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# THE ROLE OF THE PHYSICIAN IN THE MANAGEMENT OF STROKE: PATHOPHYSIOLOGY, DIAGNOSIS AND CURRENT THERAPEUTIC APPROACHES

# O PAPEL DO MÉDICO NO TRATAMENTO DO AVC: FISIOPATOLOGIA, DIAGNÓSTICO E ABORDAGENS TERAPÊUTICAS ATUAIS

# EL PAPEL DEL MÉDICO EN EL TRATAMIENTO DEL ACCIDENTE CEREBROVASCULAR: FISIOPATOLOGÍA, DIAGNÓSTICO Y ENFOQUES TERAPÉUTICOS ACTUALES

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## INTRODUCTION

Stroke represents the second leading cause of death in the world, and the major affect is responsible for physical disability, becoming fundamental in terms of public health policy. There is an increase in incidence with the aging of the population, in the USA there is a prevalence of 2.6% over 20 years of age. Stroke is more common in low- and middle-income countries due to less access to medical care, adequate imaging tests, and the necessary medication (ROXA et al., 2021).

Stroke can be divided into ischemic, occurring in 80% of cases, and hemorrhagic, in 20% of cases. Ischemic stroke occurs due to obstructive phenomena, such as thrombosis, atherosclerosis, embolism, arterial dissection, and arteritis. Ischemic stroke generates specific symptoms depending on the occluded artery. Symptoms usually persist for more than 24 hours (ROXA et al., 2021).

Hemorrhagic stroke occurs due to hemorrhagic phenomena, such as the rupture of aneurysms, arteriovenous malformations and blood dyscrasia. It is subdivided into Intraparenchymal Hemorrhage (HIP) and Subarachnoid Hemorrhage (SAH) (MACHADO et al., 2020).

It is known that the risk of stroke doubles after the age of 55, and that apparently men have higher prevalence. There is also a hereditary risk, where it shows a 1.9 times higher risk for 1st degree relatives with a history of stroke. The main modifiable risk factors are high blood pressure, diabetes mellitus, atrial fibrillation, smoking, sedentary lifestyle, obesity, alcoholism, dyslipidemia, coronary heart disease, carotid stenosis, sleep apnea, migraine with aura, use of oral contraceptives, Chagas disease, and sickle cell anemia (POMPERMAIER et al., 2021; MOITA et al., 2021).

Cerebrovascular accident (CVA) is one of the main causes of morbidity and mortality in the world, representing a significant challenge to public health. The role of the physician in stroke management is essential from early recognition of signs and symptoms to appropriate therapeutic intervention and rehabilitation. Understanding the pathophysiology of stroke, associated with current diagnostic and therapeutic strategies, enables more effective care and the reduction of the sequelae of the disease (FIGUEIREDO et al., 2020).

## GOAL

It is hoped that this article can facilitate the understanding of stroke management, as well as clarify doubts on the subject. The general objective of this study is to understand the role of the physician in the management of stroke, its pathophysiology, how the diagnosis should be made, and the necessary therapeutic approaches. The aim is to provide a comprehensive and practical view for application in the clinical context.

The specific objectives consist of those described below:

1. Define Stroke
2. Describe how the differentiation between their types is made
3. Addressing the diagnostic methods for stroke
4. Discuss clinical and therapeutic conducts for the appropriate management of stroke

## METHODOLOGY

Based on the understanding of Creswell (2007) for whom the Literature Review is configured as a preliminary stage of scientific studies, then the research is a Literature Review in which articles published in the National Library of Medicine (Pubmed), Virtual Health Library (VHL), Web of Science, Lilacs and Capes Journals were used as the basis of the study by descriptors obtained by the Health Sciences Descriptors (DeCS) of the VHL.

This is a literature review of articles published in the National Library of Medicine (Pubmed), Virtual Health Library (VHL), Web of Science, Lilacs and Cape Journals.

For the selection of articles, the following steps were followed: (I) search for articles in the databases; (II) reading of titles and abstracts, with analysis according to the eligibility criteria and; (III) full-text analysis of the papers, including in the systematic review only those required by the inclusion criteria and did not meet any of the exclusion criteria.

Published studies were eligible if they met the following criteria: (1) studies involving the main clinical manifestations of stroke
Cerebral; (2) studies that had as object of study Cerebral Vascular Accident its pathophysiology, diagnosis and therapeutic conduct; (3) articles published in the last 5 years. There were no restrictions on sample size or foreign language.

As exclusion criteria, articles were excluded that: (1) were published before 2020; (2) studied situations that do not include the management of patients with arrhythmias in emergency situations; (3) duplicates; (4) had no direct relationship with the diagnosis, electrocardiographic patterns, or management of the patient with arrhythmia in clinical practice.

## DEVELOPMENT

Cerebrovascular accident (CVA) is an acute medical emergency, of sudden onset, which occurs the sudden reduction or loss of certain neurological functions. It is an extremely serious condition that requires immediate attention from health professionals, for adequate recognition and effective intervention (POMPERMAIER, et al. 2020).

It can be classified mainly into two types: ischemic, caused by obstruction of cerebral blood flow, and hemorrhagic, resulting from the rupture of intracranial blood vessels. Ischemic cases are much more common, accounting for 85% of cases, compared to 15% of hemorrhagic patients. The only reliable way to identify the type of stroke is through an imaging test. The distinction between these subtypes is fundamental, as it determines different therapeutic approaches. In this context, the physician assumes a crucial role, from the early identification of symptoms to the implementation of appropriate therapeutic strategies and the clinical follow-up of the patient (SZYMANSKI, et al. 2021).

When there is a temporary, spontaneously reversible interruption of circulation in a group of neurons, which does not lead to cell death, we call the event a transient ischemic attack (TIA). If there is a death of neurons, we call it a stroke, where computed tomography plays a crucial role (ROXA, et al. 2021).

The pathophysiology of ischemic stroke involves the interruption of irrigation in a certain territory of the brain, causing inadequate oxygen and glucose supply to brain tissue, which triggers a cascade of harmful biochemical events, such as excitotoxicity, mitochondrial dysfunction, excessive production of free radicals, and cellular apoptosis. This chain of reactions can be partially reversed if reperfusion is performed early, before irreversible tissue necrosis sets in. The main recognized causes for ischemic stroke are atherosclerosis of large and small vessels, cardioembolism, and rarer causes, such as arterial dissection (SALES, et al. 2023).

The occurrence of hemorrhagic stroke, although less prevalent, is more lethal. It occurs pathophysiologically due to the rupture of cerebral blood vessels, usually secondary to uncontrolled arterial hypertension, vascular malformations, use of anticoagulants or drugs, leading to the formation of hematomas and increased intracranial pressure (BRANDÃO, et al. 2023).

In this scenario, early diagnosis is essential. The physician must be able to quickly recognize neurological signs and symptoms, clinically suggestive of stroke, such as sudden motor deficit, dysphagia, dysarthria, dysphonia, abulia, cerebellar ataxia, aphasia, hemineglect, hypoesthesia, vision loss, altered level of mental consciousness, and facial asymmetries (MARIANELLI, et al. 2020).

The use of the FAST scale (Face, Arms, Speech, Time) has been useful in initial screening and population education. So that society recognizes the set of symptoms and refers the patient to an emergency medical center. In the hospital environment, in the care of patients with suspected ischemic stroke, a systematized neurological examination is indicated, in which the deficits are noted and graded. For this, we have some clinical instruments, the most used being the NIH (National Institutes of Health) Stroke Scale. On the NIH Stroke Scale, the more deficits, the higher the score. For individuals with a normal neurological examination, the NIH Scale score is zero (BRANDÃO, et al. 2023).

Once the clinical suspicion has been made using the NIH scale, it is necessary to proceed with imaging tests, initially non-contrast computed tomography of the head, which allows distinguishing between ischemic and hemorrhagic stroke. Magnetic resonance imaging, on the other hand, plays a role in determining the ischemia time in the situation of an ischemic stroke, offering greater sensitivity in the early detection of ischemic infarctions and in determining the affected territory, and may be useful in selected cases (SALES, et al. 2023).

After the diagnosis is confirmed, the doctor's action extends to the choice of the therapeutic approach. In ischemic cases, thrombolysis with intravenous alteplase should be considered if the patient is within the established therapeutic window, in the best case scenario, thrombolysis should be performed within 3 hours, and this window may be extended to 4.5 hours from the onset of symptoms, in patients who have no contraindications to its use (DOS SANTOS, et al. 2023).

The main contraindications associated with the use of thrombolysis with atexamese are, age less than 18 years, sustained SBP values > 185 mmHg and DBP > 110 mmHg, ischemic stroke or neurosurgery in the last 3 months, previous hemorrhagic stroke, neoplasms, endocarditis, among others. The indicated dose of alteplase is 0.9 mg/kg up to a maximum of 90 mg, and should be administered as a bolus of 10% of the dose, followed by 90% in an infusion pump within 1 hour (SZYMANSKI, et al. 2021).

Mechanical thrombectomy is also a method of mechanical blood flow revascularization, and has shown excellent results in patients with occlusions of large vessels, such as the internal carotid artery and middle cerebral artery, especially if performed in the first six hours, and can be extended to up to 24 hours in cases selected based on imaging criteria (DA NOBREGA DINIZ, et al. 2023).

In hemorrhagic strokes, treatment is aimed at controlling blood pressure, reversing coagulopathies and, in selected cases, neurosurgical intervention to evacuate the hematoma or treat aneurysms and arteriovenous malformations. Management in intensive care units and neurointensive care is essential to reduce secondary complications, such as intracranial hypertension, hydrocephalus, and vasospasm (DE SOUZA, et al. 2023).

In addition to the acute phase, the doctor plays a central role in rehabilitation and prevention of recurrences. Post-stroke rehabilitation is multidisciplinary, but requires effective medical coordination to ensure that patients receive physical therapy, speech therapy, occupational therapy, and psychological support according to their specific needs. The patient's reintegration into their activities of daily living depends, to a large extent, on medical support during outpatient follow-up (SILVA, et al. 2023).

With regard to secondary prevention, the physician must identify and treat modifiable risk factors, such as systemic arterial hypertension, diabetes mellitus, dyslipidemia, smoking, sedentary lifestyle
and obesity. In patients with atrial fibrillation or other heart diseases, oral anticoagulation may be indicated to prevent new ischemic events. The use of antiplatelet agents, statins, and strict control of blood pressure and blood glucose are essential to reduce the risk of recurrence (DE OLIVEIRA, et al. 2021).

In addition, it is the role of the physician to guide the patient and his family about changes in lifestyle, medication adherence and the importance of regular follow-up.

Success in stroke management depends not only on acute medical interventions, but also on continuity of care and health education (SILVA, et al. 2023).

Another relevant aspect is the constant professional updating. With advances in neuroscience and the development of new therapies, physicians must stay informed about up-to-date clinical guidelines, care protocols, and emerging technologies, such as endovascular therapies, new thrombolytics, and the use of artificial intelligence in imaging screening (MARTINS, et al. 2021).

## FINAL CONSIDERATIONS

The role of the physician in the management of stroke is fundamental and directly proportional to favorable or unfavorable patient outcomes. The management of these patients is comprehensive and complex, requiring technical knowledge, quick decision-making and coordination capacity of multidisciplinary teams, availability of medications, access to a neurosurgery team in cases of thrombectomies in ischemic stroke of large cerebral arteries and in some cases of hemorrhagic stroke. From clinical suspicion to long-term follow-up, the doctor is primarily responsible for implementing effective strategies that aim not only to save lives, but also to preserve the quality of life of affected patients.

An in-depth understanding of the pathophysiology of stroke, combined with the mastery of the diagnostic and therapeutic tools available, is essential to offer excellent care. In addition, medical practice should be guided by evidence-based guidelines, sensitive to the individual needs of patients, and committed to health education and prevention of new events. In this way, the physician consolidates himself as a key player in responding to the challenge that stroke represents for health systems, being a transforming agent in both the clinical and social spheres.

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