

Case Report

Intraoperative incidental finding of maxillary hypoplasia: a rare case report

Sama Rizvi*, Riya Thakral, Stuti Shukla, Saurabh Singh

Department of ENT and Head and Neck Surgery, School of Medical Sciences and Research, Sharda University,
Knowledge Park -III, Greater Noida, Uttar Pradesh, India

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*Correspondence:

Dr. Sama Rizvi,

E-mail: samarizvi2@gmail.com

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ABSTRACT

Hypoplastic and aplastic paranasal sinuses are rare conditions which can lead to obstruction of mucociliary clearance. Most of these patients are asymptomatic, however these conditions may lead to chronic headaches and nasal obstruction which can be misleading towards the diagnosis of chronic rhinosinusitis. It has been reported in literature that conventional radiography could not differentiate between inflammatory pathologies, neoplasm, and hypoplasia of the sinus. Computed tomography and cone beam computed tomography are the modalities of choice to differentiate these conditions, wherein cone beam CT is found to be more accurate for diagnosis of hypoplasia. In the present study, we report an incidental intraoperative finding of hypoplastic left sided maxillary sinus of a 17-year-old male patient who had clinical features of chronic rhinosinusitis.

Keywords: Nasal obstruction, Headache, Maxillary antrum, Hypoplasia

INTRODUCTION

Maxillary sinus starts to develop around the third month of intrauterine life.¹ At birth the antral volume remains only of about 6-8 mm, this increments 2mm yearly uptill the age of 8 years.² Growth of the sinus lasts uptill puberty.^{3,4} Hypoplasia is defined as the underdevelopment of the paranasal sinuses, of which frontal and sphenoid hypoplasia are more common.⁵ Majority of the patients with hypoplasia of maxillary sinus are asymptomatic, some of them are found mimicking features of chronic rhinosinusitis.⁶ The incidence of maxillary sinus hypoplasia ranges between 1.5 and 10%.⁷ Maxillary sinus hypoplasia can lead to diagnostic problems, especially in conventional radiographs because it can be misdiagnosed as mucosal thickening in infectious disease or neoplasms involving the sinus.⁸ Also, atelectasis of the sinus due to chronic

sinusitis can be diagnosed as aplasia or hypoplasia of the sinus.⁹ Computed tomography (CT) scanning and also cone beam computed tomography (CBCT) and endoscopic examination of the sinus are the necessary diagnostic tools to detect the underlying abnormality. We report an intraoperative incidental finding of hypoplastic maxillary sinus.

CASE REPORT

A 17-year-old male patient presented to the ENT outpatient department with chief complaints of unilateral left sided nasal obstruction since 5 years. The boy also had history of unilateral mucopurulent profuse, intermittent non-foul-smelling, nonblood-tinged rhinorrhoea. It was also associated with radiating headache over left face. There was no history of any trauma or surgery. The birth history was not significant and there were no congenital

anomalies. On anterior rhinoscopy, left sided inferior turbinate was hypertrophied and middle turbinate was polypoidal. On diagnostic nasal endoscopy there was left sided blockade of osteomeatal complex due to presence of polyposis which was non-sensitive and did not bleed on touch. Radiological evaluation was done and patient was taken up for non-contrast computed tomography of noses and paranasal sinus which revealed bilateral mucosal thickening and left sided homogenous opacity obscuring the maxillary sinus. Initially no comments were made about the hypoplastic maxillary sinus. The patient was taken up for functional endoscopic sinus surgery to remove the polyposis and widen the osteomeatal complex. Intraoperatively while widening of maxillary antrum it was noted that the left sided antrum was hypoplastic and the distance 3 dimensional walls could not be appreciated due to narrowing (Figure 1).

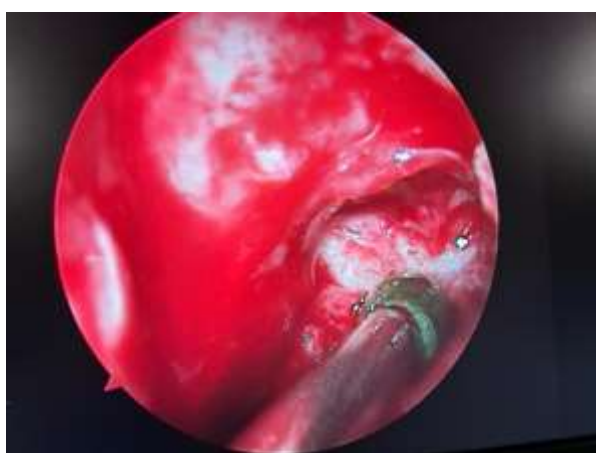


Figure 1: Intraoperative widening of maxillary antrum.

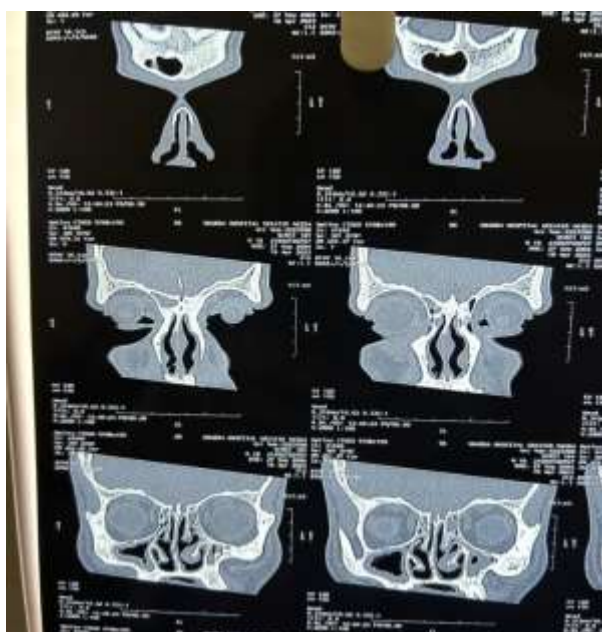


Figure 2: Post operative computed tomography.

It was also noted that the infundibulum was normal and uncinata was also normal indicating type 1 maxillary hypoplasia according to Bolger classification. Post operatively the computed tomography was reviewed again and these findings were confirmed (Figure 2).

DISCUSSION

Maxillary sinus hypoplasia (MSH) is the underdevelopment of maxillary sinus antrum which can occur due to various causes including inflammatory pathologies, hematological malignancies, trauma and neoplasms. The maxillary sinus begins developing around the fourth month of gestation as a mucosal evagination within the middle meatus of the nose. Any disruption or interference in this developmental process can lead to hypoplasia or aplasia. Maxillary sinus hypoplasia is often asymptomatic and is usually discovered incidentally during routine imaging. However, in some cases, it might be associated with sinus symptoms such as chronic sinusitis or nasal obstruction. The incidence of MSH ranges from 0.73% to 10.4% in patients with sinus symptoms.⁵⁻⁷ Computed tomography of the paranasal sinuses is the gold standard for diagnosing MSH and distinguishing it from infections or neoplasia. CT scans provide detailed images that allow clinicians to visualize the size and structure of the maxillary sinus and associated structures accurately.

When MSH is identified, particularly in cases where surgical intervention is planned (such as endoscopic sinus surgery), it is essential to consider the anatomical variations to avoid potential complications. Surgical procedures in individuals with MSH should be carefully planned to prevent harm to adjacent structures like the orbit.^{8,9} MSH is classified into three types according to the severity and associated anomalies (Bolgers classification): Type I: Mild hypoplasia with a normally developed uncinata process and well-developed infundibulum. Type II: Significant hypoplasia with a hypoplastic or absent uncinata process and a poorly defined or absent infundibulum. Type III: Profound hypoplasia with an absent uncinata process. The causes of MSH can be acquired or congenital: Acquired causes can include conditions like Wegener's granulomatosis (inflammatory osteitis), trauma with sinus deformity due to fractures or surgery, and neoplasms causing osteitis. Congenital causes can stem from conditions like congenital first arch syndrome, developmental anomalies (craniosynostosis, osteodysplasia), and genetic syndromes such as Down syndrome. Accurate diagnosis of MSH is crucial for surgical planning, especially in endoscopic sinus surgery. Failing to recognize these abnormalities can lead to unintended surgical complications, including potential harm to neighbouring structures like the orbit. It is important to diagnose these abnormalities to prevent possible complications during endoscopic sinus surgery, such as causing potential harm to the orbit.¹⁰

CONCLUSION

It is very important for otorhinolaryngologists to be aware of conditions leading to hypoplastic maxillary sinus as it can mimic other inflammatory and neoplastic pathologies. Accurate preoperative radiological diagnosis of hypoplasia can be extremely beneficial in preventing any intraoperative complications.

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