Rare disease

An uncommon cause of recurrent pyogenic meningitis: pituitary abscess

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Summary

The authors report a 36-year-old male who presented with headache and hypopituitarism, and MRI revealed a ring enhancing lesion with pituitary stalk thickening. During follow-up, he presented with recurrent pyogenic meningitis with persistence of the lesion, therefore a diagnosis of pituitary abscess was considered. He underwent trans-sphenoidal surgery (TSS) with evacuation of pus and received antibiotic treatment for the same. After this he remarkably improved and had no recurrence of symptoms. He is on levothyroxine, glucocorticoids and testosterone replacement therapy for his respective hormone deficits.

BACKGROUND

Pituitary abscess is a rare entity and a few of these patients present with recurrent aseptic meningitis and diagnosis is usually established per-operatively. We report a case, who had recurrent pyogenic meningitis and was diagnosed to have pituitary abscess preoperatively, though quite delayed and was successfully managed.

CASE PRESENTATION

A 36-year-old male presented with complaints of headache for 3 months in May 2008 for which he underwent MRI

brain that revealed a 14.4×20×16 mm sellar mass with peripheral hyperintense ring, stalk thickening and dural enhancement (figure 1). On examination, he was afebrile with body mass index of 26 kg/m². His blood pressure was 90/70 mm Hg, and had no signs of meningeal irritation. On investigation his serum electrolytes and haemogram were within normal range. Hormonal work up showed 800 h cortisol of 11.5 nmol/l (N, 140–690), total T3 1.23 nmol/l (N, 0.92–2.78), total T4 55 nmol/l (N, 58–140), TSH 1.24 mU/l (N, 0.5–5), LH 1.61 IU/l (N, 1.3–13), FSH 2.7 IU/l (N, 0.9–15), testosterone <0.69 nmol/l (N, 10–35) and prolactin of 7 µg/l

Figure 1 Pituitary MR T1 weighted contrast enhanced coronal section showing peripheral ring enhancement with central heterogeneous intensity and stalk thickening suggestive of pituitary abscess.

(N, 2–15). Paired serum (280 mOsmol/kg) and urine osmolality (350 mOsmol/kg) were within normal range. A diagnosis of lymphocytic hypophysitis was considered. He was started on glucocorticoids, L-thyroxine and testosterone replacement therapy. He presented to us again in August 2008 with headache and fever for 2 days. On examination, he had neck rigidity and early papilledema. A possibility of acute meningitis was considered and he was treated with intravenous antibiotics and stress dosages of glucocorticoids. Lumbar puncture was planned after neuroimaging. He showed clinical improvement within 24 h and repeat MRI done after 3 days showed reduction in size of the mass (10×3.5×7 mm). With this rapid clinical and radiological improvement, lumbar puncture was deferred and antibiotics were continued for 2 weeks.

He was again admitted in October 2008 with severe headache, fever and meningism. On evaluation, cerebrospinal fluid (CSF) examination showed protein 2.69 g/l, glucose 2.83 mmol/l with corresponding blood glucose of 6.39 mmol/l and 300 cells with neutrophilic pleocytosis. CSF Gram's stain, culture, Indian ink stain and adenosine deaminase levels (6 U/l) were non-contributory. He was started on intravenous antibiotics and stress doses of glucocorticoids while levothyroxine was continued. With this therapy his symptoms resolved. Radionuclide cisternography did not reveal any CSF fistula.

In December 2008, he was again admitted with complaints of headache, fever and abnormal behavior. On examination he had neck rigidity and papilledema. CSF examination after decompressive measures showed protein 2.2 g/l, glucose 4 mmol/l and 1920 cells with predominant neutrophils, while CSF Gram's stain and culture were non-contributory. MRI showed mild increase in size of lesion

(19×12×10 mm) in comparison to August 2008 with peripheral enhancement and sphenoid sinusitis.

DIFFERENTIAL DIAGNOSIS

With above mentioned clinical scenario and radiological profile in our patient, the differential diagnosis included pituitary adenoma with apoplexy, lymphocytic hypophysitis and pituitary abscess. Pituitary apoplexy was a strong contender as patient had acute onset headache and hypopituitarism. However, the MRI did not support the diagnosis as it showed peripheral ring enhancement with central hypointense area, stalk thickening and dural enhancement. Possibility of lymphocytic hypophysitis was considered in view of MRI showing stalk thickening and dural enhancement. However, both these features are non-specific and are also seen in neurosarcoidosis, tuberculosis and pituitary abscess. Moreover, hypophysitis is uncommon in men and central area of hypointensity in pituitary region on MRI is further rare.¹ Therefore, this clinical profile and characteristic MRI suggested the diagnosis of pituitary abscess. However, the diagnosis was delayed in our patient because of lack of fever, features of meningism/meningitis evolving later and possibly overlooking the MRI at the initial presentation.

OUTCOME AND FOLLOW-UP

Diagnosis of pituitary abscess leading to recurrent meningitis was considered and patient was treated with intravenous antibiotics and was subjected to trans-sphenoidal surgery (TSS). Per-operatively pus was drained from pituitary fossa, however, bacterial, fungal and mycobacterial cultures were negative. Histopathology

Figure 2 Histopathology of the pituitary tissue showing neutrophilic infiltrates with coagulative necrosis. In background haemosiderin laden macrophages are seen suggestive of old pituitary haemorrhage.

Figure 3 Pituitary MR T1 weighted contrast enhanced coronal section after trans-sphenoidal surgery showing postoperative changes.

showed coagulative necrosis of the pituitary gland (ghost cells) with infiltration by inflammatory cells predominantly neutrophils along with haemosiderin laden macrophages (figure 2), therefore underlying pituitary pathology could not be commented. Sphenoid mucosal biopsy showed gram positive cocci. Postoperatively patient had transient diabetes insipidus and CSF rhinorrhea. He was treated with intravenous antibiotics for 4 weeks and currently he is doing well. Repeat MRI showed postoperative changes (figure 3). He continues to have hypopituitarism and is on levothyroxine, glucocorticoid and androgen replacement therapy.

DISCUSSION

Pituitary abscess is a rare entity with a reported incidence among pituitary lesions varying between 0.2% and 0.6%.^{2–4} The disease usually occurs in pre-existing pituitary lesion for example, craniopharyngioma, Rathke's cleft cyst, pituitary adenoma with or without necrosis and rarely in normal pituitary.² Predisposing factors for pituitary abscess include focus of parasellar infection like sphenoid sinusitis, cavernous sinus thrombophlebitis, CSF leakage, pituitary surgery and tooth infection.⁵

Patients with pituitary abscess usually present with acute onset headache, visual deficits, high grade fever (<50%) and meningitis.^{6–7} Sometimes low grade fever and mild headache with pituitary hormone deficiencies particularly cortisol may be the presenting manifestation. Our patient initially presented with headache and hypopituitarism and later had recurrent pyogenic meningitis.

Recurrent meningitis, as a presenting manifestation of pituitary abscess is rare and a handful of cases have been reported in the literature.^{8–11} Meningeal involvement associated with pituitary abscess is usually aseptic and rarely it

can be pyogenic. Lack of demonstration of micro-organisms in CSF either on Gram's stain or culture is not surprising, as patient needed to be started on antibiotic therapy prior to lumbar puncture. Moreover, it has been previously reported in literature that organism could be isolated only in 50% of cases with pituitary abscess.⁷ Antigen detection and PCR analysis of CSF might have helped us to identify the organism. The possible cause of pyogenic meningitis as suggested by CSF profile was leakage of pituitary abscess in CSF space.

The pathogenesis of pituitary abscess include direct invasion of organisms from the surrounding structures like paranasal sinuses or cavernous sinus. Direct involvement of the pituitary gland by haematogenous route is rare as there is a strong blood pituitary barrier. Our case had sphenoid sinusitis which probably contributed to the development of pituitary abscess in an already apoplectic pituitary tissue as evidenced by presence of haemosiderin laden macrophages on histopathology and later leakage of pus into the CSF space led to recurrent episodes of meningitis.

In conclusion, this report illustrates a rare entity of pituitary abscess which should be considered in a patient who presents with meningitis and has a ring enhancing lesion in pituitary region on MRI.

Learning points

- ▶ Pituitary abscess is a potential cause of pituitary mass.
- ▶ The early presentation of pituitary abscess can be insidious and rarely associated with fever.
- ▶ Pituitary abscess can cause recurrent meningitis unless appropriately treated.
- ▶ In a patient with ring enhancing lesion on MRI, a diagnosis of pituitary abscess should be considered.
- ▶ TSS with prolonged duration of antibiotics is curative.

Competing interests None.

Patient consent Obtained.

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Walia R, Bhansali A, Dutta P, Shanmugasundar G, Mukherjee KM, Upreti V, Das A. An uncommon cause of recurrent pyogenic meningitis: pituitary abscess. *BMJ Case Reports* 2010;10.1136/bcr.06.2009.1945, date of publication

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