

## Saline in Endotracheal Suctioning

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### **Clinical Question:**

For suctioning endotracheal tubes, does the practice of not using saline prior to suctioning reduce the future risk for deoxygenation compared with using saline?

### **Summary of Key Evidence:**

Three sources of evidence were reviewed to answer the clinical question. The objective of the study by Ackerman (1993) was “to evaluate the effect of instilling normal saline into artificial airways prior to suctioning on oxygen saturation, using more rigorous design and a larger sample size than used in previous research in this area” (p. 327). The target population was 40 critically ill male patients in the medical ICU, surgical ICU and coronary care unit who had a tracheal or endotracheal tube and required mechanical ventilation. Of the 40 patients 30 had endotracheal tubes and 10 had trachs. “Prior to suctioning the ventilator was set to deliver 100% oxygen using the time-limited suction function. If required for the suctioning episode, a 5-mL saline bolus was then injected into the airway via the injection port of the in-line suction system 1 minute later” (Ackerman , 993, p. 328). Five ventilated breaths were delivered without saline instillation. The subject was then suctioned until clinically assessed to be clear by the bedside nurse. Suction was performed by nine staff nurses employed in the critical care units who volunteered for special training in the research protocol. Oxygen saturation was measured with a noninvasive pulse oximeter. The negative change caused by saline indicates that, on the average, the instillation of saline prior to suctioning had a more detrimental effect on oxygenation than not using saline. The results of this study demonstrate that saline lavage resulted in greater negative changes in oxygen saturation than omitting saline

The purpose of the study by Akgul, S. and Akyolcu, N. (2002) was “to determine the effect of presuctioning normal saline lavage on oxygenation level, heart rate and long term pulmonary hygiene” (p. 827). Study two was a quasi-experimental study since subjects weren’t randomized. “The study included 20 patients who were mechanically ventilated due to pulmonary or cardiovascular problems, or trauma in a hospital in Turkey” (p. 827). The oxygen saturation level and heart rate 1-minute prior to suctioning and the daily blood gas values were recorded on the data form. Without use of normal saline: The patient was hyperoxygenated with 100% oxygen for 1 minute. Then the patient was suctioned for 10 seconds after suctioning patient was hyperoxygenated again for 1-minute. With normal saline: The patient was hyperoxygenated with 100% oxygen for 1 minute. Then 5cc of normal saline was instilled in ET tube. Then the patient was suctioned for 10 seconds. The study shows that there is a clear decrease in SpO<sub>2</sub> 5 minutes after the procedure, a finding that was statistically different. 1 minute after suctioning however there was not a meaningful difference.

The aim of the 3<sup>rd</sup> study by Kinloch (1999) was “to describe the effects of instillation of normal saline into an endotracheal tube before suctioning on mixed venous oxygen saturation in critically ill adult patients”. It is a convenience sample of 35 patients recovering from CABG surgery in the ICU of the St.

Vincent Infirmary Medical Center, Little Rock Arkansas. The 35 subjects were divided into 2 groups: 15 subjects in the NSI group and 20 subjects in the non-NSI group. Measurements were obtained by using the Opticath flow-directed thermodilution fiber-optic pulmonary artery catheter connected to the oximetrix 3 system So2/co computer, which continuously measured Svo2 by using 3-wavelength reflectance spectrophotometry.

**Bottom Line:**

The evidence suggests that instillation of normal saline prior to suctioning endotracheal tubes has adverse effects on oxygen saturation.

**Implications for Practice:**

Nurses will be able to use this evidence when suctioning an adult with an endotracheal tube knowing the instillation of normal saline prior to suctioning has an unfavorable effect on the patient's oxygenation saturation and will not administer the saline. These unfavorable effects could include tissue damage related to the decrease in O<sub>2</sub>. This tissue damage, if in great quantity, can cause organ failure and even death.

**Articles:**

Ackerman, M. H. (1993). The effect of saline lavage prior to suctioning. *American Journal of Critical Care*, 2(4), 326-330.

Akgul, S. & Akyolcu, N. (2002). Effects of normal saline on endotracheal suctioning. *Journal of Clinical Nursing*, 11, 826-830.

Kinloch, D. (1999). Instillation of normal saline during endotracheal suctioning: Effects on mixed venous saturation. *American Journal of Critical Care*, 8(4), 231-240.