

# Bilateral antrochoanal polyps: a case report and literature review

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Antrochoanal polyp (ACP) is a common unilateral benign lesion that originates from the maxillary sinus mucosa and protrudes through the choana into the nasopharynx. Patients usually present with progressive unilateral nasal obstruction. Rarely, bilateral ACPs could be encountered in clinical practice. It is important to recognize such unusual entity to spare patients unnecessary investigations and prolonged medical and aggressive surgical treatment. Generally, ACP is managed surgically with complete excision including the mucosa of origin to reduce the risk for recurrence. In this report, we present a rare case of bilateral simultaneous ACPs that was managed successfully with endoscopic excision. Review of the literature as regards the etiology, pathophysiology, different clinical presentations, and management aspects of ACP is also presented.

## Keywords:

antrochoanal, maxillary sinus, polyps

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## Introduction

Antrochoanal polyp (ACP) is a well-known disease entity that is commonly encountered in otolaryngologic practice. It is a benign unilateral solitary lesion of the maxillary sinus mucosa that usually protrudes out of the maxillary sinus ostium and passes through the choana into the nasopharynx, and hence given the name antrochoanal polyp. It has a cystic maxillary sinus part and a solid choanal part that are joined together by an edematous mucosal band. The most common presentation is unilateral progressive nasal obstruction. Occasionally, however, it might present as isolated unilateral maxillary sinusitis secondary to obstruction of the sinus outflow drainage. Bilateral simultaneous ACPs have been documented, yet extremely rare. The recommended management of ACP is total surgical resection from its origin to reduce the risk for recurrence. In this article, we present an unusual case of bilateral simultaneous ACPs that were resected successfully using the endoscopic endonasal approach. In addition, the pathophysiology of ACP as well as some of the unusual presentations of such pathology was reviewed.

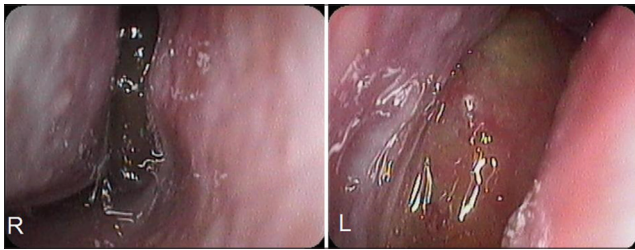
## Case report

A 62-year-old man presented to our ENT Clinic with a history of bilateral nasal blockage, worse on the right side, for 6 years. It had been increasing in severity over the last few months before presentation. There was no history of rhinorrhea, epistaxis, headache, postnasal drip, facial pain, loss of smell, allergic rhinitis, or recurrent sinusitis. Past medical and surgical history were both unremarkable. Drug history was negative and

family and social history were irrelevant. Endoscopic examination revealed right solitary nasal polyp originating from the middle meatus and extending into the nasopharynx, causing a near-total obstruction of the right choana. The left side showed a similar but smaller solitary polyp within the middle meatus with a very thin stalk passing along the middle meatus posteriorly and ending as a polyp into the nasopharynx causing partial blockage of the left choana (Fig. 1). No purulent or mucoid discharge was seen on either side. Rest of the ENT examination was normal. Computed tomography (CT) scan showed complete homogenous opacification of both maxillary sinuses with a polyp on the right middle meatus protruding into the nasopharynx causing a near-total blockage of the right choana. The left choana was partially blocked by a soft tissue mass like polyp. No expansion of the sinuses or bony erosion was noted. Rest of the sinuses looked normal (Fig. 2). A diagnosis of bilateral ACPs was made. Endoscopic endonasal resection of both polyps was performed under general anesthesia. Intraoperative findings confirmed the diagnosis of bilateral ACPs, with the larger ACP on the right side. Using both 0 and 45° telescopes, lateral walls of both concha bullosa were resected, followed by bilateral uncinectomies and wide middle meatus antrostomies (MMAs). Both ACPs were seen to originate from the posterior wall of both maxillary sinuses and protruding from the natural ostia toward the nasopharynx. No accessory ostia were noted. Complete resection of both ACPs along

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Figure 1



Endoscopic nasal examination revealed solitary nasal polyp in both middle meatus extending into the nasopharynx and causing near-total obstruction of both choanae.

with the mucosa of origin was achieved successfully through the widened MMA with the aid of powered instrumentation and angled telescopes. Right ACP was delivered orally, whereas the left one was removed nasally. The patient had an uneventful postoperative period and was discharged the next day on saline nasal douches. Histology report showed evidence of stromal edema with occasional lymphocytes, plasma cells, and eosinophils in both specimens with the final report as bilateral benign nasal polyps. No recurrence was seen on follow-up visit 6 months later.

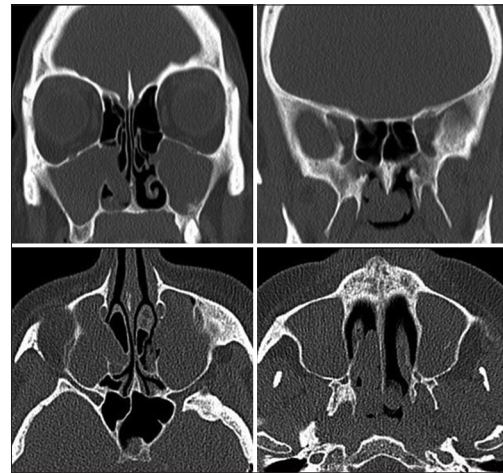
## Discussion

ACP is a unilateral benign solitary lesion that originates from the maxillary sinus mucosa. Once it grows in size to fill the maxillary sinus and protrudes from there into the nasopharynx, the patient becomes symptomatic with difficulty in breathing due to obstruction of the choana [1]. It was first reported in the literature in 1691 when Ruysch observed two cases of nasal polyps arising from the Highmore antrum. Nevertheless, it was not until 1906 when Killian published a comprehensive description of all aspects of the lesion accurately, yet Killian was not able to document the origin of the polyp. In fact, it was Ion Kubo who confirmed the maxillary sinus origin of ACP in 1909 [1]. Since then, many reports of either sporadic cases or case series of ACP were published in the medical literature.

ACP is encountered infrequently in otolaryngologic practice. Generally, the incidence ranges between 3 and 6.2% for cases of all nasal polyps [2,3]. In his review of 33 cases, over a period of 5 years, Cook *et al.* [4] reported an incidence rate of 22.3% (for all cases of nasal polyps), which is significantly higher than the usual.

Even though ACP could affect any age between 5 and 81 years, it is frequently seen in patients who are less than 40 years of age, with a mean age of 27 years at presentation [1,5,6]. Unlike inflammatory and allergic nasal polyps, ACP is more often seen in pediatric

Figure 2



Computed tomography scan showed complete homogenous opacification of both maxillary sinuses from which a polyp-like soft tissue is protruding into the nasopharynx causing incomplete blockage of both choanae.

population. In fact, it accounts for almost one-third of pediatric nasal polyps [5]. In a report of 16 cases of ACPs, 11 (68.8%) cases were seen in children below 20 years of age [7]. In another report, Al-Mazrou *et al.* [8] documented that 19 of 35 ACP cases operated consecutively were children, accounting for 54% of the total.

For an unknown reason, ACP predominates in male population, with a male to female ratio of 2–3:1 [1,5].

Distinguishing features of ACP include origin from the maxillary sinus mucosa and unilateral presentation in the form of a solitary cystic antral part and a solid nasopharyngeal part that are joined by a mucosal stalk passing through the sinus ostium [1,5,7]. Rarely, bilateral simultaneous occurrence of ACPs have been encountered. In fact, extensive review of the medical literature revealed only 10 reported cases since 1980 [5,9–14]. Our case is the 11<sup>th</sup> documented case of unusual presentation of simultaneous bilateral ACP in an elderly patient.

The most common presenting symptom of ACP is nasal obstruction, which is frequently unilateral. However, in 20–25% of cases it presents as bilateral nasal obstruction secondary to blockage of the nasopharynx by the choanal part of the polyp or occasionally by the long-standing pressure by the polyp causing deviation of the nasal septum (DNS) to the other side [1–15]. Other associated symptoms may include rhinorrhea, snoring, hyposmia, postnasal drip, headache, halitosis, and occasionally ear fullness and decreased hearing due to blockage of the Eustachian tube and development of middle ear effusion [5,7]. When extended into the oral cavity, ACP can cause dysphagia, speech disorders,

and obstructive sleep apnea [16]. Epistaxis has been reported as an unusual presenting symptom of ACP. Explanations were either, strangulation and infarction of the polyp, spontaneous amputation, or secondary infection and associated sinusitis [17]. In a very unusual presentation, Frosini *et al.* [18] discussed a case of a 81-year-old man who suffered stridor, cough, and dyspnea when lying supine. Examination revealed a giant ACP extending down to the level of the epiglottis causing laryngeal obstruction. The patient experienced immediate recovery upon complete surgical resection through an endoscopic endonasal wide MMA approach. The excised polyp was delivered transorally, measured 14 cm in length, and showed three lobules (antral, choanal, and pharyngeal) [18]. To date, only six cases of such giant ACPs have been reported in the medical literature [18–24].

Examination with anterior rhinoscopy usually shows a unilateral polyp and infrequently DNS to the opposite side [1]. Frosini *et al.* [5], in his largest series of 200 ACPs documented the presence of contralateral DNS in 55% of the cases, suggesting a chronic pressure effect from the ACP as an underlying etiology. Endoscopic nasal examination showed a solitary unilateral nasal polyp arising from the middle meatus and extending into the nasopharynx, frequently moving with swallowing during palatal elevation.

CT scan is helpful in confirming the diagnosis and exclusion of other possible pathologies such as mucocele, fungal sinusitis, juvenile nasopharyngeal angiofibroma, inverted papilloma, and maxillary sinus malignant tumors. In bilateral cases, differential diagnosis includes inflammatory/allergic nasal polyposis, fungal rhinosinusitis, and cystic fibrosis. CT characteristics of ACP include homogenous opacification of the maxillary sinus, ipsilateral nasal cavity, and nasopharynx with no evidence of bony destruction or involvement of the adjacent structures. No enhancement is seen with contrast administration [5,7]. In our reported case, similar features were seen bilaterally.

MRI, however, has been utilized by some authors to confirm the diagnosis of ACP when doubt still exists. Noted MRI features include hypointense maxillary sinus on T1-weighted images and hyperintense maxillary sinus on T2-weighted images. On gadolinium-enhanced MRI, the maxillary sinus part usually shows little or no peripheral enhancement, whereas the nasochoanal part shows strong rim enhancement. These features along with the clinical presentation and anatomic location of the mass will often yield the correct diagnosis [20,23,24]. In the current reported case, diagnosis was made without the need for MRI.

The etiology of ACP is not well understood. Some authors found a significant association between ACP and the presence of IgE-mediated allergy [4]. Topal *et al.* [25] documented prominent eosinophilia in 69% of his reported cases, suggesting possible allergic background. Al-Mazrou *et al.* [8] documented that abundant eosinophilia was more common in pediatric ACP compared with adult ACP. The ratio of allergic to inflammatory ACP was 2.8:1 and 0.8:1 in children and adults, respectively. His findings suggested that most ACPs in children are secondary to allergy, whereas inflammation and sinusitis are the main cause for the development of ACP in adults [8]. Hereditary factors are unlikely to exist. Only one report showed two siblings with ACP and that could be just a coincidence. Origin from a pre-existing maxillary sinus retention cyst is the most acceptable theory of development of ACP.

Berg *et al.* [26] suggested that ACP is originally an antral retention cyst, which is incidentally found in 8–10% of population. In fact, histology of both ACP and intramural retention cyst was found to be the same [27]. Theories to explain the development of maxillary sinus retention cyst include acinar mucous gland obstruction secondary to either allergy or infection, lymphatic duct stenosis following inflammation, mucosal edema secondary to sinus ostium obstruction by chronic inflammation, and emergence from tooth channels through which the permanent teeth migrates in children [5]. Frosini *et al.* [5], in his review, agreed that the development of ACP from already existing sinus cyst is the most acceptable etiology to date. According to him, herniation of the cyst through the accessory ostium could be explained by Bernoulli's theory. In such case, intramural cyst causes total blockage of the inferiorly located accessory ostium and partial obstruction of the three-dimensional natural maxillary sinus ostium. This will result in trapping of air within the sinus during inspiration, leading to elevation of the pressure within the sinus cavity. In turn, this will enhance the intramural cyst to enlarge in size and eventually forced out of the sinus through the accessory ostium giving rise to ACP [5].

ACP commonly originates from the posterior, inferior, lateral, or medial walls of the maxillary sinus [5,18]. Medial, inferior, and anterior origins are associated with technically difficult and challenging complete surgical resection. As previously discussed, it usually protrudes through an accessory maxillary sinus ostium. In this report, both sides were noted to originate from the posterior wall of the maxillary sinus and protrude through the natural sinus ostium.

There is a general consensus among all otolaryngologists as regards the management of ACP with surgical resection [1–24,27,28]. Historically, ACP used to be removed through an open approach with Caldwell–Luc procedure. This procedure, however, is associated with damage to the maxillary and dental growth centers in children and young adolescents, thus affecting the mid-facial growth [27]. In addition, infraorbital nerve damage and paresthesia of the involved cheek is another potential complication. Nowadays, with the advent of endoscopic surgeries of the nose and paranasal sinuses, endoscopic resection has become the gold standard approach for the management of ACP whether unilateral or bilateral. Even giant cases were managed successfully with endoscopic approach solely. Endoscopic resection is safe, effective, noninvasive, and associated with minimal morbidity [5,27]. Commonly, 0, 45, and 70° telescopes are used during resection [18]. Surgical steps include widening of the natural maxillary sinus ostium (MMA), identification of the origin of the ACP, and complete resection of the polyp along with the mucosal stalk of origin within the wall of the maxillary sinus, yet preserving the remaining healthy antral mucosa. This will promote epithelialization of the denuded area at the stalk, will allow normal physiological mucociliary clearance, and will reduce the rate of recurrence [11,14]. In cases of giant ACP or one that originates from the most anterior inferior aspect of the maxillary sinus, technical difficulties in excising the stalk can be overcome by combining MMA with inferior meatus antrostomy (IMA) for access. IMA will usually close spontaneously within few days. Some authors, however, recommend the combination of endoscopic MMA and transcanine sinuscopy for complete removal of the ACP in difficult-to-access cases, thus eliminating the risk for recurrence [29]. The use of powered instrumentation such as microdebrider through any of the above-mentioned openings (MMA, IMA, and canine fossa) could greatly assist in the complete resection of the antral portion of the polyp [18]. Histologically, almost all reported ACPs showed similar findings of edematous connective tissue core with mild inflammatory changes. [28]. In Min *et al.*'s [30] extensive histological study of 40 cases of ACPs in comparison with bilateral nasal polyposis, he indicated that inflammatory cells are more prominent in ACPs, yet eosinophils and submucous glands are more abundant in bilateral nasal polyposis, whereas epithelial edema is equally found among both. His findings suggest that ACP results from edematous hypertrophy of the respiratory epithelium rather than from distension of the glandular structures [30]. There is one reported case in which cholesterol granuloma has been documented in histology [31].

The presence of some molecular markers in ACP has been studied in comparison with mucosa from chronic rhinosinusitis (CRS) and healthy controls. In one report, Topal *et al.* [25] found that matrix metalloproteinase-9 inflammatory cells were significantly increased in ACP and CRS patients when compared with healthy mucosa. However, Mahfouz *et al.* [32] reported significantly higher levels of basic fibroblast growth factor and transforming growth factor beta in ACP compared with both CRS and healthy mucosa, which may suggest that ACP represents an inflammatory reaction caused by the overproduction of tissue-derived growth factors in an inductive environment.

Recurrence is usually associated with incomplete removal of the mucosal stalk of origin from within the maxillary sinus wall. This is attributed either to the inability of the surgeon to localize the exact origin of the polyp or to the technical difficulties in complete resection of inaccessible and/or wide mucosal origin polyp. In general, recurrence rate varies from 2 to 12.5% [5,7]. However, there is no significant difference in recurrence rate between endoscopic approach versus Caldwell–Luc surgery.

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## Conclusion

In conclusion, ACP is a benign inflammatory unilateral polyp that arises from the antrum (cystic component) and protrudes into the choana (solid component). Bilateral ACPs are very rare. Clinical presentation, endoscopic picture, CT findings, and high index of suspicion are the key to differentiate it from other causes of bilateral nasal polyposis. Identification of such entity may spare the patient unnecessary prolonged medical treatment and/or aggressive surgery. Endoscopic resection is the gold standard for management. Combined approaches with either IMA or transcanine puncture should be considered, particularly when the attachment site of the antral part of ACP is undetected.

Further research is needed to establish the relationship between ACP and both allergy and chronic sinusitis. Further work is also needed to investigate the etiology and pathogenesis of ACP by studying the role of inflammatory mediators and tumor marker expression on its development.

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## Conflicts of interest

There are no conflicts of interest.

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