

Choice of Material for Nasofrontal Duct Obliteration in Frontal Sinus Fracture

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BACKGROUND

Within the surgical management algorithm for frontal sinus fracture (FSF), the choice of material for nasofrontal duct (NFD) obliteration is controversial, and a multitude of materials have been described in the literature. The present study aims to perform a meta-analysis to determine postoperative outcomes associated with various NFD obliteration materials.

METHODS

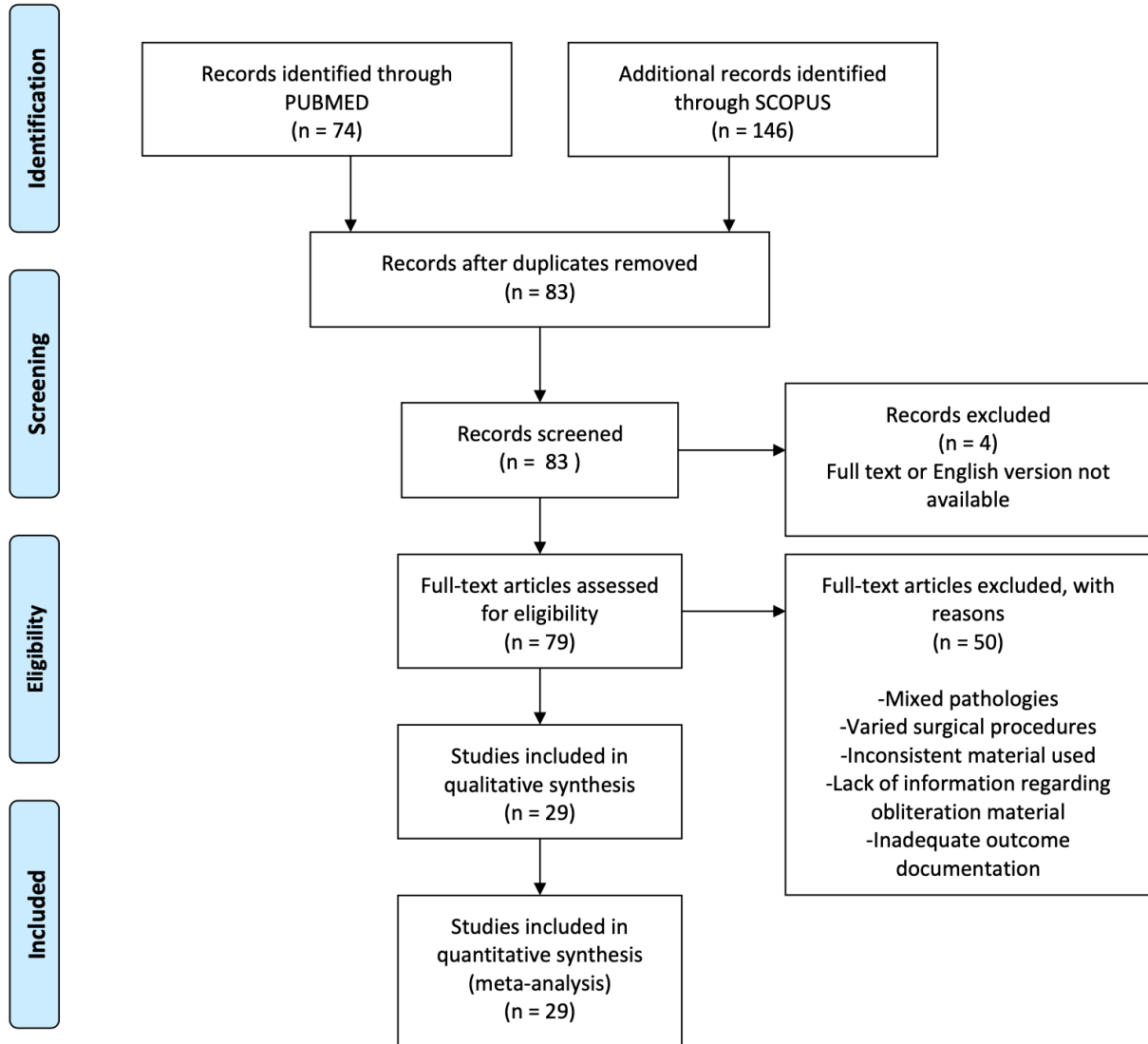
Two independent reviewers identified studies to be included based on inclusion and exclusion criteria. Odds ratios and Fisher's Exact Tests were then used to compare outcomes between cohorts based on the material used for nasofrontal duct obliteration. Complications under review included donor site complications, reoperations, frontal sinus infections, cerebrospinal fluid leaks, cosmetic defects, persistent pain and/or headaches, and mucocele formation.

RESULTS

Twenty-nine studies met inclusion criteria for this analysis. The use of a tissue flap, either pedicled or free flap, was associated with a reduced risk of reoperation and postoperative frontal sinus infection compared with non-flap materials (OR = 0.23 (CI: 0.05, 1.04), $p = 0.05$). The use of avascular bone graft was associated with an increased risk of reoperation (OR = 8.89 (CI: 2.24, 29.94), $p < 0.001$). Use of bone graft was also associated with a statistically significant increase in both postoperative frontal sinus infection compared with non-bone materials (OR = 3.92 (CI: 1.28, 11.96)), $p = 0.017$ as well as postoperative mucocele formation (no instances of mucocele in non-bone, $p = 0.0035$). The use of bone graft was also associated with an increased risk of total postoperative complications (OR = 2.68 (CI: 1.41, 5.11), $p < 0.01$). The use of autologous materials was associated with a significantly decrease number of total complications when compared with non-autologous materials (OR = 0.13 (CI: 0.02, 0.99), $p = 0.02$).

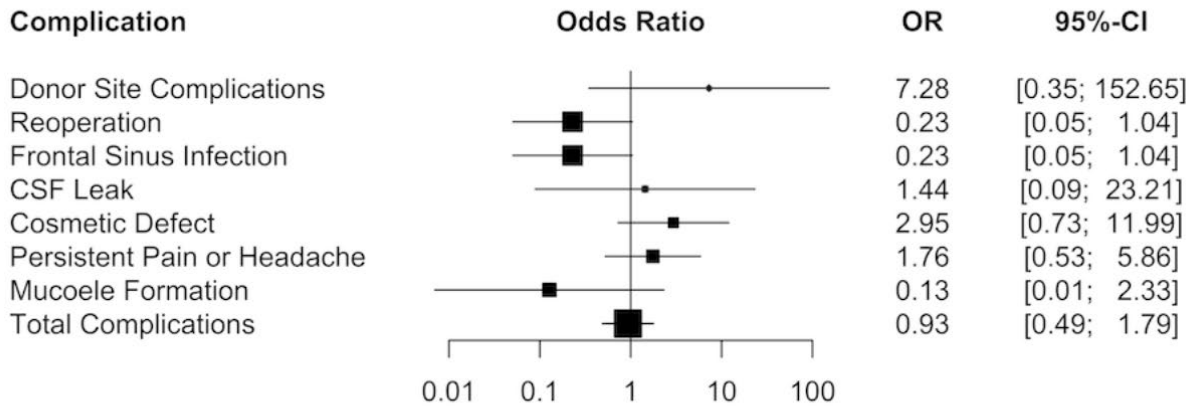
CONCLUSION

Avascular grafts, such as bone grafts, for NFD obliteration may be associated with an increased risk of reoperation. In particular, bone grafts are associated with higher rates of reoperation, postoperative infection and mucocele formation. Tissue flaps appear to offer excellent postoperative outcomes with minimal operative morbidity. This meta-analysis may be useful in further refining the roles of certain materials in NFD obliteration for FSF surgery.



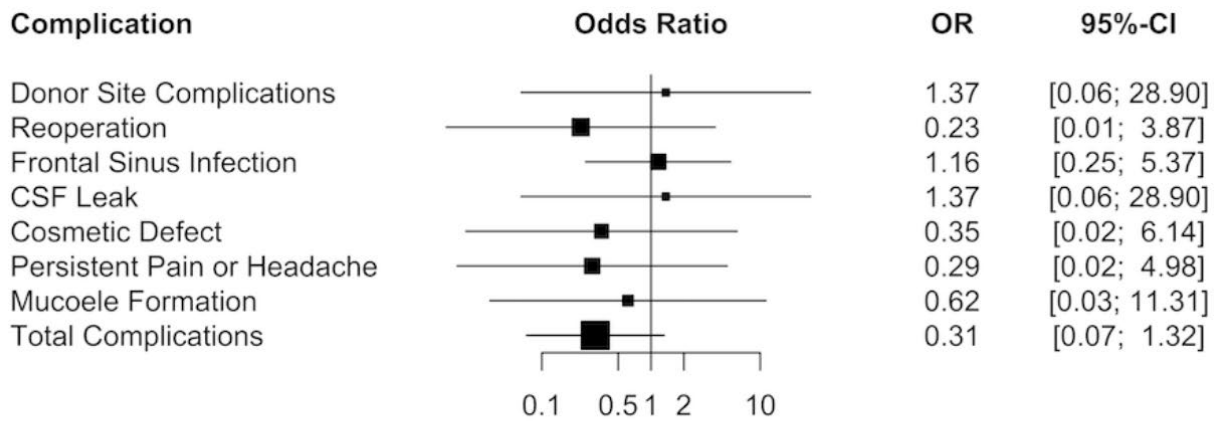
A.

Odds Ratios for Flap vs. Non-Flap



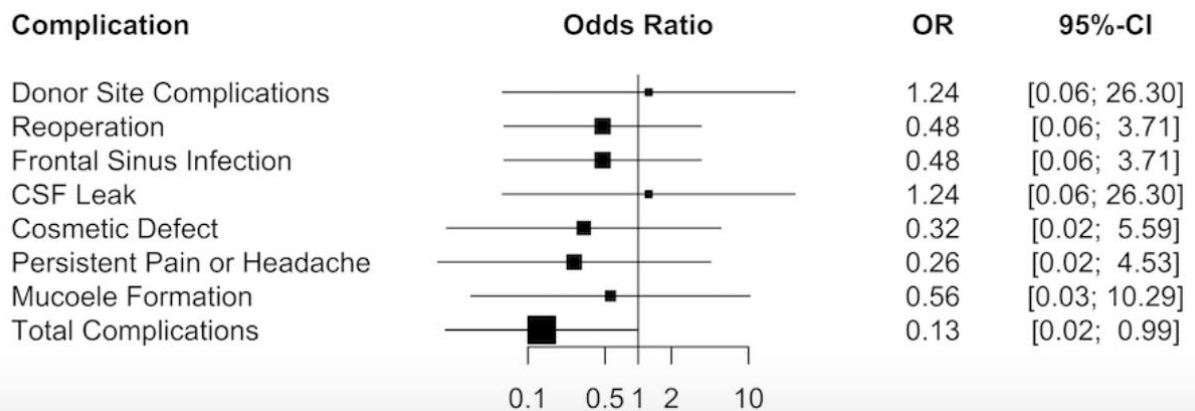
B.

Odds Ratios for Mixed vs. Non-mixed



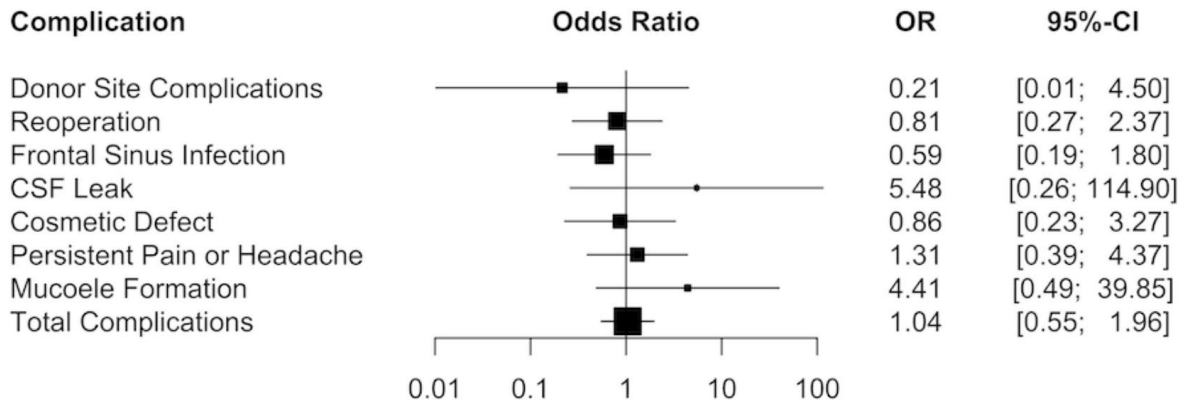
C.

Odds Ratios for Autologous vs. Non-Autologous



A.

Odds Ratios for Material Added vs. No Material Added



B.

Odds Ratios for Bone vs. Non-Bone

