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Antrochoanal polyps: analysis of 16 cases*†

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SUMMARY

Antrochoanal polyps are rare lesions. Several surgical techniques have been reported to provide complete cure of the disease. However, inadequate treatment may result in a high rate of recurrences. The aetiological as well as predisposing factors are not well understood. We present a literature review and discuss the clinical, pathological and histological features of 16 patients with antrochoanal polyps, who have been surgically treated by either an endoscopical or a conventional approach. It has been found that allergy has no role in the aetiology of antrochoanal polyps. However, the majority of the patients has sinonasal disease. The most common pre-operative radiological finding is the mucocoele-like appearance, which has also been confirmed in surgery. It is remarkable that antrochoanal polyps have recurred in 4 out of 8 patients, who have underwent simple intranasal polypectomy and inferior turbinectomy. As compared to conventional technique, the endoscopic approach proves to be superior.

Key words: antrochoanal polyps, endoscopic approach

INTRODUCTION

Nasal polyps originating from the maxillary antrum with the pedicle attached to the inner wall of the maxillary sinus, emerging from the natural (or the accessory) ostium and extending to the choanae and the nasopharynx through the nasal cavity are known as antrochoanal polyps (ACP). They occur either unilaterally or bilaterally. They are macroscopically identical to typical polyps, but are not associated with an allergic aetiology (Kamel, 1990; Loury et al., 1993). Most of the patients are young and usually under 30 years of age. The incidence varies, however, they are quite rare; only 3-6% of all nasal polyps account for ACP (Ryan et al., 1979; Loury et al., 1993).

The history of ACP recognition dates back to the 18th century. Once, it was believed that the large polyps in the posterior choanal and nasopharyngeal region originate either from the lateral wall of the nasopharynx or from the posterior aspect of the vomer. In 1906, Killian was the first to address the true site of origin and to point out the close relation between ACP and the maxillary sinus. He was also the first to recognize the enlarged antral ostium ("*being 1.7 cm to 2 cm in diameter*") in his report of 21 patients with ACP. His original method of treatment was a snare avulsion. Since then, several statements have been made regarding the diagnosis, the aetiological factors and the therapeutical alternatives for treatment of choanal polyps. Various surgical techniques were proposed as an effective procedure, because simple avulsion of the polyp has a high risk of recurrence.

We present a literature review and discuss the clinical, pathological and histological features of 16 patients with ACP, who have been surgically treated by either endoscopical or conventional approaches. Characteristics of the symptoms and remarks about the post-operative follow-up are also reviewed.

MATERIAL AND METHODS

The symptomatological, diagnostic and therapeutical perspectives of 16 patients, who had their ACP removed and were followed at Gülhane Military Medical Academy and Diyarbakir Military Hospital during a period of two years between June 1994 and November 1996, were analyzed in this series. Patients with ACP were picked out from 162 otolaryngological surgical admissions of common nasal polyps (9.8%). Two out of 16 patients were female, and ages of the patients were ranging between 14 and 30 years (mean: 22 years).

All patients were classified according to the presenting symptoms and the family histories (Table 1). Allergic and vasomotor diathesis were documented in all patients. Previous history of sinus disorders and surgery for nasosinusal disease were noted. Serum immunoglobulin levels as well as full blood counts were

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Table 1. Medical data obtained from patients during their initial admission.

symptomatology	No. of patients	average time for presence of symptoms
unilateral or bilateral nasal obstruction	9	12 - 15 months
headache	5	14 - 17 months
retronasal secretion	4	7 - 9 months
nausea during eating and swallowing	2	17 - 19 months
obstruction during sleep	2	20 - 24 months
epistaxis	1	3 - 4 weeks
loss of smelling sensation	2	6 - 7 months
no major symptom	2	-

Table 2. Results of staging of paranasal sinusitis in patients with ACPs (Kennedy criteria).

	pre-operative	post-operative
stage-IV	6	1
stage-III	3	-
stage-II	-	-
stage-I	7	1

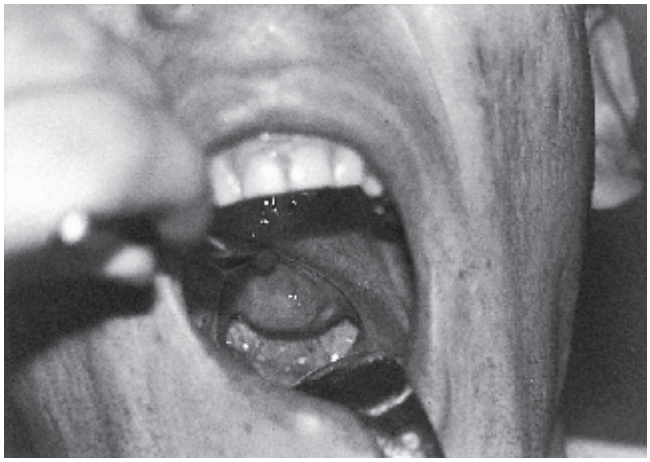

Figure 1. Antrochonal polyp suspending from the nasopharynx into the oral cavity after superior retraction of the posterior tonsillar fold.

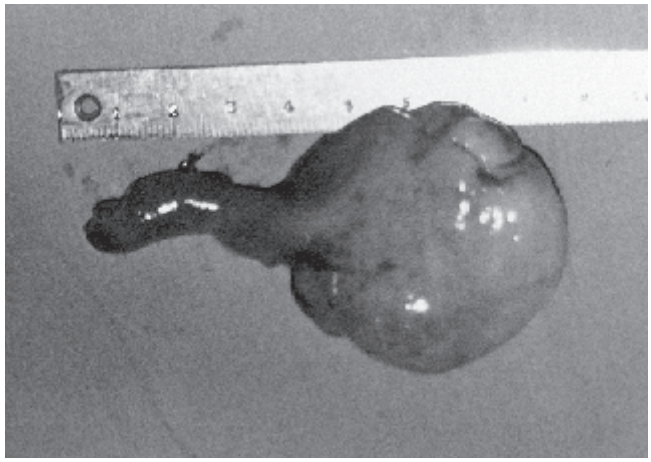

Figure 2. Antrochoanal polyp removed from one of our patients. The cystic antral part has been punctured. The stalk extending from the mass is seen.

obtained from all patients. Conventional sinus roentgenograms and axial/coronal CT scans of the paranasal sinuses were performed upon admission of the patients and during the post-operative follow-up period. The extent of the disease was staged according to the CT findings (Table 2). Patient's follow-up was possible for at least 12 months.

Simple intranasal polypectomy and inferior antrostomy were performed in eight cases. Sublabial transcanine approach (modified Caldwell-Luc operation) was performed in five cases. In two cases, the choanal part of the mass was removed through the mouth (Figure 1); one of them was 9 cm long and had a diameter of 4.5 cm (Figure 2). Extended transnasal antrostomy

Table 3. Surgical results of patients with ACPs.

	number of patients	complications	recurrences
intranasal polybectomy + inferior anstrostomy	8	2 (postop. intranasal adhesion)	4
sublabial transcanine approach (modified Caldwell - Luc)	5	3 (facial numbness in 3, facial swelling in 1 and infection in 1)	–
transnasal extended inferior antrostomy + partial inferior turbinectomy	2	1 (Diffuse intraop. bleeding and postop. intranasal crusting)	
middle meatus endoscopic anstrostomy	1	–	–

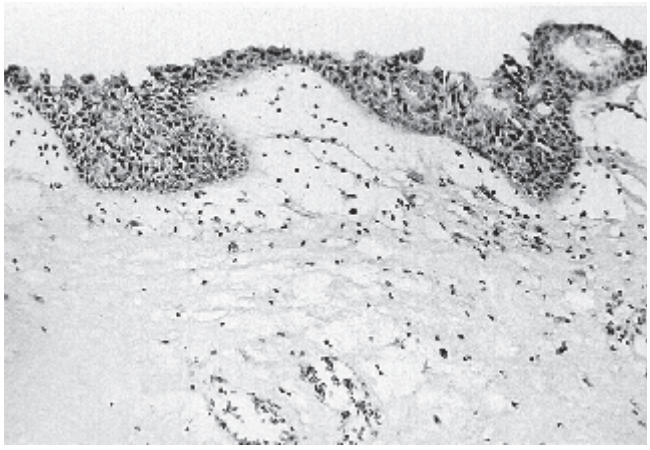

Figure 3. Histological view of the specimen. The respiratory mucosa lining the polyp presenting with focal squamous metaplasia in some areas is seen throughout the specimen. Tissue eosinophils and mucous glands are less obvious (haematoxylin and eosin staining; x100).

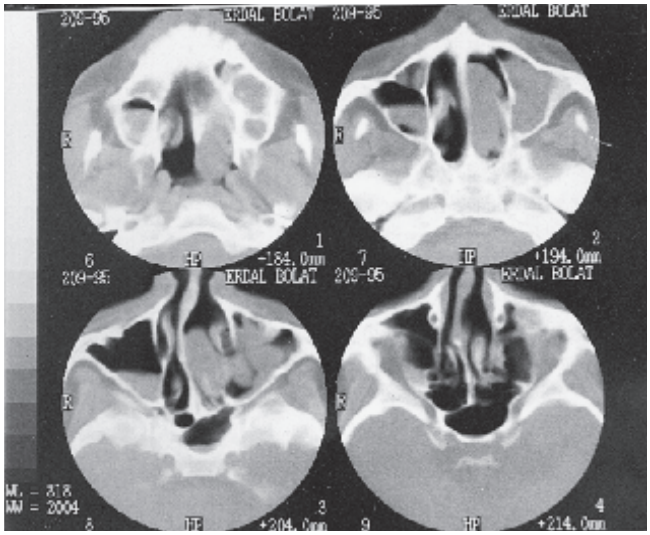

Figure 4. CT scanning of the paranasal sinuses. Choanal polyp originating from the maxillary antrum is seen on several consecutive axial scans. The posterolateral wall of the maxillary sinus is indefinite. This part may be the site of the origin. The septum has been pushed by the mass to the contralateral nasal cavity.

with partial inferior turbinectomy was performed in two patients. Endoscopic antrostomy through the middle meatus was performed in one patient. An intranasal ethmoidectomy was performed in nine patients who had ethmoidal pathology too. General anaesthesia was applied in four patients only. The rest of the patients underwent topical and local anaesthesia. Intra-operative findings and post-operative follow-up notes were recorded in all of the patients. Complications related to the operations and recurrences were also noted (Table 3). Histopathological evaluation of the specimens was done in all of the patients (Figure 3).

RESULTS

None of our cases showed allergic symptoms. Blood counts for eosinophils were less than 4% in all patients. Serum immunoglobulin levels – which have been studied in five patients – were normal. Family history regarding ACP was negative. However, 12 patients described frequent sinonasal disease. Persistent nasal obstruction was the most common symptom that was expressed and was present unilaterally in seven patients and bilaterally in two patients. It was the most bothering complaint which made the patients to accept the surgery. However, it was found during the initial interview with the patients that some minor symptoms, such as obstruction during sleep or nausea during swallowing and eating, are the most long-standing of complaints that were not given much credit by the patients. There were no symptoms in two patients and ACP were discovered during routine ENT examination. None of the patients had previous sinonasal surgery. During pre-operative evaluation of the patients by anterior rhinoscopy, it was found that the pedicle was out of sight due to congestion of the inferior turbinate in two patients. The stalk of the polyp emerging from the natural antral ostium and extending through the nasal cavity into the nasopharynx was observed by both anterior rhinoscopy and CT scanning in five cases (Figure 4). Single ACP was noted during surgery of one patient. The relation between the pedicle and the natural (or the accessory) ostium was not delineated in nine patients. The medial opening of the maxillary sinus from which the stalk was emerging, was larger than normal in 14 patients. Five out of 16 patients demonstrated an oral mass that was visible without retraction of the uvula during oral examination.

Upon pre-operative radiological evaluation of the patients, it was found that a mucocoele-like appearance is the most common finding in 11 patients (68.7%). However, there was complete blockage of the paranasal sinuses in five patients (31.3%) in axial and coronal CT scans. Bilateral pan-sinusitis was found in six cases (stage IV) and unilateral pan-sinusitis in three cases (stage III). There was isolated maxillary sinusitis in seven cases (stage I). Nine patients also had ipsilateral ethmoidal pathology. The status of the paranasal sinuses in patients with ACP is shown in Table 2. The antral part of the polyp was cystic in 11 out of 16 patients. It was found during surgery that the entire sinus mucosa is infected in seven cases and that the cyst is filling the antrum entirely. The site of polyp attachment was not determined in those cases, although the antral cyst was punctured and gently aspirated for the search of the site of the origin. All of those seven cases had an opaque appearance in radiological evaluation of the sinus. In five out of nine patients the polyp originated from the medial and in four patients from the inferolateral wall of the sinus. There were no recurrences following transnasal extended antrostomy, middle meatus endoscopic antrostomy and transcanine approaches (patient No. 8). However, ACP recurred in four out of eight patients who underwent simple intranasal polypectomy and inferior antrostomy.

Transnasal extended antrostomy and middle meatus endoscopic antrostomy were done in two stages. The choanal part or the polyp was excised by dissecting the stalk and then the sinus pathology was removed. However, transcanine approach was done as described by Myers and Cunningham (1986). The antral polyp was elevated by a fine forceps inserted through a small hole, which was not exceeding the diameter of 1×1 cm, opened at the anterior wall of the maxillary bone. The healthy mucosa lining the maxillary antrum was left intact. However, the mucosa at the possible site of origin was removed. Later on, after

gathering the antral mass intranasally through an extended transnasal antrostomy approach, the polyp was removed *en bloc*. Complications related to the surgical methods applied in this series were bleeding, intranasal adhesion, facial numbness and infection (Table 3).

DISCUSSION

Herniation of the hypertrophic maxillary sinus mucosa through the antral ostium protruding into the oropharynx is the characteristic appearance of ACP (Ryan and Nee, 1979; Loury et al., 1993). Sometimes, anterior rhinoscopy demonstrates nothing remarkable; the stalk of the ACP may be out of sight or may be covered by the swollen inferior turbinate – as seen in two of our patients. However, during the examination of the oral cavity and the nasopharynx, ACP appear as a bright, grayish-blue mass behind the uvula pushing the glossopharyngeal plica anteriorly. They may resemble an angiofibroma, neuroblastoma or a meningo-encephalocoele, which all have to be considered in the differental diagnosis.

Nasal obstruction was the most common symptom in our series. It has been reported that it is bilateral in 20-25% of the cases according to the blockage of the nasopharynx (Kamel, 1990). Headache, retronasal secretion and the loss of smelling function are other complaints. Nose-bleeding is an unusual manifestation of ACP, which makes the diagnosis more difficult (Robson et al., 1990). In such cases, angiofibroma must be first eliminated as the underlying pathology.

The pathogenesis of ACP has not been clarified. In a review of 33 cases, Cook et al. (1993) noted that there was a significant association with the allergic status. They also found a strong association between ACP and bronchial asthma (Cook et al., 1993). However, allergy rarely appears to be the cause in several other studies (Lanoff et al., 1973; Ryan and Nee, 1979). The aetiology has been demonstrated to be a chronic bacterial inflammation of the maxillary sinus and cystic fibrosis. Twelve out of 16 patients in our study have described frequent sinus disease and none of them have had an allergy. Those polyps usually have two components: the cystic part in the sinus and the solid choanal part. Both the macro- and microstructure of these antral cystic parts is similar to that of the common intramural cysts of the maxillary sinus (Berg et al., 1988). It is likely that an expanding asymptomatic antral cyst arising from blocked mucous glands within the sinus – usually following episodes of bacterial sinusitis – will emerge through the ostium into the nasal cavity, developing subsequently into a choanal polyp. The site in the antrum where ACP originate is variable. They may originate from the maxillo-ethmoidal angle in the postero-superior wall of the antrum, but sometimes they arise from the medial antral wall, the lateral posterior wall or the floor of the maxillary sinus (Berg et al., 1988; Kamel, 1990; Guindi et al., 1994). The site of origin could not be ascertained in some cases. It is not possible to separate the cyst wall from the sinus mucosa in those cases with a thin-walled cyst that totally fills the sinus cavity – as seen in seven of our cases – although puncturing the cyst wall and aspiration of some of the cyst's contents facilitates the identification of the point of cyst attachment. Classically, in patients with ACP the ostium that the polyp passes through is larger than normal; it was also large in the majority of our cases. It is still a matter of controversy whether the enlargement of the ostium is due to compression of the stalk of the polyp or that the antral mucosa forms a prolaps into the nasal cavity and subsequent development into a polyp is due to anatomical variability of the ostium (Ryan and Nee, 1979).

Maxillary sinusitis is often the sole pathology and usually it is unilateral. However, there may also be associated ethmoidal pathology. During surgical treatment of our patients, maxillary sinusitis was observed in 11 of the cases. Nine patients had ethmoidal pathology too. However, no other pathologies in the antrum other than the pathological mucosal part where the polyp originated, has been found during surgery in two patients. Kamel (1990) has observed similar findings. Radiologic opacification in the antrum, and usually in the ipsilateral ethmoid cells, is almost always accompanied by an ACP. It is likely that the site of origin should be in the vicinity of the ostium in the patients who had no radiological evidence of a complete opacification. However, we could not determine the site of origin in the patients who had the entire maxillary sinus filled with the cyst. Histological evaluation of the specimen demonstrated either a few or no cilia at all, and mucous glands were minimal. Tissue eosinophils were found to be considerably low. In the majority of specimen the most prominent feature was a respiratory mucosa lining the lesion presenting with focal squamous metaplasia and inflammatory cell infiltration with perivascular fibrosis.

The treatment of choice is complete removal of both the antral and the choanal parts of the polyp (Myers et al., 1986; Loury et al., 1993; Gerek et al., 1997). The original method of treating ACP by simple polypectomy without intervening the sinus results in long-term failure (Killian, 1906). Recurrence in children following limited surgery is high (Jafte et al., 1977). Ryan and Nee (1979) have reported 36 patients of which 14 had a transcanine approach, without any recurrence; 21 had a nasal-antral approach with one recurrence and 11 had a simple avulsion with eight recurrences (Ryan and Nee, 1979). In their review of 24 patients, Guindi and Mansour (1994) report four recurrences after simple polypectomy, two recurrences after inferior medial antrostomy, and three recurrences after middle meatal antrostomy. The technique that allows the surgeon to inspect the antral walls sufficiently seems to provide the most satisfactory therapeutical results. For instance, Schramm and Effron (1980) reported 32 children who underwent Caldwell-Luc procedure for ACP and only one of these required re-operation for recurrence. Inferior antrostomy through partial inferior turbinectomy as modified by Ophir and Marshak (1987) does not always provide good exposure, although these authors report no recurrences following surgery of 12 patients with ACP. However, intra-operative bleeding and post-operative intranasal crusting are the major drawbacks of this surgery. One of the major concerns related to the transcanine approach is the interference with facial growth and the possible risk of destruction of the permanent dentition in children. In our cases, Caldwell-Luc operation revealed no asymmetric facial growth

or devitalized dentition (Pravalainen et al., 1977; Juntunen et al., 1989). Paraesthesia and numbness of the cheek was noted in several studies despite the fact that the infraorbital nerve was isolated and protected. However, the overall complication rate of Caldwell-Luc operation in 270 patients has been found to be less than 3% (Yaringhton, 1984). For children under the age of 8-10 years, operating on the antrum is inconvenient. Less aggressive measures should be taken in polyp removal at younger ages. Nowadays, transnasal endoscopy is a reasonable alternative (Loury et al., 1993). Transcanine sinuscopy has also proved to be useful to detect early recurrences (Guindi and Mansour, 1994). However, maxillary sinus exploration through the transcanine approach seems to be the best method to eradicate the disease (Myers et al., 1986; Kamel, 1990). Transcanine usage of endoscopes with varying angles improves the manipulation of the surgeon (Gerek et al., 1997). The recurrence rate following transcanine surgery in patients with ACP is below 5-5.5% (Kamel, 1990; Loury et al., 1993). It makes visualization and instrumentation of the entire maxillary sinus possible. Sometimes, ACP regress with the medication. Seshadri (1995) reported a case of ACP who was treated with intranasal steroids. No recurrence was noted one year following the initial diagnosis. Surgery should be supported by medicaments in order to improve the therapeutical results.

REFERENCES

1. Berg O, Carenfelt B, Silfvarsward C, Sabin A (1988) Origin of choanal polyps. Arch Otolaryngol Head Neck Surg 114: 1270-1271.
2. Cook PR, William ED, McDonald R, Javel PM (1993) Antrochoanal polyposis: A review of 33 cases. ENT Journal 72: 401-402.
3. Gerek M, Yetişer S, Dundar A, Ozkaptan Y (1997) Transnasal and transcanine endoscopy in management of antrochoanal polyp. In: G McCafferty, W Coman, R Carroll (Eds.) Proc XVI World Congress Otorhynolaryngology Head and Neck Surgery - IFOS '97. Monduzzi Editore, Bologna, pp. 1499-1503.
4. Guindi AE, Mansour MH (1994) The role of transcanine surgery in antrochoanal polyps. J Laryngol Otol 108: 1055-1057.
5. Jafte BF, Strome M, Khaw et al. (1977) Nasal polypectomy and sinus surgery for cystic fibrosis: A 10-year review. Otolaryngol Clin N Amer 10: 81-91.
6. Juntunen K, Tarkkanen J, Makinen J (1989) Caldwell-Luc operation in the treatment of childhood branchial asthma. Laryngoscope 94: 249-251.
7. Kamel R (1990) Endoscopic transnasal surgery in antrochoanal polyps. Arch Otolaryngol Head Neck Surg 116: 841-843.
8. Killian C (1906) The origin of choanal polyps. Lancet 2: 81-82.
9. Lanoff G, Drado R, Johnson E (1973) Nasal polyps in children: A 10-year study. Ann Allergy 31: 551-554.
10. Loury MC, Hiney DK, Wong W (1993) Endoscopic transnasal antrochoanal polypectomy: An alternative to the transantral approach. South Med J 86: 18-22.
11. Myers EN, Cunningham MJ (1986) Modified Cadwell-Luc for the treatment of antral choanal polyps. Laryngoscope 96: 911-913.
12. Ophir D, Marshak G (1987) Removal of antral polyp through an extended nasoantral window. Laryngoscope 97: 1356-1357.
13. Pravalainen M, Pravalainen R, Tarkkanen J (1977) Influence of Caldwell-Luc operation on developing permanent teeth. Laryngoscope 87: 613-616.
14. Robson AK, Barker CS, Whittet B (1990) Epistaxis as an unusual presentation of antral choanal polyps. J Laryngol Otol 104: 643-644.
15. Ryan RE, Nee HB (1979) Antrochoanal polyps. J Otolaryngol 8: 344-346.
16. Schramm VL, Effron MZ (1980) Nasal polyps in children. Laryngoscope 90: 148-149.
17. Seshadri R (1995) Antrochoanal polyp: A case report of treatment with intranasal steroids. J Laryngol Otol 109: 553-554.
18. Yaringhton CT (1984) The Caldwell-Luc operation revisited. Ann Otol Rhinol Laryngol 93: 380-384.

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