

THE RANGE OF MORPHOLOGICAL VARIATIONS OF THE MIDDLE MEATUS OF THE NOSE IN CASES WITHOUT CLINICAL SINUSITIS

Thesis

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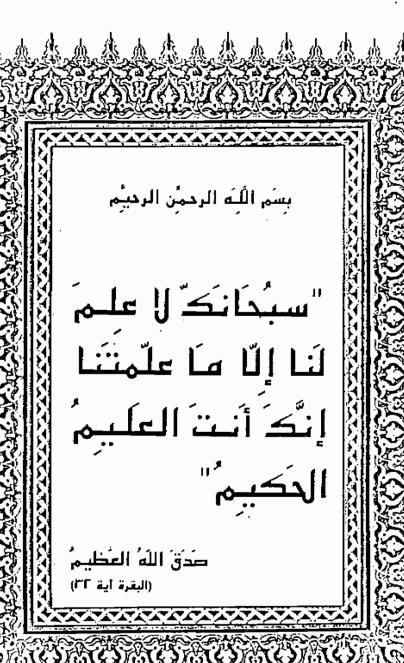
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INTRODUCTION AND AIM OF THE WORK

INTRODUCTION AND <u>AIM OF THE WORK</u>

The current techniques of Computerized Tomography (C.T.) and Functional Endoscopic Sinus Surgery (FESS) are becoming the popular ways in the diagnosis and treatment of many diseases in the nasal cavity especially chronic sinusitis. Accordingly, considerable attention has been directed towards the analysis of paranasal sinus anatomy using coronal plane Computerized Tomography (Kennedy, Zinreich, Rosenbaum and Johns, 1985). Frequent morphological variations of the middle meatus structures as the middle turbinate, uncinate process, Haller's cells and the agger nasi cells could be considered as possible pathogenic factors in the chronic sinus disease and headache (Stammberger and Wolf, 1988), On the other hand, similar anatomic variations were also detected in patients without clinical sinusitis (Zinreich, Mattox, Kennedy, Chisholm, Diffley and Rosenbaum, 1988). A review of literature revealed a lack of consensus among investigators concerning prevalence, suspected pathogenicity and clinical significance of the anatomic variations of the middle meatus region (Bolger, Butzin and Parsons, 1991).

So, the aim of the present work was to investigate the frequency, types and ranges of the morphological variations of the middle meatus in our own population.

This may act as an accurate guide for the practice of C.T. and FESS. Special interest was also given to the anthropometric features of these variations which proved to be lacking in literature, moreover, the comparison of the frequency of these variations in persons with and without chronic sinusitis may share to settle the controversy regarding their role in pathogenesis of chronic sinusitis.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

1. The Lateral Wall of the Nose

The lateral wall of the nose is formed by the nasal surface of the maxilla below, in front by the perpendicular plate of the palatine bone, and posteriorly and above by the nasal surface of the ethmoid labyrinth which intervenes between the nasal cavity and the orbit. It is very irregular owing to the presence of 3 bony projections termed the inferior, middle and superior nasal conchae. The 3 conchae project downwards and slightly medially and each forms the roof of a passage which communicates freely with the nasal cavity. These are termed the meatuses of the nose.

(A) The Inferior Concha:

It is a thin curved lamina and is an independent bone. It articulates with the nasal surface of the maxilla and the perpendicular plate of palatine bone. The inferior meatus is under the inferior concha and extends downwards to the floor of the nasal cavity. It is the largest of the 3 meatuses and extends the entire length of the lateral wall of the nose.

(B) The Middle Concha:

It is a projection from the ethmoid labyrinth. It is large and extends backwards to articulate with the perpendicular plate of the palatine bone. The middle meatus is between the middle and inferior concha. The lateral wall displays several important features which can be examined only after removal of the middle concha.

Its upper part is occupied by a rounded elevation, the bulla ethmoidalis which contains the middle ethmoid air cells. Below and in front of it a thin curved lamina of bone named the uncinate process of the ethmoid passes down and back crossing the large bony orifice of the maxillary sinus.

The curved gap which intervenes between this process and the bulla is the hiatus semilunaris. At its upper end, it becomes continuous with ethmoidal infundibulum, a short curved canal which receives the opening of the anterior ethmoidal air cells and leads up through the labyrinth to the frontal sinus. The middle ethmoidal air cells open above or near the bulla.

(C) The Superior Concha:

It is a small curved lamina which lies above and behind the middle concha. It roofs the superior meatus, which receives the openings of the posterior ethmoidal air cells. A narrow interval, the spheno-ethmoidal recess separates the superior concha from the anterior surface of the body of the sphenoid through which the sphenoidal sinus opens in the nasal cavity (Williams and Warwick, 1973).

2. Topographic Anatomy of the Middle Meatus

The osteo-meatal complex is the term given by the otolaryngologists and refers to as the maxillary sinus ostium and the ethmoid infundibulum and also as the normal aerated channels which provide air flow and mucociliary clearance for the maxillary, ethmoidal, frontal and sphenoid sinuses (Zinreich, Abidin and Kennedy, 1990).

Mafee (1991) used this term to refer to the maxillary sinus ostium, anterior and middle ethmoidal air cells ostia, fronto-nasal duct, ethmoidal infundibulum and middle meatus as well as the spheno-ethmoidal recess and superior meatus.

The osteo-meatal complex has been also defined as the area between the middle and inferior turbinates that is the confluence of the drainage of the frontal, ethmoidal, and maxillary sinuses.

In some parts of the osteo-meatal complex two mucosal layers come into contact with one another, thus increasing the local impairment of mucociliary clearance. Secretions may then be retained at this site, creating the risk for potential infection even without osteal closure (Wald, 1992).

3. The Ethmoid Bone

The ethmoid bone represents the main skeleton of the middle meatus. It is a small cuboidal bone situated in the anterior part of the base of cranium and shares in the formation of the medial wall of orbit, roof and lateral wall of the nasal cavity, septum of the nose. It is formed of the following parts; cribriform plate, perpendicular plate and labyrinth.

* The Cribriform Plate:

It occupies the ethmoidal notch of the frontal bone and forms a part of the roof of the nasal cavity. The crista galli projects upwards from this lamina in the median plane. Its sharp posterior border gives attachment to falx cerebri. Its short thick border articulates with the frontal bone by 2 small alae which complete the foramen caecum. On each side of it, the cribriform plate is narrow and depressed and presents several foramina for passage of the olfactory nerves. On each side of crista galli, there is small slit like fissure. The foramen which transmits the anterior ethmoidal nerve to the nasal cavity is placed lateral to the anterior end of the fissure.

* The Perpendicular Plate:

It is thin, flat and quadrilateral, and descends from the cribriform plate and forms the upper part of the nasal septum. It is deflected a little to one or other side. Its anterior border articulates with the nasal spine of the frontal bone and the crest of the nasal bones. The posterior border

articulates with the sphenoidal crest above and with the vomer below. The superior border is attached to the cribriform plate. The inferior border is thick and serves for the attachment of the septal cartilage of the nose.

* The Ethmoidal Labvrinth:

It consists of a number of thin walled ethmoidal air cells arranged in three groups; anterior, middle and posterior, and interposed between the 2 vertical plates of bones, the lateral or orbital plate forms part of the medial wall of the orbit, the medial plate forms a part of the lateral wall of the nose. In disarticulated bone, many of these air cells are opened, but in articulated skull, they are everywhere closed except at their apertures of communication with the nasal cavity. The upper surface of the labyrinth presents a number of open air cells, the walls of which are completed by the edges of the ethmoidal notch of the frontal bone. On the posterior surface of each labyrinth, large air cells are visible and their walls are completed by the sphenoidal concha and the orbital process of the palatine bone. The lateral surface consists of a thin smooth oblong plate named the orbital plate which covers the middle and posterior ethmoidal sinuses and forms a large part of the medial wall of the orbit, it articulates superiorly with the orbital part of the frontal bone, inferiorly with the maxilla and the orbital process of the palatine bone, anteriorly with lacrimal bone and posteriorly with the sphenoid bone.