

HEMISPHERIC STROKES

CLINICAL OR SURGICAL MANAGEMENT?

INTRACRANIAL PRESSURE MONITORING OF A CASE AND REVIEW OF THE LITERATURE

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SUMMARY - The authors report a case of a right hemispheric ischemic infarction on a 77-year-old patient that was monitored with an extradural intracranial pressure monitor (Ladd device). We show the huge intracranial hypertension that the brain was submitted despite of the medical treatment.

The treatment of hemispheric strokes can be very challenging. The usual antiedema drugs very often prove to be of no help against the mass effect and the high intracranial pressure that some patients present. More recently reports on the literature are showing good results following a decompressive surgery on such ischemic infarcts.

KEY WORDS: intracranial pressure, monitoring, hemispheric stroke, hemicraniectomy

Acidentes cerebrovasculares hemisféricos: conduta clínica ou cirúrgica? Monitorização da pressão intracraniana em um caso e revisão da literatura

RESUMO - Os autores apresentam um caso clínico de infarto hemisférico em paciente de 77 anos, no qual a pressão intracraniana foi monitorizada. Apesar do tratamento clínico realizado, a pressão intracraniana se manteve elevada. O tratamento clínico nessa entidade infelizmente mostra, na maioria dos casos, resultados insatisfatórios. Recentemente, novos estudos publicados na literatura mostram resultados promissores obtidos através da craniotomia descompressiva.

PALAVRAS-CHAVE: monitorização da pressão intracraniana, acidente cerebrovascular hemisférico, hemicraniectomia.

The application and importance of intracranial pressure (ICP) monitoring are already well established on post-traumatic intracranial injuries and spontaneous hypertensive hemorrhages^{1,19}. The literature shows the aid of this method concerning therapeutic decisions, approaches and on relationship with the patient's outcome¹³. On the other hand, only a few reports were done, analysing the ICP monitoring in ischemic events²³, especially on regard to hemispheric strokes. The treatment of massive cerebral infarctions is sometimes difficult, as some patients with high ICP do respond very poorly to the usual conservative management. None of these conservative methods has been

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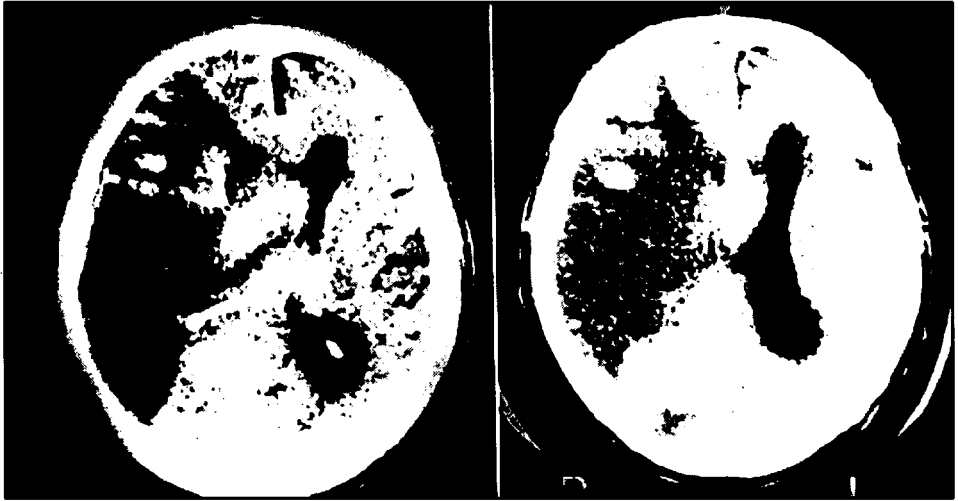


Fig 1 (A and B). Right-sided hemispheric stroke with little mass effect because of the cerebral atrophy.

consistently effective in the treatment of progressive brain edema (cytotoxic edema) due to ischemia. Decompressive surgery can be life saving on these patients without further morbidity^{8,11}.

CASE REPORT

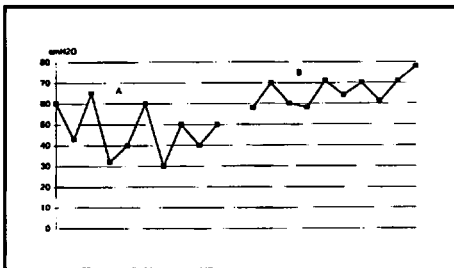
JS, a 77-year-old white man was admitted to the hospital after an acute disorientation syndrome. On admission exam he was disorientated with a left sided central facial paralysis and a left-sided hemiparesis. The computed tomography (CT) scan was normal. The duplex scan from the carotid-vertebral system and the echocardiogram showed no significant abnormality. The therapy was initiated with volume expansion, nimodipine, pentoxifylline and subcutaneous heparin in prophylactic dosis against thromboembolism. Two days later he presented an acute atrial fibrillation (reverted with ancoron) and decline of his neurological status: drowsy and left-sided hemiplegia. The pupils are equal. The CT scan showed a right hemispheric infarct with a light midline shift (Fig.1). An extradural sensor was inserted (Ladd device) to measure the intracranial pressure. The patient was further treated with dexamethasone 4mg I.V. 4/4h and sedated to be hyperventilated. The serum osmolality was maintained around 330 mmol with the aid of osmotic solutions (manitol 20% and hypertonic saline 7.5%), which were used according to the ICP values. The patient did not present a good response to the treatment and maintained a high ICP (Graphic 1). After two weeks the ICP values began to decline (Graphic 2).

The patient was dismissed on 29-December-1992 with a left-sided hemiplegia.

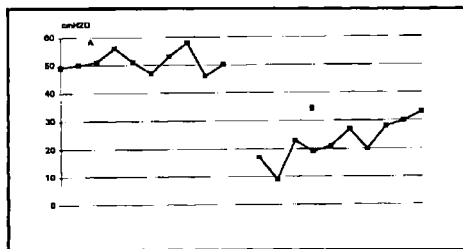
COMMENTS

Data about the treatment of massive ischemic infarcts are still debatable^{6,9,10,12}. The use of hypertonic solutions, hemodilution, steroids, barbiturates, nimodipine and hyperventilation have been advocated by some authors^{12,14,15,21}. However, well-designed randomized clinical trials have been done, proving that such agents are frequently ineffective against cytotoxic edema^{20,22,24}.

As a matter of fact, until now, clinical and experimental trials are very contradictory and new reports are largely lacking concerning the treatment of cerebral ischemia. Some clinical



Graphic 1 (A and B). The persistent intracranial hypertension with transient decreases due to the medical therapy just after the patient's neurological deterioration.



Graphic 2. A: constant intracranial hypertension 14 days after the onset, despite of the treatment. B: improvement after 4 weeks of the stroke onset.

they show the effectiveness of this life saving procedure. Rengachary et al.¹⁷ and Kondziolka and Fazl⁸ reported respectively 3 and 5 cases of decompressive craniectomy after massive cerebral infarction.

These authors showed good results after an ipsilateral frontotemporoparietal craniectomy and dural opening on those patients who develop critical cerebral hypertension and retrocaudal decay. They also advocated that one of the key factors for a better outcome is the timing of the surgical procedure. They agree that a full medical intervention should be first attempted. However, at the first sign of brain stem compression, decompression should be quickly performed. Otherwise, irreversible brain stem damage will occur¹⁷.

Bony decompression is an old method to control intracranial hypertension^{2,13}. On cases of traumatic head injury, this procedure appears to exacerbate the cerebral edema despite the control of the intracranial pressure. The enhancement of the edema is related to the increase of brain compliance and distensibility, that contribute to the decrease of the interstitial fluid pressure and consequently augment the axonal disruption. In addition, there is some impairment of venous drainage due to the incarcerated brain tissue^{1,4,5,19,25}.

On cases of hemispheric strokes with an important mass effect, surgical treatment must be considered as an alternative therapy on patients with high intracranial pressure, progressive neurological deterioration, signs of brain stem compression and no effective response to the antiedema medication. A few recent clinical reports show a good outcome on patients with hemispheric infarcts after a decompressive craniectomy and dura augmentation^{7,8,16,26}. Other authors advocate also a temporal lobectomy^{11,16}.

The measure of the intracranial pressure, with a meticulous neurological examination, can be very helpful on this decision¹⁸. On cases of dominant hemispheric strokes, results are very poor, especially because of the great morbidity that the patients are submitted. The age of the patient is also crucial, as old patients with atrophic brain and dilated ventricular system appear to support high values of ICP (as in our case) which would denote brain stem compression and brain death in young individuals.

Further investigations are still required with a great number of patients to prove the effectiveness of the ICP monitoring and also the role of the decompressive surgery on hemispheric strokes.

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