

Association of anatomic variations with antrochoanal polyps in paranasal sinus computed tomography scan

Ali Hekmatnia, Farid Shirvani, Farhad Mahmoodi, Mostafa Hashemi¹

Departments of Radiology and ¹Otolaryngology, Alzahra Hospital, Isfahan University of Medical Sciences, Isfahan, Iran

Background: This study was designed to determine the prevalence of concomitant anatomic variation of paranasal sinuses in patients with antrochoanal polyp (ACP). **Materials and Methods:** Among patients referred by their clinicians for standard computed tomography scan of paranasal sinuses septal deviation, concha bullosa, and retention cyst were evaluated in both patients with ACP as well as in a control group. **Results:** Of the 17 patients with ACP, fifteen patients (88.2%) had septal deviation and two patients (11.8%) had concha bullosa. None of the patients with ACP had retention cyst or hypertrophic turbinate. Of the 78 patients in control group, twenty-nine (37.2%) had septal deviation, six (7.7%) had concha bullosa, seven (8.9%) had retention cyst, and one (1.2%) had hypertrophic turbinate. Septal deviation in patients with ACP has higher incidence ($P < 0.001$). **Conclusion:** This study showed that septal deviation is an anatomic variation which is significantly concomitant with ACP. Larger studies are needed to show the role of other anatomic variations in patients with ACP.

Key words: Antrochoanal polyp, computed tomography scan, paranasal sinus

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INTRODUCTION

Antrochoanal polyps (ACPs) are benign lesions arising from the edematous mucosa of the maxillary sinus and extending into the choana. ACPs constitute 4%–6% of all nasal polyps. Despite nasal polyposis, ACPs are typically unilateral. They can occur in males and females at any age. However, most of the published studies have been unanimous about preponderance of males and also its peak in early decades of life.^[1,2]

Chronic sinusitis and allergic rhinitis seem to play a major role in establishing the ACP. These inflammatory processes cause mucosal edema and also mucous retention cyst formation.^[3,4] One of the suggested etiological theories for ACP described that inflammatory-related closure of osteomeatal complex and increase of pressure in maxillary sinus force

mucous retention cysts to herniate into the nasal cavity.^[2] Considering this theory, anatomic variations such as septal deviation, hypertrophic turbinate, and concha bullosa also pave the way for increasing the pressure difference between the middle meatus and the maxillary sinus.

In this study, we examine this theory by comparing the coincidence of anatomic variation in patients with ACP with normal population.

MATERIALS AND METHODS

Between March 2014 and August 2015, among patients referred to Radiology Department, Kashani and Alzahra Hospitals (Isfahan University of Medical Sciences, Isfahan) by their clinicians for standard computed tomography (CT) scan of paranasal sinuses patients with the imaging diagnosis of ACP were enrolled to the study, consecutively. The patients were followed to confirm

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Address for correspondence: Dr. Farid Shirvani, Department of Radiology, Alzahra Hospital, Soffeh Street, Isfahan 81744, Iran.
E-mail: farid.shirvanii@gmail.com

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the diagnosis of ACP through the surgery. Demographic features include sex and age were gathered.

In control group, seventy-eight patients with no evidence of polyposis were randomly selected and matched by sex and age with ACP cases. Septal deviation, unilateral or bilateral concha bullosa, and retention cyst in contralateral maxillary sinus were evaluated in both groups.

Data of both groups entered to (SPSS version 22, IBM corporation, Somers, NY, USA). Appropriate statistical tests were performed.

RESULTS

Of the 17 patients with ACP, 10 (58.8%) were males and 7 (41.2%) were females. Ages ranged from 18 to 67 years with a mean of 38.11 ± 11.06 years. Fifteen patients (88.2%) had septal deviation. Two patients (11.8%) had concha bullosa. None of the patients with ACP had retention cyst or hypertrophic turbinate.

Of the 78 patients in control group, 38 (48.7%) were males and 40 (51.3%) were females. Ages ranged from 20 to 66 years with a mean of 35.08 ± 10.45 years. Twenty-nine patients (37.2%) had septal deviation, 6 (7.7%) had concha bullosa, 7 (8.9%) had retention cyst, and 1 (1.2%) had hypertrophic turbinate.

Mann–Whitney U-test showed the higher coexistence of septal deviation in patients with ACP in comparison with control group, significantly ($P < 0.001$). However, there was no significant difference in incidence of concha bullosa between two groups.

DISCUSSION

The etiopathogenesis of ACPs has not been completely clarified and controversies are still present. Chronic sinusitis which has been introduced as an important factor in the etiology of ACP, instead could be the result of an obstruction of the maxillary sinus ostium caused by ACP. Allergic situation is another factor considered in etiology of ACP. While some studies have found significant association between ACP and allergy, others fail to detect this association.^[1-4]

Role of anatomic variations of paranasal sinuses is another state of debate. In a large series of patients with ACP reported by Frosini *et al.*, the only significant correlating factor found in the patients was the anatomical variation. In their series, rate of septal deviation (55%), inferior turbinate hypertrophy, and concha bullosa were 55%, 21%, and 7%, respectively.^[2] Balıkcı *et al.* reported a rate of 76.4% for anatomical variation in their series. They found that 32.3%

of their cases had a contralateral mucous retention cyst.^[1] In our series, 37.2% had septal deviation, 7.7% had concha bullosa, 8.9% had retention cyst, and 1.2% had hypertrophic turbinate.

While some authors consider etiologic role for some of the anatomic variations in establishment of ACP, the others claim these variations are secondary to the presence of ACP.^[5] A variety of inflammatory and allergic processes have been also suggested in ACP.^[6]

Diagnosis is based on physical examination, includes anterior rhinoscopy and nasofibroscope and CT scan. CT scan is helpful not only in the diagnosis of ACP but also in choosing the appropriate surgical approach as it offers valuable information about the boundaries of each polyp. Magnetic resonance imaging has been also used in ACP. On T1-weighted images, ACP is intermediate to low signal; and on T2-weighted images, it is heterogeneously high. However, signal variation is seen due to chronicity or presence of fungal infections. Postgadolinium images show peripheral enhancement of ACP.^[4,7]

The major imaging differential diagnoses for ACP are retention cysts, acute sinusitis with prolapsed mucosa, inverted papilloma, maxillary sinus mucocele, sinonasal organized hematoma, nasoethmoidal encephalocele, esthesioneuroblastoma, and juvenile nasopharyngeal angiofibroma.^[8,9]

Treatment is surgery-based and preferred method is intranasal endoscopic polypectomy. Excision of ACP stalk is a key point to reduce the recurrence rate.^[10,11]

CONCLUSION

This study showed that septal deviation is an anatomic variation which is significantly concomitant with ACP. Larger studies are needed to show the role of other anatomic variations in patients with ACP.

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Conflicts of interest

There are no conflicts of interest.

AUTHORS' CONTRIBUTION

All authors contributed in the conception of the work, conducting the study, revising the draft, approval of the final version of the manuscript, and agreed for all aspects of the work.

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