CLOSED-SYSTEM SUCTIONING: WHY IS THE DEBATE STILL OPEN?

In recent years, there has been a global trend in intensive care units (ICUs) to change from the established system of open endotracheal suctioning (OES) to the newer (and more costly) closed-suctioning systems. The reasons for this change were initially the reported benefits in terms of preventing OES-induced alveolar derecruitment and hypoxia, particularly in the context of severe lung disease with high PEEP requirements.\[1\] It has been suggested that closed endotracheal suctioning (CES) should reduce the risk of ventilator-associated pneumonia (VAP) by eliminating environmental contamination of the catheter before introduction into the endotracheal tube (ETT).\[2\] Another benefit of CES, often overlooked, is the limitation of aerosolization of infectious mucus particles. Thus, CES potentially has a role in preventing the spread of infection between patients and from patients to clinical staff.\[3\]

However, these potential advantages have not been shown to translate into clinically meaningful improvements, with several recent meta-analyses\[4-6\] having reproducibly demonstrated no benefit of CES over OES for a number of outcome measures, including incidence of VAP, mortality and length of ICU stay. These results are important for the implementation of evidence-based clinical practice but are not yet conclusive, considering that the meta-analyses themselves may have been underpowered to detect a true difference between suctioning systems.\[5\]

The disadvantages of CES include the risk of producing high negative pressures if the amount of air suctioned exceeds the gas flow delivered to the patient by the ventilator,\[6\] reduced efficiency in clearing thick secretions from the airways,\[7\] and the high financial cost of the system,\[8\] which has to be replaced daily in order to avoid microbial lower respiratory tract colonization.\[9\] Practically, there is also a risk of not withdrawing the catheter completely after the suctioning event, thus partially occluding the ETT and increasing airway resistance. These disadvantages may actually favor the use of OES.

The majority of clinical trials included in the meta-analysis by Peter et al.,\[5\] were conducted in first-world environments and it may, therefore, not be appropriate to directly apply these results to other ICU populations. In first-world ICUs, with adequate staffing and sufficient resources, the choice of suctioning systems could be made according to staff preference; although considering the lack of evidence supporting CES, a recommendation to change from OES at this stage cannot be considered prudent. Instead, it should be recommended that ICU staff continue with the suctioning method to which they are accustomed and at which they are proficient. However, the debate is clearly still open when addressing the specific challenges faced in ICUs in developing countries - issues which may predispose to a particularly high incidence of nosocomial infection. These include inadequate staffing, patient overcrowding, an increased burden of infectious diseases, and resource limitations. With the high incidence of infectious diseases such as pulmonary tuberculosis, the focus should perhaps be broadened from the individual patient to the wider ICU population (including staff and other patients). If CES were to reduce the risk of infection to nursing staff and patients, it may be worth the extra cost of using the system. However, until objective clinical benefit has been demonstrated, the use of CES cannot be justified in developing nations.

Therefore, it is the developing world which should be the focus of well-designed clinical trials so that the suction debate can finally be closed - one way or the other.

REFERENCES


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