

## The Common, Costly, and Deadly Complications of Respiratory Compromise

IV deep sedation causes the muscles of the upper airway to relax, as well as respiratory depression, resulting in a cascade of complications known as Respiratory Compromise (RC). RC begins as moderate complications such as upper airway obstruction, hypoventilation, severe hypoxemia, and atelectasis, which can lead to life-threatening complications such as pneumonia, respiratory insufficiency, arrest, and failure.

RC is common, costly, and deadly. In higher risk procedures such as abdominal surgery, advanced endoscopy, orthopedic surgery, and electrophysiology the incidence of RC is 5-10%.<sup>1-5</sup> In high-risk patients such as the morbidly obese, Obstructive Sleep Apnea (OSA), Congestive Heart Failure (CHF), and Chronic Obstructive Pulmonary Disease (COPD) the incidence of RC is even higher.<sup>6</sup> RC is associated with significantly longer PACU, ICU, and hospital stays as well as more days placed on a mechanical ventilator. Below is a list of the major RC complications and their estimated costs.<sup>7</sup>

- Respiratory failure without mechanical ventilation = \$7,100<sup>8</sup>
- Respiratory failure with mechanical ventilation = \$27,100<sup>8</sup>
- Pneumonia = \$16,900<sup>8</sup>
- Atelectasis = \$400<sup>8</sup>

The economic burden can be quite substantial. For example, assuming 5,000 high-risk IV deep sedation procedures are performed per year and the complications rates for respiratory failure without mechanical ventilation, respiratory failure with mechanical ventilation, pneumonia, and atelectasis are 6%, 5%, 3%, and 20%, respectively. The costs of these complications are \$2,150,000, \$6,900,000, \$2,500,000, and \$400,000 totaling \$12,000,000 per year. What's even more devastating is the fact that patients who suffer an RC event are 29 times more likely to die than those that do not.

Recent evidence has shown that the use of positive pressure intra-operatively and post-operatively not only significantly improves oxygenation and ventilation compared to the current standard but also decreases the risk of severe RC by 69%.<sup>9</sup> This reduces the costs from \$12,000,000 down to \$3,700,000 resulting in a savings of \$7,700,000. The SuperNO<sub>2</sub>VA™ device is a simple, safe, and effective nasal mask designed to deliver positive pressure both intra-operatively and post-operatively when connected to either an anesthesia machine or a hyper-inflation bag.

### References:

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