

# INPLASY PROTOCOL

To cite: Zhou et al. Feasibility of Superb Microvascular Imaging for Detecting Neovascularization of Carotid Plaques: A Meta-Analysis. Inplasy protocol 202070050. doi: 10.37766/inplasy2020.7.0050

Received: 13 July 2020

Published: 13 July 2020

**Corresponding author:**  
Cong Wang

wc027214@163.com

**Author Affiliation:**  
The First Affiliated Hospital of  
Dalian Medical University

**Support:** NA

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

**Conflicts of interest:**  
None.

## Feasibility of Superb Microvascular Imaging for Detecting Neovascularization of Carotid Plaques: A Meta-Analysis

Zhou, Y<sup>1</sup>; Wang, C<sup>2</sup>.

**Review question / Objective:** Carotid artery atherosclerosis is a major risk factor for ischemic stroke. Intraplaque neovascularization (IPN) can promote the rapid progress of plaque, induce bleeding, and lead to plaque rupture. Superb microvascular imaging (SMI) is as a novel Doppler technique that depicts low velocity blood flow without the use of a contrast agent. This meta-analysis tested the hypothesis that superb microvascular imaging (SMI) can detect intraplaque neovascularization (IPN) in individuals with systemic vasculopathy of the carotid artery compared with CEUS.

**Condition being studied:** Studies suggested that SMI may or may not detect neovascularization of carotid plaque with accuracy comparable to CEUS.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 July 2020 and was last updated on 13 July 2020 (registration number INPLASY202070050).

### INTRODUCTION

**Review question / Objective:** Carotid artery atherosclerosis is a major risk factor for ischemic stroke. Intraplaque neovascularization (IPN) can promote the

rapid progress of plaque, induce bleeding, and lead to plaque rupture. Superb microvascular imaging (SMI) is as a novel Doppler technique that depicts low velocity blood flow without the use of a contrast agent. This meta-analysis tested the

hypothesis that superb microvascular imaging (SMI) can detect intraplaque neovascularization (IPN) in individuals with systemic vasculopathy of the carotid artery compared with CEUS.

**Condition being studied:** Studies suggested that SMI may or may not detect neovascularization of carotid plaque with accuracy comparable to CEUS.

## METHODS

**Search strategy:** PubMed, Web of Science, Cochrane Library, CISCOP, and CBM databases were searched without language restrictions. The keywords and MeSH terms used included [carotid] and [plaques or plaque or fatty streak or fibroatheroma] and [contrast-enhanced ultrasound or contrast-enhanced ultrasonography or contrast ultrasonography or ultrasound contrast imaging or CEUS] and [vulnerability or stability or neovascularization] and [superb microvascular imaging]. We also performed a manual search to find other potential articles.

**Participant or population:** Neovascularization of Carotid Plaques.

**Intervention:** SMI.

**Comparator:** CEUS.

**Study designs to be included:** Clinical cohort study.

**Eligibility criteria:** (1) the study design was a clinical cohort study, (2) the study compared CEUS and SMI for detecting IPN, (3) intraplaque microvascular flow (IMVF) was graded, and (4) published data in the row x column tables was sufficient for the odds ratio.

**Information sources:** PubMed, Web of Science, Cochrane Library, CISCOP, and CBM databases were searched without language restrictions.

**Main outcome(s):** Number of intraplaque microvascular flow (IMVF).

**Quality assessment / Risk of bias analysis:** The methodological quality of each study was independently assessed by two researchers according to a tool for the quality assessment of methodological index for non-randomized studies (MINORS).

**Strategy of data synthesis:** The STATA version 15.1 software (Stata Corporation, College Station, TX, USA) was used for meta-analysis. We calculated the pooled summary odds ratio (OR) and its 95% confidence interval (CI). The Cochran's Q-statistic and I<sup>2</sup> test were used to evaluate potential heterogeneity between studies. If the Q-test showed a P50%, indicating significant heterogeneity, and the random effect model was employed or if heterogeneity was not significant, the fixed-effects model was used. Sensitivity analysis was performed to evaluate the influence of a single study on the overall estimate. We used Begger's funnel plots and Egger's linear regression test to investigate publication bias.

**Subgroup analysis:** 1. Language; 2. Equipment.

**Sensibility analysis:** Sensitivity analysis was performed to evaluate the influence of a single study on the overall estimate.

**Country(ies) involved:** China.

**Keywords:** carotid plaque; contrast-enhanced ultrasonography; intraplaque neovascularization; meta-analysis; superb microvascular imaging.

**Contributions of each author:**

Author 1 - Yang Zhou.

Author 2 - Cong Wang.