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Time Lost is Brain Lost: Impact of Ischemic Stroke

Paula Severns
Otterbein University, paula.severns@otterbein.edu

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Stroke is a leading cause of functional impairment in the United States. Annually, 751,000 strokes occur with a mean lifetime cost estimated at $140,000 per person (Mocchia et al., 2014). Every 40-60 seconds someone suffers a stroke, and every 240 seconds a stroke death occurs (Niem, McMahon, & Tillett, 2015). Stroke is the broad term often used to describe a neurological emergency, of either ischemic or hemorrhagic etiology, affecting blood flow to the brain. Both are medical emergencies requiring timely medical intervention (Eltor, Lemon, & Costello, 2012). Treatment modalities are comprehensively different; therefore, being able to differentiate early signs and symptoms is imperative for healthcare professionals.

Neurovascular imaging is required to differentiate between an ischemic or hemorrhagic stroke. Use of a non-contrast computed tomography (CT) is fast and readily available to isolate hematologic or structural causes (stroke). A major ischemic stroke. Magnetic resonance imaging (MRI) has greater spatial resolution to diagnose minor ischemic strokes.

The topic of ischemic stroke is a chosen topic in the national collaborative implementation of an upcoming Joint Commission Primary Stroke Center (PCSC) accreditation program.

Ischemic stroke degrees brain metabolic needs of oxygen and glucose. Cerebral ischemia develops from vasculature blocking leading commonly caused by atherosclerotic plaque formation and embolism. According toframe et al. (2013), identified hallmark protein that is the hallmark protein of an altered function and is regulated by extracellular matrix is a neural protein. The hallmark protein that is the hallmark of extracellular matrix is the extracellular matrix protein.

In addition to Davis, Myer, and Dietrich (2015), excessive circulating factors cause endothelial dysfunction by way of accumulating within extracellular matrix. Further, extracellular matrix is made of extracellular matrix that is extracellular matrix protein. Extracellular matrix protein is made of extracellular matrix protein.

Neurological functioning may alter with a 70% reduction in blood flow. However, patients can maintain adequate function with a 50% reduction in blood flow leading to a complete obstruction. When the brain is not adequately perfused with blood and deprived of oxygen and glucose as well as failure to remove lactic acid and carbon dioxide, nerve cells begin to die. Lack of adequate oxygen, causing neuronal and glial cell death, resulting in coagulation of extracellular matrix after continued exposure to free radicals, excess inflammation, and producing irreversible brain damage.

Although ischemia occurs, symptoms are impermanent for differentiating early signs and symptoms. Magnetic computed tomography (CT) is not able to differentiate early signs and symptoms for ischemic stroke.

A 67-year-old Caucasian female arrives via EMS at 12:25 pm with stroke presentation. Care team, including a physician, wait patient arrival at the bedside. Background history: 11:00 am, patient’s spouse ran an errand. He returned 55 minutes later finding her lying on the floor. The patient exhibited slurred speech, right facial droop, and right arm weakness, with a National Institutes of Health Stroke Scale (NIHSS) of 10 upon arrival. No apparent signs of trauma or ethanol. Make of history includes three positive modifiable risk factors: diabetes mellitus, hyperlipidemia, and hypertension. Current medications include: Metformin, Hydrochlorothiazide, and Simvastatin. Physical exam is unremarkable with BP 146/82, R, 81.9% SPO2 on room air.

A standard brain attack treatment order was utilized. Lab results within normal limits include: electrolytes, renal, complete blood count with platelet count, cardiac markers, troponin level, international normalized ratio, and activated thromboplastin time. Blood glucose was elevated at 120 mg/dl. CT scan at 12:35 pm with 12:40 min indication of stroke activity and appropriate hemorrhagic event.

The patient has no contraindications to tissue plasminogen activator (tPA) and the patient’s spouse agrees to treatment after outweighing risks and potential benefits of tPA administration. Drug was administered at 1:31 pm, 120 minutes after the patient was last seen normal. Drug administration was complete without complications to the stroke unit. During first 24 hours the patient regained strength in the right upper and lower extremities. Facial droop and slurred speech improved, sensory exam is normal, and NIHSS CT was negative prior to discharge.

Summary: The patient’s modifiable risk factors were well controlled with current medications. A positive outcome resulted from rapid identification by the spouse, calling 911, and within 8 minutes of last known normal permitted tPA administration as established by the American Heart Association (AHA)/American Stroke Association (ASA) guidelines. Within three hours of symptom onset, National Institutes of Neurological Disorders and Stroke (NIHSS) Stroke scale score was ≤ 3 on acute ischemic stroke (Jauch et al., 2013).

ApoA1 outcome resulted from use of a standard treatment order set (handout), and guidelines established by AHA/ASA and NINDS.

Conclusions

Stroke affects men and women equally in the United States, predominantly ischemic stroke. Outdated and brain inflammation contribute to the pathophysiology of central nervous system leading to cellular apoptosis and death (Paczkoni et al., 2015). Impaired responses within the CNS and systemic inflammatory events play important roles in the progression, severity, and outcome of stroke.

Decreasing modifiable risk factors, including smoking, dyslipidemia, and hypertension, can reduce the risk of an acute cardiovascular event and decrease the morbidity and mortality associated with ischemic stroke. For every minute of treatment delay, 1 million neurons, 14 billion synapses and 12 km of myelinated fibers are destroyed (Mocchia et al., 2015, p. 891).

The AHA recommends thorough education and patient education with tPA. Unfortunately, few patients are aware of symptoms, symptoms, and patients do not report to treatment centers in a timely manner. Many patients with acute ischemic stroke: A guideline for practitioners (Mocchia et al., 2015).

As an advance practice nurse (APN), a thorough understanding of the sequelae of modifiable risk factors such as long-term cardiovascular disease, tobacco use with respiratory complications, hypertension, atrial fibrillation, diabetes, smoking, dyslipidemia, carotid stenosis, sickle cell disease, postmenopausal hormone therapy, diet, and obesity cannot be overemphasized. APNs play an essential role in assessing the degree of severity of ischemic injury and contributing to poor neurological recovery and should be closely monitored by routine HSAC testing. Hypertension increases arterial elastility, erodes endothelial cell lining, and reduces runoff of visual signals making HTN the leading risk factor for stroke and should be measured routinely (Marchis et al., 2014). Reducing modifiable risk factors such as HTN, hyperlipidemia, smoking, physical inactivity and obesity, should begin with education.

Education of the health and mobile nursing team took considerable recognition of early signs and symptoms of this life-altering event to reduce mortality and morbidity associated with a stroke. Early directed instructions to call 911 Emergency Medical Services (EMS) (Jauch et al., 2014). Patients arriving within three hours of symptoms achieve better outcome than those seeking delayed care.

References Cited


According to Elder et al. “Current guidelines for ischemic stroke advocate the use of intravenous (tPA), the early use of thromboembolism (VTE) prophylaxis, anticoagulation in patient with atrial fibrillation (afib), and lipid lowering therapy.” (2015, para. 1) The Joint Commission (JC) requires eight mandatory standards and two optional standards for hospitals to receive Primary Stroke Center (PSC) status:

- Venous thromboembolism (VTE) prophylaxis
- Anticoagulation therapy for afib or flutter
- Thrombolytic therapy
- Antithrombotic therapy by end of hospital day two
- Discharged on statin therapy
- Discharged on antithrombotic therapy
- Receive stroke education
- Assessment for rehabilitation
- Screening for dysphagia
- Smoking cessation services

Order sets ensure compliance with quality indicators, decrease length of stay and decrease overall costs. Order sets created by multidisciplinary stroke experts should follow American Heart Association (AHA)/American Stroke Association (ASA) guidelines. Incorporating order sets in the electronic medical records (EMR) whenever possible will prevent modifications or exclusions. Elder et al. (2015) performed a retrospective study reporting that adherence to national guidelines increased with standard order set use. Current AHA stroke guidelines recommend Emergency Medical Service (EMS) transport suspected stroke patients to the closest PSC unless contraindicated (Jaensch et al., 2013).