

Nasal Decolonization as a Preventive Strategy for Surgical Site Infections

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INTRODUCTION:

Presence of pathogenic bacteria in the anterior nares has gained substantial attention due to its association with an increased risk for surgical site infections. In this regard, nasal decolonization has been shown to reduce the risk for surgical site infections (SSI). In this study, we aimed to study the profile of nasal microbiome and test the effect of a specific nasal decolonization solution on the microbiome.

METHODS:

We conducted a randomized, placebo-controlled, and parallel-group clinical study comprising 50 volunteers who were randomly assigned to receive povidone-iodine (PVP-I) as a nasal antiseptic solution (n=25) or saline (n=25). Nasal swabs were obtained before application (baseline) and at 3 timepoints after application (5 min, 2 h, 24 h). The swabs were analyzed for NGS sequencing and culture. Comparisons were conducted against the control solution and the baseline findings. The mucociliary function and adverse effects were also addressed at each timepoint.

RESULTS:

A high bioburden reduction was observed after the application of PVP-I (\log_{10} 3.68±0.69 at 5 min; \log_{10} 3.57±0.94 at 2 hours [both $p < 0.01$]; and \log_{10} 1.17±1.40 at 24 hours [$p = 0.14$]), compared to the control. At baseline, there were substantial associations between anaerobic species, *Corynebacterium* spp, *Staphylococcus* spp, and *Dolosigranulum* spp. The top species affected by the PVP-I treatment were *Cutibacterium acnes*, *Staphylococcus*, and *Corynebacterium* species. None of the subjects experienced adverse effects nor impaired mucociliary function.

DISCUSSION AND CONCLUSION:

Intranasal application of PVP-I led to a substantial reduction of the nasal flora for up to 24 hours after application. PVP-I cleared important SSI-related species, notably Gram-negative bacteria and *S. aureus*. Still, restoration of the microbial population was observed with slight variations to the baseline profiles. Antiseptic solutions applied to the anterior nares can transiently and markedly reduce the bioburden of the nose, making nasal decolonization a safe and effective strategy to prevent surgical site infections.

