

ORIGINAL RESEARCH

Outcome of influenza and parainfluenza associated pediatric ICU admissions

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ABSTRACT

Background: Influenza and parainfluenza viruses are respiratory pathogens that can cause severe illness, especially in children. Influenza viruses, particularly influenza A and B, are a common cause of respiratory illness in children, especially during the flu season. The present study was conducted to assess outcome of influenza and parainfluenza associated pediatric ICU admissions. **Materials & Methods:** 72 children infected with influenza and parainfluenza infection of both genders admitted to ICU. The respiratory viruses were identified using conventional diagnostic methods, including direct immunofluorescence testing (DIFT) on respiratory samples (e.g. nasopharyngeal aspirates–NPAs; bronchoalveolar lavages–BALs, tracheal aspirates–TAs, and oral swabs), with confirmation and typing by type-specific DIFT. **Results:** Out of 72 patients, males were 42 and females were 30. There were 38 cases of influenza and 34 cases of parainfluenza infection. Bacterial co-infection was seen among 12 and 7, ventilation was required in 12 and 7, systemic antibiotics in 38 and 32, systemic corticosteroids were given in 8 and 10 cases, the mean PICU stay was 3.1 days and 3.4 days. There were 2 mortalities in influenza and 1 in parainfluenza cases. The difference was non-significant ($P > 0.05$). **Conclusion:** Important childhood morbidity and PICU admissions may be linked to the pandemic H1N1, influenza, and parainfluenza viruses.

Keywords: Influenza, parainfluenza, children

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INTRODUCTION

Influenza and parainfluenza viruses are respiratory pathogens that can cause severe illness, especially in children. Influenza viruses, particularly influenza A and B, are a common cause of respiratory illness in children, especially during the flu season.¹ Severe cases of influenza in children can lead to complications such as pneumonia, bronchitis, and exacerbation of underlying medical conditions like asthma. Influenza-related pediatric ICU admissions often occur due to complications such as respiratory distress, hypoxemia (low oxygen levels), respiratory failure, and secondary bacterial infections.²

Children at higher risk of severe influenza complications include those younger than 5 years old, especially those under 2 years old, children with underlying medical conditions (e.g., asthma, heart disease, immunosuppression), and pregnant adolescents.³ Parainfluenza viruses (types 1-4) are also common respiratory pathogens in children, causing illnesses ranging from mild cold-like symptoms to severe respiratory infections. Parainfluenza viruses are a common cause of croup, a viral upper respiratory infection characterized by a barking cough and inspiratory stridor.⁴

Only a small proportion of kids would need assistance from a pediatric intensive care unit (PICU).⁵ Because of the outbreak of severe acute respiratory syndrome (SARS-CoV), which was brought on by a new corona virus, there was an extremely high level of awareness and surveillance of respiratory viral infections in 2003. Reduced interpersonal transmission of all respiratory viruses could be the outcome of increased surveillance and more stringent personal cleanliness.⁶ The present study was conducted to assess outcome of influenza and parainfluenza associated pediatric ICU admissions.

MATERIALS & METHODS

The present study consisted of 72 children infected with influenza and parainfluenza infection of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. All cases were admitted to ICU. The respiratory viruses were identified using conventional diagnostic methods, including direct immunofluorescence testing (DIFT) on respiratory samples (e.g. nasopharyngeal aspirates–NPAs; bronchoalveolar lavages–BALs, tracheal aspirates–TAs, and oral swabs), with confirmation and typing by type-specific DIFT. Data

thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 72		
Gender	Male	Female
Number	42	30

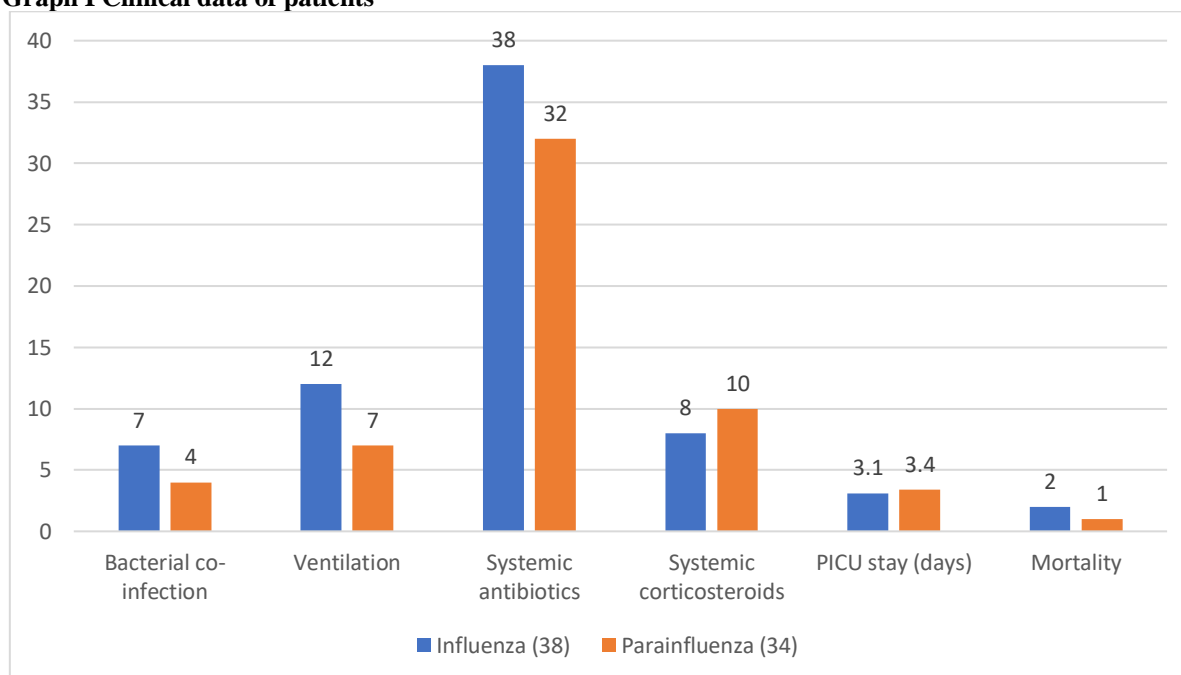
Table I shows that out of 72 patients, males were 42 and females were 30.

Table II Clinical data of patients

Parameters	Influenza (38)	Parainfluenza (34)	P value
Bacterial co-infection	7	4	0.05
Ventilation	12	7	0.17
Systemic antibiotics	38	32	0.85
Systemic corticosteroids	8	10	0.91
PICU stay (days)	3.1	3.4	0.67
Mortality	2	1	0.11

Table II shows that there were 38 cases of influenza and 34 cases of parainfluenza infection. Bacterial co-infection was seen among 12 and 7, ventilation was required in 12 and 7, systemic antibiotics in 38 and 32, systemic corticosteroids were given in 8 and 10 cases, the mean PICU stay was 3.1 days and 3.4 days. There were 2 mortalities in influenza and 1 in parainfluenza cases. The difference was non- significant ($P > 0.05$).

Graph I Clinical data of patients



DISCUSSION

Parainfluenza infections generally cause milder illness compared to influenza, severe cases can occur, especially in infants and young children.⁷ Parainfluenza-related pediatric ICU admissions may occur in cases of severe croup leading to respiratory distress and airway compromise, as well as in children with underlying medical conditions or immunosuppression who develop severe lower respiratory tract infections.⁸ Children with severe respiratory distress, hypoxemia, respiratory failure, or other complications of influenza or parainfluenza infection may require intensive care

unit (ICU) admission for close monitoring and supportive care.⁹ ICU admission criteria may include the need for mechanical ventilation, high-flow oxygen therapy, continuous monitoring of vital signs, and intravenous administration of fluids and medications. Prevention of influenza and parainfluenza infections in children includes annual influenza vaccination (for influenza) and practicing good hand hygiene and respiratory etiquette.¹⁰ Treatment of severe cases may involve antiviral medications (such as oseltamivir for influenza), supportive care (including oxygen therapy and hydration), and, in some cases, corticosteroids or

other respiratory medications for management of symptoms like croup.¹¹The present study was conducted to assess outcome of influenza and parainfluenza associated pediatric ICU admissions.

We found that out of 72 patients, males were 42 and females were 30. Hon et al¹² in their study 18 influenza (influenza A=13 and influenza B=5) and 17 parainfluenza admissions were identified over the 7-year period. Parainfluenza type 3 (n=9) was the commonest subtype of parainfluenza infection. The median age of children admitted with influenza was higher than parainfluenza (4.5 vs 1.7 years, p=0.044). Admissions associated with proven influenza and parainfluenza infections accounted for 2% of PICU annual admissions. There was only one death in 2003. 51% of these patients required ventilatory support, 45% received systemic corticosteroids, and 91% received initial broad spectrum antibiotic coverage. Bacterial co-infections were identified in 25% of these patients. The incidence of influenza admissions had not increased significantly in 2009 (H1N1 pandemic) when compared with 2003 (SARS epidemic) (p=0.3). There were only two PICU cases of pandemic H1N1 in 2009 and both survived. The annual incidence of severe PICU cases of influenza and parainfluenza were 0.94 and 0.88 per 100,000 children per annum, respectively.

We found that there were 38 cases of influenza and 34 cases of parainfluenza infection. Bacterial co-infection was seen among 12 and 7, ventilation was required in 12 and 7, systemic antibiotics in 38 and 32, systemic corticosteroids were given in 8 and 10 cases, the mean PICU stay was 3.1 days and 3.4 days. There were 2 mortalities in influenza and 1 in parainfluenza cases. Milne et al¹³ reported the clinical features and outcome of all children with a laboratory proven diagnosis of influenza A virus infection admitted to a major Paediatric Intensive Care Unit (PICU). Eight of the 22 patients with influenza A virus infection (A/Fujian/411/2002-like type) presented with encephalopathy and three of the 22 patients died. This can be compared with 44 admissions and seven (16%) deaths of patients with influenza virus admitted in the same PICU in the preceding 15 years. In the present cohort, four (18%) of the 22 patients, including one child who died, should have received influenza vaccine according to the current Australian immunisation recommendations. During the 2003 influenza season there was an increased number of children admitted to our PICU with influenza A infection and an increased number of deaths compared with previous years. Influenza infection causes significant morbidity and

mortality in young children, most of whom are not currently recommended for annual influenza vaccination.

The limitation of the study is the small sample size.

CONCLUSION

Authors found that important childhood morbidity and PICU admissions may be linked to the pandemic H1N1, influenza, and parainfluenza viruses.

REFERENCES

1. Straliotto SM, Siqueira MM, Machado V, Maia TM. Respiratory viruses in the pediatric intensive care unit: prevalence and clinical aspects. *Mem Inst Oswaldo Cruz.* 2004;99:883–7.
2. Hon KL, Leung AK. Severe childhood respiratory viral infections. *Adv Pediatr.* 2009;56:47–73.
3. O’Kelly EA, Hillary IB. Epidemiology of respiratory syncytial virus infection among infants over three winter seasons. *Irish J Med Sci.* 1991;160:12–6.
4. Kristensen K, Dahm T, Frederiksen PS, et al. Epidemiology of respiratory syncytial virus infection requiring hospitalization in East Denmark. *Pediatr Infect Dis J.* 1998;17:996–1000.
5. Chan PK, Sung RY, Fung KS, et al. Epidemiology of respiratory syncytial virus infection among paediatric patients in Hong Kong: seasonality and disease impact. *Epidemiol Infect.* 1999;123:257–62.
6. Chiu SS, Tse CY, Lau YL, Peiris M. Influenza A infection is an important cause of febrile seizures. *Pediatrics.* 2001;108:63.
7. Chiu SS, Lau YL, Chan KH, Wong WH, Peiris JS. Influenza-related hospitalizations among children in Hong Kong. *New Engl J Med.* 2002;347:2097–103.
8. Nicholson KG, McNally T, Silverman M, Simons P, Zambon MC. Influenza-related hospitalizations among young children in Leicestershire. *Pediatr Infect Dis J.* 2003;22:228–30.
9. Van Woensel JB, van Aalderen WM, Kimpen JL. Viral lower respiratory tract infection in infants and young children. *BMJ.* 2003;327:36–40.
10. Rojo JC, Ruiz-Contreras J, Fernandez MB, Marin MA, Folgosa L. Influenza-related hospitalizations in children younger than three years of age. *Pediatr Infect Dis J.* 2006;25:596–601.
11. Keren R, Zaoutis TE, Saddlemire S, Luan XQ, Coffin SE. Direct medical cost of influenza-related hospitalizations in children. *Pediatrics.* 2006;118:1321–7.
12. Hon KL, Leung TF, Cheung KL, Ng PC, Chan PK. Influenza and parainfluenza associated pediatric ICU morbidity. *The Indian Journal of Pediatrics.* 2010 Oct;77:1097-101.
13. Milne BG, Williams S, May ML, Kesson AM, Gillis J, Burgess MA. Influenza A associated morbidity and mortality in a Paediatric Intensive Care Unit. *Commun Dis Intell.* 2004;28:504–9.