

INPLASY PROTOCOL

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

Conflicts of interest:
None declared.

INTRODUCTION

Review question / Objective: To investigate sonographic findings in post-stroke hemiplegic shoulders.

Shoulder Ultrasound Imaging in the Post-stroke Population: a Study Protocol for a Systematic Review and Meta-analysis

Chang, KV¹.

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Rationale: The incidence of post-stroke hemiplegic shoulder pain was high, ranging from 34% to 84%. Uncertainties remain regarding the prevalence, etiologies, and clinical implication of shoulder pathologies after stroke. Ultrasound has emerged as an accessible tool to diagnose diverse soft tissue problems. Therefore, we undertake a meta-analysis to provide more rigorous understanding of the structural changes in post-stroke hemiplegic shoulders on ultrasound examination and hopefully to enhance the treatment strategy of hemiplegic shoulder pain.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 19 December 2022 and was last updated on 19 December 2022 (registration number INPLASY2022120075).

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tissue problems Therefore, we undertake a meta-analysis to provide more rigorous understanding of the structural changes in post-stroke hemiplegic shoulders on ultrasound examination and hopefully to enhance the treatment strategy of hemiplegic shoulder pain.

Condition being studied: The PICO (population, intervention, comparison, outcome) setting of the current meta-analysis included: (1) P: post-stroke patients; (2) I: nil; (3) C: non-hemiplegic shoulders; and (4) O: ultrasound findings of the hemiplegic shoulder.

METHODS

Search strategy: Two authors made independent searches in PubMed, Embase, and Web of Science from inception without language restrictions. The algorithm used was as followed: (“ultrasound” OR “sonography” OR “ultrasonography”) AND (“stroke” OR “post-stroke” OR “hemiplegic”) AND (“shoulder” OR “upper limb” OR “arm”).

Participant or population: Post-stroke patients.

Intervention: Nil.

Comparator: Non-hemiplegic shoulders.

Study designs to be included: Clinical studies.

Eligibility criteria: Clinical studies that examined the hemiplegic shoulder with ultrasound in the post-stroke population and reported at least one type of pathologic shoulder finding were included.

Information sources: Two authors made independent searches in PubMed, Embase, and Web of Science from inception without language restrictions. The algorithm used was as followed: (“ultrasound” OR “sonography” OR “ultrasonography”) AND (“stroke” OR “post-stroke” OR “hemiplegic”) AND (“shoulder” OR “upper limb” OR “arm”).

Main outcome(s): The primary outcome was the prevalence of pathologic structures and findings on ultrasound imaging on the hemiplegic shoulders (in comparison with the non-hemiplegic side). The effect size encompassed the penetrance for reporting the prevalence and odds ratio for quantifying the association of categorical variables.

Additional outcome(s): Nil.

Data management: Two independent authors extracted data from the recruited studies, encompassing the pathologic shoulder findings, first authors, year of publication, study design, number of participants, age and hemiplegic side of the participants, and mean time elapsed since stroke onset.

Quality assessment / Risk of bias analysis: The methodological quality of the included studies was graded by the Newcastle-Ottawa scale. The checklist designed for assessing the quality of nonrandomized studies contained seven items in three domains: selection, comparability, and outcome.

Strategy of data synthesis: Data was pooled by using the random effect model, considering significant variations in ultrasound scanning protocols and different stages of stroke patients. Between-study heterogeneity was addressed by I² and Cochran’s Q statistics. A I² value >50% was considered significant heterogeneity. The publication bias was evaluated by Egger’s test. The analysis was conducted by using Comprehensive Meta-Analysis software (version 3, Biostat, Englewood, NJ, United States), with a two-tailed p value of less than 0.05 deemed statistically significant.

Subgroup analysis: A subgroup analysis was conducted regarding the differences in motor function of the affected upper extremities.

Sensitivity analysis: Nil.

Language restriction: No language limit.

Country(ies) involved: Taiwan.

Keywords: Stroke, ultrasound, shoulder, rotator cuff, rehabilitation.

Contributions of each author:

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