

Anesthesiology  
71:318, 1989

## A Nasal Catheter for Monitoring Tidal Carbon Dioxide in Spontaneously Breathing Patients

*To the Editor:*—Goldman has described a simple method of monitoring end-tidal carbon dioxide ( $ET_{CO_2}$ ) in spontaneously breathing patients using one limb of the nasal prongs cannula designed to administer oxygen to patients.<sup>1</sup> We describe another simple, inexpensive, and reliable method that functions independently of an oxygen delivery system. The device is easy to construct and apply, and is well-tolerated by patients.

Disposable sampling catheters are made by cutting 10–12 cm lengths of a FG10 plastic feeding tube (internal diameter 2 mm). One end is inserted into a cylindrical or cubed piece of soft plastic foam about 1-cm thick so that 1–2 mm of the tube projects at one end. The foam-padded end is plugged into the anterior nares of the clearer of the two nostrils, and the distal end is attached to the capnograph tubing. The nasal end is adjusted to obtain maximum deflection and free-swinging of the capnograph needle with normal breathing (fig. 1). The tubing is taped to the cheek and the system is unaffected by subsequent movements.

Unlike the Goldman technique, our sampling catheter does not share the same port with administered oxygen, and our readings are unaffected by simultaneous administration of oxygen by an overlying face mask: oxygen administration at 6–8 l/min via a loosely fitting plastic face mask did not affect tidal carbon dioxide readings in our series.

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Anesthesiology  
71:318–319, 1989

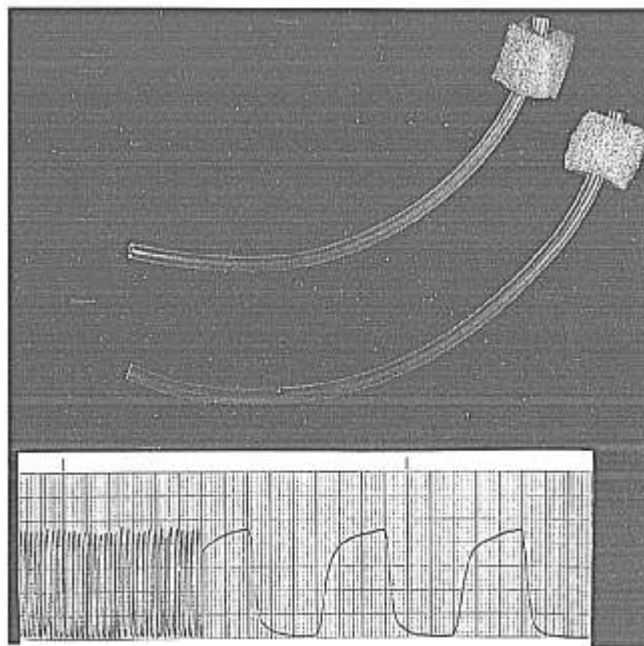


FIG. 1. Above: the cubed and cylindrical varieties of the nasal catheter support. Below: Waveform obtained from a quietly breathing patient (Datex Capnograph).

### REFERENCE

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(Accepted for publication April 24, 1989.)

## Bypassing the Diameter-Indexed Safety System

*To the Editor:*—Recently, we were called to the Radiology Department to provide anesthesia for a patient undergoing insertion of a Greenfield filter. The radiology suite used was equipped with one wall panel connected to the hospital's medical gas pipeline system with three outlets, each clearly marked for oxygen, air, or vacuum. On our arrival in the radiology suite with a portable anesthesia machine, the patient was breathing through an oxygen face mask connected to an oxygen flowmeter attached to the only wall oxygen outlet. As we checked our equipment, we opened the oxygen tank on the anesthesia machine with the intention of later connecting our machine's oxygen hose to the wall oxygen outlet. Just before we removed the patient's oxygen mask to apply the oxygen mask connected to the anesthesia circuit, we noticed that the oxygen analyzer connected to the inspiratory limb of the anesthesia circuit was reading between 40–50% oxygen. We then

noticed that someone had connected the anesthesia machine oxygen hose to a flowmeter (Model IMFA 2001, Precision Med Inc., Bath, PA) attached to the wall compressed air outlet. The air flowmeter is yellow and is clearly marked AIR. However, the green oxygen hose with an oxygen Diameter-Indexed Safety System (DISS) fitting attaches quite easily (fig. 1).

The DISS is intended to prevent accidental delivery of the wrong medical gas through the use of gas-specific fittings that are not interchangeable between different gas lines.<sup>1\*</sup> As we have since learned,

\* Pamphlet V-5. Compressed Gases Association, Inc., 1235 Jefferson Davis Highway, Arlington, Virginia 22202

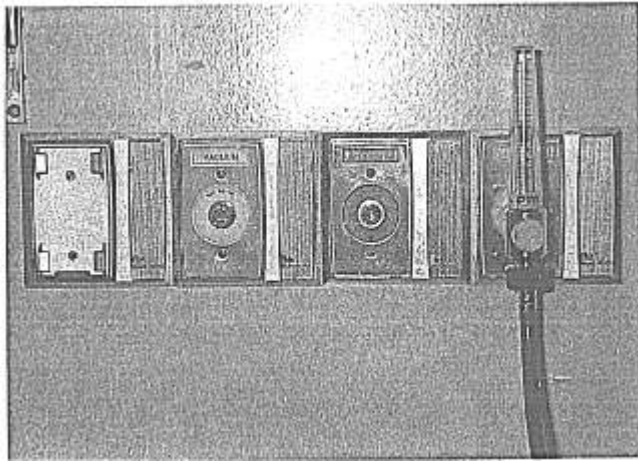


FIG. 1. Anesthesia machine oxygen hose with DISS fitting attached to air flowmeter.

the DISS standards do not apply to many adapters and regulators, including many flowmeters. In fact, it is a common practice of many respiratory therapists to interchange air and oxygen flowmeters on

ventilators they set up. In this instance, this important safety system was bypassed by the use of a flowmeter not conforming to DISS standards.

The use of a properly installed, calibrated oxygen analyzer in the anesthesia circuit alerted the anesthesiologist to this mistake before any harm was done to the patient. Perhaps all medical flowmeters and adapters should conform to the DISS standards.

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*(Accepted for publication April 25, 1989.)*

## A Complication of Fiberoptic Nasal Tracheal Intubation

*To the Editor:*—The complication reported by Nichols and Zornow<sup>1</sup> is similar to an earlier report of three cases<sup>2</sup> wherein the fiberoptic was mistakenly introduced through the Murphy's eye, resulting in inability to withdraw the instrument after successful nasotracheal intubation.

Since that time we have observed that the longitudinal radio-opaque marker leading to the terminal opening on every endotracheal tube was clearly visible through the fiberoptic. We reiterate our recommendation never to pass the fiberoptic blindly but always under direct vision identifying both the terminal opening and the Murphy's eye. When in doubt, the radio-opaque marker mentioned above should help to differentiate between these two openings.

It is true that this problem can be avoided totally by loading the endotracheal tube on to the fiberoptic before insertion. It is not always easy to judge the size of the nasal passage when the fiberoptic is passed first. A 4–6 mm fiberoptic may pass easily while a 7.0 mm or a 7.5 mm ID tube, which has an external diameter of 9 mm and 10 mm respectively, may not pass, or if passed, may be pinched (compressed) by a bony spur or a narrow nasal passage. Advancing the endotracheal tube over the fiberoptic in this situation could be difficult, traumatic, and/or impossible. Passing the endotracheal tube prior to the fiberoptic will help to recognize these anatomic factors by the distortion produced in the normal contour of the endotracheal tube as seen with the fi-

berscope. If no distortion in the endotracheal tube contour is seen and the fiberoptic passes with ease through the nasally passed endotracheal tube, then that tube should advance into the trachea over the fiberoptic with minimal difficulty and trauma.

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*(Accepted for publication April 26, 1989.)*