

# INPLASY PROTOCOL

To cite: Qu et al. Diagnostic accuracy of three-dimensional contrast-enhanced ultrasound for focal liver lesions: A protocol for systematic review and meta-analysis. Inplasy protocol 202150096. doi: 10.37766/inplasy2021.5.0096

Received: 27 May 2021

Published: 27 May 2021

**Corresponding author:**  
Hui Wang

Indlnsd@163.com

**Author Affiliation:**  
Ultrasound department of the First Affiliated Hospital of Dalian Medical University.

**Support:** No.20180550693.

**Review Stage at time of this submission:** Data analysis.

**Conflicts of interest:**  
None declared.

## Diagnostic accuracy of three-dimensional contrast-enhanced ultrasound for focal liver lesions: A protocol for systematic review and meta-analysis

Qu, MJ<sup>1</sup>; Jia, ZH<sup>2</sup>; Sun, LP<sup>3</sup>; Wang, H<sup>4</sup>.

**Review question / Objective:** Diagnostic accuracy of three-dimensional contrast-enhanced ultrasound for focal liver lesions. This systematic review will determine the accuracy of 3D-CEUS in the differential diagnosis between benign and malignant FLLs.

**Condition being studied:** Focal liver lesions (FLLs). The patients should be those who had undergone FLLs. Intervention and comparison. This study compare 3D-CEUS with pathology for diagnosing FLLs.

**Information sources:** PubMed, Web of Science, Cochrane Library, and Chinese biomedical databases will be searched from their inception to the April 31, 2021, without language restrictions.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 May 2021 and was last updated on 27 May 2021 (registration number INPLASY202150096).

### INTRODUCTION

**Review question / Objective:** Diagnostic accuracy of three-dimensional contrast-enhanced ultrasound for focal liver lesions. This systematic review will determine the accuracy of 3D-CEUS in the

differential diagnosis between benign and malignant FLLs.

**Condition being studied:** Focal liver lesions (FLLs). The patients should be those who had undergone FLLs. Intervention and comparison. This study

---

compare 3D-CEUS with pathology for diagnosing FLLs.

## METHODS

**Search strategy:** PubMed, Web of Science, Cochrane Library, and Chinese biomedical databases will be searched from their inceptions to the April 31, 2021, without language restrictions. The search strategy for PubMed will be shown in Table 1. Other online databases will be used in the same strategy.

**Participant or population:** The patients should be those who had undergone FLLs.

**Intervention:** This study compare 3D-CEUS with pathology for diagnosing FLLs.

**Comparator:** This study compare 3D-CEUS with pathology for diagnosing FLLs.

**Study designs to be included:** This study will only include high quality clinical cohort or case control studies.

**Eligibility criteria:** Type of study. This study will only include high quality clinical cohort or case control studies. Type of patients. The patients should be those who had undergone FLLs. Intervention and comparison. This study compare 3D-CEUS with pathology for diagnosing FLLs. Type of outcomes. The primary outcomes include sensitivity, specificity, positive and negative likelihood ratio, diagnostic odds ratio, and the area under the curve of the summary receiver operating characteristic.

**Information sources:** PubMed, Web of Science, Cochrane Library, and Chinese biomedical databases will be searched from their inceptions to the April 31, 2021, without language restrictions.

**Main outcome(s):** The primary outcomes include sensitivity, specificity, positive and negative likelihood ratio, diagnostic odds ratio, and the area under the curve of the summary receiver operating characteristic.

**Quality assessment / Risk of bias analysis:** The QUADAS criteria included 14

assessment items. Each of these items was scored as “yes” (2), “no” (0), or “unclear”(1). The QUADAS score ranged from 0 to 28, and a score  $\geq 22$  indicated good quality. Any disagreements between 2 investigators will be solved through discussion or consultation by a 3rd investigator. We conducted Begg's funnel plots and Egger's linear regression tests to investigate publication bias.

**Strategy of data synthesis:** Two authors will independently select the trials according to the inclusion criteria, and import into Endnote X9. Then remove duplicated or ineligible studies. Screen the titles, abstracts, and full texts of all literature to identify eligible studies. All essential data will be extracted using previously created data collection sheet by 2 independent authors. Discrepancies in data collection between 2 authors will be settled down through discussion with the help of another author. The following data will be extracted from each included research: the first authors surname, publication year, language of publication, study design, sample size, number of lesions, source of the subjects, instrument, “gold standard,” and diagnostic accuracy. The true positives, true negatives, false positives, and false negatives in the fourfold ( $2 \times 2$ ) tables were also collected. Methodological quality was independently assessed by 2 researchers based on the quality assessment of studies of diagnostic accuracy studies (QUADAS) tool. The QUADAS criteria included 14 assessment items. Each of these items was scored as “yes” (2), “no” (0), or “unclear”(1). The QUADAS score ranged from 0 to 28, and a score  $\geq 22$  indicated good quality. Any disagreements between 2 investigators will be solved through discussion or consultation by a 3rd investigator.

**Subgroup analysis:** We also performed subgroup and meta-regression analyses to investigate potential sources of heterogeneity. To evaluate the influence of single studies on the overall estimate, a sensitivity analysis was performed. We conducted Begg's funnel plots and Egger's

---

linear regression tests to investigate publication bias.

**Sensitivity analysis:** The STATA version 14.0 (Stata Corp, College Station, TX, USA) and Meta-Disc version 1.4 (Universidad Complutense, Madrid, Spain) softwares were used for meta-analysis. We calculated the pooled summary statistics for sensitivity, specificity, positive and negative likelihood ratio, and diagnostic odds ratio with their 95% confidence intervals. The summary receiver operating characteristic curve and corresponding area under the curve were obtained. The threshold effect was assessed using Spearman correlation coefficients. The Cochran's Q-statistic and I test were used to evaluate potential heterogeneity between studies. If significant heterogeneity was detected (Q test P50%), a random effects model or fixed effects model was used.

**Language:** without language restrictions.

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

**Keywords:** focal liver lesions; meta-analysis; three-dimensional contrast-enhanced ultrasound.

**Contributions of each author:**

Author 1 - Meijing Qu.

Email: 1439031356@qq.com

Author 2 - Zhaohua Jia.

Email: 1601774566@qq.com

Author 3 - Lipeng Sun.

Email: Sunlp@163.com

Author 4 - Hui Wang.

Email: Indlnsd@163.com

Conceptualization: Lipeng Sun and Hui Wang. Data curation: Zhaohua Jia and Meijing Qu. Methodology: Zhaohua Jia and Meijing Qu. Writing – original draft: Meijing Qu. Writing – review & editing: Meijing Qu and Hui Wang.