THE APPLICATION OF TRANSTRACHEAL ASPIRATION METHOD THROUGH THE CRICOTHYROID MEMBRANE TO STUDY THE MICROFLORA OF THE LOWER RESPIRATORY TRACT

THESIS

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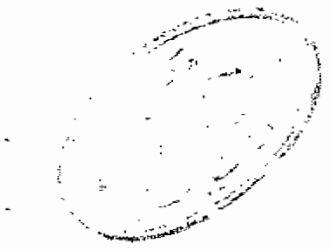
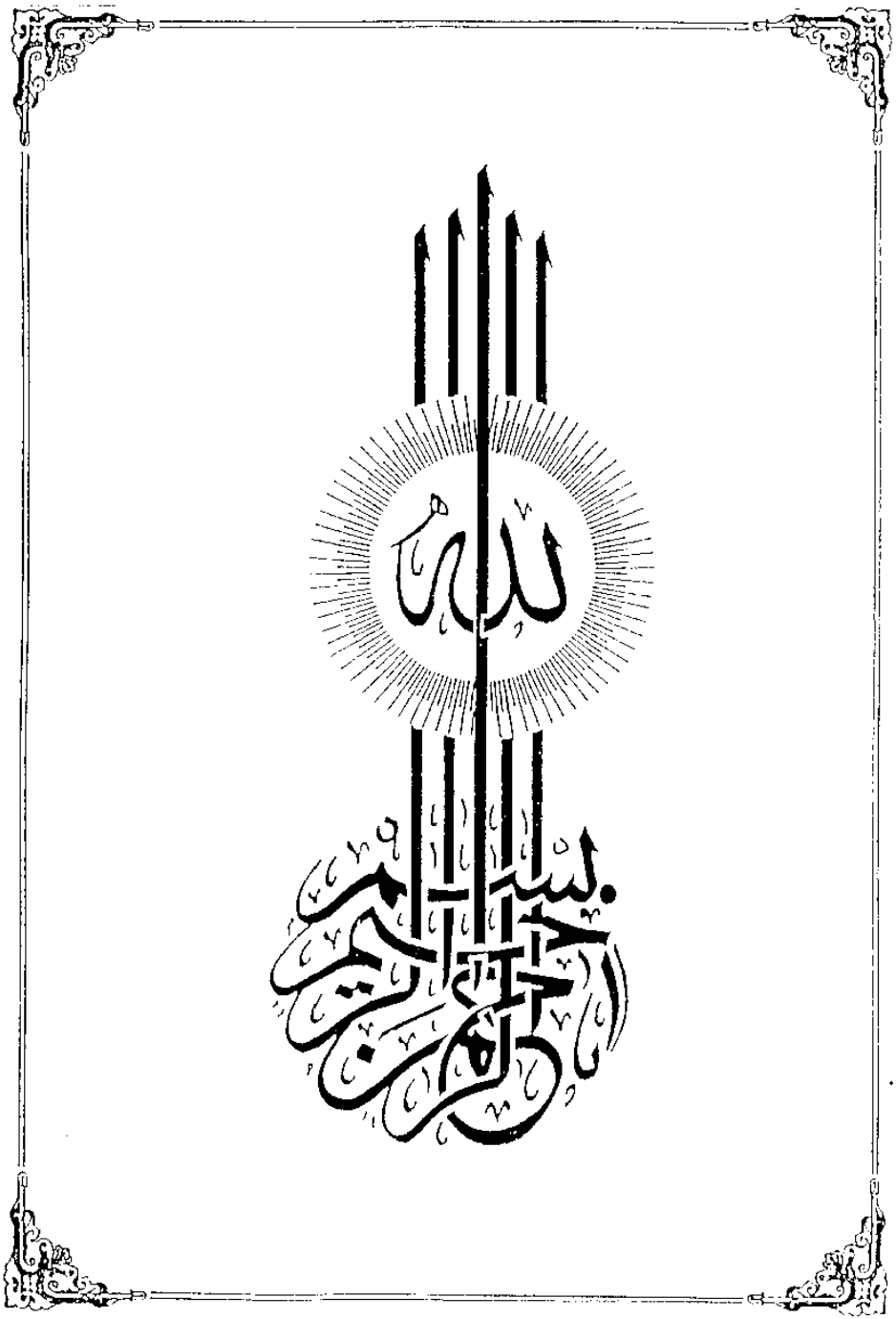
This work is dedicated to the soul of my father,
the late General SALAH MOUNIB,





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C O N T E N T S

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INTRODUCTION

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Infection of the lower respiratory tract is receiving increasing attention as a possible cause of different bronchopulmonary diseases. For many years culture of expectorated material has been performed in an attempt to identify pathogenic bacteria that are assumed to emanate from the bronchial tree. There is much evidence that Haemophilus influenzae and pneumococci, organisms said to be the most frequent pathogens in chronic bronchitis, are commonly isolated from the mouth and pharynx of persons who have no respiratory ailment, and that oropharyngeal secretions mask the bacteriology of those expectorated from the lower respiratory passages.

Anaerobic bacteria have been implicated in essentially all types of pulmonary infections. Unfortunately, when the infection is restricted to the pulmonary perenchyma, the anaerobic cause is often not recognized and is seldom established because of the difficulty of obtaining appropriate specimens for anaerobic culture. Although the blood and pleural fluid are reliable culture sources, most infections are not complicated by sepsis or empyema. Expectorated sputum

should not be cultured anaerobically because these specimens are invariably contaminated by the endogenous anaerobic flora of the mouth and oropharynx.

So maneuvers designed to reduce the error introduced by the oropharyngeal flora include the sampling of pulmonary secretions through a bronchoscope, repeated washing of expectorated sputum, and quantitative cultures. Each of these requires either a major diagnostic procedure or significantly increased laboratory effort.

So, transtracheal aspiration is performed when there is a need to obtain secretions from the lower respiratory tract for smear and culture that are uncontaminated by nasopharyngeal and oral organisms. This is especially important in searching for anaerobic bacteria and in managing the immunosupressed patient.

AIM OF THE WORK

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The aim of this study is to compare the results of sputum culture and culture of transtracheal aspirate and to review the literature in this aspect concerning the validity of the last method and its value.

REVIEW OF LITERATURE

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Transtracheal aspiration is defined as a procedure for obtaining secretions from the tracheobronchial tree by means of a catheter inserted percutaneously through the cricothyroid membrane.(Jay Stephen J. and Stonehill. Robert, 1980).

Indications of transtracheal aspiration:

Transtracheal aspiration is a safe method of obtaining material from patients with infections of the lower respiratory tract, and it has a high degree of bacteriologic reliability. The procedure is probably most helpful in patients who are severely ill with pneumonia and unable to raise sputum spontaneously. It is also likely to be useful in patients who can produce sputum but have predisposing conditions such as alcoholism or debility that predispose to pulmonary infection with "unusual" organisms. If gram negative bacilli or gram positive cocci in clusters are present in large numbers on the gram stain of expectorated sputum from such patients, a transtracheal aspiration may be helpful. The procedure is probably not

indicated in the evaluation of previously healthy individuals with uncomplicated pneumonia.(Hahn, 1970).

The usefulness of anaerobic culture of percutaneous transtracheal aspirates has been evaluated, by Bartlett et al., (1973), in 91 untreated patients with various pulmonary conditions. Bacteriologic results were correlated with clinical features suggesting anaerobic infection. No anaerobes were recovered in 58 patients, indicating that these microorganisms do not normally reside in the trachea. Clinical and bacteriologic findings in these patients indicated aerobic pulmonary infection or nonbacterial pulmonary disease. Anaerobes were recovered from 33 aspirates; in 22 patients they were the only pathogens isolated, and in 11, anaerobes were isolated in combination with potential aerobic pathogens. Two patients had cavitating bronchogenic carcinomas with anaerobic colonization. In the other 31 patients clinical features (putrid sputum, infection after aspiration, necrotizing pulmonary lesions, and response to antibiotics) indicated anaerobic infection. Proper culture of percutaneous transtracheal aspirates will generally establish the diagnosis and permit identification of the pathogens in anaerobic pulmonary infections.

Exacerbations of bronchial asthma that can not be accounted for by allergic reactions have sometimes been called "infective" asthma. Berman et al.,(1975) tested the validity of this designation by study of transtracheal aspirates obtained from 27 asthmatic patients in relapse who had findings suggestive of respiratory infection and 12 subjects without respiratory disease. Aspirates were cultured for aerobic and anaerobic bacteria, mycobacteria, fungi, mycoplasma, and viruses. A comparable variety of bacterial and fungal growth in small numbers was obtained from a majority of both groups. Microbial growth did not correlate with the presence of symptoms or signs compatible with infection. Aspirates from asthmatics with chronic bronchitis, immediate hypersensitivity to aeroallergens, aspirin intolerance yielded no greater growth than did aspirates from asthmatic without these characteristics. In only one asthmatic was there suggestion that overt infection of the lower respiratory tract contributed to exacerbation of asthma. These results do not lend support to the empiric use of antibiotics in the management of unexplained asthmatic relapse.

Rosenblatt (1976) included transtracheal aspiration with thoracentesis, needle and syringe aspiration of closed abscesses, and endocervical aspiration of intrauterine pus, as a suitable method to collect specimen for isolation and identification of anaerobic bacteria.

When a diagnosis of pulmonary tuberculosis is suspected, it is important to obtain bacteriological confirmation. A diagnosis without bacteriological proof is always open to doubt and therapy may not be justified. Moreover, the absence of M.tuberculosis in the various samples may mean either that the lesions are stabilized, or that the X-ray may in fact be indicating some other anomaly, such as primary or metastatic bronchopulmonary cancer or an infection due to other microorganisms. It is essential to obtain valid sputa. If a patient does not expectorate, there are several other possible techniques which may be used: gastric lavage when the patient wakes up, if possible at the bedside, hypertonic expectorant aerosols, instillation of saline solution by laryngeal syringe, or sampling of bronchial secretions by bronchoscopy or bronchofiberoscopy. Transtracheal puncture