Intratracheal Albuterol: A Potential Intervention for the Asthma Toolbox

In this issue of *RESPIRATORY CARE*, Johnston et al¹ remind us of a route of medication delivery that is often overlooked: intratracheal. The stimulus for the project was the death of children with a severe asthma attacks who had received numerous doses of albuterol by metered-dose inhaler (MDI), yet had no relief. The purpose of this study was to compare the effectiveness of liquid bolus administration of a bronchodilator (2.5 mg of albuterol in 1.25 mL of normal saline in 2 doses while positioned laterally) versus the MDI (360 µg) in the treatment of acute bronchospasm in mechanically ventilated subjects. The authors reviewed the literature on the administration of albuterol in intubated and mechanically ventilated subjects and the physics of fluid flow in obstructed airways in surfactant administration to explain the potential effectiveness of albuterol administered via an endotracheal tube. They demonstrated that albuterol may be instilled into an endotracheal tube in mechanically ventilated subjects with airway obstruction, yielding results similar to those obtained when using an MDI.

A MEDLINE search of literature since 1996 reveals very few references to intratracheal instillation of medications. Intratracheal instillation has been used in the treatment of arrhythmias and respiratory depression, as lidocaine, epinephrine, atropine, and naloxone are administered by this route during resuscitation when intravenous access is not available.² Unfortunately, in a retrospective study³ of resuscitation success, medications given at recommended doses (twice the intravenous dose followed by a flush) for injection into an endotracheal tube during cardiac arrest and cardiopulmonary resuscitation (CPR) were of no ben-

efit. This may be because of the poor perfusion during CPR such that the drugs never made it to the circulation or

SEE THE RELATED STUDY ON PAGE 627

target organ (heart). In an earlier study,⁴ intratracheal administration of lidocaine with a 90° torso tilt was used experimentally in swine during cardiac arrest and CPR, resulting in a higher lidocaine level as a result of torso tilt versus no tilt, but not as high as via the intravenous route. Perhaps, in these studies on target organs other than the lungs, intratracheal instillation of drugs is not effective or not as effective because there are positive outcomes with surfactant and albuterol.

Intratracheal instillation of albuterol may be considered second- or third-line therapy in the treatment of a severe asthma attack. Although it might not be used often, it is still good to know that it is effective, and it is another potential intervention in our asthma care toolbox.

Timothy B Op't Holt EdD RRT AE-C FAARC
Department of Cardiorespiratory Care
University of South Alabama
Mobile, Alabama

REFERENCES

1. Johnston DA, Gilmore TW, Gosselin KP. A comparison of meter-dose inhaled albuterol versus endotracheal liquid bolus albuterol for the treatment of bronchoconstriction: a novel route of administration. *Respir Care* 2015;60(5):627-635.
2. Cohen H, Luka B, Chan T, Erichsen N. Vasopressors, inotropes, and antiarrhythmic agents. In: Gardenhire DS. *Rau's respiratory care pharmacology*, 7th edition. St Louis, MO: Mosby Elsevier; 2008; 384.
3. Niemann JT, Stratton SJ, Cruz B, Lewis RJ. Endotracheal drug administration during out of hospital resuscitation: where are the survivors? *Resuscitation* 2002;53(2):153-157.
4. Killian CA, Robins AL, Menegazzi JJ, Scheatzle MD, Novick LA. Endotracheal drug delivery followed by a 90 degree torso tilt in a swine model of cardiac arrest. *Prehosp Emerg Care* 1997;1(4):227-232.

Dr Op't Holt has disclosed no conflicts of interest.

Correspondence: Timothy B Op't Holt EdD RRT AE-C FAARC, Department of Cardiorespiratory Care, University of South Alabama, 5721 USA Drive North, Mobile, AL 36688-0002. E-mail: topholt@southalabama.edu.

DOI: 10.4187/respcare.04202