The antrochoanal polyp

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Abstract
The different varieties of choanal polyps are reviewed by the authors according to their implantation pedicle. Their histology, possible pathogenesis, the various symptoms, steps in the diagnostic procedure and differential diagnoses are also described. Finally, the various modes of treatment are discussed, focussing in particular on the surgical methods and the new possibilities offered by developments in the field of endoscopy.

Definition:

The antrochoanal polyp was first described by Palfyn in 1763 (7) then by Killian in 1906. Killian found the close relationship of the antrochoanal polyp to the maxillary sinus, which is how it came to bear his name.
The antrochoanal polyp, also called Killian's polyp, has its origins in the mucosa of the maxillary sinus, emerges through the natural or accessory ostia, and as it elongates, finds its way along to the choana then to the naspharynx. It is unilateral in the majority of cases. However, a few cases of bilateral antrochoanal polyps have been described by Kammel (9) and Myatt (12). Its incidence is 3-6% of nasal polyps (19). It is mainly to be found in patients less than 30 years of age. Gordts (8) has described four cases in children aged less than 10, one of whom was 3 years and 9 months old. It would indeed appear that the antrochoanal polyp is the most frequent cause of endonasal mass in children (28-33%) (8,12). Sex ratio is 1 to 1 (9,16), except according to Rugina who finds a sex ratio of 2 to 1.
The aetiopathology is currently poorly understood. An allergic aetiology has been proposed (24% of children with an antrochoanal polyp have asthma triggered by aspirin) (5). Cases of antrochoanal polyps associated with cystic fibrosis have also been described. For Y.-G. Min (11), however, the relatively low number of submucous glands suggests that the antrochoanal polyp results from distension of glandular structures. Piquet (16) presents a case of lymphatic vessel thrombosis of an intramural cyst following a sinus infection. The cyst then undergoes an oedematous, angiomatous and fibrous transformation, starting at the periphery.
For Berg (4), the antrochoanal polyp is an intranasal expansion of a mural sinus cyst.

Implantation zone:

The vast majority of choanal polyps have a maxillary origin (90%) (16). They can also develop from the sphenoidal sinus (7,22,26), the ethmoid (10), the septum, the palate, and the frontal sinus (24).
Rugina (18) did some research concerning the point of attachment of antrochoanal polyps and found it to be in most cases the lateral wall of the maxillary sinus (68.5%). The pedicle

was occasionally situated on the medial antral wall (21%). In about 10% of the cases, the implantation zone could not be identified.
Berg (4) and Kamel (9) also mention the fact that the site of origin of the antrochoanal polyp is variable: maxillo-ethmoidal angle, medial antral wall, posterior sinus wall. Stammberger (23) finds the origin to be almost always on the posterior wall of the maxillary sinus at the maxillo-ethmoidal junction or on the posterior and inferior side of the ostium.

Symptomatology:

Unilateral nasal obstruction is the predominant symptom. It is often associated with mucopurulent rhinorrhoea, sometimes with headaches and hyposmia.
Less common presenting symptoms have been described, such as epistaxis, closed rhinolalia, sleep apnoea and nausea.

Macroscopical findings:

It usually presents as a firm, smooth translucent mass, gelatinous white or yellowish, occupying the nasal fossa, whereas the antral part of the polyp is cystic, often containing straw-coloured fluid. The older polyp is less striking, as it can become more fibrous or even angiomatous (angiomatous polyp) (2), making it difficult to differentiate from a sinonasal angiofibroma. The antrochoanal polyp can protrude into the nasopharynx and can be visible behind the uvula.

Microscopical findings:

The surface epithelium is generally cylindrical, and presents occasional zones of ulceration, squamous or goblet cell metaplasia. The stroma appears myxoid or fibrous and contains a few mononucleated inflammatory cells: mainly plasma cells, a few eosinophils.

The stroma may be the site of alterations:
- fatty acid deposits surrounded by a foreign body granulomatous reaction
- areas of angiofibromatosis (less frequent in typical choanal polyps)
- foci of metaplastic ossification

The number of glands is small.

After immunohistochemical analysis, some collapsed cystic structures covered by an endothelium have been demonstrated, with the use of the marker Ulex Europeus (a type of lectin, which specifically binds to vascular endothelium, proving its lymphatic origin (16)). The macroscopical and microscopical features are similar to those of intramural cysts (4).

Immunohistochemical study of the intracystic fluid shows the presence of IgA, IgG and C3p just as in submucous cysts.
Yamashiro (28) has demonstrated in the antrochoanal polyp the presence of an activator called urokinase-type plasminogen activator, which is not observed in cases of chronic sinusitis. It may well have an important role to play in the growth process of the antrochoanal polyp.

Further investigations:

- Fibroscopy and computerised tomography (sagital and coronal sections) usually allow the

determination of the origin of the polyp pedicle and the differential diagnosis from other pathologies such as meningocoele. They also enable the search for associated pathologies such as chronic ethmoiditis. On CT-scan, an opacity filling the sinus with an extension varying in length within the nasal fossa and choanae can be visualised.

An enlargement of the maxillary ostium can occasionally be observed: the reason for this is controversial. Ryan (19) believes this enlargement to be pre-existing, but it is more commonly admitted that the enlargement is secondary to pressure from the expanding polyp. The bone structure may be bloated but without erosion.

- MRI: this examination needs only to be performed in the case of a suspicion of malignity. The antrochoanal polyp has a liquid component.

- anatomopathological examination: will confirm the diagnosis.

Differential diagnosis:

- Angiofibroma: usually manifests itself with symptoms of nasal obstruction and repeated episodes of epistaxis. CT-scan demonstrates the presence of bone destruction.

- Inverted papilloma: irregular lesion at fibroscopy. CT-scan may show bony erosions, but the differential diagnosis may not always be obvious. This diagnosis should mainly be considered when a choanal polyp does not have an antral pedicle (10).

Rarely:
- Meningo(encephalo)coele: the meninges herniate through a structural defect of the base of the skull. Visualisation by CT-scan of a bony defect in the cribriform plate.

- Glioma: encephalocoele which has no more intracranial link.

- Congenital malformations: Thornwaldt cyst, Rathke's diverticulum, dermoid cyst, teratoma (hair polyp)

- mesenchymal tumour: benign tumour originating in fibrous, lipomatous, cartilaginous, osseous or vascular tissue.

- Malignant tumour: rhabdomyosarcoma, aesthesioneuroblastoma, histiocytosis X, lymphoma, sarcoma and melanoma.

Treatment:

Killian (1906) performed a simple polypectomy, but the recurrence rate was then higher than 25%.
The preferred treatment is the complete exeresis of the polyp, which means its choanal part, its antral portion, as well as its implantation pedicle (with coagulotherapy to the latter).
The Caldwell-Luc procedure allows good visualisation of the sinus cavity.

It is, however, not recommended in children, because of the risk of interfering with the development of the facial structure and dentition. Complications include postoperative oedema of the cheek, dysaesthesia of the suborbital nerve, a tooth devitalisation, and a longer hospitalisation period. For Stammberger (23) and El-Guindy (6), this transcanine route is best in order to eradicate the implantation pedicle and lower the risk of recurrence (5%). Stammberger (23) introduces his endoscope via that route. The technique has evolved since

the arrival of endoscopy.

The latest studies (9,15,16,18) advocate the endonasal route exclusively. Rugina (19) performs an enlarged middle meatotomy at the expense of the inferior turbinate via endoscopy and cauterises the implantation pedicle with the help of 80°- and 110°-curved double-spooned forceps or laser YAG. The use of 70° endoscopy helps visualising the whole sinus. Piquet performs a double meatotomy which allows him to see the entire sinus. His recurrence rate is less than 5%. Recurrence is linked to insufficient resection of the pedicle, probably situated inferiorly and close to the anterior wall. Piquet's advice is to then reoperate using the Caldwell-Luc approach (16). Rugina's estimate of a recurrence rate is 5%, down to one case in his series for whom the implantation pedicle had not been found and which had therefore not been cauterised (18). Young age appears to be a predisposing factor for recurrence (13).

Finally, the use of endoscopy enables the surgeon to perform an ethmoidectomy at the same time, should there be concomitant chronic ethmoiditis, which appears not to be so uncommon (Aktas: 9 patients out of 16) (1). However, surgery is not always simple in children, and a few surgeons recommend a simple polypectomy before the age of 8 with a view to realising a complete exeresis at a later date. Seshadri (21) has observed one case of regression (in an atopic child aged 10) after three months treatment with local corticosteroids.

Results:

The authors studied 30 cases of choanal polyp (19 women and 11 men, aged from 5 to 87 years, mean: 37 years) treated in 4 different
hospitals.
The study extended over a period from November '90 to October '99, with a mean follow-up of 21 months.
All patients underwent endoscopic surgery.
The choanal polyp had a maxillary origin in most cases (90%). The origin of the pedicle was in the anterior ethmoidal bone in one
case, was sphenoidal in another case and unknown in the third case.
None of the patients have had a recurrence to date.

Summary:

Killian's polyp, also called the antrochoanal polyp, has a maxillary pedicle. It has two lobes, an antral and a nasal portion. The polyp emerges from the sinus at the level of the middle meatus. The choanal polyp originates occasionally from the ethmoid or even from the sphenoid. The main complaint is nasal obstruction. Diagnosis relies on fibroscopy and CT-scan. Treatment is exclusively surgical, and the authors strongly recommend nowadays an enlarged meatotstomy via endoscopy, with cauterisation of the pedicle, in order to diminish recurrence rate.

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