A Guideline for Acute Stroke: Evaluation of New Jersey's Practices

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ABSTRACT

The purpose of this study was to determine the effectiveness of processes and guidelines for the patient with acute stroke receiving care in New Jersey acute care hospitals in 2010. Lack of adherence to established protocols for acute ischemic stroke may significantly affect the outcomes of care. The lack of available literature providing evidence of prior practices for stroke care in the state of New Jersey precludes a comparison with current practices. This was a descriptive study utilizing an electronic survey developed by the researcher. A convenience sample was utilized for this study consisting of stroke healthcare professionals (N = 79) within the state of New Jersey. The survey yielded a response rate of 70%. Respondents provided information on level of education, average time in position, duties, issues impeding job performance, information related to hospital practices, and stroke core measure compliance within 30 days before the survey. Study results allow designated and nondesignated centers to address issues identified and change or revise protocols accordingly.

Keywords: compliance, guidelines, satisfaction, stroke, stroke center designation

Guidelines established by the American Stroke Association (ASA) and the Brain Attack Coalition (BAC) for care of the patient with acute stroke illustrate the exceptional care that can be provided by healthcare professionals around the country (Dippel & Simoons, 2009; Heinemann et al., 2003; Luker & Grimmer-Sommers, 2009). Studies have provided evidence linking decreased cost and reduced mortality and disability with the establishment of stroke criteria, stroke response teams, and stroke units (Douglas, Burchett, Kuchibbhatla, Cohen, Blazer, 2005). Stroke centers undergo rigorous evaluations to gain the disease-specific care designation as a primary or comprehensive stroke center from The Joint Commission or the state designating services. Nationwide, there are about 50 state stroke coalitions (Washington Stroke Forum, 2012). These states provide standardized measures of care in compliance with national guidelines established by the ASA and the BAC (ASA, 2008; State of New Jersey Department of Health and Senior Services, 2009).

In addition to The Joint Commission, in New Jersey, the state service for stroke center designation is the New Jersey Department of Health and Senior Services (NJDHSS). The application process varies between the two designating bodies. The NJDHSS requires the submission of a lengthy application for the initial certification; renewal is automatic with hospital licensure renewal. As of this date, the NJDHSS has not conducted many onsite visits for the initial designation or during the redesignation process. The Joint Commission's application process, however, is more stringent, consisting of onsite visits, official presentations, and tracer evaluations by reviewers as well as evaluation of all processes followed. The designation as a stroke center occurs when evidence is provided in support of compliance with national standards, establishment of clinical practice guidelines, and performance improvement/quality improvement activities (Lichtman et al., 2009).

Improvements in outcomes are evident in greater percentages when a larger number of hospital staff accepts and adheres to guidelines, which provides improvement of care of the patient with stroke (Douglas et al., 2005; Mitchell, Ferketich, & Jennings, 1998). There is a lack of literature on the statewide guideline compliance for acute stroke. Hospitals submit data to various repositories to evaluate their compliance with stroke measures of care. Compliance is measured against a benchmark to identify their level of compliance. Collecting information on the type of facility rendering care, such as a stroke center, is an innovative strategy to determine differences in compliance rates by designation type (primary stroke center, comprehensive stroke center, and acute care hospitals with no stroke center designation).

Recommended guidelines for care of the patient with acute stroke consist of policies, procedures, specialized order sets, clinical pathways, discharge planning, education for patients and family members, ongoing staff education, research, and outcomes management (Hickey & Grota, 1999). Healthcare professionals have

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identified evidence that guidelines compliance improves care; however, some guidelines require a greater degree of change to implement (Heinemann et al., 2003). Facilities not designated as a specialty center may not have sufficient resources to educate staff or may not have specific processes or protocols in place to provide the best care, which may lead to a negative effect on clinical outcomes (Dippel & Simoons, 2009). In essence, certification as a stroke center means that the hospital follows recommended guidelines; however, this may not always be the case, as fallouts do occur.

Few studies exist investigating statewide acute stroke care. Stroke care within the "Stroke Belt" of the southeastern United States, an area known for its high incidence of cerebrovascular disease, was evaluated to see how widely tissue plasminogen activator (t-PA) was used for acute stroke and the characteristics of the medical facilities offering this drug (Dippel & Simoons, 2009). It was identified that t-PA was available for use to a great percentage of residents; however, use of other stroke protocols was lacking, which may affect outcomes and costs of care. At that time, the BAC recommendations for stroke care were not available for publication. A follow-up study investigated the changes in stroke treatment and prevention services in the Stroke Belt (Camilo & Goldstein, 2003). Diagnostic studies and in-patient rehabilitation services were found to be increased between 14% and 25%, and t-PA administration increased 11% in hospitals that followed established protocols for stroke care. The percentages for administration of t-PA for acute stroke remain low in some hospitals, as the patients do not seek care within a timely fashion, which may lead to negative outcomes (State of New Jersey Department of Health and Senior Services, 2009).

Studies have investigated the relationship between hyperglycemia during acute stroke and clinical outcomes. Blood glucose levels over 140 mg/dl have been associated with poorer outcomes (Alvarez-Sabin et al., 2003). More specifically, hyperglycemia upon admission in patients with stroke augments brain injury (Baird et al., 2003) and increases mortality and morbidity (Gale, Sicoutris, Reilly, Schwab, & Gracias, 2007). Furthermore, diabetes has independently been found to predict stroke mortality and influence outcomes associated with nonlacunar stroke and in patients undergoing reperfusion (Alvarez-Sabin et al., 2003; Hamidon & Raymond, 2003).

In this study, I queried the current practices for hyperglycemia management of the patient with acute stroke.

The gap between best practice and current practices is evident. There is a potential for change in evidence-based practice. Theories and models for change in healthcare practice have been investigated. It has been determined that, to rectify this situation, we must have a solid understanding of the problem, the target group, and any obstacles to cultivate strategies enabling change (Glasson et al., 2005; Grol & Wensing, 2004).

This author examines the effectiveness of processes and guidelines for the care of stroke patients across 34 hospitals in New Jersey.

Study Description and Study Design

The purpose of this study was to determine the effectiveness of the processes and guidelines for the care of a patient with acute stroke in acute care hospitals in New Jersey (primary, comprehensive, or no stroke center designation). This was a descriptive study defining the educational preparation of stroke coordinators, managers, and/or administrators; evaluating provider practices in compliance with acute stroke guidelines for care; and determining stroke healthcare professional's perceptions of care and their satisfaction with their facilities' guideline compliance.

Target Population and Study Sample

There are 41 acute care hospitals designated by the NJDHSS and 35 designated by the Joint Commission as primary stroke centers. Twenty-two hospitals have dual designation with both licensing entities. Twelve acute care hospitals are designated as comprehensive stroke centers (State of New Jersey Department of Health and Senior Services, 2009; The Joint Commission or the New Jersey Division of Health and Senior Services, 2008). There are 15 acute care hospitals in New Jersey without stroke center designation; of those without designation, 10 are currently following a process or protocol for the care of the patient with stroke.

To gain a better understanding of stroke care in the state of New Jersey, all acute care hospitals following a protocol for the care of the patient with acute stroke in New Jersey were included in the initial sample. Exclusion criteria were respondents who are not bachelor-prepared nurses and those respondents without the title of stroke coordinator, manager, or administrator in an acute care hospital in the state of New Jersey. As each institution has only one person in this position, adding these job titles as inclusion criteria eliminated multiple respondents from the same institution.

A significant percentage of the convenience sample for this study consisted of members of the New Jersey Stroke Coordinators Consortium (NJSCC), a professional nursing organization representing stroke healthcare professionals from hospitals, rehabilitation facilities, and the American Heart Association/ASA within the state of New Jersey. Stroke healthcare professionals from 33 Joint Commission-designated stroke centers, 42 New Jersey State licensed stroke centers, and other healthcare facilities (American Heart Association, Kessler Rehabilitation Institute) within the state of New Jersey belong to the NJSCC. The NJSCC members consist of nurses (stroke coordinators) and other healthcare professionals such as nurse educators; performance improvement coordinators; advance practice nurses (APNs); and managers, directors, and/or administrators of stroke programs. This group meets quarterly to discuss issues presented in the care of the patient with stroke and provide a forum for healthcare professionals to discuss goals and opportunities and share ideas and practices as well as common issues in stroke and stroke center management (Reilly & McCall-Brown, 2009). Participants in this study completed an electronic survey developed for this study. Two stroke coordinators from the Joint-Commission-designated hospital participated in the pilot study and were not included in the final sample.

Instrument Development

The survey that was developed for this project was evaluated for content validity to strengthen the survey, determine the appropriateness of the questions, and set a timeframe for completion. Three Neurovascular Education and Training in Stroke Management and Acute Reperfusion Therapy-Stroke fellows reviewed the survey and provided feedback: two were content experts from California, and one was from Arizona. Neurovascular Education and Training in Stroke Management and Acute Reperfusion Therapy-Stroke is an online educational program supporting the learning needs of advanced practice nurses, nurse practitioners, clinical nurse specialists, clinical staff, and physicians in the care and treatment of stroke (Arizona State University, n.d.).

Data Collection

Institutional review board approval was obtained from University of Medicine and Dentistry of New Jersey before the pilot test and data collection/analysis. Confidentiality and privacy of study participants were maintained during data collection, data analysis, and reporting of study results. Study participants were encouraged not to discuss identifying patient information.

Letters of invitation were sent to all New Jersey acute care hospitals (general acute care, medical/surgical) that followed a process for the care of the patient with acute stroke. This list was obtained from the New Jersey Hospital Association (n = 74) and cross-referenced with the Joint Commission and the NJDHSS listing of New Jersey primary and comprehensive stroke centers. Introduction letters and a survey were sent electronically to New Jersey stroke healthcare professionals (N = 79). Nonresponders received follow-up e-mails and a follow-up telephone call, which increased the response rate (Austin, Richter, & Reinking, 2008). Twenty-four e-mail notifications were undeliverable, or the invitee did not respond. This electronic survey received 55 responses yielding a response rate of 70%; exclusion criteria eliminated 21 surveys (n = 34).

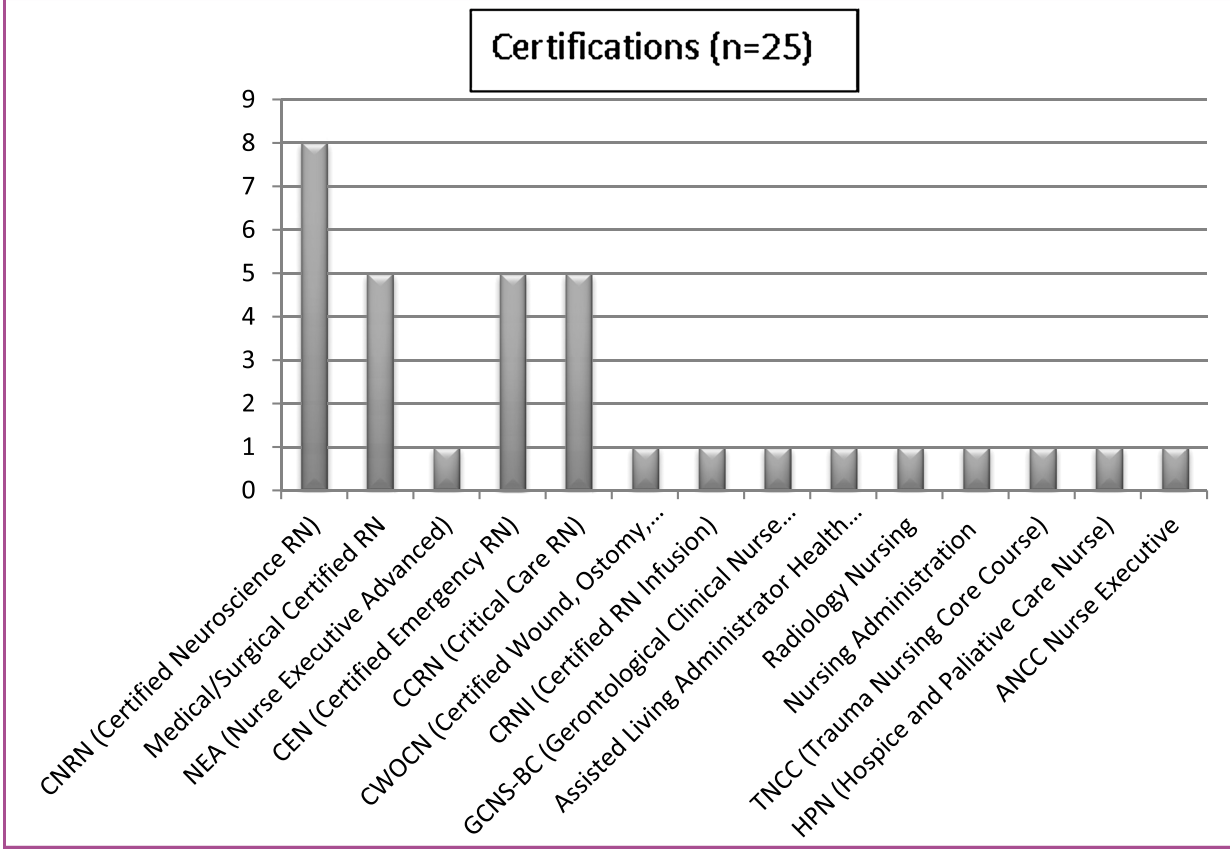
Results

Of the 34 hospitals included in the survey, the NJDHSS has designated six hospitals as comprehensive stroke centers. Comprehensive stroke centers are able to treat patients with complex types of stroke or cerebrovascular disease who require more specialized care and technological resources than those that are available at primary stroke centers, such as cerebral angiography, surgical and endovascular capabilities, specific infrastructure, and inclusion in a stroke registry. Two hospitals of the 34 responding facilities do not have stroke center designation but follow a process for the care of the patient with acute stroke.

Figure 1 represents the various certifications of stroke healthcare professionals in New Jersey. American Nurses Credentialing Center recognizes board certification that "empowers nurses within their professional sphere of activity and contributes to better patient outcomes" (American Nurses Credentialing Center, 2010). Figure 2 represents issues the respondents feel impede their effectiveness. Certified stroke healthcare professionals feel that several issues may impede their effectiveness to complete their daily tasks. The lack of knowledge of the stroke healthcare professional role was the foremost issue impeding their effectiveness. One explanation may be that there is no specific job description available for the stroke healthcare professional.

Care provided on a stroke unit by specially trained staff permits this specific population provision of services according to specific guidelines. Donabedian's Quality Health Outcome Model was utilized as a framework to investigate compliance with guidelines for acute stroke care evaluating outcomes, interventions, and healthcare practices (Choi et al., 2006; Fillenbaum, Burchett, Kuchibhatla, Cohen, & Blazer, 2007; Kaplan et al., 2006; Reker et al., 2000; Rupper, Konrad, Garrett, Miller, & Blazer, 2004; Weimar et al., 2002). Ninety-four percent of patients with acute stroke receive care on a general medical/telemetry unit with designated beds assigned for patients with stroke, and 6% are cared for on a freestanding, independent monitored (telemetry) unit.

FIGURE 1 Stroke Healthcare Professional's Specialty Certifications



This survey examined hospital practices within the last 30 days for the patient with acute stroke. Table 1 illustrates the levels of compliance for the first 10 minutes of care consisting of initial evaluation measures for certified and noncertified hospitals. Noncertified hospitals scored higher compliance levels in four categories: obtain

FIGURE 2 Issues Preventing the Stroke Healthcare Professional From Performing His or Her Duties Effectively

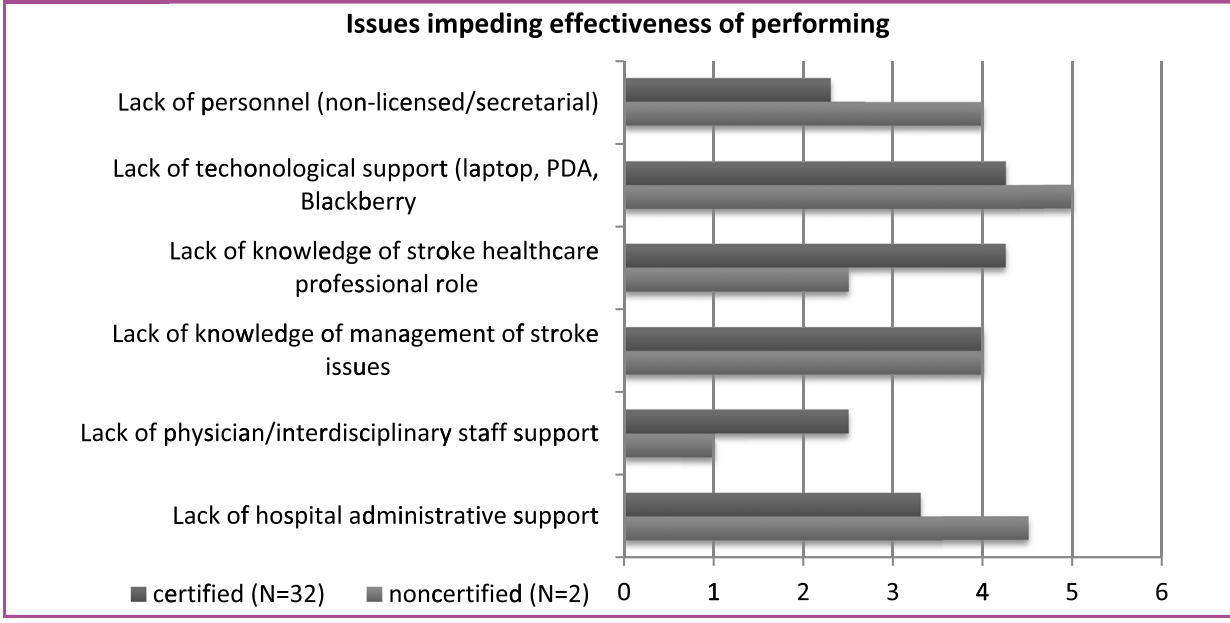


TABLE 1. Guideline Compliance: First 10 Minutes of Acute Stroke Care

	Certified Centers (n = 32)		Noncertified Centers (n = 2)	
	Yes	No	Yes	No
Assess ABCs (airway, breathing, circulation) and vital signs	100.0%	0.0%	100.0%	0.0%
Provide oxygen if hypoxemic	100.0%	0.0%	100.0%	0.0%
Obtain intravenous access and blood specimens	81.3%*	18.8%*	100.0%	0.0%
Check glucose; treat if indicated	87.5%*	12.5%*	100.0%	0.0%
Perform neurologic screening assessment	100.0%	0.0%	100.0%	0.0%
Activate stroke team	100.0%	0.0%	50.0%	50.0%
Order emergent computed tomography scan of brain	93.8%	6.3%	100.0%	0.0%
Obtain 12-lead electrocardiogram	62.5%*	37.5%*	100.0%	0.0%

*Significant at .05 level. **Significant at .01 level.

intravenous access, check glucose, order emergent computed tomography (CT) scan, and obtain 12-lead electrocardiogram. The reason may be that certified centers follow one of the stroke center recommendations regarding laboratories and/or diagnostics: "nothing will stand in the way of completing the CT scan of the head for potential t-PA candidates." In reality, obtaining intravenous access ($t(15) = 2.28$, $p = .001$) and checking glucose ($t(15) = 3.36$, $p = .005$) should be the first-line activities for stroke. Noncertified centers do not follow this practice possibly because of lack of knowledge for the best practice.

"Time is brain" is a familiar statement used by the ASA and other well-known stroke organizations. Completing non-time-sensitive tasks before CT completion may put the patient outside the window for inclusion of t-PA protocol. The ASA and the BAC recommend completion of brain imaging before rendering any treatment for acute stroke. This process is only followed by three of the surveyed facilities; noncompliance with this recommendation can have negative outcomes. Initial evaluation according to established guidelines must be followed. Treatment received before obtaining the results of the neuroimaging studies may lead to provision of negative outcomes (Dippel & Simoons, 2009). In reality, we do not know if the symptoms the patient is exhibiting are related to stroke or "stroke mimic," which may be symptoms of another medical condition.

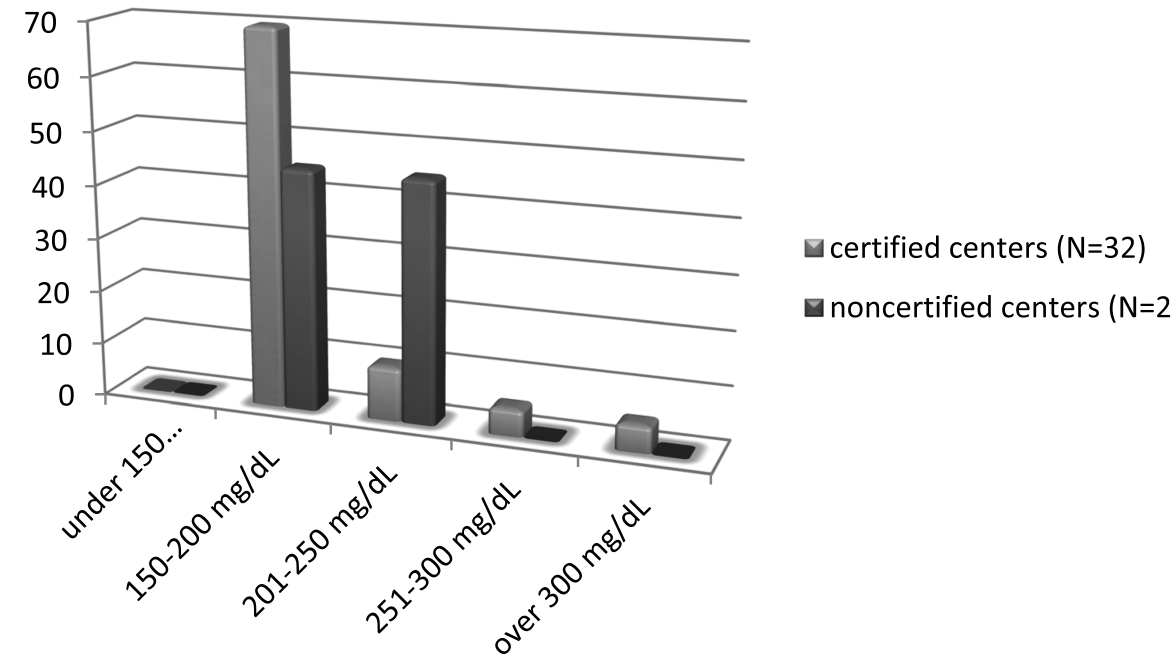
Extended hyperglycemia has a negative effect on patients with acute stroke. Moreover, 20%–50% of patients with acute stroke have elevated blood glucose levels on arrival to the hospital (Alvarez-Sabin et al., 2003; Uyttenboogaart et al., 2007). When lack of control of the hyperglycemic state impedes the recovery process, the penumbra (area surrounding the damaged brain tissue) may be compromised, which can lead to extension of the stroke to the surrounding tissue. In this study, only 23% of facilities have specific order sets for hyperglycemia management. Initiating management of hyperglycemia for elevated glucose levels is recommended: 73% of certified centers and 50% of noncertified hospitals closely monitor blood glucose levels to avoid hyperglycemia utilizing the range of 140–185 mg/dl (Fig. 3). Enhancing adherence levels for the management of elevated glucose levels provides staff with an opportunity to minimize potential negative outcomes.

Data collection for a facility providing stroke-specific care includes data submission to an Acute Stroke Registry/data repository measuring the compliance with specific "stroke performance measures" (QuadraMed, 2010). Stroke healthcare professionals advocate for these measures on all patients with stroke, utilizing the nursing staff, APNs, physicians, and residents to increase compliance.

In this study, benchmark scores for the first quarter of 2010 were obtained from QuadraMed (2010) and Clinical Outcome Practice Evaluator, which is one of the two data repositories used by the state of New Jersey for data abstraction, analysis, and reporting to The Joint Commission and New Jersey Acute Stroke Registry. Centers certified by New Jersey were below benchmark on two measures (discharge on an antithrombotic and lipid panel by the end of day 2 and statin prescribed if low-density lipoprotein is greater than 100). Noncertified centers were below benchmark on three measures (discharge on an antithrombotic and lipid panel by the end of day 2, anticoagulation if cardiac rhythm is atrial fibrillation, and statin prescribed if low-density lipoprotein is greater than 100; Table 2).

Stroke healthcare professionals work diligently to provide a high level of care to the patient with acute stroke. Many are satisfied with some areas of care but identified issues related to others. Door-to-drug timeframe is below benchmark in many facilities. The review

FIGURE 3 Initiation of Hyperglycemia Management in Acute Stroke



of literature on t-PA administration reveals that this treatment is underused (Camilo & Goldstein, 2003; Douglas et al., 2005). Some reasons are related to the public's lack of knowledge of the timeframe for administration or recognition of signs of stroke as well as the importance of calling emergency services. This survey revealed the low compliance rate as reflective of the current practices for all healthcare facilities.

Satisfaction with stroke pathway initiation within the recommended timeframe of 60 minutes of arrival is another area of concern. This survey revealed that all facilities, certified and noncertified, are in the 87th percentile for compliance with this measure. If documentation is made in the medical record by the appropriate member of the healthcare team as to why this measure cannot be met, this issue can be addressed,

TABLE 2. Stroke Performance Measure Guideline Compliance 2010

Stroke Performance Measure	QuadraMed/ Nuance Benchmark 1Q2010	Certified Centers (*n* = 32)	Noncertified Centers (*n* = 2)	Pearson Correlation	*p* Value
Deep vein thrombosis prophylaxis	79%	87.64%	95.0%		
Discharge on Antithrombotic	96%	93.00%	83.5%	.891*	.000
Patients with atrial fibrillation receiving anticoagulation	91%	92.00%	50%	.664*	.005
Antithrombotic before the end of day 2	91%	91.71%	100%	.914*	.000
Lipid panel by the end of day 2 and statin if low-density lipoprotein is greater than 100	88%	86.36%	75%	.869*	.000
Screen for dysphagia before oral intake	[a]	78.79%	75%	.498**	.050
Stroke prevention education provided	72%	89.36%	100%	.978*	.000
A plan for rehabilitation considered	92%	91.71%	100%	.907*	.000

[a]Not abstracted for The Joint Commission data analysis.
*Significant at .05 level. **Significant at .01 level.

and accordingly, compliance will increase. However, many facilities have difficulty with one of the data abstraction requirements: lack of documentation by the appropriate staff. Without the proper documentation, hospitals fail to provide appropriate care, which stroke healthcare professionals refer to as "missed stroke measures" (QuadraMed, 2010). Stroke healthcare personnel are recruiting physicians, APNs, or physician assistants to provide appropriate documentation in the medical record to eliminate these outliers. This issue has been ongoing, and stroke healthcare professionals continue to address this issue. This survey revealed that certified and noncertified centers are struggling with documentation issues in several key areas. Certified centers are aware of the importance of compliance with all guidelines; lack of compliance may jeopardize a center's redesignation efforts and may reflect negatively during the on-site visits.

Recommendations

Respondents in this study voiced similar compliance concerns regarding issues that continue to plague stroke health professionals, such as lack of documentation and t-PA administration rates. Lack of documentation is an ongoing issue. Utilizing APNs to assist with the requirements of protocol documentation in some institutions may increase guideline compliance. Physician and APN education may address this issue. Streamlining or modifying the documentation process that is currently used may assist newly designated centers and those preparing for recertification to accomplish this goals.

The current t-PA administration rates nationwide continue to remain low. In the United States, t-PA is currently approved for use within 3 hours of symptom onset. Genentech, the manufacturer of this drug, has been attempting to obtain Food and Drug Administration approval for expanding the window for administration to 4.5 hours. Some stroke centers in the United States have opted to utilize the expanded window as an off-label use. Currently, the expanded window is approved in Europe; however, it is not approved in the United States because of the lack of U.S. clinical trials to evaluate the effectiveness of the drug after 3 hours of symptom onset. Expanding the administration window allows a greater number of patients with stroke the opportunity to benefit from the drug's exceptional capabilities.

Need for improvement with guideline compliance is an ongoing problem for all facilities. Each facility should be aware of deficiencies and implement process improvement activities to address these deficiencies. Quality improvement and/or performance improvement committees discuss deficiencies in compliance and present their findings at various committee meetings. Process changes may be required to affect positive change in practice enabling increased compliance levels.

Implications for Nurses

Nurses will benefit from information provided in this study. Stroke healthcare professionals will view this information in regards to quality improvement activities for managing core measure compliance, mentoring, and education. Emergency department nurses provide the initial contact with patients with stroke. These staff members need to hold the "critical hour "stroke measures at the forefront of emergency department care. Staff nurses are the first line of defense in regards to monitoring the physician management of care, as documentation is a major obstacle in maintaining high levels of compliance. If these staff members are lacking in their efforts, the clinical implications may be devastating to the patient with acute stroke.

Limitations

There were several limitations to this project. Stroke-designated facilities within the state of New Jersey are not generalizable to other designated facilities in the United States. Generalizability is a limitation of all place-based research, and thus, the results of this project may not apply to all other settings. This survey investigated the compliance with guidelines for care at certified and noncertified centers. In 2010, New Jersey had 15 noncertified centers practicing with and without processes in place for the care of the patient with acute stroke. Two respondents from noncertified centers participated in this survey, which may not reflect the true findings of noncertified centers through the state. Collecting data on such a small number of facilities does not present true practices, processes, or outcomes. The positive responses from two noncertified centers reflect greater levels of compliance when such a small number are evaluated. We do not know if the noncertified centers that are not included in this survey provide the same level of care, follow the same guidelines, or present the same information that was gleaned from the noncertified centers represented in this survey.

The results of this study will enable New Jersey stroke healthcare professionals to visualize New Jersey's status regarding guideline compliance in acute stroke. Although it will be difficult to maintain 100% compliance with all measures, it is evident that New Jersey has not reached its full potential. The hope is that this information will allow centers, both designated and nondesignated, to address the issues that were presented here and change or revise protocols accordingly. Repeating this study in the future will permit New Jersey

acute care hospitals to view the improvement in the care practices for the patient with acute stroke.

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