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Original Research

Assessment of cases of ventilator-associated pneumonia in children

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***ABSTRACT*:**

Background: The present study was conducted to assess cases of ventilator-associated pneumonia in pediatric patients. **Materials & Methods:** The present study was conducted on 35 children age ranged 1- 12 years of both genders. In all patients, the duration of mechanical ventilation, length of intensive care was recorded. Outcome was also recorded. **Results:** Out of 35, boys were 15 and girls were 20. Underlying illness was CHDs in 8, lung diseases in 20, seizures in 4, trauma in 2 and burn in 1. The difference was significant (P< 0.05). Days on ventilator were <15 days in 17 and >15 days in 18, position was supine in 7 and semi- recumbent in 28. The difference was significant (P< 0.05). 29 patients survived and 6 died. The difference was significant (P< 0.05). **Conclusion:** Authors suggested that ventilator-associated pneumonia is major cause of mortality and morbidity in pediatrics.

Key words: Pneumonia, Outcome, Ventilator

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INTRODUCTION

Ventilator-associated pneumonia (VAP) refers to bacterial pneumonia developed in patients who have been mechanically ventilated for duration of more than 48 h which did not appear to be incubating at the time of admission.[1]

Ventilator-associated pneumonia (VAP) constitutes one of the most common healthcare-associated infections in Pediatric and Neonatal ICU and has been related to increased morbidity, length of stay and broad-spectrum antibiotic usage. However, incidence of VAP in neonatal and pediatric ICUs vary significantly around the world (between 1 to 63 episodes per 1000 ventilator days) reflecting different burden of disease but also differences in diagnostic process.

Despite major advances in the techniques for the management of ventilator dependent patients, Rates of pneumonia are considerably higher among patients hospitalized in intensive care units (ICUs) compared with those in the hospital wards. The risk of pneumonia is increased 3 to 10 folds for the intubated patient receiving mechanical ventilation.

The lower respiratory tract is the most common site of nosocomial infection in adult ICU patients, accounting for up to 30% of nosocomial infections in this population. Risk factors for ventilator-associated pneumonia in adults include duration of mechanical ventilation, exposure to antibiotics, prolonged ICU stay, the presence of invasive devices, treatment with antacids or histamine type 2 receptor blockers, and advanced age. Increased mortality has been associated with infection attributable to Pseudomonas aeruginosa and Acinetobacter species, more severe underlying illness, and inappropriate antibiotic therapy. The present study was conducted to assess cases of ventilator-associated pneumonia in pediatric patients.

MATERIALS & METHODS

The present study was conducted in the Pediatrics department. It comprised of 35 children age ranged 1- 12 years of both genders. The study was approved from ethical

committee. Parents were informed regarding the study and written consent was obtained.

VAP was considered in those mechanically ventilated for >48 hours with clinical pulmonary infection score (CPIS) of 6 or more. In all patients, the duration of mechanical ventilation, length of intensive care and the duration of hospital stay were recorded. Results were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 35		
Gender	**Boys**	**Girls**
Number	15	20

Table I shows that out of 35, boys were 15 and girls were 20.

Graph I Distribution of patients

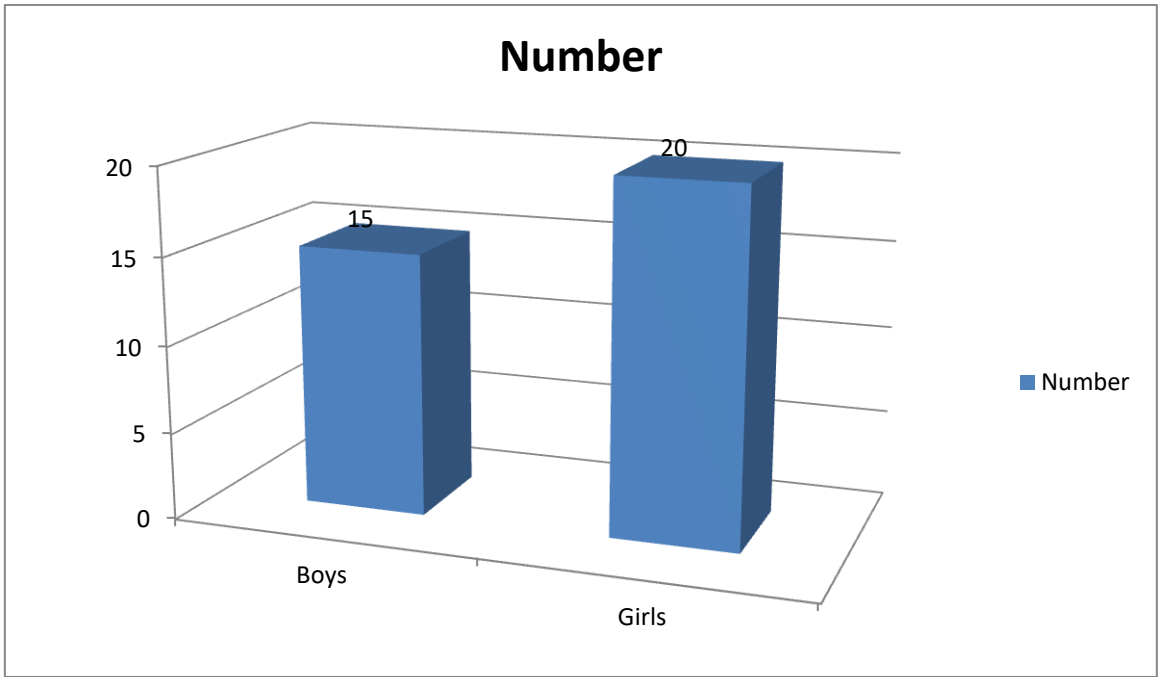

Table II Underlying illness in patients

Illness	Number	P value
CHD	8	0.01
Lung disease	20	
Seizure	4	
Trauma	2	
Burn	1	

Table II, graph II shows that underlying illness was CHDs in 8, lung diseases in 20, seizures in 4, trauma in 2 and burn in 1. The difference was significant (P< 0.05).

Graph II Underlying illness in patients

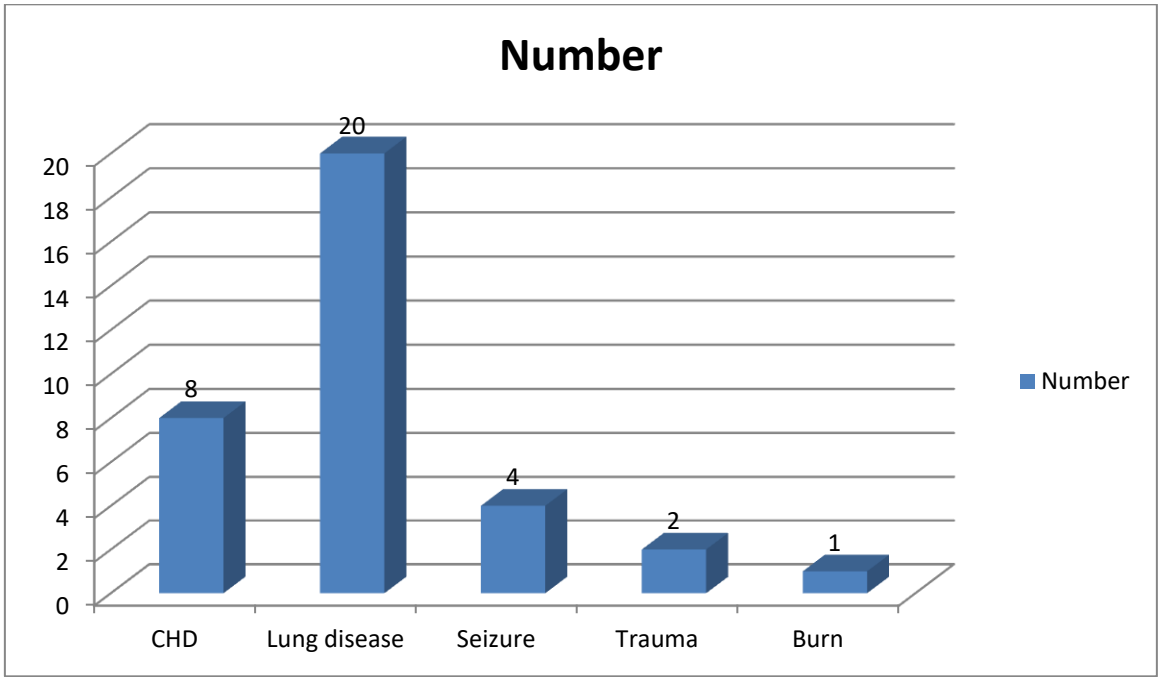

Table III Assessment of parameters

Parameters	Number	P value
Days on ventilator		
<15	17	0.92
>15	18	
Position		
Supine	7	0.01
Semi- recumbent	28	

Table III shows that days on ventilator were <15 days in 17 and >15 days in 18, position was supine in 7 and semi-recumbent in 28. The difference was significant (P< 0.05).

Table IV Outcome of treatment

Outcome	Number	P value
Survived	29	0.01
Expired	6	

Table IV shows that 29 patients survived and 6 died. The difference was significant (P< 0.05).

DISCUSSION

Ventilator associated pneumonia (VAP) remains to be the commonest cause of hospital morbidity and mortality in spite of advances in diagnostic techniques and management. VAP refers to bacterial pneumonia developing in patients who have been receiving mechanical ventilation for at least 48 hours. It is the commonest complication associated with mechanical ventilation.[6] Ventilator-associated pneumonia is estimated to cost in excess of $5000 to $8000 per episode with an estimated total US cost of $1.1 billion per year in 1985 dollars. The present study was conducted to assess cases of ventilator-associated pneumonia in pediatric patients.

In present study, out of 35, boys were 15 and girls were 20. Elward et al[9] conducted a study in which the primary outcome measured was the development of ventilator-associated pneumonia. Secondary outcomes were death and hospital and PICU length of stay. Multiple logistic

regression analysis was performed to determine independent predictors for ventilator-associated pneumonia. There were 34 episodes of ventilator-associated pneumonia in 30 patients of 911 admissions (3.3%) and 595 (5.1%) mechanically ventilated patients. The mean ventilator-associated pneumonia rate was 11.6/1000 ventilator days. By logistic regression analysis, genetic syndrome (odds ratio [OR]: 2.37; 95% confidence interval [CI]: 1.01–5.46), reintubation (OR: 2.71; 95% CI: 1.18– 6.21), and transport out of the PICU (OR: 8.90; 95% CI: 3.82–20.74) independently predicted ventilator-associated pneumonia.

We found that underlying illness was CHDs in 8, lung diseases in 20, seizures in 4, trauma in 2 and burn in 1. Days on ventilator were <15 days in 17 and >15 days in 18, position was supine in 7 and semi- recumbent in 28. 29 patients survived and 6 died.

Pena-Lopez et al[10] recently found that implementing a ventilator care bundle had a significant impact on preventing VAP in children. In this study overall VAP rates decreased by 74.7% (from 4.14 to 1.05 episodes per 1000 ventilator days, non-statistically significant). In ventilated children with tracheostomy VAP incidence decreased from 8 to 0.65 episodes per 1000 ventilator days and this difference was statistically significant.

Gadani et al[11] found that the incidence of early-onset VAP (within 96 h) was found to be 27% while the late-onset type (>96 h) was 73%. Late-onset VAP had poor prognosis in terms of mortality (66%) as compared to the early-onset type (20%). The mortality of patients of the non-VAP group was found to be 41% while that of VAP patients was 54%. Targeted strategies aimed at preventing VAP should be implemented to improve patient outcome and reduce length of intensive care unit stay and costs. Everyone of the critical care unit should understand the factors that place the patients at risk of VAP and utmost importance must be given to prevent VAP.

Gurskis et al[12] applied a multimodal intervention including staff education and evidence-based bundles for reducing nosocomial infections in three Pediatric ICUs in Lithuania. Three bundles were implemented targeting the 3 most frequent nosocomial infections: VAP, bacteremia and urinary tract infection. This study, which used the 'before and after' methodology found a significant reduction of all nosocomial infections including VAP (the most frequent). Incidence of VAP showed a tendency for reduction from 21.8 to 8.8 episodes per 1000 ventilator days.

CONCLUSION

Authors suggested that ventilator-associated pneumonia is major cause of mortality and morbidity in pediatrics.

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