



## Letters to the Editor

### Airway injury caused by a Portex single-use bougie

To the Editor:

The tracheal tube introducer (bougie) is widely used to facilitate difficult intubation. However, single-use introducers, compared to reusable ones, appear to be more traumatic [1–3].

A 61-year-old woman with esophageal reflux and no predictive signs of difficult intubation received rapid-sequence induction with application of cricoid pressure. Direct laryngoscopy revealed a Cormack-Lehane grade 3 view. An unlubricated Single Use Tracheal Tube Introducer (SIMS Portex, Hythe, Kent, UK) was advanced into the trachea without any resistance. Correct placement was indicated by the tracheal “clicks” sensation. The tracheal tube was advanced easily over the bougie and through the larynx, without 90° anticlockwise rotation. However, when attempting to remove the bougie, it was stuck inside the tracheal tube. We succeeded in removing it by withdrawing it gradually, as gently as possible.

After the endotracheal tube was connected to the breathing system, we noticed blood coming out of the tube. Mild endotracheal suction was performed repeatedly and bleeding gradually ceased. Hypoxia did not occur at any time. When the surgery was completed, the patient recovered uneventfully and her postoperative course was uncomplicated.

The Portex single-use bougie was introduced in 1997, due to concerns about microbial contamination via multiple use. It has a different design from the multiple-use introducer [4]. The Portex Venn Reusable Tracheal Tube Introducers are made with a braided polyester base with a resin coating, while the single-use Portex introducer is a hollow tube, coated with plastic. The difference in material may explain the increased resistance we felt between the introducer and tube, and the difficulty in withdrawing the unlubricated bougie from the tube. Zwaal and Gupta also described an inability to advance a tracheal tube over an unlubricated single-use Portex bougie [5]. The manufacturer recommends that tracheal introducers be lubricated before use.

The airway trauma may not have been related to the difficulty in removing the introducer, as it may have occurred when the bougie was advanced into the trachea. Another possible mechanism is tissue blockage between the angled distal end of the introducer and the tracheal tube when the bougie was withdrawn. The multiple-use introducer has an angled (40°) tip with rounded end, while the single-use bougie has an angled, less flexible tip with a more flattened end. The peak force exerted by the single-use bougie on tissue is greater, especially when it is held close to the tip [1–3]. These characteristics render the single-use bougie more likely to cause tissue injury than the multiple-use device [6].

In light of our experience, the anesthesiologists in our department agreed not to use single-use introducers in their practice any longer.

It should be stressed that the 1997 version of the Portex single-use introducer is no longer produced. Although many departments still use the “old” version, a new version is available.

The quality of single-use equipment should be improved, in order to be safe and effective when used.

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### The rotated mask hold

To the Editor:

Bag-mask ventilation is a basic life support skill for every medical practitioner in general, and for every anesthesiologist in particular. The correct facemask (FM) holding technique is crucial for effective mask ventilation, prevention of high airway pressure and stomach dilatation, and prevention of early fatigue of the operator.

One of the most common reasons for inadequate manual FM ventilation is an incomplete seal between the FM and the patient's face which, leads to leakage of air and emptying of the ventilating bag (when ventilation is performed with an anesthesia breathing circuit). This happens more often in inexperienced users and/or when the patient is edentulous, in patients with a beard or facial deformities, or in instances when the operator's hands are small relative to the patient's face and the mask size used.

We have observed that a modification of the classic FM holding technique may decrease the incidence of inadequate FM ventilation and, very often, provide more efficient ventilation. We call this technique the "rotated mask hold".



**Fig. 1** View of the classic mask hold.



**Fig. 2** The rotated mask hold.

The classic technique of FM holding (in right-handed persons), which is described in most textbooks and manuals, is comprised of the following finger positioning (**Fig. 1**):

- The small finger (finger 5) of the left hand is placed on the left mandibular angle, pressing forward and upwards.
- The thumb (finger 1) is then placed against the superior, narrow part of the FM that covers the patient's nose, just above the insertion point of the breathing system connector into the FM, and pressed downward.
- The index finger is placed on the left lower quadrant of the FM, pressing downward.
- Finger 3 is placed either on the FM pressing downward or on the chin, with its tip pressing upward.
- The tip of finger 4 is placed on the chin, pressing upward.

Looking at **Fig. 1**, it is obvious that the FM section that is most difficult to seal is its right lower quadrant, since no finger reaches that area for direct downward compression of the FM against the face. Such uneven and inadequate downward pressure on the mask often leads to air leakage, especially when the operator's hand is small and the patient's face is large. This traditional FM holding technique also requires forceful pressure on the patient's face with the tips of fingers 3, 4, and 5, often leaving redness and painful pressure points.

When using the rotated mask hold, the hand and finger positioning is modified as follows (**Fig. 2**):

- The hand is rotated clockwise about 45 degrees.
- The thumb and index finger encircle the insertion point of the breathing circuit into the FM, pressing downward.
- Finger 3 is placed as far as possible into the FM's right lower quadrant, applying downward pressure in this leak-prone area.