

Case Report

Variant drainage of frontal sinus

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Received: 10 March 2016

Revised: 11 March 2016

Accepted: 07 April 2016

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ABSTRACT

Frontal sinuses are drained by front nasal duct. The opening of the front nasal duct is found on the anteromedial aspect of the floor of the sinus. The duct then continues through the ethmoidal labyrinth and enters the ethmoidal groove at the anterior end of the middle meatus. Here we noticed that frontal sinus was draining into the bulla ethmoidalis on both the sides. These anatomical variations affect the drainage and ventilation of Para nasal sinus due to infection lead to stasis of secretion cause recurrent and chronic sinusitis.

Key words: Para nasal sinuses, Frontal sinus, Middle meatus

INTRODUCTION

Paranasal sinuses have been recognized from the time of Galen (130-201 AD).¹ There is two groups of Para nasal sinuses: anterior and posterior. Frontal sinus belongs to the anterior group.² The sinuses are divided into several recesses, which communicate with each other through incomplete bony septa. Occasionally, one or both sinuses may be absent. Normal average dimensions are Height-3.16 cm, Breadth- 2.58 cm, Depth-1.8 cm. Frontal sinus is drained by front nasal duct. The opening of the front nasal duct is found on the anteromedial aspect of the floor of the sinus. The duct then continues through the ethmoidal labyrinth and enters the ethmoidal groove at the anterior end of the middle meatus. A good knowledge of anatomy will enable the surgeon to operate with more confidence, by improving one's ability to correctly interpret normal variants from abnormal or pathological conditions, and determine an appropriate surgical treatment plan to reestablish mucociliary flow to the sinus.³

METHODS

A Case was detected during a research project to see the drainage of the frontal sinus in department of Anatomy, GMCH, and Chandigarh. For this, sagittal section of each specimen was made and frontal sinus was exposed. The middle turbinate was removed. From the frontal sinus a probe was passed to demonstrate the opening of the duct in to nasal cavity. In this case the sinus opened directly to the bulla ethmoidalis on both the sides (Figure 1).

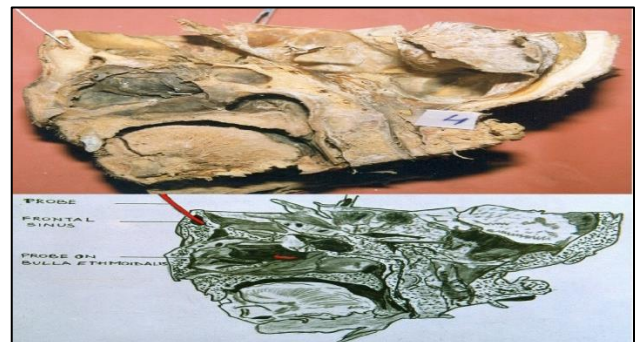


Figure 1: Frontal sinus opening into bulla ethmoidalis.

DISCUSSION

The frontal sinus originates as an outgrowth of the cephalic end of the middle meatus in an area termed as frontal recess. Frontal sinus as well as anterior ethmoidal cells develops in this area. This area, operculated by the middle turbinate, is identifiable in the late third to the early fourth fetal month. By the age of six years the sinus grows sufficiently large to be just visible in the frontal bone in radiographs. The upward extension continues, with the cell lying at first closer to posterior table before it finally rests in the cancellous bone midway between the two tables. The frontal sinus does not attain its adult size and form until 15 to 20 years. The frontal sinus and anterior ethmoidal cells develop in this area. At birth the area has only pits and furrows in the frontal area. It is from one or more furrows that frontal sinus develops. It may develop.¹ By direct extension of the whole frontal recess.² From one or more of the anterior ethmoidal cells, which originate in the frontal furrows or.³ Occasionally from the ventral end of the ethmoidal infundibulum. In the first instance there is no true front nasal duct. Instead, a wide communication exists with the nasal cavity, anterior and superior to the hiatus semilunaris, which the most common finding is. In the latter two instances a frontal duct will develop. The tortuosity of the duct will depend on the cells from which the sinus originated and the degree of development and disposition of the neighboring cells. According to Lee variations in the opening of frontal sinus in the middle meatus are 1. Drainage in to frontal recess anterior to infundibulum (55%) 2. Drainage above but not in to infundibulum (30%) 3. Drainage in to infundibulum (14%) 4. Drainage above the bulla (1%) 4.

According to Laszlo and Szabo, topography of the opening into middle meatus (50 cases) is as follows:

1. Above the anterior pole of the middle nasal concha in one case (2%).
2. Before the anterior pole of the middle concha opening directly into middle meatus in 2 cases (4%).
3. On the lateral wall of the anterior third of middle meatus in 15 cases (30%).
4. In the middle third of middle meatus together with the orifice of maxillary sinus and a few ethmoidal cells in 2 cases (4%).
5. At the top of anterior third of middle meatus in 22 cases (44 %).
6. Rest of specimens were not included in the study as they showed ossification at the lower end of duct or double orifices⁵ (Figure 2). Basmajian says the most common site of opening is into superior aspect of hiatus semilunaris. In most of the cases of present study, the sinus opened in to frontal recess explaining the

development of the frontal sinus from the extension of frontal recess⁶. This is similar to the observations of Lee & Basmajian.^{4,6} In 2 instances the frontal sinus appears to have developed either from one or more of the anterior ethmoidal cells, which originate in the frontal furrows or from the ventral end of the ethmoidal infundibulum explaining their opening into infundibulum and on to the bulla ethmoidalis similar to the description given by Lee.⁴

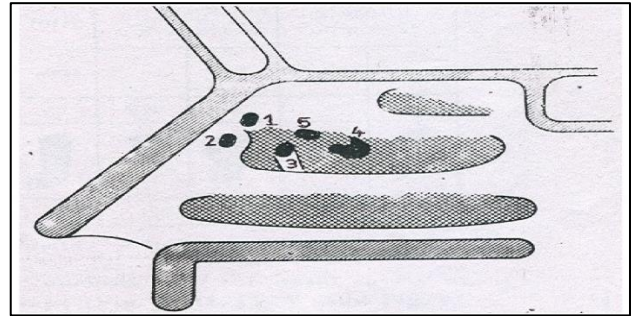


Figure 2: Topography of frontal sinus opening into middle meatus.

CONCLUSION

We found a case in which sinuses opened directly to the bulla ethmoidalis on both the sides. It is important for surgeon to be aware of variations that may predispose patients to increased risk of intraoperative complications and help to avoid these to improve success of management strategies. These anatomical variations affect the drainage and ventilation of paranasal sinus due to infection lead to stasis of secretion cause recurrent and chronic sinusitis. In view of the presence of these significant variations, we reemphasize the need for proper preoperative assessment in every patient in order to accomplish a safe and effective endoscopic sinus surgery.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Sharma A, Amrutha KV, Abraham J. Variant drainage of frontal sinus. *Int J Res Med Sci* 2016;4:2458-60.