Response to "Simplifying Nerve Monitoring"
Jeffrey Cheng and Ken Kazahaya
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What is This?
Simplifying Nerve Monitoring

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We applaud the efforts of Cheng and Kazahaya, who recently published a report on an alternative to the use of the Nerve Integrity Monitoring system (NIM, Medtronic-ENT, Jacksonville, Florida) for pediatric thyroid surgery. The smallest endotracheal tube available from Medtronic is 5-0, and Cheng and Kazahaya describe the use of endolaryngeal hookwire electrodes to accomplish laryngeal nerve monitoring in pediatric patients.

The technique described is sophisticated, somewhat invasive, and would appear to be time-consuming. It requires a separate direct laryngoscopy with an operating microscope following intubation in order to accomplish electrode placement. In some respects, it represents a step backward toward the original strategy proposed for laryngeal nerve monitoring.

We suggest consideration of a simpler alternative to the NIM system, represented by the adhesive electrodes produced by Neurovision (Nerveana, Ventura, California), which may be affixed to any size tube and have therefore become our device of choice for pediatric thyroid surgery. This system is versatile, compatible with the NIM interface (and can therefore be used with that monitoring system), and provides a robust signal with capability for stimulation either using a Prass probe or customizable instruments manufactured by Neurovision. This method is fast and reliable, and it does not require additional procedures, operating time, or specialty equipment training. A final cautionary note is that no laryngeal nerve monitoring system can substitute for thorough anatomical knowledge and meticulous surgical technique in identifying and protecting the recurrent laryngeal nerve.

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We would like to thank Drs Terris and Duke for discussing their simplified nerve monitoring technique and also strongly agree that no nerve monitoring technique can supplant adequate knowledge of anatomy and meticulous surgical technique. We recognize that our endolaryngeal hookwire technique is technically sophisticated, especially when compared to the stick-on monopolar electrode. Using the 2 wires per vocalis muscle provides a true electromyography (EMG)-like response from the muscle, allowing for more subtle responses to be observed at low stimulation currents. Considering that the input can act as a differential amplifier, the fact that the 2 electrodes are close to each other provides for a more sensitive measure of electrical activity in the muscle. Since the electrodes are placed directly into the muscle, our technique is not dependent upon the positioning of the endotracheal tube, which can move during the case. We also utilize neuromonitoring endotracheal tubes, but it is not uncommon that we have cases where we no longer obtain responses and find that the endotracheal tube position has twisted or changed in depth. The position of the tube is critical and may have to be checked at some point during the case if responses should be present and are not.
The senior surgeon has used the monopolar stick-on electrodes on some of the younger patients (endotracheal tube size smaller than 5.0) and found that the monitoring can be quite noisy and also will require the endotracheal tube to be decreased in size due to the additional thickness that the electrode adds to the outer diameter of the endotracheal tube. On a young patient, this may decrease the size of the endotracheal tube significantly enough to affect ventilation or may make it easier for the tube to kink during surgery. A smaller tube might be necessary to avoid unnecessary pressure on the subglottic structures if an adequate leak cannot be obtained with an age-appropriate, sized endotracheal tube. When smaller diameter endotracheal tubes are used, the ability to ventilate may become an issue and the tube becomes more flimsy.

Therefore, the senior surgeon, in younger children or with lesions in the parapharyngeal space or infratemporal fossa, which may require repositioning during the case, will utilize the endolaryngeal hookwire electrode technique. For children typically intubated with a 5.0 or larger endotracheal tube and not requiring significant repositioning, he will use a commercially available neuromonitoring endotracheal tube of the appropriate size.

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