Commentary: Predicting surgical site infections following cardiac surgery? Perhaps the ‘NOSE’ knows.

Sameer A. Hirji MD MPH*, Jake A. Awtry MD MA*, George Tolis Jr MD

*Co-first author

Division of Thoracic and Cardiac Surgery, Department of Surgery, Brigham and Women’s Hospital, Harvard Medical School, Boston, MA

Conflict of Interest: Author S.H. is a consultant for Encare EIAS system. There are no other conflict of interest related to this manuscript

Corresponding Author:

George Tolis Jr, MD

Division of Thoracic and Cardiac Surgery
Brigham and Women’s Hospital,
Harvard Medical School, Boston, MA

Email: gtolis@bwh.harvard.edu

Word Count: 500/500
Central Picture:

Legend: Sameer A. Hirji MD (left), Jake Awtry MD (middle), George Tolis Jr MD (right)

Central Message (199/200 characters)
Abnormal nasopharyngeal flora may be a risk factor for surgical site infections (SSI) after cardiac surgery patients, but further investigations under optimal SSI prevention conditions are warranted.
Despite advances in local wound care and standardized perioperative treatment protocols, surgical site infection (SSI) continues to be a significant contributor to morbidity, mortality, and cost after cardiac surgery.\cite{1,2} To limit SSI and improve outcomes, previous work has primarily focused on improving perioperative care through stewardship of peri-operative antibiotic use, optimization of glycemic control, and in some cases, pre-operative prophylactic treatment of intranasal Staphylococcus decolonization with mupirocin.\cite{3,4} While screening for and treating Staphylococcus colonization prior to surgery is known to reduce SSI, to our knowledge no prior study has specifically assessed the relative contributions of other nasopharyngeal organisms to development of SSI after cardiac surgery.\cite{5}

Takami et al., in this issue of the journal, address this timely question and retrospectively reviewed 1,226 consecutive patients undergoing cardiac surgery via median sternotomy with pre-operative nasopharyngeal or nasal cultures.\cite{6} Specifically, their study evaluated the relationship between microbial patterns and SSI, and demonstrated that cultures positive for abnormal nasopharyngeal flora were an independent predictor of SSI, in addition to known predictors such as female sex, diabetes mellitus, and use of tracheostomy. While the study findings were hypothesis-generating, the authors suggested that the use of both pre-operative nasal and nasopharyngeal cultures, which was found to have high sensitivity and specificity for SSI, respectively, would allow for possible identification of high-risk patients to help tailor the use of prophylactic measures (e.g. wound vac therapy) or guide initial therapy for infections.

Takami et al. should be applauded for this extensive study and for providing a framework to identify additional readily identifiable and potentially actionable risk factors. Interpretation of
their results, however, should take into account the following limitations. First, local protocols in the studied time period included use of sternal bone paste and frequent use of tracheostomies. Both these have been previously shown to be associated with SSI, and may have likely contributed to the high rate of SSI observed in the study (6.5%). Second, intra-operative gentamicin was not used, which may have contributed to the sizable number of SSIs caused by gram-negative rods. Furthermore, although abnormal flora in cultures was a risk factor for SSI, there was no statistical concordance between the organisms grown in culture and those that caused the associated SSI.

While some clinicians have postulated that infections in the surgical population are not simply related to the presence of virulent organisms, it is possible that some infections are a result of more broad disturbances in the host-microbiome relationship that promote bacterial virulence. [7] Thus, the causative relationship between the aberrant nasopharyngeal microbes and SSI as well as the relevance of the association in the setting of more stringent SSI prevention protocols remains unclear at this time. Possible further studies may include validating the proposed association in a prospective cohort of patients, mechanistic investigations into how alterations in the skin and nasopharyngeal microbiome contribute to SSI, and adjusting perioperative antibiotics or local wound care approaches for individuals determined to be high risk based on pre-operative cultures. Time will tell whether the ‘nose’ knows.
References


