



Editorial



Chlorhexidine mouthwash reduces halitosis in surgical patients, but is it worth the risk?

Thirst, xerostomia, and halitosis are frequently observed in surgical patients. These symptoms are caused and aggravated by pre-operative fasting, stress-induced deficient salivary production, particular drugs, and inadequate oral care. Because of the substantial impact on patient wellbeing, research initiatives to prevent or reduce these jeopardies are plenty (Can et al., 2023; Schitteck et al., 2020; Tsai et al., 2022). In this issue of *ICCN*, Lee et al. report on their randomised-controlled trial to assess the effect of pre-operative mouthwash with a chlorhexidine 0.12% solution on bacterial colonization and halitosis (Lee et al., 2024). In a nutshell, no microbiological impact could be demonstrated, but halitosis was significantly reduced during the time of intubation and 30 min post-surgery.

In this editorial we want to highlight the importance on pre-operative optimization of oral health and put the favorable effect on halitosis, as reported by Lee et al., into context. Two aspects are of key importance. First, the prevalence of halitosis ranges from 2% in Sweden to 78% in Jordan (Suzuki et al., 2019). This clearly indicates that halitosis is a highly preventable condition. Second, one must reflect on whether chlorhexidine mouthwashes are really the way forward.

The main reason for halitosis is the volatile end products of microbial metabolism in the oral cavity. An adequate treatment consists of periodontitis treatment, mechanical tongue cleaning, and the use of oral care products containing antibacterial agents. While the use of 0.12% and 0.2% chlorhexidine has been described to effectively reduce halitosis, recent and alarming reports about its safety must be considered. In detail, the use of chlorhexidine mouthwashes is reported to be associated with increased in-hospital mortality (Deschepper et al., 2018; Parreco et al., 2020; Blot, 2021), resulting in a call to limit the use of antiseptic mouthwashes to cases where strict indications outweigh the anticipated risks (Blot et al., 2022). Is halitosis truly such an indication? With all respect for the discomfort that comes with halitosis, we believe not.

It can be questioned whether a single provision of chlorhexidine oral care deleteriously impacts patients' prognosis. However, in the hospital-wide cohort study by Deschepper et al. (2018) the harmful impact of chlorhexidine oral care was equal for patients having only a single bottle of oral care solution on their hospital bill, and patients having multiple bottles of chlorhexidine oral mouthwash solution on their invoice. As such, it seems that long-term exposure is not a condition to face health risks.

Besides the safety concerns associated with antiseptic mouthwashes, it is also questionable whether oral care with chlorhexidine is appropriate as a stand-alone measure, considering the alternatives and the up-

to-date multimodal treatment. After all, effective antibacterial substances with less side effects and costs than chlorhexidine are available. These include, among more, green tea, salvia tea, and some essential oils (Cerri et al. 2023; Hur et al. 2007).

The limited window of observation in the study by Lee et al. is also worth a comment. An effective treatment of halitosis for up to 30 min after surgery does not guarantee a protection against long-term problems of halitosis such as the higher risk of sociophobia and squamous cell carcinoma of the head, neck and oesophagus (Zaitso et al., 2011). Therefore, by no means the safety concerns associated with chlorhexidine oral care solutions diminish the need for an efficient and safe approach to tackle the problem of halitosis. Additionally, halitosis is a health problem that should not only be addressed perioperatively. This is obvious when considering the just mentioned long-term problems but also when bearing in mind short-term complications such as post-operative pneumonia. Optimizing oral health should be a routine intervention for all patients facing major surgery (e.g., cardiac surgery).

Finally, the practice of pre-operative fasting should be mentioned. Extensive pre-operative fasting ("fast from midnight") is increasingly abandoned as the standard, and much shorter fasting timeframes ("Eat until 2, drink until 6") proved to be safe as well, thereby reducing the need for hospital resources (Jolley et al., 2023). One may assume that such an approach would also positively affects all surgical patients' wellbeing. After all, stress-induced oral dryness and "bad breath" is not limited to patients with poor oral health.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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