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CLINICAL REVIEWS

Neurologic emergencies in resource-limited settings: A review of stroke care considerations



Urgences neurologiques dans des contextes caractérisés par de faibles ressources: Examen de considérations associées aux soins de l'AVC

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Background: The current guidelines and evidence supporting acute stroke management have limitations in resource austere environments despite being a leading cause of death worldwide. Developing countries face a rapidly increasing and disproportionate burden of cerebrovascular disease yet differences in setting and resource limitations bring challenges that have a major influence in management options – especially with routine imaging and interventional considerations. In addition, general awareness, diagnosis and management of stroke remain poor.

Objectives: To outline current acute stroke management and critical interventions that should be integrated into current practice while highlighting resource-limited care considerations.

Methods: A systematic search of Ovid MEDLINE and reference lists of the literature on stroke, guidelines, and acute stroke management including care considerations in resource-limited settings was conducted through March 2014.

Recommendations: Within emergency medicine, emphasis should be placed on establishing a robust stroke assessment and care process that is resource appropriate and scalable. Adherence as resources allow to current stroke care guidelines including acute management, stroke center coordination, palliation and resource allocation may improve outcomes. Further research related to resource-limited management is essential. Risk reduction through population-based interventions and early recognition may help to reduce the burden of disease.

Contexte: Les lignes directrices et les constatations actuelles sur la prise en charge de l'AVC aigu montrent leurs limites dans les environnements pauvres en ressources, alors que l'AVC aigu est une cause de mortalité majeure dans le monde. Les pays en développement sont confrontés à un fardeau de maladies cérébrovasculaires disproportionné et en croissance rapide, alors que les différences de contextes et les ressources limitées entraînent des difficultés ayant une influence majeure sur les possibilités de prise en charge - particulièrement en termes d'imagerie classique et de possibilités d'interventions. De plus, la sensibilisation du public, le diagnostic et la prise en charge de l'AVC sont toujours largement insuffisants.

Objectifs: Décrire la prise en charge et les interventions critiques actuelles associées à l'AVC aigu qui devraient être intégrées à la pratique actuelle tout en soulignant les considérations associées aux soins dans les contextes pauvres en ressources.

Méthodes: Une étude systématique d'Ovid MEDLINE et de publications de référence sur l'AVC, les lignes directrices et la prise en charge de l'AVC aigu, et notamment les aspects liés aux soins dans des contextes pauvres en ressources, a été réalisée pendant le mois de mars 2014.

Recommandations: En médecine d'urgence, l'accent doit être mis sur la mise en place d'une solide procédure d'évaluation et de soins de l'AVC, proportionnée aux ressources et évolutive. L'observance, dans un contexte caractérisé par de faibles ressources, des lignes directrices relatives aux soins de l'AVC, notamment la prise en charge des cas aigus, la coordination des centres traitant l'AVC, les soins palliatifs et l'allocation des ressources, peut améliorer les résultats. Il est essentiel de poursuivre la recherche sur la prise en charge avec des ressources limitées. La réduction du risque par des interventions au sein de la population et un dépistage précoce peut contribuer à atténuer le fardeau de la maladie.

African relevance

- Ensure early assessment and stabilization of ABCs in acute stroke management.

- Stroke mimics, such as hypoglycemia, should be promptly assessed.
- Blood pressure management is essential and depends on the type of stroke.
- Establish a stroke protocol following evidence-based, resource allowable practices.

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Introduction

Nearly 60% of all deaths worldwide are associated with chronic diseases, such as heart disease, stroke, and cancer.¹

Stroke, the second leading cause of death, accounted for 5.7 million deaths in 2005. The vast majority (>85%) of these deaths occur in low and middle income countries with one third under the age of 70.^{2,3} Cerebrovascular disease is pervasive and rapidly expanding, affecting the poor and disadvantaged disproportionately, furthering health gaps within and between countries.⁴

A study done in sub-Saharan Africa (SSA) shows that the trend of stroke is increasing in young populations, however much of the public health focus remains on infectious and communicable diseases.⁵ Similar to developed countries, high blood pressure remains a major determinant for stroke and subsequent death.⁶ While stroke risk is increasing by rapid urbanization and transition from agrarian to urban determinants, awareness, diagnosis and management of stroke remain limited.^{5,6}

Current models of care for acute neurologic emergencies are time sensitive and resource dependent. Established global guidelines require prompt recognition of symptoms, immediate transportation to an emergency center, emergent brain imaging, laboratory testing, and prompt thrombolytic interventions when appropriate. Stroke guidelines primarily emanate from developed systems with comprehensive stroke services limiting uniform adoption in less austere settings. Minimizing brain injury, managing comorbid illness and complications while uncovering the causative etiology are paramount for quality outcomes.

This manuscript will address optimal care first, then resource-limited considerations recognizing research limitations in many areas. Establishing a standardized, scalable and affordable mode of evaluation, transportation and management of acute stroke patients as well as standard prevention and rehabilitation protocols that will help to reduce stroke occurrence, mortality and morbidity to the population are essential regardless of resource limitations.

Source of data

A systematic search of Ovid MEDLINE and reference lists on stroke literature, guidelines, and acute stroke management including resource-limited settings was conducted through March 2014.

Acute stroke management

Acute focal brain function deficit is a central feature of acute ischemic stroke (AIS). Early recognition and transportation to a care center is paramount and allows prompt assessment, stabilization, laboratory and radiography evaluations. Critical

decisions based on these findings may require secondary interventions such as intubation, blood pressure control, thrombolytic considerations, and comorbid management.⁷⁻¹¹ Patients suffering an acute neurologic event (ANE) may have concurrent serious medical conditions. Therefore, a rapid but thorough assessment should include:

- ABCs Assessment (Airway, breathing and circulation) and other emergent medical interventions.
- Immediate identification and treatment of any contributing medical conditions (e.g., hypoglycemia, hypotension and hypoxia) (Table 1).
- Thrombolytic therapy determination for acute ischemic stroke (Table 2).
- Identifying the cause of the patient's acute neurologic presentation.

As time from onset to intervention is of paramount importance, the initial evaluation of stroke patients will determine interventions. Obtaining a history, physical examination, serum glucose, oxygen saturation, and a non-contrast CT scan are sufficient in most cases to identify potential candidates for thrombolytics. Critical information includes the time of symptom onset along with specific aspects of the past medical history that may affect the use of thrombolytics.

Critical interventions

ABCs

Assessing vital signs and ensuring stabilization of airway, breathing, and circulation are fundamental to all critical patients, including those with stroke. We recall that acute stroke from intracranial hemorrhage, vertebrobasilar, or bihemispheric ischemia can cause elevated intracranial pressure causing decreased respiratory drive or inability to protect the airway. Cerebral vasodilation from hypoventilation and resulting hypercarbia may further increase intracranial pressure and therefore perpetuate a cycle leading to respiratory failure. Supplemental oxygen has not been shown to be beneficial in non-hypoxic stroke victims and should only be provided for hypoxic patients.^{8,9,12}

Initial history & physical (H&P)

Establishing the ischemic stroke onset time is critical because it is the main eligibility determinant for treatment with intravenous thrombolysis. For patients who are unable to provide a reliable onset time, use the last known normal time. For those

Table 1 Differential diagnoses for acute ischemic stroke.

Complex migraine	Posterior Reversible Encephalopathy Syndrome (PRES)
Syncope	Encephalopathy (hypertension, infectious, Wernicke)
Systemic/central infection	Seizure with postictal paresis, aphasia or neglect
Functional deficit (conversion disorder)	Spinal cord disorder (compressive myelopathy, etc)
Head trauma/subdural	Central Nervous System Tumor or Abscess
Transient global amnesia	Metabolic derangement (hypoglycemia, toxins, etc)
Multiple sclerosis exacerbation	

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