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# A minimally invasive technique for aggressively monitoring high-risk patients undergoing low-risk surgical procedures that do not require endotracheal intubation

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*To the editor*: As a major comprehensive cancer center, we have encountered several cases that involve high-risk patients associated with malignancy, chemotherapy, coexisting disease, and/or age. These patients are often scheduled for a low-risk surgical procedure where endotracheal intubation is not required. The maintenance of anesthesia, utilizing even minimal anesthetic agents, can be very challenging in patients with compromised cardiac and pulmonary status.

We are currently using a combination of two minimally invasive devices to provide safe anesthesia for better patient monitoring. After induction of anesthesia, a laryngeal mask airway (LMA)-ProSeal (LMA North America, San Diego, CA, USA) is placed and secured. Following the LMA placement, a 5-mm transesophageal probe (Hemosonic Probe; Arrow International, Reading, PA, USA) is introduced through the esophageal port of the LMA (Fig. 1). The transesophageal probe is positioned at the level of the sixth thoracic vertebra where the esophagus and the descending aorta are in their closest relation. The transesophageal probe consists of a Doppler and an echo M mode that measure aortic velocity and aortic diameter, respectively. With these two values, the aortic blood flow is determined [1]. After correct positioning, a continuous display of valuable information, such as cardiac output, stroke volume, contractility, and aortic peak velocity, is provided. By entering the mean arterial blood pressure, the systemic vascular resistance is calculated.

Close correlation of the information provided by a transesophageal probe and the values obtained from a pulmonary artery catheter has been documented [2,3]. Continuous cardiac output monitoring offers the potential to identify acute changes in ventricular performance. While other methods of measuring continuous cardiac output, such as a pulmonary artery catheter, carry significant risk, the transesophageal Doppler device is relatively safe and has the same risk as the placing of an orogastric tube [4]. Successful passage of a Doppler probe (not an echo probe) through the side port of the LMA was first described by Hemerling [5]. Uda [6] attempted the placement of a 6.5-mm echo-Doppler probe, but failed due to its large caliber.

**Fig. 1.** Transesophageal Doppler probe has been introduced through the esophageal port of the laryngeal mask airway

We were successful in using a 5-mm echo-Doppler probe that fits well through the side port of the LMA.

We believe that using the transesophageal probe in conjunction with the LMA-Proseal provides a minimally invasive way to aggressively monitor high-risk patients undergoing low-risk surgical procedures that do not require endotracheal intubation.

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