

**Salbutamol and ipratropium by inhaler is superior to nebulizer in children with severe acute asthma exacerbation: Randomized clinical trial. Pediatric Pulmonology. 2019;1-6.**

**Background & Objectives:** In moderate-severe asthma exacerbation, salbutamol by inhaler (MDI) is superior to salbutamol delivered by nebulizer (NEB) but there is lack of evidence in the subgroup of children exclusively with more severe acute asthma exacerbation. The study compares the efficacy of salbutamol and ipratropium bromide (SIB) by MDI versus by NEB in severe asthma exacerbations.

**Methods:** Prospective Randomized clinical trial enrolled 103 children (2-14 years of age) with severe asthma exacerbations seen at the emergency room in Asuncion, Paraguay during the period from January 2013 to January 2017. One group received salbutamol and ipratropium (two puff every 10 min for 2 h and then every 30 min for 2 h more) by MDI with a valved-holding chamber and mask along with oxygen by a cannula separately (MDI-SIB); and the other received nebulization with oxygen (NEB-SIB) of salbutamol and ipratropium (1 every 20 min for 2 h and then every 30 min for 2 h more). Primary outcome was the rate of hospitalization (Pulmonary Score  $\geq 7$ ) after 4 h and secondary outcome was oxygen saturation.

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

Pediatric Evidence And Research Learning Snippet



### MDI versus Nebulizer for severe acute asthma exacerbation: Which is superior?

**Results:** Fifty two children received MDI-SIB and 51 NEB-SIB. After the 4th hour, children on MDI-SIB had significantly ( $P = 0.003$ ) lower rate of hospital admission than on NEB-SIB (5.8% vs 27.5%, RR: 0.21 [0.06-0.69], respectively). Similarly, a significant improved clinical score after 60 min and increase in oxygen saturation after 90 min of treatment was observed in MDI-SIB versus NEB-SIB group ( $4.46 \pm 0.7$  vs  $5.76 \pm 0.65$ ,  $P < 0.00001$ ; and  $90.5 \pm 1.7$  vs  $88.43 \pm 1$ ,  $P < 0.00001$ , respectively).

**Conclusions:** Even in severe asthma exacerbations, administration of salbutamol and ipratropium by MDI with valved-holding chamber and mask along with oxygen by a cannula separately was more effective than by a nebulizer.

**Key message:** Administration of salbutamol and ipratropium by inhaler is more effective than nebulizer in children presenting with severe acute asthma exacerbation in terms of decreasing hospital admission (~80% decrease), improved clinical score and oxygen saturation.

### EXPERT COMMENT



“This study confirms the efficacy and safety of inhaler therapy for children with severe acute asthma exacerbation. The main reason to recommend nebulizer in previous guidelines was the necessity to use oxygen by nebulizer to avoid hypoxemia. However, in the present study, oxygen was provided by nasal cannula to the MDI-SIB. The potential explanation for the superiority of MDI/spacer compared to nebulizer is the higher percentage of pulmonary deposition of the former”

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