Other full case

A clue in the nose

Hussam Ammar,¹ Michael A Meyer²¹University at Buffalo, State University at New York, Buffalo, New York, USA;²Erie County Medical Center, New York, New York, USA**Correspondence to** Dr Hussam Ammar, h_ammam70@yahoo.com**Summary**

A morbidly obese 50-year-old woman presented with two episodes of septic meningitis over a 4-month period. The patient admitted having a watery discharge from her right naris for a year; she could not recall a history of head trauma. The glucose level of the discharge was 65 mg/dl. The authors diagnosed cerebrospinal fluid (CSF) rhinorrhoea. A second inspection of the brain CT showed flattening of the pituitary gland suggestive of empty sella, and a right posterior wall sphenoid sinus defect. Our patient had many features suggestive of spontaneous nasal CSF leak. Elevated intracranial pressure is a common finding; it increases the hydrostatic forces exerted at anatomically weakened sites of the skull and eventually produces a bone defect. Endoscopic exploration of the sphenoid sinus showed a bony defect which was repaired. When the patient was last seen 6 months after her surgery, she was doing well and her rhinorrhoea had stopped.

BACKGROUND

This case has some unique features:

- ▶ Cerebrospinal fluid (CSF) rhinorrhoea was the cause of recurrent meningitis in a 50-year-old patient.
- ▶ Spontaneous nasal CSF leak was the cause of CSF rhinorrhoea; this is an evolving entity and is considered a variant of benign intracranial hypertension.
- ▶ The presence of empty sella in this case was secondary to increased intracranial pressure.
- ▶ The images in this case are compelling.

CASE PRESENTATION

A morbidly obese 50-year-old woman with hypertension and chronic headache, presented to our institution with

fever, worsening headache and confusion. The brain CT was unremarkable.

Analysis of cerebrospinal fluid (CSF) revealed 800 white cells/mm³ with 86% neutrophils, a protein level of 65 mg/dl and normal glucose level. Cultures and gram stain were negative. We treated the patient empirically with vancomycin, ceftriaxone and ampicillin for pyogenic meningitis. Her symptoms resolved.

However, 4 months later she again presented with fever and severe headache. CSF analysis revealed 1500 white cells/mm³ with 97% neutrophils and a protein level of 212 mg/dl. She was treated empirically with the same antibiotics. No organisms were isolated.

Figure 1 Anterior view: sphenoid sinus wall defect.

Figure 2 Posterior view: sphenoid sinus wall defect.

Figure 3 Empty sella.

On further questioning, the patient admitted having a watery discharge from her right naris for a year. She had frequent frontal headache and was told it was stress related. She did not have facial asymmetry on examination and denied any history of head trauma.

INVESTIGATIONS

A second inspection of her brain CT showed prominent CSF spaces within the sella turcica, flattening of the pituitary gland suggestive of empty sella, and a right posterior wall sphenoid sinus defect (figures 1 and 2). A brain MRI confirmed the presence of empty sella (figure 3).

The discharge from the right naris was a clear, watery fluid with a glucose level of 65 mg/dl. We diagnosed CSF rhinorrhoea.

TREATMENT

Endoscopic exploration of the sphenoid sinus revealed a bony defect in the posterior right aspect of the sinus with visible arachnoid and brain tissue. The defect was sealed with fat and bone grafts.

OUTCOME AND FOLLOW-UP

When the patient was last seen 6 months after surgery she was doing well and her rhinorrhoea had stopped.

DISCUSSION

Recurrent bacterial meningitis occurs in 4–9% of cases of community-acquired bacterial meningitis in adults.^{1 2} A history of remote head trauma and CSF leakage are the most common reported predisposing factors for recurrent pyogenic meningitis in the literature (47–59%). CSF rhinorrhoea is a discharge of CSF from the nose secondary to disruption of the barriers between the sinonasal cavity and the anterior and middle cranial fossae.³

Closed head injury causes 70–80% of cases of CSF rhinorrhoea. Sinus infection, neurosurgical surgery and skull base tumours can result in CSF leaks.^{3 4} Congenital skull malformations can present rarely in adults with CSF rhinorrhoea and recurrent meningitis.¹

Spontaneous nasal CSF leak is an evolving entity. Elevated intracranial pressure (ICP) is a common finding in patients with spontaneous CSF nasal leak as it increases the hydrostatic forces exerted at anatomically weakened sites of the skull, and eventually produces a bone defect.^{3 4}

Patients with spontaneous CSF rhinorrhoea are most commonly middle aged, obese females with pressure type headache, pulsatile tinnitus and visual abnormalities. It is considered a variant of benign intracranial hypertension.³ Arachnoid pits and empty sella are common radiological findings in patients with spontaneous CSF leak secondary to elevated ICP.^{3 4}

Testing nasal secretions for β -2 transferrin is more sensitive and specific than older methods testing for glucose, proteins and electrolytes.^{3 4} High resolution CT, a CT cisternogram, radionuclide cisternography and magnetic resonance cisternography are used to diagnose CSF leak with variable success.^{3 4} Preoperative intrathecal fluorescein injection has an accuracy of 96% but is not approved by the US Food and Drug Administration.^{3 4}

Our patient has several features suggestive of spontaneous CSF rhinorrhoea.

Most CSF leaks caused by accidental and surgical trauma heal with conservative measures, which include bed rest, head elevation and avoidance of straining.³ Endoscopic sinus surgery is the preferred surgical approach.⁴ Acetazolamide decreases CSF production and theoretically may reduce the risk of developing subsequent skull base defects in patients with elevated CSF pressures.^{3 4}

Incidental radiological findings (ie, empty sella) and historical information (ie, a history of nasal discharge), which may be considered irrelevant by the novice, are important clues.

Understanding Occam's principles of parsimony and searching for a hypothesis that explains the history, physical examination, laboratory and radiological studies, can be the key to solving many cases.⁵

Learning points

- ▶ Cerebrospinal fluid rhinorrhoea is a common cause of recurrent bacterial meningitis.
- ▶ Spontaneous cerebrospinal fluid rhinorrhoea is an evolving entity; and is likely caused by elevated intracranial pressure.
- ▶ Incidental radiological findings (ie, empty sella) can be a sign of increased intracranial pressure.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Tebruegge M**, Curtis N. Epidemiology, etiology, pathogenesis and diagnosis of recurrent bacterial meningitis. *Clin Microbiol Rev* 2008;**21**:519–37.
2. **Adriani KS**, van de Beek D, Brouwer MC, *et al*. Community-acquired recurrent bacterial meningitis in adults. *Clin Infect Dis* 2007;**45**:e46–51.
3. **Kerr JT**, Chu FW, Bayles SW. Cerebrospinal fluid rhinorrhea: diagnosis and management. *Otolaryngol Clin North Am* 2005;**38**:597–611.
4. **Schlosser RJ**, Bolger WE. Nasal cerebrospinal fluid leaks: critical review and surgical considerations. *Laryngoscope* 2004;**114**:255–65.
5. **Lo Re V 3rd**, Bellini LM. William of occam and occam's razor. *Ann Intern Med* 2002;**136**:634–5.

This pdf has been created automatically from the final edited text and images.

Copyright 2011 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.

BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Ammar H, Meyer MA. A clue in the nose. *BMJ Case Reports* 2011;10.1136/bcr.08.2010.3240, date of publication

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow