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Protection of Recurrent Laryngeal Nerve during Neck Surgery: A New Combination of Neutracer, Laryngeal Mask Airway, and Fiberoptic Bronchoscope

To the Editor:—Injury to the recurrent laryngeal nerve is a serious complication during neck surgery, especially during thyroidectomy. To prevent such a complication, we observe movement of the vocal cords during recurrent laryngeal nerve stimulation in patients breathing *via* a laryngeal mask airway.

In ten patients scheduled for thyroidectomy, anesthesia was induced by inhalation of nitrous oxide and halothane. After a moderate depth of anesthesia was achieved, the laryngeal mask airway was inserted. During surgery the recurrent laryngeal nerve was electrically stimulated with a 23-G Pole needle (TOP, Japan). The amplitude of the stimulation was 13–17 mA, and the frequency was 3–5 Hz. The movement of the vocal cords was observed through a fiberoptic bronchoscope inserted through the laryngeal mask airway. No muscle relaxants were used.

Figure 1 depicts the vocal cords in the absence of stimulation of the recurrent laryngeal nerve. When the recurrent nerve was stimulated where it crosses near the inferior thyroid artery, movement of the ipsilateral vocal cord was observed in all cases (fig. 2). However, intense bilateral movement of the vocal cords was observed in one case when the nerve was stimulated near the site where it penetrates the cricothyroid membrane (fig. 3).

During anesthesia, laryngeal spasm occurred in two cases. In one case, inadequate depth of anesthesia caused mild spasm. In the other, intense laryngeal spasm occurred concurrently with the use of electrocautery near the recurrent laryngeal nerve. The former case was managed by deepening anesthesia and topical application of local anesthetics (4% lidocaine injected through the bronchoscope). No other adverse effects were encountered.

The laryngeal mask airway is a new form of airway being used for various kinds of anesthesia.[1] The reason for using the laryngeal mask airway in the cases described above is to obtain good views of vocal cord movement during surgery. In the cases described above, two cases of laryngeal spasm occurred. One case was attributed to inadequate depth of anesthesia, and the other was caused by the use of electrocautery close to the recurrent laryngeal nerve. To prevent this type of complication, maintaining an adequate level of anesthesia as well as using topically applied local anesthetics may be necessary. In addition, bronchoscopic examination *via* the laryngeal mask is recommended whenever difficulty in managing the airway occurs.[2] In cases with greater difficulty in maintaining the airway, we have inserted a small endotracheal tube (ID 6.0 mm) through the laryngeal mask airway.

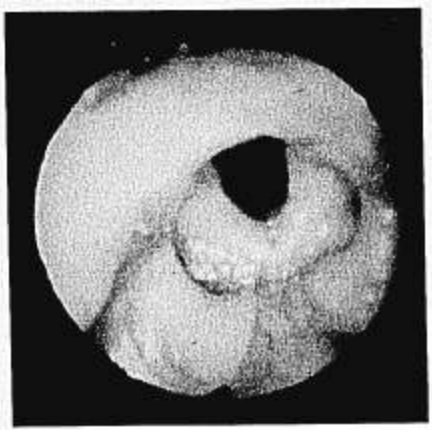

FIG. 1. The vocal cords without electrical stimulation.

FIG. 2. The ipsilateral movement of vocal cords.

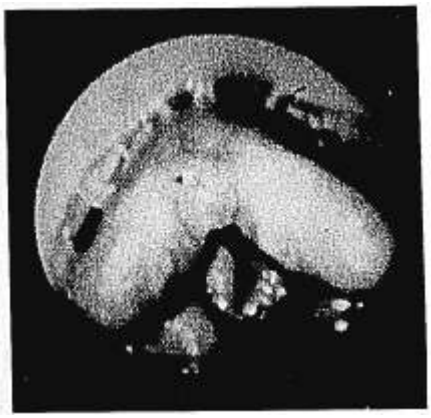

FIG. 3. The bilateral movement of vocal cords.

In conclusion, the technique described above was considered quite helpful for minimizing injury to the recurrent laryngeal nerve, particularly during surgery in which surgeons have difficulty in identifying this nerve.

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Erroneous Blood Pressure Measurements with a Noninvasive Blood Pressure Monitor

To the Editor:—Automated noninvasive blood pressure monitors (NIBPs) are used extensively to accurately and automatically monitor the blood pressure of surgical patients.

A healthy adult man was scheduled for an elective orthopedic procedure. Upon arrival in the operating room, standard monitors (ECG, blood pressure (BP), precordial stethoscope, and pulse oximetry) were applied. During preparation for the case, the BP cuff was placed between the metal frame and the mattress of the bed, just below the pillow. The tubing from the NIBP machine to the cuff appeared to be leading to the patient, although in reality it was not attached to the patient. Prior to induction, the NIBP was cycled and gave a reasonable BP, almost identical to his preoperative value, and the heart rate correlated with the ECG. Induction commenced with thiopental, fentanyl, and vecuronium. The NIBP continued to indicate plausible BPs, although BP was increased as one might expect following intubation of the trachea. Because BP was increased, the vaporizer with isoflurane was dialed to higher concentrations. Measurements were being obtained every 2.5 min. When the BP continued to increase despite administration of more anesthesia, and other clinical signs (except BP and a narrowing pulse pressure) indicated that the patient was anesthetized adequately, one of the team members put the NIBP on hold and checked the cuff, only to find it between the mattress under the head of the patient. At this time the NIBP was applied to the patient and the isoflurane concentration was decreased, as the patient was indeed well anesthetized, having a much lower BP than the NIBP had indicated. The case proceeded without further difficulty. A thorough inspection of that particular NIBP monitor following the case revealed no problems with the calibration or operation of the device.

The Accutorr 1A NIBP monitor uses the oscillometric measurement technique to record systolic and diastolic blood pressures. Briefly, arterial pulsations are transmitted to the cuff and quantified as the cuff pressure is slowly decreased. Transitions in the amplitudes of these pulsations are correlated with the decreasing cuff pressure to determine systolic, mean, and diastolic blood pressures. Because the cuff is being used to measure these pulsations, the NIBP monitor is sensitive to any other extraneous pulsatile signal detected by the cuff. Such signals could be caused by patient movement or bumping the cuff by surgical or anesthesia personnel. Our hypothesis as to the cause of this incident is that movement of the patient's head during mask application and bumping of the cuff and tubing during induction were somehow sufficient to be measured as arterial pulsations and displayed as blood pressure. It should be noted that these pulsations did not trigger the motion artifact indicator on the NIBP monitor. We recommend that during preparation for induction, the cuff from any NIBP monitor, especially those using the oscillometric technique, remain with the monitor and not be placed on the armboard or mattress of the surgical table.

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In Reply:—The authors' unusual experience with the Accutorr 1A appears to exemplify a limitation of all oscillimetric noninvasive blood pressure monitors (NIBPs) in that rhythmic external pulsations may cause erroneous readings. This is a function of how the oscillimetric NIBP technique works. The monitor detects rhythmic pulsations during the bleed-down period and translates these into NIBP readings. If random signals are detected, the monitor will display a motion artifact or will recycle.

The Accutorr 1A (and 2A) NIBP monitors have the following status indicators:

Zero in mean blood pressure (BP) window: Excessive motion detected; monitor will recycle up to three times.

Illuminated motion artifact indicator: Noise detected in pulsations; NIBP reading may be erroneous.

Software in the later Accutorr 3/4 NIBP monitors has been further refined but is still subject to the same limitations.

Users with questions on the Accutorr monitors should call Datascope's Technical Support Department at 1-800-288-2121 or 201-265-8800.

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