

FIG. 2. Diagram of a new endotracheal tube with two side ports. (1) A side port 0.5 cm distal to an inflatable cuff. (2) A side port 0.5 cm proximal to an inflatable cuff. (3) An infusion port for infusion of local anesthetics to the proximal portion of the trachea. (4) Pilot tube for the inflatable cuff. (5) An infusion port for infusion of local anesthetics to the distal portion of the trachea.

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The Gum-elastic Bougie: Old but Still Useful

*To the Editor:*—We have observed, during our period of practice of anesthesiology in North America, that an instrument which is considered a part of standard anesthetic equipment at home is not readily available here. We highlight this fact as we think the endotracheal tube introducer,\* or gum-elastic bougie, offers advantages over other equipment used in cases of difficult tracheal intubation.

The introducer is 60 cm long and 15 FG in diameter. The tip is angled at 40°, 3.5 cm from the end. It is built up on a woven polyester base that combines both stiffness and flexibility at body temperature. It is easily sterilized, and so can be re-used.

In a situation where visualizing the vocal cords is difficult, the introducer is lubricated, then directed posterior to the epiglottis, with the tip angled anteriorly (fig. 1). Using the introducer as a guide, the endotracheal tube (ETT) is passed over it into the desired position.

Other introducers used inside the ETT have the major disadvantage of being too rigid. Because they need to be angled anteriorly to enable them to be passed into the larynx, it is frequently difficult, if not impossible, to manipulate the tube and introducer off the anterior wall of the larynx and into the trachea. The flexibility of the "gum-elastic" bougie overcomes this

problem. This flexibility also makes any damage to the vocal cords or trachea unlikely, as the introducer will bend if undue force is applied in the face of resistance.

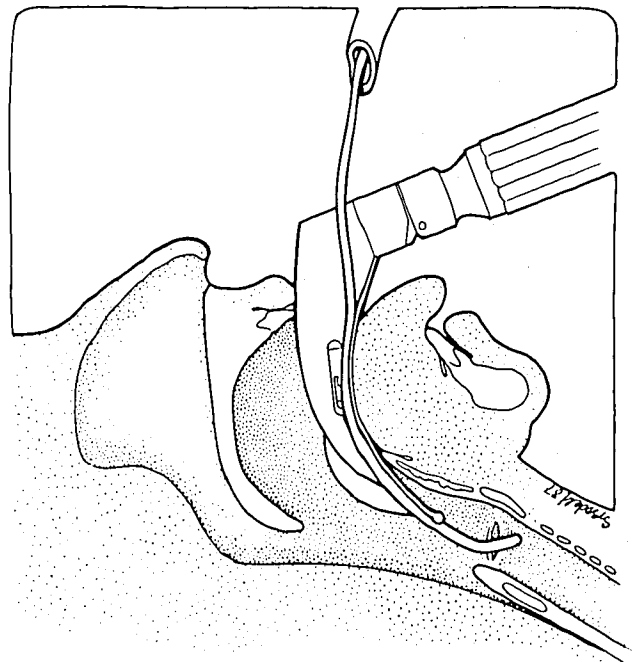


FIG. 1. Bougie directed into trachea. ETT inserted over bougie into position.

\* Downs Surgical Inc., Decatur, Georgia

Local trauma is always a potential hazard with any manipulation in the laryngotracheal region; however, in our experience, the use of the gum-elastic bougie is not associated with soft tissue damage provided excessive force is not applied.

The bougie has also been found helpful in changing the ETT in patients who require prolonged endotracheal intubation. The bougie is passed through the ETT that is in place. The tube is then removed over the bougie and the new tube introduced.

Although most anesthesiologists are becoming very adept at using the fiber-optic laryngoscope for difficult intubations, in the situation where there is unexpected

difficulty, we feel there should be a bougie readily available.

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### The Effect of a Second Dose of Succinylcholine on Cardiac Rate and Rhythm Following Induction of Anesthesia with Ketamine

*To the Editor:*—We recently reported that marked bradydysrhythmias may occur following a second dose of succinylcholine (SCh) after induction of anesthesia with midazolam or etomidate, and that the occurrence of these dysrhythmias was statistically significant after induction with etomidate.<sup>1</sup> We showed, in agreement with the findings of others, that the use of thiopental for anesthetic induction protects against the occurrence of such dysrhythmias.<sup>2,3</sup> The study has since been extended to define the effect of a second dose of SCh following induction of anesthesia with ketamine.

Eight ASA physical status I patients with a mean age of 35 yr (range 20–64) were studied. Approval of the Human Subjects Protection Committee at our institution and informed consent were obtained. The study protocol was the same as previously reported. Anesthesia was induced with ketamine 2 mg/kg iv. A second dose of SCh (0.5 mg/kg) was given 5 min after the first SCh injection. Paired Student's *t* test was used for statistical analysis, with *P* < 0.05 considered to be significant.

We found that, following induction of anesthesia with ketamine, the decrease in HR after the second dose of SCh was not significant as compared with HR immediately prior to the second injection. No patient exhibited any dysrhythmias (table 1).

TABLE 1. Effect of Second Dose of Succinylcholine on Cardiac Rate and Rhythm

Group	Age (Yr)	Baseline HR	HR Before 2nd SCh	Minimum HR After 2nd SCh	Rhythm After 2nd SCh
Ketamine n = 8	35 ± 15	78 ± 11	105 ± 15	92 ± 24	● Sinus rhythm (n = 8).

Values are mean ± SD; n = number of patients; HR = heart rate (bpm); SCh = succinylcholine.

Ketamine produces a sympathomimetic effect primarily by direct stimulation of CNS structures.<sup>4</sup> It seems reasonable to assume that the observed protective effect of ketamine against SCh-induced dysrhythmias and lack of significant decrease in HR after a second dose of SCh following induction with ketamine are due to its sympathomimetic actions.

In summary, we found that administration of a second dose of succinylcholine to healthy adult patients after induction with ketamine is safe with respect to cardiac rate and rhythm.

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