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CASE REPORT

Endoscopic endonasal resection of a nasal meningoencephalocele - Case report

Vlad Budu[1,2], Tatiana Decuseara[1], Andreea Nicoleta Costache[1], Loredana Ghiuzan[1], Monica Hodor[3], Gabriel Dascalu[3], Mihai Tusaliu[1,2], Ioan Bulescu[4]

[1]"Prof. Dr. D. Hociota" Institute of Phono-Audiology and Functional ENT Surgery, Bucharest, Romania
[2]Faculty of Medicine, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania
[3]Floreasca Emergency Clinical Hospital, Bucharest, Romania
[4]Department of Morphological Sciences, Discipline of Anatomy, "Carol Davila" University for Medicine and Pharmacy, Bucharest, Romania

ABSTRACT

Nasal meningoencephaloceles are rare findings, represented by protrusions of intracranial contents into the nasal cavity. They present as unilateral masses, and commonly determine unilateral nasal obstruction, rhinorrhea and non-characteristic headaches.

We present the case of a 34-year-old patient diagnosed with a posttraumatic transethmoidal meningoencephalocele. The patient presented with unilateral nasal obstruction, mild headache and episodic watery rhinorrhea. The treatment was endoscopic endonasal surgical excision and repair of the skull base defect, in a mixt ENT-neurosurgical team. Patient follow-up showed no remaining mass or symptoms and normal closure of the skull base defect.

KEYWORDS: nasal meningoencephaloceles, nasal endoscopy, nasal obstruction, rhinorrhea.

INTRODUCTION

Nasal meningoencephaloceles (MEC) are rare intranasal masses, which are characterized by protrusions of intracranial contents into the nasal cavity[1-3]. The main forms of MEC are congenital and posttraumatic, but other forms, like spontaneous or iatrogenic, have been described in literature[4-7]. Related to their location, nasal MEC can be divided into basal and frontoethmoidal types, while the basal type can be furthermore classified into transethmoidal, sphenoethmoidal, transsphenoidal and frontosphenoidal[2-4]. Clinical presentation of nasal MEC can vary due to their size and location. In many cases, common symptoms are nasal obstruction, headaches and CSF leaks. In some cases, recurrent meningitis and some neurological symptoms have been reported, but this is not the usual presentation[4,7].

Diagnosis of MEC can be made through imaging studies, nasal endoscopy and biochemistry of nasal discharge, when discharge is a symptom[5]. Imaging studies like CT and MRI are both important in the diagnosis of this pathology. CT can be used in the preoperative stage in order to review the surgical area, while MRI should be used for evaluation of the contents in the sac and other neural abnormalities[8-11].

Surgical treatment is the only choice for MEC and, depending on the size and location, it can be done through different approaches, such as lateral rhinotomy, bicoronal flap, or intranasal techniques[8,11]. Recent advancement of endoscopic endonasal techniques has made this type of surgery more frequently used, and it has been successful in many cases of nasal MEC[12,13].

Corresponding author: Vlad Budu, "Prof. Dr. D. Hociota" Institute of Phono-Audiology and Functional ENT Surgery, 21 Mihail Cioranu Street, District 5, 061344, Bucharest, Romania
e-mail: vladbudu@yahoo.com
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A 34-year-old male presented in our clinic complaining of mild headache, repetitive episodes of watery rhinorrhea and unilateral right nasal obstruction. Case history revealed that the patient suffered a cranial trauma as a result of a car accident 15 years before presentation. Trauma determined a fracture of the nasal pyramid without displacement, epistaxis and temporary loss of conscience. No permanent damage of the nose or skull base was identified at the time of the accident, and the patient had no physical complaints until a couple of months before presentation.

Endoscopic examination of the nasal cavity using a rigid 0 and 70 degrees telescope showed a polyp-like round mass in the middle and superior parts of the right nasal fossa. The mass was at first visible between the middle turbinate and the nasal septum (Figure 1), but further examination revealed that it extended superiorly to the skull base (Figure 2).

Imaging studies, both CT and MRI were performed, and they revealed a right unilateral mass extending through the anterior skull-base, and a bony defect of approximately 1 cm (Figures 3, 4).

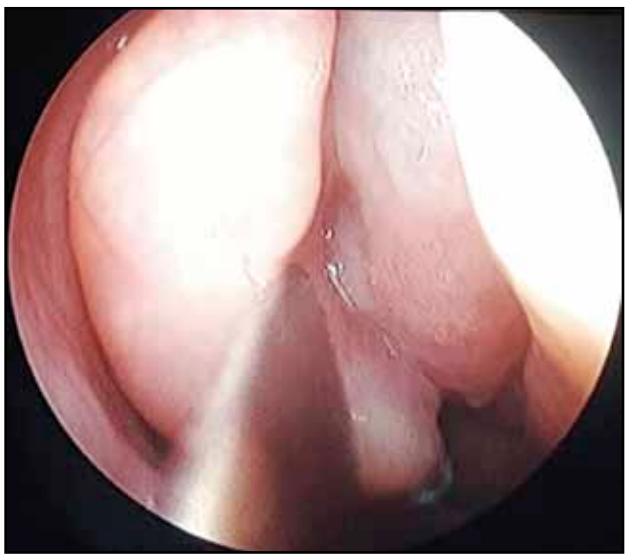

Figure 1 Endoscopic view of the right nasal fossa, showing the MEC between the middle turbinate and the nasal septum (0 degrees rigid telescope).

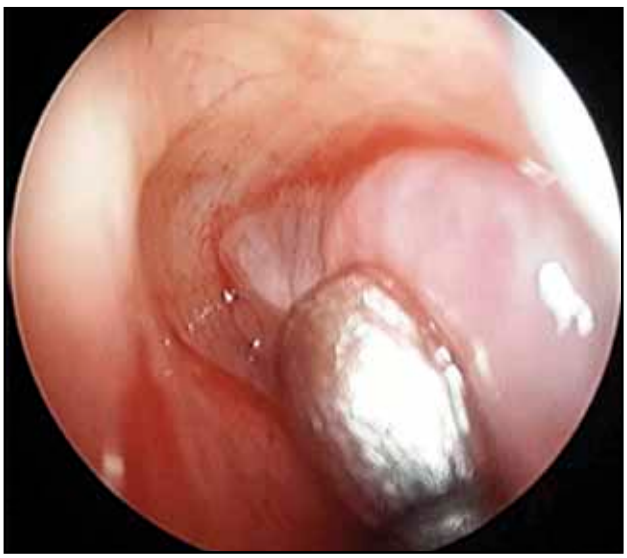

Figure 2 Endoscopic view of the right nasal fossa, showing the origin of the MEC and the skull base (70 degrees rigid telescope).

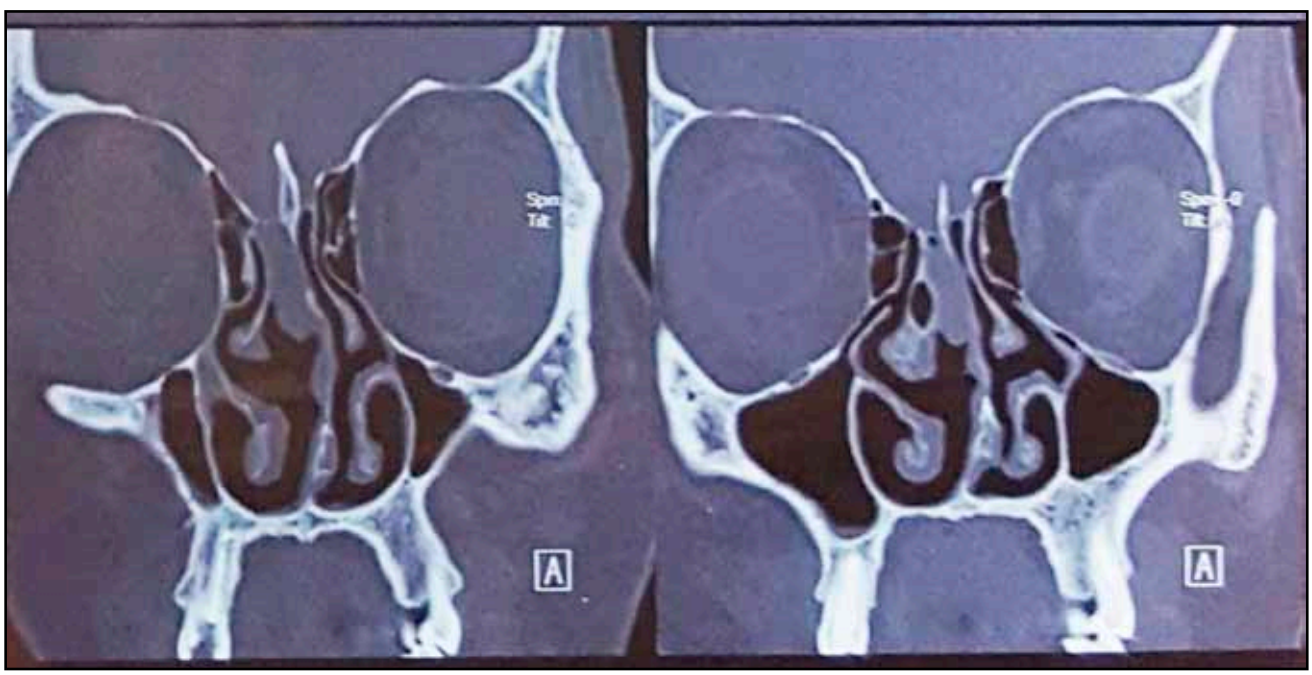

Figure 3 Preoperative cranio-facial CT scan, coronal view, showing the mass protruding through the skull base, between the septum and right middle turbinate.

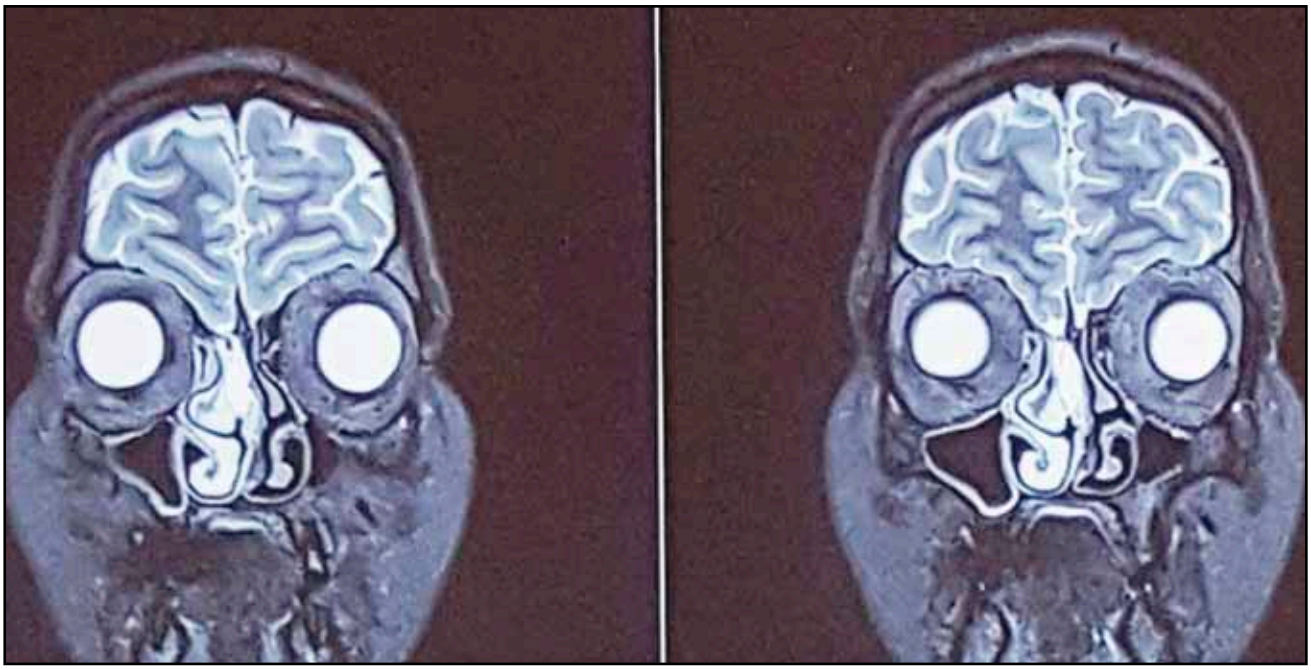

Figure 4 Preoperative head MRI exam - right meningoencephalocele.

The treatment comprised of an endoscopic endonasal resection of the tumor and closure of the skull-base defect. The tumor was resected *en-block* under direct endoscopic visualization, using bipolar coagulation of its origin (Figure 5, 6). Even though there was no CSF leak after the complete removal of the tumor, the skull base defect was closed using a three-layer on-lay technique. A 24 h nasal package was considered necessary, and there was no postoperative bleeding or CSF leak. The patient received intra- and postoperative IV antibiotics and a lumbar drainage was set in place for 24 h. The 7-day postoperative follow-up revealed no persistent symptoms, with no headache or nasal obstruction. The head MRI performed at 6 months after surgery showed a sealed skull-base defect, with no CSF leak and no dural or neural protrusion.

DISCUSSIONS

MEC are rare and discovered most frequently in children, even though their etiology is still poorly understood. It is considered that the most common type of encephaloceles is the congenital type, defined by a

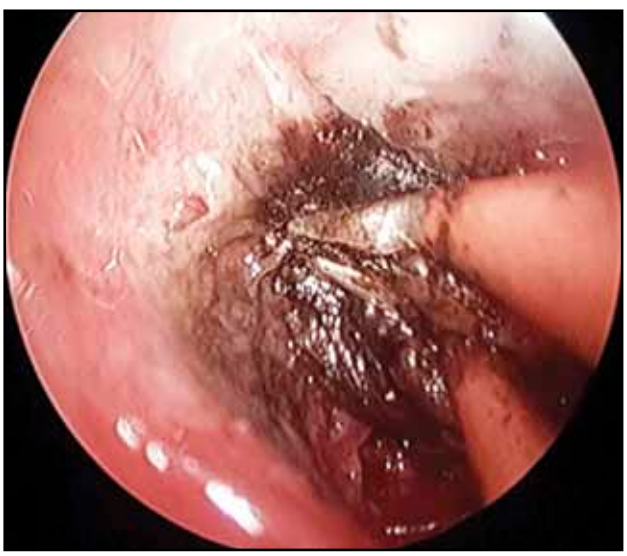

Figure 5 Intraoperative endoscopic view showing bipolar coagulation of the tumor insertion at the skull base (70 degrees telescope).

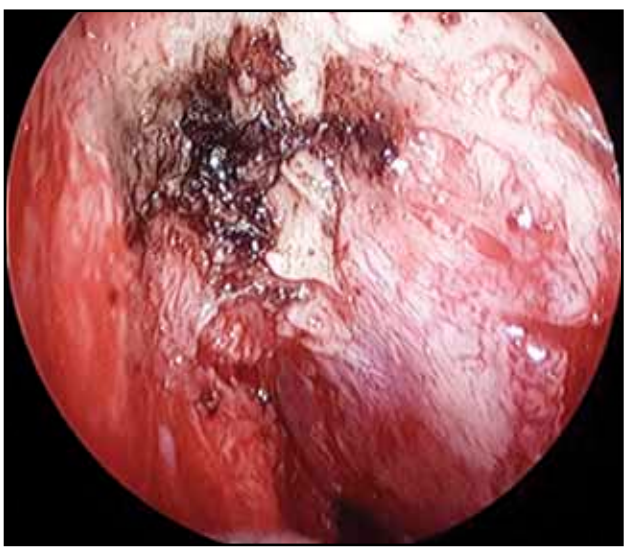

Figure 6 Intraoperative endoscopic view showing the origin of the tumor at the skull base, after complete resection (70 degrees telescope).

combination of genetic and environmental factors[8]. Other types of MEC, due to their etiology, are posttraumatic, iatrogenic and spontaneous. In our case, patient history revealed a prior cranial and nasal trauma suffered in a car accident, so we considered that it was a posttraumatic type of MEC.

Common classification of encephaloceles in relation to their situation is comprised of four major types: frontoethmoidal, basal, occipital and of the cranial vault[8,14,15]. The first two are considered anterior encephaloceles and can present as masses in the nasofrontal region and in the nasal cavity, or both. The area of bone defect represents the difference between frontoethmoidal and basal encephaloceles. Whilst frontoethmoidal MEC develop like herniations at the level of the forehead, nose, or orbit, basal MEC present as masses posterior or through the cribriform plate. In our case, the tumor extended through the cribriform plate and it was visible only in the nasal fossa. Due to this position we classified it as a transethmoidal MEC[12].

Diagnosis of MEC can be difficult at first due to non-specific symptoms. The symptoms vary in relation to the situation of the tumor and extend from runny nose, headache, nasal obstruction and snoring to more severe ones like endocrine dysfunction and disruption in the optic pathway (usually in transsphenoidal herniation)[16,17]. Endoscopic examinations of the nasal cavity as well as imaging studies are of clear importance in the diagnosis of MEC. Endoscopy is a valuable instrument in the diagnosis process since it can provide information about the general appearance, size, shape, eventual presence of pulsation and origin of the tumor, while also giving a general perspective of the operatory field, when surgical approach is considered. Imaging studies are used for visualization of the mass and contents, assessing other defects of the skull base or facial skeleton, as well as other brain or neural lesions. Some authors consider that a preoperative angiography or angio-magnetic resonance could be used to evaluate the presence of an eventual vascular structure inside the tumor[8,18]. In the case presented by us, we used both CT and MRI examinations in order to better visualize the extent of the bony skull base defect and the contents of the tumor.

Surgery is considered the only treatment option for these tumors. Several types of surgical approaches can be used, depending on the size and especially the location. Classic approaches, such as lateral rhinotomy or bicoronal flap, can be used for frontoethmoidal or very large basal types of MEC. More modern endoscopic endonasal surgical techniques are used in cases were the tumor size and the skull base defects are manageable. These techniques have been very successful in many cases[8,12,13]. In the case presented by us, the tumor was resected en-block using an endoscopic endonasal approach, in a mixed ENT-neurosurgical operating team. This was possible due to the fact that the size of the bony defect was manageable and the complete endoscopic visualization of the tumor was possible. There was no CSF leak during surgery because the small dural defect was sealed by bipolar electrocautery. The bony defect was closed using a three-layer on-lay technique with a superior turbinate graft and conchal mucosa. No CSF leak was present in the postoperative stage. Literature shows a high success rate and no mortality or morbidity for the endoscopic approach in selected cases.

Postoperative follow-up is mandatory in these cases, since a couple of complications are possible, such as CSF leak and infection. Other types of complications such as neurological lesions or recurrent meningitis are possible, but less likely. We did not see any of the cited complications in our cases, and the follow-ups showed a significant increase in the patient's quality of life.

CONCLUSIONS

Even though MEC are rare encounters in clinical practice, they should always be considered as a possibility when discovering a unilateral polyp-like or pulsating mass, associating watery rhinorrhea and headache. CT and MRI should always be performed for better visualization of the tumor and bony defects. In some cases, an angiography could be a useful instrument. Inter-specialty cooperation between ENT, neurosurgery and imaging specialist should be considered in these cases, in order to ensure the best treatment outcome. Surgical techniques should be adapted for each case, according to the size and location, considering tumor resection and bony defect closure as one-stage surgery. Bipolar electrocautery is the adequate surgical technique for sealing small dural defects, without any CSF leak.

Conflict of interest: The authors have no conflict of interest.

Contribution of authors: All authors have equally contributed to this work.

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