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HAEMORRHAGIC CEREBROVASCULAR ACCIDENT (CVA) ETIOLOGY AND CASE REPORT

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Abstract: *A haemorrhagic cerebrovascular accident refers to a spontaneous bleeding in the cerebral parenchyma, located either supratentorial or infratentorial, that occurs in the absence of a surgical or traumatic cause. The incidence is estimated at 12-15 new cases per 100.000 inhabitants per year. Intracranial haemorrhage is the third most frequent cause of stroke, the vast majority being represented by primary/hypertensive (spontaneous) intracerebral haemorrhage, ruptured saccular aneurysm, a vascular malformation or haemorrhage associated with the use of anticoagulants or thrombolytic agents. A cerebral tomography computer examination is the examination of choice in diagnosis of haemorrhagic CVAs. The treatment can be either therapeutic or surgical, depending on the case, with the consideration that an immediate medical treatment is mandatory for the best odds of recovery.(1)*

INTRODUCTION

A haemorrhagic stroke (otherwise known as an intracerebral haemorrhage) occurs when a blood vessel ruptures causing blood accumulation in the tissue around the rupture.

The etiology of a haemorrhagic stroke includes hypertension, arteriopathies, ruptured saccular aneurysms, ruptured AVM (vascular malformations), cavernous angioma, haemorrhagic disorders (e.g. leukaemia, haemophilia, hypofibrinogenemia), haemorrhage intro primary and secondary brain tumours, septic embolism, haemorrhagic infarction (arterial or venous), inflammatory or infectious diseases of the veins or arteries. Among the risk factors, there are to be mentioned the age, sex and race (black people have a much higher risk because they are more prone to having high blood pressure, diabetes and obesity) (2,4), hypertension, tobacco smoking and excessive alcohol use, cocaine use, coagulation disorders, low cholesterol levels (< 160 mg/dl), hepatopathy, genetic mutation or history of cerebrovascular accident.

In terms of location, in 50% of the cases it occurs in the basal nuclei, putamen, lenticular nucleus, internal capsule or globus pallidus, in about 15% in the thalamus, and only 1-6% in the brainstem.

The most common clinical manifestations are represented by, initially, an increased blood pressure, followed by neck pain/stiffness, arrhythmias and low grade fever, aphasia, eye deviation and hemianopsia may occur in deep haemorrhages (due to the compression of white matter fibers), or hyperventilation, tachycardia/bradycardia and central type fever that are present in thalamic haemorrhagic strokes or brainstem strokes, sometimes accompanied with a limited or total loss of consciousness.

Signs that plead for a positive diagnosis of a intracerebral haemorrhage are hypertension (> 200 mmHg), an acute onset is characteristic, shortly followed by the installation of a comatose state, acute onset of focal neurologic signs (eg. hemiplegia), unusually severe headache accompanied by nausea and vomiting and highlighted by a haemorrhagic CSF at lumbar puncture and a CT examination.(3)

The Hemphill scale (4,5) is currently used in neurosurgical practice to asses a prognostic and it is based on evaluating the clinical criteria, the GCS at admission, age of the patient, the hematoma volume, the presence of interventricular haemorrhage, and last but not least, the origin of the haemorrhage. According to the obtained scores, a prognosis can be estimated as follows: a score of 0 points it to be associated with a 0% mortality, while a score of maximum 6 points will be associated with 100% mortality, leaving place for variations between these two extremes.(6)

The pre-hospital management of an intracerebral haemorrhage has the main objective to provide airway and cardiovascular support to unstable patients, along with careful documentation of the clinical picture, medical history and current medication of the patient.(7) As far as therapeutical methods are concerned – the prompt treatment of intracranial pressure, treatment of seizures, hypertension and hyperglycaemia treatment, as well as hemostatic and anticoagulant treatment are indicated, in addition to temperature control, iron administration, nursing, STEM cells treatment (8) and venous thrombosis profilaxy. Surgical treatment revolves around simple aspiration, craniotomy or craniectomy, endoscopy or stereotactic surgery, depending on the case. The treatment of haemorrhagic cerebrovascular accidents has as main goals: reduction of hematoma volume, normalization of the midline shift (by decreasing the intracranial pressure), increasing the blood pressure of the affected hemisphere, stopping blood loss and eliminating thrombin and other blood degradation products that may later induce a neurotoxic oedema.

CASE REPORT

We present a case of a 60 year-old male, known with

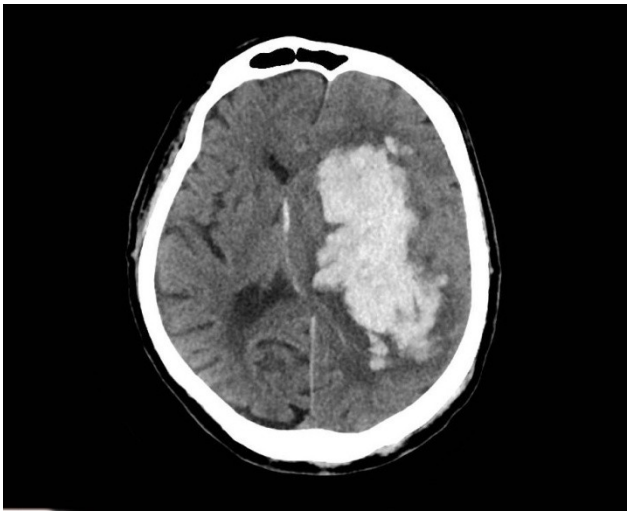
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high-risk hypertension in medical history, admitted to the Neurosurgery ward with symptoms of clinical features of right hemiplegia and mixed aphasia, suddenly debased during the same morning.

On clinical neurological examination the patient presented right hemiplegia, intracranial hypertension syndrome, mixed aphasia with a GCS of 11 points, without meningeal syndrome and without cranial nerve palsies.

A cerebral CT scan was performed that confirmed the presence of a voluminous intraparenchymal fronto-temporo-parietal left hematoma, with significant midline shift and a small blood collection in the lateral left ventricle.

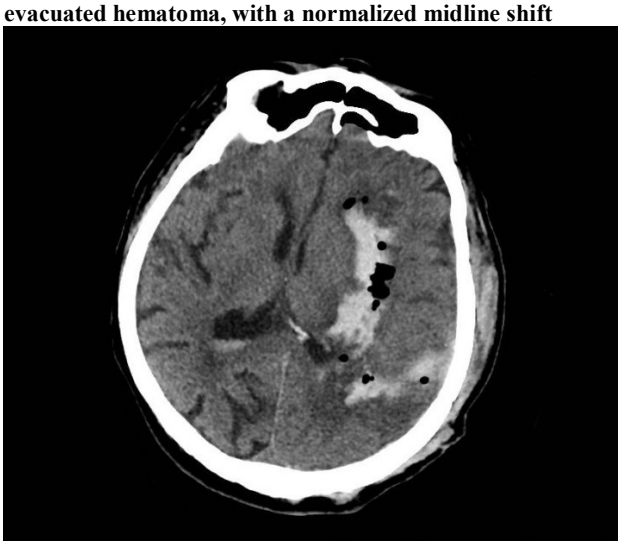
Figure no. 1. Preoperative CT scan revealing an intraparenchymal fronto-temporo-parietal left hematoma with significant midline shift



This was the case of a clinical emergency and it required urgent medical intervention. The elected surgical procedure was an osteoplastic temporo-parietal craniotomy performed under general anesthesia, with the successful evacuation of the intraparenchymal fronto-temporo-parietal left hematoma.

A cerebral CT scan was performed shortly after, revealing the partially evacuated hematoma.

Figure no. 2. Postoperative CT scan showing the partially evacuated hematoma, with a normalized midline shift



The patient was discharged in a good general condition and with significant clinical improvement, 4 days postoperative. The evolution of the patient will be monitored through periodic clinical control, in addition to the cardiological supervision, as to avoid any future complications that may appear.

DISCUSSIONS

Prognostic factors that assert a CVA status include a decreased GCS, hematoma volume > 30 ml associated with intraventricular haemorrhage, hydrocephalus, the presence of a subarachnoid haemorrhage, perilesional oedema, raised intracranial pressure, modifications in blood coagulability and/or development of seizure disorder.

The clinical criteria that require mandatory surgical treatment can be a either a quick deterioration in a patient's condition (a drop in the GCS of 2 or more points), hemiparesis/hemiplegia and aphasia (due to the raised intracranial pressure determined by the presence of the hematoma or the perilesional brain oedema), failure of the conservative treatment (translated by raised intercranian pressure) and age under 50, all completed with a cerebral CT scan.

On the other hand, it is to be mentioned that some cases are better to be treated only in a conservative manner, as a surgical intervention may worsen the patient's condition, with zero benefits. Such cases include a patient in GCS 4 (manifested through decerebration) or GCS 3 (correlated with deep coma – nonreactive patient, fixed mydriasis), massive haemorrhage in the dominant hemisphere with significant destruction, or in cases of acute respiratory distress/respiratory arrest installation.

If the volume of the hematoma is greater than 85 ml, if we have a massive haemorrhage that presents bilateral extension accompanied by a midline shift or if the brainstem lesions exists, the patient's chances of survival are slim to none.

The STICH (international Surgical Trial for Intracerebral Haemorrhage) trial results, as presented by Professor A. D. Mendelow, STICH Principal Investigator, at the Joint Annual Meeting of the AANS/CNS Section on Cerebrovascular Surgery and the American Society of Interventional and Therapeutic Neuroradiology in San Diego, February 3, 2004, in a preliminary report, with gathered data from approximately 1000 patients, concluded the lack of significant difference regarding the outcome of patients undergoing early surgical intervention, in relation to those that were treated conservatively. It is to be mentioned that subgroup analyses are still in trial, and at the moment with no signs of a clear advantage of surgery in any cohort of patients analysed – the only exception may be the existence of a clot described greater than 1 cm, deep in the cortical surface.(9)

Although the therapeutic possibilities and the current prognosis in intracerebral hemorrhages are not encouraging, many therapies are being studied at this time. Among the most promising are those that address the role of modulating thrombin activity in cerebral hemorrhages and the potential use of nanoparticles for the administration of active substances at the site of brain injury.(10,11)

CONCLUSIONS

Haemorrhagic cerebrovascular accidents represent a contemporary challenge, hence, prevention plays a very important role regarding this pathology. Even if there are some unchangeable factors such as race, age and ethnicity, there are a few measures that any patient prone to having a haemorrhagic stroke must be encouraged to follow.

The doctor must take the responsibility to instruct the patient in adopting a healthy diet low in sodium and rich in potassium, as well as explaining how and why to control the blood sugar, cholesterol and blood pressure, to treat circulatory

problems (e.g. peripheral artery disease, sickle cell disease, severe anaemia), to identify and manage atrial fibrillation and last but not least, explaining the warning signs of stroke and how to immediately respond in the given situation.

Emphasis should be put on the benefits of losing weight (being more active), of smoking cessation and of appropriating a healthy lifestyle overall.(12)

The neurological examination of the patient and the CT examination are decisive for the diagnosis. The therapeutic approach is to be tailored as needed, to each case.

Unfortunately no clear path is available for ICH management in the present, as the practice guidelines are in a continuous alteration.

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