Intravenous salbutamol decreased recovery time in acute severe asthma in children

Browne GJ, Penna AC, Phung X, Soo M. **Randomised trial of intravenous salbutamol in early management of acute severe asthma in children.** Lancet. 1997 Feb 1;349:301-5.

Objective
To evaluate the efficacy of intravenous salbutamol in decreasing recovery time in children with acute severe asthma who present to the emergency department (ED).

Design
Randomised, double-blind, placebo-controlled trial with 24-hour follow-up.

Setting
ED of an Australian hospital.

Patients
29 children < 12 years of age (mean age 7 y, 66% boys) who presented to the ED with acute severe asthma, defined as including either all 4 signs and symptoms of wheeze, sternal retraction, accessory muscle use, and dyspnoea or any 1 of cyanosis, pulsus paradoxus, altered consciousness, or silent chest on auscultation. Exclusion criteria were life-threatening asthma, congenital heart disease, personal or family history of supraventricular tachycardia, presence of other respiratory illness, diabetes mellitus, weight < 10 kg or > 50 kg, age < 1 year or > 12 years, and currently taking the maximum daily dose of intravenous salbutamol. 100% of patients completed the study.

Intervention
14 patients were allocated to 15 μg/kg of salbutamol as a 10-minute infusion, and 15 were allocated to saline infusion. All patients also received standard treatment, which consisted of nebulised salbutamol every 20 minutes initially and then adjusted to clinical state; intravenous hydrocortisone (5 mg/kg bolus over 3 min); and oxygen to achieve 93% oxygen saturation.

Main outcome measures
The primary outcomes were recovery time and clinical assessment of asthma as moderate or severe at 2 hours. Secondary outcomes included side effects and the need for oxygen therapy.

Main results
The mean recovery time was shorter in the salbutamol group than in the control group (4.0 vs 11.1 h for cessation of nebulised salbutamol every 30 min, $P = 0.03$). Intravenous salbutamol reduced the number of children having moderate or severe asthma at 2 hours ($P = 0.002$) and the number of children who needed oxygen to maintain oxygen saturation at 93% in room air ($P = 0.05$) (Table). The groups did not differ for side effects, except for increased tremor at 2 hours in the salbutamol group ($P < 0.02$).

Conclusion
Intravenous salbutamol reduced recovery time and symptoms during episodes of severe asthma in children.

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Intravenous salbutamol vs placebo*

Outcome at 2 hours	Intravenous salbutamol EER	Placebo CER	RRR (95% CI)	ARR |EER – CER|	NNT (CI)
Moderate or severe asthma	36%	93%	62% (31 to 83)	57%	2 (1 to 4)
Need for oxygen	14%	53%	73% (12 to 93)	39%	3 (2 to 22)

*Abbreviations defined in Glossary; RRR, ARR, NNT, and CI calculated from data in article.

Commentary

Asthma continues to be one of the major causes of hospitalisation in children (1) and a frequent reason for ED visits. An intervention that could decrease the time spent in the ED would be very beneficial. A recent trend in the treatment of acute paediatric asthma is to decrease the use of intravenous aminophylline (2) and increase the use of oral glucocorticoids early in the patient's visit (3). This therapy has resulted in a substantial decrease in the number of children who require the insertion of an intravenous catheter, which is a painful procedure.

This trial by Browne and colleagues has identified a potentially useful intervention. Intravenous salbutamol therapy would only be relevant for severe episodes of status asthmaticus, where the benefit of a shorter time spent in the ED and faster resolution of an acute asthmatic attack would outweigh the effects of inserting an intravenous catheter. For children with less severe episodes, using frequent salbutamol nebulisations with oral glucocorticoids early in their hospital stay would be the accepted approach.

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References

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