Giant middle turbinate osteoma diagnosis and management

Abstract

We present a patient with intractable frontal headache and intranasal polyposis, who was found to have a massive, complex osteoma arising within a concha bullosa. A 22 year old male presented with nasal obstruction, frontal headache, diplopia and imbalance. His symptoms were severe and poorly responsive to medical management and CT imaging revealed a large osteoma (59 x 33 x 32 mm), arising within a pneumatised middle turbinate and extending into the nasopharynx. The patient underwent urgent image-guided modified endoscopic Lothrop’s procedure which facilitated complete excision of the osteoma. To date only 8 previous cases of middle turbinate osteomalacia have been described. The presented case described the first experience of endoscopic excision with a Lothrop’s approach.

Keywords

Osteoma, paranasal sinuses, endoscopic sinus surgery, modified endoscopic Lothrop procedure, concha bullosa.

Introduction

Sino-nasal osteomas are the commonest benign tumours of the paranasal sinuses with an approximate true incidence rate between 0.014% and 3%.1-9 Osteoma are slow growing benign bony tumours that arise within the paranasal sinuses and can cause symptoms of sinusitis and obstructive complications. However, many are asymptomatic and are found incidentally on imaging for chronic rhinosinusitis.10-11 Those tend to be smaller in size, and not yet obstructive. Osteoma arising within a pneumatised middle turbinate is an extremely rare occurrence, with only eight cases previously reported in the world literature.1, 12-18 Historically, X-ray of the paranasal sinuses was the preferred imaging modality and open surgery was frequently required for symptomatic patients, often via lateral rhinotomy or mid-facial degloving procedures.19,20 Reports of osteoma arising within the middle turbinate emerged in the 1980s.12 The induction of endoscopic sinus surgery since the early 1990s has played an important role in management of sino nasal osteoma, further aided by recent advances in computerised tomography (CT) imaging with tri-planer reconstruction and magnetic resonance imaging (MRI).1,12,22 Operative intervention is indicated for symptomatic osteomas, large osteoma or those with evidence of compression of adjacent structures causing visual or vascular symptoms.23,24 The surgical approach adopted is largely dictated by tumour location, size and extension, taking into account the experience of the surgeon.5 Strek et al described the various modalities of surgical treatment of sino nasal osteoma in a series of seventeen cases.25 His paper reported excellent outcomes after endoscopic, open and combined approaches and recommended an endoscopic approach for small to mid-sized osteomas but favoured an open or combined approach for larger tumours.25

Case Report

A 22 year old male presented to accident and emergency with severe, progressive frontal and bi-temporal headache for three weeks. He had previously experienced rhinorrhoea and nasal obstruction for 12 months, with symptoms refractory to intra-nasal steroid sprays and systemic analgesics. Fibre-optic nasoendoscopy revealed polypoid swelling within the right nasal cavity, with associated mucopus and deviation of the nasal septum to
the left. CT imaging revealed a huge osteoma arising within a right sided concha bullosa (Figure 1). It measured 59 x 33 x 32mm and was seen to extend to the anterior skull base and into the sphenoid sinus and post nasal space, with left lateral displacement of the nasal septum and bowing of the ipsilateral lamina papyracea with mass effect on the right medial rectus muscle and optic nerve (Figure 2). There was associated complete opacification of the right frontal sinus, ethmoid air cells, and sphenoethmoidal recess bilaterally. No aggressive features were noted and the bowing and remodelling of the lamina suggested chronicity. MRI imaging excluded intracranial extension but demonstrated mass effect on the right orbital contents (Figures 3, 4).

Treatment with intravenous antibiotics, topical nasal decongestants and systemic corticosteroids failed to improve his symptoms and the headache rapidly deteriorated over 48 hours, requiring opiate analgesia. Furthermore, he developed diplopia and ophthalmodynia, but without peri-orbital cellulitis or proptosis. The failure of medical management in the acute setting necessitated an alternative approach to management. Due to the size of the osteoma both endoscopic and external approaches were options, but on balance the endoscopic approach was selected following discussion with the patient.

**Surgical procedure**

The nose was decongested with topical 1:1000 adrenaline. Using a 4mm 0° Storz endoscope the osteoma was identified within a right concha bullosa (Figure 5). A mucoperichondrial flap was raised over the superior septum and reflected posteriorly. The right middle turbinate was excised to the level of the first olfactory neuron and a superior septal window was created. The osteoma was approached both from inferiorly, within the right nasal cavity, and superiorly from the left nasal cavity through the septal window. Due to the size of the osteoma it was removed in three pieces, using a drill. Uncincetomy and middle meatal antrostomy facilitated access to the superior portion of the osteoma. The remaining superior part was then carefully dissected away from the anterior skull base, adjacent to the ethmoidal artery, and there was no evidence of an intra-operative CSF leak. The superior portion of the osteoma was significantly larger than the previous pieces and removal through the post nasal space and into the oropharynx was considered however, it was deemed too large for this route, meaning removal via the right nostril was undertaken. Unfortunately, this was complicated by traumatic tearing of the right alar rim and collumellar skin due to the massive size of the fragment, which were repaired with 6-0 vicryl sutures, and it was a learning point in the case as its importance in patient’s consent.

Histopathological examination revealed respiratory mucosa with submucosal proliferation of dense, mature lamellar bone, in keeping with the clinical diagnosis of osteoma. The patient had smooth postoperative recovery with complete resolution of the headache and was discharged five days later. Later ophthalmology assessment post op revealed normal vision with no sign of optic nerve compression.

**Discussion**

Whilst the majority of sinonasal osteomas are asymptomatic and discovered incidentally on imaging, the case presented herewith demonstrates the potential for this condition to cause rapidly progressive symptoms, once a critical size is reached, associated with potentially serious complications within the orbit. In such cases, urgent surgical management may be required.
Osteomas mostly occur in the nasal sinuses. The frontal sinus is the most frequent location for sinonasal osteoma formation, followed by the ethmoid sinuses, maxillary sinus, and sphenoid sinuses, and, very rarely in the nasal cavity in 0.6% of cases. Sinonasal osteoma arising within a pneumatised middle turbinate is extremely rare. In the current literature; only eight cases were reported to occur in the middle turbinate. Fewer cases are reported regarding superior and inferior turbinate’s osteomas. The case described herein represents the largest reported middle turbinate osteoma. It is also the first middle turbinate osteoma to be entirely excised endoscopically, and the only known case of endoscopic excision with a modified endoscopic Lothrop approach.

Whilst planning surgical intervention, the size of the osteoma was specifically considered. Because given the huge dimensions of the mass, endoscopic access could have been problematic. Hence the decision to remove the mass piecemeal and utilising a Draf III approach. Pre-operative imaging showed the osteoma abutting the anterior skull base, thereby alerting the surgeon to the risk of excessive manipulation of the mass which could have resulted in skull base injury and subsequent CSF leak or injury to the anterior ethmoidal artery. Therefore, a drill was selected to carefully divide the lesion into three pieces which safely facilitated complete extirpation. Conversion to a combined approach could have been considered, as is well described in the literature, in the event of failure of a total endoscopic approach.

A key learning point from this case is to consider the potential requirement for an alar releasing incision to facilitate removal, which should be discussed with the patient pre-operatively.

**Conflicts of interest**

None declared

**Summary**

- The case reported herewith represents the largest known concha bullosa osteoma.
- It is the first to be removed entirely endoscopically. It is also the first removed via a modified endoscopic Lothrop approach.
- This very challenging case highlights the importance of thorough interrogation of pre-operative clinical assessment, imaging and careful planning of the surgical procedure.
- Particular consideration would be given to means of gaining access to the mass and modes of safe removal, such a piecemeal excision.
- The approach and surgical principles highlighted by this case can similarly be applied when considering endoscopic excision of other very large sino-nasal osteomas.
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References