Transtracheal Oxygen: Not Exactly a “Novel” Technology

I was recently catching up on some long overdue journal reading and came upon the editorial “Demand valves for oxygen therapy: your mileage may vary” by John Shigeoka in the February issue of RespirologiaCare.1 Though I agree with the overwhelming majority of Dr Shigeoka’s observations, I took exception to his description of transtracheal catheters as “the other novel form of oxygen-conserving device.”

Dr Shigeoka observed that he rarely sees ambulatory patients using transtracheal catheters. That may certainly be the case in the Salt Lake City area in general, and at his Veterans Affairs hospital specifically, but it is certainly not the case nationwide.

There are tens of thousands of transtracheal oxygen patients across the United States, and indeed around the world. After all, chronic obstructive pulmonary disease (the most common indication for transtracheal oxygen) doesn’t know where the patient lives. Transtracheal oxygen has been available since Heimlich first published an article on the subject in 1982.2 Subsequent work by Christopher et al,3 Hoffman et al,4 and Kampelmacher et al5 have proven both the safety and efficacy of transtracheal oxygen, as well as a variety of other clinical improvements, such as in the patient’s work of breathing,6 compliance with prescribed oxygen therapy,3 hospitalizations,4 and overall quality of life.4 The transtracheal oxygen program originally outlined by Christopher et al3 has been dramatically streamlined over the past 18 years, and the newer “Fast Tract” procedure, done by a qualified surgeon, has also decreased the very labor-intensive early phases of the old Seldinger technique from 6–8 weeks to just 2–3 weeks. Many of our patients combine their transtracheal oxygen with pulse or demand-valve oxygen delivery systems, which substantially enhances their ability to get out of the house and increase the duration and quality of their activities of daily living.7

It is easy to overlook the fact that the transtracheal catheter itself is a conserving device, in that it normally decreases resting oxygen flow by approximately 50%. Using conservative estimates with a demand-valve device, with just a 2–1 oxygen savings, that would result in a bulk oxygen reduction of some 75%. Several studies have also documented significant decreases in hospital days and costs per admission, which saves money for all of us, including those who pay for this patient care through our taxes.5,8

In fact, there has recently been very substantial renewed interest in transtracheal oxygen, as reports on some of the more advanced applications (eg, in augmented ventilation,9 in patients who are noncompliant with continuous positive airway pressure in the treatment of obstructive sleep apnea,10,11 and as an aid to weaning long-term-tracheostomized patients from mechanical ventilation) begin to be published in respected journals.12

I have included a “stick pin” map of the United States showing active transtracheal oxygen centers (Fig. 1). As you can see, transtracheal oxygen centers tend to cluster around major population centers, but that is not always the case. Interestingly, there are active transtracheal oxygen centers in every state except Oregon. There are also transtracheal oxygen patients in 9 European countries, Australia, and New Zealand. Respiratory therapists play important roles in the administration and clinical evaluation of transtracheal oxygen patients in hospital-based programs. For all intents and purposes, a transtracheal oxygen program is a ready-made therapist-driven protocol just waiting to be implemented.

Though it is true that transtracheal oxygen may not be prevalent in certain areas where many therapists and pulmonologists practice, with an 18-year of history of clinical practice and over 150 references in the medical literature, transtracheal oxygen is surely a therapy that is underutilized and could benefit many thousands of patients with chronic obstructive pulmonary disease who require continuous supplemental oxygen.

As always, future studies need to be done to corroborate much of this speculation and extrapolation of existing and anecdotal data. Last year a graduate of the pulmonary fellowship program at Harvard told me that in his 3 years of training he only had 1 hour covering oxygen therapy. Perhaps it is time to make sure these young pulmonologists, while still residents and fellows, are trained to think of oxygen as a drug we put “in” a patient, rather than “on” a patient.

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REFERENCES


The author responds:

I would like to thank Mr. Goodman for informing the readers of Respiratory Care and me about the success of the transtracheal oxygen catheter, which was considered a decade ago, along with the reservoir cannula and demand oxygen valve, to be a novel way to deliver oxygen.1 The fourth novel strategy was combined demand-flow and transtracheal therapy.1 However, the study by Bliss et al2 concerned demand valves that delivered oxygen to the nasal airway (see the Methods section). That study was the focus of my editorial.3

My sightings of the transtracheal catheter are rare. This may be supported by Mr. Goodman’s map that shows his company has much less market penetration in Utah than in Colorado.

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REFERENCES