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Retrospective Study

Hemorrhagic Stroke in a Moroccan Intensive Care Unit (About 50 Cases)

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Abstract

Through this analytical study, we emphasize the quality of the management of the hemorrhagic stroke. We realized a retrospective study about 50 patients hospitalized at the resuscitation department of the surgical emergencies at the UHC Casablanca during a period of 4 years from 2011 to 2015. It included 31 men and 19 women, the mean age was 51 ± 15 years old. The epidemiological, clinical, paraclinical, therapeutic, and evolutive data were collected and gathered on a card then entered and analyzed on SPSS software. 50 patients were collected that the average age is 52 plus or minus 15 years old, the male predominance is noted.

The hypertension remains the main risk factor. The hemiplegia is the main focal neurological sign, the most frequent site of cerebral hemorrhage is lobar.

In the literature, various predictive factors of mortality are observed. The prognosis of the hemorrhagic stroke in the units of intensive cares is still dark, hence the importance to develop specialized centers in order to improve the management of the patients who suffer from this affection.

Keywords: *Hemorrhagic Stroke; Moroccan Intensive Care Unit*

Introduction

Stroke (Cerebral Vascular Accident) is, according to the international definition, a sudden deficit of focal brain function with no apparent cause other than a vascular cause. Their etiologies can be ischemic or hemorrhagic. High blood pressure is concomitant with acute visceral distress, especially stroke, which is life-threatening in patients, making hypertension the number one risk factor for stroke among other cardiovascular causes. The aim of our work is to analyze the profile of hemorrhagic strokes and to determine the main predictors of mortality in a population of patients hospitalized at the surgical intensive care unit in of the university hospital of Ibn Rochd, Morocco [1-3].

Materials and Methods

Type of study

This is a retrospective observational epidemiological study of 50 cases admitted to the intensive care unit, based on an operating sheet and analysis of the files.

Place and period of the study

All the files studied were collected at the intensive care unit and anesthesia of the surgical emergency CHU IBN ROCHD in Casablanca, during the period between January 2016 and December 2020.

Data collection

The data were collected using a pre-established operating sheet comprising: epidemiological, clinical, radiological, therapeutic and evolutionary data.

Statistical study: The statistical analysis was carried out by entering data into Excel and analysis using SPSS software, in consultation with the epidemiology service of the Faculty of Medicine and Pharmacy of Casablanca.

Results

The average age of our patients was 52 ± 15 years with extremes ranging from 20 years to 80 years and a peak frequency in the 60 - 70 years age group of around 36%. The male sex was predominant, i.e. 31 men (62%) for 19 women (38%). Hypertension represents the most frequent risk factor 41% followed by diabetes with a rate of 26%. In our study, the recruitment rate was maximum in the autumn period 33.33%. Clinically: 70% of patients were admitted beyond 48 hours. The onset of neurological symptoms was sudden in 74% of cases in 37 patients. Headaches preceded the onset of the neurological deficit in 26% of cases (13 patients) followed by vomiting and convulsions 3%. On admission, the clinical examination found consciousness disorders with a Glasgow score of ≤ 10 in 33 patients or 66%. Hemiplegia was noted in 23 patients, it dominated all neurological signs with 46% of cases followed by bilateral mydriasis in 23%. On admission 15 patients or 38% of cases had grade 3 hypertension and 06 patients, i.e. 18% of cases had grade 2 hypertension. The electrocardiogram carried out in 18 patients was pathological in 8 patients with the following abnormality: arrhythmias in 5 cases. Conduction disorders 1cas. Left ventricular hypertrophy: 2 cases and repolarization disorder: 1 case.

Paraclinically: Cerebral CT showed intra-parenchymal hemorrhage in 40 patients or 79% of cases with a predominance of the parietal location (23%). Pure subarachnoid hemorrhage was noted in 4 patients, or 10% of cases. 46% of patients presented with ventricular flooding. 4-axis cerebral arteriography was performed in 4 patients and was found to be normal in 1 patient and pathological in 3 patients with lesions as follows: An aneurysm of the anterior communicating artery in 2 patients, a right sylvian aneurysm in 1 patient. 4 patients underwent brain MRI with lesions as follows: An arteriovenous malformation in 1 patient, cerebral cavernomatosis in 1 patient and a tumor process in 2 patients. 3 patients underwent CT angiography with lesions as follows: A left arteriovenous malformation, a temporal fusiform telangiectasia with vasospasm as well as an occlusion of the right sylvian artery.

On the biological level: The glycemia on average is 1.4 g/l with a difference of 5.76 g/l, hyperglycemia was present in 15 patients or 26.4% of cases, Troponins were evaluated in 10 patients/the average rate was 0.39 ± 0.68 ng/ml with extremes ranging from 0.01 ng/ml to 2.82 ng/ml. Regarding medical treatment: Artificial ventilation was necessary in 37 patients, i.e. 74%. Antihypertensive treatment was prescribed in 30 patients, i.e. 59%. Nimodipine was prescribed in 45 patients, or 90%. The surgical indication was asked in 22 patients, i.e. 44% embolization: No patient in our study received endovascular treatment. The outcome was favorable in 14 patients, or 28%, and unfavorable in 36 patients, or 72% of cases. The average stay was 15 days with extremes ranging from 2 to 19 days. The average duration of

external ventricular drainage is 8 to 5 days, with extremes ranging from 2 to 21 days. Postoperative CT was performed in all patients who received surgical treatment. It showed an aggravation in 50%, an improvement in 30.4% of the cases, as well as a persistence of the same aspect in 19.6% of the cases. The evolution during the stay in the intensive care unit was dominated by mainly infectious complications in 47 patients, i.e. 94.7%. 36 patients died out of 50 patients, for a mortality rate of 72%. In the vast majority of epidemiological studies, hemorrhagic strokes account for a quarter to a third of vascular disorders of the brain.

Discussion

Intracerebral hemorrhages represent 10 to 12% of all strokes. They are twice as frequent as subarachnoid hemorrhages. Regarding non-modifiable risk factors:

- Age is the most important risk factor, after 55 years, for each age group of 10 years, the rates of stroke are multiplied by 2 both in men and in women, but there are also in young adults. In our series, mortality is not influenced by age.
- In France, the incidence of stroke is two to three times lower in women than in men between 55 and 64 years old. In our series the male sex was predominant but did not influence mortality.
- It is very likely that the disease is the result of an interaction between several genes and environmental factors. Family screening was only recommended in families with at least two 1st degree relatives.

For modifiable risk factors:

- High blood pressure is the most potent modifiable risk factor for bleeding strokes at any age. It multiplies the risk of cerebral hemorrhage by 10, in our study, the results are consistent with the literature.
- Diabetes is an independent risk factor for HIC. This risk factor seems to be involved in AVCH through abnormalities of coagulation factors and changes in the arterial wall linked to hyperglycemia: In our series, 26% of patients were diabetic, which is consistent with the literature.
- Aneurysms are the most common cause of subarachnoid hemorrhages, in about 80% of cases the ASH is related to the rupture of an intracerebral aneurysm.
- The promoting role of tobacco on the risk of stroke has been established. Especially cerebral hemorrhages and cerebral infarctions.

About 5 to 10% of intracerebral tumors are the site of hemorrhage during their evolution, these are mainly primary malignant tumors of the glioblastoma type or metastasis - Time is the key factor in the vital prognosis and/or residual handicap. Clinically:

- Hemorrhagic stroke is manifested by the sudden onset of a neurological deficit, sometimes progressive over a few hours, smoothly, most often in a waking state or during a period of activity. This seems to be confirmed by our study, the installation of which was brutal in 74% of cases. The prodromes are dominated by headaches (26%).

- Many other studies have shown that the GCS score is the most important and consistent predictor of mortality outcomes.
- In our study, the presence of a coma significantly influences the mortality rate, which is consistent with the literature.
- The neurological examination confirms the functional neurological deficit, specifies the topography and identifies the affected territory, very briefly, we will look for unilateral sensory or motor deficits, aphasia and transient mono-ocular blindness, and especially the association of these different signs.
- In our series among focal neurological signs only the presence of bilateral mydriasis was a significant prognostic determinant.
- The increase in blood pressure was mainly characteristic of hemorrhagic strokes. Studies show that the increased risk of HAVA compared to blood pressure figures is logarithmic, there is no cut-off value.

Paraclinically:

- Computed tomography of the brain without injection of the contrast product is the key examination in the primary diagnosis of hemorrhagic stroke; intra-parenchymal hemorrhage is evident in the form of a well-limited, homogeneous spontaneous hyper density, sharply contrasting with the normal density of the surrounding tissue.
- In our study, ventricular flooding and the location of the hemorrhage in the brainstem are factors of poor prognosis.
- Arteriography should be performed within the first 24 - 48 hours, in the absence of any contraindication for surgery. It must include a study of the 4 axes (carotid and vertebral) with multiple incidences (face, profile, 3/4) due to the possibilities of the multiplicity of aneurysms. In case of subarachnoid hemorrhage, a CT angiography can be performed to look for an intracranial aneurysmal malformation, the improvement of the devices makes it possible to obtain three-dimensional images of the cerebral vessels for precise anatomical localization.
- Developments in MRI imaging have provided new tools to characterize cerebrovascular malformations, in particular intracranial aneurysms, arteriovenous malformations (AVMs) and dural arteriovenous fistulas (FAVD). The main goal of brain MRI is to be able to detect vascular disease when it exists.
- In case of normal brain scan, and only in this case, a lumbar puncture can be performed for diagnostic purposes by a trained operator.
- The abnormalities noted on the ECG most often observed are an ST segment shift, an increase in the QT interval, an inversion of prominent U waves with arrhythmias in 35% of cases that may jeopardize the prognosis vital.
- Initial blood sugar is a determining factor in the progression of cerebrovascular disease, several studies have demonstrated the aggravating role of hyperglycemia in cerebral hemorrhage.
- Increases in troponin I have been measured in patients with ASA. The most severely neurologically affected patients are more likely to have an increase in troponin and impaired myocardial dysfunction.

- During the first 48 hours after a subarachnoid hemorrhage, three fatal complications can occur: rebleeding, hydrocephalus by obstruction of the CSF flow and cardiovascular complications, namely cardiac arrhythmias and acute lung edema.

Regarding treatment

- A monitoring of blood pressure, heart rate and oxygen saturation as well as temperature monitoring are carried out.
- Optimal oxygenation seems essential to avoid neuronal suffering. Intubation and ventilation are recommended in patients with stroke with coma, except for ethical contraindications.
- Neuroprotection by controlling blood sugar, dysnatremia, prevention of seizures and hypothermia.
- Treatment of hypertension: Since arterial hypertension remains the most frequent cause of cerebral hemorrhage and increases the risk of re-bleeding during the first three days, close monitoring of blood pressure is recommended in order to limit the extension of the cerebral hemorrhage but while respecting a so-called physiological arterial hypertension, to maintain a sufficient cerebral perfusion pressure. It is recommended to treat hypertension at this stage if the systolic blood pressure is ≥ 185 mmHg and/or diastolic ≥ 110 mmHg.
- Treatment of intracranial hypertension by 30 degree head elevation plus osmotherapy, restoration of normal coagulation and treatment of vasospasm.
- Prevention of thromboembolic disease is recommended, although studies concerning the prevention of thromboembolic complications in patients with intracerebral hematoma are very few.
- Artificial feeding is often used in patients with swallowing disorders after stroke and is aimed at maintaining adequate nutrition. Nasogastric tubes are still commonly used because they are easy to apply, are relatively non-invasive, although generally poorly accepted by patients.

Management in a neurovascular unit decreases mortality from hemorrhagic stroke, reduces the length of

hospital stay and contributes to better functional recovery. There is no specific treatment for spontaneous intracerebral hemorrhage, however recent data suggests that the use of recombinant activated factor VII (rF VIIa) Novoseven® would limit the progression of intracerebral hematoma. The objective of the surgical procedure (trepanation or stereotaxis) is not to completely evacuate the hematoma, but to ensure decompression of the adjacent parenchyma and to reduce intracranial pressure. Among the consensual indications for surgical intervention are the ventricular drainage from acute hydrocephalus, lobar hematomas associated with a ruptured aneurysm, young patients with superficial hemorrhage and signs of engagement and cerebellar hemorrhages with signs of brainstem compression, these indications are based on criteria clinical (patient's age, current anticoagulant treatment, level of vigilance, pupillary size, progression) and neuroradiological (size and site of the hematoma, associated subarachnoid hemorrhage, mass effect, size of the ventricles) and should be discussed at case by case. In our case, surgery was recommended in 22 patients, i.e. (44%) of the patients studied: ventricular drainage (23%) and evacuation (18%), drainage + evacuation (59%). Mortality affected 14 operated patients or (63%). The decision of the the-

rapeutic choice must result from a discussion between surgeons, radiologists and neuro-anesthetists-resuscitators. This must take into account the location of the aneurysm, its anatomical appearance, the patient's clinical condition and his history. The ISAT study shows a reduction in neurological morbidity after embolization compared to surgical treatment.

In terms of evolution: Hemorrhagic strokes are more fatal in the acute phase compared to ischemic strokes, there is a great disparity between countries regarding the mortality rate at 30 days after admission to hospital, this rate is estimated at around 25.1%. In our series, mortality reached 72% of patients. Hemorrhagic strokes have a higher functional recovery than ischemic strokes, for Dennis., *et al.* the percentage of return to functional autonomy is 40% in hemorrhagic strokes while this rate does not exceed 12% in ischemic strokes. Jorgensen in a comparative study showed that recovery does not depend on the nature of the stroke but on its initial severity. The prevalence of depression after a stroke is high (20 to 60%) regardless of the time of stroke. its occurrence in relation to the stroke. Its presence has a negative effect on motor and cognitive recovery, as well as on mortality.

Conclusion

Hemorrhagic stroke is a common condition known to be vitally and functionally serious. HTA is the main risk factor for intracerebral hemorrhages.

The confirmation of the diagnosis is mainly based on medical imaging. In univariate analysis, the predictive factors of mortality are: low Glasgow score (GCS < 8), presence of bilateral mydriasis, ventricular flooding, brainstem hemorrhage, high troponin level.

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