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Original Research Article

Fronto-Ethmoidal Osteoma with Orbital Extension: Which Approach?

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Abstract: Paranasal sinus osteoma is a rare benign tumor that evolves slowly and can be responsible for ophthalmologic, sinus and endocranial complications. Its treatment, when it is necessary, is only surgical. We report two cases of fronto-ethmoidal osteoma with orbital extension operated in our department, using a para-latero-nasal approach with supra-superciliary extension. Through these cases and in the light of the literature, we will discuss the interest of this approach in the management of ethmoidal fronto-orbital osteomas. Also, we will underline the advantages and inconveniences of other approaches.

Keywords: Fronto-ethmoidal osteoma, orbital extension, para-latero-nasal approach, supra-superciliary.

INTRODUCTION

Paranasal sinus osteoma is a rare benign tumor that evolves slowly and can be responsible for ophthalmologic, sinus and endocranial complications. Its treatment, when it is necessary, is only surgical [1, 2].

We report two cases of fronto-ethmoidal osteoma with orbital extension, operated on in our maxillofacial surgery department in Rabat. The approach was para-lateronasal with extension to the supraorbital region, which allowed us a good exposure of the mass.

MATERIALS AND METHODS

We report two cases of fronto-ethmoidal osteoma with orbital extension, operated in our maxillofacial surgery department. Both patients were men, without any particular history. The first one was 41 years old with an exophthalmos of the left eye (Fig 1). The second patient was 38 years old and had an exophthalmos of the right eye (Fig 5).

Clinically, both patients had no limitation of eye movements or diplopia. Endo buccal and rhino-logical examinations were normal.

The radiological exams performed for both patients, including a CT scan of the facial mass and a cerebral MRI, showed a left ethmoidal nasal osteoma extending into the anterior cerebral fossa and the orbital cavity for the first patient. The radiological assessment of the second patient showed a right fronto-ethmoidal osteoma protruding into the homolateral orbit, responsible of a grade II exophthalmos.

RESULTS

For the surgical management of the 2 patients, we opted for a total enucleation of the osteoma by para-latero-nasal approach with supra-superciliary extension.

A fronto-naso-orbital bone flap was performed, which allowed us to demonstrate the osteoma and its total resection by morcellation, using the ball burr (Fig 3 & 7). The flap was then put back in its place with a microplate, fixed by 5mm micro screws, with the realization of a trans-nasal canthopexy, after verification of the permeability of the lacrimal tract.

The postoperative follow ups were simple. One year after surgery, no signs of recurrence were detected for both patients (Fig 2 & 6).

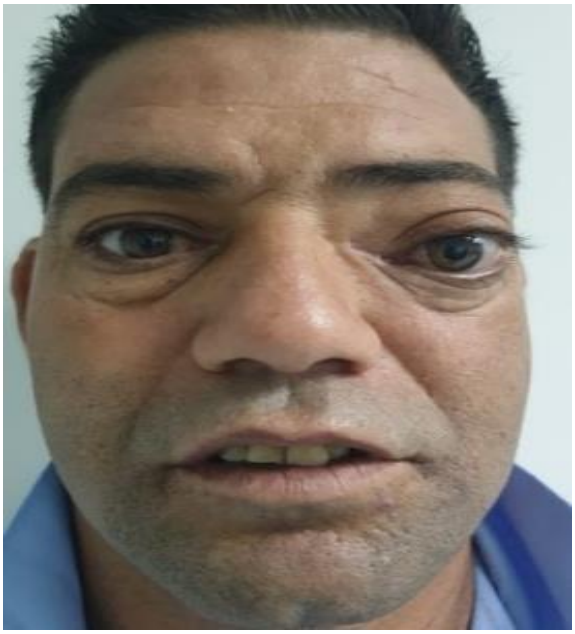

Fig 1: Before the surgery

Fig 2: After the surgery

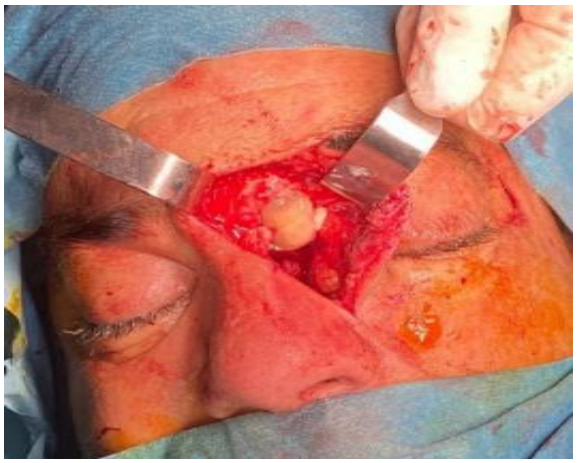

Fig 3: During the surgery

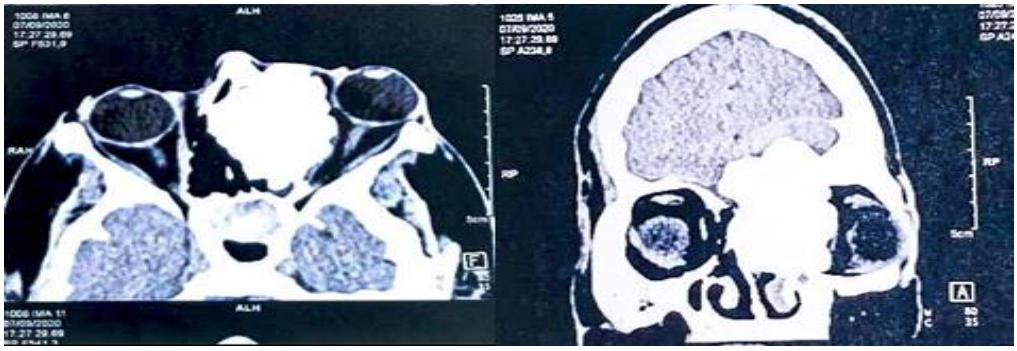

Fig 4: Facial CT scan (coronal and axial sections) showing the left fronto-ethmoïdal orbital osteoma of our first patient

Fig 5: Before the surgery

Fig 6: After the surgery

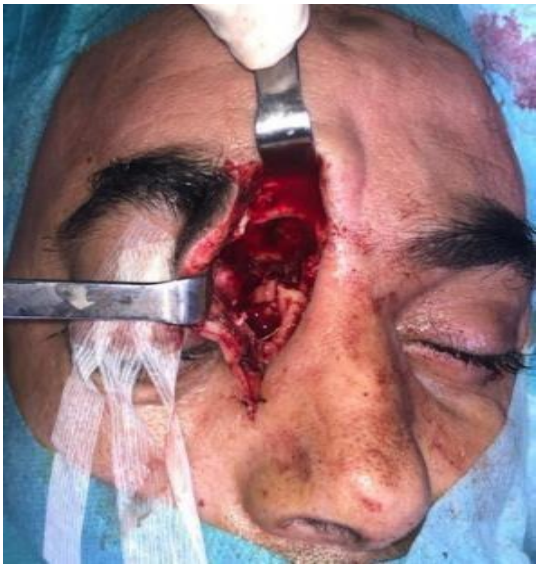

Fig 7: During the surgery

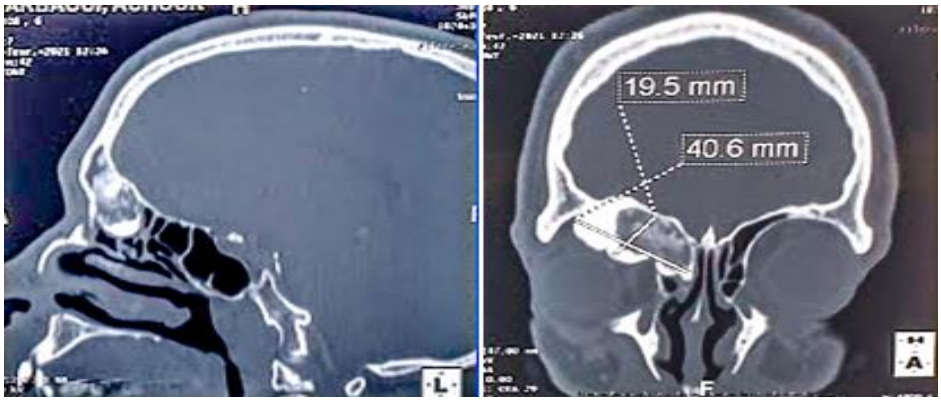

Fig 8: Facial CT scan (coronal and sagittal sections) showing, the right fronto-ethmoïdal osteoma protruding into the homolateral orbit of our second patient

DISCUSSION

Nasosinus osteoma is a benign bone tumor, slowly evolving, located in the frontal (50% of cases), ethmoidal (40% of cases) or maxillary (5-10% of cases) sinuses. Localization in the sphenoidal sinuses is exceptional (1.2% of cases) [2]. From these sinuses, the osteoma may extend into the orbital cavity. However, orbital extension of these osteomas is rare: it represents between 0.4 and 5 % of all orbital tumors and 0.6-2.5% of the causes of tumor exophthalmos [3].

The tumor usually occurs before age 50 years, and it is more common in men than in women [2], which is consistent with our findings.

Because osteoma is asymptomatic for a long time, the discovery of the tumor is most often made by chance during a radiological examination.

Symptomatology most often begins with atypical frontal headache [2, 4]. The other clinical signs are variable depending on the sinus site of origin of the tumor, variously associating ophthalmologic, rhino-logic, or cerebral signs [1, 4].

Frontal sinus or fronto-orbital osteoma can sometimes be palpated as a hard, painless mass located in the upper part of the medial canthus. In case of orbital extension, ophthalmologic signs are dominated by irreducible, painless exophthalmos with downward, forward, and outward displacement of the eyeball, associated with diplopia with limitation of eye movements, decreased visual acuity and/or dacryocystitis [4].

The posterior ethmoidal and sphenoidal locations may develop towards the optic canal with compression of the optic nerve, causing amaurosis, optic atrophy and papilledema [2].

Osteoma of the maxillary sinus presents as a jugal or palatal swelling, which may secondarily invade the floor of the orbit or reveal itself as an exophthalmos. The rhino-logical signs observed are nasal obstruction in cases of ethmoidal or ethmoido-maxillary osteoma, or in connection with sinus retention phenomena in cases of involvement of the nasofrontal canal [2].

The positive diagnosis is based on the radiological assessment. Blondeau's radiograph is always useful in the first instance. It allows to guide the diagnosis in front of a very dense, homogeneous, well limited, round or polycyclic calcic opacity and occupying entirely or partially the lumen of the fronto-ethmoidal or maxillary sinuses.

The CT scan of the facial mass, performed in axial and coronal sections, has the advantage of establishing the diagnosis by specifying the exact location, dimensions, state of the sinus walls, and the relationship with the meningeal and optic structures, thus allowing the choice of the surgical approach.

MRI complements but does not replace CT examination, but is useful for the assessment of posterior intracranial extension in sphenoidal osteomas [1].

Histological diagnosis is not a problem, and three types have been described according to their spongy, compact or mixed composition.

The curative treatment of a nasosinus osteoma can only be surgical. It has two objectives: total removal of the tumor and its pedicle to avoid recurrence and avoid aesthetic and functional damage by reconstruction of the bone walls [5].

The indication for surgery depends on the size of the osteoma, its local evolution, the symptomatology and the presence of complications, particularly of the orbit and brain. Abstention surgical removal is recommended for small asymptomatic osteomas, subject to regular clinical and especially radiological monitoring [3, 5]. However, an exception should be made for small osteomas of the infundibulum located near the frontal sinus ostium, because of the early complications to which they are exposed [4].

The approach will depend on the location and extension of the tumor, and should result in the least possible aesthetic damage.

The tansfacial approach was chosen in all our patients. It was performed through a fronto-orbital incision, possibly extended to the para-lateronasal region. It allows access to the orbital, anterior and posterior ethmoidal regions and is therefore indicated in osteomas with orbital extension [2].

A bi-coronal Lairns-Unterberger approach with a frontal flap can also be used, mainly for aesthetic purposes, as it is concealed in the scalp. It allows exposure ofthe frontal sinus, the anterior ethmoid and the orbit [2]. It is necessary for large complicated frontal sinus osteomas [5].

Endocranial and mixed craniofacial neurosurgical approaches will be reserved for osteomas with intracranial extension (posterior wall, roof of the ethmoid) and for large osteomas with posterior extension.

Finally, sphenoidal osteomas can be approached via the trans-temporal approach. Several excision techniques can be used [2]: en bloc excision, tumor fragmentation, controlled wear with a burr from the periphery to the center, or hollowing out the central part with a burr followed by extraction of the external shell. In all cases, the anterior flap must be preserved and will be put back in place at the end of the procedure.

In the case of an osteoma deforming the fronto-orbito-nasal region, reconstruction of the superior- internal wall of the orbit may eventually involve an iliac graft [3].

Postoperative monitoring must be regular and rigorous, based on clinical and CT scans. It allows the detection of infectious complications, but especially recurrences [6].

CONCLUSIONS

Sinus osteomas are benign tumors that can be responsible for ophthalmologic, sinus and endocranial complications. The diagnosis should be made in the presence of any tumor exophthalmos of progressive onset. The positive diagnosis is based on the radiological assessment and treatment when it is necessary is surgical. The prognosis of these tumors is good when properly managed.

Conflicts of Interest: The authors declare no competing interest.

Authors' contributions: All the authors participated in the treatment of this patient and in the redaction of this article.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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