. A 911-call was made and the man was transported to Abington Memorial Hospital.

In screenings at the Shorday Atrium, several people were directed to the Emergency Trauma Center for dangerously high blood pressure readings.

At a community health fair, a man complained of a headache. He was on daily medication for hypertension, and his blood pressure was very high. EMTs at the health fair immediately transported him to the Emergency Trauma Center at Abington Memorial Hospital.

For more information about health education programs and screenings, please call the Department of Community Health Services at 215-481-2204.