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**Corresponding author:**
Ru Chen

allergychen@163.com

**Author Affiliation:**
The first hospital of JiaXing.

# Comparative Efficacy and Tolerance of Different Monoclonal Antibodies for the Treatment of Chronic Rhinosinusitis: A Systematic Review and Network Meta-Analysis

Chen, R; Deng, J; Sun, Y; Sun, DX; Zhu, F; Ling, K; Jiao, XF; Sima, GQ.

## ADMINISTRATIVE INFORMATION

**Support -** The authors declare that this study received no support from any organization, company, or individual.

**Review Stage at time of this submission -** Preliminary searches.

**Conflicts of interest -** None declared.

**INPLASY registration number:** INPLASY202470104

**Amendments -** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 July 2024 and was last updated on 26 July 2024.

## INTRODUCTION

**Review question / Objective** A systematic review and Meta-analysis were conducted to analyze the efficacy and safety of monoclonal antibodies (Dupilumab, Mepolizumab, Benralizumab, and Omalizumab) in the treatment of chronic rhinosinusitis.

**Condition being studied** Biologic therapy has been deployed with encouraging results for asthma and atopic dermatitis. Several monoclonal antibodies that were initially studied for these conditions have now been trialed for chronic rhinosinusitis with nasal polyps. These include dupilumab, omalizumab, mepolizumab, reslizumab and benralizumab. However, most existing studies have compared biologics with placebo, there lacks a head-to-head randomized trial comparing biologics. Therefore, A systematic review and meta-analysis were conducted to analyze the efficacy and safety of monoclonal antibodies in the treatment of chronic rhinosinusitis.

## METHODS

**Search strategy** Randomized controlled trials (RCTS) of monoclonal antibodies in the treatment of chronic rhinosinusitis were searched in Pubmed, embase and cochrane library. Search terms include subject words and free words, such as #1"Sinusitis"[Mesh] #2"Rhinitis"[Mesh], #3"Paranasal Sinus Diseases"[Mesh], #4"Paranasal Sinuses"[Mesh]#5((((rhinosinusitis [Title/Abstract]) OR (nasosinusitis[Title/Abstract])) OR (pansinusitis[Title/Abstract])) OR (ethmoiditis[Title/Abstract])) OR (sphenoiditis[Title/Abstract]), #6(CRSsNP[Title/Abstract]) OR (CRSwNP[Title/Abstract]), #7"Nasal Polyps"[Mesh],#8"Polyps"[Mesh]. #9"Antibodies, Monoclonal"[Mesh], #10"Antibodies, Anti-Idiotypic"[Mesh], #11"Biological Therapy"[Mesh] #12((((dupilumab[Title/Abstract]) OR (omalizumab[Title/Abstract])) OR (mepolizumab[Title/Abstract])) OR (reslizumab[Title/Abstract])) OR (benralizumab[Title/Abstract]) etal.

**Participant or population** Patients with chronic rhinosinusitis (with or without nasal polyps) were included in this study.

**Intervention** Patients in the intervention group were treated with monoclonal antibodies (Dupilumab, Mepolizumab, Benralizumab, and Omalizumab).

**Comparator** The control group usually received placebo. Nasal glucocorticoids may have been added in some control groups.

**Study designs to be included** Only randomized controlled trials will be included.

**Eligibility criteria** Inclusion criteria were in accordance with PICOS principles. Reviews, case reports, case series, observational studies, cohort studies, animal research, conference abstracts, articles with insufcient information, and papers published in languages other than English were all eliminated.

**Information sources** The literature data were mainly collected from Pubmed, Cochrane library, Embse ,the World Health Organzation International Trials Registry Platform and Clinical Trials.

**Main outcome(s)** The outcome measures included nasal polyp score (NPS), Lund-Mackay CT score, 22-item SinoNasal Outcome Test score (SNOT-22 score), the University of Pennsylvania Smell Identification Test (UPSIT) score, nasal Congestion score, Lose of smell socre.

**Additional outcome(s)** Other outcomes included hematological parameters and adverse events.

**Data management** Papers were independently examined and crosschecked by two authors based on the inclusion and exclusion criteria. Disagreements were resolved by discussing. For incomplete data during the data collection, the data was collected by contacting the corresponding author of that study through E-mail. The author's name, publication year, intervention, sample size, gender, age, follow-up period, and outcome measures and so on were all retrieved.

**Quality assessment / Risk of bias analysis** Two authors independently evaluated the quality of studies. The Cochrane Collaboration's tool was used to assess the risks of bias and quality of RCTs. The following biases were investigated: random sequence generation, allocation concealment, blinding of participants and employees, blinding of result evaluation, incomplete outcome data, selective reporting, and others. When the methods were completely disclosed, there was a "low risk" of bias, a "high risk" when the methods were not mentioned, and an "unknown risk" when the methods were acknowledged but insufciently comprehensive.

**Strategy of data synthesis** (DIC). However, the DIC value does not determine the heterogeneity between studies. When the DIC difference between the two models is greater than 5, both models are considered to be significantly different, and the model with a smaller DIC value is selected to continue the data analysis. The consistency model was adopted in this study, and the model was fitted by Markov chains, and the number of Markov chains was set to 3. To eliminate the effect of the initial value, 20,000 data iterations were performed, and the simulation iteration was set to 50,000. The Potential scale reduction factor (PSRF) reflects the convergence of the model. When PSRF is 0 and 100%, it indicates the worst and best convergence of the model, respectively. The degree of convergence of the model can also be reflected in the trajectory plot and density plot. The efficacy of different interventions is ranked by ranking and cumulative probability plots, the local inconsistency of the data is shown by node splitting, and the league table shows the effect of pairwise comparisons between different interventions. The data was displayed using WMD, SMD, and Risk ratio (RR) and 95% CI.

**Subgroup analysis** If necessary, Subgroup analysis may be performed according to age, presence or absence of asthma, presence or absence of nasal polyps, intervention and follow-up timesubgroup analysis was used to explore the efficacy and safety of monoclonal antibodies in different species and different control groups.

**Sensitivity analysis** Sensitivity analyses may be performed to assess the stability of a study when the results of a subgroup analysis are unsatisfactory or the heterogeneity of the study is high.

**Language restriction** English.

**Country(ies) involved** China.

**Keywords** Chronic Rhinosinusitis; Monoclonal Antibodies; Meta-analysis.

**Contributions of each author**

Author 1 - Ru Chen.
Email: allergychen@163.com
Author 2 - Jing Deng.

Author 3 - Yao Sun.
Author 4 - Dongxun Sun.
Author 5 - Feng Zhu.
Author 6 - Kai Ling.
Author 7 - Xinfang Jiao.
Author 8 - Guoqi Sima.
Email: smgq73@163.com