

Introduction

Endoscopic endonasal surgery for skull base tumors has advanced significantly, but postoperative cerebrospinal fluid (CSF) leak remains a significant concern. Introducing the vascularized pedicled nasoseptal flap (PNSF) has markedly reduced CSF leak rates, though outcomes remain variable across different studies.<sup>1-5</sup>

This systematic review and meta-analysis aimed to compare the efficacy of vascularized *versus* non-vascularized reconstruction techniques in these procedures.

Methods and Materials

Three databases (PubMed, Cochrane, and Embase) were systematically searched to identify studies comparing CSF leak rates between PNSF and non-vascularized techniques for reconstruction after endoscopic endonasal skull base surgeries.

It was designed according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) reporting guidelines. Statistical analysis was performed using Review Manager, with heterogeneity evaluated via I<sup>2</sup> statistic.

Results and Discussion

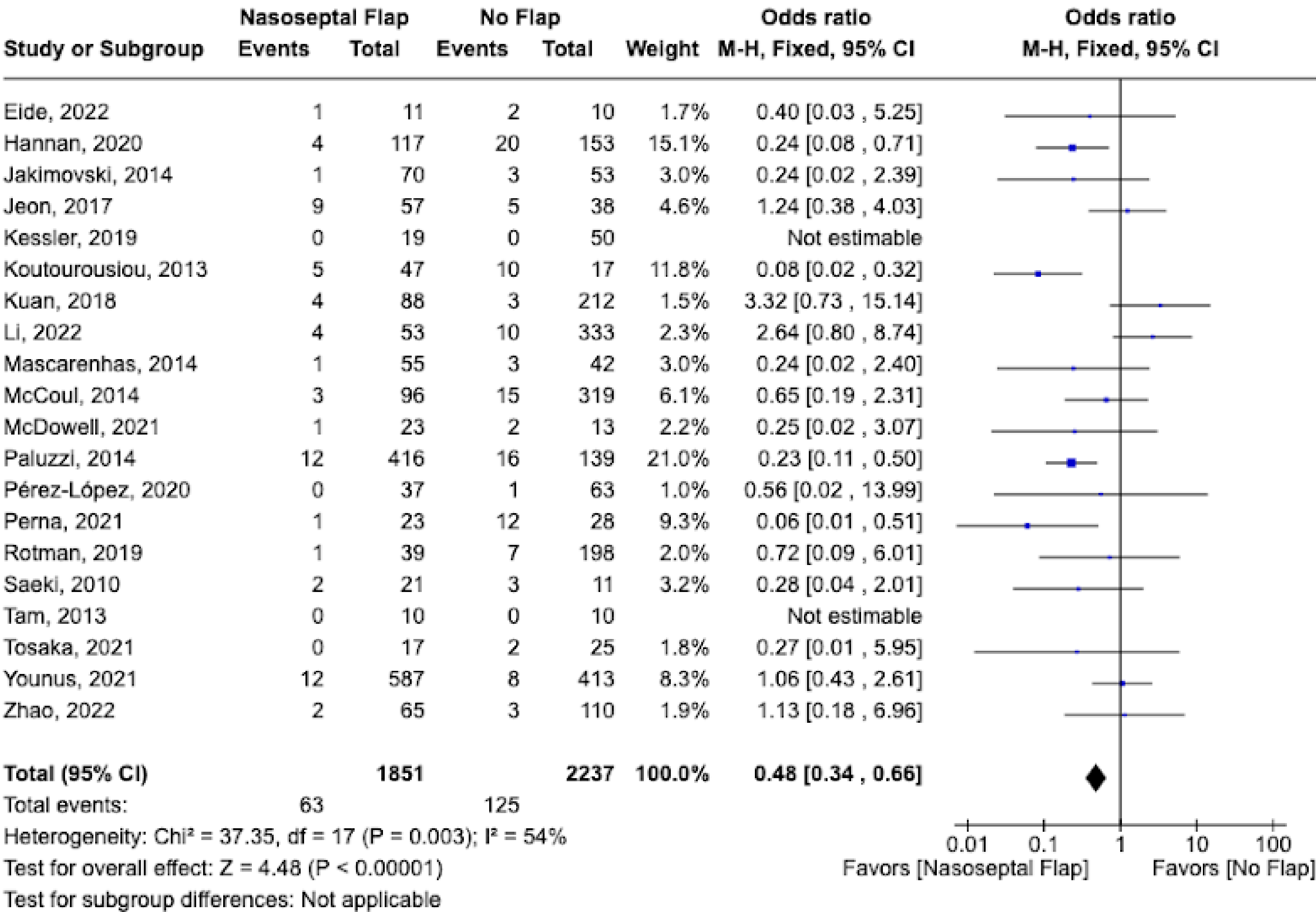
After thorough selection, twenty articles were selected, and a total of 4,088 patients were included, of whom 1,851 were assigned to the nasoseptal flap group, and 2,237 were assigned to the no-flap group.

The postoperative CSF leak ratio was significantly lower in the group that underwent reconstruction with PNSF compared to all the other grouped methods, respectively, 3.4% and 5.6% (OR 0.48; 95% CI 0.34-0.66; p<0.00001; I<sup>2</sup>=54%).

The postoperative CSF leak rate is probably higher than we found in the group undergoing non-vascularized reconstructions, since PNSF is often reserved for extended approaches or cases with high grade intraoperative CSF leakage. This results in a selection bias, which is consistently observed across studies.

Our study included randomized controlled trials (RCTs) and non-randomized prospective and retrospective cohort studies. As a result, the data were somewhat heterogeneous, which may affect the validity of our findings.

Figure 2. Forest Plot of CSF leak ratio comparing usage of nasoseptal flap *versus* no flap for reconstruction of endoscopic skull base surgery.



Conclusions

Our results suggest that using the PNSF is associated with a lower incidence of postoperative CSF leak than other reconstruction techniques in endoscopic skull base surgeries and may be used for patients at risk of this complication. Over years of implementation across various centers, this technique proved safe, incurs no additional costs, and appears to result in no long-term morbidity.

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