The Clinical Outcome of Image-Guided System in Endoscopic Sinus Surgery for Chronic Rhinosinusitis: A Meta-Analysis

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Background

Chronic rhinosinusitis (CRS) is characterized by persistent symptomatic inflammation of nasals. Image-guided system (IGS) is a technology for confirming locations in anatomically challenging fields. Although IGS is considered useful in endoscopic sinus surgery (ESS), its impact on the clinical outcome remains further evaluation.

Objective

This study aimed to compare the clinical outcomes in chronic rhinosinusitis patients undergoing IGS ESS with non-IGS ESS.

Methodology

- Key databases (PubMed, EMBASE, Cochrane, CNKI, WanFang, and VIP) were searched for comparative clinical studies published from database inception to January 10, 2024 to identify relevant evidence.
- **Population:** CRS patients.
- **Intervention:** ESS with IGS.
- **Comparator:** ESS without IGS.
- **Outcome:** Complications, recurrence, revision surgery, blood loss and surgical time.
- **Study design:** Randomized clinical study (RCT) and observational study.
- Two reviewers independently screened the literature, extracted data, and assessed the risk of bias of the included studies.
- A meta-analysis was performed to calculate odds ratios (OR) and weighted mean difference (WMD). In the heterogeneity assessment, when I^2 was >50%, a random-effects model was used, whereas when I^2 was ≤50%, a fixed-effect model was applied.

Results

- A total of 763 studies fulfilled the search, of which 17 were included, with a total sample size of 3,048 patients (**Figure 1**).
- Among the included studies, 3 are RCTs and 14 are observational studies.

Results

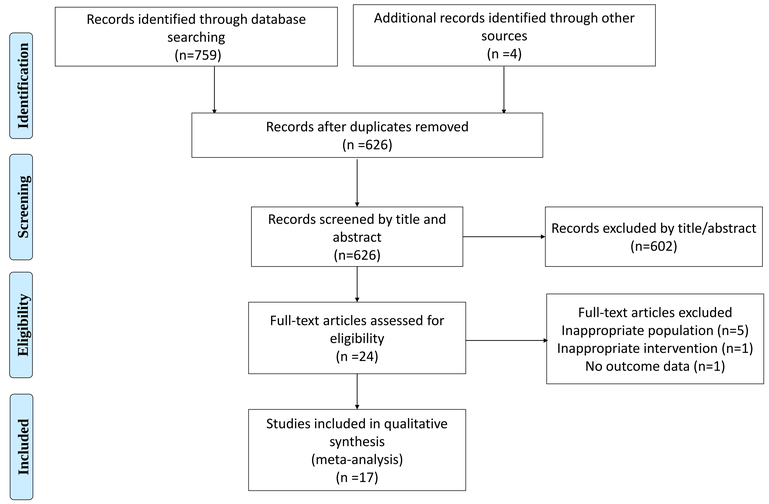

Figure 1. PRISMA flow diagram of the selection process

- Compared with non-IGS, total complications were less common in the IGS group (OR=0.55; 95% CI, 0.39 to 0.77; P<0.001) (**Figure 2**).
- IGS could reduce intraoperative blood loss (WMD=-10.075; 95% CI, -19.80 to -0.35; P=0.04) (**Figure 3**) and surgical time (WMD=-4.275; 95% CI, -5.93 to -2.61; P<0.001) (**Figure 4**).
- However, there were no significant differences in the incidence of recurrence (OR=0.55; 95% CI, 0.30 to 1.01; P=0.05) and revision surgery (OR=0.76; 95% CI, 0.50 to 1.23; P=0.26) between the two groups.

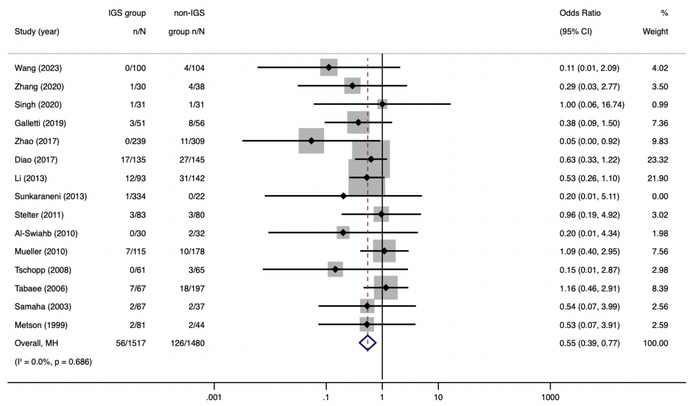

Figure 2. Forest plot of the odds ratio for complications in IGS ESS vs. non-IGS ESS

Results

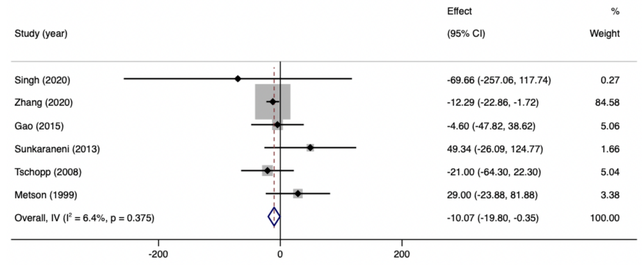

Figure 3. Forest plot of blood loss volume in IGS ESS vs. non-IGS ESS

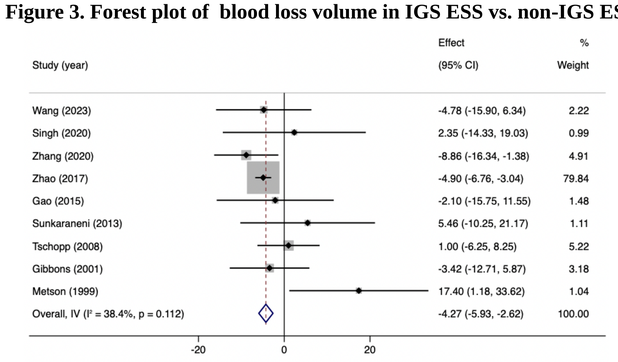

Figure 4. Forest plot of surgical time in IGS ESS vs. non-IGS ESS

Conclusion

The use of IGS compared with non-IGS was associated with a lower risk of complications and with a reduction of intraoperative blood loss and surgical time. These findings do support the clinical use of IGS as an adjunct in ESS for chronic rhinosinusitis patients.

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