



Solitary Osteoma within the Cavity of a Pneumatized Middle Turbinate

CASE REPORT

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ABSTRACT

Paranasal sinus osteomas are benign osteogenic lesions, often diagnosed incidentally on computed tomography (CT). Their etiology is unknown, and they most commonly involve the frontal and ethmoid sinus. We present an exceedingly rare localization of osteoma within the cavity of a concha bullosa of the middle turbinate in a 38-year-old woman with frontal headaches and right-sided facial pain. The patient was treated by partial turbinectomy with tumor excision and preservation of the lateral middle turbinate mucosa. The patient was free of pain following surgery. We report the case and imaging and review the pertinent literature. To our knowledge, this is the first case of massive involvement of the cavity of a pneumatized middle turbinate by an osteoma. Solitary osteoma within the concha bullosa cavity should be included in the differential diagnosis of rhinogenic headaches as well as in the differential diagnosis of extraordinary pathologic entities within the pneumatized middle turbinate.

Keywords: Conchae nasales, headache, nasal surgical procedures, osteoma

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INTRODUCTION

Osteomas of the paranasal sinuses are benign lesions of osseous origin, often incidentally found by computed tomography (CT) scanning. These tumors are found on CT scans of the paranasal sinuses in about 3% of cases (1). Osteomas are more frequently found in male than in female patients, and the male to female ratio is 1.5-2.6:1 (2). In the paranasal sinuses, osteomas most commonly arise from the frontal and ethmoid sinus (1, 2). The structures of the nasal cavity are rare places for osteoma origin. The occurrence of osteoma in the middle nasal turbinate is extremely rare, and a review of the literature showed only eight such reported cases (3-10). The concha bullosa of the middle turbinate is the most commonly seen anatomic variant of the middle nasal concha. The cavity of the concha bullosa is lined by a respiratory epithelium in a similar manner as the paranasal sinuses, and this pseudostratified respiratory epithelium is also characterized by mucociliary clearance. Because of these features, the concha bullosa is susceptible to pathologic entities just like the true paranasal sinuses. Polyps, ossifying fibromas, mucocèles, pyocèles, fungal balls, and cholesteatomas are all extraordinary pathologies that can be found within the cavity of the concha bullosa (11-13). To our knowledge, there is only one previously described case of solitary osteoma within the concha bullosa cavity, and we present here the second similar case (7).

CASE REPORT

A 38-year-old woman suffered from 3 years of intermittent right-sided frontal headaches and facial pain with sense of pressure and nasal obstruction. She denied having other nasal symptoms. She reported to have been involved in a traffic accident in which she suffered a fracture of the nasal septum 20 years before the rhinological examination. After the occurrence of headaches, she was examined by a neurologist, an ophthalmologist, and an ENT specialist, and she was treated by corticosteroid nasal sprays and with non-steroidal anti-inflammatory drugs without success. The patient was treated for migraine, but no medications were effective.

On nasal endoscopy, we found normal-appearing nasal mucosa, hypertrophy of the right middle turbinate, and a septal deviation to the left side. CT scan of the paranasal sinuses demonstrated extensive-type pneumatization of the right middle turbinate and lamellar-type pneumatization of the left middle turbinate and a left-side septal deviation. On coronal, sagittal, and axial CT sections, an oval expansile lesion of bone density with a diameter of 19.9 mm was found inside the right-sided aerated middle concha. This bone lesion filled the largest part of the concha bullosa cavity. No inflammatory changes or other pathologies were found in the paranasal sinuses (Figure 1 a-c).

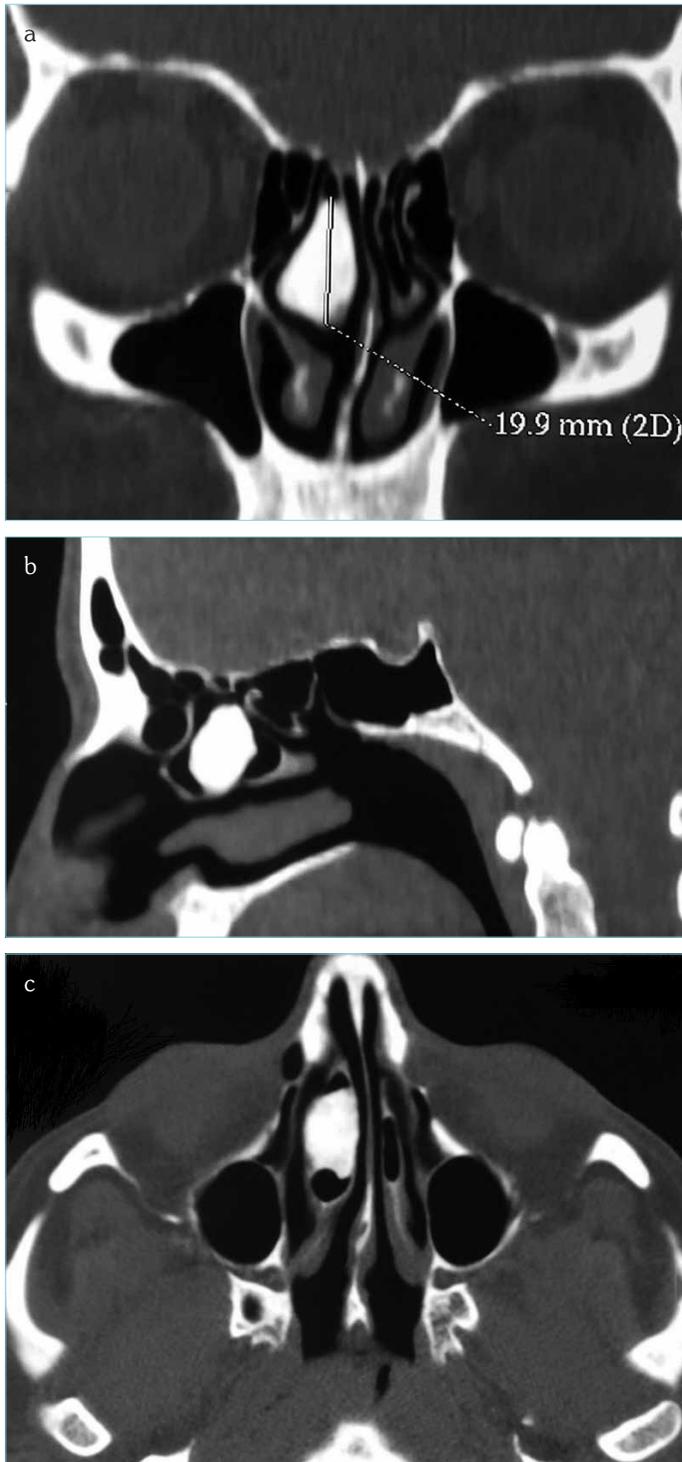


Figure 1. a-c. Coronal (a), sagittal (b) and axial (c) CT scan of the paranasal sinuses showing an oval expansile lesion of bone density inside the right-sided aerated middle turbinate

An endoscopic partial turbinectomy under general anesthesia was performed. After a vertical incision on the midline of the anterior wall of the middle turbinate, we created a plane between the bony and mucosal surface of the lateral lamella. Following the removal of the lateral lamella, a bony enlargement within the concha bullosa was gently separated from the inner surface of the medial lamella, preserving the middle turbinate attachment



Figure 2. The removed mass measured 20x15x7 mm

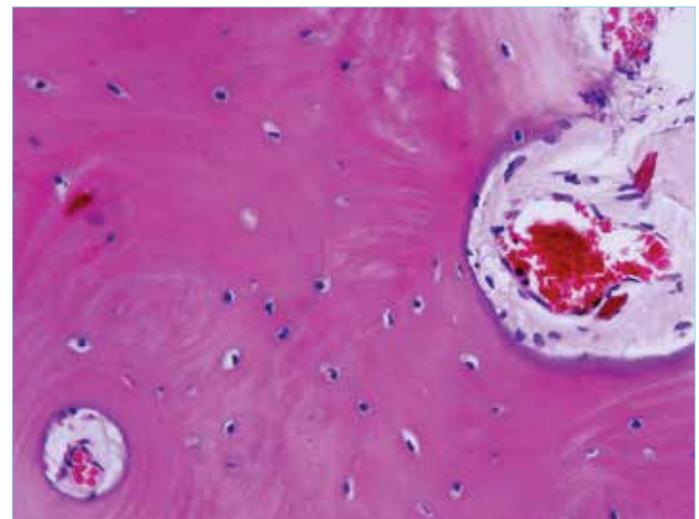


Figure 3. Histopathological examination showed ivory-type osteoma which was composed predominantly of dense mature lamellar bone with little fibrous medullary stroma (hematoxylin-eosin, original magnification x 200)

to the lamina cribrosa. The lesion was resected totally. Finally, a Cottle's septoplasty was performed. A few days postoperatively, the patient was free of headache. The removed tumor had dimensions of 20 mm×15 mm×7 mm (Figure 2). Histopathological examination showed an ivory-type osteoma that was composed predominantly of dense mature lamellar bone with little fibrous medullary stroma (Figure 3). At 8 month's follow-up, the patient reported no further headaches, and nasal breathing had significantly improved.

DISCUSSION

There are two histological types of osteomas. The ivory or compact type, which was found in our patient, is very dense and lacks Haversian canals. The spongy mature type or cancellous osteoma is composed of softer bone with intertrabecular hematopoietic bone marrow or fat (1). Although paranasal sinus osteomas are frequently seen in the ethmoid complex, the aerated middle turbinate as a part of the ethmoid is an exceptionally rare site of origin of this tumor, and only one similar case has been previously reported (7).

The etiology of osteoma is still doubtful. Most osteomas are sporadic, but they can also be observed as part of Gardner's syndrome, an autosomal dominant disease characterized by intestinal polyps, osteomas, and cutaneous soft-tissue tumors (1). The solitary osteoma has unknown origin, but three different hypotheses have been proposed.

According to the traumatic hypothesis, mechanical trauma causes disturbed bone remodeling, and this is the main cause of osteoma formation, especially during puberty, which is the period of fastest growth of the bones (2). In the case of our patient, trauma could be the potential factor for both middle turbinate pneumatization and osteoma development. The exact reason of the middle concha pneumatization is still unknown. The possible causes of nasal septal deformation are intra-uterine fetal traumas, perinatal traumas, and traumas following delivery; developmental anomalies of the maxilla and pre-maxilla; and breathing through the mouth (14). Previous studies found a high level of association and parallel development of nasal septal deviation and the middle concha bullosa (15). We suggest that microfractures in the bone tissue of the middle nasal concha might be sites of nasal/paranasal mucosa ingrowths as a precondition for spreading to the pneumatic space of the concha bullosa. Thus, in our patient, trauma of the nasal region, which was diagnosed during late puberty, could be the cause of the middle turbinate aeration and the development of osteoma within the concha bullosa.

According to the infectious hypothesis, chronic inflammation has a crucial role in the formation of paranasal sinus osteomas. Long-term bacterial/viral infection acts as a trigger for osteoblast proliferation and increased osteogenic activity resulting in osteoma development (2). Our patient had no symptoms or local or radiological findings of chronic sinonasal inflammatory disease.

According to the embryonic hypothesis, the main places for paranasal sinus osteoma formation are osseous proliferations at the junctions where the cartilaginous ethmoid bone meets the membranous frontal bone (2). However, it is not easy to explain the development of osteoma inside the concha bullosa, which is the part of ethmoid bone but, at the point of middle turbinate attachment, usually has no contact with the frontal bone.

Symptoms related to an osteoma generally arise from the pressure on normal structures, and the main complaint is headache. Frontal headaches and facial pain can often arise as a result of acute or chronic rhinosinusitis or as a result of mucosal contact between two opposing nasal mucosal surfaces in the absence of inflammatory disease (15). Many clinicians are not familiar with explaining rhinogenic headaches by the presence of "contact points". However, the results of some investigations clearly show that multiple anatomical variations in the nasal cavity might cause mucosal contact and lead to rhinogenic contact-point headache (15). In our patient, frontal headache and facial pain could have resulted from the osteoma growth inside the concha bullosa and the resulting pressure on its inner walls and between the concha bullosa and the lateral nasal wall. Diagnosis was done by CT scan, and surgical excision of the lesion can lead to the complete resolution of symptoms. Endoscopic partial turbinectomy seemed to be an effective treatment.

In differential diagnosis, ossifying fibroma and fibrous dysplasia should be considered (1). Radiographically, ossifying fibroma appears as an osseous lesion surrounded by a unilocular and well-

defined sclerotic border. Histopathologically, ossifying fibroma is composed of fibrous tissue that might vary in cellularity. The mineralized component might consist of plexiform bone and acellular mineralized material. Fibrous dysplasia is radiologically characterized by hazy borders and histologically by a fairly homogenous "ground glass" appearance representing disorganized spicules of bone. In contrast, "true" lamellar bone is surrounded by osteoblastic activity, and this feature is important in the differential diagnosis between ossifying fibroma and fibrous dysplasia (1).

CONCLUSION

Solitary osteoma within the concha bullosa cavity is an exceedingly rare finding; however, it should be included in the differential diagnosis of rhinogenic headaches as well as in the differential diagnosis of extraordinary pathologic entities within the pneumatized middle turbinate. Endoscopic excision remains the primary treatment. Histopathological diagnosis is necessary for differential diagnosis from other osteogenic lesions, especially ossifying fibroma and fibrous dysplasia.

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Informed Consent: Written informed consent was obtained from patient who participated in this study.

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