

Pathogens Causing ICU Acquired Pneumonia in Police Hospitals

Thesis

*Submitted for Partial Fulfillment of M.S. Degree
in Chest Disease & Tuberculosis*

By

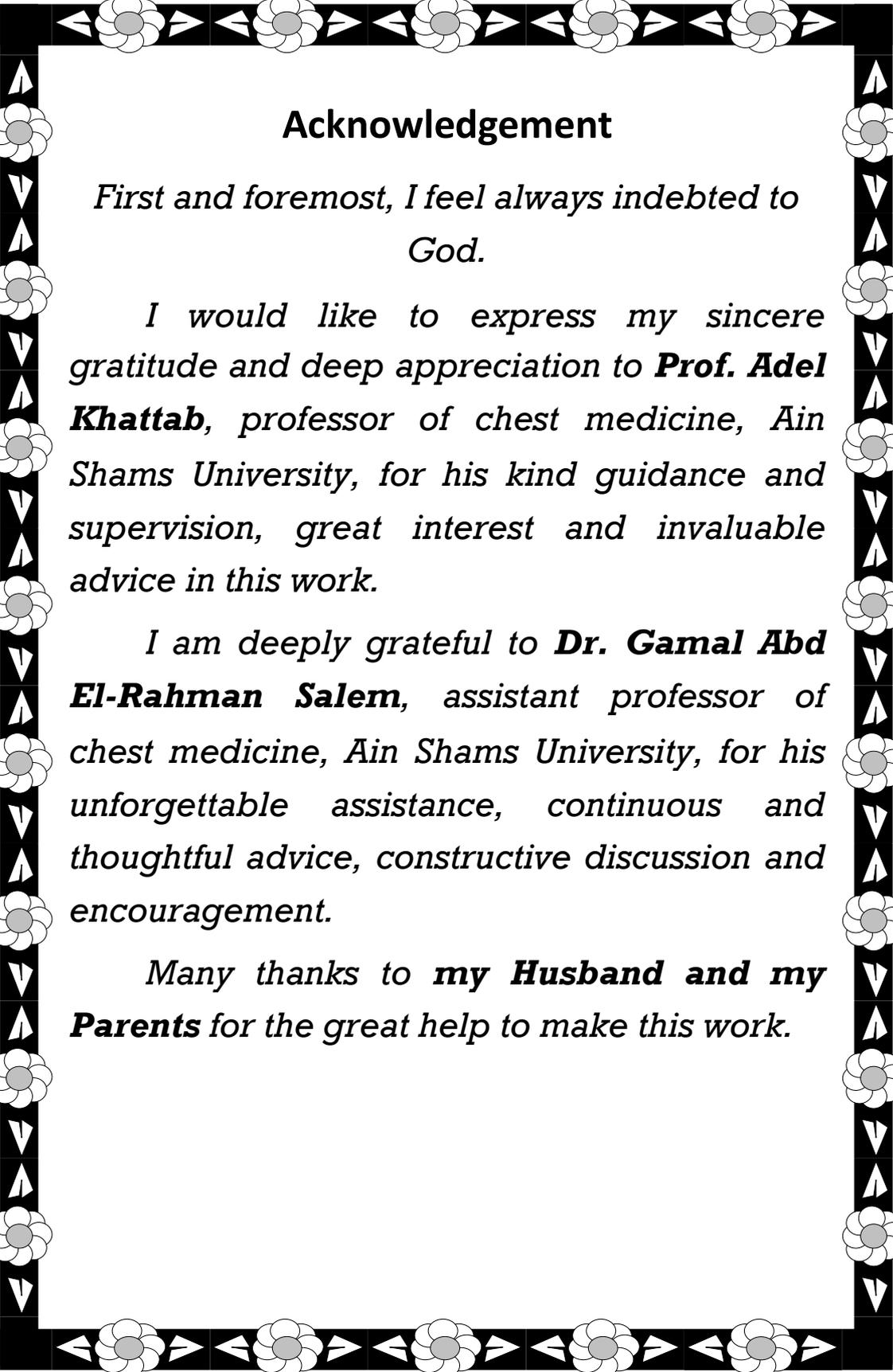
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List of Abbreviation

1. APACHE: Acute Physiology and Chronic Health Evaluation
2. ARDS: Acute Respiratory Distress Syndrom
3. BAL: Bronchoalveolar Lavage
4. CPIS: Clinical Pulmonary Infection Score
5. ESR: Erythrocyte Sedimentation Rate
6. K. Pneumonia: Klebsiella Pneumonia
7. M.O.F.: Multiple Organ Failure
8. NHAP: Non Hospital Acquired Pneumonia
9. P. Aeruginosa: Pseudomonas Aeruginosa
- 10.P.P.: Post Prandial
- 11.PSB: Protected Specimen Brush
- 12.S. Aureus: Staphylococcus Aureues
- 13.S. Maltophilia: Stenotrophomonas Maltophilia

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Introduction

Hospital-acquired pneumonia (HAP), ventilator-associated pneumonia (VAP), and healthcare-associated pneumonia (HCAP) remain important causes of morbidity and mortality despite advances in antimicrobial therapy, better supportive care modalities, and the use of a wide-range of preventive measures (**Hutt E, Kramer AM, 2002**).

HAP is defined as pneumonia that occurs 48 hours or more after admission, which was not incubating at the time of admission (**Tablan OC et al., 2004**). HAP may be managed in a hospital ward or in the intensive care unit (ICU) when the illness is more severe. VAP refers to pneumonia that arises more than 48-72 hours after endotracheal intubation. Although not included in this definition, some patients may require intubation after developing severe HAP and should be managed similar to patients with VAP. (**Craven DE et al., 1986**).

HAP is usually caused by bacteria, is currently the second most common nosocomial infection in the United States, and is associated with high mortality and morbidity (**Tablan OC et al., 2004**).

Although HAP is not a reportable illness, available data

suggest that it occurs at a rate of between 5 and 10 cases per 1,000 hospital admissions, with the incidence increasing by as much as 6- to 20- fold in mechanically ventilated patients (**Chaster J, Fagon JY, 2002**).

HAP accounts for up to 25% of all ICU infections and for more than 50% of the antibiotics prescribed (**Richards MJ et al., 1999**). VAP occurs in 9-27% of all intubated patients. In ICU patients, nearly 90% of episodes of HAP occur during mechanical ventilation. In mechanically ventilated patients, the incidence increases with duration of ventilation. (**Cook DJ et al., 1998**).

The crude mortality rate for HAP may be as high as 30 to 70%, but many of these critically ill patients with HAP die of their underlying disease rather than pneumonia. The mortality related to the HAP or “attributable mortality” has been estimated to be between 33 and 50% in several case-matching studies of VAP. Increased mortality rates were associated with bacteremia, especially with *Pseudomonas aeruginosa* or *Acinetobacter* species, medical rather than surgical illness, and treatment with ineffective antibiotic therapy (**Heyland DK et al., 1999**).

HAP, VAP, and HCAP may be caused by a wide spectrum of bacterial pathogens, may be polymicrobial, and

are rarely due to viral or fungal pathogens in immunocompetent hosts. Common pathogens include aerobic gram-negative bacilli, such as *P. aeruginosa*, *Escherichia coli*, *Klebsiella pneumoniae*, and *Acinetobacter* species. Infections due to gram-positive cocci, such as *Staphylococcus aureus*, particularly methicillin-resistant *S. aureus* (MRSA), have been rapidly emerging in the United States (**Rello J et al., 1994**).

Aim of the Work

To define the pathogen of ICU acquired pneumonia and antibiotic sensitivity in Police Hospital ICUs.

Review of Literature

Nosocomial Infection:

The term "Nosocomial infection" generally used now include all microbial diseases that develop in hospitalized patient after the expiry of the supposed incubation period of the disease. Recent advances in medical and surgical techniques have improved the outlook for many patients suffering from sever or potentially fatal diseases. However the procedures used to cure or alleviate the illness carry frequently a very high risk of infection (**Castle et al., 1980**).

Patients in critical care centers are more severely compromised than those in other hospital sections. In addition to the severity of illness that require more close nursing care, those patients maybe subjected to therapies that include drugs or equipments that further increase their susceptibility to infection (**Castle et al., 1980**).

Nosocomial respiratory Infection

Nosocomial pneumonia is the second most common Nosocomial infection and along with primary bacteremia, the leading cause of death from infection acquired in the hospital (**Celis et al., 1988**).

Definition:

HAP (Hospital acquired Pneumonia) is defined as pneumonia that occur after 48 hours or more after admission (**Tablan OC et al., 2004**). HAP maybe managed in a hospital ward or in the intensive care unit (ICU) when the illness is more sever. VAP (Ventilator-Associated Pneumonia) refer to pneumonia that arises more than 48-72 hours after endotracheal intubation (**Craven DE et al., 1986**).

For many years, VAP has been diagnosed by the clinical criteria published by **Johanson et al in 1972**, which include the appearance of a new or progressive pulmonary infiltrate, fever, leukocytosis, and purulent tracheobronchial secretions, however, these criteria are nonspecific (**Meduri, 1993**).

In mechanically ventilated patient, fever may be caused by a drug reaction, extrapulmonary infection, blood transfusion, or extrapulmonary inflammation, pulmonary infiltration maybe due to pulmonary hemorrhage, chemical aspiration, pleural effusion, congestive heart failure or tumor (**Mayhall, 2001**).

Early onset VAP occurs during the first 4 days of mechanical ventilation, late onset VAP develops in the fifth day or later (**Gross man and Fein, 2000, American Thoracic Society, 1995**).

Epidemiology:

Incidence:

HAP is usually caused by bacteria is currently the second most common nosocomial in the United States, and is associated with high mortality and morbidity (**Tablan OC et al., 2004**). The presence of HAP increases hospital stay by an average at 7 to 9 days per patient and has been reported to produce on excess cost of more than \$40,000 per patient (**Chastre J, Fagon JY, 2002**). Although HAP is not a reportable illness, available data suggest that it occur at a rate of between 5 and 10 cases per 1,000 hospital admission, with the incidence increasing by as much as 6 to 20 fold in mechanically ventilated patients (**Chastre J, Fagon JY, 2002**).

HAP accounts for up to 25% of all ICU infections and for more than 50% of the antibiotics prescribed (**Richards MG et al., 1999**). In ICU patients, nearly 90% of episodes of HAP occur during mechanical ventilation. In mechanically ventilated patients, the incidence increases with duration of ventilation. The risk of VAP is highest early in the course of hospital stay, and is estimated to be 3% / day during the first 5 days of ventilation, 2% / day during days 5 to 10 of ventilation, and 1% / day after this (**Cook DJ et al., 1998**)