

Delayed stroke diagnosis with fatal outcome in South Sudan: need for greater awareness

Kenyi Alex Daniel and Ronald Woro

Authors Affiliations:

Juba Medical Complex, Juba, South Sudan

Correspondence:

Kenyi Alex

kenyialex434@gmail.com

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ABSTRACT

Spontaneous intracerebral haemorrhage is a stroke subtype that is associated with high morbidity and mortality due to mass effect raised intracranial pressure, and injury to the surrounding brain tissue. We report a case of a 35-year-old female with a massive left parietal intracerebral haemorrhage of sudden onset followed by rapid neurological deterioration due to the mass effect. An urgent brain Computed Axial Tomographic (CT) scan, and basic laboratory tests were obtained. Supportive treatment with intravenous fluids and management of physiological parameters were planned but could not be instituted due to the rapid deterioration of the patient's condition. A risk factor could have been previously undetected such as uncontrolled hypertension though vascular abnormalities e.g. burst aneurysm or arterio-venous malformation were possible. She died within an hour of presentation to the hospital. We conclude that prompt diagnosis and management of intracerebral haemorrhage is a significant challenge in South Sudan due to limited awareness, facilities, and late presentation of stroke.

Introduction

Spontaneous intracerebral haemorrhage is a stroke subtype that is associated with high morbidity and mortality due to the mass effect of raised intracranial pressure and injury on the surrounding brain tissue. It accounts for half of the disability-adjusted life years lost, though it only represents 10-15% of strokes. Spontaneous intracerebral haemorrhage in young patients is not a common hospital presentation among stroke cases in South Sudan.

We report a case of a 35-year-old female with a massive left parietal intracerebral haemorrhage of sudden onset followed by rapid neurological deterioration due to the mass effect.

Case presentation

A 35-year-old female, mother of six children, presented to Juba Medical Complex (JMC) accompanied by relatives. She was previously well. Three days before the presentation, she developed severe intermittent headaches without visual disturbances or fever. She was assessed at another nearby facility the same morning that she was brought to the hospital. She had been diagnosed with malaria and typhoid fever and started on intravenous artesunate for malaria

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and ceftriaxone for suspected typhoid fever. On arrival at JMC, a right-sided weakness was noted, and sudden loss of consciousness was associated with deviation of the mouth to the right side. She was afebrile. A single seizure with urinary incontinence occurred just before she died. Her past medical and surgical history was unremarkable.

On examination at JMC, she had laboured breathing and a reduced level of consciousness with a Glasgow coma scale of 6 out of 15. She was overweight, but her body mass index was not available. Blood pressure was 122/77 mmHg in the left arm using a mercury sphygmomanometer, pulse rate 98 beats per minute, regular and of normal volume. The respiratory rate was 27 breaths per minute with oxygen saturation of 70% on room air and axillary temperature of 36.3 °C.

Power was graded as 0/6 on the right side and 4/6 on the left side on the Medical Research Council scale. Reflexes were equivocal on both sides. The tone was flaccid. Pupils reacted sluggishly to direct light. Assessment of other body systems was unremarkable.

The limited laboratory blood tests before she died showed total white blood cells 14.2×10^9 (3.5 – 11.5) with neutrophilia, haemoglobin 11.0g/dl (13.5-15.5), and platelets 287×10^9 (150-450). Blood film for malaria showed moderate *Plasmodium falciparum* parasites; random blood sugar was 6.5mmol/L (reference range 4.2-8.6mmol/L). Our differential diagnosis was a stroke and cerebral venous thrombosis. An urgent brain CT scan was obtained (Figure 1) and demonstrated a large left parietal haemorrhage leading to sudden deterioration and death.

Discussion

Because of the patient's rapid deterioration and death, there was no opportunity to carry out other laboratory investigations, such as serum electrolytes, creatinine, coagulation profile, cardiac enzymes, toxicology screening, and arterial blood gases, in order to exclude other causes with similar symptoms. The initial presenting symptoms were nonspecific. Malaria and enteric fever are prevalent locally, hence the initial management. Our management was supportive of the urgent transfer to the intensive care unit (ICU) at Juba Teaching Hospital. Close relatives were informed about the patient's condition and CT scan findings, indicating poor outcomes. A risk factor could have been previously undetected such as uncontrolled hypertension though vascular abnormalities e.g. burst aneurysm or arterio-venous malformation were possible.

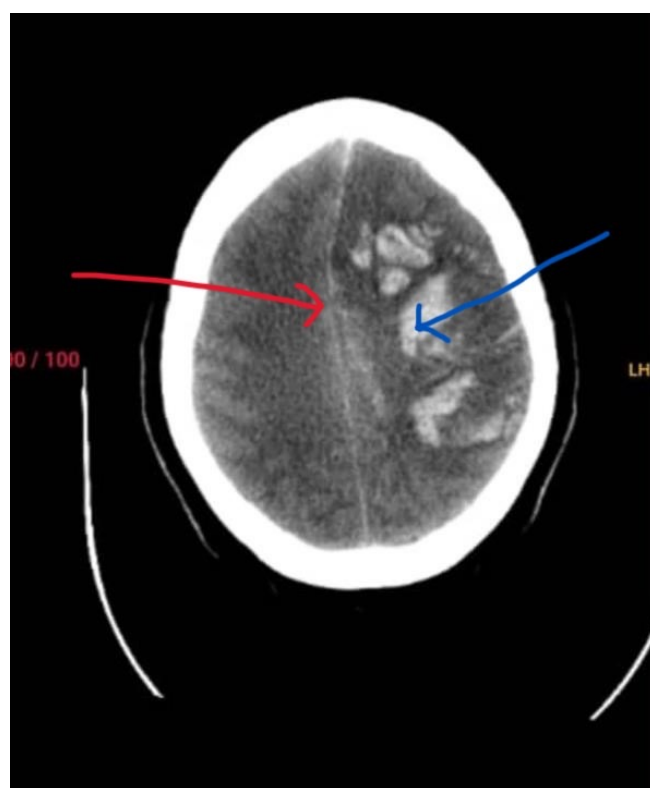


Figure 1. CT brain scan indicating the intracerebral haemorrhage (blue arrow) and the midline shift (red arrow)

Her level of consciousness decreased quickly, with subsequent death consequent upon the intracerebral bleeding and expansion of the haematoma as indicated by the significant midline shift on the CT scan (Figure 1). Haematoma expansion, as seen on follow-up CT brain scans, which were not shown in this patient, is associated with a poor prognosis.^[1] However, patients with moderate to large ICH baseline volumes (about 75ml) at the early presentation from symptom onset have the highest risk for haematoma expansion.^[2]

The high peripheral neutrophils are probably reactive neutrophilia and unlikely to influence the prognosis. However, studies on the relevance of inflammatory and oxidative stress markers in ICH as prognostic markers for the quantification of oedema volume were noted to play a crucial role in secondary brain damage and oedema formation.^[3,4]

This case highlights the lack of awareness and preventive programmes in South Sudan and many other African countries.^[5] There are no studies conducted to determine the burden of strokes in South Sudan. Most of the cases we

diagnose with stroke in our facility are due to ischaemia. A systematic review and meta-analysis on the epidemiology of ICH conducted in 52 studies noted that the incidence of ICH had not decreased in the last 40 years worldwide, with a higher incidence in Asia than in other continents. It is also noted that the incidence increases with age and differs at the 85-year boundary, with men more likely to develop ICH than women, with the basal ganglia being the common area for ICH.^[6] Relevant studies have noted a rise in stroke incidence, especially in urban areas compared to rural areas.^[7] Most patients diagnosed with stroke present for the first time with weakness, slurred speech, or decreased level of consciousness without a prior history of hypertension. Hypertension (systolic BP ≥ 140 mmHg and diastolic BP ≥ 90 mmHg) is a modifiable risk factor.

Data analyses from 125 population-based studies in 2010, including 968,419 adults from 90 countries, estimated the global prevalence of hypertension and/ or current use of anti-hypertensives was 31.1%. Slightly higher in men than women and was lower (28.5%) in high-income countries than low- or middle-income countries (31.5%). In women, it was lowest in highest income countries (25.3%) and highest in sub-Saharan Africa (36.3%).^[8] Hypertension in Africa has been on the rise. A study in Nigeria indicated an increase in the prevalence of hypertension, especially in women, with half of the hypertensive individuals untreated or poorly controlled.^[9] Other studies have also noted a similar increase in hypertension and strokes.^[9] The burden resulting from stroke has been on the increase in Africa.^[10,11]

Diagnostic facilities for stroke are very limited in South Sudan, with only four functional health units having CT scanners and only one facility with MRI. All are located in Juba. At JMC, we diagnose stroke cases with CT scanning, which is readily available, unlike a few years ago when this imaging modality was lacking. Non-contrast CT scanning is rapid, highly sensitive, and specific for identifying ICH.^[12] Magnetic resonance imaging (MRI) is more sensitive for ICH.^[13] Hyperacute ICH has unique imaging features on stroke MRI and is detectable with excellent accuracy, especially in chronic ICH.^[14] However, brain CT scanning of our patient provided the diagnosis. Additional CT angiography (CTA) and contrast-enhanced CT help spot underlying cerebral small vessel disease and identify patients at risk of ICH expansion.^[15,16] CTA and perfusion studies are not available in South Sudan.

Management of stroke requires stroke units with trained healthcare personnel, clear agreed guidelines, and emergency services.^[17] This is lacking in South Sudan.

In contrast to developed countries where there are emergency services with quick access to diagnostic scans and the possibility of thrombolysis for ischaemic stroke,^[18] most patients we receive with stroke present after days of developing symptoms due to lack of accessibility to emergency services. Others opt for traditional management before considering hospital management. This is possibly due to a lack of awareness about stroke. In addition, a lack of unified guidelines is a common challenge in most low-and-middle-income countries.^[19] The few available health facilities are poorly equipped to handle acute stroke cases. There are no available unified guidelines for stroke management and stroke training programmes for doctors and nurses, which is a common challenge in most low-and middle-income countries.

Rehabilitation is an essential aspect of stroke management. The rehabilitation centres available across South Sudan are inadequate. This would enhance the speed of recovery and, in turn, reduce the disability burden in society.^[18] The lack of research facilities makes it difficult to address the root causes of strokes, which would help policymakers in planning.

Conclusion

In South Sudan, the burden of ICH is unclear, but stroke cases have risen in recent years. Limited access to diagnostic tools means many strokes, both ischaemic and haemorrhagic, go undiagnosed. Poor health facilities, a lack of CT scanners, specialized stroke units, and precise management guidelines contribute to inadequate stroke care. To address this, South Sudan needs focused management guidelines, stroke units, diagnostic and research facilities, and public awareness campaigns to improve early detection and treatment. These issues present significant challenges for policymakers, the government, and partners.

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