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**Effectiveness and Safety of Different Surgical
Approaches for Nasal Vestibular Cysts: A Systematic
Review and Network Meta-Analysis**

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2025100083

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 October 2025 and was last updated on 12 August 2025.

INTRODUCTION

R **ev**iew question / **O**bjective P (Population): Patients with a clear diagnosis of nasal vestibular cysts (via clinical manifestations/imaging).
I (Intervention): Four surgical approaches: lip groove excision surgery, endoscopic removal of vestibular cysts, low-temperature plasma radiofrequency ablation under nasal endoscopy, nasal endoscopic nasal pathway surgery.
C (Comparison): Direct/indirect comparisons among the four surgical approaches.
O (Outcomes): Primary outcomes: surgery duration, intraoperative blood loss, hospital stay, postoperative recovery time, postoperative recurrence rate.

S (Study design): Systematic review and network meta-analysis.
Objective: To systematically compare the safety and efficacy of the four surgical approaches for nasal vestibular cysts, providing evidence-based guidance for clinical selection.
Condition being studied Nasal vestibular cysts originate from residual/ectopic epithelial cells at the embryonic globular-maxillary process fusion site. They mainly affect 40–50-year-old females, mostly unilaterally. Early stages are asymptomatic; enlargement causes nasal alar swelling, and secondary infection causes pain. Conservative treatment is ineffective, so surgical approach directly impacts treatment experience and prognosis.

METHODS

Participant or population Patients with a clear diagnosis of nasal vestibular cysts (no age/gender restrictions). Studies must clearly distinguish the four surgical approaches and report total sample size.

Intervention Lip groove excision surgery: Transverse incision in gingivolabial sulcus, separation of mucosa/subcutaneous tissue, complete cyst excision, layered suturing. Endoscopic removal of vestibular cysts: Nasal endoscopy-guided incision of cyst wall to create a "drainage window" (no complete excision). Low-temperature plasma radiofrequency ablation under nasal endoscopy: Plasma electrode ablates cyst wall (coagulative necrosis), sealing small blood vessels.

Nasal endoscopic nasal pathway surgery: Nasal vestibule entry, small incision on cyst surface mucosa, partial excision (for large cysts).

Comparator Direct or indirect comparisons among the four surgical approaches (lip groove excision, endoscopic vestibular cyst removal, low-temperature plasma radiofrequency ablation under nasal endoscopy, nasal endoscopic nasal pathway surgery) to meet network meta-analysis requirements.

Study designs to be included Randomized controlled trials, cohort studies, other observational/interventional studies (full-text published, scientifically sound design, high methodological quality).

Eligibility criteria Inclusion: As defined in PICOS (Section 8); studies provide data for comparative analysis.

Exclusion: ① Studies with unextractable/incomplete original data (missing outcomes, logical errors, improper statistics); ② Duplicate publications.

Information sources Electronic databases (CNKI, VIP, Wanfang, PubMed, EMBASE, Cochrane Library).

Main outcome(s) Surgery duration (start to end of procedure): Effect measure: Mean Difference (MD), 95% CrI. Intraoperative blood loss (defined units): Effect measure: MD, 95% CrI. Hospital stay (days): Effect measure: MD, 95% CrI. Postoperative recovery time (return to normal activities): Effect measure: MD, 95% CrI. Postoperative recurrence

rate (follow-up-defined recurrence): Effect measure: Odds Ratio (OR), 95% CrI.

Quality assessment / Risk of bias analysis The risk of bias of included non-randomized studies will be independently assessed by two reviewers using the Risk Of Bias In Non-randomized Studies - of Interventions (ROBINS-I) tool. Discrepancies will be resolved through consensus or arbitration by a third senior reviewer. The certainty of evidence for each network estimate will be evaluated using the Confidence In Network Meta-Analysis (CINeMA) framework, considering within-study bias, reporting bias, indirectness, imprecision, heterogeneity, and incoherence. The certainty of evidence will be classified as high, moderate, or low.

Strategy of data synthesis The data synthesis strategy has been enhanced to include additional network meta-analysis techniques. Prior to conducting quantitative synthesis, the transitivity assumption will be evaluated by comparing the distribution of potential effect modifiers across treatment comparisons. Network consistency will be assessed through global inconsistency testing (design-by-treatment interaction model) and local inconsistency evaluation (node-splitting analysis). If adequate data are available, network meta-regression will be conducted to investigate the impact of potential effect modifiers on treatment effects. To evaluate publication bias and small-study effects, comparison-adjusted funnel plots will be utilized. The effect measures will be as follows: Continuous outcomes (MD, 95% CrI); dichotomous outcomes (OR, 95% CrI). The results will be presented using league tables (pairwise comparisons), forest plots, and SUCRA (Surface Under the Cumulative Ranking Curve) for intervention ranking.

Subgroup analysis The subgroup analysis plan was updated. Although no predefined subgroup analyses were planned initially, exploratory analyses based on clinically relevant effect modifiers will be performed when sufficient data are available. Network meta-regression will also be conducted to investigate whether potential covariates influence treatment effects.

Sensitivity analysis None planned.

Language restriction No language restrictions will be imposed.

Country(ies) involved China.

Other relevant information This protocol has been revised to enhance methodological rigor. The primary amendments include changing the confidence interval (CI) to a credible interval (CrI) to align with the Bayesian model, substituting the Newcastle-Ottawa Scale (NOS) with the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I) for risk of bias assessment, replacing the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) with the Confidence in Network Meta-Analysis (CINeMA) for evaluating the certainty of evidence in network meta-analysis, and incorporating additional analyses such as transitivity assessment, network meta-regression, and comparison-adjusted funnel plots. These modifications do not affect the original research question, study population, interventions, comparators, or outcomes.

Keywords Nasal vestibular cyst; Network meta-analysis; Lip groove excision surgery; Endoscopic removal of vestibular cyst; Low-temperature plasma radiofrequency ablation under nasal.

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