Patient Experiences Demonstrating the Role of Nasal CPAP in Sedation of Patients with Obstructive Sleep Apnea

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Executive Summary

Patients with obstructive sleep apnea (OSA) are at increased risk for upper airway obstruction and hypoxemia during procedural sedation, even when regional anesthesia techniques are employed. The following patient experiences illustrate rapid onset airway compromise during propofol-based intravenous sedation and the immediate, sustained reversal of obstruction and hypoxemia with application of the Xchange™ nasal CPAP device.

Background

OSA is a well-recognized independent risk factor for difficult mask ventilation, sedation-related airway obstruction, and perioperative hypoxemia. Sedative agents such as propofol exacerbate upper airway collapsibility by reducing pharyngeal muscle tone and blunting ventilatory drive.

Patient Experience 1

38-year-old female undergoing ORIF of a wrist fracture (BMI 30, known OSA, Mallampati III). After supraclavicular block and initiation of propofol sedation with standard oxygen mask, the patient obstructed within 3–4 minutes with desaturation to 85%. Application of the Xchange™ nasal CPAP device resulted in resolution of obstruction and improvement of oxygen saturation to 100% within one minute, with robust $ETCO_2$ waveform quality observed. Peak airway pressure was measured at 18 cm H_2O and was adjusted as needed using the adjustable pressure-limiting (APL) valve located on the elbow of the Xchange device. Additional airway pressure adjustments were achieved by increasing or decreasing oxygen flow at the flow meter to reach the desired level of nasal positive airway pressure. The device remained in place for the 90-minute procedure with stable oxygenation.

Patient Experience 2

68-year-old male undergoing ORIF of the elbow (BMI 32, OSA, hypertension, home CPAP use). After supraclavicular block and propofol sedation with standard oxygen mask, the patient developed oxygen desaturation in the range of 82–86% within minutes, requiring intervention. Application of the Xchange™ nasal CPAP device restored oxygen saturation to 100% within one minute with sustained, high-quality $ETCO_2$ waveform. Peak airway pressure was measured at 16 cm H_2O and was adjusted accordingly to maintain oxygenation and appropriate $ETCO_2$ waveform quality. Oxygen saturation remained 98–100% throughout the remainder of the procedure.

Pressure Titration and Safety Considerations

Nasal CPAP delivered via the Xchange™ device allows for clinician-controlled titration of airway pressure in real time. Airway pressure may be adjusted using the APL valve as well as by modifying oxygen flow at the flow meter. This dual-control approach permits incremental pressure adjustments tailored to patient response, airway patency, oxygenation, and capnographic waveform quality. Care should be taken to avoid excessive airway pressures, with continuous monitoring of oxygen saturation, $ETCO_2$, respiratory pattern, and patient comfort. The ability to titrate pressure gradually enhances safety and reduces the risk of gastric insufflation, patient intolerance, or barotrauma.

Device Description

The Xchange™ nasal CPAP device is a single-use nasal dock that delivers positive airway pressure using existing wall or anesthesia machine oxygen without additional hardware. Airway pressure may be titrated using both the APL valve and oxygen flow rate, allowing clinician-controlled adjustment of delivered CPAP.

Conclusion

These cases demonstrate predictable sedation-induced airway obstruction in OSA patients and rapid, sustained reversal with nasal CPAP. The Xchange™ device is entirely unique, non-invasive and oāers excellent airway support through delivering positive pressure to keep the airway patent during procedural sedation.