SELLOTOMY

AN ESSAY

SUBMITTED FOR THE PARTIAL FULFILLMENT OF THE MASTER DEGREE IN OTO-RHINO-LARYNGOLOGY

PRESENTED BY

SAMER AHMED IBRAHIM

MB.B.Ch.

SUPERVISED BY

PROF. DR. MOHAMED OSMAN EL-KAHKY

PROFESSOR OF OTO-RHINO-LARYNGOLOGY

AIN SHAMS UNIVERSITY

PROF. DR.

MOHAMED ABDEL AZIM EL-BEGERMY

PROFESSOR OF OTO-RHINO-LARYNGOLOGY

AIN SHAMS UNIVERSITY

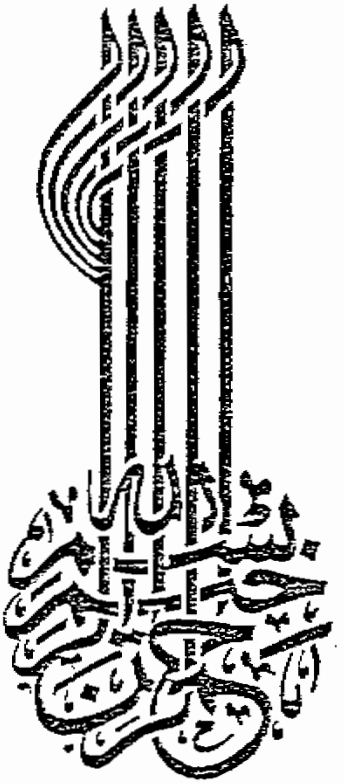
AIN SHAMS UNIVERSITY

ENT DEPARTMENT

FACULTY OF MEDICINE

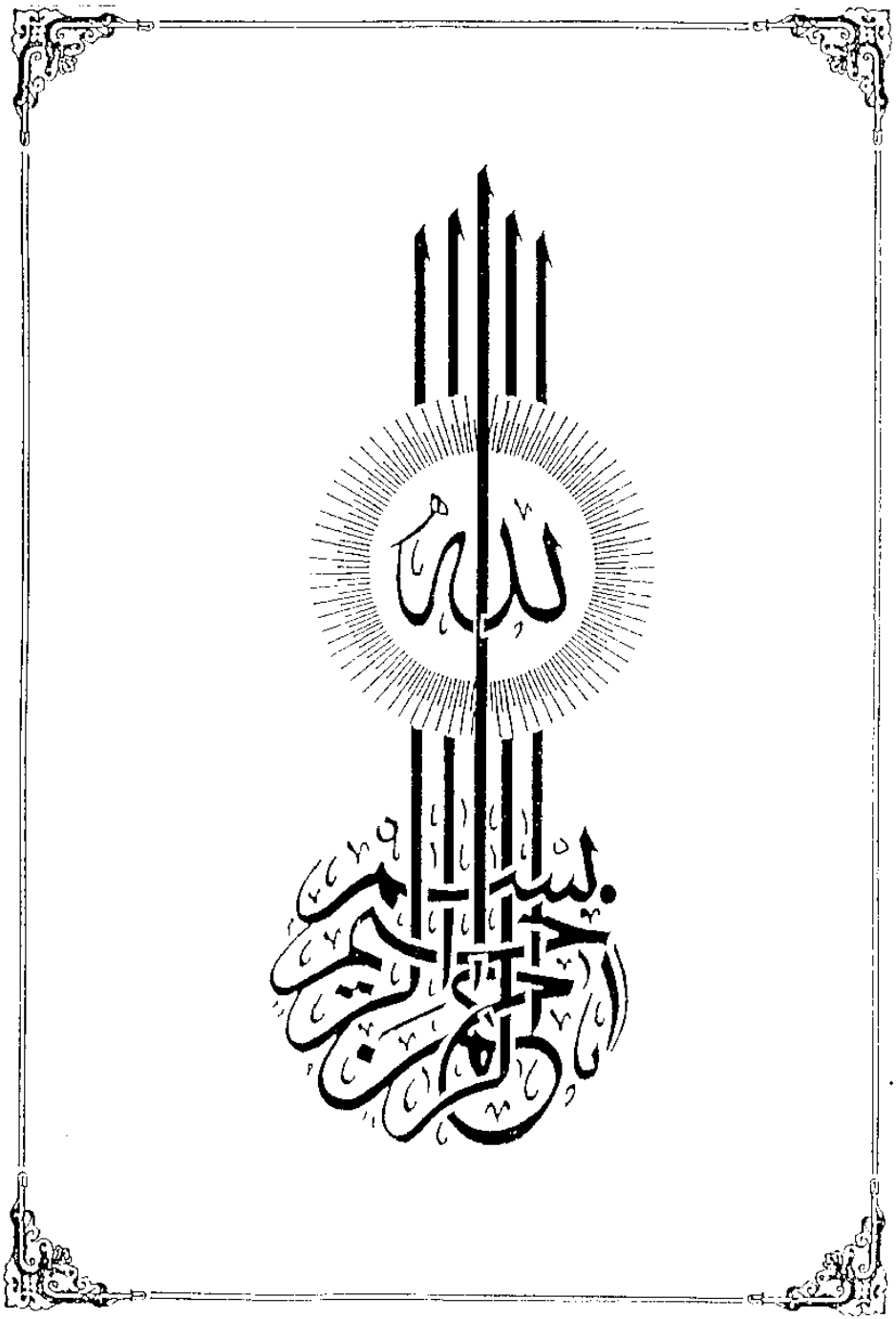
CAIRO

1994



وقل اعملوا فسيرى الله عملكم ورسوله والمؤمنون

صدق الله العظيم



ACKNOWLEDGEMENTS

I wish to express to all those who, in different ways, have helped me to complete this work, and especially to :

Prof. **Mohamed El-Kahky**, professor of Otorhinolaryngology, Ain Shams Faculty of Medicine, and my prinicipal supervisor, for intiating my interest in the field of transsphenoidal hypophysectomy and for his unfailing support and stimulating viewpoints. His never-fading active guidance and outstanding enthusiasm have been of great psychological support throughout this work. To him this work owes its existance.

Prof. **Mohamed El-Begermy,** Professor of Otorhinolaryngology, Ain Shams Faculty of Medicine, for meticulous supervision and uninterrupted care and advice.

My professors and senior staff in ENT Department for their continous encouragements and kind sympathy through out this work.

Finally, but of major importance, was my family. Without their love, never-fading patience and indispensible support, I would probably not have completed this work.

Samer Ahmed

LIST OF TABLES

LIST OF FIGURES

Figure 13: Alotomy incision used in 1/3 of cases. (after Tucker and Hahn, 1982).

Figure 14: Lateral alotomy with posterior dissection approach to the sphenoid. (after Wilson et al., 1990).

Figure 15: Incisions for septal surgery:

A : Hemitransfixation.

B : Killian.

C : Vertical incision.

(after Baraka, 1989).

Figure 16: External rhinoplasty incision. (after Koltai et al., 1985).

Figure 17: Labiocolumellar crease incision. (after Peters and Zitsch, 1988).

Figure 18: Incision for transethmoid operation. (after Merrem and Goldhahn, 1984).

Figure 19: Anterior ethmoidal artery is exposed in the frontoethmoid suture. (after Williams, 1987).

Figure 20: Removal of the adenoma in a piece-meal fashion. (after Merrem and Godhahn, 1984).

Figure 21: The periosteum is elevated over and inside the maxilla and nasal bone. A piece of bone from the frontal process is removed. (after petruson and Elversson, 1988).

Figure 22: a: nasal mucosa on posterior part of the septum is dissected free and moved anteriorly .

b: Post. septum fractured and the rostum removed.

(after Petruson and Elversson, 1988).

Figure 23: Transantroethmosphenoid approach. (after Kenan, 1979).

Figure 24: Transpalatal approach. (after Kenan, 1979).

CONTENTS

Sphenoid Sinus :

The sphenoid sinus is subject to considerable variations in size and shaps and to variation in the degree of pneumatization. It is present as minute cavities at birth; its main development takes place after puberty, reaching its full size during adolescence. Occasionally, there are gaps in its bone, with the mucous membrane lying directly against the dura matter. A single major septum separated the sinus into two large cavities in 68% of the specimens, and 4% had two major septae separatring the sinus intor three large cavities. The carotid artery frequently produces a serpiginous prominence into the sinus wall below the floor and along the anterior margin of the sella. The optic canals usually protrude into the superolateral position of the sinus, and the second and third divisions of the trigeminal nerve into the inferolateral part. A diverticulum of the sinus, called the "opticocarotid recess", often projects laterally between the optic canal and the carotid prominence. Howver, 4% had no bone separating the artery from the sinus mucosa, and 66% had less than 1mm thickness of bone covering the carotid arteries. This may expalin some of the cases of cranial nerve deficits and carotid artery injury reeported following trans-sphenoidal surgery ***(Renn and Rhoton, 1975).***

Optic nerve and chiasm

Of the sellae they studied, 10% were prefixed, 15% postfixed, and 75% normal (Fig. 4). The distance from the tuberculum to the anterior margin of the chiasm in normal specimens varied from 2 to 6mm, with an average of 4 mm. The cross sectional width of the optic nerves just proximal to the optic canal was consistently greater than the height, thus making the nerves somewhat flat; width ranged from 3.5 to 6.0mm, mean

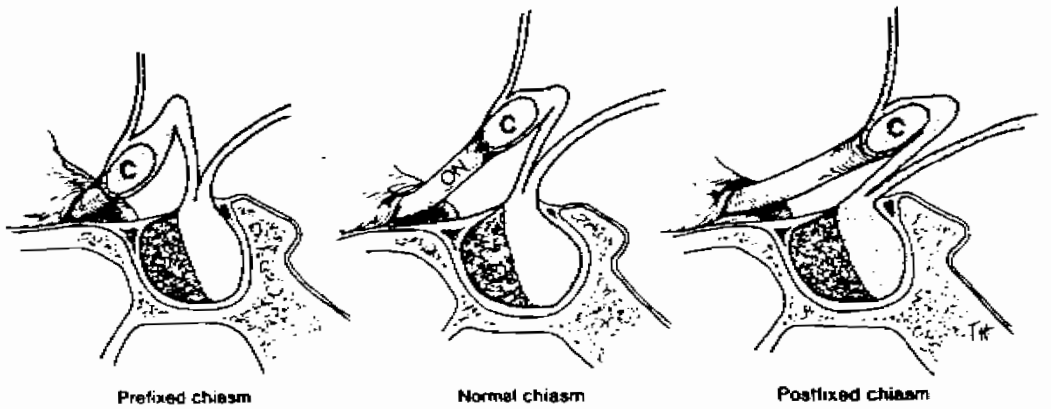


Figure 4 : Three different positions of the chiasm in relation to the pituitary gland. C = chiams; ON= optic nerve. (after Melen, 1987).

5 mm, height from 2 to 5 mm, mean 3 mm. Optic nerve length from anterior chiasm to the optic canal entrance ranged from 8 to 19 mm, mean 12 mm. The length varied from side to side in the same specimen by 2 mm. The angle formed by junction of the line along the medial margin of optic nerves as they approach the line along the medial margin of optic nerves as they approach the chiasm ranged from 50° - 80°. The protrusion of tuberculum sella above the line connecting the superior surface of the nerves as they enter the optic canal is maximum 3 mm in 44% of the specimens.

Optic canals

Absence of bone over optic nerves covered by dura as they enter the optic canals could lead to nerve injury during surgery. The length of nerve covered only by dura at the entrance into the optic canal varied from 0.5 to 8.0 mm average 3mm.

The optic canals bulge into the anterior superior part of the shenoid sinus. In 4% of the nerves, some areas were covered only by the optic sheeth and sinus mucosa. Injury to nerves exposed in the sinus may explain some of the cases of unexpected visual loss following trans-sphenoidal surgery ***(Renn and Rhoton, 1975).***

Diaphragma sellae

Diaphragmal width ranged from 6 to 15 mm. The width was greater than the length in 84%, and was equal to length in 16%. It was concave in 54% of the specimens, convex in 4%, and flat in 42%. The diaphragmal

opening was 5 mm or greater in 56%, and in these cases would not form a barrier during trans-sphenoidal surgery ***(Renn and Rhoton, 1975).***

Intercavernous sinuses

The basilar sinus, which connects the posterior aspect of both cavernous sinuses, is usually the largest and most constant connection across the midline, posterior to the clivus. It is multiloculated cavity lying within the dura on the posterior aspect of the dorsum. It was present in 82% of the specimens.

The anterior intercavernous sinus passes anterior to the hypophysis and the posterior one passes behind the gland, but either or both may be absent. Anterior intercavernous sinus were present in 76% of the specimens, and posterior intercavernous sinuses in 32% . Large anterior venous sinuses make trans-sphenoidal surgery more difficult ***(Renn and Rhoton, 1975).***

The variants considered disadvantageous to the transsphenoidal approach were :

1- Large anterior intercavernous sinuses extending anterior to the gland (10%).
2- A thin diaphragma sellae or a diaphragma wioth large opening.
3- Sphenoid sinuses with no major septum or a sinus with the major septum off the midline.
4- A presellar type of sphenoid sinus no obvious bulge of the sellar floor into the sphenoid sinus.
5- Carotid arteries expsoed in the sphenoid sinus with no bone over them.

6- Optic canals with bone defects exposing the optic nerves in the sphenoid sinus.

7- A thick sellar floor.

8- Carotid arteries that approach within 4 mm of midine within the sella.

(Renn and Rhoton, 1975)

HISTORICAL REVIEW

HISTORICAL REVIEW

Great interest was aroused in surgery of the pituitary gland at the turn of the century, as diseases were recognized which developed from pituitary dysfunction. ***(Kennedy, et al., 1984).***

The location of the gland made satisfactory surgical exposure challenging and a wide variety of approaches were tried with varing success.

The earliest procedures on the pituitary gland were undertaken by transcranial route. ***(Collins, 1973).*** In 1893, Caton and Paul, acting on the advice of Sir Victor Horsley, made the first approach to the sella through a lateral subtemporal craniotomy. ***(Caton and Paul , 1893).***

Horsley himself used the same lateral approach in 10 pituitary tumours between 1904-1906. ***(Ciric, and Tarkington, 1974).***

Krause, in 1900, demonstrated the transfontal craniotomy approach to the sella, using a cadaver dissection. He first tried this approach in 1905, but it was not untill 1909 that krause successfully used this method. ***(Collins, 1973).***

Interest was soon aroused with regard to the possibility of approaching the gland by extracranial transsphenoidal routes. The first effort to approach the sella by the transsphenoidal route go back to 1897 when Giordano proposed a transseptal technique. ***(Ciric and Tarkington, 1974).***