

Pneumatized septal turbinate



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ABSTRACT

Intumescencia septi nasi anterior is an anatomical variation in the nasal cavity, first described by Morgagni in 1662; septal turbinate and tuberculum septi nasi anterior are among the various other names attributed to this anatomical structure. It is an expandable vascular network which develops from the septal mucosa. Computed tomography, following history-taking and physical examination, is a valuable tool in diagnosing turbinate pneumatisation. This paper reports the case of a 23-year-old female with nasal stuffiness as her primary complaint, who was found to have pneumatization of the septum mimicking the septal concha. Pneumatization of the septal turbinate may also be a cause of septal enlargement. The symptomatology, diagnosis and treatment options for cases of septal turbinate are discussed. The surgical interventions performed in the presented case are briefly described. The presented patient had a pneumatization of the septal turbinate, like those of the conchae. It is reported for the first time in medical literature, and the histological and functional similarities of the septal turbinate and of the nasal conchae are pointed out.

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1. Introduction

Intumescencia septi nasi anterior (ISNA) was first described by Morgagni in 1662 as a mucosal protuberance, located anteriorly on the septum. Later, in 1900, Schiefferdecker defined a vascular network on the anterior part of the septum and named it as “septal turbinate” [1]. The nasal septum consists of the lamina perpendicularis of the ethmoid bone, vomer and the septal cartilage. The “septal turbinate” is a mucosal swelling on the septum, with variable macroscopic borders [2].

The nasal conchae are significant anatomic structures of the nasal cavity, lined on the lateral nasal wall. While the inferior nasal concha is a distinct bony structure, the middle, superior, and also the suprema concha seen in some cases, are all considered to be a part of the ethmoid bone [3]. Concha bullosa is the name given to the pneumatization of the middle concha, and, although rarely encountered, also of the superior and inferior conchae [4]. Pneumatization of the middle concha was reported for the first time by Santorinus in 1739 [5]. The first report of an inferior concha bullosa in medical literature was authored by Zinreich et al. [6]. In this case report, a pneumatization of the septal turbinate, like those

of the conchae, is reported for the first time in medical literature, and the histological and functional similarities of the septal turbinate and of the nasal conchae are pointed out.

2. Case report

A 23-year-old female patient consulted for nasal stuffiness of 10 years' duration. The patient did not have a history of nasal trauma. Anterior rhinoscopy and nasal endoscopic examination revealed that the nasal septum was slightly deviated to the left. The coronal and axial paranasal sinus CT images showed pneumatization in the anterior septal area, on the septal cartilage known as septal turbinate. Additionally, coronal and axial paranasal sinus CT scans showed a pneumatized septal turbinate, a septum slightly deviated to the left, and bilateral hypertrophic inferior turbinates (Figs. 1 and 2). Pneumatized septal turbinate and alar cartilages were observed at bone density through CT (Fig. 3). Septoplasty was performed under general anesthesia, and the deviated cartilaginous-osseous formation was surgically removed. The pneumatized septal turbinate was also excised meticulously in toto for histological examination. Radiofrequency and ablation plus outer fracture was conducted for the correction of bilateral inferior turbinates hypertrophies. There were no postoperative complications. The follow-up showed that the patient have been relieved of her complaints. Histopathological examination revealed pneumatized spaces replacing medullary bone areas and cortical thinning

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Fig. 1. Coronal paranasal sinus CT scan.



Fig. 3. Alar cartilages were observed at bone density through CT scan.

(Fig. 4). There was no mucosal lining inside the pneumatized septum in tissue section.

3. Discussion

Intumescencia septi nasi anterior, first reported by Morgagni in 1662 as *intumescencia septi*, is also known by various other names in medical terminology. In Latin, *intumescencia* means “ability to expand”. Septal turbinate, as can easily be understood, shows that it is located on the anterior part of the septum. It is also called *tuberculum* since its structure is capable of swelling [1]. The

term septal turbinate is yet another name, although it does not share the exact structure and functions of the lateral turbinates. The septal turbinate is primarily a glandular formation, not a venous one. Saunders has shown that there were no cavernous tissues in the septum, thus rhinophysiologically the swelling function of the septum was less than the lateral turbinates [7]. Some sources use the term Kiesselbach triangle, however it is a misnomer since the Kiesselbach triangle is located more inferiorly and is not connected to septal turbinate [8].

Delank et al. report the dimensions of the septal turbinate as approximately 10.2 mm on the vertical and 6.2 mm on the sagittal planes, based on measurements conducted on cadavers. When a septal turbinate was present, the septum, which is normally 4–5 mm wide, was enlarged up to 12–13 mm. The distance from the base of the nose was reported as 29 mm. [8]. Delank also reported 43% and 14% increases in nasal airflow values, respectively, after applying xylomethazoline and saline solutions to the septal turbinate. In his study, Delank verified with rhinomanometrical measurements what was previously reported in medical literature; that the septal turbinate did indeed influence the quality and



Fig. 2. Axial paranasal sinus CT scan.

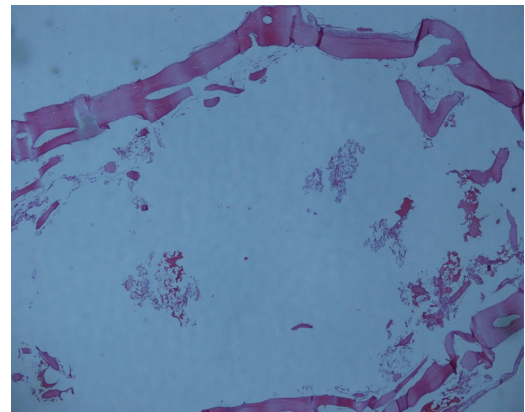


Fig. 4. Cortical thinning and pneumatic spaces of the intramedullary area (stained by hematoxylin–eosin technique).

the local velocity of endonasal airflow. Maran investigated the connection between the lateral nasal wall, the middle turbinate and the septal turbinate, and showed by rhinomanometrical measurements that the septal turbinate has the capability to reduce the nasal opening by 2–3 mm, thus altering respiration [9].

Histologically the respiratory epithelium of the septum is composed of multilayered cylindrical ciliary cells. The epithelium rests on tunica propria. Numerous packets of mucous glands are found in this region. The glandular packets reach down to the mucoperichondrium and mucoperiosteum [2]. The septal turbinate is likewise composed of respiratory epithelium, bands of connective tissue underlie the glandular cells and those bands are surrounded by large blood vessels. The histomorphological structure of the septal turbinate resembles that of the concha. The tissue looks like that of an expandable nasal concha. It gets its blood supply from the branches of the ethmoidal artery, and its veins are v.facialis, v.opthalmica superior and v.ethmoidalis [2,8].

The incidence rates for the occurrence of the septal turbinate were reported as 54% by Perovic, 66.4% by Delank, and 55.79% by Arslan [1,8,10]. Delank pointed out that the incidence rates differed in specific age groups. He also showed that septal turbinate could be encountered in both sexes and in all age groups. Since the septal turbinate is not seen in all cases like the nasal turbinates, it can be considered as an accessory formation [1,8]. Arslan et al. reported that the prevalence of the septal turbinate was higher in males of all age groups. They showed that its prevalence decreased by age, and explained that decrease by the generalized mucosal atrophy of the elderly [1]. Delank explained the lower prevalence of the septal turbinate in babies by its ongoing development over a period of time with the transformation of the tubercular mucosa and commented that its absence would not mean it did not have embryological origins [8].

The term “concha bullosa” is generally used for the middle turbinate, being the most commonly encountered anatomical variation of the middle turbinate. Concha bullosa is the partial or total pneumatization of the bulbous or lamellar parts of the nasal turbinates [4,6]. In a retrospective study covering 12 years, Yang et al. examined 59,238 sinonasal CT's in 2008, and found that 16 patients had inferior concha bullosa, 2 bilateral ones included [11]. Braun and Stammberger observed pneumatization in 5 of the 6 conchae [12]. Ozturan et al. reported pneumatization of all the 6 conchae, and named it as “conchae bullosis” [13]. The incidence rate for the pneumatization of perpendicular plate of the ethmoid bone was reported as 18% by Wang et al. [14]. In our case, the coronal and axial CT images and endoscopic examination showed pneumatization on the cartilaginous septum, in the anterior septal area known as septal turbinate, instead of the ethmoid bone area of the septum. We call it pneumatized septal turbinate, but our case was observed at bone density as it was observed at the same CT sections with the alar cartilages. Patient's not only the septal cartilage tissue, but also the lower lateral cartilages were observed radiographically as ossified. Perhaps, we may also define it as

ossified pneumatized septal turbinate. Our case is a first in medical literature in presenting the pneumatization of the septal turbinate.

4. Conclusion

Although the septal turbinate was first described by Morgagni in 1662, this anatomical formation still does not have a sound body of knowledge behind it, and is not extensively covered in medical literature. Previous studies on the septal turbinate showed that its histomorphological structure resembled that of the nasal conchae. Our case report is a first case demonstrating that the septal turbinate may also be pneumatized like the nasal conchae. Since the septal turbinate may have significant effects regarding respiration, smelling and air-conditioning, it is a subject worth further investigation. Extensive research employing various methods is a must for acquiring more knowledge about the septal turbinate.

Conflict of interest

None.

Fundings

None.

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