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Conclusion: The strategy adopted in our case is safe, effective, simple and lead to little to no complications. After a review of literature, we discuss the pathological and management aspects of this rare entity.



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CASE REPORT

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Keywords: Brain abscess, Hydrocephalus, Temporal Horn entrapment, Ventricle

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INTRODUCTION

Brain abscess is a serious, life-threatening condition. Despite the prompt use of modern antibiotics in its management, it still represents a potential cause of mortality (5–23%) in literature [1–5]. Presentation symptoms are non specific, and many are due to edema surrounding the lesion. Most are due to increased intracranial pressure (headache, nausea/vomiting, lethargy). Hemiparesis and seizures develop in 30–50% of cases. Symptoms tend to progress more rapidly than neoplasms.

The most feared complications of cerebral abscess are herniation secondary to mass effect, intraventricular rupture of brain abscess, hemorrhage into the abscess or hemispheric infarction due to internal carotid artery thrombosis [6].

Unilateral acute hydrocephalus also represents an exceptional complication of cerebral abscess' complications. Few cases about this specific complication are reported in literature [7].

We describe the case of a patient treated from a complicated acute unilateral hydrocephalus secondary to cerebral abscess, successfully managed by endoscopic technique.

CASE REPORT

A 65-year-old male was initially admitted in the department for management of left hemiparesis and headaches, and was found to have a right parietal lesion. The rapid onsets of the symptoms during the week preceding the admission lead us to suspect a brain abscess. At admission, the patient presented with normal consciousness, left hemiplegia and left hemianopia, little concordant with initial brain MRI scan. Neither diffusion nor ADC sequences specific to intracranial infection was

performed on the first MRI scan. Our initial hypothesis was high grade glioma.

Unfortunately, neurological deterioration with disturbance of consciousness was observed within few hours. We decided then to perform a new MRI scan with diffusion and ADC sequences, which found a typical image of a right parietal brain abscess ruptured into the lateral right ventricle (Figure 1). Cerebral abscess brain drainage was urgently decided and performed. A 25 cm³ of foul-smelling pus was aspirated with a trocar. Partial excision of the brain abscess capsule was made. Multiple bacteriological samples were sent to the laboratory.

Empirical antibiotic therapy by cefotaxim and metronidazole was initially prescribed and maintained for a total of six weeks after verification of bacterial samples. Microbiological tests found oral cavity flora: *Streptococcus intermedius* and *Parvimonas micra*. A cardiac transthoracic ultrasound was performed, eliminating infective endocarditis. Under antibiotic therapy, and introduction of corticosteroids two days after the initial surgery, we noticed improvement in general state, with absence of hyperthermia within 4 days. Through his hospitalization, the patient remarked improvement of his left hemiplegia, with reduced strength left hand motricity and beginning of motor recuperation of superior and inferior limbs. The muscle strength was rated 4/5. Biological inflammatory syndrome was normalized within 10 days; the C-reactive protein was 3 mg/L. A specialized dental examination and dental panoramic tomography revealed bad orodental state with six teeth to extract. The patient was then transferred to the neurological department for further treatment.

Eleven weeks after the first surgery, the patient was re-admitted in our department for acute left hemiplegia. The CT scan and MRI scan found a right unilateral hydrocephalus with ipsilateral temporal horn entrapment secondary to secular partition of brain cerebral abscesses (Figure 2). Initial clinical examination reported confusion with left hemiplegia and left homonymous hemianopia.

Operative Technique

The obstructive character of the hydrocephalus lead us to manage it by an endoscopic fenestration under neuronavigation. We used a rigid endoscope. The working channel permits introduction of instruments for irrigation, coagulation, and biopsy.

The operation was carried out with the patient in a semi-sitting position under general anesthesia. A left frontal burr-hole was made contralateral to the enlarged temporal horn and the endoscope with its stylet was introduced into the normal left frontal horn. The stylet was then removed and the optical system was inserted to visualize the ventricle. By gently moving the endoscope under neuronavigation control, a window was created in the septum pellucidum (Figure 3). The endoscope was passed through the communication and the contralateral enlarged temporal horn was explored; the cannulation of the compressed right temporal horn was performed

successfully through the right atrium. No bleeding was observed. Then the endoscope was withdrawn from the fenestration, allowing immediate backflow of cerebrospinal fluid (CSF) (Figure 4).

Clinical regression of the left hemiplegia with quasi-total motor recuperation was observed within few hours. The 24 hour control CT scan found a collapsed right temporal horn.

The patient was retransferred to the reeducation center for further cares.

At one month, systematic cerebral CT scan found significant decrease of the enlargement of the right temporal horn (Figure 5).

Six months after the second operation, total motor recuperation was observed. The patient was able to walk with a cane. The initial left hemianopia recovered.

DISCUSSION

Ipsilateral hydrocephalus is an unusual complication of brain abscess [6].

The two main explanations are: plexus choroid thrombosis [8] or the formation of inflammatory septa [9].

The entity that we describe here was previously defined

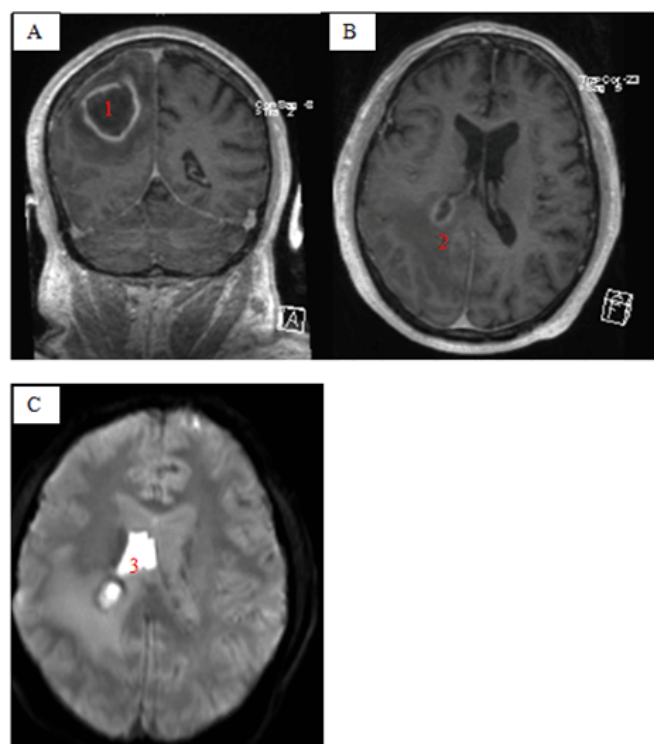


Figure 1: Preoperative magnetic resonance imaging scan (A, B): Respectively Coronal and Axial T1 gadolinium sequences showing a right parietal brain abscess (1) with perilesional edema (2) and right ventriculitis, C: Axial diffusion weighted imaging sequence showing important perilesional oedema with hypersignal into the abscess and the ventricle, compatible with a beginning ventriculitis (3).

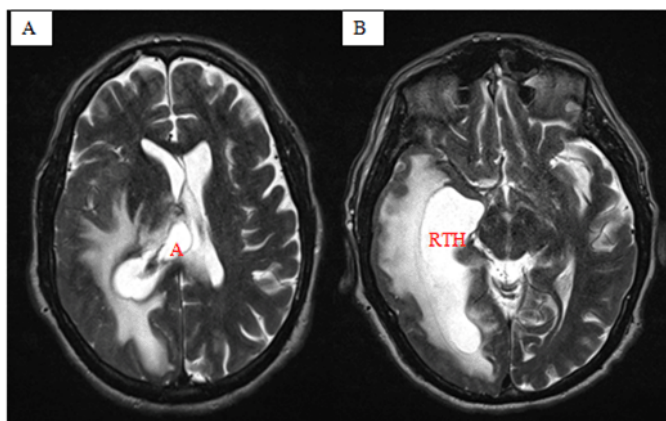


Figure 2: Magnetic resonance imaging scan (A, B): Axial T2 sequence showing important edema around the entrapped right temporal horn (RTH) with inflammatory veils and septa into the right atrium (A).

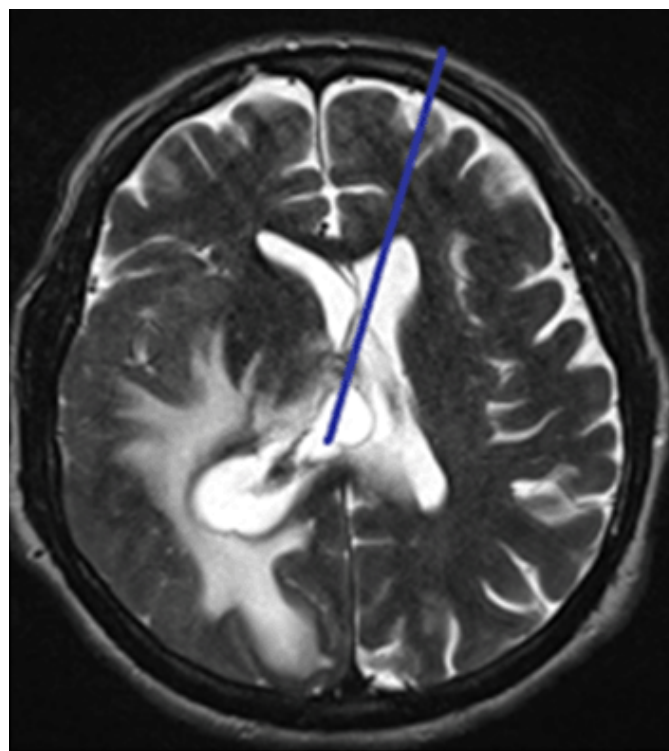


Figure 4: Preoperative cerebral axial T2 magnetic resonance imaging scan. Trajectory planning modeling the fenestration of the septum pellucidum and cannulation of the entrapped right temporal horn through the right atrium.

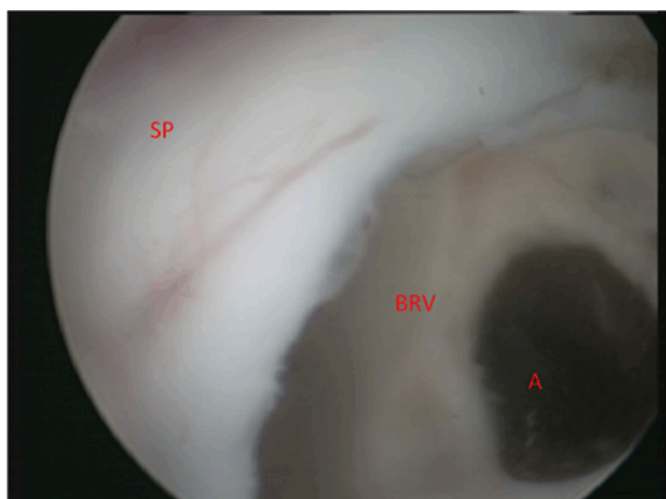


Figure 3: Intraoperative endoscopic view of the fenestration. The cannulation is well visualized at the right Atrium where septa and veils were identified. SP: Septum Pellucidum. BRV: Body of Right Ventricle. (A: Atrium of Right ventricle).

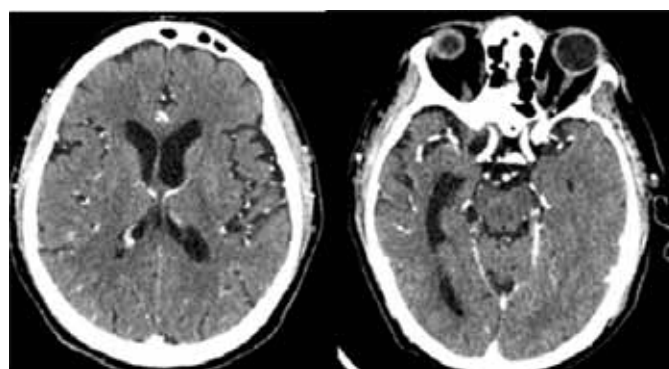


Figure 5: A 1-month post contrast cerebral axial computed tomography scan showing the absence of contrast enhancement and quasi symmetric ventricles.

by Cairns [10]. It consists of obstruction of the atrium of one lateral ventricle so that the trapped or isolated temporal horn containing choroid plexus expands into a cyst. This gives rise to the symptoms of raised intracranial pressure as well as appropriate features of focal cerebral dysfunction such as homonymous hemianopia and contralateral hemiparesis.

When the infection involves the ventricles, the patient may develop a number of thin veils or septa within the ventricles separating them into a number of compartments. These septa may progress after the infection has been overcome. They consist of thin translucent veils of tissue which are most often situated in the lateral ventricles just behind the foramen of Monro, though there may be multiple septa throughout the ventricular system. Their pathogenesis is uncertain but it has been suggested that they arise from tufts of glial tissue which grow out from areas of the ventricular wall

which have been denuded of ependyma by the preceding ventriculitis. This so-called compartmentalized or multiloculated hydrocephalus is difficult to treat [11].

The two primary treatments of monoventricular hydrocephalus are CSF shunts or a neuroendoscopic approach [12].

Neuroendoscopy is a very useful and less invasive technique for treating many types of hydrocephalus, including isolated dilatation of one lateral ventricle or horn [13].

Due to the infectious environment, CSF shunts seems less appropriate, knowing that many complications might be encountered [14–17].

CONCLUSION

Monoventricular hydrocephalus secondary to brain abscess are exceptional in literature. They are the consequence of either choroid plexus thrombosis or formation of inflammatory septa. Neuroendoscopic management is considered the “Gold Standard” in the treatment of obstructive hydrocephalus. The strategy adopted in our case is safe, effective, simple and lead to little to no complications.

Author Contributions

Kaissar Farah – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Kevin Beccaria –

Nacer Zakaria Mansouri – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Thomas Graillon – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Henry Dufour – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Stéphane Fuentes – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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