ORIGINAL STUDY

Evaluation and management of antrochoanal polyps in children

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ABSTRACT

BACKGROUND. Antrochoanal polyps (ACP) were originally reported by Gustav Killian in 1906. Antrochoanal polyps (ACPs) are benign polypoid lesions that begin in the maxillary antrum and extend into the choana. Although there have been recorded occurrences of bilateral ACPs in the literature, ACPs are mostly unilateral. They typically have an impact on youth and youngsters.

MATERIAL AND METHODS. In a trial of 15 cases treated and admitted to our ENT Pediatric Department at the Emergency County Hospital Timisoara over the previous four years, the pathology, differential diagnosis, treatment, complications, etiopathogenesis, clinical features, positive and differential diagnosis, preoperative evaluation, pathology, and treatment of ACPs were reviewed in this study.

RESULTS. The patients age group comprised five females (33.33%) and ten boys (66.67%), ranging in age from 7 to 16 years. The most common presenting symptoms were unilateral nasal obstruction (100%), purulent rhinorrhea (66.67%), olfactory impairment (53.33%), and mouth breathing (46.67%). A nasal endoscopy and a craniofacial CT scan were the gold standards for diagnosing ACP. The chosen course of treatment for all pediatric patients included in the study was surgery: 12 patients (80%) underwent transnasal endoscopic polypectomy, and 3 patients (20%) underwent both transnasal polypectomy and transcanine fossa approach. The success rate of the combined endoscopic and transcanine fossa approach was 100%, whereas the transnasal endoscopic surgery (polypectomy) had an 80% success rate.

CONCLUSION. Polypectomy combined with a transcanine fossa approach technique and transnasal polypectomy is the optimal course of treatment.

KEYWORDS: children, antrochoanal polyps, polyps, endoscopic sinus surgery, nasal blockage.

INTRODUCTION

Antrochoanal polyps (ACPs) are benign polypoid tumors that begin in the maxillary antrum and extend into the choana[1]. In the vast majority of cases, ACPs are almost always unilateral. Most commonly, they affect children and young adults, and the most common symptom is nasal obstruction, which can occur with or without olfactory impairment[2]. There are three types of choanal polyps: ethmoidochoanal, sphenochoanal, and antrochoanal. According to Dadas et al.[3], sphenochoanal and ethmoidochoanal polyps are significantly less prevalent than antrochoanal polyps, which make about 4 - 6% of all nasal polyps. Three sections can be described according to their extension: an extrasinusal, an ostial, and an intrasinusal section[3].

Allergies and sinus inflammation are the two variables that may be involved in the etiopathogenesis of antrochoanal polyps[4]. Sunagawa et al.[5] demonstrated the possible implication of plasminogen activator inhibitor-1 and urokinase-type plasminogen activator in the pathogenesis of ACPs in their study.

Depending on the study, the incidence of antrochoanal polyps might vary from 4% to 10.4% of all nasal polyps[6].

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Table 1. Symptomatology of pediatric patients with antrochoanal polyps.

Symptoms	No. of cases	%
Unilateral nasal obstruction	15	100
Rhinorrhea (nasal drainage)	10	66.67
Olfactory disfunction	8	53.33
Mouth breathing	7	46.67
Nasal pruritis	6	40
Snoring	5	33.33
Headache	3	20
Epistaxis	2	13.33

Up to 33% of cases are in children and young adults, who are more likely to experience them.

To make the diagnosis and create a treatment plan, nasal endoscopy and cranial computed tomography (CT) are needed. The only effective treatment for antrochoanal polyps, in all its manifestations, is surgery. The two major objectives of the treatment are to remove the polyp entirely and to prevent its recurrence.

MATERIAL AND METHODS

Pediatric patients with antrochoanal polyps who were treated and admitted to the "Bega" ENT Pediatric Department of the "Pius Branzeu" Emergency County Hospital in Timisoara, Romania, throughout the course of the preceding four years were the subject of this retrospective study.

Pre-, intra-, and postoperative video footage, radiological tests, and patient medical records were reviewed.

RESULTS

After looking through the medical records, it was found that 15 patients were diagnosed and treated for antrochoanal polyps in the last 4 years. The patients' age varied from 7 to 16 years, with 10 boys (66.67%) and 5 girls (33.33%), according to the demographic statistics.

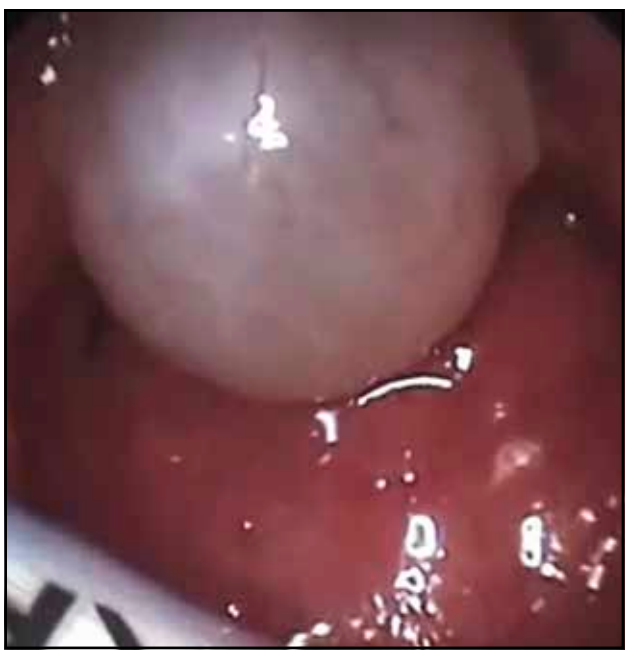

Figure 1. Appearance of a polypoid mass behind the uvula and the soft palate.

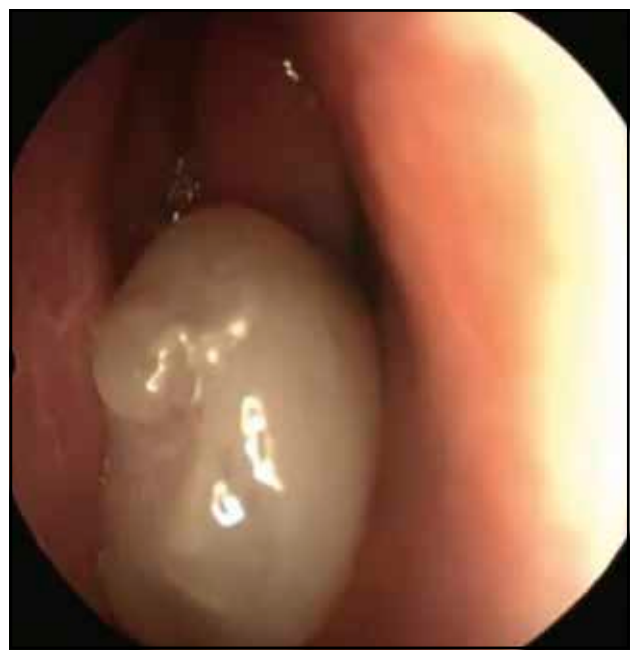

Figure 2. Nasal endoscopic view of an antrochoanal polyp localised in the right nasal fossa

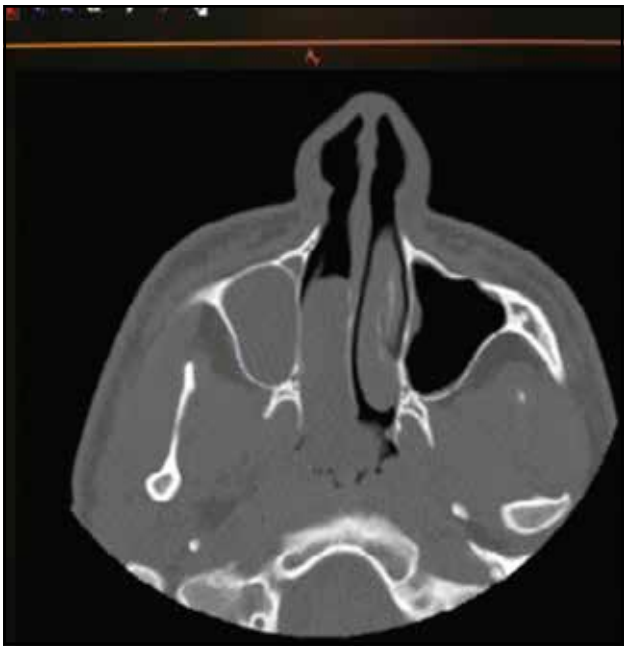

Figure 3. Cranio-facial CT scan, axial image of a double sphenochoanal polyp

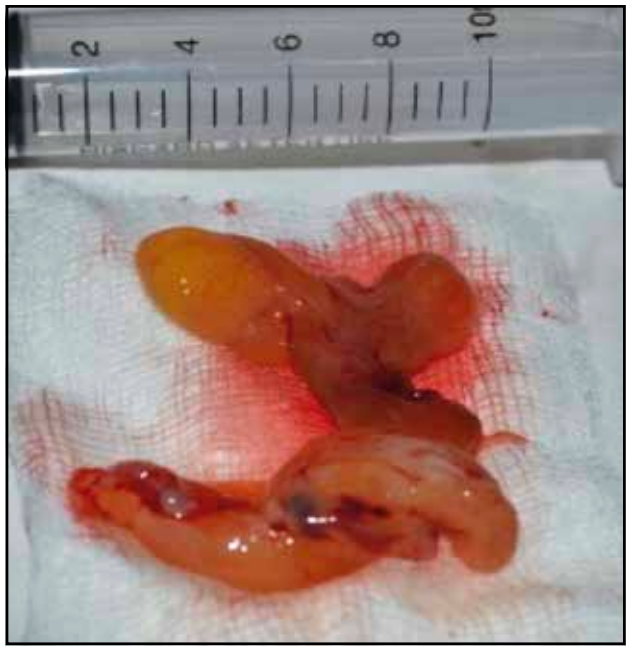

Figure 4. Double sphenochoanal polyp – Postoperative view

The diagnosis of ACP was made using a comprehensive history, a clinical examination, a nasal endoscopy, and radiological analysis. At admission, the majority of the patients' symptoms were caused by unilateral nasal blockage (Table 1). There was also rhinorrhea in ten patients (66.67%). Nasal pruritis (6 patients, 40%), snoring (5 patients, 33.33%), headache (3 patients, 20%), mouth breathing (7 patients, 46.67%), olfactory dysfunction (8 patients, 53.33%), and epistaxis (2 patients, 13.33%) were next in line.

During the examination of the oropharynx, ACP was observed diving from the nasopharynx in three cases (Figure 1). Every patient had a nasal endoscopy, which was considered "the gold standard diagnostic test". A single growth that resembled a tumor and had grape-like components that were fluid, translucent, and easily moved, and non-bleeding on touch, was observed, which confirmed the appearance of a polyp (Figure 2).

A craniofacial CT examination was performed on each subject (Figure 3). In each case, paranasal sinus opacification was confirmed by computed tomography of the nose and paranasal sinuses due to a mass that was confined to the nasal cavity and extended to the choana. We observed opacification of the sphenoid sinus in one patient, which could be a sign of a sphenochoanal polyp. The maxillary sinus was the site of opacification most frequently seen (Figure 3).

100% of the 15 patients underwent surgery under general anesthesia and orotracheal intubation. The polyp was detached from the pedicle in three individuals, and the nasopharyngeal part was removed through the mouth before endoscopic sinus surgery. Twelve patients (80%) underwent endoscopic polypectomy alone by nasal endoscopic approach, while three patients (20%) underwent transnasal endoscopic polypectomy in addition to the transcanine fossa approach method. An ACP was found to have stretched through the accessory maxillary ostium and into the nasal cavity during the surgical procedure. A twin sphenochoanal polyp was seen in another patient (Figure 4). Anterior nasal packing was practiced for one day in all patients. All patients were monitored in the hospital for two days after the surgical intervention.

Postoperatively, nasal decongestants with/without anti-inflammatory drugs were recommended for a week. There were no postoperative complications in any of the cases. Postoperative follow-up to analyze recurrence was attempted in all patients.

The follow-up time ranged from 1 to 4 years and 2 patients were lost from the records. We recorded 2 recurrences in patients who underwent endoscopic polypectomy (at 2 years, respectively, 2 ½ years from surgical procedures) and 100% success rate in the combined endoscopic and trans-canine approach (trans-canine trocar).

DISCUSSIONS

Antrochoanal polyps, sometimes referred to as Killian polyps, are benign tumors that start in the maxillary sinus and extend through the nasal canal to the choana[7]. Despite being a clinical illness, nasal polyposis is infrequently seen in youngsters. A 2008 study by Caimmi et al.[8] at a Pediatric ENT University Center in Italy evaluated and treated 56 consecutive patients with nasal polyposis; of

Table 2. Stammberger's classification of nasal polyps (Stammberger, H., Functional Endoscopic Sinus Surgery: The Messerklinger Technique. DC Becker; 1991)[9].

Type	Systemic Disease	Characteristics
I	Antrochoanal polyps	Isolated unilateral polyps arising from the maxillary sinus and passing into the nasal cavity and to the nasopharynx, through the posterior nostril
II	Large isolated choanal polyps	Large polyps in the nasal cavity coming mainly from the contact of the two mucosal surfaces inside the ethmoid sinuses or the sphenoethmoidal recess
III	Polyps associated with chronic rhinosinusitis; non-eosinophil dominated	Usually bilateral Rare in children
IV	Polyps associated with chronic rhinosinusitis; eosinophil dominated	Include specific conditions, such as non-allergic rhinitis, Samter's triad, and allergic fungal rhinosinusitis
V	Polyps associated with specific disease (cystic fibrosis, primary ciliary dyskinesia, malignancy)	Nasal polyps developing in the context of systemic diseases

those, 50% had unilateral polyps – antrochoanal polyps.

Table 2 shows that Stammberger's classification[9], the most often used technique of polyp classification until 2012, categorizes nasal polyps into five groups. The first two types include Killian polyps (type I) and large isolated choanal polyps (ACP) (type II), which are both rather common in young people and are also frequently referred to as giant choanal polyps.

The European Position Paper on Rhinosinusitis and Nasal Polyps from 2020 (EPOS 2020) proposes the term "chronic rhinosinusitis with nasal polyps" (CRSwNP) and includes the antrochoanal polyp in this subtype[10]. Some authors have connected ACPs to allergies or persistent rhinosinusitis[1,4]. Ozcan et al.[4] investigated the light microscopic and ultrastructural features of antrochoanal polyps and middle meatus nasal polyps. They concluded that the etiology of the antrochoanal polyp is more likely to be a chronic inflammatory process than an allergy mechanism based on the normal aspect of the basement membrane and epithelium, the high number of other inflammatory cells, and the low number of eosinophils. They did this by using transmission electron microscopy and light microscopy. Using immunohistochemistry, Luukkainen et al.[11] evaluated the tissue edema and lymphatic vessel density in CRSwNP and ACP in 120 sinus mucosa and polyp tissue specimens. As a control group, the scientists used tissue samples from the inferior turbinate. They found that the tissue specimens from the maxillary sinus showed low absolute and relative densities of lymphatic vessels, which is indicative of CRSwNP, and that the tissue specimens from the nasal cavity linked to both CRSwNP and ACP had low absolute and relative densities of vascular and lymphatic vessels.

The symptoms presented by patients with ACP are not specific to the condition. They include nasal obstruction, rhinorrhea, snoring, headache, mouth breathing, epistaxis, olfactory disfunction, halitosis, dyspnea, dysphagia, dysphonia and nasal itching, symptoms which can be found in most nasal diseases[6,12-15]. In our case series, the main presenting symptoms were unilateral nasal obstruction (100%), rhinorrhea (66.67%), olfactory disfunction (53.33%), mouth breathing (46.67%), nasal pruritis (40%), snoring (33.33%), headache (20%) and epistaxis (13.33%), similar with the results reported by Orvidas et al.[12] and Gendeh et al.[13]. Abnormal symptom presentations are also reported in the literature in patients with antrochoanal polyps. Salib et al.[14] presented in 2000 a case of a 14-year-old boy with obstructive sleep apnea syndrome and cachexia and diagnosed with antrochoanal polyp. Obstructive sleep apnea has been reported by Veerappan et al.[15] as one of the early indications in a young child with an antrochoanal polyp.

The nasal endoscopy and the craniofacial CT scan were the most important tools for diagnosing ACPs in our pediatric patients. The native cranial CT scan is the suggested imagistic research in nasal polyposis pathology because it offers clear features of the paranasal sinuses in the bone-window. Using enhanced-contrast imaging could be suggested in order to rule out other types of sino-nasal cancers. The CT scan exhibits a number of unique characteristics when ACPs are present: well-defined tissue mass with a mucin density that extends into the nasopharynx and enlarges the native or accessory ostium of the maxillary sinus; possible sinus enlargement (details seen on coronal imaging); no associated bone destruction[16].

The major surgical treatment for ACPs in children, which has been widely accepted and used in recent years, is functional endoscopic sinus surgery (FESS). The Caldwell-Luc surgery, mini-Caldwell-Luc, and transcanine fossa sinusoscopy are further surgical techniques that may be utilized[17]. The main objectives of the surgery are to remove the polyp entirely, identify the point of entry into the sinus, and prevent the ACPs from proliferating or recurring. FESS, the leading surgical approach for primary instances of pediatric ACPs, satisfies this rationale. This is accepted because, as compared to open

surgery, minimal blood loss, minimal discomfort, quicker recovery following surgery, and shorter operating hours are only a few of the benefits that make it safe and problem-free, without the risk of damaging the growing teeth, facial pain, paresthesia)[1,18].

The recurrence rate is another important aspect in cases of antrochoanal polyps. Children with ACPs have a rather significant recurrence rate, depending on the surgical approach used[1,6,12,19-25]. Chen et al.[6] discovered recurrence in 3 cases of 14 after 2 years in their 10-year retrospective research, and Ozdek et al.[21] reported 2 patients with recurrence of 10 included in their study (4 patients underwent FESS and 6 patients combine FESS and transcanine fossa sinusoscopy). Seven ACP patients in the research group of Orvidas et al.[12] experienced recurrences after surgery: four after intranasal treatments with or without Caldwell-Luc, and three after endoscopic procedures. Al-Mazrou et al.[22] reported that recurrence occurred in two of the 19 juvenile ACP patients who had transnasal endoscopic approach (12 patients) and combined endoscopic and transcanine fossa approach procedure (7 patients). Several papers show no recurrence following endoscopic sinus surgery for pediatric patients with antrochoanal polyps[23-25]. Regarding the two recurrences we reported, we believe that the lack of appropriate instruments in younger patients and the inability to precisely detect the polyp's implantation were the main causes of the endoscopic approach's failure. Research indicates that the recurrence rate after endoscopic surgery varies from 0% to 23%, but the recurrence rate after combination surgery for choanal polyps ranges from 0% to 6.66%[19,20].

CONCLUSIONS

Surgery is the sole feasible option for treating antrochoanal polyps in children, and it is typically the first choice for primary surgery. Antrochoanal polyps can be successfully treated with endoscopic sinus surgery. If complete endoscopic control of the illness is not guaranteed, the combination approach is the most effective way to lower the risk of relapses.

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