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Management of Acquired Ventilator Associated Pneumonia In Critically Ill Patients

Essay

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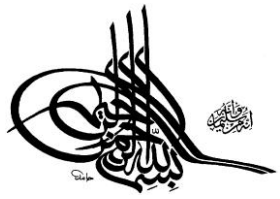

قالوا سبحانك لا علم لنا إلا ما علمتنا

إنك أنت العليم الحكيم

صدق الله العظيم

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LIST OF ABBREVIATIONS

AARC	American Association for Respiratory Care
ARDS	Acute Respiratory Distress Syndrome
ATS	American Thoracic Society
AVP	Arginine Vasopressin
BAL	Bronchoalveolar Lavage
BMJ	British Medical Journal
BPSB	Blind Protected Specimen Brush
BSI	Blood Stream Infection
CAMRSA	Community Associated Methicillin Resistant Staphylococcus Aureus
CAP	Community Acquired Pneumonia
CASS	Continuous Aspiration Of The Subglottic Secretions
CF	Complement fixation
CFU	Colony Forming Unit
CMV	Cytomegalovirus
COPD	Chronic Obstructive Pulmonary Disease
CPIS	Clinical Pulmonary Infection Score
CRP	C-Reactive Protein
CTSS	Closed Tracheal Suctioning System
DFA	Direct Fluorescence Antibody
DVT	Deep Venous Thrombosis
EB	Elementary Bodies
EIA	Enzyme Immuno Assay
ELISA	Enzyme-Linked Immunosorbent Assay

ETA	Endotracheal Aspirate
ETT	Endotracheal Tube
FDA	Food and Drug Administration
GI	Gastrointestinal
HAP	Hospital Acquired Pneumonia
HCAP	Health Care Associated Pneumonia
HCU	High care unit
HDU	High Density Unit
HIV	Human Immunodeficiency Virus
HSV	Herpes Simplex Virus
ICO	Intracellular Organism
ICU	Intensive Care Unit
IDSA	Infectious Diseases Society Of America
IFA	Immunofluorescent Antibody
IV	Intravenous
MCCU	Medical Critical Care Unit
MDR	Multidrug Resistant
MIC	Minimum Inhibitory Concentration
MIF	Micro Immunofluorescence
MINI-BAL	Mini- Bronchoalveolar Lavage
MR-PROANP	Midregional Pro-Atrial Natriuretic Peptide
ND	No Data
NHSN	National Healthcare Safety Network
PBP	Penicillin Binding Protein
PCR	Polymerase chain reaction

PCT	Procalcitonin
PEEP	Positive End Expiratory Pressure
PPMS	Potentially Pathogenic Microorganisms
PSB	Protected Specimen Brush
PTA	Polymyxin e, Tobramycin, and Amphotericin b
RB	Reticulate Bodies
RCTS	Randomized Controlled Trials
RIA	Radio immunoassay
SDD	Selective Digestive Decontamination
SCCU	Surgical Critical Care Unit
SEC	Squamous Epithelial Cells
SSSI	Skin And Skin-Structure Infection
STREM-1	Soluble Triggering Receptor Expressed On Myeloid Cells-1
TREM- 1	Triggering Receptor Expressed On Myeloid Cells-1
UTI	Urinary Tract Infection
VAP	Ventilator Associated Pneumonia
VRE	Vancomycin Resistant Enterococci

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INTRODUCTION

Pneumonia is the second most common nosocomial infection and is a leading cause of death due to hospital-acquired infection (**Tablan OC et al., 2003).**

Ventilator-associated pneumonia (VAP) is a form of nosocomial pneumonia that occurs in patients receiving mechanical ventilation for longer than 48 hour **(Pickett KE, 2008).**

The incidence of VAP differs Between different types of ICU units, hospitals (public and private sector) and countries (developed and developing) the range varies from 9% to 27% **(Klompas M, 2007).**

VAP is associated with increases in morbidity, mortality, hospital length of stay and costs. Although any patient with an endotracheal tube in place for more than 48 hours is at risk for VAP, certain patients are at higher risk like patient with preexisting conditions such as immunosuppression and chronic obstructive lung disease. The Mortality rates in patients with VAP range from 20% to 50% and may be as high as 70% when the infection is caused by multidrug resistant pathogens **(ReaNeto A et al., 2008).**

Pathophysiology of VAP involves 2 main processes: colonization of the respiratory and digestive tracts and microaspiration of secretions of the upper and lower parts of the airway **(Kunis Ka et al., 2003).**

Because every patient who is intubated and receiving ventilatory support is at risk for VAP. Making an accurate diagnosis of this disease and starting treatment is critical. The diagnosis can be made on the basis of radiographic findings, clinical findings and results of microbiological tests of sputum or invasive testing such as bronchoscop **(Porzecanski I et al., 2006).**

Treatment should be started when there is a clinical suspicion of VAP choice of antimicrobial based on patient factors and local resistance pattern **(Pieracci FM et al., 2007).**

VAP is preventable and certain practices have been demonstrated to reduce its incidence and its associated burden of illness **(Muscedere J et al., 2008).**

Prevention of VAP is possible through the use of strategies intended to minimize endotracheal intubation, The duration of mechanical ventilation and the risk of aspiration of oropharyngeal pathogens **(Pieracci FM et al., 2007).**

Aim of The Work

This essay discusses the up to date measures which could be used for diagnosis, treatment, prevention and control of acquired ventilator associated pneumonia in critically ill patients.

Pathophysiology & Risk Factors of Acquired Ventilator Associated Pneumonia in Critically Ill Patients

PATHOPHYSIOLOGY AND RISK FACTORS

The term "nosocomial infection" generally used includes 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 severe or potentially fatal diseases. However, the procedures used to cure or alleviate the illness carry frequently a very high risk of infection **(Chastre J et al., 2002).**

Nosocomial pneumonia is the leading cause of death from nosocomial infections. Aspiration of bacteria directly from the oropharynx or around the artificial airway are important factors in the pathogenesis of nosocomial pneumonia. Most cases of nosocomial pneumonia occur in patients without respiratory devices. However, patients receiving mechanical ventilation through an endotracheal tube have a fourfold increase in risk for hospital acquired pneumonia **(Fridkin SK, 2001).**

Infection occurs when the patient aspirates minute quantities of upper respiratory secretions because of the decreased cough and sneezing reflexes, impaired mucociliary transport or intubation that allows secretions to enter the lung around the tube. These infections begin with colonization of the upper respiratory tract by pathogenic microorganisms that are then aspirated into the lung **(Rello J et al., 2008).**

Infections of the lower respiratory tract form most common of the recorded hospital acquired infections. Colonization of the lower respiratory tract by gram negative aerobic bacilli is particularly common in patients undergoing mechanical ventilation whether by tracheostomy or by endotracheal tube **(Hayon J et al., 2002)**.

Some hospital acquired infections are not different from infections with the same microorganisms in the general population, but many are profoundly influenced by the patients underlying illness or by medical or surgical treatment undergone in hospitals. The source of the infecting organisms may be "exogenous" from another patient or a member of the hospital staff, or from inanimate environment in the hospital, or it may be "endogenous" from the patients own flora **(Fagon JY et al., 2000).**

Susceptibility to infection is also related to the patient's length of stay in the critical care unit, surgical critical care unit (SCCU) patients were more susceptible to nosocomial infection than medical critical care unit (MCCU) patients (31% vs24 %) and the rate of nosocomial infections was nearly twice in SCCU patients compared to MCCU patients (62% vs 35%) **(Fagon JY et al., 2000)**.

Pneumonia is defined as inflammation of the lung parenchyma caused by infection. Ventilator-associated pneumonia (VAP) is defined as pneumonia occurring >48 - 72 hours after endotracheal intubation VAP is therefore also a nosocomial infection, i.e. an infection that develops >48 hours after a patient has been admitted to a hospital or health care facility **(Pickett KE, 2008).**

The classification scheme for pneumonia as outlined by the American Thoracic Society Guidelines for the Management of Adults with Pneumonia refers to nosocomial pneumonia as hospital acquired pneumonia (HAP), which includes both VAP and health care-associated pneumonia (HCAP) Both are clinically and microbiologically distinct from community-acquired pneumonia (CAP) **(Pieracci FM et al., 2007).**

Ventilator-associated pneumonia remains the most common and fatal nosocomial intensive care unit infection among mechanically ventilated patients **(Rello J et al., 2008).**