

Original Research

Evaluation of ventilator induced pneumonia in pediatric patients

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ABSTRACT:

Background: Pneumonia is the largest single cause of child mortality outside of the neonatal period. The present study was conducted to assess cases of ventilator induced pediatric pneumonia. **Materials & Methods:** The present study was conducted on 38 children age ranged 1- 12 years of both genders. In all patients, the duration of mechanical ventilation, position and GCS status was assessed. **Results:** Age group 1-4 years had 9 boys and 10 girls, 5-9 years had 6 boys and 5 girls and 10-12 years had 5 boys and 3 girls. 9 patients were conscious and drowsy and 29 were stuporous and comatose. Days on ventilator were <15 days in 7 and >15 days in 31, Position was supine in 8 and semi- recumbent in 30. The difference was significant ($P < 0.05$). 32 patients survived and 6 expired. The difference was significant ($P < 0.05$). **Conclusion:** Authors found that pediatric pneumonia is major cause of mortality and morbidity in today's world.

Key words: Pediatric, Pneumonia, Ventilator

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INTRODUCTION

Pneumonia is the largest single cause of child mortality outside of the neonatal period, accounting for 15% of the approximately 6.3 million global child deaths each year. Pneumonia is also a major cause of childhood morbidity with approximately 120 million episodes of pneumonia occurring annually.¹ Ventilator-associated pneumonia (VAP) refers to bacterial pneumonia developed in patients who have been mechanically ventilated for duration of more than 48 h.¹ It ranges from 6 to 52% and can reach 76% in some specific settings. Hospital-acquired pneumonia (HAP) is the pneumonia after 48 h or more after admission, which did not appear to be incubating at the time of admission.²

Up to 50% of consultations at healthcare facilities for sick children in low and middle-income countries (LMICs) are due to acute respiratory infections.³ Accurate measurement of the incidence of childhood pneumonia is important for allocation of resources, measurement of the impact of interventions such as new vaccines, identifying risk factors and for health system planning. The most

recent National Nosocomial Infection Surveillance (NNIS) data from 2002 to 2004 show NICU VAP rates ranging from 1.4 to 3.5 per 1,000 ventilator days.⁴ In 1998, a cross-sectional study of hospital-acquired infections in 50 children's hospitals was performed by the Pediatric Prevention Network. Of 43 children's hospitals that returned questionnaires reporting NICU and PICU surveillance data, the VAP rate by device days was reported by 19 hospitals, and 12 hospitals provided VAP rates stratified by birth weight groups.⁵ The present study was conducted to assess cases of ventilator induced pediatric pneumonia.

MATERIALS & METHODS

The present study was conducted in the department of Pediatrics. It comprised of 38 children age ranged 1- 12 years of both genders. The study was approved from institutional ethical committee. parents were informed in their language about the study and written consent was obtained.

Data of patients such as name, age, gender etc. was recorded. VAP was considered in those mechanically ventilated for >48 hours with clinical pulmonary infection score (CPIS) of 6 or more. A cut off of 96 hours of mechanical ventilation is used to distinguish early onset

of VAP from late onset VAP. 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 Age and gender wise distribution of patients

Age group	Boys	Girls
1-4	9	10
5-9	6	5
10-12	5	3

Table I, graph I shows that age group 1-4 years had 9 boys and 10 girls, 5-9 years had 6 boys and 5 girls and 10-12 years had 5 boys and 3 girls.

Graph I Age and gender wise distribution of patients

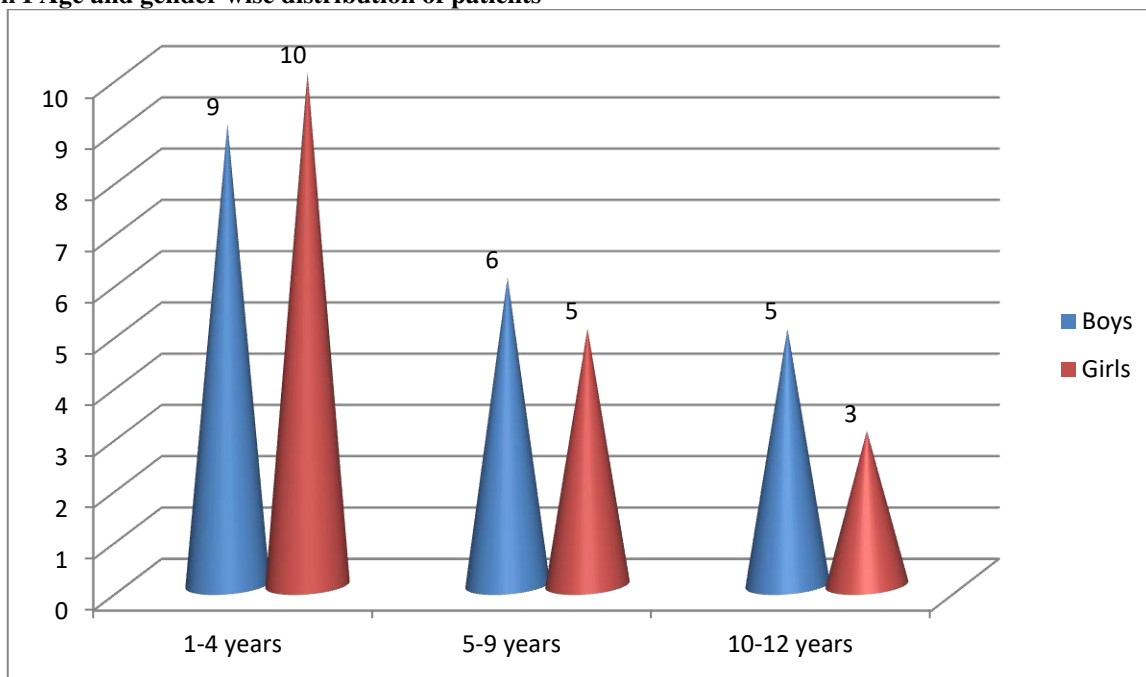
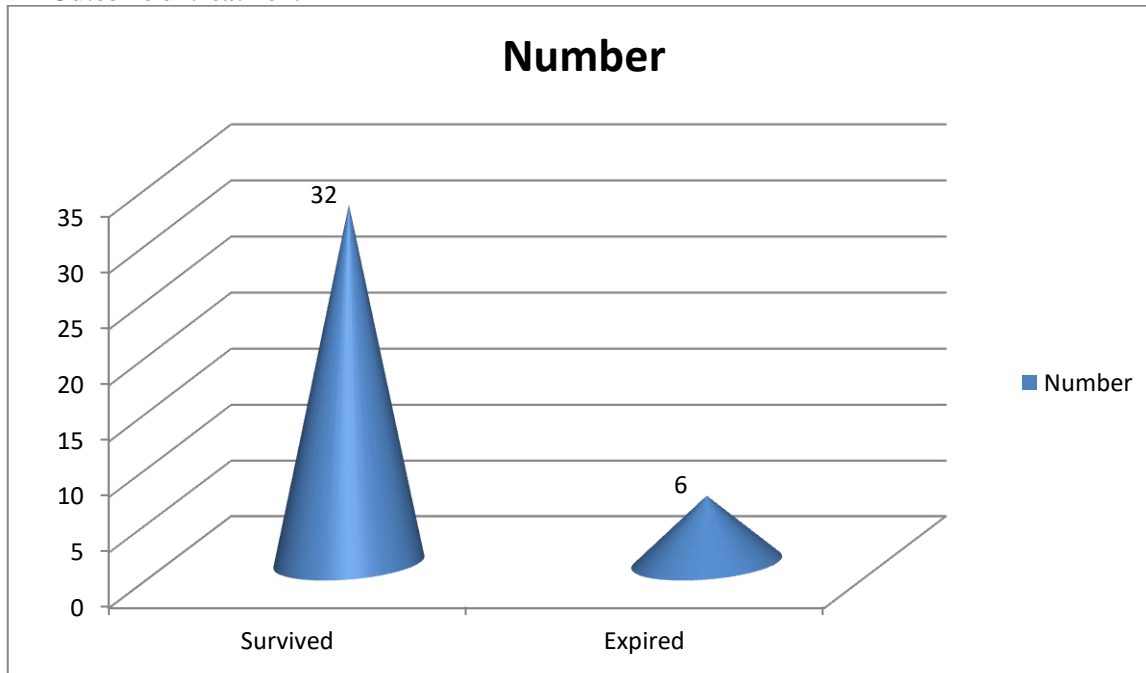


Table II Evaluation of factors in pediatric patients

Factors	Parameters	Number	P value
Consciousness	Conscious and drowsy	9	0.05
	Stuporous and comatose	29	
Days on ventilator	<15	7	0.02
	>15	31	
Position	Supine	8	0.04
	Semi- recumbent	30	

Table II shows that 9 patients were conscious and drowsy and 29 were stuporous and comatose. Days on ventilator were <15 days in 7 and >15 days in 31, Position was supine in 8 and semi- recumbent in 30. The difference was significant (P< 0.05).

Graph II Outcome of treatment



Graph II shows that 32 patients survived and 6 expired. The difference was significant ($P < 0.05$).

DISCUSSION

VAP continues to be a major cause of morbidity and mortality of ICU patients. The incidence continues to be high in spite of improved understanding of the risk factors of VAP.⁶ There is no consensus on the preventive strategies akin to adults, in form of bundle approach in children. The risk of pneumonia is increased 3 to 10 folds for the intubated patient receiving mechanical ventilation. The mortality with VAP is considerably high, varying from 24 to 50% and can reach as high as 76% in some specific settings or when lung infection is caused by high risk pathogens.⁷ The present study was conducted to assess cases of ventilator induced pediatric pneumonia.

In present study, age group 1-4 years had 9 boys and 10 girls, 5-9 years had 6 boys and 5 girls and 10-12 years had 5 boys and 3 girls. Sharma et al⁸ in prospective cohort study, 86 mechanically ventilated children admitted in a PICU of a single center were analyzed to determine the incidence of VAP, to evaluate the associated risk factors, and to document the etiological agents for the same. The incidence of ventilator associated pneumonia was found to be 38.3% by CDC criteria while 24.4% were microbiologically confirmed VAP. The most common organism isolated was Acinetobacter. Independent risk factors were found to be enteral feeding and use of proton pump inhibitor. Simplified Clinical Pulmonary Infection Score of ≥ 4 had a good sensitivity and specificity for diagnosis of CDC defined VAP. Incidence of ventilator associated tracheobronchitis (VAT) was found to be 11.6%.

We found that 9 patients were conscious and drowsy and 29 were stuporous and comatose. Days on ventilator were < 15 days in 5 and > 15 days in 31, Position was supine in 6 and semi- recumbent in 30. The difference was significant ($P < 0.05$). Torres et al⁹ found that a total of 128 patients were screened and 86 were enrolled (median age 30 mo 95% CI 4.0–84.0; 72% boys). The most common admitting diagnosis was sepsis (16%) followed by acyanotic congenital heart disease with pneumonia (14%) and the most common indication for ventilation was respiratory failure (45.3%). The incidence of VAP according to CDC criteria was 38.4%, while the incidence of microbiologically confirmed VAP was 24.4%. The incidence of ventilator associated tracheobronchitis (VAT) was found to be 11.6%. Acinetobacter was the most frequently isolated organism (47%) followed by Pseudomonas (28%), Klebsiella (15%), E. coli (5%) and Enterobacter (5%). Risk factors for VAP on bivariate analysis were use of proton pump inhibitor (PPI), enteral feeding and re-intubation. On multivariate analysis, use of PPI and enteral feeding were identified as independent risk factors for VAP.

We observed that out of 38 patients, 32 patients survived and 6 expired. Lack of a gold standard for diagnosis is the major culprit of poor outcome of VAP. The clinical diagnosis based on purulent sputum may follow intubation or oropharyngeal secretion leakage around airway, chest X-ray changes suspected of VAP may also be a feature of pulmonary oedema, pulmonary infarction, atelectasis or acute respiratory distress syndrome.¹⁰

CONCLUSION

Authors found that pediatric pneumonia is major cause of mortality and morbidity in today's world.

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