The Use of Diuretic in Mechanically Ventilated Children with Viral Bronchiolitis

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The Journal of Critical Care Medicine 2021;7(2):97-103

Objective: To evaluate the use of intravenous Furosemide in children with bronchiolitis, who required invasive mechanical ventilation.

Method: In this single-center retrospective cohort study, children admitted to pediatric intensive care unit between November 2012 and March 2018 were studied. Children aged < 2 years admitted to the PICU with a diagnosis of viral bronchiolitis and requiring respiratory support by invasive mechanical ventilation were included in the study. Children with congenital heart disease, tracheostomy dependency or chronic diuretic therapy before admission and those with renal replacement therapy or extracorporeal life support, were excluded from this study.

After 24 hours of mechanical ventilation, the percentage of fluid overload was calculated. Initial FiO2 and PEEP were noted. Oxygen saturation and the fraction of inspired oxygen ratio (SpO2/FiO2, S/F) were calculated for each patient upon initiation of mechanical ventilation and before and 24 hours after furosemide initiation. Patients who received diuretics were identified as Group F, and those who did not receive diuretics were classified as Group N. Both groups were compared.

ACADEMIC P.E.A.R.L.S

Pediatric Evidence And Research Learning Snippet

Diuretic in Ventilated Kids with Viral Bronchiolitis

Results: Of the 224 mechanically ventilated children with confirmed bronchiolitis, 179 (79%) received furosemide on Day 2 of invasive ventilation. Out of these, 72% of the patients received intermittent intravenous furosemide, whereas 28% received continuous infusion. Furosemide was used more commonly in patients who had a higher fluid overload. Initial fluid overload was associated with longer duration of mechanical ventilation (median days 6 vs 4, p<0.001) and length of stay (median days 10 vs 6, p<0.001) even with the use of furosemide.

Table Pre and post 24 hour clinical and laboratory variables among patients who received intravenous furosemide

N = 179	Pre diuretic	Post diuretic	p-value
CFB in ml [median IQR]	891 [588.50-1263]	807 [565-1368]	0.47
FO per cent [median IQR]	14 [9.30-19.02]	13.87 [10.55-19.06]	0.59
Weight in kg [median IQR]	6.10 [4.4-9.20]	6.55 [4.4-9.40]	0.73
FiO2 [median IQR]	0.45 [0.3-0.45]	0.35 [0.3-0.4]	0.007
PEEP [median IQR]	7 [5-8]	6 [5-8]	0.47
SpO2:FiO2 [median IQR]	270 [214-321]	280 [242-330]	0.034
Serum creatinine [median IQR]	0.2 [0.2-0.3]	0.2 [0.2-0.3]	1.0
Serum blood urea nitrogen [median IQR]	5 [2-7]	5 [3-9]	1.0
Serum bicarbonate [median IQR]	26 [23-29]	32 [28-36]	< 0.001

CFB = cumulative fluid balance; IQR = interquartile range; FO = fluid overload; FiO2 = fraction of inspired oxygen; PEEP = positive end-expiratory pressure; SpO2 = oxygen saturation

Conclusion: There is a potential benefit of improved oxygenation in these children with use of furosemide, though further research is needed to quantify this benefit and any potential harm. Due to potential harm with fluid overload, restrictive fluid strategies may have a potential benefit.

EXPERT COMMENT

“Fluid overload is associated with increased morbidity, prolonged PICU stay, ventilator associated events and mortality in both children and adults. Conservative fluid strategies and protocol-driven diuretic therapy may help improve patient outcomes.”

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With warm regards,

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Reference

Nisha Agasthya, Kimberlee Chromey, James H. Hertzog, Jigar C. Chauhan. The Use of Diuretic in Mechanically Ventilated Children with Viral Bronchiolitis: A Cohort Study. The Journal of Critical Care Medicine 2021;7(2):97-103. DOI: 10.2478/jccm-2021-0008