CASE REPORT

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Frontal mucocoele communicating with an arachnoid cyst of the anterior cranial fossa*

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SUMMARY

Mucocoeles usually involve the frontal sinus and can extend to the orbit or intracranially. In this case symptoms and radiological findings were typical of a left frontal mucocoele with intracranial extension. Intraoperative findings were compatible with a left frontal mucocoele communicating with an arachnoid cyst of the anterior cranial fossa.

Key words: mucocoele, arachnoïd cyst, frontal sinus, skull base

INTRODUCTION

A mucocoele is defined as a sterile accumulation of mucous secretions into a paranasal sinus due to the obstruction of its ostium. The clinical manifestations of a mucocoele are usually benign [1,2] and can be localized to the sinus or involve the orbit. Common presenting symptoms are proptosis, diplopia, ocular displacement, frontal headache [3]. Bony changes like thinning and erosion of one or more of the involved sinus walls are frequent. In rare cases mucocoeles can have an intracranial extension [4]. A frontal mucocoele communicating with an arachnoid cyst of the anterior cranial fossa is reported. To our knowledge no similar cases have been presented in the literature.

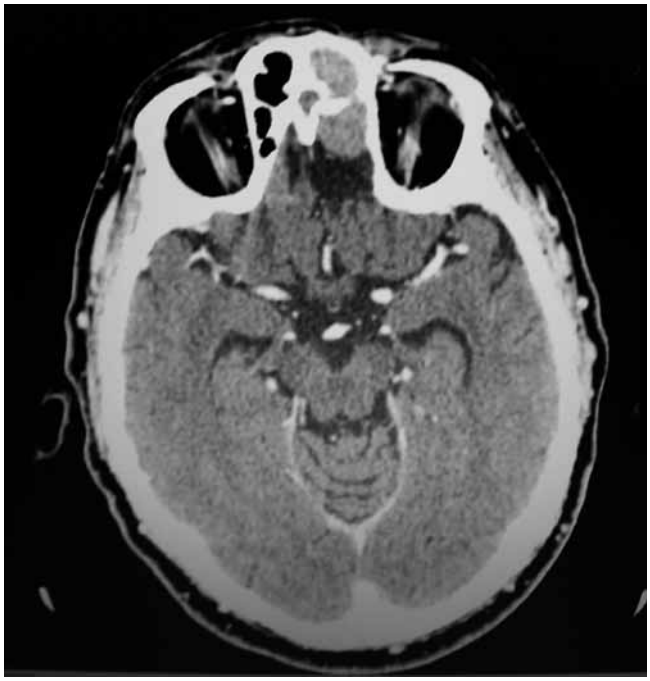

Figure 1. Preoperative CT scan showing the lesion. The erosion of the posterior wall of the left frontal sinus is visible.

CASE REPORT

A 61-year-old man was admitted to the otolaryngology service because of frontal headache, left ocular symptoms, including photophobia, increased tearing and conjunctival hyperemia. No focal neurological findings were noted on admission. The patient was under treatment for hypertension and hypercholesterolemia. No other significant features were found in his medical history.

A CT scan showed a homogeneous, slightly hyper-dense mass with a well-defined rim that occupied the whole left frontal sinus and extended to the floor of the left anterior cranial fossa through an interruption of the posterior wall of the sinus. The lesion did not show contrast enhancement. The diameter of its intracranial portion was 20 x 20 x 23 mm (Figure 1). A MRI showed a mass of fat-like intensity located on the floor of the left anterior cranial fossa, in continuity with the left frontal sinus; the mass didn't show signal modification after the injection of contrast medium (Figure 2).

A working diagnosis of left frontal sinus mucocoele with intracranial extension was formulated, and a surgical therapy was planned.

Under general anaesthesia, the patient underwent a trans-nasal endoscopic procedure (Draf 2B) [5-7]. After the opening of the left frontal sinus, initially viscous material leaked followed by clear fluid that seemed to be cerebrospinal fluid. When the frontal sinus was empty, a wide round-shaped hole was noted on the posterior wall of the sinus; a cavity within the brain was visible through the hole (Figure 3). The endoscopic approach was suspended, and the patient underwent a frontal osteoplasty. The surgical exploration showed that the dura mater was attached to the frontal bone, and no evidence of respiratory epithelium was visible in the intracranial residual cavity; the surrounding brain seemed to be separated from the cavity by a thin arachnoid-like membrane. Samples of frontal sinus and intracranial tissues were taken for histological examination.

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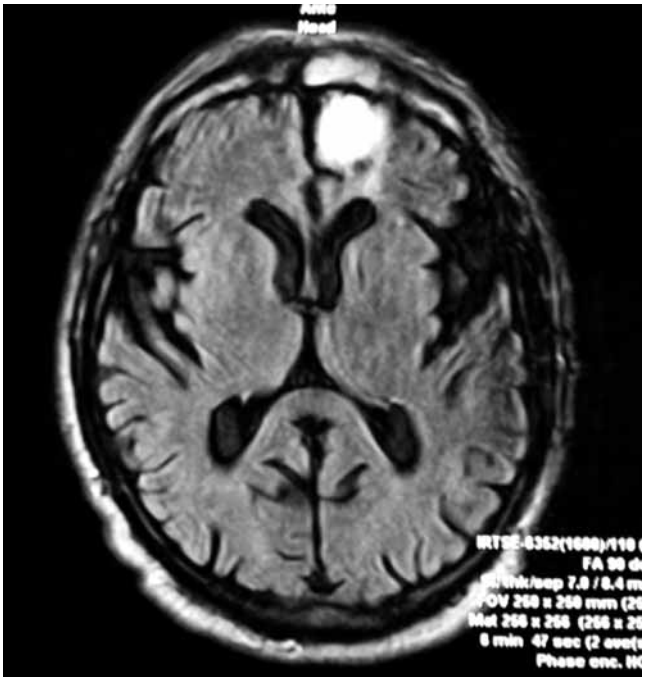

Figure 2. Preoperative MRI showing the mass occupying the floor of the left anterior cranial fossa and the frontal sinus.

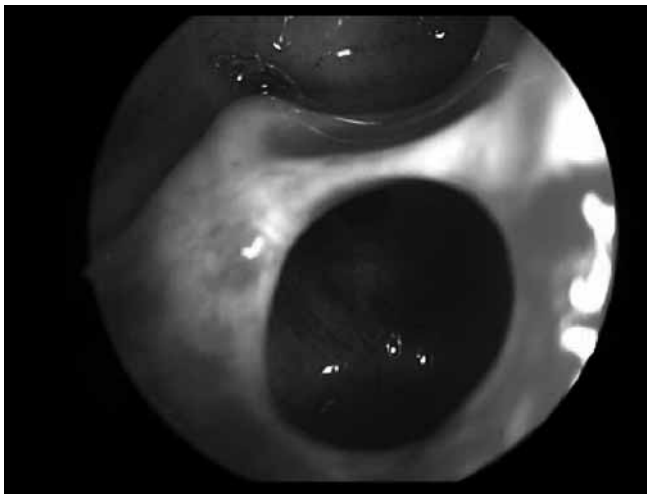

Figure 3. Intraoperative findings: the posterior wall of the left frontal sinus appears interrupted and the intracranial cavity is visible.

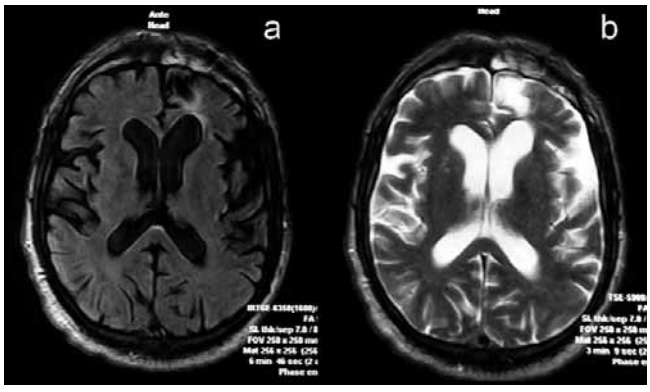

Figure 4. Postoperative T1 (a) and T2 (b) weighted MRI.

The intracranial cavity was separated from the frontal sinus with multilayer Tissodura patch, and the frontal sinus was obliterated with temporalis fascia and abdominal fat. The postoperative course was uneventful and the patient was discharged on the 4th postoperative day.

The histological results confirmed the presence of a respiratory epithelium covering the frontal sinus, and of an arachnoid-like membrane covering the intracranial cavity.

A MRI performed during the follow-up confirmed the presence of a cystic lesion on the floor of the anterior cranial fossa, referrable to the arachnoid cyst, the obliteration of the frontal sinus and a slight dilatation of the ventricular system (Figure 4). The patient is symptom-free after eight months of follow-up.

DISCUSSION

Mucocoeles are sterile accumulations of mucous secretions into an obstructed paranasal sinus. Obstruction can be due to inflammation, allergy, fibrosis, trauma, previous surgery, anatomical abnormality or osteoma [8-11]. The continued mucous secretion generates a pressure in the obstructed sinus that cause gradual thinning, distension and erosion of its walls [12].

Mucocoeles usually originate in the frontal sinus, and less often in the ethmoid or sphenoid sinus. Maxillary sinus mucocoeles are very rare [13]. Their behaviour is usually benign, and they occur with similar frequency in adults of both sexes [14]. Proptosis is the most common presenting sign of a frontal mucocoele; other signs and symptoms include a mass in the supero-medial quadrant of the orbit, ocular displacement, pain, diplopia, frontal headache and epiphora [3,15]. The computed tomographic appearance is usually that of a discrete, homogeneous, isodense mass often associated with bony changes [16]. Complications of frontal mucocoeles are erosion of the anterior or posterior wall, resulting respectively in a fluctuant subperiosteal anterior mass or an epidural abscess, meningitis, subdural abscess or brain abscess.

In the case the presenting symptoms were typical of a frontal mucocoele. CT and MRI showed a left frontal sinus mass extending to the anterior cranial fossa. The radiological features were typical of a mucocoele with intracranial extension. The intraoperative findings, supported by the histological response, made us believe that the intracranial cavity was an arachnoid cyst communicating with a mucocoele of the frontal sinus.

Arachnoid cysts are rare lesions of the cerebrospinal axis, accounting for only 1% of all intracranial space-occupying lesions [17]. They usually occur in the middle cranial fossa, but they can develop at any site where the arachnoid membrane is located. Like mucocoeles, arachnoid cysts are benign, expansive, space occupying masses. They may produce symptoms and signs either from direct pressure on neurovascular structures or from a general increase in intracranial pressure, depending on the location of the cyst [18]. Suggested mechanisms of origin of arachnoid cysts include primary cerebral

agenesis, subarachnoid haemorrhage, congenital sequestration, trauma, and inflammation [17-19].

Our case is of particular interest since the patient didn't experience meningitis or any other infectious central nervous system complication, seizures or any other focal neurological symptoms, that are the most common presenting symptoms of arachnoid cysts. The absence of infectious complications can be explained by the sterility of mucous material forming the mucocoeles.

Probably mucocoeles and arachnoid cyst were two independent lesions separated by the posterior wall of the left frontal sinus, and progressive erosion of that wall connected them.

Even though arachnoid cysts of inflammatory origin are usually symptomatic, while our patient did not complain of any focal neurological symptoms, we can't exclude the possibility that an inflammatory process led to the formation of this arachnoid cyst. We could postulate that the mucocoele originated from an inflammatory obstruction of the frontal duct, and that the same inflammatory process, through an osteitis, led to the formation of the arachnoid cyst.

Postoperative radiological findings confirmed the good result of the surgical procedure since the intracranial lesion had the intensity of an arachnoid cyst, meaning that its content was cerebrospinal fluid without proteins usually contained in the mucous material forming the mucocoeles. Therefore the closure of the transcranial defect was effective.

To the best of our knowledge, no similar cases have been reported in the literature.

CONCLUSIONS

The case presented appears to be the first frontal mucocoeles communicating with an arachnoid cyst of the anterior cranial fossa. Presenting symptoms and radiological findings were typical of a mucocoele with intracranial extension. The diagnosis of a mucocoele communicating with an arachnoid cyst was made intraoperatively. The operation, started with an endoscopic approach, was converted to an external frontal osteoplastic flap to obtain a wide exposure of the posterior wall of the left frontal sinus. The treatment was successful.

REFERENCES

1. Nakayama T, Mori K, Maeda M. Giant pyocele in the anterior intracranial fossa – Case report. Neurol Med Chir (Tokyo) 1998; 38: 499-502.
2. Stankiewicz JA, Newell DJ, Park AH. Complications of inflammatory diseases of the sinuses. Otolaryngol Clin North Am 1993; 26: 639-655.
3. Lund VJ, Rolfe ME. Ophthalmic considerations in fronto-ethmoidal mucocoeles. J Laryngol Otol 1989; 103: 667-669.
4. Peral Cagigal B, Barrientos Lezcano J, Floriano Blanco R, Garcia Cantera JM, Sanchez Cuellar MA, Verrier Hernandez A. Frontal sinus mucocoeles with intracranial and intraorbital extention. Med Oral Patol Oral Cir Bucal 2006. 1; 11: E527-30.
5. Draf W. Endonasal micro-endoscopic frontal sinus surgery: the Fulda concept. Op Tech Otolaryngol Head Neck Surg 1992; 2: 234-240.
6. Eviatar E, Katzenell U, Segal S, et al. The endoscopic Draf II frontal sinusotomy: non-navigated approach. Rhinology 2006; 44: 108-113.
7. Bockmuhl U, Kratzsch B, Benda K, Draf W. Surgery for paranasal sinus mucocoeles: efficacy of endonasal micro-endoscopic management and long-term results of 185 patients. Rhinology 2006; 44: 62-67.
8. Lunardi P, Missori P, Di Lorenzo N, Fortuna A. Giant intracranial mucocoeles secondary to osteoma of the frontal sinuses: report of two cases and review of the literature. Surg Neurol 1993; 39: 46-48.
9. Nakajima Y, Yoshimine T, Ogawa M, et al. A giant intracranial mucocoeles associated with an orbitoethmoidal osteoma. Case Report. J Neurosurg 2000; 92: 697-701.
10. Lund VJ. Endoscopic management of paranasal sinus mucocoeles. J Laryngol Otol 1998; 112: 36-40.
11. Lund VJ. Anatomical considerations in the aetiology of fronto-ethmoidal mucocoeless. Rhinology 1987; 25: 83-88.
12. Hashim AS, Asakura T, Awa H, Yamashita K, Takasaki K, Yuhi F. Giant mucocoeles of paranasal sinuses. Surg Neurol 1985; 23: 69-74.
13. Iannetti G, Cascone P, Valentini V, Agrillo A. Paranasal sinus mucocoeles: diagnosis and treatment. J Craniofac Surg 1997; 8: 391-398.
14. Iqbal J, Kanaan I, Ahmed M, Al Homsi M. Neurological aspects of sphenoid sinus mucocoeles. Br J Neurosurg 1998; 12: 527-530.
15. Avery G, Tang RA, Close LG. Ophthalmic manifestations of mucocoeless. Ann Ophthalmol 1983; 15: 734-737.
16. Perugini S, Pasquini U, Menichelli F, Salvolini U, de Nicola M, Valazzi CM. Mucocoeless in the paranasal sinuses involving the orbit: CT signs in 43 cases. Neuroradiology 1982; 23: 133-139.
17. Hadley MN, Grahm TW, Daspit CP, Spetzler RF. Otolaryngologic manifestations of posterior fossa arachnoid cysts. Laryngoscope 1985; 95: 678-671.
18. Pappas DG, Brackmann DE. Arachnoid cysts of the posterior fossa. Otolaryngol Head Neck Surg 1981; 89: 328-332.
19. Rengachary SS, Watanabe I, Brackett CE. Pathogenesis of intracranial arachnoid cysts. Surg Neurol 1978; 9: 139-144.

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