

Performance Characteristics Of Endotracheal Tubes During Single Port Subglottic Suctioning versus Multi Port Subglottic Suctioning in an Ex Vivo Porcine Trachea Model

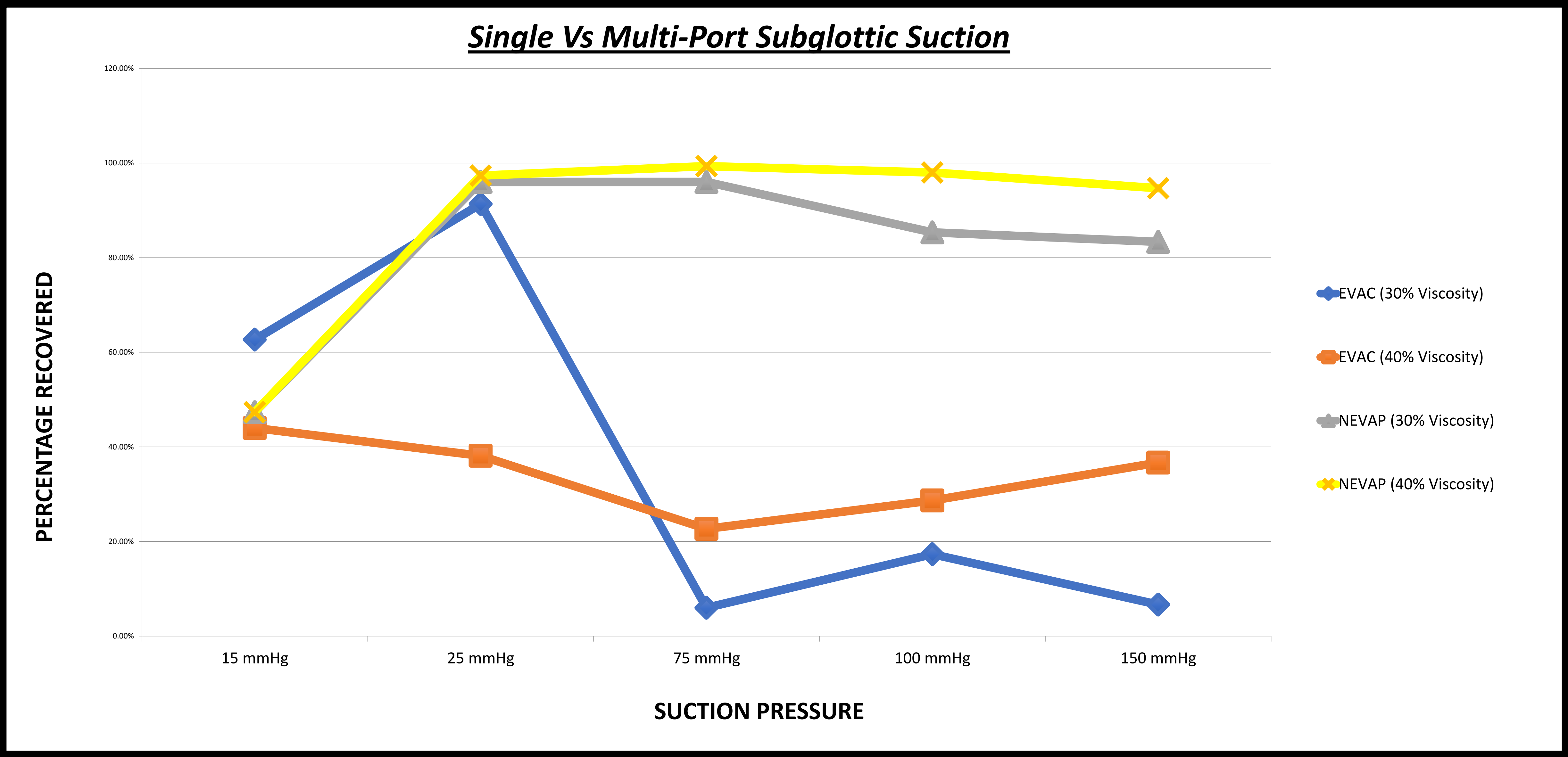
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Introduction

Ventilator associated pneumonia (VAP) is a hospital acquired condition that independently contributes significantly to morbidity and mortality in critically ill patients (1,2). Evacuation of subglottic secretions has been shown to reduce the risk of aspiration thereby reducing the risk of VAP (3,4,5). Several commercially available endotracheal tubes are specifically designed and developed to offer continuous or intermittent evacuation of subglottic secretions(6). However, subglottic suctioning has been associated with entrapment of the tracheal mucosa, laryngeal edema, and tracheal injury (7,8,9). In general, endotracheal tubes that offer subglottic secretion clearance employ a single port where as a multiport clearance device might provide a more efficient clearance and lower blockage rate. The aim of this study is to observe the clearance efficiency and blockage rate of endotracheal tubes that employ single port and multiport subglottic suctioning.

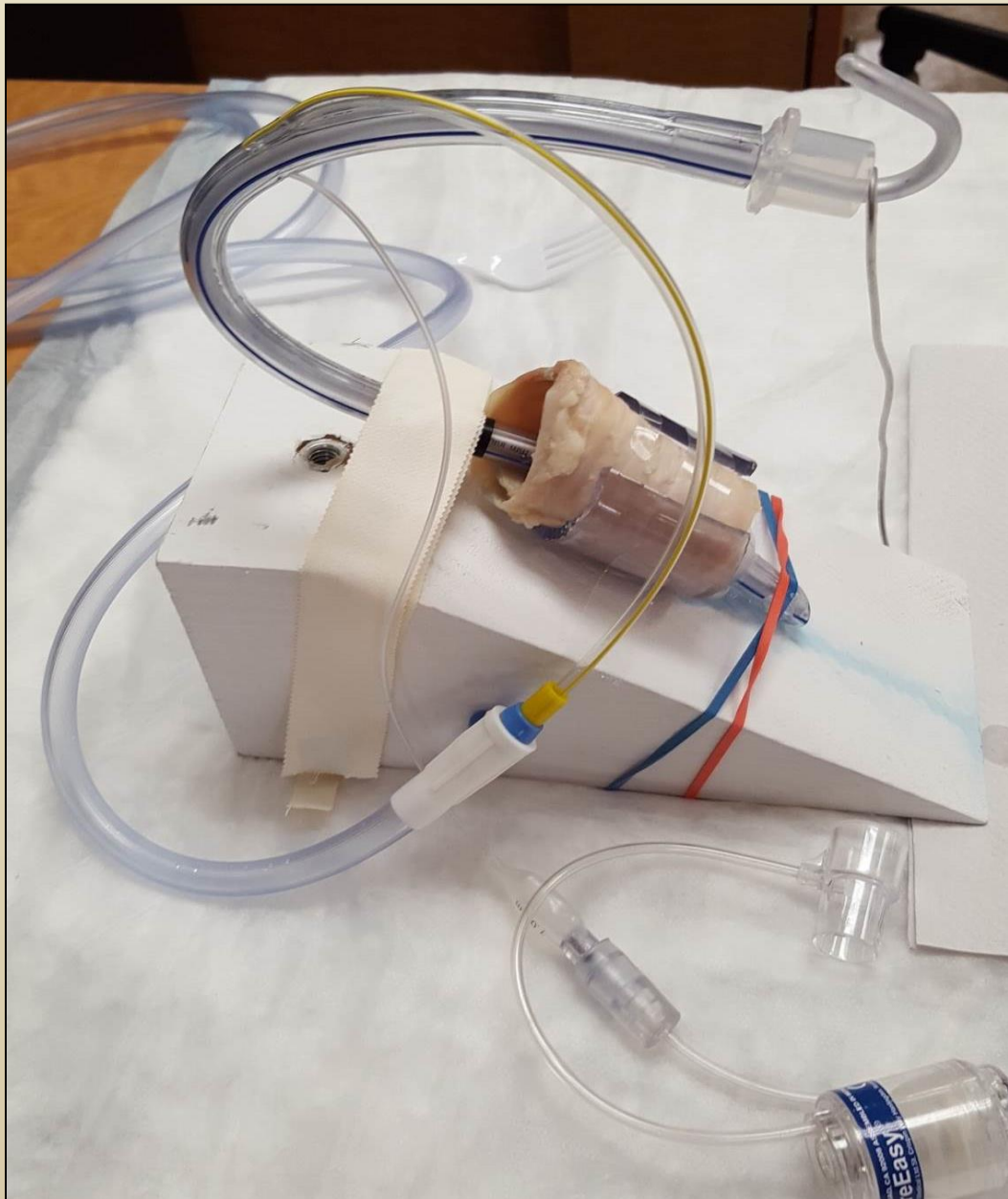
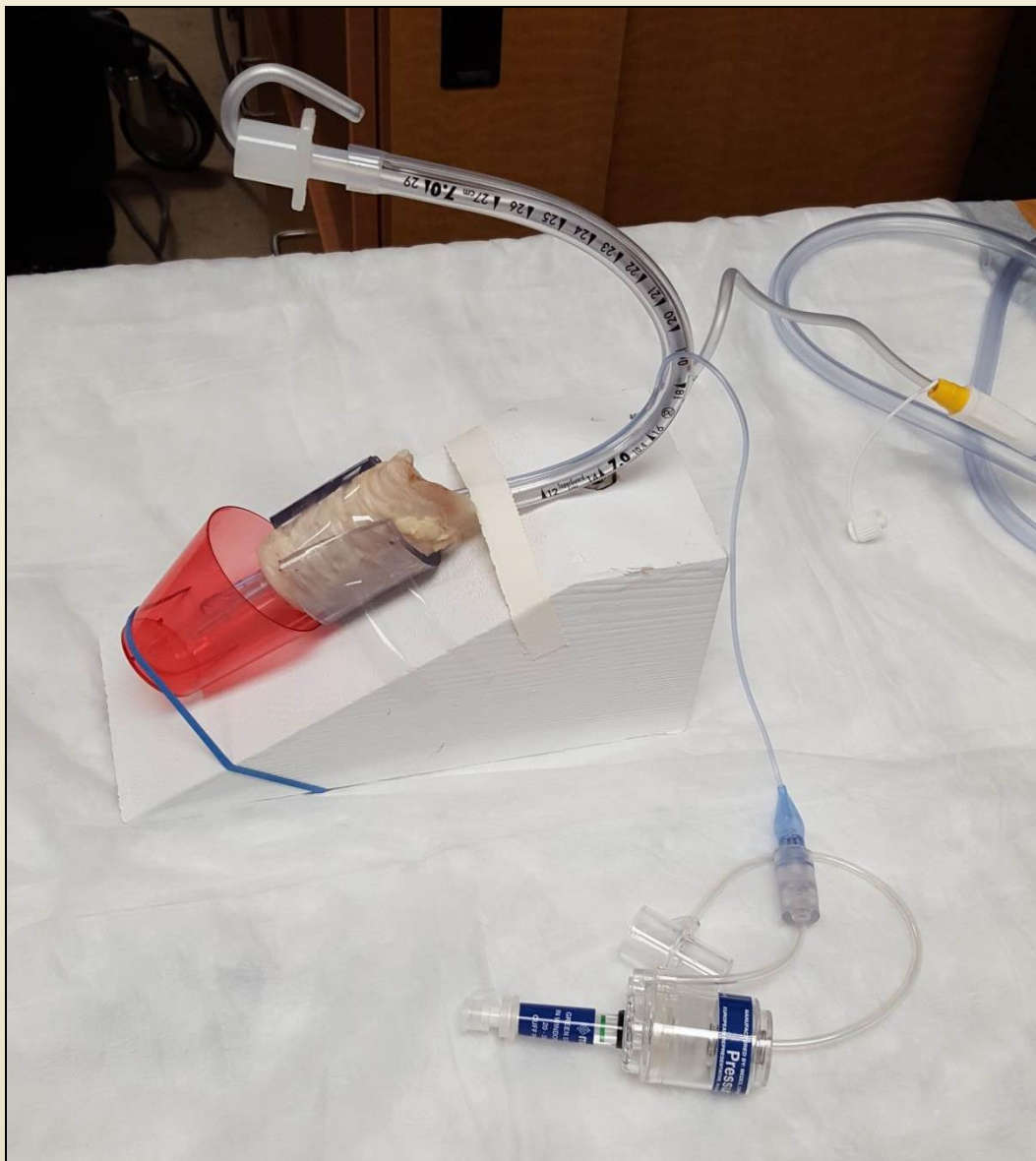


Results

Leakage past the endotracheal tube cuffs as a percentage of each concentration of sucrose solution recovered, varied with viscosity of solution and vacuum pressure in both tubes. At low suction pressures (-15 and -25 mm Hg) there was little difference in subglottic clearance. With the higher viscosity sucrose solution, there remained a significant reduction in subglottic recovery with the single port TaperGuard™ Evac endotracheal tube. The multi port structure on NeVap™ endotracheal tube performance was consistent with both viscosities and vacuum pressures beyond -25 mm Hg.

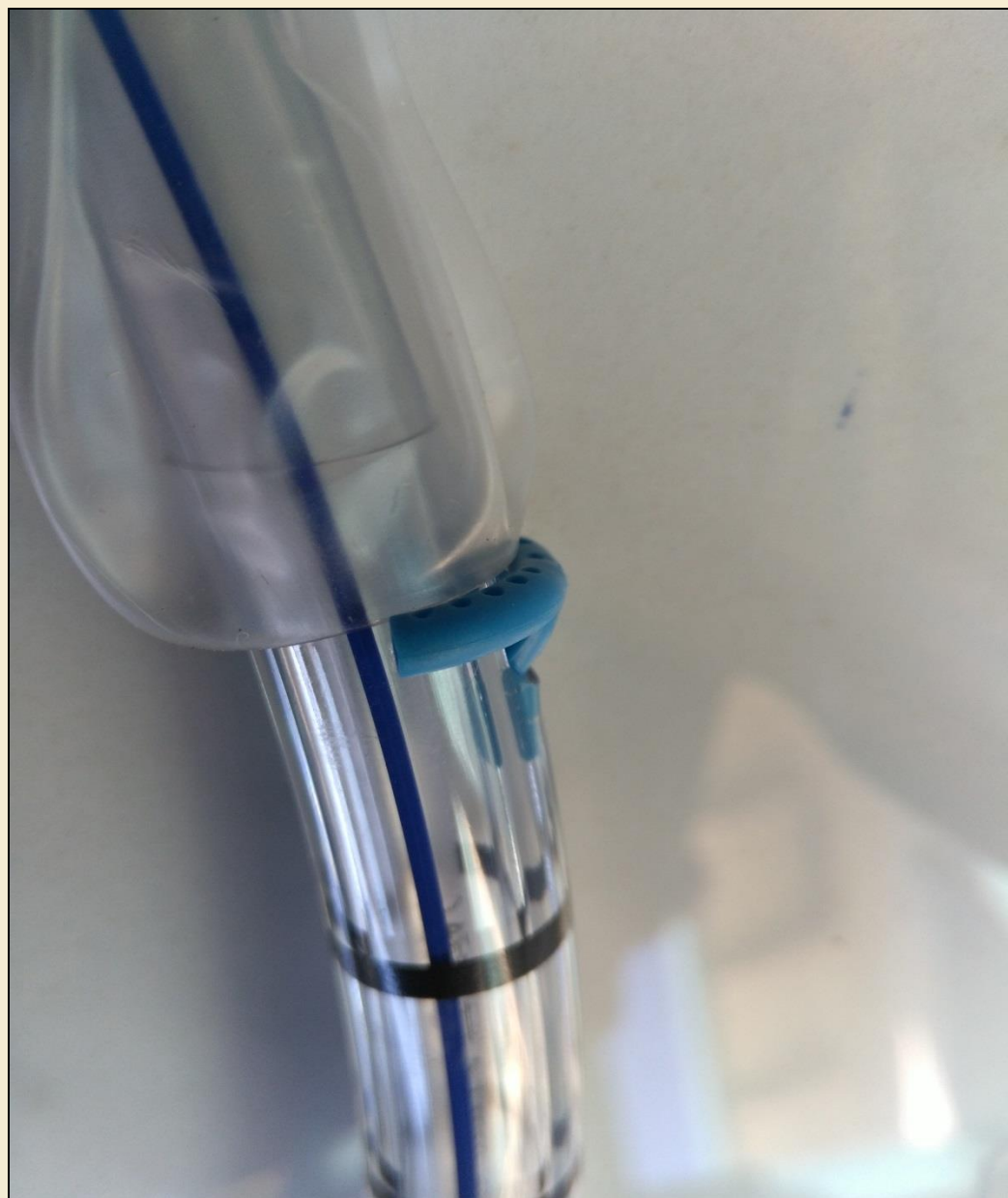
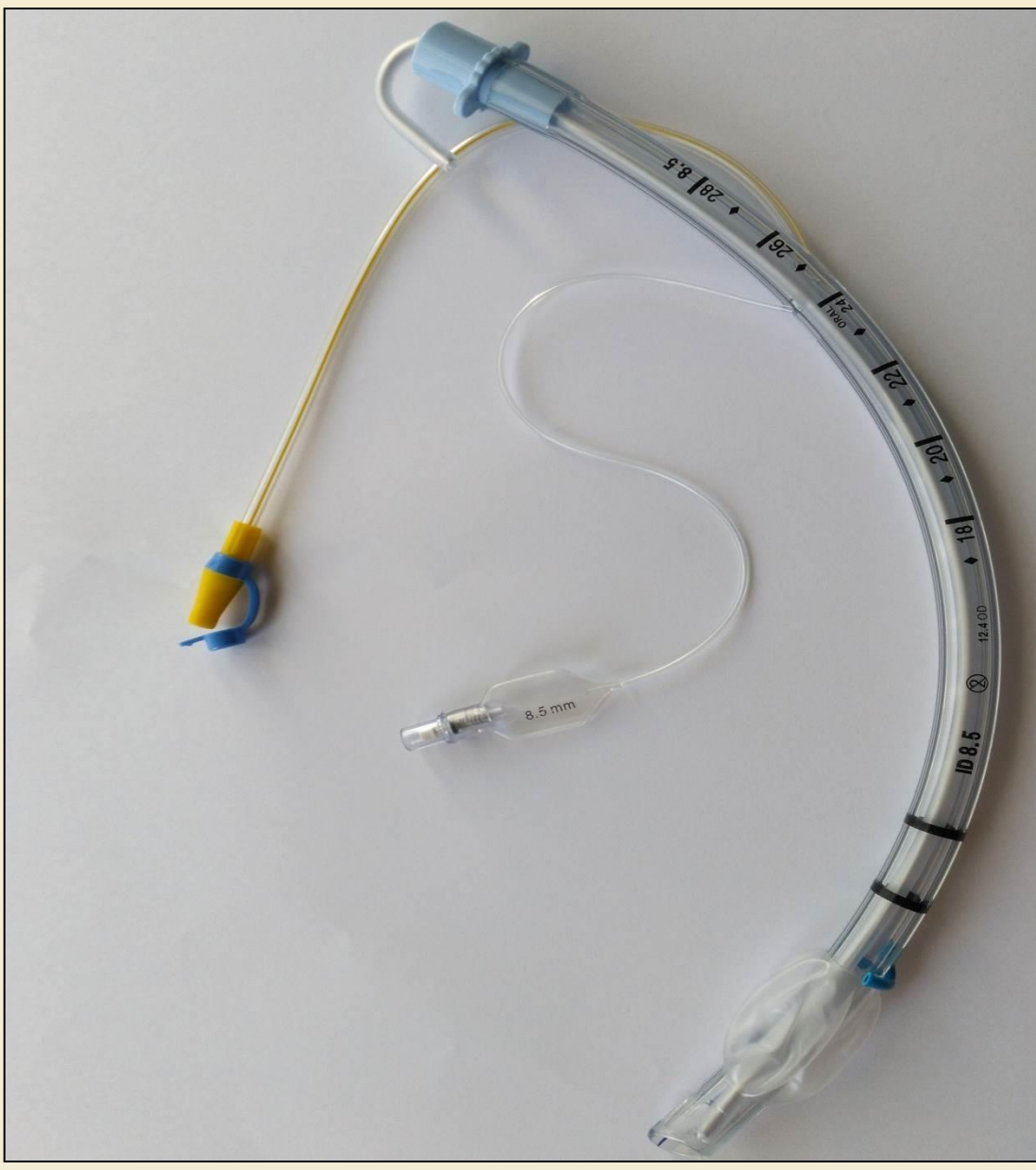
	Evac (30% Viscosity)	Evac (40% Viscosity)	NeVap (30% Viscosity)	NeVap (40% Viscosity)
15 mmHg	62.67% (Recovered)	44.00% (Recovered)	47.33% (Recovered)	47.33% (Recovered)
25 mmHg	91.33% (Recovered)	38.13% (Recovered)	96.00% (Recovered)	97.33% (Recovered)
75 mmHg	6.00% (Recovered)	22.67% (Recovered)	96.00% (Recovered)	99.33% (Recovered)
100 mmHg	17.33% (Recovered)	28.67% (Recovered)	85.33% (Recovered)	98.00% (Recovered)
150 mmHg	6.67% (Recovered)	36.67% (Recovered)	83.33% (Recovered)	94.67% (Recovered)

Table 1. Recovery Results from Evac and NeVap ET Tube at Different Viscosity



Conclusions

This study evaluated the performance characteristics of a single port subglottic and multi port subglottic suction adjuncts of two endotracheal tubes in a porcine tracheal model. The results suggest that several factors might challenge the performance of endotracheal tubes with single port subglottic suction structures, which might include viscosity of oral secretions and tracheal tissue blockage of the port at suction pressures greater -25 mm Hg.



NeVap ET Tube with Multi-Port Subglottic Suction Appendage

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Acknowledgments

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