CASE REPORT

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A Case of Rare Anatomic Variation: Bifid Inferior Turbinate

Bahadır ÖZBULAT[a], İlhan ÜNLÜ[a]

[a]Department of Otolaryngology, Düzce University Faculty of Medicine, Düzce, Türkiye

ABSTRACT There are 3 pairs of turbinates defined: superior, middle, and inferior. They are located throughout the lateral walls of the nasal cavity. The embryological evolution of the nasal turbinate is a complex process. During the embriologic development of nasal turbinate, anatomic variations may appear at multiple points. There are very few publication about this topic. Bifid inferior turbinate is a very rare abnormality that is easily identified on paranasal tomography but should be looked on endoscopy. We have one case about bifid inferior turbinate. This variation should be kept in mind as a rare cause of nasal obstruction. We have found that surgical treatment is very beneficial this patients.

Keywords: Bifid; turbinate; nasal obstruction; anatomic variation

There are 3 pairs of turbinates defined: superior, middle, and inferior. They are located throughout the lateral walls of the nasal cavity.[1]

The upper and middle turbinates are section of the ethmoid bone. Inferior turbinates discrete and unique bone. Distinguishes it with this feature.[2,3]

The turbinates are a major functional and anatomical structure of the lateral nasal wall. They are responsible for various nasal functions including filtration of inhaled air, humidification, lubrication and regulation nasal airflow.[4]

Nasal turbinates demonstrate different anatomical variations like other nasal structures. The embryological development of inferior turbinate is linked to most widely accepted theory regarding the mechanics of variations formations.[5]

The inferior turbinate develops in the 6th to 8th week of embryo from the prochordal plate on the lateral nasal wall and continues to develop after birth.[6]

Anatomical variatons of the inferior turbinate are a very common variation group. Yasan et al in their study group, found that lower turbinate variations were seen at the rate of %2. The anatomic variants determined from paranasal sinus computed tomography performed on 1,085 patients: 1.01% paradoxical, 0.7% hypoplasia, 0.13% pneumatized and 0.09% bifid.[7]

In another study Tugtag Demir B et al investigate 376 patients who performed paranasal sinus computed tomography (CT) due to rhinological or orbital complaints. Inferior turbinate variations rate determinate as 4.5%. These variations were serrated in 2.5%, bullous in 0.8%, paradoxical in 0.3%, accessory bifid in 0.5%, and hypoplasia in 0.3%.[8]

Bifid inferior turbinates is an highly uncommon variation. It was defined by Aksungur et al.[9] There are very few publications about this topic. It should be well recognized and evaluated before the operation as it causes complaints such as nasal congestion and atypical facial pain and as a landmark in endoscopic nasal surgery.[7]

Bifid inferior turbinate is a very rare abnormality that is easily identified on paranasal tomography but should be looked on endoscopy.[3]

Correspondence: Bahadır ÖZBULAT
Department of Otolaryngology, Düzce University Faculty of Medicine, Düzce, Türkiye
E-mail: bahadirozbulat@hotmail.com

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Seventeen year old female introduced to our health facility with complaint of unilateral nasal obstriction and rhinorrea past 4 years. She didn't use any medicine in this time. She has no previous history of any nasal surgery. On anterior rhinoscopy and nasal endoscopy showed nasal polip in right nasal cavity (Figure 1a).

For further examination, non-contrast CT scan of her paranasal sinuses was performed. This demonstrated there were double inferior turbinate and one of them polypoid (Figure 1b).

The patient underwent partial inferior turbinectomy. On the surgery we removed polipoid bifid inferior turbinate (Figure 2). After 1 month, patient's nasal congestion was completely relieved. When we compare the preoperative and postoperative tomography, nasal cavity obstruciton significantly better than before (Figure 3).

DISCUSSION

Anatomical variations in the inferior turbinate close the airway and leading to important clinical consequences.[10] But in the previous studies focused on middle turbinate due to crucial place for endoscopic sinus surgery.

Studies on the inferior tubinates focused on hypertrophy and its treatment. Other variations are often in the form of case reports. They are case reports defined as pneumatization, agenesis, serrated and bifid lower turbinate.[3,4,8,11,12]

Bifid inferior turbinate was defined by Aksungur et al they examined 253 coronal CT of the nasal cavity who were thougt to have chronic sinusitis. One patient's unilateral uncinat process was not developed and 2 inferior turbinates in the same side. They called it: Bifid inferior turbinate.[9]

The embryological evolution of the nasal turbinate is complex process. During the embriologic development of nasal turbinate, anatomic variations may appear at multiple points. The inferior turbinates are pair of independent bones and they develop from the maxilloturbinal. The uncinate process takes its origin from the first ethmoturbinal.[2]

In the reported patient, bifid inferior turbinate coexisted with a developmental anomaly of the uncinate process. In addition, the bifid inferior turbinate represented 2 separate turbinates originating from the same region.[3]

According to Viswanatha et al. bifid inferior turbinate always associated with the absence of uncinate process.[13] It can present alone or with other turbinate anomalies. There was no uncinat process in our study either.

Yilmaz et al, made 2 cases report.[14] Two patients applied for nasal obstruction. The paranasal sinus computer tomography showed bifid inferior turbinate. However, both patients did not undergo surgical intervention. In our cases, our patient undergo surgical intervention and her symptoms resolved.

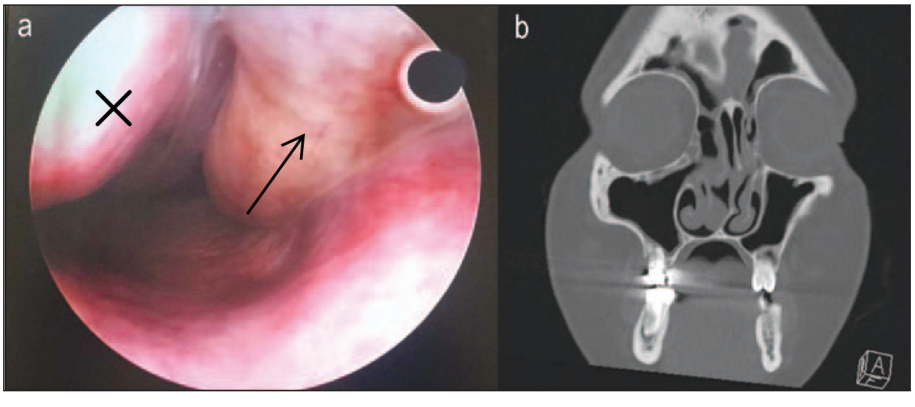

FIGURE 1: a) Preoperational endoscopic images. Arrow: Polipoid inferior tubinate. Cross: Non-polipoid inferior turbinate. b) Preoperational paranasal CT.

FIGURE 2: Polipoid inferior turbinate.

This case report show that bifid inferior turbinate is rare anatomical variatons of turbinates. It can cause nasal obstriction and rhinorrea. We can identify with anterior rhinoscopy and paranasal sinus computer tomography.

We demonstrated the benefit of surgery in these cases for the first time in the literature.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Bahadır Özbulat;* ***Design:*** *Bahadır Özbulat;* ***Control/Supervision:*** *Bahadır Özbulat, İlhan Ünlü;* ***Data Collection and/or Processing:*** *Bahadır Özbulat;* ***Analysis and/or Interpretation:*** *Bahadır Özbulat, İlhan Ünlü;* ***Literature Review:*** *Bahadır Özbulat;* ***Writing the Article:*** *Bahadır Özbulat, İlhan Ünlü;* ***Critical Review:*** *Bahadır Özbulat.* ***References and Fundings:*** *Bahadır Özbulat, İlhan Ünlü;* ***Materials:*** *Bahadır Özbulat.*

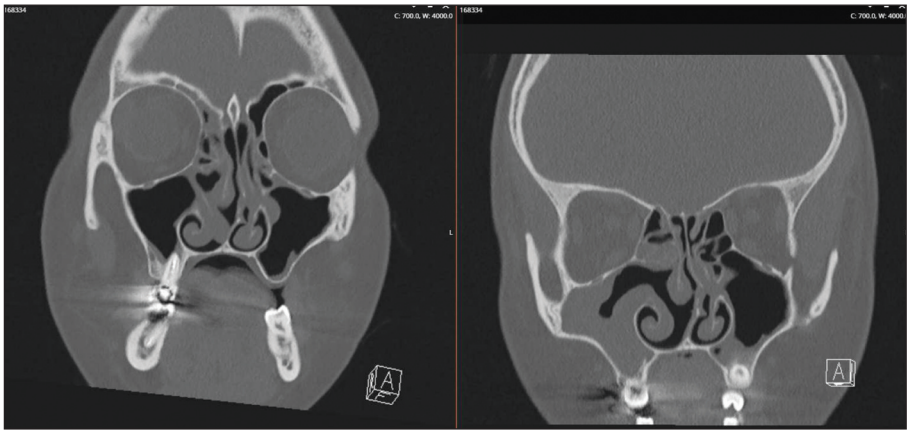

FIGURE 3: Preoperational and postoperational CT.
CT: Computed tomography. Informed consent was taken from the patient.

REFERENCES

1. Dalgorf DM, Harvey RJ. Chapter 1: Sinonasal anatomy and function. Am J Rhinol Allergy. 2013;27 Suppl 1:S3-6. [Crossref] [PubMed]
2. Stammberger H. Functional Endoscopic Sinus Surgery. Philadelphia: Mosby Year Book; 1991. p.49-87, 145-268.
3. Ozcan KM, Selcuk A, Ozcan I, Akdogan O, Dere H. Anatomical variations of nasal turbinates. J Craniofac Surg. 2008;19(6):1678-82. [Crossref] [PubMed]
4. Alkhaldi AS, Alhedaithy R, Alghonaim Y. Concha bullosa of the inferior turbinate: report of two cases. Cureus. 2021;13(6):e15479. [Crossref] [PubMed] [PMC]
5. Oztürk A, Alataş N, Oztürk E, San I, Sirmatel O, Kat N. Pneumatization of the inferior turbinates: incidence and radiologic appearance. J Comput Assist Tomogr. 2005;29(3):311-4. [Crossref] [PubMed]
6. Doğru H, Döner F, Uygur K, Gedikli O, Cetin M. Pneumatized inferior turbinate. Am J Otolaryngol. 1999;20(2):139-41. [Crossref] [PubMed]
7. Yasan H, Aynali G, Akkus O, Yarıktas M, Dogru H, Baykal B. Alt konka anatomik varyasyonlarının sıklığı [The frequency of inferior turbinate anatomic variations]. KBB Forum. 2006;5:12-4. [Link]
8. Tugtag Demir B, Sari N, Cankal F. Inferior turbinate variations: a radioanatomic study. Eur J Rhinol Allergy. 2022;5(3):84-8. [Crossref]
9. Aksungur EH, Biçakçi K, Inal M, Akgül E, Binokay F, Aydogan B, et al. CT demonstration of accessory nasal turbinates: secondary middle turbinate and bifid inferior turbinate. Eur J Radiol. 1999;31(3):174-6. [Crossref] [PubMed]
10. El-Demerdash AA, Beheiry EAW, El-Aini SM, Mohamed ASE, Khattab AMI. Morphological and histopathological study of hypertrophied inferior nasal turbinate in Egyptian patients: in clinical perspective. Egypt J Otolaryngol. 2020;36(1):24. [Crossref]
11. Gümüşalan Y. Coincidence of bilateral hypogenesis and unilateral agenesis of the turbinates (conchae nasales) in man. J Otolaryngol. 1997;26(6):392-5. [PubMed]
12. Aydin O, Ustündağ E, Ciftçi E, Keskin IG. Pneumatization of the inferior turbinate. Auris Nasus Larynx. 2001;28(4):361-3. [Crossref] [PubMed]
13. Viswanatha B, Suprabha H, Vijayashree M, Somshekhar AVP. Rare anatomical variations of nasal turbinates: a prospective study. Res Otolaryngol. 2017;6(5):59-63. [Link]
14. Yılmaz MS, Güven M, Akidil Ö, Kayabaşoğlu G. Bifid inferior turbinate: a report of two cases. Kulak Burun Bogaz Ihtis Derg. 2014;24(6):357-60. [Crossref] [PubMed]