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CASE REPORT

Dysgenesis of the middle turbinate: A unique cause of nasal airway obstruction

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We present a unique case of nasal airway obstruction resulting from dysgenesis of the middle turbinate that has not been previously described. A 33-year-old woman presented to our clinic with a long history of right nasal airway obstruction refractory to medical management with nasal steroid sprays and antihistamines. She denied both epistaxis and rhinodynia, and had no history of nasal surgery. Additionally, she had never been nasally intubated for any other surgical procedure and had no history of nasal manipulation or trauma to the face. Nasopharyngoscopy demonstrated the absence of a normal middle turbinate (MT) and an obstructing mass in the posterior right nasal cavity that completely occluded the right choana (Fig 1). A computed tomography (CT) scan of the paranasal sinuses revealed a pedunculated nasal mass occurring at the posterior attachment of the malformed right MT (Fig 2). Clinical biopsy specimens were conclusive for benign respiratory mucosa, and the patient consented to operative removal of the mass. Intraoperatively, the mass was transected at the pedicle and easily delivered through the nasopharynx into the oral cavity for removal. The mass was sectioned and noted to have a firm bony rim, with a fluid-containing mucocele in the center. The patient had complete resolution of her symptoms postoperatively, and three months later she remained asymptomatic and without recurrence.

This case report has been approved by the Institutional Review Board of Wilford Hall Medical Center (FWH20080139N). Patient consent for publication has been obtained by the authors.

Figure 1 Endoscopic view of the posterior right nasal cavity with a 0-degree scope showing a lateral nasal wall mass obstructing the choana.

Discussion

Understanding the embryologic development of the lateral nasal wall provides insight into its complex anatomy and anatomic variants. The ethmoid turbinates originate from ridges in the lateral nasal wall of the fetus. Six major furrows, or grooves, develop during the eighth to tenth week, and these furrows are separated by ridges, or ethmoturbinals.[1] Some of these ridges and furrows fuse or disappear, resulting in the nasal turbinates of the adult. The uncinate process persists from the descending portion of the first ethmoturbinal, which otherwise regresses. The descending segment of the first primary furrow, located between the first and second ethmoturbinals, becomes the ethmoidal infundibulum, and its superiorly ascending segment becomes the frontal recess. The permanent MT develops from the third ethmoturbinal, and the superior turbinate develops from the fourth ethmoturbinal. The supreme turbinate, when present, develops from the fusion of the fifth and sometimes sixth ethmoturbinals.

Common anatomic variations of the middle meatus include agger nasi cells, infraorbital ethmoid (Haller) cells, concha bullosa, and paradoxically bent MTs, which are defined as laterally convex turbinates. The most common variant of the MT is the concha bullosa, an extensively

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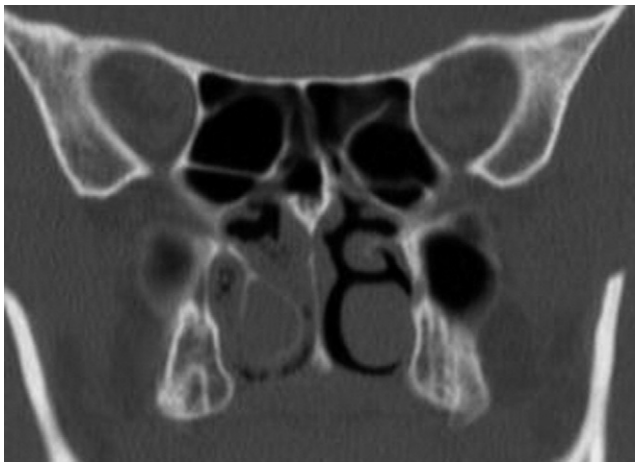

Figure 2 Coronal computed tomographic image through the choana demonstrating the obstructing right nasal cavity mass, with a bony attachment that originates from the posterior basal lamella of the right middle turbinate.

pneumatized MT that may contribute to nasal airway obstruction. Two less commonly described anomalies include secondary MT and accessory MT. Secondary MTs are defined as bony projections covered by soft tissue that originate from the lateral wall of the middle meatus.[2] Few articles reference the secondary MTs, which are quite rare and are most frequently bilateral.[2-5] The secondary MT was first described as an anatomic variant of the middle meatus by Khanobthamchai et al,[3] who noted an incidence of 1.5 percent. A study by Aykut et al[4] examined 175 coronal CT scans of the paranasal sinuses and demonstrated an incidence of 6.8 percent, but their study was limited to patients with symptoms of chronic sinusitis. The secondary MT projected medially and superiorly from the root of the basal lamella at the lateral nasal wall in the middle meatus. In all cases, the secondary MT appeared posterosuperior to the infundibulum.[4] Rarer still, the accessory middle turbinate is not a true turbinate in fact, but a medially bent and anteriorly folded uncinate process.[3,5] This is anatomically distinct from the secondary MT. Neither of these anomalies appropriately describes this patient's operative findings.

Given the normal appearance of the uncinate, ethmoid bulla, infundibulum, and superior turbinate, the observed finding was most likely an embryologic remnant of an incompletely developed MT, or a developmental aberration of the third basal lamella. Secondarily, it appeared that a resulting mucocele enlarged the turbinate to a size capable of producing symptoms of nasal airway obstruction. As the pathology was consistent with normal tissue and she had no recurrence at three months follow-up, we believe it is reasonable to conclude that this patient represents the first description of a previously unrecognized developmental anomaly.

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Author Contributions

Wesley M. Abadie, acquisition of clinical data and primary author of the manuscript; **Jonathan L. Arnholt,** patient care, contribution of data, and revision of manuscript; **Lee A. Miller,** patient care, revision of manuscript, and final approval of version to be published.

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