Double Intubation Catheter Guided (DICG) Technique for Nasal Intubation May Reduce Severe Epistaxis and Major Complications in Children

Callie E. Frey
Noah J. Choi
Mitra A. Alikhani
Aryan Meknat, MD
Shahriar Alikhani, MD

Pediatric and Specialty Surgery Center, MobiSurg Inc., Laguna Hills, CA

Introduction:

Nasal intubation is associated with complications such as bleeding, damage to nasal tissue, and retropharyngeal tear. Techniques such as thermo-softening and catheter guidance have been suggested to decrease complications; however, there are no techniques to consistently eliminate severe complications. In this large-scale, retrospective study, pediatric patients were nasally intubated using a novel double intubation catheter guided (DICG) technique as a means of reducing severe complications.

Methods:

We studied 2,329 children under the age of twelve (4.4 $\pm$ 2.2 yrs) using the DICG technique. Patients were first orally intubated, and a naris was pre-treated with Oxymetazoline. A 12 French red rubber catheter was introduced, and the tip was extracted through the mouth. The appropriate size endotracheal tube was inserted inside the wide end of the red rubber catheter and passed through the nose using the catheter as a guide. The nasal tube was introduced into the trachea as the oral tube was removed. A four-by-four gauze was inserted into the posterior pharynx, kept there for a minimum of 30 minutes, and inspected for bleeding. Bleeding was considered clinically significant if the gauze had over 40% of its surface area covered in blood or if the patient had bleeding requiring clinical intervention. Statistical analysis was performed using hypothesis testing to analyze the probability difference.

Results:

The incidence of clinically significant bleeding and other complications reported by our study was zero. Due to the small, private nature of our practice, we did not expose our patients to an increased risk of complications by utilizing other techniques. However, given similarities between our study and others utilizing direct insertion, catheter guided techniques, and thermo-softening, Table 1 presents a comparison of our data and those found in two similar studies.

Discussion:

The DICG technique for nasal intubation allows immediate securing of the airway with oral intubation, prevents aspiration and allows ventilation. It permits ample time to prepare the naris and produces a virtually bloodless insertion of the nasal endotracheal tube. The lack of clinically significant bleeding and other complications in our study demonstrates that the DICG technique is a considerable improvement to existing techniques for nasal intubation. The down sides of the DICG technique are increased time to nasal intubation and the need for multiple intubations.

Table 1:

Comparison of the incidence of clinically significant bleeding recorded by MobiSurg with the double intubation catheter guided technique (DICG) and the incidence reported by two similar studies, Watt et al[1] and Elwood et al[2], utilizing direct insertion, thermo-softening and catheter guided techniques without prior oral intubation.

MobiSurg DICG	Watt et al.[1] Direct	Watt et al.[1] Warmed	Watt et al.[1] Catheter	Elwood et al.[2] Direct	Elwood et al.[2] Catheter
n=2,329	n=43	n=38	n=40	n=51	n=52
0.0%	56%	39%	5%[a]	29.4%	9.6%[b]

Abbreviations: DICG, double intubation catheter guided.
[a.] p-value < 0.001; probability difference = 0.05; 95% confidence interval = 0.014-0.165
[b.] p-value < 0.001; probability difference = 0.096; 95% confidence interval = 0.042-0.206

Conclusion:

The double intubation catheter guided (DICG) technique for nasal intubation eliminates the risk of severe complications for nasal intubation in children. It should be routinely taught in training programs as a preferred technique for nasal intubation.

References:

1. Watt S, Pickhardt D, Lerman J, Armstrong J, Creighton PR, Feldman L. Telescoping tracheal tubes into catheters minimizes epistaxis during nasotracheal intubation in children. *Anesthesiology.* 2007; 106(2):238-42.
2. Elwood T, Stillions DM, Woo DW, Bradford HM, Ramamoorthy C. Nasotracheal intubation: a randomized trial of two methods. *Anesthesiology.* 2002; 96:51-3.