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Therapeutic attitude for intraparenchymal hematoma About 24 cases in Niamey

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ABSTRACT:
Introduction: The management of intraparenchymal hematoma requires medical treatment at first step, but the usefulness and indications of neurosurgical treatment is still subject to debate. We propose to evaluate the therapeutic attitude of patients admitted in our department with intraparenchymal hematoma. **Method**: This was a prospective study from January 2020 to December 2022 in neurosurgery and emergency department of the Niamey National Hospital. **Results**: We enrolled 24 patients, 14 males and 10 females, with a ratio of 1.4. The mean age of our patients was 40.1 years, ranging from 17 to 77 years. On admission, 20 of our patients (83.33%) presented with a disturbance of consciousness; 14 patients (58.33%) had intracranial hypertension syndromes such as headache and jet vomiting. 22 patients (91.66%) had motor deficit. Cerebral CT scans were carried out systematically in all our patients. In the supratentorial region, polar location was observed in 8 patients (33.33%) and deep basal ganglia hematoma in 14 patients (58.33%); in the sub tentorial region, hematoma involved the cerebellar hemispheres in 2 cases (08.33%). Therapeutically, all patients were under medical management, although 18 underwent surgery. The surgical procedure involved evacuation of the hematoma in 7 cases, and external ventricular draining in 11 cases. The outcome was favourable in 3 cases of polar intraparenchymal hematoma and one cerebellar hematoma, and in 2 non-operated patients with deep intraparenchymal hematoma. Overall mortality was high, 75% of those admitted for intraparenchymal hematoma. **Conclusion**: Despite all the progress made in neurosurgery, notably new therapeutic methods (radiosurgery, stereotaxis, endoscopic surgery), spontaneous intraparenchymal haemorrhage remains a dreaded pathology with a poor prognosis. The attitude should always be, to treat patients with the maximum of resuscitation and surgical resources available.

Keywords: Intraparenchymal hematoma, surgery, progress, Niger.

INTRODUCTION:

Spontaneous intracerebral (or intraparenchymal) haemorrhages (ICH) are characterized by a non-traumatic irruption of blood into the brain parenchyma. They account for 10 to 15% of strokes, and together with subarachnoid haemorrhage, are grouped in haemorrhagic strokes. In most cases, there is no etiology, i.e., related to the rupture of small vessels damaged by chronic hypertension (HTN) or amyloid angiopathy (1). Among strokes, cerebral hematomas (CH is often grim, leading to severe neurological sequelae (only 20% of patients are independent at 6 months) and a mortality rate ranging from 35% to 52%, depending on the study (2). Medical treatment is an essential first therapeutic step [3,4]. However, the usefulness and indications of neurosurgical care is subject to debate. We propose to evaluate the therapeutic attitude of patients admitted with intra-parenchymal hematoma to our department.

PATIENTS AND METHODS:

We proposed to carry out a prospective study from January 2020 to December 2022 in the neurosurgery and emergency departments of the Niamey National Hospital. The inclusion criteria were all patients admitted for intraparenchymal haematoma without trauma to the neurosurgery department and patients admitted to the emergency units in whom a neurosurgical opinion had been sought. The patients whose records were empty or incomplete, or who had signed a discharge immediately after diagnosis were excluded from the study. This work was based on the full records of patients followed up during this period. 24 files were collected.

Data collected during the study were as follow:

- Epidemiological data included patient age, sex, and contributory history.
- Clinically, we noted:
- Medical history in relation to their clinical status.
- Neurological status (consciousness, focal signs)
- General condition at the beginning of and during the care of our patients.

Morphological paraclinical studies focused on CT scan and MRI with angiographic sequences. Imagery was used to determine lesion type, topography, associated lesions, and signs of radiological severity. Therapeutic management: exclusively medical or associated with surgery. Finally, the evolution of management was noted. We encountered no problems of bias in the selection of our patients.

RESULTS:

We enrolled 24 patients, 14 males and 10 females (ratio 1.4), with an average age of 40.1 years, ranging from 17 to 77 years. Clinically, level of consciousness was assessed using the Glasgow Coma Score (GCS), graded from 3 to 15. On admission, 20 of our patients (83.33%) had a disturbance of consciousness, including 8 patients with a GCS between 13 and 15 (33.33%), 6 patients with a GCS between 9 and 12 (25%) and 6 patients with a GCS between 8 and 3 (25%). 14 patients (58.33%) had an intracranial hypertension syndrome with headache and jet vomiting. We noted 22 patients with motor deficits (91.66%), 14 of whom (58.33%) had total and proportional flaccid hemiplegia, while 8 (33.33%) had proportional flaccid hemiparesis. Other neurological disorders include the meningeal syndrome, manifested mainly by meningeal stiffness in 5 cases (20.83%), and focal signs in 15 patients (62.50%), such as language disorders (motor aphasia) in 5 cases, sensory disorders in 3 cases, and damage to the cranial pairs in 7 cases: 4 cases of VII paralysis, 2 cases of III paralysis and 1 case of VI paralysis. cortical irritation in the form of convulsive seizures and agitation in 7 patients. We noted an increase in blood pressure in 18 of our patients (75%). Cerebral CT scans were performed systematically in all our patients. It was used to diagnose the hematoma, which appeared as a spontaneous hyperdensity within the parenchyma, to determine the topography and to estimate the volume. In the supratentorial region, polar location was observed in 8 patients (33.33%) and deep basal ganglia hematoma in 14 patients (58.33%). In the sub tentorial stage, the hematoma involved the cerebellar hemispheres in 2 cases (i.e. 08.33%). We did not record a brainstem location in our series. The lesion involved the right hemisphere in 16 cases (66.66%), and the left hemisphere in 8 cases (33.33%),

The diameter of the intra-parenchymal hematoma was:

- ✓ < 3cm in 4 cases (i.e., 16.66%).
- ✓ [3-5cm] in 14 cases (58.33%).
- ✓ ≥ 5 in 6 cases (i.e., 25%).

Effraction of the hematoma into the ventricular system, while remaining limited, was present in 13 of our patients (i.e., 54.16%), associated with hydrocephalus in 6 patients (i.e., 25%). Intraparenchymal hematoma exerted a mass effect in 16 patients (66.66%). In our series, cerebral MRI was requested in 2 cases to investigate the etiology. Therapeutically, all patients benefited from medical treatment, although 18 underwent surgery. The indication for surgery concerned 3 cases of polar intra-parenchymal hematoma; 14 cases of deep intra-parenchymal hematoma; 1 case of cerebellar hematoma. The surgical procedure involved evacuation of the hematoma in 7 cases, and external ventricular bypass in 11 cases. The outcome was favorable in 3 cases of polar intraparenchymal

hematoma and one cerebellar hematoma, and for 2 non-operated patients with deep intraparenchymal hematoma. 14 patients, including 3 deep hematoma evacuations and 11 external shunts, died. Overall mortality was high, at 18 patients, representing 75% of patients admitted for intraparenchymal hematoma, 14 of the 18 operated patients died (77%) and 4 of the 6 non-operated patients (33.33%).

DISCUSSION:

The location of haemorrhage varies. In our series, we found that more than half of the cases involved deep intra-parenchymal hematomas, in 14 patients (58.33%). On the other hand, polar cortical hematomas were found in 8 patients (33.33%), and sub-tentorial hematomas involved the cerebellar hemispheres in 2 cases (08.33%). In the literature, the sites of rupture of penetrating vessels causing spontaneous hematomas are, in order of frequency, the so-called deep areas of the brain (55%), the peripheral lobar areas (25%) and the posterior fossa (20%) [5]. On the clinical features, the sudden onset of neurological symptoms is the first sign that a stroke has occurred, but there are no signs that are specific to the haemorrhagic one. Clinical manifestations will depend on the location and extent of the hematoma. Classically, these are signs of intracranial hypertension (ICHT), characterized by headache, vomiting, then impaired alertness or even coma. A meningeal syndrome may be observed in cases of subarachnoid or intraventricular extension. Deep-seated ICH (thalamus, putamen, caudate nucleus) will, by compressing the internal capsule, induce contralateral hemiplegia. Lesions of the subcortical white matter can interrupt the activity of various cortical regions, resulting in various neurological dysfunctions or deficits: aphasia, homonymous lateral hemianopia, hemineglect, frontal syndrome, and brainstem lesions are accompanied by damage to the cranial pairs, contralateral hemiplegia and cerebellar haemorrhages will cause a cerebellar syndrome (6.7.8). All our patients were symptomatic. 20 of our patients (83.33%) had a disturbance of consciousness, 14 (58.33%) had an intracranial hypertension syndrome with headache and jet vomiting. 22 patients (91.66%) had motor deficits. Other neurological disorders included meningeal syndrome in 5 cases (20.83%) and focal signs in 15 patients (62.50%), such as language disorders (motor aphasia) in 5 cases, sensory disorders in 3 cases, and damage to the cranial pairs in 7 cases, cortical irritation with convulsive seizures and agitation. Management of intra-parenchymal haematomas remains disappointing; the aim of cerebral hematoma treatment is multiple: to minimize the risk of rebleeding, to limit the extension and consequences of intracranial hypertension, and to reduce the risk of complications. This therapeutic approach is based on monitoring and correction of vital signs and early rehabilitation. However, if the initial assessment reveals signs of seriousness, the patient should be admitted to an intensive care unit, possibly with mechanical ventilation. There are many surgical options for the management of haemorrhagic stroke (conventional craniotomy [9-10], minimally invasive surgery [11-12-13], decompressive craniectomy [14-15]), and ventricular drainage of acute hydrocephalus. In our series, we selected surgical indications for lobar hematomas with a cortical mouth (less than one cm), a patient with cerebellar hematoma who presented with worsening of consciousness disturbance, for patients with deep hematoma we chose patients under 50 years of age, GCS greater than 8 with hematoma greater than 30 ml, and patients with ventricular flooding. Surgical indications found in the literature include lobar hematomas associated with aneurysm rupture, and young patients with superficial haemorrhage and signs of involvement. A potential benefit of surgery in cortical strokes less than 1 cm from the cortical surface [10], craniotomy is currently recommended in patients with a cortical hematoma of more than 30 ml and less than 1 cm from the cortical surface [16]. In the case of cerebellar haemorrhage, prompt surgical evacuation is recommended in the event of altered consciousness or signs of brainstem compression [17].

We have not used minimally invasive surgery limited by our local resources, yet this technique is cited as a promising option with many advantages over conventional craniotomy, such as shorter operative time, reduced tissue damage, and the fact that the procedure can be performed under local anaesthesia. The various methods of minimally invasive surgery involve endoscopic aspiration under stereotactic guidance, either coupled with

thrombolysis or not, using alteplase or urokinase. We did not also perform decompressive craniectomy, as our patients for whom we retained the indication for intraoperative decompressive craniectomy did not have excessive oedema. This option was not retained by several authors who saw no potential benefit [14-15].

The surgical procedure involved conventional craniotomy to evacuate the hematoma in 7 cases (3 lobar hematomas, 3 deep intraparenchymal hematomas and 1 cerebellar hematoma) and external ventricular draining in 11 cases of deep intraparenchymal hematomas.

After two weeks, 6 patients were discharged from hospital to continue rehabilitation, including 4 operated patients (3 polar hematomas, one cerebellar hematoma) and 2 non-operated patients (deep hematoma).

Mortality is high in this pathology, at 75%. This high mortality rate is of course found in the literature. A score, based on independent prognostic factors for death, is used to determine the risk of death 1 month after the initial episode. There is a linear relationship between this score and the risk of death. At 0, the risk of death is zero. At 6, it is over 80%. The calculation method is as follow:

1) GCS score:
- ✓ 3-4: 2 points
- ✓ 5-12: 1 point
- ✓ 13-15: 0 points

2) ICH volume, cm^3:
- ✓ ≥30: 1 point
- ✓ <30: 0 point

3) Intraventricular haemorrhage:
- ✓ Yes: 1 point
- ✓ No: 0 points

4) ICH of infra-tentorial origin:
- ✓ Yes: 1 point
- ✓ No: 0 point

5) Age, year:
- ✓ ≥80: 1 point
- ✓ <80: 0 point

Total score: 0-6

In our small series, 14 of the 18 patients operated on died, i.e. 77%, which explains the attitude of some authors to opt for surgical abstention and resuscitation. This ineffectiveness of surgery must be qualified and must above all be based on a rigorous selection of indications.

CONCLUSION:

Spontaneous intraparenchymal haematoma has a wide variety of clinical expression, depending on the topography of the haemorrhage, its volume and its evolving course. But since the advent of CT scans, knowledge of ICHs has evolved considerably allowing a better prognostic approach and facilitating the choice of treatment. However, the usefulness and indications for neurosurgical treatment of ICHs remain highly debated. Intracranial pressure monitoring enables medical treatment to be tailored to the patient's needs and appears to be an important factor in improving prognosis. Despite all the progress made in neurosurgery, notably the new therapeutic methods (radiosurgery, stereotaxis, endoscopic surgery), spontaneous intraparenchymal haemorrhage remains formidable, with a poor prognosis, Despite a high mortality rate, the danger is to think about supposed severe sequelae and by then, not implementing the full range of treatments. On the contrary, the attitude should be, as far as is reasonable, to treat patients to the maximum of resuscitation and surgical possibilities.

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Photo 1: Axial section of cerebral CT scan without contrast injection, showing a deep thalamo-capsulo-lenticular left parenchymal hematoma with ventricular flooding.

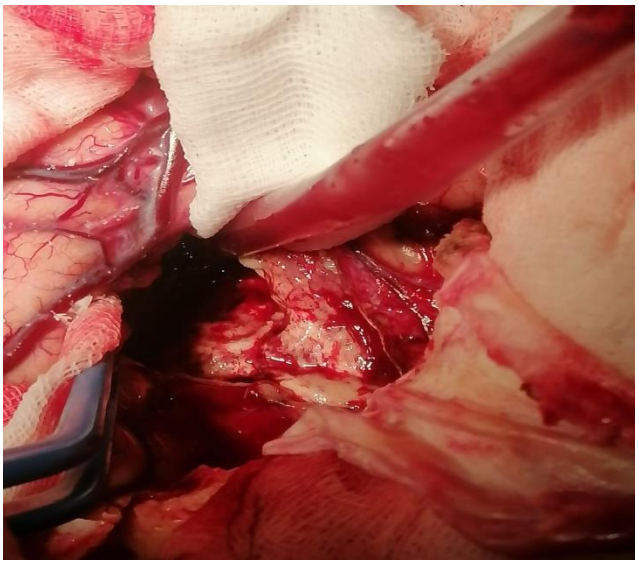

Photo 2: Intraoperative image showing evacuation of a hematoma by craniectomy, opening of the sylvian valley to allow access to the basal temporal hematoma.

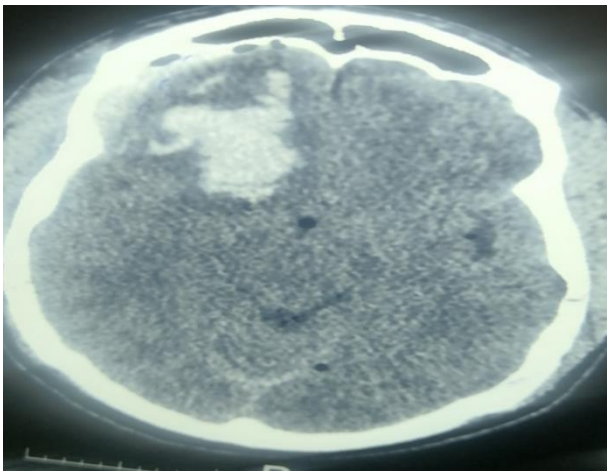

Photo 3: Right frontal lobar hematoma, the cortical nature and large volume of which are indications for surgery.