A Case with Pituitary Abscess Presented with Acute Purulent Meningitis

Akut Purulan Menenjitle Gelen Bir Pitüiter Abse Olgusu

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Abstract
Pituitary abscess is a rare and potentially life-threatening disease. Misdiagnosis is extremely frequent, until the drainage of purulent material during surgery because of the non-spesific clinical signs and laboratory findings. The diagnosis can be made preoperatively with awareness of the disease and careful assessment of radiological investigations, especially magnetic resonance imaging (MRI). We report a 43-year-old man who presented with acute purulent meningitis. Control MRI scans, performed because of the deterioration in patient's general status during follow-up, revealed a pituitary abscess. We preferred a conservative approach initially, but abscess drainage later became essential, since there was no response to antibiotic therapy. The lesion disappeared after transsphenoidal drainage. The general health status of the patient, receiving a replacement therapy for anterior pituitary deficiency, was good 2 months after discharge. Pituitary abscess should be kept in mind in patients with acute meningitis whose clinical picture deteriorates despite the appropriate treatment. This case illustrates that the preoperative diagnosis is possible with careful evaluation, and with the treatment of this life-threatening condition, satisfactory results might be achieved. *Turk Jem 2009; 13: 63-6*
Key words: Pituitary abscess, meningitis, magnetic resonance imaging (MRI), pituitary insufficiency

Özet
Pitüiter abse nadir görülen ve hayati tehlike arzeden bir hastalıktır. Klinik belirti ve laboratuar bulgularının özgül olmaması nedeniyle cerrahi sırasında purulan materyal drene edilene değin yanlış tanı sıktır. Hastalığın farkında olunması ve özellikle Magnetik Rezonans Görüntüleme (MRG) gibi radyolojik incelemelerin dikkatli değerlendirilmesi ile cerrahi öncesi tanı konması mümkündür. Biz akut purulan menenjit ile gelen 43 yaşında bir erkek hasta sunuyoruz. Takip sırasında genel durumunun bozulması nedeniyle çekilen kontrol MR görüntüleri ile pitüiter abse saptandı. Başlangıçta konservatif yaklaşımı tercih etmemize karşın antibiyotik tedavisine cevap olmamasından dolayı abse drenajı gerekti. Transsfenoidal drenaj sonrası lezyon kayboldu. Anterior pitüiter yetmezlik nedeniyle replasman tedavisi alan hastanın taburculuğundan 2 ay sonra genel durumu iyidir. Uygun tedaviye rağmen genel durumları bozulan akut menenjitli hastalarda pitüiter abse akla gelmelidir. Bu olgu dikkatli değerlendirme ile cerrahi öncesi tanı konulabileceğini ve bu hayatı tehdit eden durumun tedavisinin yüz güldürücü olabileceğini göstermektedir. *Türk Jem 2009; 13: 63-6*
Anahtar kelimeler: Pitüiter abse, menenjit, manyetik rezonans görüntüleme (MRG), pitüiter yetmezlik

Introduction

Pituitary abscess is considered to be a rare cause of hypopituitarism. The first description of the entity was made by Simmonds in 1914, and more than 210 cases have been reported in the literature. Since the condition is life-threatening, early diagnosis and adequate treatment are critical. Despite the advanced techniques in neuroimaging, the cases are often misdiagnosed as sellar masses before surgery. The clinical signs are often non-specific; pituitary insufficiency may occur either pre-or postoperatively. We report a patient with pituitary abscess due to sphenoidal sinusitis, presented with anterior pituitary insufficiency which was diagnosed preoperatively.

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Case Report

A 43-year-old male was admitted to the emergency service with history of headache, vomiting, and fever. The headache started 15 days before admission, and increased in severity within the last 4 days. Fever, vomiting, and unconsciousness were added to the headache in the last 4 days. He was treated as sinusitis with cefditoren pivoxil 2x200 mg daily for 15 days before admission. On physical examination, fever (body temperature was 39.5 C), reduced cognitive function, stiff neck, and Kerning and Brudzinski signs were present. White blood cell count was 21900 cells/mm^3 (4.800-10.800) with 80% neutrophils and 15% lymphocytes, C-reactive protein was 256 mg/L (0-6) and erythrocyte sedimentation rate (ESR) was 106 mm/h at the initial laboratory investigation. Lumbar puncture was performed in the emergency unit. Cerebrospinal fluid (CSF) examination revealed elevated opening pressure, pleocytosis (1200 cells/mm^3 with 90% polimorphonuclear lymphocytes-PMNL), elevated protein concentration (522 mg/dl) and decreased glucose concentration (1.6 mg/dl). No microorganism was detected on gram-stain. A diagnosis of acute purulent meningitis was made on the basis of clinical and laboratory findings. Empirical intravenous antibiotic therapy with ceftriaxon (4g/day) and dexamethasone 0.15 mg/kg/every 6 hours for the first 4 days were initiated. The patient's treatment was maintained at the Department of Infectious Diseases. No organism grew in cultures of CSF. His mental status improved, fever resolved, and white blood cell count decreased to 10000 cells/mm^3. On the seventh day of treatment, the patient rapidly deteriorated, symptoms of fever, headache and neck tiffness ensued with the development of anisocoria and left abducens nerve paralysis. Second lumbar puncture was performed in order to evaluate the efficacy of treatment, and all parameters were found to be improved. On compurerized axial tomography (CT, CAT) scan of the paranasal sinuses, an air-fluid level was detected in the sphenoid sinuses, considered as a typical sign of bacterial sinusitis. Involvement of the anterior cranial fossa by the infective process was also present.

He underwent a magnetic resonance imaging (MRI) that revealed an intrasellar lesion with high-intensity signal on T2-weighted sequences (Figure 1) and low-intensity signal on T1-weighted sequences. No enhancement of gadolinium in the central part of the lesion but a peripheral enhancement of pituitary gland was observed (arrows). Intrasellar infiltrative process showed extension to the suprasellar region. Cerebritis with hypothalamic abscess and massive perifocal edema in the base of the midline anterior cranial fossa were observed (Figure 2). Suprasellar cystic contents showed high signal intensity on diffusion-weighted imaging (DWI) (Figure 3). Parenteral metranidazole 4x500 mg was added to the antibiotic therapy after the diagnosis of meningitis and brain abscess secondary to sinusitis. He was consulted to neurosurgery and conservative management was preferred due to small size of the abscess.

Despite the antimicrobial therapy, the general status of the patient worsened, hypotension developed and fever reappeared. The results of hormonal analysis revealed pituitary insufficiency (Table 1). Replacement therapy for pituitary insufficiency with levothyroxine (0.1mg/day) and prednisolone (7.5 mg/day) was started. The patient underwent transsphenoidal drainage of the abscess. Gram stain of abscess material revealed abundant PMNL without any microorganism. Culture of acid-resistant bacilli, Indian ink preparations and all other cultures were negative. The histopathological evaluation showed signs of acute and chronic inflammation.

After the transsphenoidal drainage of the abscess, the patient was continued on antimicrobial therapy with ceftriaxon (4g/day) and metranidazole (2 g/day) for 6 weeks. Levothyroxine and prednisolone were also continued on maintenance dose for pituitary deficiency. Two months postoperatively, the patient was examined by 1 µg ACTH stimulation test which revealed a peak cortisol level of 5.94 µg/dl. Hormonal reevaluation showed deficiencies in adrenal, gonadal and thyroid axes. Urine osmolarity was 794 mosm/kg, while serum osmolarity was 285 mosm/kg. Control MRI revealed a normal pituitary gland (0.9 cm in height) and disappearance of the pituitary abscess (Figure 4). The patient is now on levothyroxine, prednisolone and testosterone replacement therapy for the deficient pituitary hormones. Probably he will require a life-long hormonal therapy.

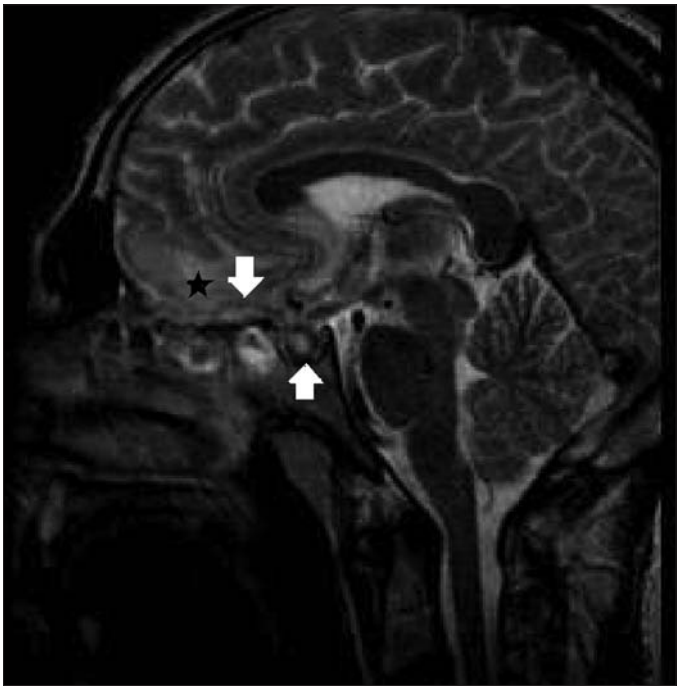

Figure 1. Sagittal T2-weighted spin-echo MR image demonstrating the heterogeneous high-intensity signal of the lesions (arrows) with massive perifocal edema (star)

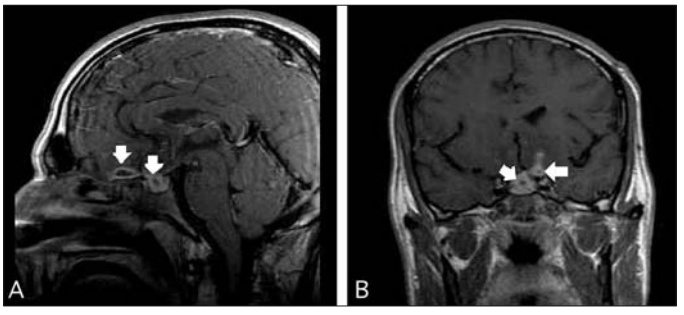

Figure 2. A) Contrast-enhanced sagittal and B) Coronal T!-weighted spin-echo MR images sho a cystic intra-and supra-sellar lesions with ring enhancement (Pituitary abcsess sphenoid sinusitis

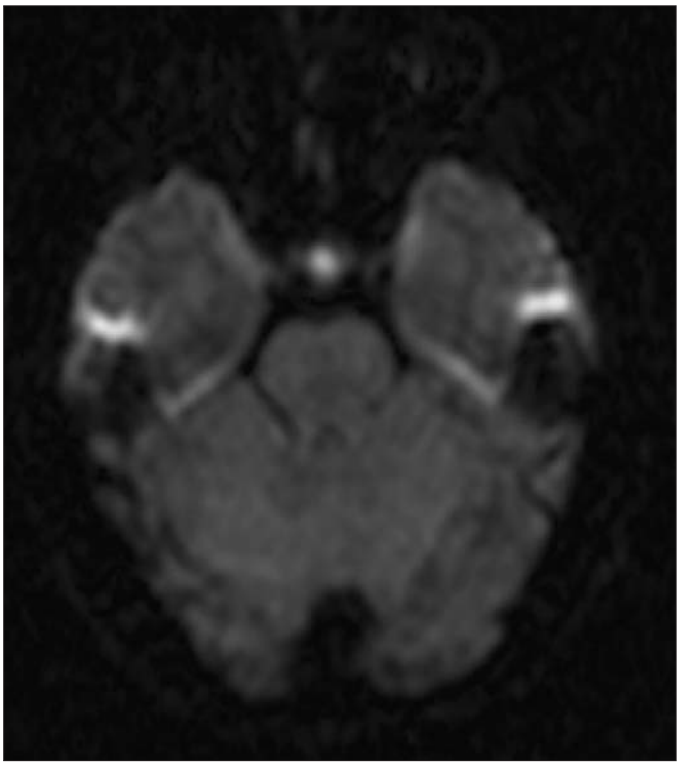

Figure 3. Supra-sellar cystic contents, which is purulent material, showing high intensitiy on diffusion-weighted imaging (DWI)

Table 1. Hormonal evaluation before and 2 months after replacement therapy

Hormone	Before treatment	2 Months after treatment*
Free T3 [2.5-3.9 pg/ml]	1.2	2.10
Free T4 [6.1-11.2 pg/ml]	4.5	7.8
TSH [0.35-5.5 µu/ml]	0.55	0.08
FSH [0.7-11.1 mIU/ml]	0.39	1.31
LH [0.8-7.67mIU/ml]	0.27	0.552
Free Testosterone [8.69-54.6 pg/ml]	1.09	0.29
Prolactin [2-18 ng/ml]	2.97	-
IGF-1 [107-310 ng/ml]	-	275
Cortisol [5.0-26 µg/dl]	12.8	2.16

* The patient had replacement therapy with levothyroxine (0.1 mg/day), prednisolone (7.5 mg/day), and testosterone (250 mg/28 days)

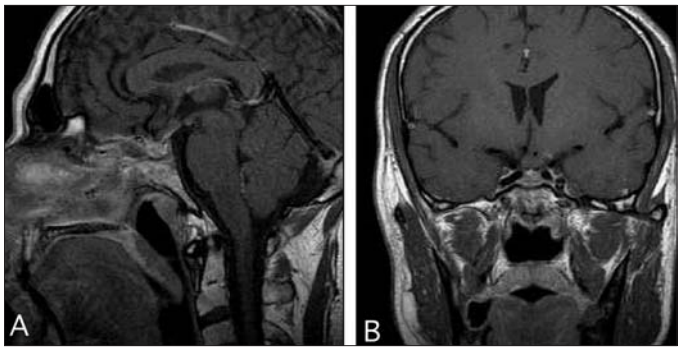

Figure 4. A) Coronal B) gadolinium-enhaced T1-weighted spin-echo Pituitary MR images two months after surgery demonstrating the disappearance of pituitary andsuprasellar abscesses with ring enhancement

Discussion

Pituitary abscess (PA) is a rare condition and it is difficult to estimate the real incidence. Although there are a few hundreds of case reports, the largest series of disease reported by Vates et al consists of 24 patients (1). Abscess formation may develop in a normal, healthy gland without an identifiable source of infection, hence called primary PA. More than 60% of the reported cases are in this group (1,2). In secondary PA, intrasellar infection may occur via the bloodstream, or via direct extension from a focus such as sphenoid sinusitis, meningitis, cavernous sinus thrombophlebitis (3,4) or even otitis media (5).

It is speculated that sellar masses facilitate the occurrence of abscess (6). Pituitary adenomas, Rathke's cleft cyst and craniopharyngioma are the most frequently reported lesions complicated by abscess (7). Pituitary abscesses are also reported following transsphenoidal pituitary surgery or irradiation therapy, possibly due to anatomic disruption (1). Impairment of host defense mechanism by chemotherapy, haematological malignancies, and immunodeficiencies, either familial or acquired, may predispose to development of PA (8). There are two cases reported with PA in postpartum period (9,10) and a case during pregnancy (11). It is well-known that size and blood flow alterations occur in pituitary gland during pregnancy, but it would be speculative to assume that these alterations or pregnancy itself predispose to abscess formation.

The presented case in this report seems to be secondary to meningitis. The patient, however, was not immunocompromised; he had sphenoidal sinusitis and meningitis. Direct invasion might have caused the pituitary abscess.

A classical presentation is absent in PA because of non-specific clinical signs, laboratory and radiological findings. The most common clinical symptom is headache (91.7%) (1), without a specific pattern. Vates et al reported that 33.3% of cases presented with fever, 33.3% had elevated white blood cell count and 25% had meningismus (1). The cases without inflammatory and/or meningeal symptoms and signs are not infrequent (12). Dutta et al mentioned in their report that triad of fever, meningism and leukocytosis, as seen in our patient, may be suggestive for PA. It seems to be rational to expect infective manifestations in acute onset conditions like in this case, rather than chronic courses as preexisting tumours complicated with abscess.

Symptoms related to mass effect such as visual disturbance and pituitary insufficiency may be seen like in any other sellar lesion (13). Destruction of the gland may result in hypopituitarism. Growth hormone deficiency is reported to be the earliest manifestation followed by follicle-stimulating hormone/luteinizing hormone, thyroid stimulating hormone and adrenocorticotrophic hormone deficiencies (14). Diabetes insipidus (DI) is a much more common complication of PA compared to any other primary pituitary tumour. Only 10 % of pituitary tumours reported by Blackett presented with DI, but almost half of patients with PA showed signs of DI such as polyuria, polydipsia (2). More than 50% of patients had panhypopituitarism at presentation and 10% had new-onset hypopituitarism postoperatively in Vates's series. In contrast to most of the cases previously reported, there were

no findings of DI in our patient, neither before nor after the surgery. Although most cases require hormone replacement therapy, rarely, pituitary insufficiency may not develop (15) or recovery of hypopituitarism can occur, as seen in a 14 year-old girl with primary PA (16).

We could not perform stimulation tests in order to diagnose pituitary insufficiency because of the critical illness of our patient, but low basal serum concentrations of anterior pituitary hormones (Table 1) and the significant improvement in general status following the replacement therapy supported the diagnosis of pituitary insufficiency.

Diagnosis of PA is problematic. It usually takes a long time, varying from months to years, from onset of symptoms to the diagnosis (8). Our patient was one of the cases reported with PA formation during the course of acute meningitis, possibly due to sphenoidal sinusitis.

Various causative microorganisms including gram positive cocci, gram negative bacilli, fungi, amoebae and yeast have been reported in PA (1,13,17-19). The most common pathogens are gram positive cocci (1). In half of the cases no organism could be isolated either due to inadequate anaerobic techniques and fungal isolation, or prior antibiotic therapy (1,20). It was not surprising in our patient not to isolate any microorganism, since he had been under antibiotic therapy for a relatively long time for sinusitis and meningitis, respectively.

Radiological examinations in PA may show enlargement of sella turcica which is seen with almost any sellar mass. Computed tomography scan shows also non-specific findings including low density area with ring enhancement, filling of the sphenoidal sinus with destruction of the sellar floor (9). MRI is the most useful diagnostic tool preoperatively. Intrasellar lesions with low-intensity signal on T1-weighted sequences and high intensity signal on T2-weighted sequences have usually been reported suggestive of PA as well as any other lesion containing liquid. High signal intensity on T1-weighted sequences may appear due to proteinaceous content of abscess, or bleeding into the mass can result with same image. The peripheral rim enhancement is also thought to be suggestive for PA. Although adenomas may also have enhancement, rim enhancement of abscess is thinner (21). The reported pituitary abscess is also presented with rim enhancement as expected and a diagnosis of pituitary abscess could be made preoperatively with a careful assessment of MRI scans.

Surgical drainage and following antibiotic treatment are the recommended management for pituitary abscess (1,22). Transsphenoidal approach is considered to be safer than craniotomy because of the risks of dissemination of infection and visual loss related to the surgical procedure (1,23). Conservative treatment with antibiotics may be alternative to surgical approach in selected patients. Although a few reports are present regarding pituitary abscess successfully treated with antibiotics only (5,24), the initial diagnosis, particularly based on imaging findings, must be done carefully. In case of conservative management, long-term follow-up with pituitary imaging is necessary to prevent the recurrences. Because of the small size of the abscess, we initially preferred conservative therapy in the management of our patient, but the general status of the patient worsened despite the aggressive antibiotic treatment. Hence, a transsphenoidal drainage was performed, and the clinical signs and inflammatory markers resolved following surgery. A close follow-up to reduce the risk of recurrence of the abscess and anterior pituitary deficiency is being carried on.

Pituitary abscess should be suspected in a patient with acute meningitis whose clinical picture deteriorates despite appropriate treatment.

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