A Simple Device to Enable Capnography during Jet Ventilation for Laryngoscopy

To the Editor:—Jet ventilation as described by Sanders for bronchoscopy and modified by Goulton and Donald for use during laryngoscopy can facilitate surgical access to the larynx and is often recommended for use during laser surgery of the airway to eliminate the presence of a flammable endotracheal tube. A disadvantage of this technique is the lack of end-tidal carbon dioxide monitoring. An experimental dog model of translaryngeal jet ventilation demonstrated the correlation of end-tidal carbon dioxide, sampled at the tip of the injector, and arterial carbon dioxide when the respiratory rate was 15 breaths/min, even during obstruction of up to 80% of the cross-sectional area of the upper airway. The authors of this experimental study suggest monitoring end-tidal carbon dioxide during translaryngeal jet ventilation by the use of side-stream sampling through a nasal cannula or a low deadspace face mask. To enable side-stream sampling when jet ventilation is used during laryngoscopy, we produced the double lumen injector shown in figure 1. This consists of a 13-Ga metal injector attached to a thumbscrew to which an 18-G 9-cm needle was welded. The entire device was then sandblasted to decrease specular reflectance. As can be seen in figure 1, the addition of the sampling lumen does not appreciably increase the size of the injector or the potential for the device to interfere with surgery. The injector is clamped to the base of the laryngoscope and attached to a high-pressure gas source and a side-stream sampling device.

The capnographic tracings in figure 2 illustrate the results obtained while sampling from the modified injector of figure 1 during suspension laryngoscopy. These tracings were obtained with an infrared analyzer (OR SARACAP, PPG Industries, Lenexa, KS) while sampling at 110 ml/min through a 10-foot catheter. A muscular 49-yr-old man weighing 100 kg presented for biopsy of the vocal cords. His history is notable for moderate obstructive pulmonary disease and former intravenous use of heroin and amphetamine. The airway was unremarkable. General anesthesia was induced and maintained with fentanyl, propofol, succinylcholine, and vecuronium. A 7-mm oro-

Fig. 1. Addition of a second lumen to the injector to permit side-stream sampling.
Epidural Versus Intravenous Fentanyl Following Thoracotomy

To the Editor:—Although the evidence continues to mount against the clinical application of fentanyl for postoperative epidural analgesia, I still find myself reluctant to abandon fentanyl in favor of morphine. Based on theory and my clinical experience, I had hoped that by delivering fentanyl into the thoracic epidural space, closer to the proposed site of action in the spinal cord, it would provide a more selective spinal analgesic effect and avoid the systemic levels produced with lumbar epidural fentanyl analgesia. Unfortunately, Guinard and his associates, in a carefully designed and well executed study, have effectively proved that even thoracic epidural fentanyl infusions do not appear to offer a substantial reduction in fentanyl requirement and systemic exposure.

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