

An Evaluation of the SuperNO₂VA™ Nasal Mask as an Alternate Airway for Short General Anesthetics

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Introduction

- In children, esophagogastroduodenoscopies (EGDs) and other brief procedures are often performed under general anesthesia with a variety of airway devices such as endotracheal tubes (ETT), supraglottic airways (SGA), or nasal cannulas.
- Anesthetic concerns include achieving adequate anesthetic depth while avoiding respiratory complications.
- The SuperNOVA nasal mask is a novel airway device that creates a seal around the nose. This can be attached to a oxygen source or anesthesia circuit, allowing for the delivery of continuous positive airway pressure, positive pressure ventilation, and/or volatile anesthetic.

Project Goals

- The aim of this pilot study was to assess our clinical use of the SuperNOVA as an airway device in children.

Methods

- After IRB approval, medical records of patients with whom the SuperNOVA nasal mask was used as an alternative to endotracheal tube or nasal cannula were reviewed.
- Patient demographic, procedural data, and respiratory complications classified as: minor (coughing, desaturation <90%, reversible airway obstruction) or major (laryngospasm, bronchospasm, aspiration).
- The primary outcome was the frequency of respiratory complications.

Figure 1: SuperNOVA Nasal Mask Application



Results & Data

- Twenty-four patients, with a median age of 15 years (IQR: 11-16) underwent general anesthetic procedures with use of the SuperNOVA
 - 58% had upper endoscopies
 - 29% had combined upper and lower endoscopies
 - 13% had other procedures
- Median procedure time of 40 minutes (IQR: 25-48), under combined volatile and intravenous anesthesia (63%).
- Two patients (4.2%, 95% CI: 0.7-20.2%) had minor complications consisting of 1) coughing/airway reactivity intraoperatively and 2) a desaturation to 90% resulting in one non-elective conversion to SGA.
- There were no major complications (0%, 95% CI: 0.0-13.8%).

Table 1: Patient and Procedure Characteristics and Outcomes

Median, [IQR] (Range)		N=24
Age (years)		15 [11-16] (3-19)
Weight (kg.)		51 [33-60] (14-84)
BMI (kg/m ²)		20.6 [16.5-23.2] (14.6-30.4)
ASA; 1 / 2 / 3		8 / 15 / 1
Procedure		
	Upper Endoscopy	14 (58%)
	Upper and Lower Endoscopy	7 (29%)
	Other	3 (13%)
Position		
	Supine	16 (67%)
	Lateral Decubitus	6 (25%)
	Prone	2 (8%)
	Duration (min.)	40 [25-48] (20-100)
Induction Technique		
	Volatile + Intravenous	11 (45%)
	Volatile	9 (38%)
	Intravenous	4 (17%)
Anesthesia Maintenance Technique		
	Volatile + Intravenous	15 (63%)
	Volatile	7 (29%)
	Intravenous	2 (8%)
ETCO ₂ Intermittently Unavailable		
	Yes	8 (33%)
	No	16 (66%)
Conversion to SGA/ETT		
	None	21 (88%)
	Elective	2 (8%)
	Non-Elective	1 (4%)
Complications		
	Minor	2 (8.3%, 95%CI: 2.3-25.8%)
	Major	0 (0.0%, 95%CI: 0.0-13.8%)

Discussion/Conclusion

- The main finding of this pilot analysis is that the SuperNOVA provides effective oxygenation, with a comparable complication rate as other unsecured airway devices. There is insufficient data or experience to suggest its superiority over nasal cannula at this time.
- Advantages of using the SuperNOVA versus nasal cannula include the potential for higher FiO₂ delivery, ability to augment anesthetic depth via inhaled agents, and the ability to provide positive pressure ventilation if hypoventilation and/or oxygen desaturation occur.
- When compared to tracheal intubation, this technique is less invasive, potentially contributing to improved patient recovery.
- Further, larger studies are needed to fully characterize SuperNOVA use in children, especially with regards to cost, complications, and effect on recovery.

Conclusions

- We demonstrate that the SuperNOVA is an alternative airway device that can be used during brief procedures requiring general anesthesia.

References

- Patino M. Comparison of different anesthesia techniques during esophagogastroduodenoscopy in children: a randomized trial. *Paediatr Anaesth.* 2015; 25: 1013-1019.
- Friedt M. An update on pediatric endoscopy. *Eur J Med Res.* 2013; 18: 24.
- Dar AQ. Anesthesia and sedation in pediatric gastrointestinal endoscopic procedures: a review. *World J Gastro Endosc.* 2010; 2: 257-262.