some modification of their application will make them go a longer way. This is a challenge to all of us.

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REFERENCES


Wet Nebulization in Acute Asthma

The Last Refrain?

“Music, when soft voices die, vibrates in the memory”

Percy Bysshe Shelley

For 6 years, my office was located next to our clinic treatment rooms. Almost every day from my position on that hallway, I listened to the high-pitched descant song of the nebulizer performing the ballad of asthma treatment. The song is a familiar one to those working in emergency departments, pediatric wards, and ICUs, and it resonates through all my memories of caring for children with asthma. In coming years, however, it is a song we will hear less often. And quite possibly, it is a melody our academic grandchildren will not know at all.

In this issue of CHEST (see page 1309), Avigdor Mandelberg and his group from Tel Aviv report on a study comparing nebulizers with metered-dose inhaler (MDI) and spacer for the treatment of acute wheezing in infants and children. It is a well-designed and executed randomized, double-blind, placebo controlled trial comparing 2.5 mg of nebulized salbutamol with four puffs (400 μg) of salbutamol MDI delivered in a metal, nonelectrostatic spacer with face mask. The study had sufficient power to detect a 5% change in clinical scores between the two groups, and no significant difference between

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children treated with nebulizer or MDI spacer was demonstrated. The authors conclude that MDIs with spacers “can be used instead of wet nebulization in the delivery of β-agonists even in a relatively unselected population of wheezy infants and small children.” This study builds on a similar one published by the same group using adults 2 years earlier and further speaks in favor of using MDIs rather than nebulized therapy in the treatment of asthma.

There is a large body of evidence to support this change in practice. A number of studies have shown therapy with MDI to be as effective as nebulizer therapy in preterm infants, infants, children, and adults with acute wheezing or asthma. Studies have demonstrated adequate lung deposition of medication delivered by MDI when compared to nebulizer. The dose deposited in the lungs ranged from approximately 1 to 10% of the dose for both MDI and nebulizer, depending on the size of the child. The lung deposition may be as much as 60% lower if the child is crying.

There is, therefore, both clinical and physiologic evidence to support the use of MDI therapy in place of nebulization. Why is this idea met with incredulous stares by clinicians, as it was when I suggested it recently at our department’s morning report? Old therapies, it seems, tend to linger in the mind in much the same way as old melodies. Modifications in the way we do business may be gradual; however, a retrospective view of the last 30 years reveals obvious, dramatic changes in asthma therapy.

Three decades ago, a pediatric textbook suggested that syrup of hydriodic acid mixed with ephedrine, potassium iodide, and potassium guaiacholate were acceptable components of asthma treatment. Inhaled isopropylisopropinephrine was suggested as sometimes being beneficial. As a reflection of how far things have come, the use of steroids in asthma therapy was discouraged: “the rising mortality rate from asthma in recent years has been contributed to by therapy with corticosteroids.”

Ten years later, inhaled isoproterenol or isethionate were suggested as possible choices for bronchodilator therapy. Steroids were to be used, “. . . until status asthmaticus subsides, then rapidly terminated.” In 1987, nebulized isethionate or metaproterenol were the inhaled therapies of choice, and it was proposed that with rare exceptions the “administration of steroids as part of the emergency room treatment program is unnecessary.” It seems likely that wet nebulization is destined to take its place on the shelf alongside potassium guaiacholate and isethionate.

There are, however, areas for caution in the transition to the exclusive use of MDIs. First, consideration of the type and pretreatment of spacer device used is crucial. A significant amount of the drug can be deposited on the spacer walls, especially if a nonelectrostatic spacer is used, as in the current study. There are several alternatives to using the standard, plastic “out of the box” spacer. A metal, nonelectrostatic spacer can be used as in this study, but it will require sterilization between patients. It is also possible to use a plastic spacer that has been primed with medication (15 puffs) to decrease drug deposition. Finally, it is possible, though probably not practical, to treat the spacer with detergent to render it less electrostatic. The choice of which spacer to use seems to be less critical than previously thought, and even a sealed 500-mL cold-drink bottle has been shown to be effective. On military field exercises, we have successfully used an empty liter bottle for irrigation fluid to treat adults with acute asthma.

The other crucial aspect of successful MDI therapy of asthma addresses the difference between efficacy (use under ideal study conditions) and effectiveness (use under real-life conditions) of this delivery system. The MDI must be used with proper technique to be effective, and it generally is not. In our asthma program, we discovered that only 30% of children are able to use the MDI correctly on their first attempt. Despite training by our pharmacist asthma educator, at the first outpatient follow-up (1 to 2 weeks) on the initial attempt, only 40% of children are using the inhaler correctly (unpublished data; D. Chan, RPh; January 1999). Clinicians suffer the same difficulties with MDI technique. When MDIs are used to treat children with asthma either acutely or chronically, the technique of the patient, parent, or staff administering the drug must be closely scrutinized and evaluated.

β-Agonists delivered by wet nebulization have been the backbone of asthma therapy for the past 30 years. Studies such as the one presented here by Mandelberg and colleagues strengthen the argument that nebulized delivery provides no advantage over MDI with spacer. Wet nebulization is more expensive and time consuming for patients and practitioners, with little or no added benefit.

At the close of this decade, we regale our house staff with tales of asthma treated with IV aminophylline and subcutaneous epinephrine. Perhaps they will, in turn, spin tales for the residents of tomorrow of children treated with clouds of bronchodilator mist. And thus, we may be listening to the nebulizer’s last refrain.

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Time To Move Advance Care Planning Beyond Advance Directives

Patients fear losing their lives to the medical system. They dread being trapped in insensitive medical institutions, tethered to inhumane machines, robbed of personal privacy, and subjected to the accompanying indignities. Driven by this specter, many patients want to make decisions to govern their future treatment—a process called advance care planning. For over 30 years, the best-known means of advance care planning has been advance directives. By signing these legal documents, patients can request or refuse specific treatments and can choose proxies for times of future incapacity. Advance directives promise what many patients crave most for the end of life—control over treatment.1

1228