

## Introduction

- Hepatic artery occlusion (HAO) is one of the major complications after liver transplant. Mortality rate is as high as 60%.
- Doppler ultrasound (DUS) is universally utilized. However, its sensitivity and specificity are low.
- Reference standards include CTA and MRA, but these procedures can put patients at risk for contrast induced nephropathy and are expensive.
- Contrast enhanced ultrasound (CEUS) is an emerging diagnostic tools and a fast, cost-effective technique that assesses the vascular structure using microbubbles.
- The advantage of CEUS over CTA and MRA is that it is safe to use in renal insufficiency.
- Previous studies have demonstrated that CEUS could be utilized to screen for HAO; however, differences in study design, such as differences in diagnostic criteria of HAO, reference standards, and other CEUS parameters were present.

## Methods and Materials

- Embase, Scopus, CINAHL, and Medline searches were conducted from inception through March 2019
- The titles and abstracts were reviewed by two independent authors
- Quality assessment was performed using QUADAS-2 by two independent authors
- Pooled sensitivity and pooled specificity were calculated using the R version 3.2.4 (R Core team 2013)
- Log diagnostic odd ratio (LDOR) were calculated. Publication bias was assessed by Deeks' funnel plot.

Figure 1. A flow diagram demonstrating the search strategy implemented in this study.

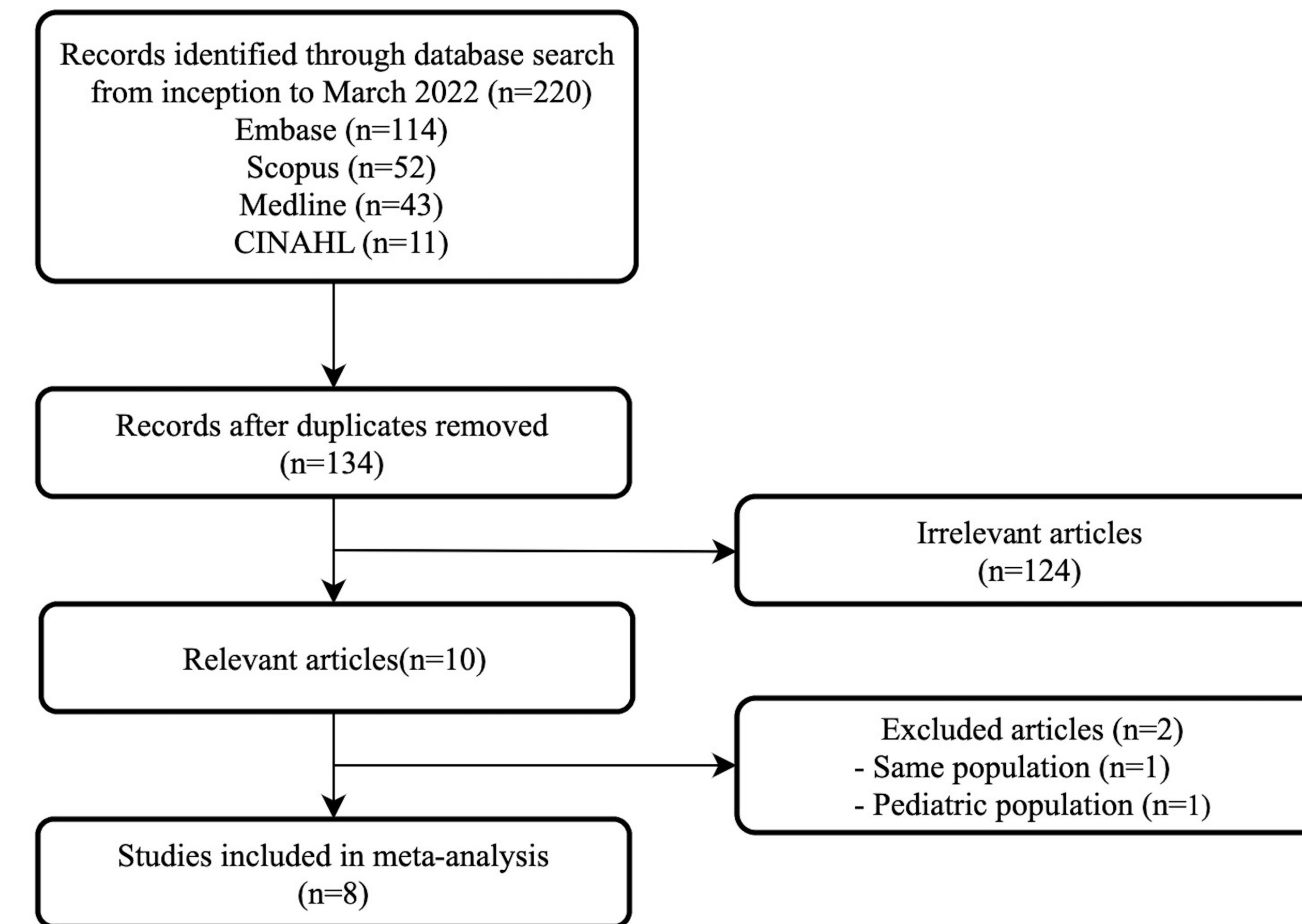
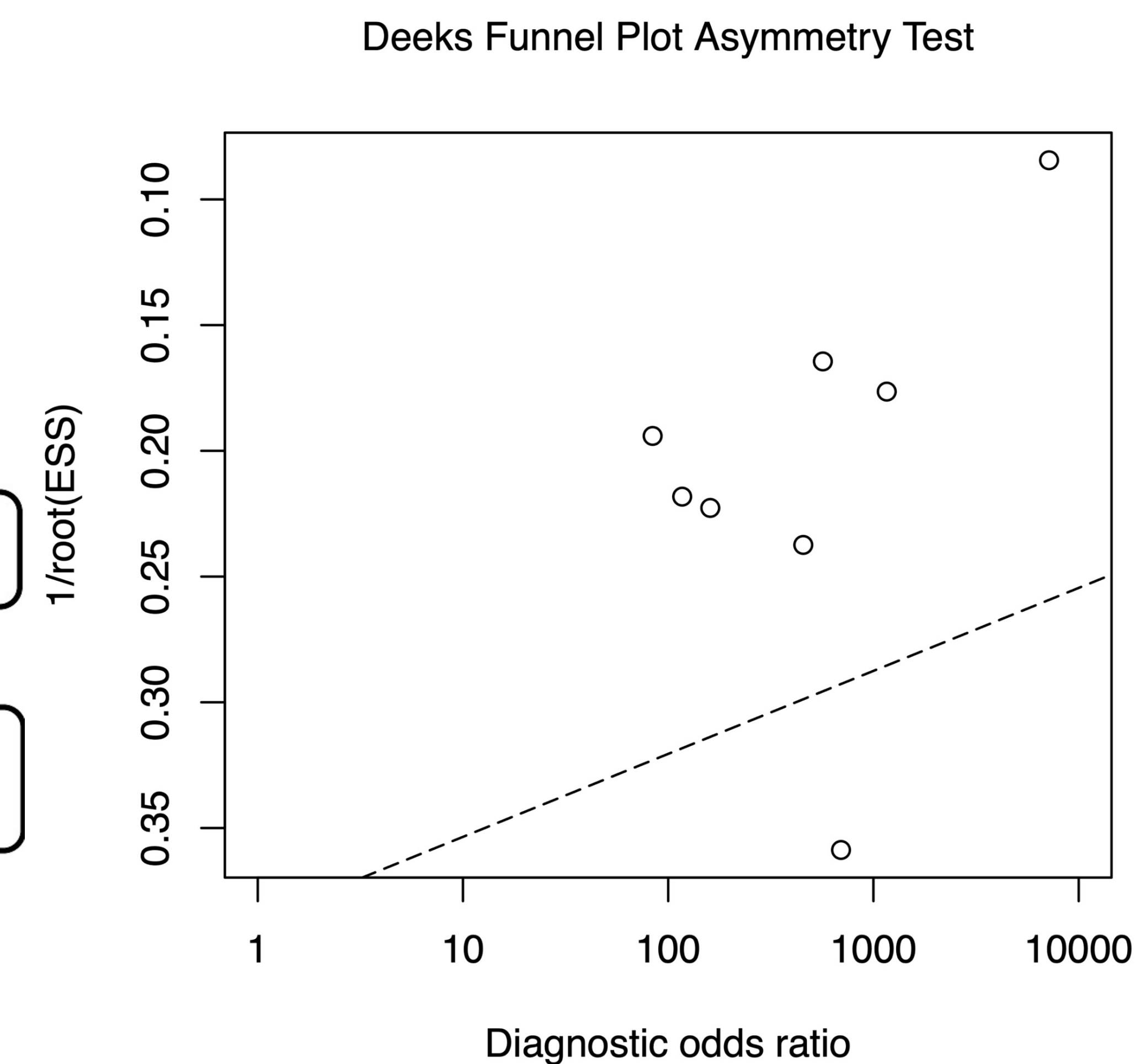


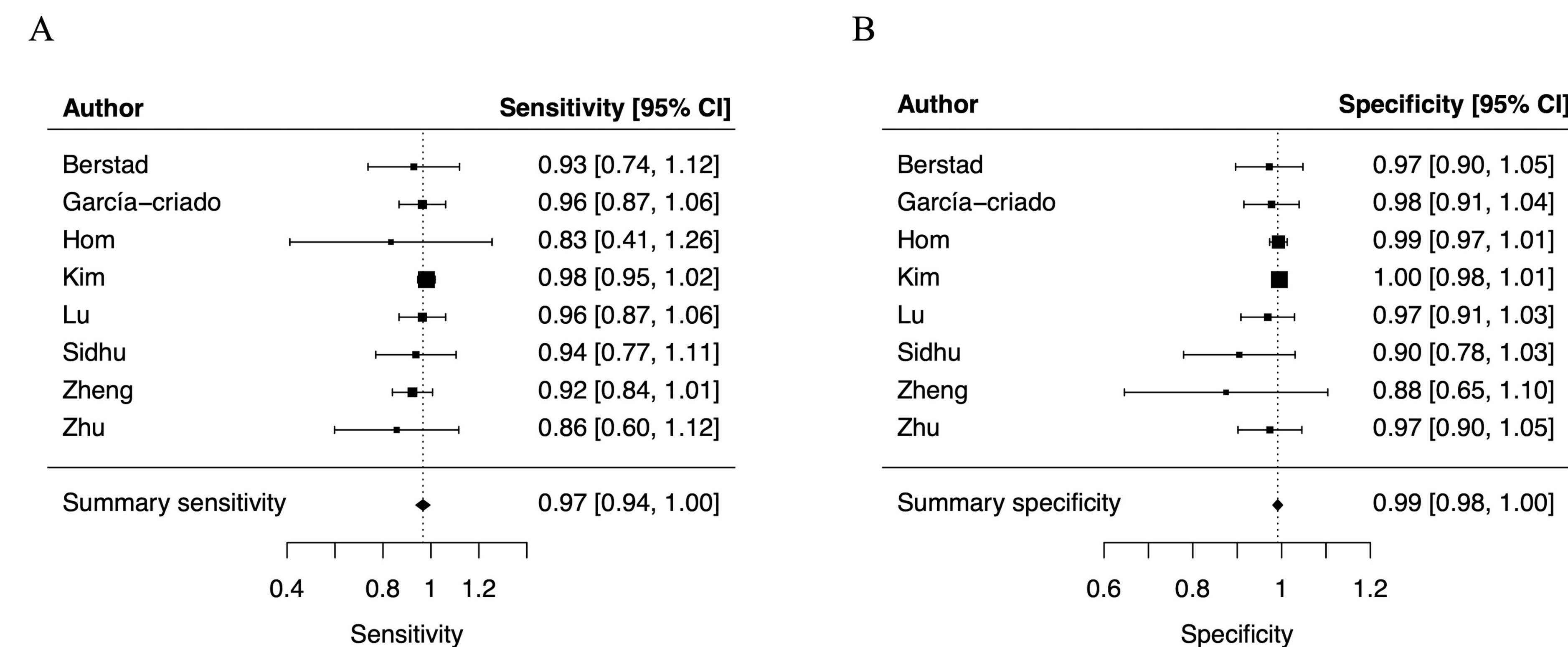
Figure 2. A Deeks' funnel plot of studies evaluating performance of CEUS in detection of HAO.



## Results

- Of the 134 studies identified in our search; 8 studies meet our inclusion criteria.
- 1,145 and CEUS was performed in 434 participants.
- Using CT angiography, follow-up, and surgery as the gold standard, the sensitivity, specificity, and LDOR of contrast-enhanced ultrasound for detection of HAO were 0.97 (0.94-0.99), 0.99 (0.98-1.00), and 5.73 (4.54-6.93).
- There was no publication bias among studies evaluating HAO (p=0.44)

Figure 3. Forest plots demonstrating individual and summary sensitivity (A) and specificity (B) of each study evaluating performance of CEUS in detection of HAO.



**“Contrast-enhanced ultrasound has excellent performance in detecting hepatic artery occlusion after liver transplant.”**

## Contact

Busara Songtanin  
TTUHSC, Lubbock  
Email: busara.songtanin@ttuhsc.edu

## References

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