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Meta-analysis of focused assessment with sonography for trauma (FAST) contrast ultrasonography for assessment of trauma

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Apizi, A[1]; Li, J[2]; Dong, LJ[3]; Liu, W[4]; Li, B[5]; Chen, YT[6]; Yu, ZX[7].

Corresponding author:
Zhaoxia Yu

yuzhaoxia24220@163.com

Author Affiliation:
Department of Critical Care Medicine,the first affiliated hospital of xinjiang medical university , urumqi, xinjiang province of china, 830054.

ADMINISTRATIVE INFORMATION

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

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 February 2024 and was last updated on 27 February 2024.

INTRODUCTION

Review question / Objective To systematically review the efficacy of FAST and ultrasonography in trauma assessment, explore their advantages and disadvantages in different trauma scenarios, and provide guidance for clinical practice.

An extensive literature search was conducted using databases such as PubMed, EMBASE, and the Cochrane Library for studies related to FAST and ultrasonography in trauma assessment. Search terms were set as "contrast-enhanced ultrasound" OR "contrast-enhanced ultrasonography" OR "contrast ultrasonography" OR "ultrasound contrast imaging" OR "CES " OR "CEUS" AND "trauma". Screening criteria included (a) the study dealt with the comparison of FAST and ultrasonography in trauma assessment, (b) the type of literature was original research, excluding reviews, meta-analyses, etc., and (c) the language of the literature was limited to English. The following information was extracted from the selected literature: authors, year, and study center; study design ; sample size; age of study subjects; and ultrasound site used.

Condition being studied Timely and accurate assessment of traumatic injuries is critical to the development of an effective treatment plan. The use of ultrasound technology in trauma assessment is gradually attracting attention, with focused assessment with sonography for trauma (FAST) and ultrasonography being two commonly used methods. The aim of this study was to compare the performance of FAST and ultrasonography in trauma assessment by Meta-analysis.

METHODS

Participant or population Ten relevant studies were screened through an extensive literature search, including databases such as PubMed and

Web of Science. Meta-analysis was performed using a random-effects model with Relative risk (RR) as a measure to compare the detection ability of FAST and ultrasonography by fixed-effects and random-effects models. Funnel plots, radar plots, and sensitivity analyses were performed to assess the stability of the results and publication bias.

Intervention The study dealt with the comparison of FAST and ultrasonography in trauma assessment.

Comparator The study dealt with the comparison of FAST and ultrasonography in trauma assessment.

Study designs to be included (a) the study dealt with the comparison of FAST and ultrasonography in trauma assessment, (b) the type of literature was original research, excluding reviews, meta-analyses, etc., and (c) the language of the literature was limited to English. The following information was extracted from the selected literature: authors, year, and study center; study design ; sample size; age of study subjects; and ultrasound site used.

Eligibility criteria (a) the study dealt with the comparison of FAST and ultrasonography in trauma assessment, (b) the type of literature was original research, excluding reviews, meta-analyses, etc., and (c) the language of the literature was limited to English.

Information sources Ten relevant studies were screened through an extensive literature search, including databases such as PubMed and Web of Science.

Main outcome(s) Meta-analysis showed an RR of 1.57 [1.22, 2.02] for FAST and ultrasonography compared with ultrasound treatment and surgical resection, indicating a significant difference between them in trauma assessment. Among the different trauma sites, ultrasonography was significantly better than FAST in determining the presence of trauma. there was no publication bias in the results of the analysis, and no significant effect was observed in the sensitivity analysis.

Quality assessment / Risk of bias analysis Publication bias analysis was performed using funnel plot and Egger's test. No asymmetry was observed in the funnel plot observation and the P value of Egger's test was 0.43981, indicating that no significant publication bias was observed in this Meta-analysis. The results of sensitivity analysis showed that individual studies had a small effect on the combined effect, verifying the stability of the results.

Strategy of data synthesis Meta-analysis and other statistical analyses were performed using statistical software (R). Appropriate models were selected based on heterogeneity and Meta-analysis results were interpreted. By using the above methods, we will be able to comprehensively assess the efficacy of FAST and ultrasonography in trauma assessment and provide reliable evidence to guide clinical decision-making by healthcare professionals in different contexts.

Subgroup analysis Relative risk (RR) was used as the main measure of effectiveness. Meta-analysis was performed using fixed-effects and random-effects models, and the choice of model was based on Q-value and I^2 index. For heterogeneity, forest plotting was performed by detecting RR values of FAST and ultrasonography at the time of organ injury.

Sensitivity analysis Publication of bias analysis and sensitivity analysis - Funnel plots and Egger's test were utilized to assess publication bias. Funnel plots were used to determine the presence of publication bias, and the p-value of Egger's test was used to measure its statistical significance. Sensitivity analyses were performed to examine the effect of individual studies on the combined effect to verify the stability of the results.

Country(ies) involved China - the first affiliated hospital of xinjiang medical university.

Keywords focused assessment with sonography for trauma; Meta-analysis.

Contributions of each author

Author 1 - Anwaier Apizi.
Author 2 - Jian Li.
Author 3 - Liangjie Dong.
Author 4 - Wei Liu.
Author 5 - Bo Li.
Author 6 - Yutang Chen.
Author 7 - Zhaoxia Yu.