

Anatomical Study of Accessory Maxillary Ostia and Its Surgical Importance

Bharathi.D¹, Komala.B², Reshma Sharath³

, Professor & HOD²

¹Tutor, Bangalore Medical College & Research Institute, Bengaluru, India

²BGS Global Institute of Medical Sciences, Bengaluru, India

³Tutor, Rajarajeswari Medical College & Hospital, Bengaluru, India

Abstract: The lateral wall of nasal cavity of the human body shows wide variations. Familiarity with the variations in sinonasal anatomy is a prerequisite for safe and effective surgical treatment of sinonasal disease. In this study nasal endoscope was used in conjunction with cadaveric sagittal section of head to locate the accessory maxillary ostia. The aim of the study was to evaluate the frequency of occurrence and location of accessory maxillary ostia by both nasal endoscopy & cadaveric dissection. A total of 50 patients with chronic sinusitis were studied by nasal endoscope and the anatomical variations of ostiomeatal complex were identified, data collected and photographed. Accessory maxillary ostia were present in 22% of subjects. In view of these variations, anatomic knowledge is essential for safe and effective endoscopic sinus surgery.

Keywords: Paranasal sinuses; accessory maxillary ostium; variations; nasal endoscopy.

I. INTRODUCTION

Most of the anatomic nasal and sinus variations occur along the lateral wall of the nasal cavity. All sinuses drain in this region, therefore the anatomic variations hinder the normal mucociliary drainage. This in turn, predisposes to inflammatory diseases of the sinuses [1].

Clearance of mucous from the maxillary antrum solely depends upon the mucociliary action of its lining mucosa. Normally, the synchronous ciliary beat is towards principal or main maxillary ostium, located in the hiatus semilunaris. The Accessory maxillary ostium when present whether as a consequence of chronic maxillary sinusitis or as a congenital entity is more advantageously placed than the natural aperture. Little drainage that occurs in such cases is due to gravitational effect as these ostia do not have active mucociliary clearance [2].

The use of nasal endoscope in this study is novel and has made apparent the extent of variation. The success and safety of functional endoscopic sinus surgery depends on surgeon's knowledge of nasal and sinus anatomy.

II. MATERIAL & METHODS

The present study comprised of 50 adult male and female patients in the age group of 20-50 yrs presenting with complaints of nasal obstruction, nasal discharge and headache for a period of 6 weeks or more despite adequate medical treatment at outpatient department (OPD) of ENT, Rajarajeswari Medical College and Hospital, Bengaluru. Previous history of endonasal surgery, nasal trauma, nose and paranasal sinus tumour were excluded from the study. Prior approval by institutional ethics committee taken and a written informed consent was taken from all the patients before participating in the study.

a. Nasal endoscopy:

Karl Storz Hopkins Nasal endoscope rod zero degree angled view with diameter of 4mm, cold light source and fiberoptic light delivery system with Karl Storz endovision camera system was used.

Under aseptic precautions, anterior nasal packing of both the nasal cavities was done using ribbon gauze soaked in 4% xylocaine with 1:100,000 adrenaline solution. After 10 minutes the nasal pack was removed and zero degree 4mm rigid endoscope was introduced into the nasal cavity to visualize the structures in the lateral nasal wall. Nasal Endoscopy was done to visualize the accessory maxillary ostia, its' position whether in the anterior or posterior fontanelle was observed.

b. Cadaveric sagittal sections of head:

In the Department of Anatomy, 20 human cadaveric sagittal sections of head and neck specimens were studied and the findings were noted. Presence of accessory maxillary ostium was observed and photographed.

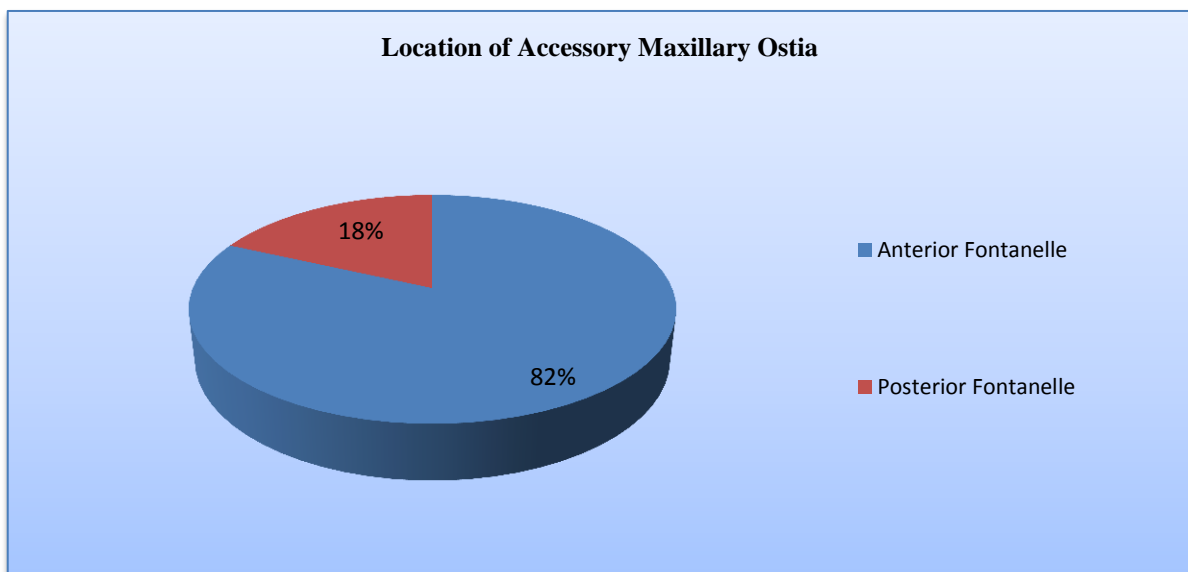
III. RESULTS

Accessory maxillary ostia were seen in 22% as shown in table 1. Of these 82% was located in the anterior fontanelle and 18% was in the posterior fontanelle (Table2).

Table 1: Accessory Maxillary ostia		
	<i>Number</i>	<i>Percentage</i>
Present	11	22%
Absent	39	78%

Table 2: Location of accessory maxillary ostium		
	<i>Number</i>	<i>Percentage</i>
Anterior fontanelle	9	82%
Posterior fontanelle	2	18%

Graph 1: Location of Accessory Maxillary Ostia



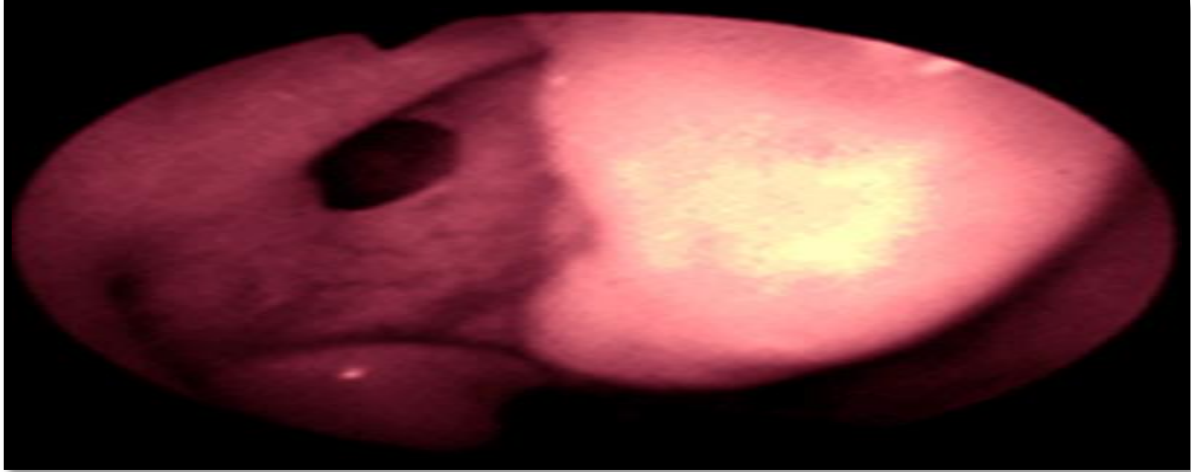


Figure 1. The nasal endoscopic view of left lateral nasal wall showing the accessory maxillary ostium after retraction of the middle turbinate.

Fig. 1 Accessory maxillary ostium in anterior fontanelle In two of the cadaveric specimens, there is presence of accessory maxillary ostia in the anterior fontanelle as shown in Fig 2.



Figure 2: Cadaveric sagittal section of head and neck- Lateral wall of nasal cavity showing middle meatus following retraction of middle turbinate. Accessory maxillary ostium is seen

MT: middle turbinate; BE: bulla ethmoidalis; UP: uncinat process; AO: accessory maxillary ostium

IV. DISCUSSION

Accessory maxillary ostia:

A possible mechanism of formation of accessory ostia is obstruction of the main ostium by the maxillary sinusitis or due to anatomic and pathologic factors in the middle meatus resulting in the rupture of membranous areas known as fontanelle. The word fontanelle was introduced by Zuckerkandl to describe certain regions in the middle meatus located below the uncinat process and above the inferior turbinate, covered by nasal mucous membrane medially and mucosa of maxillary sinus laterally with connective tissue sandwiched between the two. These are thus deficient bony component and are weak areas of the middle meatus vulnerable to perforation.

These according to their location in relation to uncinat process are anterior nasal fontanelle (ANF) and posterior nasal fontanelle (PNF). The ANF lies between the inferior edge of the uncinat process and attached margin of the inferior turbinate while the PNF is located posterosuperior to the uncinat process [3].

The differences between the natural and accessory maxillary ostia of maxillary sinus are given in table 3.

Table 3: Difference between natural and accessory maxillary ostia	
Natural	Accessory
Always present	Present in 10 to 40%
Difficult to see clinically	Easily seen on endoscopy
Lies deep in infundibulum	Lies in sagittal plane in fontanelle
Oval shaped	Round or punched out appearance
Always single	Can be multiple
Small in diameter	Can be large (upto 1cm)

Table 4 depicts the prevalence of accessory maxillary ostia by various authors. Our study correlates with that of Van Alyea.

Table 4: Prevalence of Accessory maxillary ostia	
Author	Prevalence
May ⁴	10%
Kennedy & Zinreich ⁵	15%
Van Alyea ⁶	23%
Schaeffer ⁷	43%
Kumar ⁸	30%
Our study	22%

V. CONCLUSION

The presence of accessory maxillary ostia in 22% of patients emphasises the necessity of diagnostic nasal endoscopy preoperatively. This study attempts to describe the accessory maxillary ostia and its prevalence in chronic rhinosinusitis patients using the nasal endoscope. In view these variations good knowledge of normal anatomy as well as anatomical variations is required for safe and effective functional endoscopic sinus surgery.

REFERENCES

- [1] Brunner E, Jacobs JB et al. (1996) Role of the agger nasi cell in chronic sinusitis. *Ann Oto Rhino Laryngol* 105: 649-700.
- [2] Levine HL, Mark M, Rontal M, Rontal E. Endoscopic sinus surgery. "Complex anatomy of lateral nasal wall simplified for endoscopic surgeon". 3rd ed, Thieme Medical publishers: New York, 1993. p. 1-28.
- [3] Chao TK. (2005) Uncommon anatomic variations in patients with chronic paranasal sinusitis. *Otolaryngol Head Neck Surg* 132(2):221-5.
- [4] May M, School SM, Korzee J. (1990) Location of maxillary os and its importance to endoscopic sinus surgeon. *Laryngoscope* 100: 1037-1042.
- [5] Kennedy DW, Zinreich J. *Otolaryngology, Head and Neck Surgery*, 2nd ed, W.B. Saunders Company: Philadelphia, 1991. p. 1861-1871.
- [6] Van Alyea. (1936) The Ostium Maxillare-anatomic study of its surgical accessibility. *Arch Otolaryngol* 24:553-559.
- [7] Schaeffer JP. (1912) The sinus maxillaries and its relations in the embryo, child and adult man. *Am J Anat.* 10:313-67.
- [8] Kumar H, Choudhry R, Kakar S. (2001) Accessory maxillary ostia: Topography and clinical application. *J Anat Soc India* 50(10): 3-5.