

Diagnosis and management of benign tumors of nasal and paranasal cavities: 31 cases

Mardassi Ali, Mathlouthi Nabil, Nefzaoui Safa, Dimassi Hela, Mezri Sameh, Zgolli Cyrine, Chebbi Ghassen, Ben Mhamed Rania, Akkari Khemaies, Benzarti Sonia

ENT Department, Military Hospital of Tunis, Tunis, Tunisia

Correspondence to Ali Mardassi, MD, ENT Department, Military Hospital of Tunis, Montfleury 1008 Tunis, Tunisia
Tel: +216 22 55 22 52
E-mail: alimardassi@gmail.com

Received 29 June 2014

Accepted 20 November 2014

The Egyptian Journal of Otolaryngology
2015, 31:4–9

Aim

To precise the clinical, paraclinical and therapeutic features of the benign tumors of nasal and paranasal cavities.

Methods

We report a retrospective study carried out in the ENT Department of the Military Hospital of Tunis, Tunisia over a period of 10 years (2003–2012).

Results

We report 31 patients operated for benign tumors of the nasal and paranasal cavities. The mean age was 38 years (2 months to 73 years), and the sex ratio was 2.4 (22 male and nine female). The diagnosis was assessed through endoscopic and radiological findings. Surgery was undertaken by an endonasal approach in 84% and an external approach in 16% of the cases. The evolution after surgery was different according to the histological type of the tumor.

Discussion

Benign tumors of the nasal and paranasal cavities are characterized by their histological diversity. Thus, clinical presentation is variable and nonspecific. Their diagnosis has been improved by modern imaging techniques and is definitely confirmed after histological examinations. Actually, endoscopic surgery of the paranasal sinuses has become the procedure of choice for treatment.

Keywords:

benign tumors, endonasal surgery, histology, imaging, sinus

Egypt J Otolaryngol 31:4–9

© 2015 The Egyptian Oto - Rhino - Laryngological Society
1012-5574

Introduction

Sinonasal diseases are mainly dominated by inflammatory lesions. Benign and malignant tumors are uncommon. The benign tumors are characterized by their histological diversity [1]. Their clinical presentation is nonspecific, including facial pain, purulent nasal discharge, epistaxis, and nasal obstruction [2]. Imaging plays a critical role in establishing the diagnosis and may occasionally illustrate characteristic features of specific histological types. The treatment is based on surgery. External and endonasal endoscopic approach are two complementary methods, both of them having their indications [1].

Materials and methods

We report a retrospective study carried out in the ENT Department of the Military Hospital of Tunis, Tunisia: 31 patients operated for benign tumors of the paranasal cavities over a period of 10 years (2003–2012). The study was approved by the medical committee of the military hospital of Tunis, Tunisia. The mean age was 38 years (2 months to 73 years), and the sex ratio was

2.4 (22 male and nine female). The diagnosis was suspected in all the cases after nasal endoscopy and radiological examinations. All the patients benefited from a computed tomographic (CT) scan of the sinuses in the coronal and axial planes before surgery. Scans were carried out using the Siemens Somatom Plus 4 (Global Business Unit Siemens AG Medical Solutions Computed Tomography & Radiation Oncology, Siemensstr. 1 DE-91301 Forchheim Germany). Parameters applied included 512 matrix, 200 field of view, 1-mm section thickness (contiguous slices), fast scan mode, beam hardening correction, 140 kV and 94 mA exposure. Surgery was performed through endonasal approach in 26 cases and external approach in five patients. The confirmation of the diagnosis and the type of tumor was histological in all the cases.

Results

A total of 31 patients were included in our study. No medical past history was reported, and, especially, neither rhinologic nor any neoplastic disease was previously diagnosed in all the patients. Epistaxis was the most frequent complaint symptom (51.6%)

followed by unilateral chronic nasal obstruction (41.9%). Nasal discharge was reported in only 19% of the cases. Extrarhinologic symptoms were noted in five cases: proptosis in two cases, facial swelling in two cases, and headache in one case. The interval between the first symptom and the diagnosis varied between 1 and 36 months (mean 10 months). Endoscopic examination of the nasal cavities revealed a mass in 87% of the cases. Moreover, the physical examination found a proptosis in two cases and a facial swelling in two cases. Neither cranial nerve palsy nor cervical node was noted in all the patients. Radiological examinations were conducted preoperatively in 18 patients: CT scan alone was conducted in 18 cases and CT scan with MRI in three cases. Surgery was indicated in all the patients using an endonasal approach in 84% and an external approach in 16% of the cases. The histological types of the tumors are shown in Table 1. Treatment-related complications varied according to the surgical approach. After endonasal surgery, three patients had a severe bleeding requiring blood transfusion. After external approach, one patient complained of an inesthetic lateronasal scar with paroxysmal facial pain. The postoperative complications and the long-term outcomes are resumed in Table 2.

A detailed description of the clinical and paraclinical features is presented according to the histological type of the tumor.

Table 1 Histological types of the nasosinusal tumors

Tumor type	n (%)
Inverted papilloma	9 (29)
Cavernous hemangioma	2 (45)
Capillary hemangioma	12 (45)
Osteoma	3 (13)
Ossifying fibroma	1 (13)
Leiomyoma	1 (13)
Myxoma	1 (13)
Glioma	1 (13)
Schwannoma	1 (13)
Total	31 (100)

Table 2 Complications of surgery and postoperative outcome of our patients

Tumor type	Type of surgery	Complications of surgery (%)	Outcome	
			Recurrence (%)	Degeneration
Inverted papilloma [3]	Endonasal [4]	Severe bleeding: 2 (22) shetic lateronasal scar, paroxysmal facial pain	3 cases (33)	—
	External [1]			
Cavernous hemangioma [2]	Endonasal	Severe bleeding: 1 (50)	—	—
Capillary hemangioma [5]	Endonasal	—	—	—
Osteoma [6]	External	—	1 case (33)	—
Ossifying fibroma [1]	External	—	—	—
Leiomyoma [1]	Endonasal	—	—	—
Myxoma [1]	Endonasal	—	—	—
Glioma [1]	Endonasal	—	—	—
Schwannoma [1]	Endonasal	Persistent facial pain	—	—

Epithelial tumors

Inverted papilloma

There were nine cases of inverted papilloma (IP) diagnosed in our study. The mean age was 48 years. Male to female ratio was 8 (eight male to one female). All cases presented with unilateral nasal obstruction. Of them, five had nasal discharge, and two had proptosis. Endoscopic examination revealed a polypoid mass in the nasal cavities in all the cases. CT scan showed an enlargement of the middle meatus in all the cases and an extension to the frontal and ethmoid sinus in six cases. Bony lysis of the maxillary sinus walls was found in five cases and bony condensations in two cases (Figs. 1–3). We have classified our patients according to the Krouse staging system: seven patients were under stage T3, and two under T2. For the treatment, an endonasal endoscopic approach was carried out for eight patients. A tumor resection associated with a wide antrostomy was performed in all the cases, associated in two cases with ethmoidectomy. An external approach with lateral rhinotomy was achieved for one patient. During the follow-up, a recurrence of the tumor was diagnosed in three cases. For the first case, the recurrence was noted 2 years postoperatively and treated surgically successfully. For the other two cases, we had observed multiple recurrences: at 5 months and 4 years for the second case; and at 3, 6, and 8 years for the third one. No case of degeneration was observed.

Vascular tumors

In our study, 14 cases of vascular tumors were diagnosed. The two main types observed were.

Cavernous hemangioma

It was found in two men aged 73 and 55 years, respectively, who presented with recurrent epistaxis. The tumor arose from the inferior turbinate in one case and from the superior turbinate in the second case. Its size was 1 and 2 cm, respectively. An endoscopic surgery

was performed in both cases with no recurrence during follow-up.

Capillary hemangioma

This tumor was diagnosed in 12 cases. The mean age was 34 years with no sex preponderance. Epistaxis was the main complaint. It involved the nasal septum in 11 cases and the vestibule in one case. All patients underwent endonasal surgery with a good outcome.

Bony tumors

Osteoma

There were three men with an average age of 22 years who presented with osteomas. Extrarhinologic symptoms led to the diagnosis. It was mainly a face swelling in two cases associated in the first case with frontal headache and with a proptosis in the other case; the third case presented with an isolated proptosis. The CT scan performed in all the cases showed that the tumor involved the frontal and the ethmoidal

sinus with an extension to the orbit in two cases and was confined to the ethmoid and the orbit in the last case (Fig. 4). External surgery approach was indicated for these cases. A lateral rhinotomy was performed in two cases and an external frontoethmoidectomy in the third case. Recurrence was observed in one case, 1 year postoperatively in the case treated initially by lateral rhinotomy. A revision surgery was performed through a bicoronal approach and the tumor was extirpated *in toto*.

Ossifying fibroma

It was diagnosed in a woman aged 47 years who presented with a facial swelling affecting the frontal region. CT scan showed a calcified mass of the frontal sinus with an extension to the ethmoid (Fig. 5). The patient had an excision of the tumor through an external frontoethmoidectomy.

Mesenchymatous tumors

Glioma

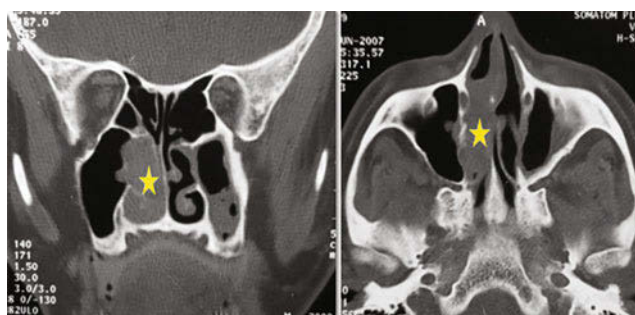
It was diagnosed in a 2-month-old baby who suffered from dyspnea owing to a mass bulking the right nasal fossa. CT scan and MRI showed a 2 cm formation

Figures 1



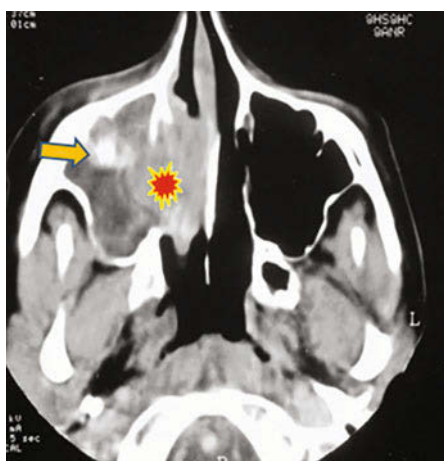
Coronal and axial computed tomographic (CT) scan: inverted papilloma (IP) involving the maxillary sinus and the left nasal cavity.

Figures 2



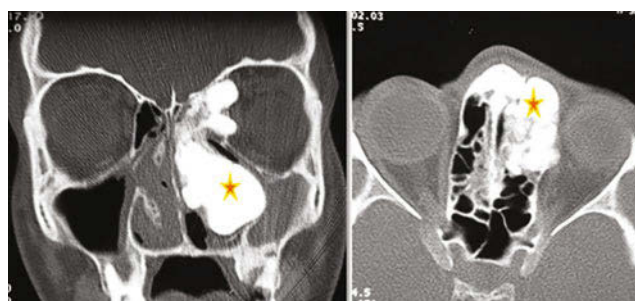
Coronal and axial computed tomographic (CT) view of an inverted papilloma (IP) involving the maxillary sinus and the right nasal cavity.

Figures 3



Computed tomographic (CT) findings in inverted papilloma (IP): calcifications within the tumor.

Figures 4



Coronal and axial computed tomographic (CT) scan: large ossified mass arising from the left ethmoid sinus and extending into the orbit and the nasal cavity (ethmoid osteoma).

at the level of the right inferior turbinate. Endonasal surgery was performed with an excellent outcome.

Myxoma

A 10-year-old child presented with unilateral nasal obstruction. Nasal endoscopy revealed a translucent mass in the left nasal cavity coming from the middle meatus. CT scan showed a mass involving the left maxillary sinus with an extension to the nasal cavity and the nasopharynx. Endoscopic excision was successfully performed with no recurrence noted during follow-up.

Leiomyoma

A 68-year-old man presented with chronic nasal obstruction. On endoscopic examination, we found a friable mass fulfilling completely the right nasal cavity. CT scan showed an expansive mass coming from the sphenothmoidal recess (Fig. 6). The patient underwent surgery by endoscopic approach. No recurrence of the disease was noted after 3 years of follow-up.

Schwannoma

It was diagnosed in a 54-year-old woman who presented with recurrent epistaxis and nasal obstruction. CT scan showed an expansive mass of the left maxillary sinus with an extension to the ethmoid (Fig. 7). Schwannoma was excised by the endonasal approach. After 4 years of follow-up, no recurrence has been noted, but the patient still experienced facial pain.

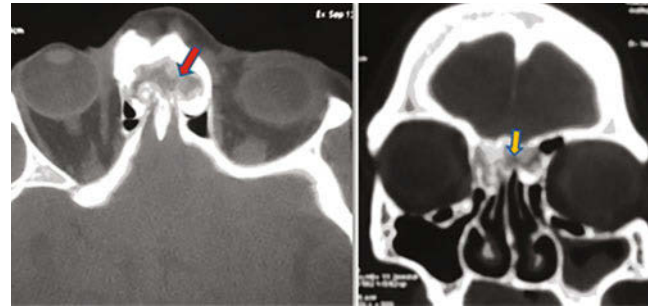
Discussion

Epithelial tumors

Sinonasal papillomas

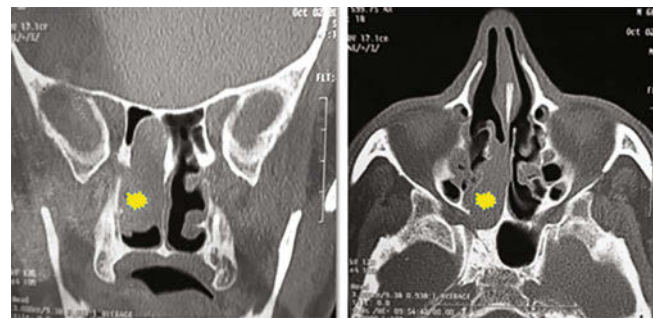
Sinonasal papilloma is a benign tumor deriving from the mucosa of the nose and paranasal sinuses. Three types are individualized: IP, cylindrical cell, and exophytic papilloma [6]. This classification is based on histological finding. In IP, the epithelium grows inwardly toward a stroma leading into the IP formations. The exophytic fungiform papilloma has exophytic papillary formations. However, the cylindrical cell sinonasal papilloma has an epithelium made of several layers of the eosinophilic columnar cells. Furthermore, the cylindrical cell and IP generally arise from the lateral nasal wall and extend into the maxillary and/or ethmoidal sinuses [7]. IP is the commonest type. It is frequently revealed by unilateral nasal obstruction, but we can also note bleeding, or sinusitis. On clinical examination, the IP presents like a mulberry uneven surface and reddish grey-livid

Figurs 5



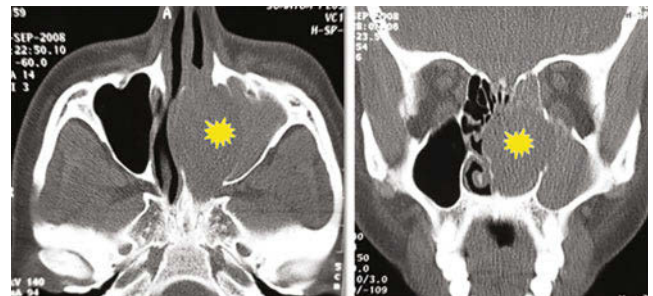
Axial and coronal computed tomography showing ossifying fibroma involving the ethmoid sinus.

Figurs 6



Coronal and axial computed tomographic (CT) scan showing a leiomyoma of the right ethmoid sinus with an extension into the nasal cavity.

Figurs 7



Axial and coronal computed tomographic (CT) scans: expansive mass of the left maxillary sinus and the nasal cavity with bony remodeling of the septum (nasal schwannoma).

color and may bleed when touched [7]. Etiology is still not yet elicited; many causes have been reported such as allergy, chronic sinusitis, viral infections, and inflammation [7]. Human papillomavirus infection appears to be implicated as one of the possible causative factors in the pathogenesis of IP [8]. The CT appearance of IP is variable and nonspecific. Calcification is usually seen, but not constant. Bone changes including erosion, remodeling, and widening are usually present and do not presume any malignant transformation. In fact, in more than 75% of patients,

various degrees of bone destruction are reported [7]. On MRI, a striated cerebriform pattern on T2-weighted and contrast enhanced T1-weighted images is supportive but not specific [2]. In our study, variable degrees of bony lysis and/or condensation have been noted in CT-scan images. Many staging classifications were proposed, especially Krouse, which is based on IP location and extension [9]. In our study and according to this classification, seven patients were classified under T3. Treatment is based on surgery. It must be early and curative. The whole mucosal disease should be excised by the endonasal route when complete resection is possible, or by external surgery [10]. The extent of the disease essentially, the individual patient factors, and the surgical expertise determine the choice of the surgical approach. Endoscopic approach should be abandoned in some cases such as: massive skull base erosion, intradural or intraorbital extension, brain invasion, extensive involvement of the frontal sinus or infratemporal fossa involvement, or the concomitant presence of squamous cell carcinoma [3,4]. A combined external and endonasal approach can also be used to a better control of lesions. Recurrence is directly proportional to the removal. It mainly occurs at an average of 24–40 months after the operation. No significant differences were observed between the recurrence rates on different approaches, but they were higher with conservative resections [7]. In our study, we have noted three cases of recurrence of IP. They were multiple occurrences after several years of surgery in two patients. The main stress for the surgeon is the coexistence of carcinoma with IP. In fact, it arises in about 10% of patients with IP [11]. The prevalence of carcinoma is higher in cases of: bilateral IP, predominance of mature squamous epithelium, severe hyperkeratosis, a mitotic index equal to or greater than 2, and the absence of inflammatory polyps among the papillomas [12].

Nonepithelial tumors

Vascular tumors

Hemangioma is a benign neoplasm of vascular origin with endothelial proliferation. Histologically, they are divided into two types, capillary and cavernous depending on the dominant vessel size at microscopy [5]. They can arise from the osseous, mucosal, or submucosal tissues of the nasal cavity or sinuses [13]. Capillary hemangiomas are more frequent and usually arise in the nasal cavity from the nasal septum or the vestibule less frequently on the anterior side of the inferior turbinate. They occur predominantly in children and male youth. Hormonal imbalance and excessive inflammatory response after local trauma have been evocated in their involvement [14]. The main symptom is

recurrent epistaxis. Conservative local excision is the recommended treatment. However, electrocoagulation, cryotherapy, and laser have also been reported as successful therapies of these lesions [14].

Cavernous hemangiomas are more common in adults, especially men after their fifth decade of life. They always arise from the lateral wall of the nasal cavity or from the medial wall of the maxillary sinus [13]. These tumors tend to arise from the bony tissue of the paranasal cavities [15]. On imaging, they appear like an expansive soft tissue mass with bone changes including thinning and deviation to bone destruction. A heterogeneous enhancement is often seen due to areas of bleeding and necrosis [13,14]. The main treatment of cavernous hemangiomas is surgical. Radiation therapy is reserved for inaccessible lesions [15].

Bony tumors

Osteoma

It is a benign slow growing tumor usually affecting men in their third and fourth decades of life [16]. The frontal sinus is the commonest site (50%) followed by the ethmoid (40%) [2]. In our study, the ethmoid was the most frequent site affected. These tumors are, often, completely asymptomatic. If symptomatic, they present with headache, cosmetic deformity, proptosis, epiphora, and visual complaints [17]. Two histologic types are reported: the hard cortical osteoma and the soft cancellous osteoma [18]. On CT findings, osteomas present as dense bony masses protruding into or from the sinus [2]. The treatment is based on surgery. Surgery is indicated for symptomatic osteomas and those threatening the noble structures. The approach depends on the size and the localization of the tumor [19].

Ossifying fibroma

Ossifying fibroma is presumed to originate from the mesenchymal blast cells that exist in the periodontium surrounding the teeth [20,21]. It is often seen in women in their third and fourth decades of life. Mainly observed in the mandible and the maxilla, they are rarely found in the nasal cavities. On these localizations, ossifying fibroma tends to display more aggressive behavior and rapid growth [21]. Although they can be asymptomatic, these lesions often expand, causing significant facial asymmetry, pain, and local destruction [20]. On CT, they present as well-defined unilocular radiolucencies with scattered radiopaque foci [19]. Total removal must be performed to avoid recurrence. Endoscopic resection of sinonasal ossifying fibroma (OF) is an excellent therapeutic option if it is possible to do.

Rare benign tumors

Leiomyoma, meningioma, fibroma, myxoma, and schwannoma are rare tumors occurring in the paranasal cavities. No specific findings are reported. The diagnosis is immunohistologic. Surgical approach allows the diagnosis and the treatment of these lesions.

Conclusion

The treatment of benign tumors of the nasal and paranasal cavities is mainly surgical. Endoscopic approaches have become the procedures of choice. Total resection is the guarantee of no recurrence. The follow-up is mandatory in all the cases.

Acknowledgements

Conflicts of interest

None declared.

References

- Bonfils P. Benign tumors of the nose and sinuses: the inverted papilloma. *EMC Otorhinolaryngol* 2007; 2:1–15 [Article 20-400-A-10].
- Dym R, Masri D, Shifteh K. Imaging of the paranasal sinuses. *Oral Maxillofacial Surg Clin N* 2012; 24:175–189.
- Lawson W, Patel ZM. The evolution of management for inverted papilloma: an analysis of 200 cases. *Otolaryngol Head Neck Surg* 2009; 140:330–335.
- Tomenzoli D, Castelnuovo P, Pagella F, Berlucchi M, Pianta L, Delù G, et al. Different endoscopic surgical strategies in the management of inverted papilloma of the sinonasal tract: experience with 47 patients. *Laryngoscope* 2004; 114:193–200.
- Dhanapala N, Ravis Hanker C, Ramya B, Supriya B. A rare case of sinonasal cavernous hemangioma. *Res Otolaryngol* 2013; 2:12–14.
- Vorasubin N, Vira D, Suh JD, Bhuta S, Wang MB. Schneiderian papillomas: comparative review of exophytic, oncocytic, and inverted types. *Am J Rhinol Allergy* 2013; 27:287–292.
- Wassef SN, Batra PS, Barnett S. Skull base inverted papilloma: a comprehensive review. *ISRN Surg* 2012; 2012:175903.
- Buchwald C, Franzmann MB, Jacobsen GK, Lindeberg H. The presence of human papillomavirus in sinonasal papillomas, demonstrated by polymerase chain reaction with consensus primers. *Hum Pathol* 1993; 24: 1354–1356.
- Krouse JH. Development of a staging system for inverted papilloma. *Laryngoscope* 2000; 110:965–968.
- Bacon CK, Hendrix RA. Inverted papillomas of the nasal septum. *Trans Pa Acad Ophthalmol Otolaryngol* 1990; 42:1008–1013.
- Yoon JH, Kim CH, Choi EC. Treatment outcomes of primary and recurrent inverted papilloma: an analysis of 96 cases. *J Laryngol Otol* 2002; 116: 699–702.
- Nachtigal D, Yoskovitch A, Frenkiel S, Braverman I, Rochon L. Unique characteristics of malignant schneiderian papilloma. *Otolaryngol Head Neck Surg* 1999; 121:766–771.
- Vargas MC, Castillo M. Sinonasal cavernous haemangioma: a case report. *Dentomaxillofac Radiol* 2012; 41:340–341.
- Kumar Gupta D, Somavanshi S, Agrawal A, Bharti R, Shree N. Capillary hemangioma of the lateral nasal wall. *Int J* 2012; 5:127–129.
- Hamdan AL, Kahwaji G, Mahfoud L, Hussein S. Cavernous hemangioma of the maxillary sinus: a rare cause of epistaxis. *Middle East J Anaesthesiol* 2012; 21:757–760.
- Sinha A, Jha D, Deka RC. Osteoma of the paranasal sinuses. *Indian J Otolaryngol Head Neck Surg* 2013; 55:166–169.
- Mansour AM, Salti H, Uwaydat S, Dakroub R, Bashshour Z. Ethmoid sinus osteoma presenting as epiphora and orbital cellulitis: case report and literature review. *Surv Ophthalmol* 1999; 43:413–426.
- Pierse JE, Stern A. Benign cysts and tumors of the paranasal sinuses. *Oral Maxillofac Surg Clin North Am* 2012; 24:249–264.
- Verma RK, Kalsotra G, Vaiphei K, Panda NK. Large central osteoma of maxillary sinus: a case report. *Egypt J Ear Nose Throat Allied Sci* 2012; 13:65–69.
- Dubey SP, Murthy DP, Kaleh LK, Vele DD. Malignant tumours of the nasal cavity and the paranasal sinuses in a Melanesian population. *Auris Nasus Larynx* 1999; 26:57–64.
- Jégoux F, Métreau A, Louvel G, Bedfert C. Paranasal sinus cancer. *Eur Ann Otorhinolaryngol Head Neck Dis* 2013; 130:327–335.