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Multiple Meningoencephaloceles in a Morbidly Obese Patient

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Abstract

Presentation

A 47-year-old morbidly obese female presented with seizures associated with progressive confusion, pyrexia and headache. Nasal endoscopy showed a smooth grey mass filling the entire right nasal cavity.

Diagnosis

CT scan showed a hypodense expansile lesion filling the right nasal cavity. A large bony defect was noted in the posterior table of the right frontal sinus. MRI showed intracerebral right frontal empyema.

Treatment

Image-guided endoscopic approach was conducted to repair all defects.

Discussion

Patients with characteristic profiles fitting that of suspected increased intracranial pressure should alert the skull base surgeon of the possibility of multiple defects. Further documentation of such cases will help to determine the best diagnostic and management approach of multiple meningoencephalocoeles with CSF leak.

Introduction

The first clear attempt to define spontaneous CSF rhinorrhoea was by St. Clair Thomson in 1899[1]. CSF rhinorrhoea with no background history of iatrogenic or traumatic causes are termed

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spontaneous. Interconnection between the subarachnoid space and the nasal cavity intensifies the risk for meningitis. Thus, expedient surgical management is warranted.

Case presentation

A 47-year-old morbidly obese Caucasian female presented with seizures associated with pyrexia and headache. Her CT scan showed a hypodense expansile lesion filling the right nasal cavity with opacification of the right frontal, maxillary and ethmoid sinuses. A large bony defect was noted in the posterior table of the right frontal sinus. MRI showed intracerebral right frontal empyema. She was managed medically for encephalitis then was referred to our institution for further intervention.

The patient described a 3-year history of clear rhinorrhea with no history of trauma or nasal surgery. She suffered with insulin-dependent diabetes mellitus. On examination, she had a BMI of 43. Nasal endoscopy showed a grey mass filling the right nasal cavity. Fluid seen in the right nasal cavity that was positive for beta-2 transferrin. This confirmed CSF leak with a meningoencephalocele. Papilledema was not detected.

The case was tackled in a multidisciplinary approach with the neurosurgical team, as it was uncertain if the frontal sinus defect was accessible endoscopically for repair. On lumbar drain insertion, opening pressure was normal. Intraoperatively, the patient had three sites of herniation: the right frontal sinus posterior table, right and left cribriform plate. Using a unilateral image guided endoscopic approach, the right sided meningoencephaloceles were then excised. To enhance visualization a Draf IIB frontal sinusotomy and a total spenoethmoidectomy was performed. The right frontal sinus posterior table along with the right medial cribriform bony defects were detected. The mucosa and dura dissected circumferentially from the bone around the defects. The frontal defect was closed with underlay + overlay technique. The medial defect was closed with fat and underlay fascia lata figure 1. A right sided nasoseptal flap was elevated and placed over both defects, followed by Bioglue® (Cryolife, Kennesaw, GA, USA). On the left side, iatrogenic adhesions were created between the middle turbinate and the superior nasal septum to seal the defect in the skull base at that site by fibrosis figure 2.

The lumbar drain was clamped on post-operative day five and no leak from the nose was noted. The lumbar drain was removed at post-operative day seven and the patient was noted to have leakage from the lumber drain site. This was managed by sealing the site with a purse string suture. The patient was discharged on acetazolamide.

Discussion

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One of the widely accepted causative theories of spontaneous CSF leaks is benign intracranial hypertension. Continual pulsation of the hydrostatic pressure of CSF intracranially can lead to bone erosion in the long term[2]. Our patient matched the demographic profile of benign intracranial hypertension being a middle-aged female with elevated body mass index however her opening pressure was normal, and she did not have papilloedema[3]. It is possible that her pressures were normal due to the volume of CSF leaking through her nose. The persistent CSF leak from the lumbar drain site following the repair of the bony defects and its abatement after initiating acetazolamide implicates high intracranial pressure as a possible cause.

The most frequently reported sites of spontaneous CSF leak have varied between the cribriform plate, anterior ethmoids or lateral sphenoid sinus[4]. However, in a cohort study of 46 patients the most common location of spontaneous CSF leak was found to be frontal sinus posterior table in 36% of cases[5].
Cases with more than two skull base defects are rarely described in the literature. A retrospective multicentre study demonstrated 25 patients with multiple spontaneous CSF leakage and only three of the patients had three simultaneous leaks[6].

The endoscopic approach to management of CSF leaks has proven to be reliable with a reported success rate of 97% [7]. Nevertheless, challenges exist when repairing frontal sinus defects. There is a risk of outflow stenosis and the inability to visualise lateral defects. In our case, a Draf IIb approach was sufficient to allow visualisation and access for repair whilst establishing a widened frontal outflow simultaneously. Similar approaches were found to have success rate of 97.3% in 37 patients undergoing endoscopic frontal sinus CSF leak repair[8].
In conclusion, the potential for multiple skull base defects warrants a careful multidisciplinary approach to maximise chances of successful repair.

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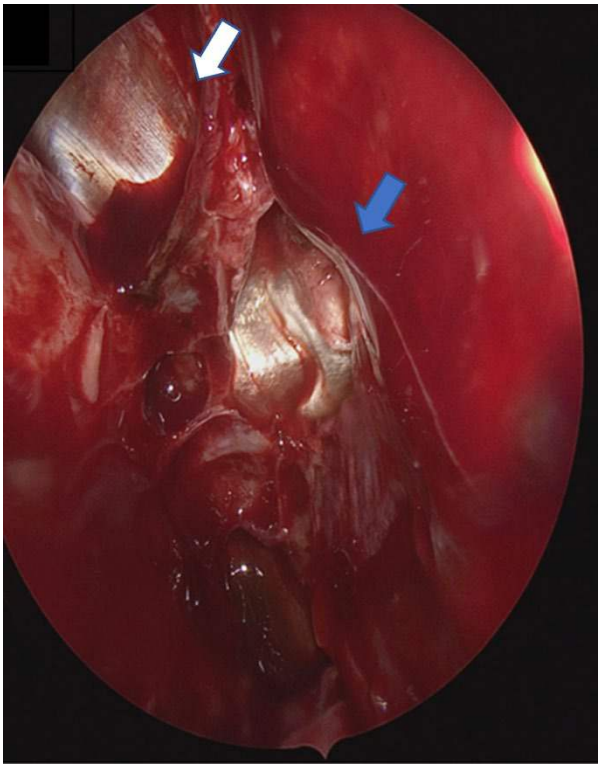

Figure 1 right frontal posterior table defect (white arrow), right cribriform plate defect (blue arrow)

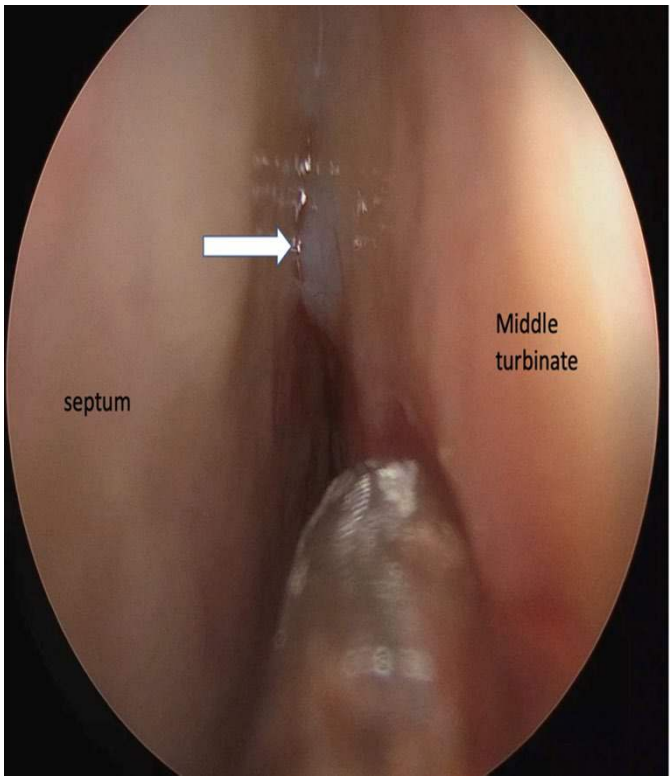

Figure 2 left cribriform plate defect (white arrow).

Declarations of Conflicts of interest:
None to declare.

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