RADIOLOGICAL STUDY OF LUNG ABSCESS

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in
(Radio Diagnosis)

BY

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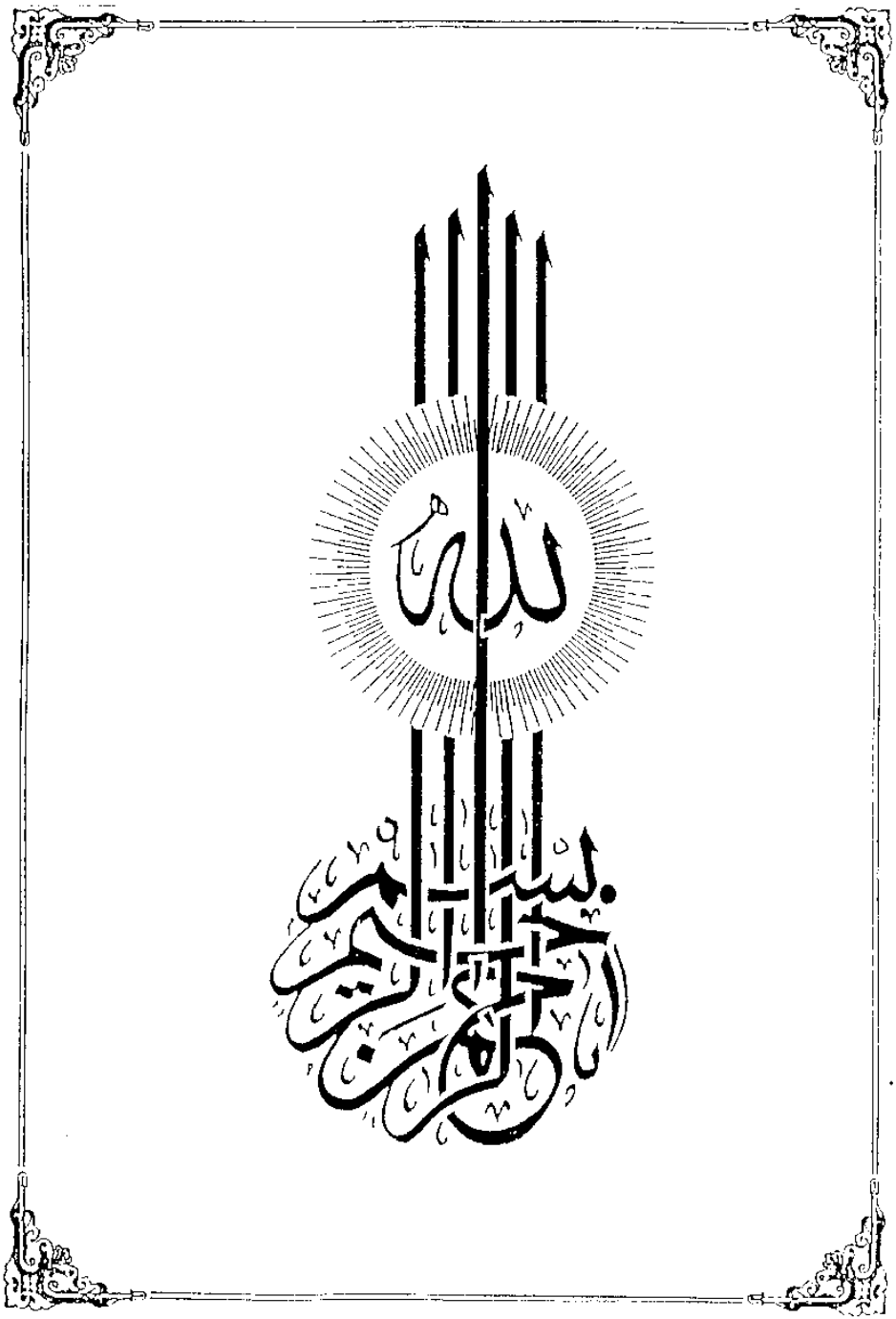

C O N T E N T S

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INTRODUCTION

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Radiology undoubtedly plays a major role in the diagnoses and management of lung abscess. Radiological examination shows the stages of development of lung abscess, together with its site, and extent and may throw light on the possible aetiology, so is indespensable to the clinical examination. The progress of the case is usually assessed by radiological examination.

The aim of this work is to show the role of Radiology in the diagnosis of lung abscess and to compare this with the clinical diagnosis. Besides, its value in the assessment of the progress and management of the cases is essential.

PATHOLOGY

AND

CLINICAL PICTURE

Pathology of lung abscess:

The term of pulmonary abscess describes a local suppurative process within the lung characterised by necrosis of lung tissue. Lung abscesses may develop at any age and especially frequent in young adults. Oropharyngeal surgical procedures, sinobronchial infections, dental sepsis and bronchiectasis play important roles in their development. Males are more often affected than females.

Aetiology and Pathogenesis:

Although any pathogen, under appropriate circumstances; may produce an abscess, the commonly isolated organisms are ,in order of frequency, streptococcus viridans, staph.aureus, streptococcus haemolyticus, pneumococci, some of anaerobic streptococci and a list of less common gram negatives. (Schweppe et al, 1961). Mixed infections occur often because of the important role that inhalation of foreign material plays. The spirochaetes and fusiform bacilli of vincents infection are often identified in these lesions, but their significance is as controversial here as it is in bronchiec-

tasis. More likely, they are merely secondary saprophytic invaders. The causative organisms are introduced into their sites of focal destruction by the following mechanisms (Amberson, 1954).

(1) Aspiration of infective material:

This is particularly common in acute alocholism, coma, anaesthesia, sinusitis, gingividental disease and debilitation in which cough reflexes are depressed. Aspiration of gastric contents is particularly serious because the gastric acidity adds to the irritant role of the food particles and, in the course of aspiration, mouth organisms are inevitably introduced.

(2) Antecedent primary bacterial infection:

Post pneumonic abscesses formation are particularly associated with staph.aureus, K. klebsiella and the type III pneumococcus. Mycotic infections and bronchiectasis are additional antecedents to lung abscess formation.

Staphylococcal pneumonia:

The disease is due to lung invasion by staph.aureus. It is regarded as a complication of staph septiceamia, originating in a boil or an osteomylitis or as a staphylococcal infection superimposed on a virus pneumonia. The organism can directly attack the lung. The disease is more commoner in infants and children. It can be seen in adults when antibiotic resistant organisms develop in other diseases. The disease produces patchy consolidations, usually in one or two segments and rarely lobar. It is commonly unilateral in at least 70% and the affected segments are swollen and enlarged and not atelectatic. The disease rarely manifests itself as patchy areas of bronchopneumonia one cm or less in diameter (miliary abscess). In untreated or resistant cases abscess formation quickly occurs and the cavities are easily seen in the consolidated area. Tomography shows that such cavities have thick walls. Effusion and empyema are common and in infants may be localised to the paravertebral gutter. A staph pericardial effusion is a rare complication. Ribs adjacent to the consolidation may show periostitis or a rarefying osteitis.

When staphylococcal infection supervenes on virus infection, it drastically alters the clinical picture; the patient, from moderately ill, becomes desperately ill and cyanosed. A miliary pattern of patchy areas of bronchopneumonia are superimposed on the interstitial appearances due to the virus. Large segmental consolidations seldom occur and the pneumatoceles of primary staphylococcal pneumonia seldom develop (Shanks S.C. & Kerley, 1973).

Friedlander's Bacillus pneumonia:

The Causative organism is Klebsiella pneumoniae. It has a number of types. The disease which is fortionately uncommon, used to have a mortality rate 80% and even with modern treatment this has only been lowered to 20%. The patches of consolidation, most frequent in the upper lobe have a characteristic mucinous appearance, which corresponds to the sticky mucoid appearance of the colonies on culture. The patches tend to coalesce undergo necrosis and develop into abscesses. Death may take place in the course of few days. When recovery takes place it is slow and protracted. During this period the condition is readily mistaken for T.B. especially if it is confined to the upper lobes. As the organism is gram-negative, they are resistant to Penicillin. (Anderson 1977).

3) Septic embolism:

Infected emboli from thrombophlebitis in any portion of the systemic venous circulation or from vegitative bacterial endocarditis on the right side of the heart are trapped in the lung.

(4) Parasitic infestation:

i. Amoebic lung abscess:

The endemicity of amoebiasis varies widely in different parts of the world, and with it the frequency of its pulmonary and other Complications. Though as a rule the lesions caused by Entamoeba histolytica, the causative organisms, are severest in the large intestines, the amoeba may invade the blood stream and spread to other organs. To the lesion thus produced, the term abscess was usually applied, although in its uncomplicated form there is no evidence of suppuration. Usually, haematogenous dissemination is initially limited to the portal venous system, but should the infestation involve the rectum, the amoeba may enter the haemorrhoidal veins and reach the lungs directly by way of the systemic circulation. Much oftener, however, the

pulmonary abscesses which are commonest in the right lung are secondary to those in the liver; the amoeba pass through the diaphragm to give rise to lesions in the pleural cavity and the lung.

An amoebic abscess in the lung like that in the liver, is essentially a focus of localised destruction of the parenchyma - an amoebic pneumonia-in which large areas of lung substances are destroyed and replaced by a reddish brown viscous fluid. There is little inflammatory reaction in the surrounding tissues, but amoeba may be seen in secretions taken from the zone surrounding the cavity. Often the area of destruction extends to involve one of the bronchi; and much of the characteristic, and often blood stained, fluid may be then expectorated. Should this happen, the condition may be further complicated by secondary bacterial infection of the resulting cavity. Such suppurating lesions in the lungs are a grave complication of amoebiasis, and their mortality is high. (Symmers 1960.).

ii. Complicated hydatid cysts:

Infection of the surrounding lung can occur at any stage in the life of the parasite. In the case of a complicated hydatid, where the cyst is ruptured, the result is often a chronic lung abscess, and this may be the situation when the hydatid is first discovered. (Sutton D.1975).

(5) Neoplasia:

Secondary infection is particularly common in the bronchopulmonary segment obstructed by a primary or secondary malignancy. This sequence is typical of bronchogenic carcinoma in which impaired drainage, distal atelectasis and aspiration of blood and tumour fragments all contribute to the development of sepsis.

(6) Bronchiectasis:

It is a persistant dilatation of the bronchi accompanied by suppurative inflammation.

Pathogenesis: The following two factors are responsible for the production of bronchiectasis.

(1) Infection: in the form of marked chronic inflammation of the bronchi with destruction of the musculo-elastic tissue of the bronchial walls and its replacement by fibrous tissue and so become weakened and liable to dilatation.

The infection is usually long standing and starts early in life and may follow measles, whooping cough, influenza lobar and bronchopneumonia. The infection usually occurs as well in the surrounding lung tissue, ending in fibrosis and traction on the already weakened bronchial walls.

(2) Obstruction: of the bronchi (complete) as occurs by foreign bodies, tumours, or pressure from outside as by enlarged lymph nodes. The effects of obstruction are:

i. It leads to stagnation of secretion followed by infection and destruction of the walls of more bronchi which become weakened and liable to dilatation.

ii. It leads to areas of collapse followed by compensatory stretching and dilatation of the to maintain the orginal size of the lung within the chest.

Morbid Anatomy:

It occurs more commonly in the lower lobes of the lung particularly that of the left lung, but sometimes it is bilateral. The bronchi are dilated either diffusely i.e. cylindrical type and this is more common, or localised, i.e. saccular type which