STUDY OF THE INCIDENCE, PATHOGENESIS AND PATHOLOGY OF BILHARZIASIS OF THE LUNG

THESIS

Submitted in Partial Fulfilment
For the Requirement of the M. Sc. Degree in
(Pathology)

By
MAISSA NOUR EL DIN MOSTAFA
M. B., B. Ch.

Supervised by
Prof. Dr. MOURAD ALI SHERIF

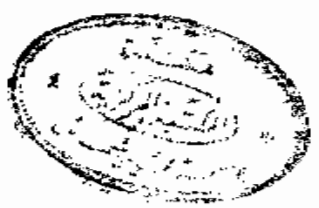
Pathology Department
Faculty of Medicine
Ain Shams University

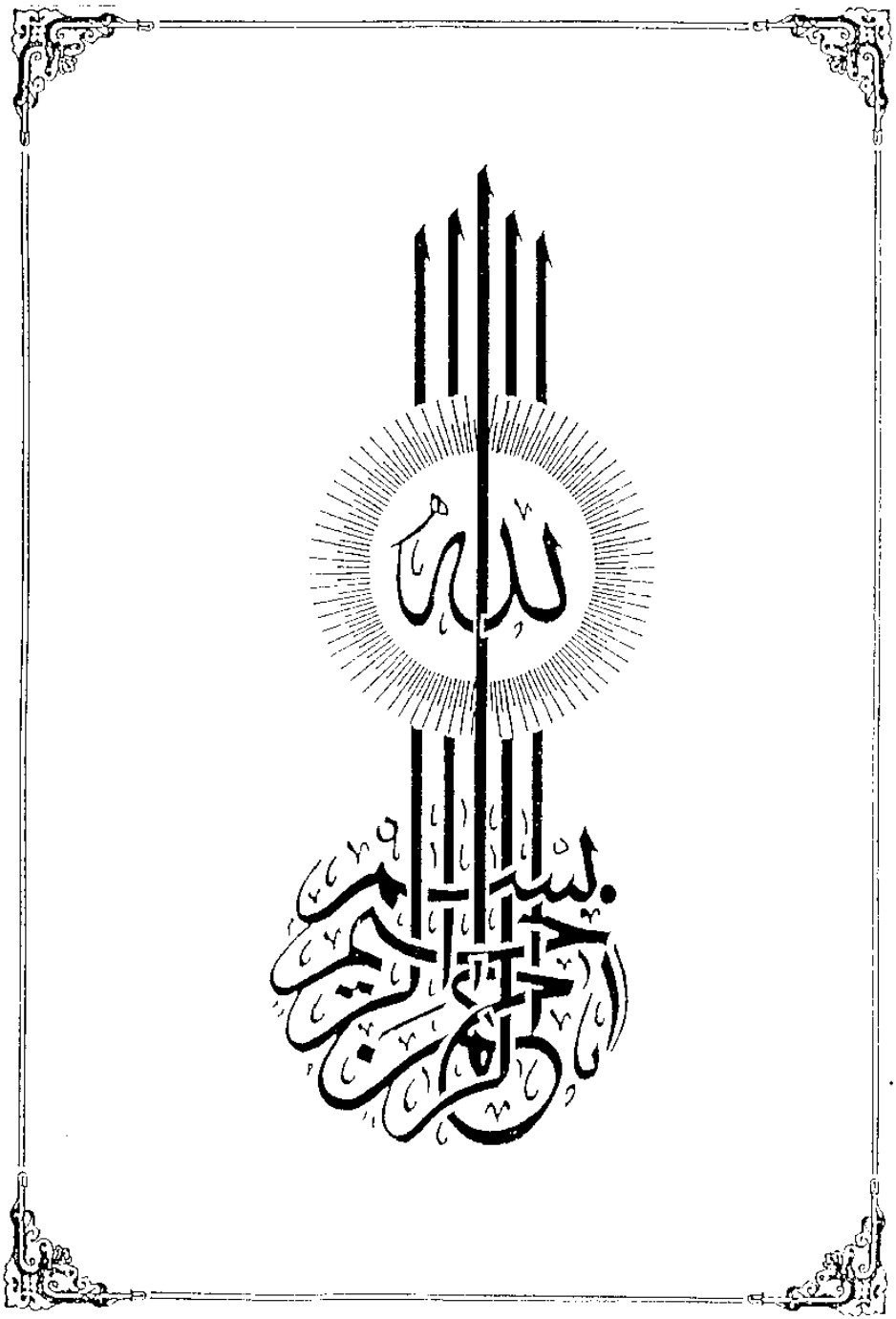
1979

ACKNOWLEDGEMENT

I would like to express my gratitude to Professor Mourad Sherif Professor and Head of Departmentof Pathology, Ain Shams University who encourage me and gave me a lot of his advice to complete this work .

My thanks extend to the staff and technicians of the Pathology Department who helped in completing the work.





C O N T E N T S

- - -

INTRODUCTION AND AIM OF THE WORK

INTRODUCTION AND AIM OF THE WORK

Schistosomiasis constitutes one of the major economic and health problems of increasing importance not only in Egypt, but also extending to various other parts of the world where the disease is endemic. The deleterious effects of bilharzial infection on general health and socio-economic aspects of the Egyptian population have been thoroughly investigated and are universally recognized. The prevention and treatment of such a serious disease are therefore of prime national importance.

The aim of this work is to study the incidence, pathogenesis and pathology of bilharziasis of the lung.

In this study 25 autopsy cases infected with urinary and/or intestinal schistosomiasis were examined grossly and microscopically in order to correlate between the species of infection, intensity of infection and cause of death with the quantity and quality of lung affection.

ANATOMY AND HISTOLOGY OF THE LUNGS

ANATOMY OF THE LUNGS

The lung surface is mottled and its colour is pink or grey. The lung is crepitant to touch. The lung conforms to the shape of the cavity which contains it. It has a convex costal surface and a concave diaphragmatic surface, separated from each other by a sharply angled inferior border. The posterior border of each lung is generously rounded to fit the paravertebral gutter and is continued up to the convex apex. The anterior border is thin and sharp; on the left side the lower border is deeply concave the cardiac notch. The mediastinal surfaces differ somewhat. On the left side the cardiac notch is seen to be the anterior margin of a deep concavity produced by the pericardium in front of the hilum; the arch and the descending aorta make a deep groove on the lung surface around the hilum. On the right the cardiac impression is much shallower; a groove for the azygos vien curves over the hilum. The apices are grooved by the subclavian arteries.

The lung roots:

1. The left lung root:

The upper part is occupied by the left pulmonary artery lying within the concavity of the aorta. Below and

behind it is seen the left bronchus as it slopes downwards from the bifurcation of the trachea. There are two pulmonary viens onein front of and the other below the left bronchus, and both in contact with the upper end of the pulmonary ligament. These structures, whieh constitute the lung root, are inclosed in a sleeve of pleura; which is called the pulmonary ligament. It is of coarse not a ligament, neither it is concerned with the lung. It provides the necessary freedom of "dead space" for the structures of the lung root. Its two layers separate on descent of the lung root during inspiration, and on enlargement of the pulmonary viens during increased pulmonary blood flow.

II. The right lung root:

Here in general the arrangement of the structures is similar to that on the left side, but the bronchus to the upper lobe (the eparterial bronchus) leaves the main stem bronchus outside the lung. Thus there are found the upper lobe bronchus and its accompanying pulmonary artery above the level of the main stem bronchus. Only two pulmonary veins leave the hilum of the right lung. They are disposed as on the left, one in front of and one below the main bronchus, at the upper end of the pulmonary ligament. The root of the right lung lies within the curve of the azygos vien. It is surrounded by

a sleeve of pleura that is too big for it, and depends below as a reflected fold of empty pleura, called the right pulmonary ligament. Its function is the same as that of the left pulmonary ligament. At the root of each lung bronchial arteries enter and bronchial viens leave. Hilar lymph nodes lie in around the main bronchus. The small anterior and the larger posterior pulmonary plexuses around the lung root.

The pulmonary arteries:

They are symmetrical in both length and position as they approach the lung roots. The pulmonary trunk no sooner shacks itself free of its attachment to the fibrous pericardium then it bifurcates, in the concavity of the aortic arch, in frent of the left main bronchus. The left pulmonary artery, attached to the concavity of the aortic arch by the ligamentum arteriosum, quickly spirals over the top to reach the back of the left main bronchus. The right pulmonary artery, longer than the left passes across below the carina and at the lung root is held to the right main bronchus by the upper bronchus.

Fissures:

The oblique fissure extends from the surface of the lung to the hilum and divides the organ into upper and lower lobes which are connected only by the lobar bronchi and vessels. On the right lung a horizontal fissure passes from the anterior margin into the oblique fissure to separate a wedge shaped middle lobe from the upper lobe. The visceral pleura, clothing the surface of the lung, extends inward to line the depth of the fissure. The middle lobe of the right lung is completely separate from the upper lobe in only about one third of individuals; in the remainders the fissure separating it from the upper lobe is incomplete or even absent (10%). In the left lung the boundary of the cardiac notch extending down to the lingula, represents the middle lobe, fused always to the upper lobe. The oblique fissure of each lung makes a slippery surface between the two halves. This promotes easier and more uniform expansion of the whole lung.

Internal Structure:

Because the left lung grows into a smaller cavity some of its bronchi delay in their separation from each other. Each lobe of the lung is made up of segments,

and these are similar on the two sides. However, the pattern of division of the bronchial tree to arcade the segments is different on the two sides. This is to say, the asymmetrical bronchi ultimately reach in the segments, a fairly symmetrical destination. The main bronchus on each side supplies the three lobes of the lung. It extends from the carina at the bifurcation of the trachea down to the origin of the middle lobe bronchus. Beyond this level only the lower lobe bronchus continues on.

The bronchial tree:

The right main bronchus gives off its three lobar bronchi separately; indeed the upper lobe bronchus leaves it outside the hilum of the lung. The left main bronchus gives off three lobar bronchi, but the upper two are fused for a short distance before separating into upper lobe bronchus and the lingular lobe bronchus.

Segmental bronchi: Each lobar bronchus in turn gives off branches, the segmental bronchi; each of these supplies a segment of the lung. These suppling bronchopulmonary segments are roughly pyramidal in shape, their bases lying on the surface of the lung. They are given

the same names and numbers as the segmental bronchi. The segments differ on the two sides only in the different positions of the two segments of the middle lobe.

The segmental bronchi have been named and numbered as follows:

Rt lung	Lt lung
Upper lobe	Upper lobe.
1. Apical	1.) Apico posterior
2. Posterior	2.)
3. Anterior	3. Anterior
Middle lobe	Lingular Lobe
4. Lateral	4. Superior
5. Medial	5. Inferior
Lower lobe	Lower lobe
6. Apical basal	6. Apical (superior)
7. Medial basal	7.) Medial basal
8. Anterior basal	8.) Anterior basal
9. Lateral basal	9. Lateral basal
10. Posterior basal	10. Posterior basal

The upper lobe:

On the right this is supplied by the upper lobe bronchus which separates the right main bronchus outside the hilum of the lung. It divides into three (Apical, posterior and anterior) for the three segments of the

upper lobe. On the left the upper lobe bronchus branches from the left main bronchus inside the hilum of the lung and in common with the bronchus to the lingula. The two have separating, the upper lobe bronchus divides into two, a combined apico-posterior and an anterior. The apico-posterior bronchus soon separates into apical and posterior bronchus, one for each segment. Thus the upper lobe has the same three segments as on the right side.

The Middle lobe:

On the right the bronchus leaves the front of the right main bronchus about an inch (3 cm) below the upper lobe bronchus. This is only slighly above the opening of the apical bronchus to the lower lobe. The bronchus divides to supply lateral (small) and medial (large) segments of the middle lobe. On the left the lingular lobe is joined with the lower division of the upper lobe. Its bronchus arise in common with the upper lobe bronchus and divides to supply superior and inferior segments. The cardiac excavation into the left lung has not only obliterated the fissure between the middle (i.e. lingular) lobe and the upper lobe, but has rotated the lingular so that the lateral and medial segments of the right side

have become superior and inferior here on the left.

The lower lobe:

The apical segment of the lower lobe is supplied by a bronchus which is the first branch of the bronchial tree, in the supine position inhaled liquids enter it. On each side the apical segmental branches come off close below the middle lobe bronchus. Astethoscope must be placed alongside the base of the scapular spine to listen to this segment (at the inferior angle of the scapula only segment number 10 is heared). The basal part of the lower lobe is supplied by 4 branches, which are medial, anterior, lateral and posterior. The medial basal or cardiac segment of the left lung is always present but it is small because the pericardial excavation suppresses this part of the lung. Furthermore it comes off in common with the basal segmental branches. Thus the pattern of the right and left bronchial trees are minor images, but the heart on the left side gives less room. So the left upper and middle lobe bronchi, and the left apical and posterior segmental bronchi, and the medial and anterior basal segmental bronchi are joined for a while, before they find room to branch apart.