SURVIELLANCE OF TUBERCULOSIS CONTACTS

An essay

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by

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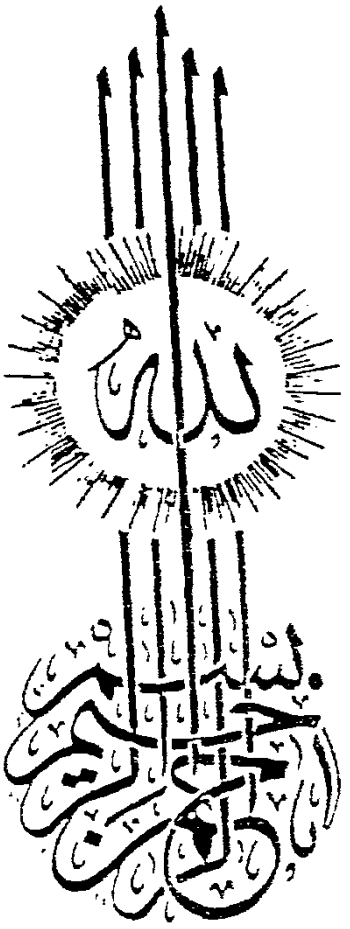

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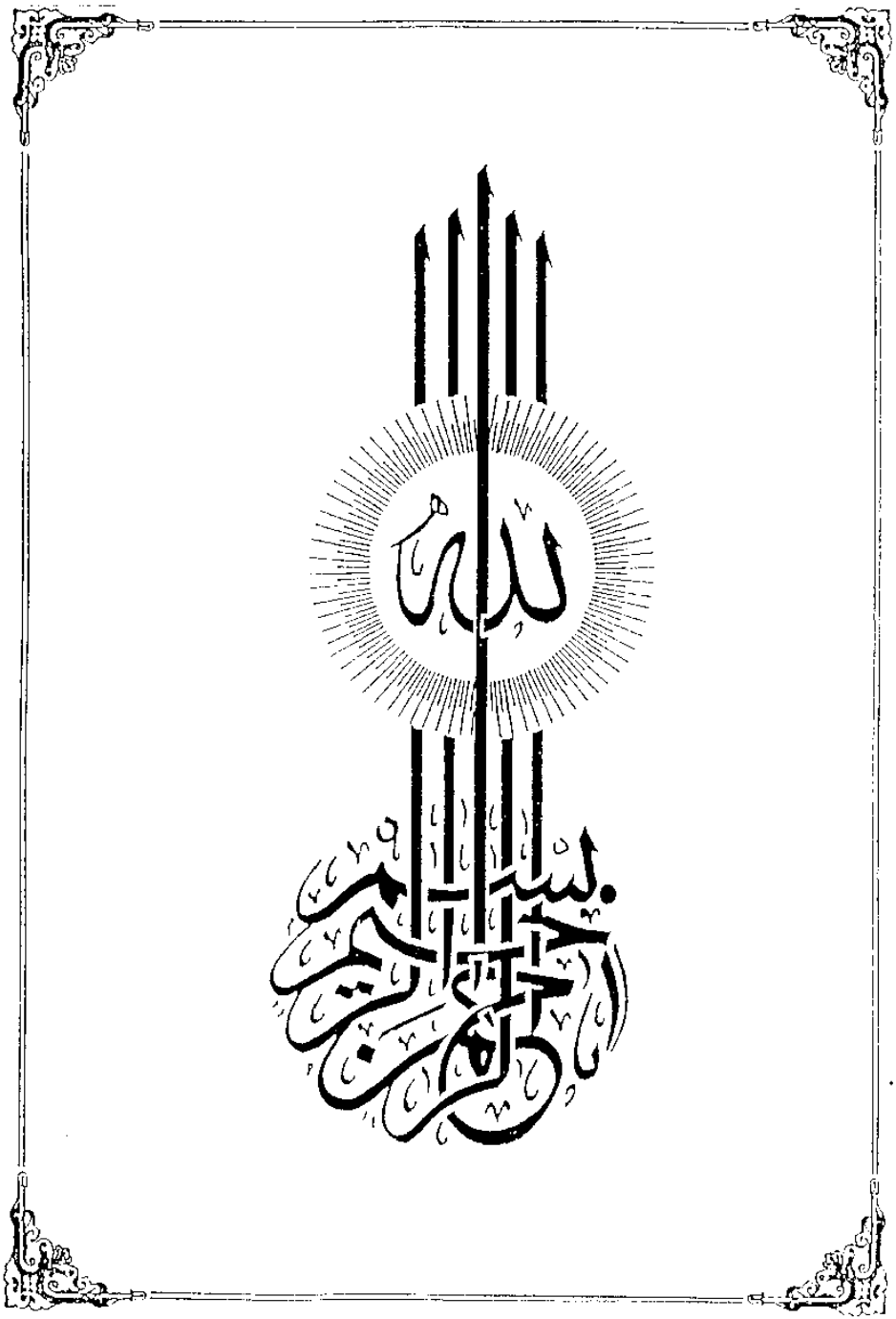

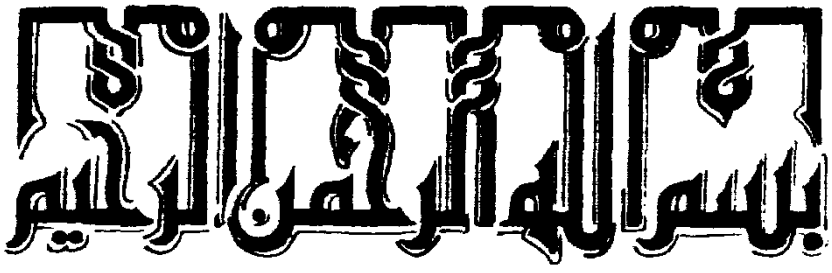

C O N T E N T S

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A C K N O W L E D G E M E N T

" First and foremost, thanks are to GOD the beneficient and merciful " .

I would like to express my deepest thanks and gratitude to my Professor Dr. Karima Ahmed Abdel Khalek Professor of Pediatrics, Ain Shams University, for her valuable and sincere guidance and advices, without her efforts this work would not have been achieved .

I N T R O D U C T I O N

Tuberculosis is a chronic infectious disease caused by mycobacteria of the " tuberculosis complex ", mainly Mycobacterium tuberculosis .

It was the leading cause of death in young people all over the world . Today, despite great progress in its treatment and control, it is still an important medical problem in many developing countries .

The World Health Organization reported in 1982 that there were still 7 to 10 million new cases and about 3 million deathes each year from tuberculosis allover the world . In the United States tuberculosis mortality decreased from a rate of 202 per 100,000 in 1900 to less than 1 in 1980 .

Considerable progress in controlling the disease has been achieved in most industerial societies. . The mortality rate in the United States, for example, has fallen steadily since the begining of the 19 th century to its present level of about 1.4/ 100,000 population .

On the other hand, in some of the underdeveloped countries tuberculosis remains a major public health problem and is the commonest cause of death .

The supervision of contacts of patients with tuberculosis is accepeted as an important factor in the control of tuberculosis . Its aims are essentially three-fold, namely

to detect active or inactive tuberculosis amongest contacts, also to detect subsequent development of tuberculosis in selected contacts considered to be at risk and finally through the use of BCG, to protect certain tuberculin negative contacts from subseqently developing the disease .

The aim of the essay is to through light on tuberculosis and the value of contact procedures for its control .

HISTORICAL REVIEW

A disease that was probably tuberculosis was known as early as 1000 B.C. Hippocrates described symptoms of a malady called phthisis, meaning to waste and recognised nodules (phymata) of the lung as a feature of the disease . Such nodules, known as tubercula in Latin, were called tubercles when they became recognised as the pathological characteristics of the disease . The term tuberculosis was just applied to the clinical and pathologic description of the disease in 1834 (Harris and Mc Clement, 1983) .

The great physicians and scientists who were associated with landmark discoveries in tuberculosis include Laennec, who was early in the nineteenth century disclosed the physical signs and morbid anatomy and who suggested the concept of one disease with involvement of many organ systems; Villemin , in 1868 showed that the infection was caused by trahsmission, Koch demonstrated the tubercle bacillus in 1882, Roentgen, whose discovery of x-rays in 1895 was the begining of diagnostic radiology and allowed recognition of cavity formation . Also Waksman, by his discovery of streptomycin in 1944 provided the first agent that could be used successfully in chemotherapy of the disease (Wolinsky, 1985).

During the last half-century, a concerted global effort has produced remarkable results in reducing the incidence of the disease . Even so, tuberculosis remains the leading

bacterial cause of death among the reported infectious diseases, and it disables or kills millions of peoples each year . Perhaps the most crucial change in tuberculosis control was the introduction of antituberculus drugs in the late 1940 . Before chemotherapy, the out look for its control through treatment of patients with the disease was black . Now a day's by chemotherapy and preventive therapy, it is possible to blok transmission of infection, prevent disease in the already infected, and accelerate the decline in both the incdence and prevalence of tuberculosis . The reduction in deaths and cases of the disease took a sharp downward turn at about 1950 and has continued to decline annually since that time (Edwards, 1981) .

E T I O L O G Y

Mycobacterium tuberculosis is the causative organism of tuberculosis . This organism is one of thirty named species and probably an even large number of unnamed species belonging to the genous Mycobacterium (Citron and Girling, 1983) .

The mycobacterium tuberculosis belongs to the genus Mycobacterium, which is classified in the family Mycobacteriaceae of the order Actinomycetales . Taxonomists do not agree on further classification of the genus Mycobacterium, but a useful concept is that of the tuberculosis complex to include M. tuberculosis, M. bovis, and probably M. africinum . Some taxonomists would subdivid M. bovis into European, Afro-Asian, and African variants . Few suggested that there should be just one species, M. tuberculosis, with subclassifications of bovine type, African type and so forth.(Wolinsky, 1985) .

Morphology :

Tubercle bacilli are long, curved, often with beaded or banded rods 4 μm or more in length and about 0.5 μm in diameter . They tend to form long cords . They do not stain easily with gram stain because of the high cell lipid content , but once stained, for example by Ziehl - Neelsen or fluorochrome procedures, they strongly resist decolourization with acid and alcohol (Citron and Girling, 1983) .

This remarkable property of acid-fastness results from the lipoidal constituents in an intact cell structure; disrupted cells lose acid-fastness and become less resistant to aniline stain (Harris and Mc Clement, 1983) .

Culture :

In vivo and in vitro, these microbes grow relatively slowly . They are obligate aerobes and require carbon dioxide for growth . Culture media capable of supporting multiplication of relatively fastidious bacteria are not appropriate for the isolation of most strains of mycobacteria;so special substrates are required . More recently developed culture systems incorporate oleic acid and albumin it permits considerably more rapid growth (Eichenwald, 1983) .

Two kinds of mediums are customorily used for culturing specimens (1) a complex medium containing eggs or egg yolks and potato extract, such as the Lowenstein-Jensen medium or the American Trudeau society medium; (2). A semisynthetic medium containing oleic acid and albumin, such as the middlebrook 7 H-11 agar medium . The latter medium permits earlier detection of growth because it is transparent . In addition, it is superior for determining the susceptibility to antimicrobials . Because some strains of mycobacteria grow better on one kind of medium than on another, it is worthwhile to culture on both an egg-potato medium and the 7 H - 11 medium (Harris and Mc Clement, 1983) .

Virulence :

Unlike other pathogenic bacteria, tubercle bacilli do not produce exotoxins, endotoxins or extracellular enzymes noxious to the host, and they are rapidly phagocytosed, even in the absence of antibody . Moreover, large numbers of organisms can be injected into animals without causing immediate disease . Indeed the precise mechanism of their virulence is not at all clear (Citron and Girling, 1983).

MODE OF TRANSMISSION OF INFECTION

Tuberculosis is most commonly transmitted by a patient with infectious pulmonary tuberculosis to other persons by way of infected droplet nuclei . The diseased person produces these droplet nuclei on coughing or sneezing (Styblo, 1986) .

Large airborn particles may settle out of the air to the floor or ground where the bacilli, although viable, remain relatively harmless . Droplet nuclei a few μ m in diameter are produced by the rapid evaporation of water from the aerosolized, small droplets containing only one or a few tubercle bacilli . These droplet nuclei may remain suspended in air for long periods . When air containing such droplet nuclei is inhaled by uninfected person, the small particle borne into the lung to the pulmonary alveoli, where the microorganisms become implanted and infection is intiated (Harris and Mc Clement, 1983) .

Ingestion is no longer a common pathway for infection, although in the days of unpasteurized milk and widespread tuberculosis in cattle this was a common route of infection for M. bovis, especially for the production of tuberculosis of the tonsils and subsequent involvement of the submandibular lymphnodes .

Another route of infection that still may be observed, however, is primary inoculation through the skin. Laboratory workers may inoculate themselves with actively growing cultures