



Shoulder surgery using combined regional and general anesthesia versus regional anesthesia and deep sedation with a non-invasive positive pressure system: A retrospective cohort study

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Objectives

Shoulder surgery is typically performed under general anesthesia with its attendant risks. Deep sedation may provide advantages for shoulder surgery, although this may prove challenging in patients at risk for hypoxemia. Airway access is difficult during shoulder surgery since the patient is generally turned away from the anesthesiologist and placed in the beach chair or lateral decubitus position. This study was undertaken to explore the utility of using the SuperNO₂VA™ mask for ventilatory support during deep sedation compared to general anesthesia with endotracheal intubation during shoulder surgery.

Study methods

This was a retrospective case control study comparing patients undergoing shoulder surgery using deep sedation with interscalene block (n=20) vs. general anesthesia with cervical paravertebral or interscalene block (n=40). All surgeries were performed by the same surgeon. Outcomes measured included conversion to general anesthesia, anesthesia times, recovery times, use of urinary catheters, use of vasopressors, and use of antihypertensives.

Results

No patients receiving deep sedation required conversion to general anesthesia. Anesthesia times were lower for patients undergoing deep sedation ($p < 0.0001$). Post-anesthesia times and operative times were similar between groups. IV fluid requirements were lower in the deep sedation group, and none of these patients re-quired urinary catheters (vs. 60% in the general anesthesia group). Vasopressor administration was more common in the general anesthesia group while antihypertensives were more frequently needed in the deep sedation group.

Parameter	Sedation	GA	P value
Age (years)	60.5	63.6	
BMI	32.0	31.2	
OR to anesthesia ready (min)	12	31	<0.0001
Anesthesia ready to incision (min)	42	37	0.25
Surgery end to departure (min)	5	9	0.005
Induction and emergence time (min)	17	39	<0.0001
IV fluids (ml)	451	1312	<0.0001
Vasopressors	3	33	
Antihypertensives	15	8	
Urinary catheter	0	24	

Table: Demographics and Results, Sedation with SuperNO₂VA vs. general anesthesia (GA)

What is SuperNO₂VA?

The SuperNO₂VA is a nasal CPAP mask that has a nasal bridge membrane and creates an airtight seal when placed over the patient's nose, directing the flow of gas to the upper airways, allowing the airway to remain open and preventing its collapse. The goal of the device is to improve oxygenation and ventilation by keeping the airway patent, providing positive pressure to the lower airways, and minimizing the shunt effect and alteration of the ventilation-perfusion ratio typical of respiratory distress. Notably, the device operates off wall oxygen and does not require high-flow oxygen delivery systems.



Figure 2 SuperNO₂VA nasal CPAP device with orogastric tube in place

Take home message

Shoulder surgery under deep sedation with ventilatory support via the noninvasive SuperNO₂VA mask system may offer advantages over surgery under general anesthesia. General anesthesia is often associated with dramatic physiologic responses such as hypotension and reflex tachycardia in addition to the risks inherent in intubation. These authors noted a shorter time required to prepare the patient for surgery and shorter recovery times post-surgery. Because deep sedation patients required lower intravenous fluid volumes, they did not require placement of a urinary catheter. Patients under deep sedation were less likely to require vasopressor support. Shoulder surgery under deep sedation using the SuperNO₂VA nasal CPAP device for ventilatory support appears to provide benefits over general anesthesia with intubation.

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