ANAESTHESIA FOR MEDIASTINOSCOPY

Thesis

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Presented by

Inas Faten Aly Rached

(M.B., B.Ch.)

UNDER SUPERVISION OF

Prof. Dr. Nabil Abd El Moaty

Professor of Anaethesia

Ain Shams University

Dr. Mohamed Sallam

Lecturer of Anaesthesia

Ain Shams University

FACUTLY OF MEDICINE

AIN SHAMS UNIVERSITY

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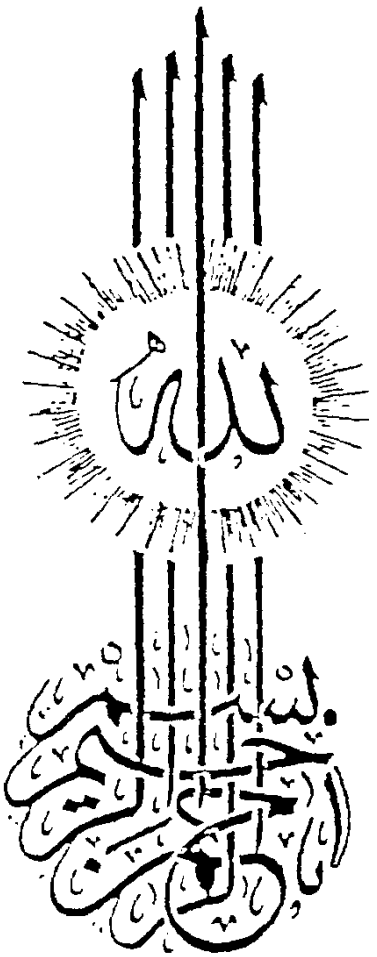

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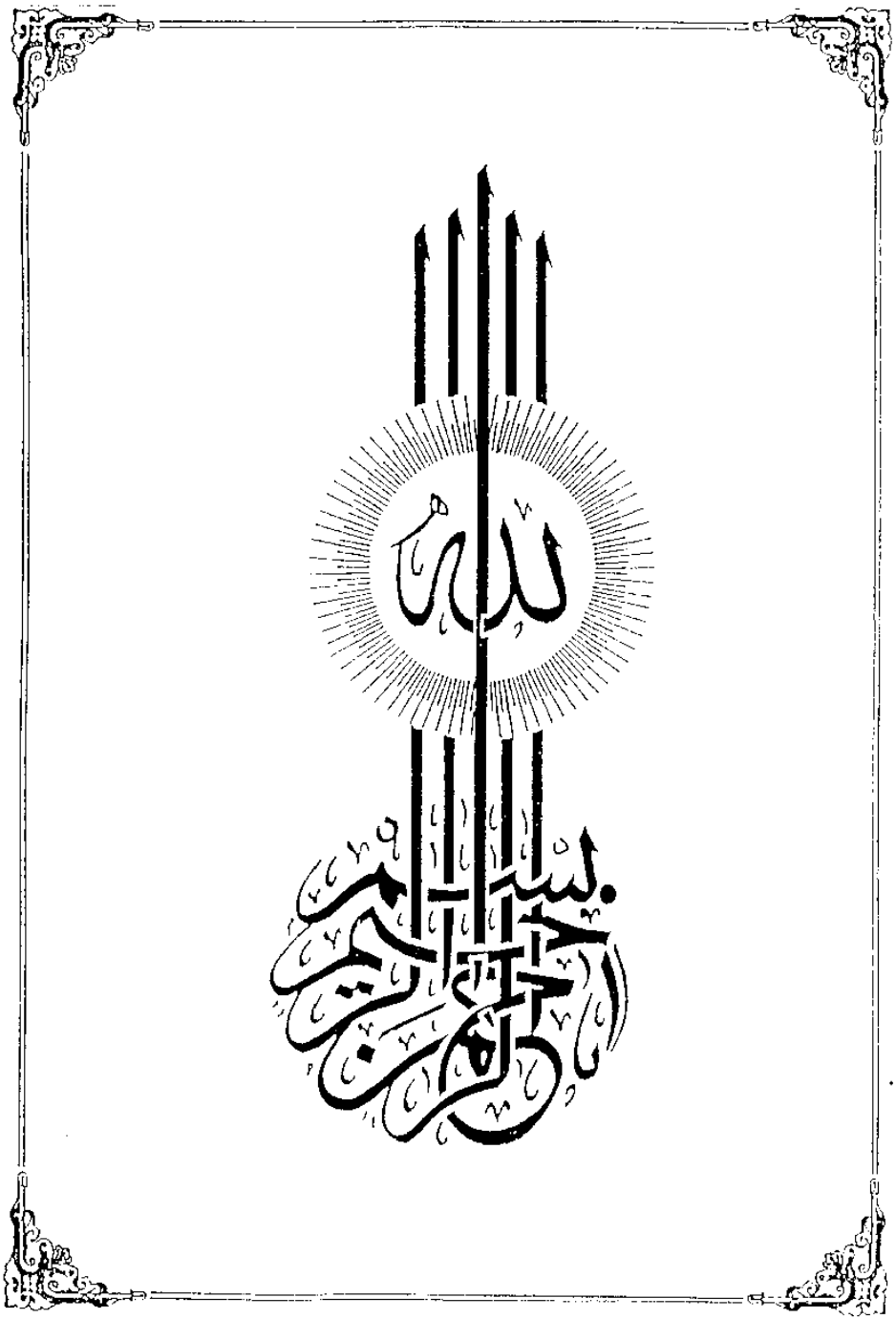

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CONTENTS

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INTRODUCTION

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Mediastinoscopy:

Is a surgical-endoscopic technique used mainly for examination and biopsy of lesions of the superior and postero-middle mediastinum.

It is particularly concerned with diseases that primarily or secondarily involve the paratracheal and parabronchial structures (Tucker, 1972).

The use of Mediastinoscopy in therapy is only occasional. As a diagnostic method it is highly successful and has been adopted in many countries (Otto et al, 1972).

The entry into the superior mediastinum as a diagnostic measure was not developed until the decade following 1950 and it has been practiced widely only for the past ten years.

In the past, thoracotomy was used to obtain a biopsy of lung or hilar tissue for study.

In 1949, Daniels suggested a diagnostic method much less drastic than thoracotomy, namely scalene lymph node biopsy.

The technique was further developed in 1954 by Harken and his co-workers. They suggested the introduction of Jakson laryngoscope through a lateral supraclavicular incision down into the paratracheal region thus facilitating exploration of the superior mediastinum. In 1959, Carlen recommended biopsy of the paratracheal nodes, through a midline incision in the suprasternal notch.

Finally, in 1959, Eric Carlens introduced the mediastinoscope, a specially designed instrument which could be passed into the superior mediastinum through a suprasternal incision, allowing the biopsy of tissue from both paratracheal regions, subcarinal and hilar areas.

This method was further developed by Specht in 1965 permitting the inspection of the anterior and posterior mediastinum and also the evaluation of the spread of the carcinoma of the oesophagus and to take biopsies (Otto et al, 1972).

A parasternal approach to the mediastinum and pleural space was also described by Stemmer and associates (1965) and Mc Neil and Chamberlain (1966).

Mediastino-pleuroscopy is another technique introduced by Deslauriers and his co-workers (1976) for simultaneous exploration for the mediastinum, pleural space and pulmonary parenchyma that can be used as a last step in establishing a tissue diagnosis before resection or medical treatment is recommended.
Mediastinoscopy can be performed under either general anaesthesia or local anaesthesia.

It is recommended that the use of general anaesthesia for mediastinoscopy is preferable to the use of local anaesthesia. (Vaughan; 1978) because of the convenience to the surgeon and the patient.

Because of the particular area of investigations involved during this procedure, lesions of neighboring structures may occur and require specific monitoring with good knowledge of the anatomy, cardio-respiratory physiology and the patients disease which allow successful planning of anaesthetic technique, management and predicting the potential complications of mediastinoscopy.

ANATOMY

ANATOMY OF THE MEDIASTINUM

The mediastinum strictly speaking is the partition between the two lungs and therefore includes the mediastinal pleura of both sides, but it is generally defined as the interval between the two pleural sacs.

It extends from the sternum in front to the vertebral column behind, and from the thoracic inlet above to the diaphragm below. It is divided into two parts,. an upper, which is named the superior mediastinum, and a lower, which is subdivided into the anterior, middle and posterior mediastina. The superior mediastinum is continuous with the lower part at the plane passing through the manubriosternal joint infront and the lower surface of the fourth thoracic vertebra behind.

The superior mediastinum: lies between the manubrium sterni in front, and the upper four thoracic vertebrae behind. It is bounded below by the plane passing through the sternal angle in front, and the lower part of the body of the fourth thoracic vertebra behind; above by the plane of the thoracic inlet, and laterally by the mediastinal pleurae. It contains the origins of the sternohyoid

and sternothyroid and the lower ends of the longus colli muscles; the aortic arch, brachiocephalic, left common carotid , left subclavian arteries; the brachiocephalic vein ; the upper half of the superior vena cava, left superior intercostal veins; the vagus, cardiac, phrenic and left recurrent laryngeal nerves; the trachea; oesophagus and thoracic duct; remains of the thymus, the paratracheal, brachio cephalic and some of the tracheobronchial lymph nodes are also present in the superior mediastinum.

The anterior mediastinum: lies between the body of the sternum in front and the pericardium behind. Above the level of the fourth costal cartilage, it is exceedingly narrow, owing to the close approximation of the two pleural sacs. It contains some loose areolar tissues, the sternopericardial ligaments, two or three lymph nodes and a few small mediastinal branches of the internal thoracic artery.

The middle mediastinum: is the broadest part of the inferior mediastinum. It contains the heart, pericardium, ascending aorta, lower half of the superior vena cava, terminal part of the azygos vein, the bifurcation of the trachea, the two bronchi, the pulmonary trunk dividing

into right and left pulmonary arteries, the right and left pulmonary veins, the phrenic nerves, the deep part of the cardiac plexus and some tracheobronchial lymph nodes.

The posterior mediastinum: is bounded in front by the bifurcation of the trachea; the pulmonary vessels, the pericardium and by the posterior part of the upper surface of the diaphragm, behind, by the vertebral column from the lower border of the fourth to the twelfth thoracic vertebra , on each side by the mediastinal pleura. It contains the ascending thoracic aorta, the azygos, hemiazygos veins, the vagus and splanchnic nerves, the oesophagus, the thoracic duct, and the posterior mediastinal lymph nodes. (Roger Warwick and Peter Williams, 1973).

Course and relations of the mediastinoscope to the deep structures: (Foster et al; 1972):

Under general anaesthesia and with the patient intubated, a 3 to 4 cm long transverse skin incision is made 2 cm above the suprasternal notch, between the anterior borders of the sternocleidomastoid muscles.

The incision is carried down the mid-line to the anterior surface of the trachea, retracting the sternohyoid

and sternothyroid muscles laterally. A cleavage plane is developed down into the superior mediastinum anterior to the trachea and posterior to the major vessels. The mediastinoscope is introduced into the dissection plane to reach the anterior surface of the trachea through the suprasternal mediastinoscopy incision.

Three layers of cervical fascia must be divided. These are: (1) The superficial fascia of the neck investing the platysma muscle. (2) The deep cervical fascia. (3) The pretracheal fascia.

The thin pretracheal fascia which invest the thyroid gland passes into the superior mediastinum as an investment for the inferior thyroid veins. The importance of incising the pretracheal fascia to the mediastinoscopist is clear when it is understood that efforts to enter the superior mediastinum without doing so will lead the examiner anteriorly to the major vessels of the superior mediastinum rather than posteriorly to those structures.

As the mediastinoscopy incision is fashioned from skin to trachea, neck veins of varying size may be encountered.

The anterior jugular veins pass along the anterior borders of the sternohyoid muscles invested by deep cervical fascia; often they are joined across the mid-line by jugular arch lying within the suprasternal space. Deep to the jugular vessels the inferior thyroid veins invested by pretracheal fascia.

A single inferior thyroid vein or a venous plexus may be present covering the anterior tracheal surface below the thyroid isthmus. The thyroid-ima is a small and inconstant artery arising from either the aorta, right common carotid, subclavian or internal thoracic arteries. It ascends infront of the trachea to the thyroid isthmus.

An inferior thyroid venous plexus associated with an anterior plexus are often present, lying on the anterior tracheal wall. As the mediastinoscope passes behind the supra-sternal notch, its anterior surface comes into contact with the posterior aspect of the brachiocephalic (innominate) artery. The left common carotid artery lies anterior and to the left of the mediastinoscope, while the left subclavian artery is posterior and to the left. Crossing obliquely in front of these arteries from left to right is the left brachio cephalic vein, which joins the right brachiocephalic