A Retrospective Study to Assess the Risk Factors of Ventilator Associated Pneumonia (VAP) among Patients Undergone Mechanical Ventilator

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Abstract

Background: Ventilator-Associated Pneumonia (VAP) is a hospital acquired pneumonia or it is a lower respiratory tract infection which common occurs in patients who were kept on mechanical ventilation with endotracheal tube or tracheotomy for more than 48 hrs.

Objective: The aim of this study is to assess the risk factors of ventilator associated pneumonia.

Methods and Materials: This is a retrospective study conducted in a specialized surgical care unit of 57 beds with 18 ICU beds; all patients who underwent the procedure of invasive mechanical ventilation for more than 48 hours. These patients were divided into two groups, group A has developed the VAP and group B has not developed the VAP. Some certain risk factors were assessed among the patients who developed the VAP with help of records.

Results: Researchers have searched 100 patients' data who were admitted and treated on mechanical ventilation. The percentage of the length of stay in the ICU with VAP is 64% and the patients without VAP is about 36%. The death rate was 54.2%, among VAP patients. About 53 % of the patients developed VAP who had the previous hospitalization, 69 % of the patients developed VAP with previous history of steroid treatment and 50 % of the VAP patients had undergone the surgical procedure and 84 % of VAP patients had the endotracheal tube or tracheotomy

Conclusion: In this study the patients who had undergone the MV developed VAP significantly with endotracheal tube or tracheotomy.

Key words: *retrospective study, risk factors, Ventilator Associated Pneumonia (VAP), Mechanical Ventilator.*

Introduction

Ventilator Associated Pneumonia is very commonly occurring acquired infection among the patients admit in ICUs and on Mechanical ventilators. The incidence of VAP ranging from 7 to 40 % [1]. Among intubated patients the VAP is higher than the other patients [2]. *Pseudomonas aeruginosa , Acinetobacter baumannii , and* methicillin-resistant*, Staphylococcus aureus* , are common pathogens responsible for development of VAP [3]. About 60% VAP cases are diagnosed with gram-negative bacilli, and *P. aeruginosa* which increases the hospital stay in ICU [4].

The main features of VAP is high fever, increased in WBC and alteration in sputum collection noticed [5]. The health condition of patients with VAP is suddenly deteriorated and can threaten the life of the patients and increase the burden for health care professionals [6].

The risk factors are the complex responsible factors in developing the VAP and these risk factors also make the treatment to be complicated. Some of these risk factors are Endo tracheal catheterization, duration of stay in the ICUs, nursing practices in certain nursing procedures, age and gender of the patients, duration of ventilation, history of cardiac diseases and previous

surgical history [7].

Methods and Materials

This is a retrospective study conducted in a specialized surgical care unit of 57 beds with 18 ICU beds. Reviewed the records of 100 patients who underwent the procedure of invasive mechanical ventilation for more than 48 hours. The tool consisted of demographic variable and check list of risk factors. These patients were divided into two groups, group A has developed the VAP and group B has not developed the VAP. The risk factors were assessed among the patients who developed the VAP. The following of the risk factors assessed[8]

1. Age and gender of the patients
2. Endo tracheal catheterization,
3. Duration of stay in the ICUs,
4. Nursing practices in certain nursing procedures,
5. Duration of ventilation,
6. Previous history of Hospitalization
7. History of cardiac diseases
8. Previous surgical history.
9. COPD
10. Use of steroid therapy.

Results

Table I: Description of demographic variables in terms of frequency and percentage

n=100

Sr. No	Demographic variables	Frequency	Percentage%
1.	Male	84	84
2.	Female	16	16
3.	Hypertension	46	46
4.	Diabetes	28	28
5.	Coronary artery diseases	74	74
6.	Patients with high baseline e WBC(12,000/Cum)	44	44
7.	Patients with purulent sputum	46	46
8.	Patient with cough (mild or severe)	44	44
9.	Patients with worsening ABG	74	74

Table 2: Assessment for the development of VAP in terms of frequency and percentages:

n=100

VAP Positive		VAP Negative	
f	%	f	%
64	64	36	36

Table 3: Assessment of risk factors responsible for increasing the risk of VAP among positive patients in terms of frequency and percentages

n=64

S.No	Risk factors	Frequency	Percentage %
1.	Endo tracheal catheterization	54	84.375
2.	Duration of stay in the ICUs	60	93.75
3.	Poor nursing practices in certain nursing procedures	56	87.5
4.	Duration of ventilation more than 48 hours	59	92.19
5.	Previous history of Hospitalization	34	53.13
6.	History of cardiac diseases	54	84.38
7.	Previous surgical history.	32	50
8.	COPD	60	93.75
9.	Use of steroid therapy	44	68.75
10.	Organ failure	60	93.75

Discussion

In this study, male patients were more than female patients, 46 % of the patients had the hypertension, 74 % of the patients had the CADs and 74 % of the patient's ABG levels had worsened gradually. Out of 100 patients, 64 patients have developed the VAP.

In present study 92% of the VAP positive patients had stayed in ICU with mechanical ventilation more than 48 to 72 hours. This is also one of the risk factors for the development of VAP. More than 93 % of the COPD and major organ failure patients also had developed VAP. The patient who had the history of cardiac and coronary artery diseases also had shown more significance for the development of VAP. The strict aseptic precautions need to be taken by health care professionals while performing any invasive or noninvasive procedure on patients with MV as in this study showed poor nursing practices also can develop the VAP.

A study conducted by Mevlut Karatas etal results also supporting the current study results, the length of the stay, poor practices during invasive procedures, comorbid disease conditions, recurrent hospitalization, use of prophylactic antibiotic therapy, recurrent intubations increased the development of ventilator associated pneumonia [9].

Conclusion

In this study the patients who had undergone the MV developed VAP significantly with endotracheal tube or

tracheotomy, long hospital stay, associated infections and major organ failures.

Conflict of Interest– Nil

Source of Funding- Self

RRC: Permission was obtained from RRC committee of Symbiosis College of Nursing and also permission was obtained from the hospital where the study was conducted.

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