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MR Imaging of Pituitary Abscess : Report of Two Cases[1]

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Pituitary abscess is a rare condition of the pituitary gland. We report MR imaging findings in two cases of surgically-confirmed pituitary abscess occurring in women aged 39 and 28. In both a peripheral rim enhancing lesion, similar to abscesses in other areas of brain, was seen in the pituitary fossa.

Index Words : Pituitary, disease
Pituitary, MR

A pituitary abscess is a rare lesion ; its pre-operative diagnosis remains difficult, and there have been reports concirning the result of MR imaging studies. We report two cases of a pituitary abscess. In both, MRI findings showed a sellar mass with a central fluid signal and peripheral rim enhancement ; one case also showed a fluid-fluid level in the mass, and the other showed a hypointense signal rim on T2-weighted image (T2WI). Pre-operative diagnosis of the first case was a pituitary adenoma with hemorrhage or necrosis, and of the second, was a pituitary abscess. When MRI findings are as above, the possibility of a pituitary abscess should-in appropriate clinical settings-be borne in mind.

Case report

Case 1

A 39-year-old female patient presented with a 4-day history of headache, nausea and vomitting. She had no history of a specific illness. Neurological and other physical examinations revealed no abnormal findings except for a mildly elevated erythrocyte sedimentation rate (34mm/hour). Hormonal assay was within the normal range, except for a mildly elevated serum prolactin level (41.6ng/ml). T1-weighted MR image (T1WI) demonstrated a low to intermediate signal mass in the pituitary fossa ; the mass extended to the suprasellar cistern and mildly compressed the optic chiasm (Fig. 1A, B). A fluid-fluid level with signal intensity of the dependent material higher than that of the supernatant was noted in the mass (Fig. 1A). On T2WI, the mass showed a hyperintense signal and a fluid-fluid level with a more hyperintense signal of the supernatant than the dependent material was also noted (Fig. 1C). On contrast-enhanced T1WI, thin peripheral rim enhancement was noted along the outer margin of the mass and the anterosuperior portion of the enhancing rim was focally thickened (Fig. 1D). The sphenoid sinus was clear, without mucosal thickening or fluid. Pre-operative diagnosis was pituitary adenoma, with necrosis or hemorrhage. Using the trans-sphenoidal approach, the patient was operated on ; about 3cc of whitish yellow pus was aspirated, without a grossly demonstrable tumor mass. No tumor cells were found ; histopathologic examination showed only inflammatory cells, and gram stain and culture did not reveal any organism.

Case 2

A 28-year-old female patient presented with a 1-month history of progressively developing headache. She had no history of a specific illness. Neurological and other physical examinations revealed no abnormal findings. Hormonal assay showed panhypopituitarism, while serum thyroxine, TSH, testosterone, progesterone, cortisol, ACTH, LH and FSH were all below normal limits. All other laboratory tests were within the normal range. On T1WI, MRI of the pituitary gland demonstrated a low to intermediate

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signal mass in the pituitary fossa ; the mass extended to the suprasellar cistern and mildly compressed the optic chiasm (Fig. 2A). On T2WI, the mass showed a hyperintense signal, with a round, ring-like hypointense signal within it (Fig. 2B). On contrast-enhanced T1WI, thick peripheral rim enhancement was noted in the mass (Fig. 2C), and there was mild mucosal thickening in the sphenoid sinus. Pre-operative diagnosis was pituitary abscess. Using the right subfrontal approach, the patient was operated on. The pituitary gland was well-encapsulated and whitish yellow pus-like fluid was aspirated. No tumor cells were found to be present ; histopathologic examination showed only inflammatory cells, and gram stain and culture did not reveal any organism.

Discussion

A pituitary abscess is very uncommon. Since 1914, about 60 cases have been reported ; the majority of these were autopsy cases in the pre-antibiotic era (1, 2). The CT appearance of a pituitary abscess has been described in several reports (3), but to our knowledge there have been only two in which its MRI findings have been described (4). There have been reports of two different mechanisms by which a pituitary abscess develops ; sellar lesions (such as pituitary adenomas, Rathke's cleft cysts or craniopharyngiomas) with secondary infections (5-7) or caused by surgery for a pituitary adenoma (8), and infections of a previously healthy pituitary gland usually associated with sphenoid sinusitis or meningitis (1, 2). In a large number of cases, however, a clear source of infection was not found (9). In both our cases, the source of the infection was not determined and there was no demonstrable underlying lesion such as a pituitary adenoma, nor adjacent inflammation such as active sinusitis or meningitis. Mild mucosal thickening was noted in the sphenoid sinus in case 2 but this was not thought to be the cause of the pituitary abscess. The causative agents are common microorganisms including streptococci, staphyococci, Klebsiella, Proteus and E. coli (1, 2), but in many reported cases, including ours, culture proved to be sterile (1, 9). The clinical diagnosis of a pituitary abscess is di-

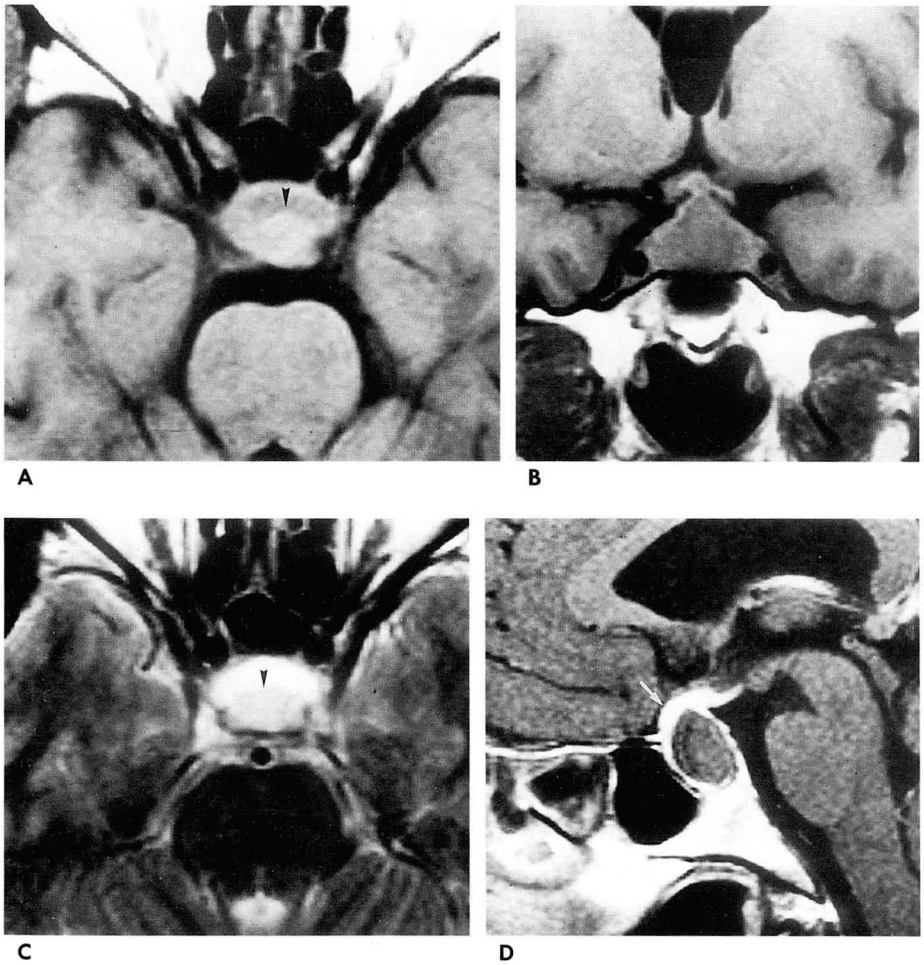
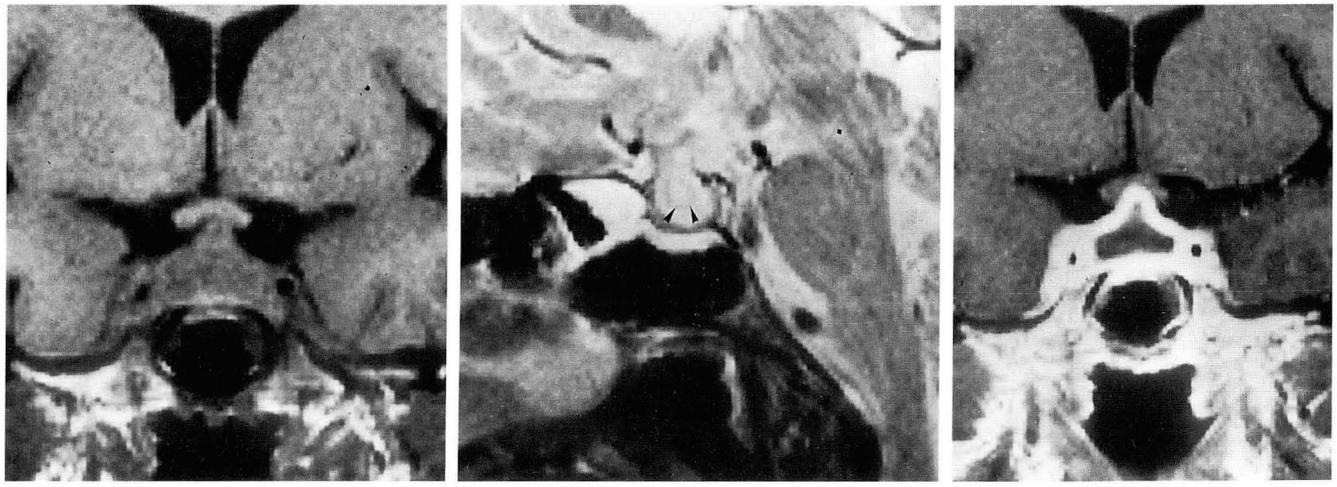


Fig. 1. A. Axial and **B.** coronal T1-weighted (500/15) image show a low to intermediate signal mass in the pituitary fossa with suprasellar extension mildly compressing the optic chiasm. A fluid-fluid level (arrowhead in a) is noted in the mass with more hyperintense signal material in dependent portion relative to supernatant.
C. On axial fast spin echo T2-weighted (3000/85/15) image the mass is appeared as hyperintense signal. A fluid-fluid level (arrowhead) is also noted with more hyperintense signal of supernatant relative to dependent material.
D. Sagittal constrast enhanced T1-weighted (400/15) image sows relatively thin peripheral rim enhancement. The enhancing rim is focally thickened at its anterosuperior portion (arrow). The sphenoid sinus is clear.



A B C

Fig. 2. A. Coronal T1-weighted image (500/15) shows a low to intermediate signal mass in the pituitary fossa with suprasellar extension mildly compressing the optic chiasm.
B. on sagittal T2-weighted (2500/80) image the mass is appeared as hyperintense signal. Note a thin round hypointense signal rim in the mass (arrowheads).
C. coronal constrast enhanced T1-weighted (500/15) image show thick peripheral rim enhancement.

fficult because the symptoms and signs are nonspecific; they include headache, visual disturbance or signs of impaired endocrine function (amenorrhea, polydipsia, or polyuria, for example) (1, 2). These clinical manifestations do not distinguish a pituitary adenoma from the much rarer pituitary abscess. Headache was the only symptom found in both of our cases; in the literature it is the most common symptom, and accounts for about 90% of reported cases (1, 2). Imaging findings, especially those of MRI are therefore very important for the diagnosis of this rare disease. On MRI, both of our cases showed a central fluid signal (low to intermediate on T1WI and high on T2WI) and peripheral rim enhancement; these findings are identical to those of previous reports and also similar to the MRI of a brain abscess. Our cases additionally showed a fluid-fluid level (case 1), and a hypointense signal rim on T2WI (case 2). It has been suggested that this latter is causes by oxygen free radicals produced by macrophages in the abscess wall and is, reportedly, a helpful finding in the diagnosis of a brain abscess (10). Using MRI findings of peripheral rim enhancement and a hypointense signal rim on T1WI, we preoperatively diagnosed a pituitary abscess. In the surgical field of case 2, a thick abscess capsule was found and we suggest that a hypointense signal rim on T2WI would be a helpful finding for the diagnosis of a pituitary as well as a brain abscess. The fluid-fluid level of case 1 is also an interesting finding. The dependent material showed a higher signal on T1WI and a lower signal on T2WI than the supernatant. We made a preoperative diagnosis of hemorrhagic pituitary adenoma, but retrospectively, these signal characteristics are not consistent with any stage of hemorrhage, which might suggest that the dependent debris of the abscess is more proteinaceous than the supernatant. The differential diagnosis of a pituitary abscess includes pituitary adenomas, craniopharyngiomas, Rathke's cleft cysts, and intrasellar arachnoid cysts, for example (1-4). Of these, a pituitary adenoma with hemorrhage or necrosis is thought to be the most difficult to deferentially diagnose, because it is much more common than a pituitary abscess and can also show peripheral rim enhancement of the remnant normal pituitary gland. When a pituitary abscess is superimposed upon these intrasellar masses, the diagnosis becomes more complicated. Even though a pituitary abscess is a rare disease entity, its possibility should borne in mind when MRI shows a central fluid signal and peripheral rim enhancement in the pituitary fossa, since early diagnosis and pre-operative antibiotic treatment can reduce operative mortality and morbidity (1, 2). the peripheral hypointense signal rim on T2WI and the fluid-fluid level noted in our two cases would be additional helpful MRI findings for the diagnosis of a pituitary abscess.

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뇌하수체 농양의 자기공명영상 소견 : 2예 보고[1]

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뇌하수체에 발생하는 질환들 중 뇌하수체 농양은 매우 드문 것으로 알려져 있다. 저자들은 각각 39세와 28세 여자에서 수술 및 병리조직학적으로 확진된 2예의 뇌하수체 농양을 경험하였기에 보고한다. 2예 모두의 자기공명영상에서 터키안 내부에 다른 부위의 농양과 같이 변연부 조영증강을 보이는 종괴가 관찰되었다.