International Platform of Registered Systematic Review and Meta-analysis Protocols

INPLASY

INPLASY202470011

doi: 10.37766/inplasy2024.7.0011

Received: 04 July 2024

Published: 04 July 2024

A meta-analysis of comparison between transcranial Doppler ultrasound and transthoracic echocardiography for evaluating PFO-RLS associated with cryptogenic stroke

Zhang, YY; Xie, QQ; Yuan, MQ.

Corresponding author:
Meiqin Yuan

yuanmeiqin202066@163.com

Author Affiliation:
Yantai Yuhuangding Hospital, Department of Ultrasound Medicine.

ADMINISTRATIVE INFORMATION

Support - N/A.

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

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202470011

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 04 July 2024 and was last updated on 04 July 2024.

INTRODUCTION

Review question / Objective Cryptogenic stroke refers to an ischemic stroke whose cause remains unknown even after thorough investigation. Contrast transthoracic echocardiography (cTTE) and contrast transcranial Doppler ultrasound (cTCD) are commonly employed diagnostic tests in the evaluation of PFO-RLS associated with cryptogenic stroke. However, there is a need to compare the diagnostic efficacy of these two techniques to determine their respective benefits in clinical practice.

Condition being studied Cryptogenic stroke refers to an ischemic stroke whose cause remains unknown even after thorough investigation. Contrast transthoracic echocardiography (cTTE) and contrast transcranial Doppler ultrasound (cTCD) are commonly employed diagnostic tests in the evaluation of PFO-RLS associated with cryptogenic stroke. However, there is a need to compare the diagnostic efficacy of these two techniques to determine their respective benefits in clinical practice.

METHODS

Search strategy “transcranial Doppler," “transthoracic echocardiography," “transthoracic echocardiography imaging," "echocardiography imaging," "transesophageal echocardiography," “patent foramen ovale," "right to left shunt," "cryptogenic stroke," "stroke," “ischemicstroke.".

Participant or population N/A.

Intervention N/A.

Comparator N/A.

Study designs to be included A meta-analysis was conducted to estimate the diagnostic efficacy of cTTE and cTCD in PFO-RLS associated with cryptogenic stroke. A comprehensive searching of relevant electronic databases was carried out, and the literature was screened according to

predefined criteria. Data were extracted, and quality assessment was carried out through the Quality Assessment of Diagnostic Accuracy Studies-2 (QUADAS-2). Statistical analysis was carried out using Revman 5.1 and STATA 14.0 software.

Eligibility criteria Articles were included when they met the following inclusion criteria: 1) Prospective study; 2) C-TEE was the present gold standard for stroke diagnosis; 3) Comparison of diagnostic efficacy in the examination of patients with cryptogenic stroke between cTTE and cTCD; 4) The diagnostic accuracy could be calculated by the quantity of true positive, false positive, true negative and false negative in study. We excluded: 1) review papers, abstracts, case reports, editorials, and letters; 2) studies without published full text; 3) duplicated studies; and 4) articles with incomplete data.

Information sources Related articles were retrieved on PubMed, Medline, the Cochrane Library, and LILACS till March 2023.

Main outcome(s) Based on the pooled analysis of the included studies, both cTTE and cTCD showed high diagnostic accuracy in detecting foramen ovale associated with cryptogenic stroke. However, cTCD exhibited higher sensitivity compared to cTTE, while cTTE showed slightly higher specificity.

Quality assessment / Risk of bias analysis The risk of bias evaluation was conducted through QUADAS-2. As demonstrated in Figure 2, most articles exhibited high quality concerning the practicality of this test in clinical practice.

Strategy of data synthesis This meta-analysis used Revman 5.1 and STATA 14.0 software, and P.

Subgroup analysis N/A.

Sensitivity analysis Eleven prospective studies were involved in the meta-analysis. The pooled diagnostic accuracy of cTTE and cTCD was assessed by calculating sensitivity, specificity, and corresponding 95% confidence intervals (CIs). The sensitivity of cTCD for detecting foramen ovale associated with cryptogenic stroke was found to be 97.0% (95% CI: 0.94-0.99), while the specificity of cTTE was 92.0% (95% CI: 87.0% to 95.0%). The area under curve (AUC) of c-TCD was 0.98 (95%CI 0.96-0.99). The AUC of c-TTE was 0.97 (95%CI 0.94-0.98).

Country(ies) involved China.

Keywords Cryptogenic stroke, contrast transthoracic echocardiography, contrast transcranial Doppler ultrasound, diagnostic accuracy, meta-analysis.

Contributions of each author

Author 1 - Yanyan Zhang - Methodology, Investigation, Data curation, original draft.
Email: 1058805869@qq.com
Author 2 - Qianqian Xie - Methodology, Investigation, Data curation, original draft.
Email: 1058805869@qq.com
Author 3 - Meiqin Yuan - Idea, Supervision, review &editing.
Email: yuanmeiqin202066@163.com