The Ethmoid Bone, Anatomical, Clincopathological and Surgical Aspects

Essay
Submitted In The Partial Fulfillment of The Master Degree in Otorhinolaryngology

By
Mohammed Shehata Taha
M.B., B.Ch.

Supervised by
Prof. Dr. Fouad Abbas
Professor of Otorhinolaryngology
Faculty of Medicine-Ain Shams University

Prof. Dr. Mohammed Abd El-Azim El-Begermy
Professor of Otorhinolaryngology
Faculty of Medicine-Ain Shams University

Dr. Magdi Samir
Assistant Professor of Otorhinolaryngology
Faculty of Medicine- Ain Shams University

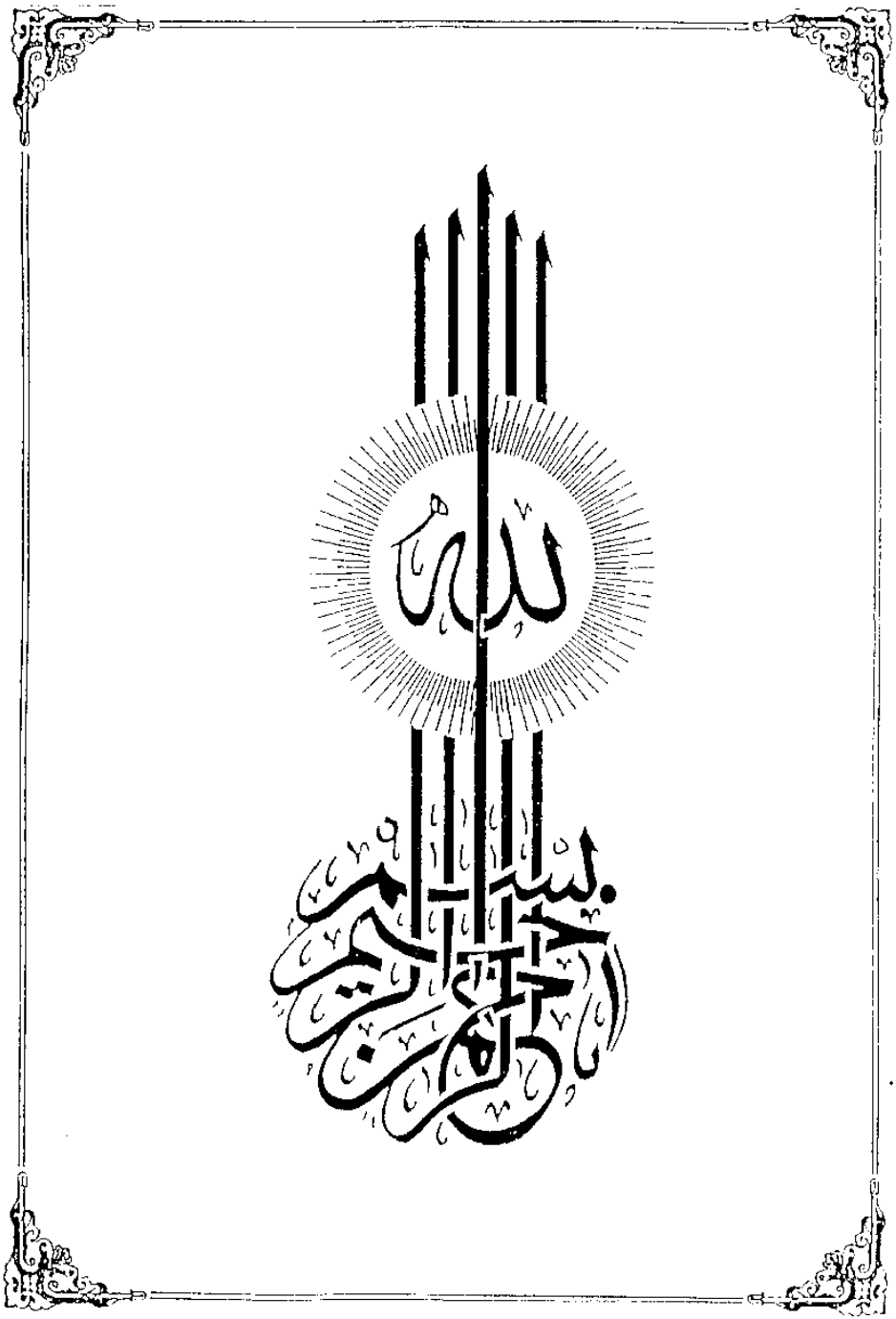
Faculty of Medicine
Ain Shams University
1995

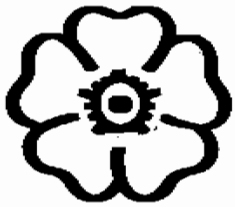
بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

صدق الله العظيم

سورة البقرة/ آية ٣٢





To My Family

M. Shehata

Acknowledgment

Thanks to ***Allah***

I would like to express my utmost gratitude and thanks to the eminent Prof. ***Dr. Fouad Abbas*** *, Prof. of Otorhinolaryngology Faculty of Medicine Ain Shams University, for his generous help and scrupulous supervision and for having devoted to me much of his precious attention and sincere advice.*

I owe special thanks to ***Dr. Mohamed Abdel-Azim El- Begermy,*** *Prof. of Otorhinolaryngology, Faculty of Medicine Ain Shams University, for his great cooperation, experience, wisdom and for his constant help throughout this work.*

I feel deeply indebted to Dr. ***Magdi Samir,*** *Ass. Prof. Otorhinolaryngology, Faculty of Medicine Ain Shams University, for his continuous encouragement, and valuable guidance. I would like to thank him for his constant support and valuable remarks that have been of utmost help.*

No words can express my deep thanks to ***Dr. Magdi Amin.*** *Assist. Prof. of Otorhinolaryngology , Faculty of Medicine Ain Shams University for his continuous encouragement and valuable advice.*

M. Shehata

List of contents

List of abbreviations

AEA: Anterior ethmoid artery

AN : Agar nasi

CP : Cribriform plate

EB : Ethmoidal bulla

EI : Ethmoid infundibulum

ES : Ethmoid sinus

GA : General anaesthesia

GL : Ground lamella

HS : Hiatus semilunaris

MT : Middle turbinate

PNS: Paranasal sinuses

UP : Uncinate process

Introduction and Aim of the Essay

Introduction

The ethmoid bone is a complex bone. It is situated at the anterior part of the skull base and assists in forming medial wall of the orbit, nasal septum, roof and lateral wall of the nasal cavity.

The labyrinth of the ethmoid bone contains a lot of thin walled ethmoid sinuses which may be divided into, anterior, middle, and posterior groups of sinuses *(Stammberger, 1991)*.

The superior and middle turbinates are parts of the ethmoid bone. It also shares in forming of the components of what is called " the osteomeatal complex" which is the key area for drainage of most paranasal sinuses *(Stammberger, 1991)*.

Many anatomical variations may be met when the ethmoid bone is studied. These variations may lead to obstruction of the osteomeatal complex leading to sinusitis *(Rice, 1989)*.

Many areas are hidden from clinical examination thus hiding small tumours.

Also these anatomical variations may predispose to injury of the nearby structures if not recognized by the surgeon *(Rice, 1989)*.

The Aim of the Essay

1. Is to review the anatomical aspects of the ethmoid bone. Its variations, relations to nearby structures.

2. Review of normal and abnormal plain film, tomographic radiology and computed tomography of the ethmoid sinuses.

3. Review of important pathological conditions as sinusitis and some tumours of the nose which affects the ethmoid bone.

4. Implication of these anatomical aspects on different surgical approaches of the ethmoid bones and the possible surgical complications.

Embryology of the Ethmoid Bone

Embryology of the ethmoid bone

The ethmoid turbinates originate from ridges in the lateral nasal wall of the fetus (Fig. 1). In 9th to 10th week, 6 major furrows develop that may be reduced by fusion to 3 or 4. These furrows are separated by ridges that have an anterior ascending portion (the ramus ascendus) and a posterior, inferior and more horizontal portion (ramus descendus) *(Stammberger, 1991)*.

In this, they begin to resemble the fully developed turbinates. The inferior turbinate, the maxilloturbinal represent a separate individual bone. The first ethmoturbinal regresses during later development. Its descending portion forms the uncinate process and its ascending portion forms the agger nasi. The first primary furrow lies between the first and second ethmoiturbinals. Its descending portion becomes the ethmoidal infundibulum, its superior ascending part becomes the frontal recess. Continuing pneumatization of the frontal recess into the frontal bone finally result in formation of the frontal sinus. Additional furrows (frontal furrow) and the corresponding ridges (frontal ridges) between them evolve into elevations and depressions that ultimately may form anterior ethmoidal and infundibular cells. If these develop in the area of the frontal sinus ostia, their endoscopic differentiation may be very difficult and, in case of disease, impossible. Similar difficulties in differentiation may arise when a frontal ethmoidal cells (bulla frontalis) develop simultaneously