The Professional Medical Journal
www.theprofesional.com

DOI: 10.29309/TPMJ/2019.26.09.4021

ORIGINAL PROF-0-4021

INCIDENCE OF ICU-ASSOCIATED PNEUMONIA IN PATIENTS ADMITTED TO ICU OF MAJOR TERTIARY CARE HOSPITALS

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Article received on:
16/08/2018
Accepted for publication:
15/02/2019
Received after proof reading:
28/08/2019

ABSTRACT… Objectives: Despite in techniques advancement to patient care for respiratory tracts are instrumented may complicate the IAP course up to 50% in patients with mechanical ventilation. It requires rapid diagnoses and treatment that is appropriate as per patient condition. Many studies revealed negative impact with delayed administration and antibiotic treatment in IAP patients may increase the hospital mortality and morbidity. The primary objective of the study was to estimate the incidence of IAP in the patient admitted in ICU of tertiary care hospitals in Rawalpindi Pakistan. **Study Design:** Observational cross sectional study. **Setting:** ICU units of various tertiary care hospitals in Rawalpindi, Pakistan. **Period:** One year from Dec 2016-Dec 2017. **Materials and Methods:** A total 450 subjects were enlisted for the study; these patients were selected randomly. The exclusion criteria include all patients with Acute Respiratory Distress Syndrome (ARDS) or those on long-term antibiotic or steroid therapy and all the pregnant women whereas all the patients of both sexes, kept on ventilator for more than 48 h and above the age of 18 years were included in this study. **Results:** We enrolled a total of 450 patients for this study. The average age of all the participants was 61.51 + 12.8 with range 36-91. 230(51.1%) of the patients were male whereas 220(48.9%) were females. The Trauma-Pulm contusion was absent in all patients. In ICU 150 (33.3%) were diagnosed with COPD, 150(33.3%) with Asthma, 220(48.9%) with ARDS, 10 (2.2%) with head trauma and 310 (68.8%) with diabetes.200 (44.4%) smokers, 40(8.8%) were having lung cancer, 310(68.8%) were hypertensive and 20 (4.4%) were with Pneumothorax - requiring Chest Tube. **Conclusion:** We may conclude from our study that ICU associated Pneumonia is a serious issue, that developed with longer hospital stay, duration of mechanical ventilation and re-intubation. By reducing the mechanical ventilation duration, pneumonia can be controlled.

Key words: Hospital Stay, ICU Associated Pneumonia (IAP), Intensive Care Unit (ICU), Mechanical Ventilation Duration.

Article Citation: Nouman MK, Zaidi SAA, Zaidi B, Saleem K, Malik MK. "The incidence of ICU-associated pneumonia in patients admitted to ICU of major tertiary care hospitals". Professional Med J 2019; 26(9):1546-1550.
DOI: 10.29309/TPMJ/2019.26.09.4021

INTRODUCTION

Intensive care unit (ICU) associated Pneumonia (IAP) is usually a pneumonia developed among patients who were on mechanical ventilation more than 48 hours in ICU.[1-2] The range varies from 0-60% and sometime 76% in certain conditions.[3-4] The IAP developed once after the patients get admitted to the ICU of tertiary care hospital. The presence of IAP can increase the hospital stay up to 10 days and more in patients admitted to ICU.[5-6] This not only increases the hospitalization stay but also indirectly increases the patient's cost. To a certain report published in literature, it is said that the development of IAP increases 3% per day during first week of mechanical ventilation.[7-8] Despite in techniques advancement to patient care for respiratory tracts are instrumented may complicate the IAP course up to 50% in patients with mechanical ventilation.[9] It requires rapid diagnoses and treatment that is appropriate as per patient condition. Many studies revealed negative impact with delayed administration and antibiotic treatment in IAP patients may increase the hospital mortality and morbidity.[10] The primary objective of the study was to estimate the incidence of IAP in the patient admitted in ICU of tertiary care hospitals in Rawalpindi Pakistan.

MATERIAL AND METHODS

We had opted the observational cross sectional design for the present study. A total 450 subjects were enlisted for the study; these patients were selected randomly from the ICU units of various tertiary care hospitals in Rawalpindi, Pakistan. The study duration was of one year from Dec 2016-Dec 2017. The exclusion criteria include all patients with Acute Respiratory Distress Syndrome (ARDS) or those on long-term antibiotic or steroid therapy and all the pregnant women whereas all the patients of both sexes, kept on ventilator for more than 48 h and above the age of 18 years were included in this study. The demographic information with necessary diagnostic history was collected for all the subjects after the attendant or person signed the consent form. For all diagnostic values, the standard operating procedures (SOPs) were strictly followed in hospital laboratory. The blood sugar, blood pressure was measured and assigned a diabetic or non-diabetic status same hypertensive and non-hypertensive. The hospitalization stay and the outcomes were also noted. The ethical approval was taken from the college and hospital ethical Committee.

Statistical Analysis

All the information collected or noted from patients were than entered electronically to MS EXCELL sheets and stored in computer. Latterly this data was prepared for SPSS and analyzed by using version 20. Descriptive statistics were applied by calculating mean and standard deviation. Frequency distribution and percentages were performed for all qualitative variables like gender, Diabetes, Pneumonia etc. P values less than 0.05 was considered statistically significant in all inferential statistics.

RESULTS

We enrolled a total of 450 patients for this study. The average age of all the participants was 61.51 + 12.8 with range 36-91. 30(6.6%) of the patient were in the age category of 36 to 44. 70(15.5%) belong to 45-54 and 180(40%) were above 55-64 years of age.170 (37.7%) of the patients were above and equal to 65 years of age. 230(51.1%) of the patients were male whereas 220(48.9%) were females. 180(40%) of the patients were in public hospitals, 90(20%) were in private and 180(40%) were in semi public hospitals. The detailed summary of presenting complaints can be seen in Figure-1.

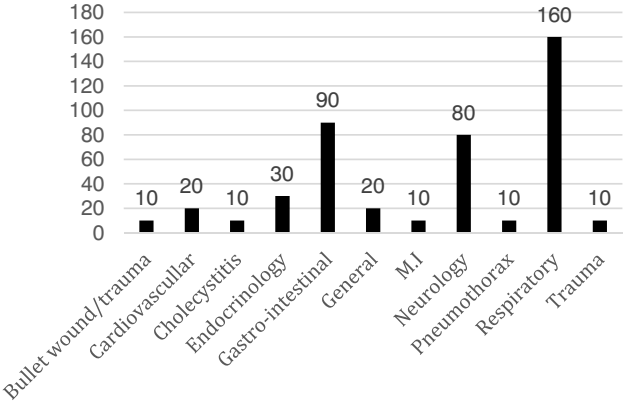

Figure-1. Frequency of presenting complaints in patients.

The Trauma-Pulm contusion was absent in all patients. In ICU 150 (33.3%) were diagnosed with COPD, 150(33.3%) with Asthma, 220(48.9%) with ARDS, 10 (2.2%) with head trauma and 310 (68.8%) with diabetes. 200 (44.4%) smokers, 40(8.8%) were having lung cancer, 310(68.8%) were hypertensive and 20 (4.4%) were with Pneumothorax - requiring Chest Tube. More on the patient's outcomes and findings is given in Table-I.

Patient's Findings/Outcome	n(%)
Ventilator associated pneumonia	280(62%)
ICU length of Stay (average)	10.42 days
Trach or ETT	
ETT	400(89%)
Trach	50(11%)
Average Days on MV after which pneumonia developed	4.46 days
Re-intubations	140(31%)
Position - Supine / Semi-Recumbent	
Supine	250(56%)
Semi-Recumbent	200(44%)
Conscious on admission	360(80%)
Sedation	380(85%)
Broad spectrum Abx	220(49%)
Oral Antiseptics	220(49%)
Antacids	50(11%)
H2 Blockers	320(72%)
Sucrulfate	90(20%)
PRBC transfusion	80(18%)
OG/NG Tube	300(67%)

Table-I. A detailed summary of patient's findings or outcomes

At three month follow up 120(26.6%) patients had expired. The evaluation of risk in various risk factors was done in Table-II.

Risk Factors	Incidence of Pneumonia	P-Value
ETT	62%	0.81
Trach	67%	
Re-Intubations		0.000
Yes	100%	
No	47%	
PRBC Transfusion		0.41
Yes	75%	
No	59%	
Sedation		0.004
Yes	71%	
No	14%	

Table-II. The detailed summary of the risk assessment (incidence of Pneumonia)

Preventive Measures	Incidence of Pneumonia	P=Value
Sucrulfate		0.009
Yes	100%	
No	53%	
H2 Blockers		0.000
Yes	47%	
No	100%	
Antacids		0.38
Yes	80%	
No	60%	
Oral Antiseptics		0.001
Yes	27%	
No	96%	
Broad Spectrum Abx		0.84
Yes	64%	
No	61%	

Table-III. The detailed summary of the preventive measures on incidence of Pneumonia

DISCUSSION

This study was planned to determine the ICU associated Pneumonia in patients admitted to ICU of various tertiary care hospitals in Rawalpindi. We not only estimated the pneumonia incidence but also identify the patient's outcome once on mechanical ventilator in ICU. We had reported in our study the ICU associated pneumonia overall incidence of 62%. This incidence is slightly higher to other published studies.[11,8] This may be due to the population difference, geographical differences and difference in use of preventive strategies. The average ICU stay length was almost 11 days reported in our study. This also an elevated stay, the probable reasons could be the insufficiency and experience of the staff nurses in the tertiary care hospital, thus this study also highlighted the insufficiency of paramedical staff may increase the length of stay of patients alongside to the physical condition of the patient. This is very much comparable to the situation in other developing countries.[12] Under current causal conditions, we have observed in our study that the respiratory and gastro-intestinal complaints were commonest that patients present while on ventilation. Trauma was also observed in patients that could be considered in pneumonia development. Similar findings were observed in various published reports.[9] In few studies the commonest factor was the injury like head and multiple fractures were commonest in their population.[13-14] Considering the other risk factors, we reported in our study the longer hospitalization stay and duration of mechanical ventilation as most important factors for pneumonia development. It is observed in this study the patients who were on mechanical ventilation for a period of above ten days had developed more pneumonia than those who were on less than ten days. Similar findings were reported by an Italian study with above 700 ICU patients concluding the ICU associated pneumonia were arisen 5% among patients on mechanical ventilation for a day to reach above 60% for those where the ventilation period was set up to 30 days.[15-19] Another risk factor was the trach and ETT factor, it was observed in high incidence in our population. H2 blockers, broad-spectrum Abx and Oral antiseptics were also commonest and associated to the pneumonia development. We found similar findings in a study held in France, where antimicrobial therapy significantly raised the ICU associated Pneumonia.[10] We reported in our findings that the risk of getting Pneumonia is high in patients who went intubation, with Sucrulfate and in a sedated condition with p values (0.000, 0.009, 0.004 respectively), Whereas the risk is high if the patient is not taking any oral antiseptics and with no H2 blockers with p value less than 0.05. The difference is not statistical significant

in case of PRBC transfusion but the incidence is high among those patients who underwent PRBC transfusion i.e. 75%.

CONCLUSIONS

We may conclude from our study that ICU associated Pneumonia is a serious issue, that developed with longer hospital stay, duration of mechanical ventilation and re-intubation. By reducing the mechanical ventilation duration, pneumonia can be controlled.

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