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Original Research Paper

How to make an early disgnosis of ischemic and hemorrhage stroke in the emergency department. Doubt and challenges of a newly trained on-call doctor

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ABSTRACT:

Introduction: Cerebrovascular accident (CVA) is one of the main causes of mortality and disability in the world, representing a major public health challenge. For early and accurate diagnosis of both types of stroke, various imaging modalities are used, such as computed tomography (CT) and magnetic resonance imaging (MRI), which play a crucial role in differentiating between ischemic and hemorrhagic stroke**. Objectives:** To review current diagnostic methods for hemorrhagic and ischemic stroke, addressing imaging technologies, emerging biomarkers and clinical criteria that facilitate differential diagnosis. We will also discuss the limitations and challenges faced in clinical practice, considering the particularities and urgencies of each type of stroke. **Material and Methods**: The methodology used was a literature review. The research was carried out through an electronic search of scientific articles. **Results and Discussion**: In order to deal with stroke cases efficiently, it is essential that the medical team is well prepared, both in theoretical and practical terms. This preparation involves training to quickly identify signs and symptoms of a stroke, such as sudden loss of function on one side of the body, difficulty speaking, mental confusion, loss of coordination and blurred vision. Final considerations: Early distinction between the types of stroke, made by means of imaging tests, is fundamental, as it guides appropriate treatment and prevents complications. In both cases, rapid response and specialized care in the hospital environment are critical factors for the prognosis. Therefore, effective emergency care, based on well-established protocols and the training of health teams, is indispensable for reducing the morbidity and mortality rates associated with stroke.

Keywords: Emergencies; Cerebrovascular accident; ischemic and hemorrhagic stroke.

INTRODUCTION:

Cerebrovascular accident (CVA) is one of the main causes of mortality and disability in the world, representing a major public health challenge (1). It is characterized by a sudden interruption of blood flow to the brain, which results in damage to brain tissue and impairment of neurological functions. The two main types of stroke are ischemic and hemorrhagic, which differ in their etiology, clinical presentation, and diagnostic and therapeutic approach (2).

Ischemic stroke, which accounts for around 85% of cases, occurs due to an arterial obstruction that interrupts the supply of blood and oxygen to a certain area of the brain (3).

This obstruction can be caused by thrombosis, embolism or stenosis of large arteries, and its severity depends on how long the blood flow is interrupted and the extent of the affected area. Hemorrhagic stroke, on the other hand, accounts for around 15% of cases and is caused by the rupture of a blood vessel, which leads to the extravasation of blood into the brain tissue (4).

For the early and accurate diagnosis of both types of stroke, various imaging modalities are used, such as computed tomography (CT) and magnetic resonance imaging (MRI), which play a crucial role in differentiating between ischemic and hemorrhagic stroke (5).

CT, which is widely available in emergency units, is usually the first choice for initial diagnosis, since it is efficient at identifying the presence of intracranial hemorrhage. MRI, although less accessible, has greater sensitivity in detecting early ischemic lesions and can provide detailed information on the extent and location of the affected area (6).

In addition to imaging tests, biomarkers and clinical assessments help in the differential diagnosis and estimation of stroke prognosis. The analysis of serum biomarkers, for example, can indicate the presence of neuronal damage and inflammation, providing complementary information to the images (7).

From a clinical point of view, the rapid assessment of symptoms such as paralysis, speech difficulties and loss of coordination can direct the suspicion of stroke and guide emergency interventions (7).

Accurate diagnosis of the type of stroke is fundamental for guiding treatment. In ischemic strokes, interventions such as thrombolytic therapy and mechanical thrombectomy are viable options and should be started as soon as possible (8).

In the case of hemorrhagic stroke, management includes strict control of blood pressure, measures to reduce cerebral edema and, in some cases, surgical intervention to drain the hematoma (9).

The choice of therapy depends on the early and precise characterization of the type of stroke, which reinforces the importance of diagnostic methods and initial clinical assessment (7).

The transition from academic life to clinical practice is a period of intense transformation and challenges for newly qualified doctors. After years dedicated to the theoretical and practical study of medicine, these professionals are faced with a new reality, where their skills and knowledge are put to the test in situations of increasing responsibility and pressure (10).

This initial period of a medical career is characterized by a set of challenges that require not only technical knowledge, but also communication skills, decision-making under pressure and adaptation to institutional health structures (11).

The first years of practice bring a natural feeling of insecurity for the newly qualified doctor, since the real-life scenario of medicine imposes situations that are often not addressed in academic training. These difficulties include the responsibility of making decisions with a direct impact on patients' lives and managing high workloads, which contributes to high levels of stress and exhaustion (12).

From a global perspective, studies show that the level of burnout among newly qualified doctors has been increasing in various regions, which represents a problem for public health and the efficiency of health systems (13).

In addition, the hospital environment, where many of these doctors start their careers, presents specific challenges. Lack of experience can make it difficult to adapt to clinical practices and hospital protocols, while support from more experienced professionals is not always available or sufficient (14). In this way, building skills to face institutional barriers and acquiring practical autonomy are fundamental and often arduous processes at this early stage (15).

Another aspect to be considered is the psychological impact of initial medical work, where constant exposure to situations of suffering and death can generate long-term emotional problems. Several studies have highlighted the importance of psychological support strategies for new professionals in order to reduce the impact of stress and improve the quality of care provided (15). The lack of a structured support network contributes to the development of emotional problems and limits the new graduate's ability to cope with the daily stresses of the profession (16).

In addition to the emotional challenges, there is also the issue of the relationship with the patient. Many newly qualified doctors are still developing their communication and empathy skills, essential elements for establishing a good doctor-patient relationship. The literature highlights that, throughout academic training, there is a concentration on the technical aspects of medicine, leaving gaps in the interpersonal skills that are crucial in care (16).

This article seeks to explore the main challenges faced by newly qualified doctors, with the aim of providing a comprehensive overview of the difficulties and proposing support strategies for these professionals. Discussing the obstacles faced by doctors at the start of their careers is of great importance for improving health policies and for training new doctors who are better prepared to face the reality of clinical practice (14).

OBJECTIVES:

To review current diagnostic methods for hemorrhagic and ischemic stroke, addressing imaging technologies, emerging biomarkers and clinical criteria that facilitate differential diagnosis. We will also discuss the limitations and challenges faced in clinical practice, considering the particularities and urgencies of each type of stroke.

MATERIAL AND METHODS:

The methodology used was a literature review. The research was carried out through an electronic search for scientific articles published on the Scielo (Scientific Electronic Library Online) and Lilacs (Latin American Health Sciences Literature) and Pubmed websites. We used the health terminologies consulted in the Health Sciences descriptors (DeCS/BIREME); current diagnostic methods for hemorrhagic and ischemic strokes, addressing imaging technologies, emerging biomarkers and clinical criteria that facilitate differential diagnosis.

The inclusion criteria were: original article, published in Portuguese and English, freely accessible, in full, on the subject, in electronic format and published in the last ten years (2000 - 2024), totaling 51 articles.

RESULTS AND DISCUSSION:

Urgent and emergency care services aim to provide immediate care to individuals with an imminent risk to their lives, and represent one of the essential services for the health system (1).

To make the terminology easier to understand, the Ministry of Health has adopted the term “Emergency” for all cases requiring immediate care (1). However, these terms are often used synonymously in medical literature. In this article, we will adopt the term Urgência, encompassing Urgency and Emergency in order to simplify the nomenclature, as recommended by the Ministry of Health.

A milestone in the structuring of the emergency care model in Brazil was the Emergency Care and Trauma Program, created by the Ministry of Health (MS) in 1990, with the aim of reducing the incidence of and morbidity and mortality from external injuries (9).

With a view to organizing urgent/emergency care in Brazil, the Ministry of Health instituted the National Urgent Care Policy (PNAU), in which Ordinance No. 2048 of 2002 (10) and Ordinance No. 1863 of 2003 (11) have been the legal instruments for building, implementing and organizing urgent and emergency care systems.

Based on these regulations, a strategy was established for organizing urgent care systems through the use of regulation centers, structured at state, regional and municipal levels, with the aim of organizing the flow of patients in the system and functioning as a communication gateway open to the general public, through which requests for help are received, evaluated and prioritized (2).

In Brazil, the structuring of emergency care systems has used elements of the Franco-Germanic model for the organization of multidisciplinary care teams and Anglo-American programs with regard to the systematization of knowledge and care practices (12).

With regard to pre-hospital care (PHC), which involves actions taken with the user before they are admitted to hospital, it can be carried out in two ways: basic life support, characterized by non-invasive manoeuvres, and advanced life support, which enables invasive ventilatory and circulatory support procedures (6,7). The quality of care provided influences the victim's survival and aims to ensure that they arrive at the scene alive (8). This stage is fundamental to the patient's prognosis.

On arrival at the care unit, it is essential to classify the severity of the Urgent and Emergency situation. In Brazil, the Manchester Triage System (STM) is commonly adopted FIGURE 1, created in 1994 in England, which in turn is made up of 5 priority levels: Level 1 (red) are patients emerging from care and should receive immediate medical attention; Level 2 (orange) are very urgent patients and need care within 10 minutes;Level 3 (yellow) are urgent patients and need medical assessment within 60 minutes;Level 4 (green) are less urgent patients who should be seen within 120 minutes; Level 5 (blue) are non-urgent patients who can wait for care for up to 240 minutes (9 - 11).

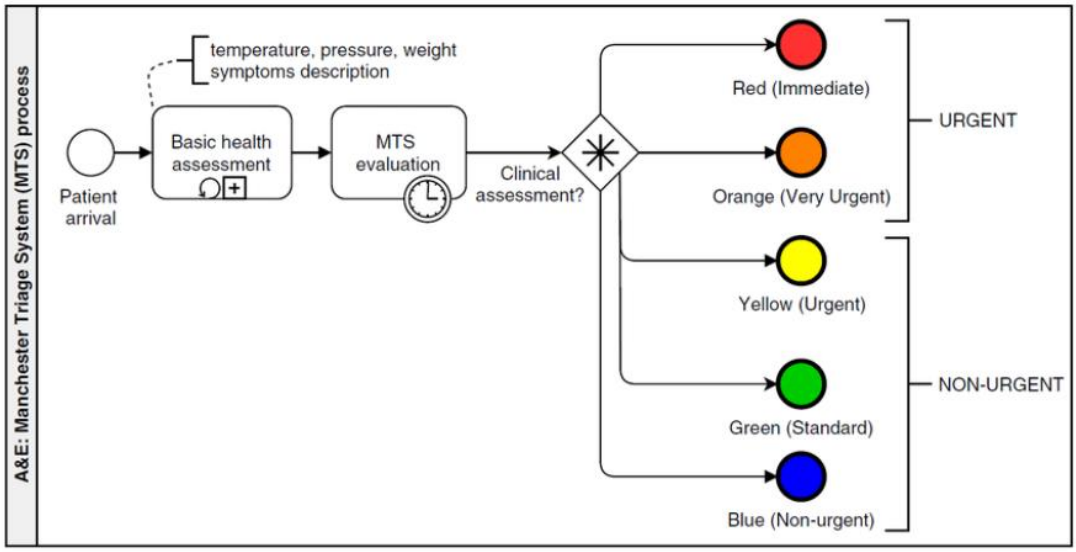

FIGURE 1. Manchester Triage System (MTS) process performed by trained nurse. Source: (13).

In 2019, the Thematic Committee on Population-Based Information carried out a population-based national health survey (PNS) to assess health conditions, including the profile of care in health services, morbidity and general mortality (12,13). Cardiovascular diseases were identified as the main causes of death, with variations according to age group and gender, and had a major impact on emergency services.

Cerebrovascular accident (CVA) is a highly relevant medical emergency, characterized by the interruption of blood flow to the brain, leading to neurological damage (16). There are two main forms of stroke: ischemic stroke and hemorrhagic stroke, which differ in their mechanism of injury, epidemiology and treatment, making early diagnosis and correct identification essential for proper management in emergency situations (17).

Ischemic stroke occurs when there is an obstruction of the blood vessels, preventing the flow of blood and oxygen to a specific part of the brain. The most common causes include thrombosis and embolism, often associated with risk factors such as hypertension, diabetes, dyslipidemia and unhealthy lifestyle habits (sedentary lifestyle and smoking). In the emergency setting, it is essential to make the differential diagnosis between ischemic and hemorrhagic stroke, as treatment for ischemic stroke may involve the administration of thrombolytics, such as recombinant tissue plasminogen activator (rtPA). This treatment is highly effective, as long as it is administered within a therapeutic window of 3 to 4.5 hours after the onset of symptoms, highlighting the importance of speedy care (18-20).

FIGURE 2 shows an example of a CT scan of an ischemic stroke.

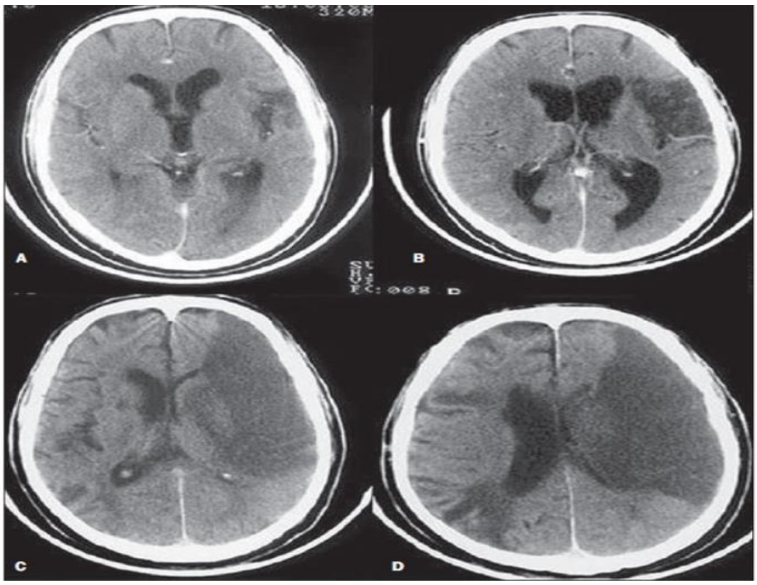

FIGURE 2. CT scan of an ischemic stroke in the MCA territory. A,B: Partial infarction, with involvement restricted to the left hemisphere. C,D: Complete infarction on the left, with mass effect compressing the lateral ventricle. Lesser left hypodensity can be seen in the right hemisphere. Source: (21).

Between 12 and 24 hours there is a change in the normal white-gray differentiation, due to edema. After 24 hours, until the 7th day, an area of hypodensity is seen in a vascular distribution (in 70%), due to cytotoxic edema. There may even be a mass effect with total or partial compression of ventricles and cisterns. Hemorrhagic transformation can occur and is seen in 70% of cases between the 2nd and 4th days. As the mass effect diminishes, ex-vacuum dilation of the ventricles can be observed. Later, there may be loss of parenchymal mass, with associated furrowing and ventricular enlargement resulting in encephalomalacia (17-20).

FIGURE 3 shows a CVA after 6 hours of symptoms.

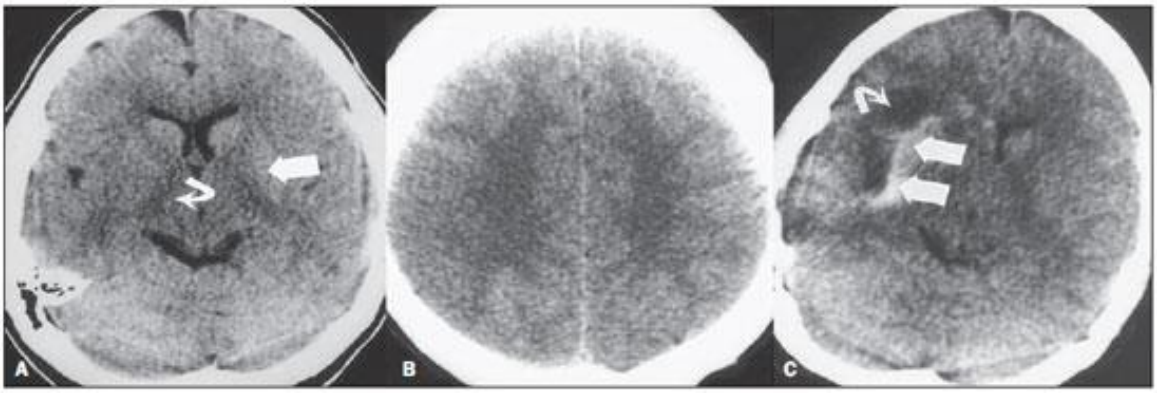

FIGURE 3. A. CT scan six hours after symptoms. The curved arrow denotes medial demarcation of the posterior portion of the right internal capsule. Note that the lateral margin of the right internal capsule is poorly defined, due to the decreased attenuation of the lentiform nucleus. The straight arrow shows the normal left internal capsule and lentiform nucleus. B: Decreased white-gray differentiation in the right cerebral hemisphere, corresponding to the distribution of the MCA. C: Three days later - area of greater attenuation (straight arrows) corresponding to hemorrhage in a region of infarction. The non-hemorrhagic areas of infarction are seen as hypoattenuating (curved arrow) Source: (21).

Thrombolytic therapy, however, carries risks and is only indicated after confirmation of the absence of cerebral hemorrhage, usually verified by computed tomography (CT) of the skull. Thus, the speed with which imaging tests are carried out, combined with clinical assessment, can determine the success of the treatment, minimizing sequelae and improving the patient's prognosis (24-29).

Hemorrhagic stroke is caused by the rupture of a blood vessel, leading to extravasation of blood into the brain tissue. This type of stroke is often associated with uncontrolled hypertension, the use of anticoagulants, aneurysms and arteriovenous malformations. In an emergency setting, hemorrhagic stroke represents an even greater challenge, as treatment is essentially conservative, aimed at reducing intracranial pressure and preventing further hemorrhages, often involving emergency surgical interventions, such as draining the hematoma or repairing the ruptured vessel (22).

Rapid identification of hemorrhagic stroke is crucial, as the use of thrombolytics is contraindicated, and any delay in proper management can lead to an increase in intracranial pressure and involvement of extensive brain areas, resulting in a much more serious prognosis. Tests such as skull CT or magnetic resonance imaging (MRI) are essential to confirm the diagnosis and establish an immediate treatment plan (23).

Considering facial paresis, specific motor alterations and the presence of asymmetrical reflexes, a focal seizure could also be considered. However, the prolonged duration of the symptoms and the absence of visible seizure activity during the physical examination make ischemic stroke a more likely explanation (25).

Hemiplegic Migraine, although less common, hemiplegic migraine can present with similar symptoms, such as numbness, weakness and eye deviation. However, the absence of a previous history of significant migraines and the rapid onset of symptoms make this hypothesis less likely compared to an ischemic stroke (26).

Intracerebral hemorrhage (ICH) is the second most common cause of stroke after ischemic stroke and represents a significant cause of morbidity and mortality. ICH can be categorized as spontaneous or traumatic, and ICH after traumatic brain injury is reviewed separately (29).

The primary mechanical injury to the brain parenchyma occurs through the expansion of the hematoma and perilesional edema. Both the volume of the hematoma and the edema contribute to the mass effect and increased intracranial pressure (ICP), which in turn can cause reduced cerebral perfusion and ischemic injury and, in cases of very large ICH, cerebral herniation (30).

The perihematoma region shows delayed perfusion and increased diffusivity mixed with areas of reduced diffusion, suggesting the presence of

vasogenic and cytotoxic (ischemic) edema. Acute changes in blood pressure with impaired cerebral autoregulation in patients with ICH can contribute to perihematoma ischemia (31).

Increased intracranial pressure and the resulting reduction in cerebral perfusion pressure may play a role, and this phenomenon may be exacerbated by reduced blood pressure (5)

Clinical suspicion of intracerebral hemorrhage (ICH) is based on signs such as sudden onset of symptoms that progressively worsen, especially when accompanied by intense headache, vomiting, severe hypertension and changes in the level of consciousness or coma. However, differentiating between cerebral hemorrhage and ischemia cannot depend solely on clinical characteristics.

To confirm the diagnosis of ICH and rule out an ischemic stroke or other conditions that mimic a stroke, it is essential to perform neuroimaging, such as computed tomography (CT) or magnetic resonance imaging (MRI) (32-36).

A CT scan is performed initially. MRI with contrast is preferred to identify possible underlying causes of ICH. Contrast-enhanced brain CT is an alternative, albeit less sensitive, option for patients who cannot undergo MRI. Vascular imaging tests, such as CT or MRI angiography, or digital subtraction angiography, are performed when an underlying vascular lesion is suspected (33).

Routine laboratory evaluation to investigate underlying causes or associated risks in patients with ICH includes; Complete blood count, electrolytes, urea, creatinine and glucose; Prothrombin time (with international normalized ratio [INR]) and activated partial thromboplastin time for all patients; Coagulation time with thrombin for patients using direct oral anticoagulants; Specific cardiac troponin; Toxicology screening to detect cocaine and other sympathomimetic drugs; Urinalysis; Pregnancy test in women of childbearing age; and An electrocardiogram (ECG) obtained early on can help identify patients with ICH and concomitant cardiac dysfunction (24-29).

The treatment of hemorrhagic stroke is clinical, with some indications for surgery. The measures to be taken are adequate intensive support (circulatory and ventilatory) of the ABCD of any emergency, BP control, general measures to reduce intracranial pressure (ICP) and anticonvulsants if there is an epileptic seizure. BP management should be based on the value (33-37).

For patients with a systolic blood pressure (SBP) between 150 and 220 mmHg, it is recommended to reduce the SBP to around 140 mmHg, preferably during the first hour after presentation, as long as the patient remains clinically stable (33-37).

In the case of patients who present with an SBP above 220 mmHg, we suggest a rapid reduction to below 220 mmHg. After this initial reduction, blood pressure should be lowered gradually over a few hours, aiming for a range of 140 to 160 mmHg, as long as the patient remains clinically stable (35-37).

If there is clinical worsening during this period, it may be necessary to adjust antihypertensive therapy more intensively. Although the ideal blood pressure target is not entirely clear, maintaining SBP between 140 and 160 mmHg is considered a reasonable goal for patients who remain clinically stable (33-37).

Reducing systolic blood pressure to below 130 mmHg in the first few hours after starting ICH has not shown clear benefits in reducing mortality or disability, and may increase the risk of adverse events such as cerebral hypoperfusion and kidney damage (38-42).

For individuals with an initial systolic blood pressure (SBP) of 160 mmHg or higher, our preference is to start treatment with nicardipine. This choice is attributed to its rapid action and ability to be titrated quickly. Blood pressure is closely monitored every five minutes, and patients undergo hourly assessments to detect any signs of neurological deterioration (12, 17, 32).

On the other hand, for those with an initial SBP below 160 mmHg, we opted to start treatment with labetalol. This decision is influenced by the ease of administration and the prolonged duration of the effect associated with labetalol (9, 40).

In some cases of hemorrhagic stroke within the brain tissue, surgical intervention may be necessary due to the development of an intracranial hypertension syndrome. Indications for surgery include; Hematoma volume between 20-50 Ml; Glasgow Coma Scale score between 9-12; Patient age between 50-69 years; Hematoma located in lobar region, without affecting ventricular cavities (deeper lesions are difficult to access without causing significant damage to neural tissue). In the case of cerebellar hemorrhage: Cerebellar hematoma greater than 3 cm; Decreased level of consciousness; Compression of the brainstem or presence of obstructive hydrocephalus; For supratentorial hemorrhage: Surgery must be performed within 8 hours of the onset of symptoms (41).

FIGURE 4 shows a CT scan of the skull after a hemorrhagic stroke.

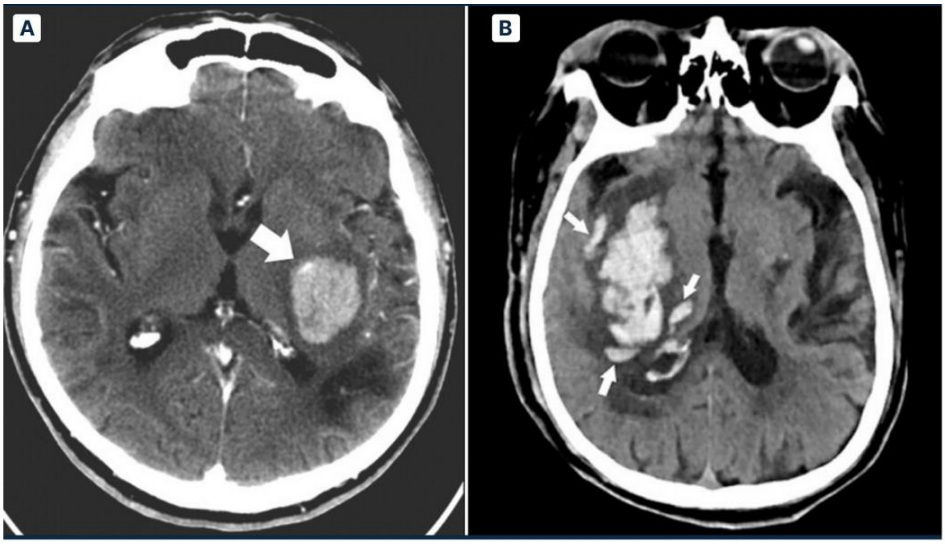

FIGURE 4. Hemorrhagic stroke within brain tissue Source: 33.

Both ischemic and hemorrhagic strokes share similar symptoms, such as sudden loss of strength on one side of the body, difficulty speaking, confusion, and deviation of the corner of the mouth, which can make initial clinical differentiation difficult. Therefore, imaging tests are essential in emergency triage. Distinguishing between the two types is vital, since management is completely different: while ischemic stroke benefits from the use of thrombolytics to unclog the vessel, hemorrhagic stroke requires approaches that control bleeding and reduce intracranial pressure (42 - 45).

The approach to stroke in emergency care involves a set of steps that range from initial clinical recognition to the application of specific and rapid therapies, mainly based on imaging tests for an accurate differential diagnosis. The implementation of care protocols that prioritize immediate examinations and assessment of risk factors can contribute significantly to the prognosis (42 - 45).

The main cardiovascular emergencies include acute myocardial ischemia or infarction (AMI), stroke, acute pulmonary edema (APE), acute coronary disease (ACD), hypertensive crisis and cardiorespiratory arrest (CRA) (14,15). Cardiovascular diseases are responsible for 26% of hospital admissions in Brazil and represent the most significant impact on public health resources (14,16).

Stroke is one of the main causes of morbidity and mortality in the world and is an important cause of emergency (17). It represents the second cause of death in individuals over 60 years of age and the fifth among people aged 15 to 59 years of age. Stroke is the most important cause of morbidity and physical disability in the developed world. In Brazil, according to data from DATASUS (18), stroke is the leading cause of death and disability in adults. Furthermore, it imposes high complexity on health services, since many victims, in addition to emergency care, require specialized assistance and physical rehabilitation (19,20).

Large differences in incidence and mortality between countries have been attributed to variations in modifiable risk factors (e.g., obesity, hypercholesterolemia, and exposure to tobacco and/or ethanol), resulting in more frequent and/or severe conditions in some countries (21–23).

In Brazil, it is important to note the lack of public health policies that are efficient in controlling these risk factors, and the high rate of stroke compared to developed countries and other Latin American countries, despite also being considered developing countries. In fact, these factors are responsible for 90% of cases of stroke and other vascular diseases (16).

Other neurological causes are responsible for a large part of consultations in health units, such as headache and epileptic seizures.

Headaches are associated with a high socioeconomic impact, loss of productivity at work and reduced quality of life, with harm to family and social relationships (24,25). In Brazil, although headaches account for 9% of all consultations for acute problems in Primary Care, the vast majority of patients do not seek medical care (26). The World Health Organization (WHO) classifies migraine (the type of headache with the highest social cost) as one of the 20 leading causes of loss of years of healthy life per year in the world. Migraine alone is responsible for approximately 400,000 lost workdays per year per one million inhabitants in developed countries (27).

According to the PNS, external causes of mortality also represent a prominent position (4–6), representing the third cause of overall mortality, and the main cause in the age group from 1 to 49 years (32,33). External causes are considered to be injuries, trauma or any other type of health problem, whether intentional or not, with sudden onset and as an immediate consequence of violence or exogenous cause (34).

According to the WHO (27), Brazil is the third country with the highest number of deaths due to traffic accidents, which are a common medical emergency in emergency care units within a 24-hour period. External

causes are responsible for a large proportion of hospital admissions in Brazil and impose a high demand on health services (35,36). Many patients require long-term care from different medical specialties, and others become incapacitated (36).

It is also interesting to note that there has recently been an increase in the prevalence of emergency cases in Brazil and worldwide, which is a consequence of demographic changes in the population, such as the increased longevity of the population associated with several chronic diseases. In this context, it is worth highlighting the increase in the number of people treated for chronic non-communicable diseases (37), with asthma being one of the most frequent in this group (38), as well as mental disorders (39), which account for approximately 3% of all treatments performed in general emergency hospitals.

Emergency care requires a quick and safe approach to patients, with early initiation of treatment. Professional qualifications are essential to ensure the best clinical outcome in emergency care (40,41). However, the general budget deficit situation of hospitals that treat these patients, combined with the inexperience of recent graduates who make up a large part of the human resources in this sector and the lack of adoption of clinical protocols, makes this area one of the most complex and costly in the Brazilian health system. (42). Furthermore, medical academic training has also been the subject of debate regarding the changes implemented recently (43).

For decades, medical education has been undergoing transformations in methods and content, with curricular reforms in several medical schools (43). In addition to the large volume of theory during undergraduate studies, curricula are being restructured with practical scenarios. However, there are still gaps and recent graduates feel insecure about providing emergency care. Paradoxically, the emergency departments are mostly occupied by newly graduated doctors (44).

In this context, the specialty and subjects related to Emergency Care have been arousing greater interest among medical undergraduates, especially after its recognition as a medical specialty in Brazil in 2015 (45). Furthermore, the creation of Law No. 12,871 in 2013 defined as a requirement in medical training a minimum of 30% of the practical internship workload carried out in activities in primary care and emergency care (46).

Based on the premises described, it is essential to develop tools to assist professionals in emergency and urgent care. Smartphones are the most widely used mobile devices in academic routines and in the healthcare field. The use of applications has increased significantly, both by patients in the control of primary diseases, medical service providers such as health plans, and especially by physicians in the search for the most appropriate course of action (50,51).

Apps in the emergency and urgent care field aim to optimize access to therapeutic conduct, training, and continuing education for medical teams, which represent an important way to impact the healthcare system. Technological tools and the use of applications, platforms, and online resources have been gaining increasing space in the medical education scenario. Books, although essential for study, are not recommended for quick reference in the workplace, requiring quick strategies for consulting flowcharts, scores, and medical prescriptions (50,51).

Currently, Medscape is the best-known medical application worldwide, with more than 10 million users who benefit from quality and comprehensive content. Because it is so complete, it works as a study and training tool and not as a tool to assist in quick decisions in the Urgent and Emergency environment. In Brazil, we have the Whitebook application with more than 250 thousand users, with complete and updated content covering pathophysiology, clinical presentation and diagnostic approach. However, to make a quick decision, we have to navigate through all the topics and the dosage of the medications is not calculated with their standard dilutions. Despite these available options, to date, there is still no quick-access tool adapted to the therapeutic options available on the national market (50,51).

To deal with stroke cases efficiently, it is essential that the medical team is well prepared, both in theoretical and practical terms. This preparation involves the ability to quickly identify signs and symptoms of a stroke, such as sudden loss of function on one side of the body, difficulty speaking, mental confusion, loss of coordination and blurred vision (9-12).

Rapid recognition of symptoms is essential for stroke treatment. The application of the FAST scale (Face, Arms, Speech, Time) has proven effective as an initial screening method. Rapid detection allows care to begin in the pre-hospital phase, which can improve prognosis. Furthermore, this stage needs to be continually reinforced during medical training so that professionals can differentiate between types of stroke – ischemic and hemorrhagic – and initiate appropriate treatment according to the patient's situation (13-19).

Emergency physicians must be trained to follow specific protocols, such as those of the American Heart Association (AHA) and the American Stroke Association (ASA), which guide immediate care. For ischemic stroke, for example, the use of thrombolytic agents, such as Alteplase, is highly effective, but requires technical knowledge about contraindications and the exact time of administration, which must occur within a therapeutic window of up to 4.5 hours after the onset of symptoms (15, 21, 47).

Computed tomography (CT) and magnetic resonance imaging (MRI) are essential resources for confirming the diagnosis and differentiating between ischemic and hemorrhagic stroke, which guides the

therapeutic approach. However, this step requires that physicians be able to quickly interpret the results of these exams and, in many cases, coordinate with neurologists to confirm the therapeutic decision (8).

Caring for a stroke patient is a race against time, and therefore rapid and accurate decision-making is essential. Physicians and health professionals must be trained to act together, each with defined functions, which minimizes errors and speeds up care. This training requires an interdisciplinary and practical approach, which must be updated frequently to keep up with medical innovations (17).

Medical preparation in emergency stroke care involves knowledge of specific protocols, rapid diagnostic techniques, and decision-making skills. Healthcare institutions should prioritize continuing education and training for their teams to increase the chances of success in emergency care, thus contributing to the reduction of sequelae and mortality rates associated with stroke (18, 22).

CONCLUSION:

In conclusion, emergency care in hemorrhagic stroke and ischemic stroke is essential to minimize neurological damage and improve the patient's chances of recovery. Hemorrhagic stroke, characterized by the rupture of a blood vessel and extravasation of blood into the brain, requires rapid interventions to control intracranial pressure and reduce bleeding. In ischemic stroke, caused by the obstruction of a cerebral artery, the focus is on reestablishing blood flow as quickly as possible, often through thrombolytic drugs or mechanical procedures to remove the clot.

Early distinction between the types of stroke, made through imaging tests, is essential, as it guides appropriate treatment and prevents complications. In both cases, rapid response and specialized care in the hospital environment are critical factors for the prognosis. Therefore, effective emergency care, based on well-established protocols and training of health teams, is essential to reduce the morbidity and mortality rates associated with stroke.

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