CASE REPORT
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A Combined Endoscopic Endonasal and Transoral Approach for Intraosseous Hemangioma or Other Anterior Benign Tumors of the Maxilla

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ABSTRACT

Intraosseous hemangiomas, also called primary intraosseous vascular anomalies, are rare benign vascular abnormalities characterized by severe expansion of blood vessels inside the bone.[1] They are generally found in the vertebral column and craniofacial bones. They are extremely rare in the maxilla but more common in the mandible, zygoma, and orbital region. They generally manifest with painless enlargement of the bones and local symptoms specific to the area.[1] Indications for endoscopic sinus surgery are constantly expanding.[2,3] Here, a minimally invasive combined endoscopic endonasal and transoral surgical management of a maxillary intraosseous hemangioma is described. To the authors' knowledge, this is the first report of such a combined procedure for an antero-inferior lesion of the maxilla.

Keywords: Benign tumor, endoscopic sinus surgery, maxilla, palate, sinus pathology

Introduction

The technique is illustrated with the case of a 70-year-old woman presenting with an intraosseous hemangioma on the anterior part of the maxilla. In 2017, a maxillary bone lesion was discovered on a computed tomography scan. An open maxillectomy was proposed to the patient, but she refused it. The evolution of the symptoms was slow, with the development of a mass on the hard palate and the persistence of painless discomfort. The patient presented to the institution for a second opinion in 2019. A computed tomography scan, a magnetic resonance imaging (MRI) scan, and a biopsy were performed, which confirmed the diagnosis.

The mass was visible in the mouth, and a bulge on the left nasal floor was noticed on nasofibroscopy. Computed tomography scans showed an osteolytic lesion in the left maxilla (Figure 1). The lesion extended to the hard palate, to the floor of the left nasal fossa, and in contact with the left lower turbinate and close to the roots of teeth 22, 23, 24, and 25. The lesion contained bony trabeculations. The tumor measured 26 × 25 × 24 mm and appeared aggressive on MRI, with an effraction of the upper maxillary arch, invasion of the bony palate, and the floor of the nasal fossa (Figures 2 and 3). A minimally invasive surgical approach combining endoscopic endonasal and transoral approaches was proposed. The patient received clear and complete information and gave her informed consent. The study was approved by the institutional review board CE 3383.

Case Presentation

Step 1: Intraoral surgical approach

The palatal mucosa was incised along the dental arch, creating a flap and exposing the bony surface of the lesion. This allowed direct access to the tumor on the inferior side.

Step 2: Endoscopic endonasal approach

The endoscopic part was performed using a 4K endoscopy system with a 0-degree endoscope. To obtain topical vasoconstriction, cottonoid patties soaked in a 5% diluted cocaine solution were placed in the left nasal cavity. An incision was performed on the septum and on the nasal fossa floor in order to create a large septal flap.[4] The pedicled nasoseptal flap was

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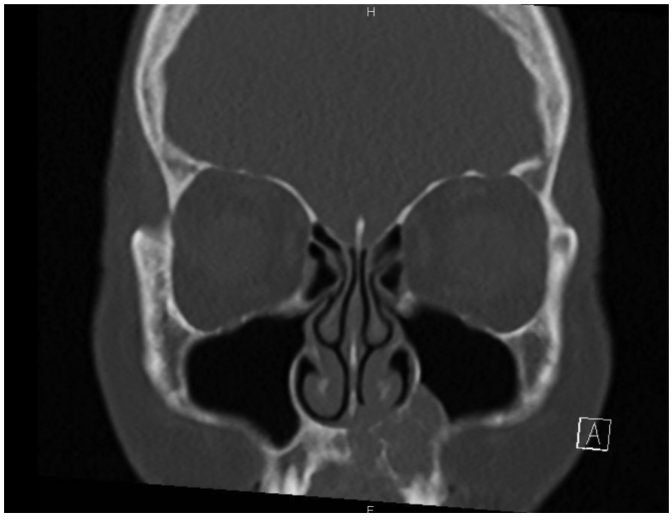

Figure 1. Preoperative computed tomography scan, coronal slice.

dissected and stored in the nasopharynx. The endoscopic medial maxillectomy performed at the time of biopsy was enlarged to allow wide access to the superior part of the lesion (Figures 4 and 5).

Step 3: Tumor resection

We drilled the tumor out from the mouth side and from the endonasal side using 30 000 rpm burs, performing complete macroscopic debulking. A large oroantral communication was then created (Figure 6).

Step 4: Reconstruction

The palatal flap was replaced and sutured along the crest of the gums. Endoscopically, a large piece of septal cartilage was harvested and placed in the gap between the nasal fossa and the sinus on 1 side, and the oral cavity on the other side, with the aim of recreating a palate. The septal flap was replaced and sutured as well. The cartilage was then partially covered by the

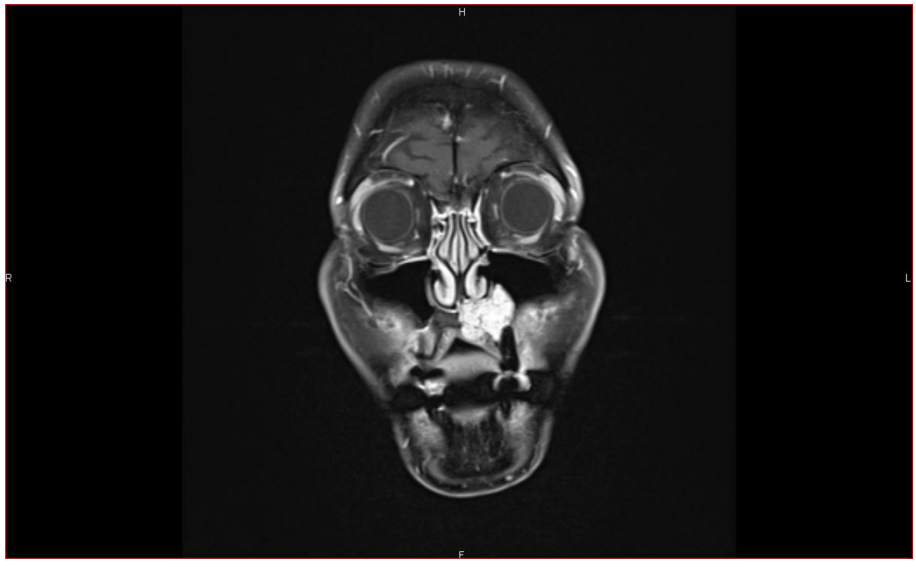

Figure 2. Preoperative magnetic resonance imaging, coronal slice.

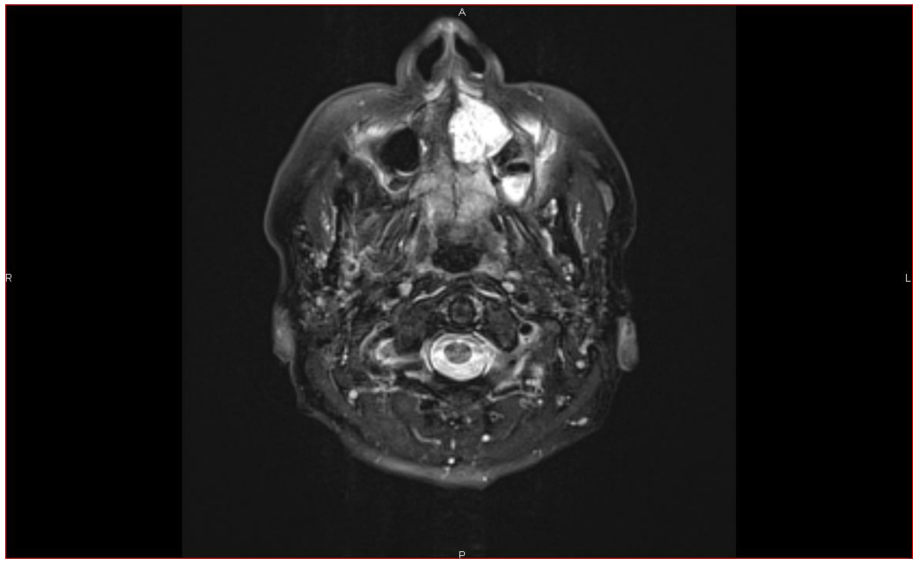

Figure 3. Preoperative magnetic resonance imaging, axial slice.

Figure 4. Septal incision.

septal flap above and completely covered by the palatal flap below. Packing of both nasal cavities with Merocel was made (Figure 7).

Postoperative Care

Nasal packing was kept for 48 hours and then removed. Nasal irrigations with saline solution, an application of ointment, and

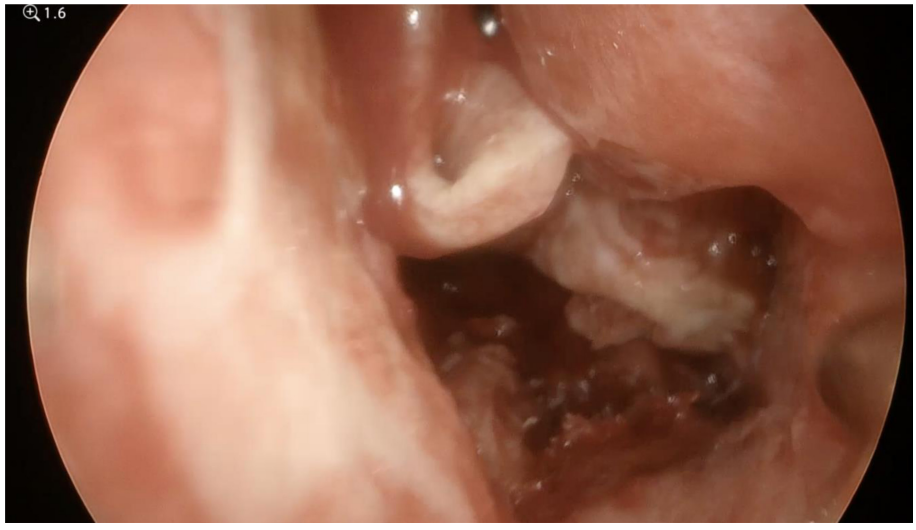

Figure 5. Septal incision with a view of nasal roof and tumor.

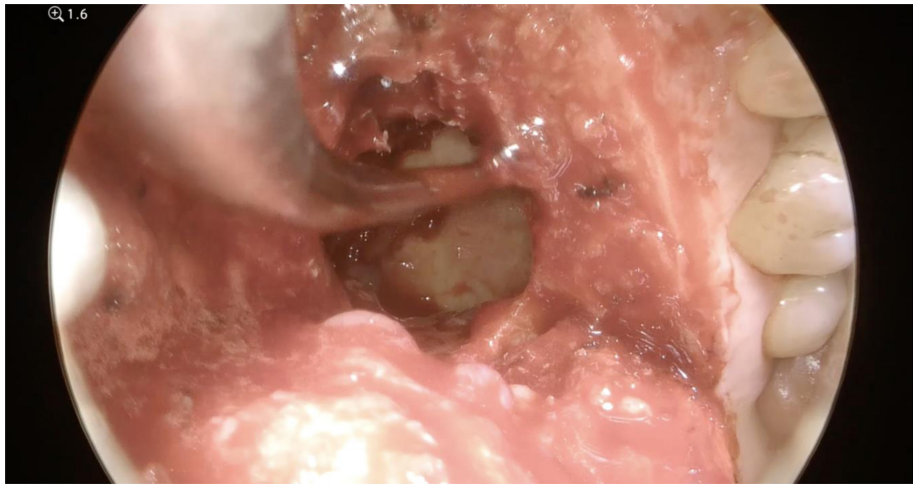

Figure 6. Intraoral view of tumor resection.

Figure 7. Reconstruction with septal cartilage.

antiseptic spray 3 times a day were carried out after precautionary unpacking. Mouthwashes with chlorhexidine were also prescribed. A feeding tube was placed for 10 days.

Results

A complete macroscopic debulking of the tumor was performed. The surgery lasted 3 hours and 20 minutes. The healing of the nose and the mouth took about 2 weeks. The patient was discharged from the hospital when she was able to eat solid food.

Magnetic resonance imaging and computed tomography 24 months after surgery demonstrate complete resection and no tumor recurrence or residual tumor (Figures 8 and 9).

Endoscopic examination at 1 year showed complete healing of the nasal septum and sinus without septal perforation. There was no communication between the mouth and the sinus radiologically nor any sign of oronasal fistula clinically. The patient had no empty nose syndrome or nasal complaints.

Discussion

Over the years, several therapeutic options have been described in treating intraosseous hemangiomas. Radiotherapy was initially used but appeared to be ineffective due to the radioresistance of endothelial cells.[1] In selected cases, injection of sclerosing substances is used to destroy the endothelium of the hemangioma while preserving the bone.[1] Conservative treatment with oral steroids may be the first line of management in infantile intraosseous hemangiomas. A wait and scan policy has been described; however, when the tumor is locally invasive, surgery is indicated and different approaches are available. Embolizations can be performed preoperatively to reduce intraoperative bleeding.

The first surgical option was an open maxillectomy, which had been suggested to the patient beforehand. This technique allows a broad approach ensuring optimal control of margins and hemostasis in case of unexpected bleeding. However, it remains invasive for a benign tumor. Furthermore, any minimally invasive technique can be converted to open surgery if necessary. For these reasons, another approach was considered.

The second approach was an exclusively intraoral approach with the advantage of avoiding facial scars. It allows direct access to the inferior part of the maxilla. Its limitation is poor visual control of the upper part of the lesion. In this case, the closure of the oroantral communication would probably have been weaker using local flaps, bank bone, or dust bone. An effective 3-layer flap with the septum would not have been possible in this approach.

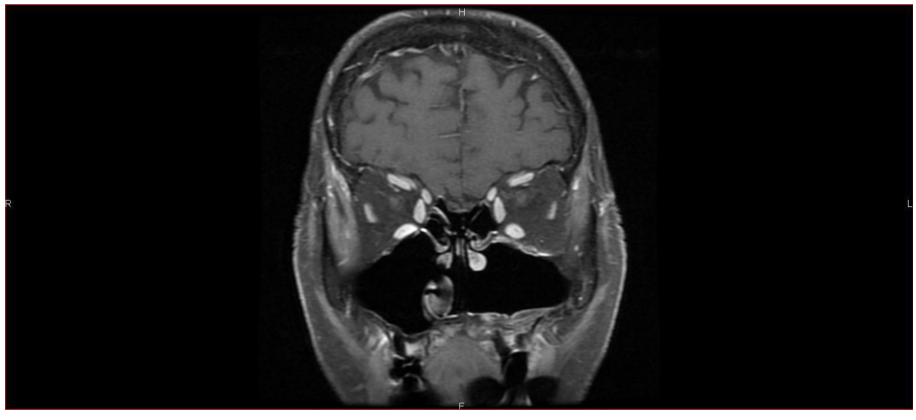

Figure 8. Postoperative magnetic resonance imaging, coronal slice, 24 months after the surgery.

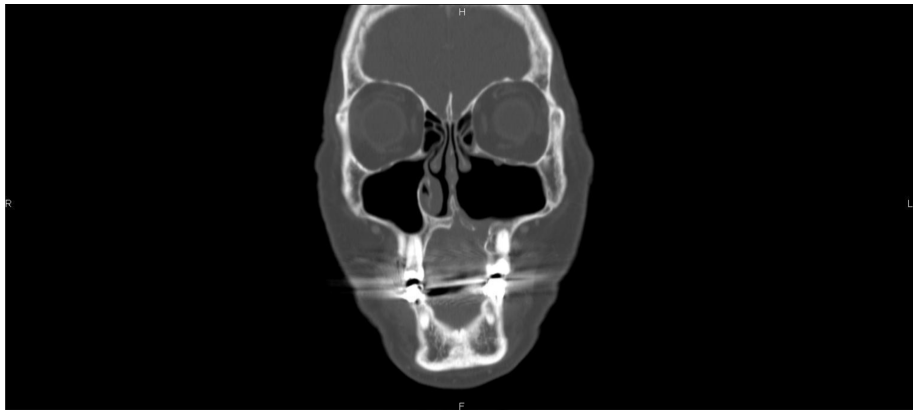

Figure 9. Postoperative computed tomography scans 24 months after the surgery.

The exclusively endonasal approach was a third option. Using this technique, visualization and resection of the inferior part of the tumor (anterior palatal bone) would have been challenging. The mucosa of the hard palate would probably have been damaged.

A fourth option, combining transoral and endonasal approaches, appeared to be more suitable for this localization. This minimally invasive technique demonstrated a fine visualization of all the macroscopic boundaries of the tumor and allowed to achieve a complete piecemeal resection by drilling between the 2 cavities and avoiding damage to the flaps. The reconstruction was made during the same operating session. Indeed, a wide communication between the nasal cavity and the mouth was created during the resection. The pedicled nasoseptal flap (Hadad-Bassagasteguy flap[4]), vascularized by the nasoseptal artery, a branch of the posterior septal artery, was placed on the nasal fossa floor. The palatal mucosa was used as a flap in the mouth. The closure was reinforced with an autologous cartilage graft harvested from the nasal septum to improve rigidity and sealing. The multilayer closure was tight, without any oroantral communication left. There was no residual septal perforation or other long-term local morbidity. The endoscopic medial maxillectomy created a large cavity allowing good local monitoring by fibroscopy to rule out recurrence postoperatively.

The main advantage of this combined approach, compared to others, was its effectiveness in managing the large and inevitable oro-antral communication. The risk of persistent fistula formation was a significant potential complication.

This technique optimized closure and provided a reliable solution for sealing the defect in the long term while maintaining both functional and aesthetic outcomes.

Combined approaches using endonasal endoscopic techniques are increasingly used.[4] They can be combined with orbital, oral, or neurosurgical approaches, offering a new panel of interventions. This technique is a unique combination of an endoscopic medial maxillectomy extended to the resection of the nasal floor with a transoral approach to treat a lesion of the inferior part of the maxilla.

The decision between an open approach versus an endoscopic approach must remain flexible. Extension and anatomic localization are important for decision making. The mastery of both techniques by the surgical team is essential to make this decision objectively and to have the flexibility to migrate towards an open approach when it is indicated. In 2 reference centers in Italy,[5] they compared the advantages and disadvantages of open and endoscopic approaches in the treatment of osteomas of the maxillofacial area. There was only 1 case of upper maxilla localization that was performed by a medial endoscopic maxillectomy. The endoscopic approach allowed for less traumatic and more functional surgeries, absence of scars, and reduced morbidity and hospital stay. The disadvantages included the difficult management of intraoperative complications and the need for sophisticated surgical instruments.[5]

This surgical approach was effective, minimally invasive, and innovative in several aspects. The indications for this technique could be extended to other benign tumors of the anterior and inferior maxillary region (osteomas, angiofibromas) if larger series confirm its feasibility and safety. However, its limitations must be considered, particularly when wide margins are required. In such cases, especially for malignant tumors, a classical maxillectomy would likely remain the preferred approach.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Artificial Intelligence Usage Statement: The authors declared that no artificial intelligence tool was used in the preparation of the manuscript.

Ethics Committee Approval: This study was approved by the Ethics Committee of Institut Jules Bordet (Approval no.: CE 3383; Date: October 12, 2021).

Informed Consent: Written informed consent was obtained from the patient who agreed to take part in the study.

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Declaration of Interests: The authors have no conflicts of interest to declare.

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