Letter to the Editor

Nasopharyngeal Placement of a Nelaton Suction Catheter in Respiratory Monitoring of Sedated Patients

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Office-based cosmetic surgeries, which utilize mild to moderate sedation in addition to local anesthesia, are frequently performed both in the United States and European countries. Statistics released by the American Society for Aesthetic Plastic Surgery showed that 56% of all cosmetic surgeries performed in 2014 were in the office setting.[1]

The growth of office-based cosmetic procedures raises the risk of rarely seen sedation-related adverse events. Sedation at any level beyond minimal has a risk of ventilatory depression and airway obstruction, which can result in anoxic brain injury and death. Although the intention is to maintain the same level of sedation during procedures, there is always risk of progressing to a deeper level of anesthesia. One study that assesses sedation levels at 3-minute intervals during elective endoscopy procedures showed that deep sedation occurred at least once in 68% of their patients who were intended to undergo moderate sedation.[2]

Respiratory monitoring has two components: oxygenation and ventilation. Oxygenation is monitored by pulse oximetry in a conscious patient. But assessment of ventilation is best accomplished by clinical signs in a conscious patient and carbon dioxide (CO_2) monitoring in a moderate-to-deeply sedated patient. In 2010, the American Society of Anesthesiologists included an important amendment for basic anesthetic monitoring: mandatory exhaled end-tidal carbon dioxide ($ETCO_2$) monitoring during both moderate and deep sedation.[3]

Partial pressure of CO_2 in the respiratory gases is ideally measured with capnographs in intubated patients. For nonintubated patients, capnograms (special nasal cannulas which supply oxygen and measure the CO_2 content of expired air simultaneously) or transcutaneous $PaCO_2$ monitors are used.[4]

For those who do not have these devices, a simple nasopharyngeal nelaton suction catheter can be used to monitor $ETCO_2$. In sedated patients, we insert a thin nelaton suction catheter through the nose into the nasopharynx of a patient to monitor $ETCO_2$ during sedation (Figure 1). The distance that the tip of the catheter travels is equivalent to the distance between the anterior nares and the external opening of the ear. Then, we use the rubber part of an infusion set as a connector between the nelaton suction catheter and $ETCO_2$ catheter of the monitor. As soon as the catheter is connected to $ETCO_2$ monitor, normally shaped capnography waveforms appear on the screen (Figure 2). Thus, we can monitor the amplitude, frequency, and pattern of ventilation. Any abnormal shape or value of $ETCO_2$ alerts the clinician regarding the ventilation of a sedated patient. Supplementary Video S1, which demonstrates insertion of a nelaton suction catheter and the appearance of respiratory waveforms on the monitor, is available as Supplementary Material at www.aestheticsurgeryjournal.com.

Oxygen flow in low levels (eg, 2-4 lt/min) through the nasal cannula does not cause artifacts in the sampling of CO_2 in the exhaled air because nasal cannula providing

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Figure 1. Lateral view of a 57-year-old woman connected to the $ETCO_2$ monitor while undergoing a blepharoplasty procedure in mild sedation. The photograph was taken before placement of the nasal cannula for oxygen supplementation.

Figure 2. Normally shaped capnography waveforms appear on the screen as soon as the catheter is connected to $ETCO_2$ monitor.

supplemental oxygen rests in front of the nares, whereas suction catheter is put into the nasopharynx. The technique mentioned in this article has been utilized by many anesthesiologists for over 10 years. Studies evaluating the accuracy of samples obtained with capnographs noted a good to excellent correlation between $ETCO_2$ and partial pressure of the CO_2 in the blood.[4-6] We have used this technique on our mild-to-moderately sedated patients for almost 3 years and have not seen any adverse events related to the use of it to date. The risk of trauma and bleeding from the nasal mucosa is minimal when the suction catheter is placed correctly. It should be noted that the accuracy of this sampling technique decreases with mouth breathing, patient secretions, and partial airway obstruction.[4]

End-tidal monitoring is effective and should be considered mandatory for respiratory monitoring in all sedated patients. All that a clinician needs is to insert a thin nelaton suction catheter into the nose of sedated patient and connect it to their $ETCO_2$ monitor, as described in this letter. This technique should also be implemented into other areas of clinical care in which sedation is applied such as emergency rooms, intensive care units, and post-anesthesia care units.

Supplementary Material

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