

# INPLASY

## Meta-analysis of the diagnostic value of computed tomography angiography for severe carotid artery stenosis

INPLASY202440027

doi: 10.37766/inplasy2024.4.0027

Received: 06 April 2024

Published: 06 April 2024

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### ADMINISTRATIVE INFORMATION

**Support** - Natural Science Foundation of Sichuan Province (24NSFSC7535).

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

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202440027

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 06 April 2024 and was last updated on 06 April 2024.

### INTRODUCTION

**Review question / Objective** To comprehensively evaluate the diagnostic efficacy of CT angiography (CTA) in detecting severe carotid artery stenosis through a rigorous meta-analysis approach.

**Condition being studied** The diagnostic accuracy of computed tomography angiography (CTA) in assessing the severity of carotid artery stenosis.

### METHODS

**Participant or population** Patients undergoing diagnosis of carotid artery stenosis severity.

**Intervention** CTA diagnosis of severe carotid artery stenosis.

**Comparator** DSA diagnosis of severe carotid artery stenosis.

**Study designs to be included** Diagnostic studies.

**Eligibility criteria** (1) Clinical investigations aimed at evaluating the diagnostic efficacy of CTA in identifying severe carotid artery stenosis, with severe stenosis defined as narrowing ranging from 70% to 99%; (2) Digital subtraction angiography (DSA) of the carotid artery is widely acknowledged as the "gold standard" for diagnosing carotid artery stenosis; (3) The literature reviewed includes pertinent studies containing data on true positive (TP), true negative (TN), false positive (FP), and false negative (FN) values for diagnosing severe carotid artery stenosis, which can be directly or indirectly extracted.

**Information sources** Data sources utilized for this review encompass various databases including VIP, CNKI, China Biomedical Literature Database, Wanfang, Embase, PubMed, and the Cochrane Library. These databases were systematically searched to ensure comprehensive coverage of relevant literature.

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**Main outcome(s)** True positive (TP), true negative (TN), false positive (FP), and false negative (FN).

**Quality assessment / Risk of bias analysis** The quality assessment of the studies incorporated into the meta-analysis was conducted utilizing the Quality Assessment of Diagnostic Accuracy Studies (QUADAS) tool. This tool is widely recognized for its ability to comprehensively evaluate the methodological rigor and reliability of diagnostic accuracy studies.

**Strategy of data synthesis** Data analysis was performed utilizing Stata 17.0 and Meta-Disc 1.4 software. Heterogeneity among studies was assessed using Cochran's Q test and the I<sup>2</sup> statistic. In cases where P > 50%, indicating significant heterogeneity, a random-effects model was applied; otherwise, a fixed-effects model was employed [12]. The combined sensitivity, specificity, positive likelihood ratio, negative likelihood ratio, and diagnostic odds ratio, along with their corresponding 95% confidence intervals (CIs), were computed for the included studies. Forest plots and Summary Receiver Operating Characteristic (SROC) curves were generated, and the area under the curve (AUC) was calculated. If heterogeneity was observed, the presence of a threshold effect was assessed utilizing the Spearman correlation coefficient in Meta-Disc 1.4 (a strong positive correlation indicating a threshold effect). Furthermore, meta-regression analysis was conducted to explore the sources of heterogeneity. Subgroup analyses were performed to investigate variations in sensitivity and specificity among different subgroups. Deek's funnel plot was employed to evaluate publication bias, with P < 0.05 indicating the presence of publication bias.

**Subgroup analysis** Subgroup analyses were performed to investigate potential variations in sensitivity and specificity across different subgroups, particularly when significant heterogeneity was observed. This allowed for a more nuanced exploration of the diagnostic performance within distinct subsets of the data.

**Sensitivity analysis** Sensitivity analysis was performed by systematically excluding individual studies to evaluate their impact on the overall results for each outcome indicator.

**Country(ies) involved** China.

**Keywords** CT angiography; carotid artery stenosis; meta-analysis.

### Contributions of each author

Author 1 - Han-Lin Zeng.

Author 2 - Fu-Qiang Shao.

Author 3 - Xian-Feng Peng.

Author 4 - Chun-Yu Lei.