

INPLASY PROTOCOL

To cite: Yu et al. Robot-assisted kyphoplasty improves clinical and radiological features better than fluoroscopy-assisted kyphoplasty in the treatment of vertebral compression fractures: a meta-analysis. Inplasy protocol 202250106. doi: 10.37766/inplasy2022.5.0106

Received: 16 May 2022

Published: 16 May 2022

Corresponding author:
Bin Yu

rmyyyubin@163.com

Author Affiliation:
Tianjin Union Medical Centre,
Nankai University.

Support: No.2021180;
2020YJ007.

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

Conflicts of interest:
None declared.

Robot-assisted kyphoplasty improves clinical and radiological features better than fluoroscopy-assisted kyphoplasty in the treatment of vertebral compression fractures: a meta-analysis

Yu, HW¹; Luo, G²; Yu, B³; Sun, TW⁴; Tang, Q⁵; Jia, YT⁶.

Review question / Objective: The purpose of this meta-analysis was to evaluate whether patients treated with robot-assisted kyphoplasty for vertebral compression fractures have more clinical and radiographic improvement than patients treated with fluoroscopy-assisted kyphoplasty.

Eligibility criteria: (1) randomized controlled trials (RCTs) or observational cohort studies which compared RA-kyphoplasty with FA-kyphoplasty in treating vertebral compression fractures; (2) Fractures are osteoporotic or traumatic vertebral compression fractures(AO spine type A) (3)Studies should include at least one of the following data: preoperative, postoperative and final follow-up vertebral height and kyphosis angle and VAS scores for back pain; cement distribution and leakage (4) no time and language limitations for the study.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 May 2022 and was last updated on 16 May 2022 (registration number INPLASY202250106).

INTRODUCTION

Review question / Objective: The purpose of this meta-analysis was to evaluate whether patients treated with robot-assisted kyphoplasty for vertebral compression fractures have more clinical

and radiographic improvement than patients treated with fluoroscopy-assisted kyphoplasty.

Rationale: Kyphoplasty is a commonly used minimally invasive technique for treating vertebral compression fractures to

maintain the sagittal balance of the spine. However, the correction of vertebral height and kyphosis with this technique is often incomplete, and cement leakage after surgery is a common complication. Robot-assisted kyphoplasty is promising to overcome these problems. However, a comprehensive review of the efficacy of robot-assisted kyphoplasty has not yet been performed.

Condition being studied: Patients with vertebral compression fractures.

METHODS

Search strategy: ("Robot-assisted"[All Fields] OR ("kyphoplasties"[All Fields] OR "kyphoplasty"[MeSH Terms] OR "kyphoplasty"[All Fields]) OR "PKP"[All Fields]) AND (((("spine"[MeSH Terms] OR "spine"[All Fields] OR "vertebral"[All Fields] OR "vertebrals"[All Fields]) AND ("fractures, compression"[MeSH Terms] OR "fractures"[All Fields] AND "compression"[All Fields]) OR "compression fractures"[All Fields] OR "compression"[All Fields] AND "fractures"[All Fields])) OR "VCF"[All Fields]).

Participant or population: Patients with vertebral compression fractures requiring robotic-assisted kyphoplasty or fluoroscopy-assisted vertebroplasty.

Intervention: Robotic-assisted kyphoplasty.

Comparator: Fluoroscopy-assisted kyphoplasty.

Study designs to be included: Randomized controlled trials or cohort studies.

Eligibility criteria: (1) randomized controlled trials (RCTs) or observational cohort studies which compared RA-kyphoplasty with FA-kyphoplasty in treating vertebral compression fractures; (2) Fractures are osteoporotic or traumatic vertebral compression fractures(AOspine type A) (3)Studies should include at least one of the following data: preoperative, postoperative and final follow-up vertebral height and

kyphosis angle and VAS scores for back pain; cement distribution and leakage (4) no time and language limitations for the study.

Information sources: A comprehensive literature search was performed through the following databases: PubMed, EMBASE, Cochrane Library, ScienceDirect, CNKI.

Main outcome(s): Preoperative, postoperative, and final follow-up vertebral height, kyphosis angle, and VAS scores for back pain.

Additional outcome(s): Cement fully distribution and leakage rates.

Data management: The following data were extracted from the included studies: (1) study design: first author, publication time, and study type; (2) sample demographics: number of patients and vertebrae, follow-up time, age, gender, and disease diagnosis; (3) Surgery details: robot type, operation time, X-ray exposure frequency and doses.

Quality assessment / Risk of bias analysis: Two reviewers evaluated bias risk in the cohort studies using the Newcastle–Ottawa scale. Publication bias was analyzed qualitatively by funnel plot.

Strategy of data synthesis: The continuous data were calculated by weighted mean difference (WMD) with 95% confidence intervals (CI), and dichotomous variables were calculated by using odds ratio (OR) with 95% confidence intervals (CI). Statistical heterogeneity was calculated by using a chi-square test and I² test. When I² ≤ 50%, we performed a fixed-effect model for the meta-analysis. Otherwise, the random-effect model was performed. The meta-analysis was performed using RevMan 5.3 for Windows (Cochrane Collaboration, Oxford, UK). If the result of the meta-analysis was a probability of p < 0.05, it was considered to be statistically significant.

Subgroup analysis: Subgroup analysis was performed for vertebral height, kyphosis angle, and back pain VAS scores according to preoperative, postoperative, and final follow-up.

Sensitivity analysis: Sensitivity analysis is performed by excluding a single study of each study in turn and reanalyzing the data.

Language: No restriction.

Country(ies) involved: China.

Other relevant information: No.

Keywords: robotic-assisted, fluoroscopy-assisted, kyphoplasty, vertebral compression fractures.

Dissemination plans: Publicly published.

Contributions of each author:

Author 1 - Hongwei Yu - propose questions; collect data; synthesize data; write manuscripts.

Email: yuhw416@163.com

Author 2 - Gan Luo - collect data; write manuscripts.

Email: luoganhd@126.com

Author 3 - Bin Yu - Review and correct the manuscript.

Email: rmyyyubin@163.com

Author 4 - Tianwei Sun - Review and correct the manuscript.

Email: billsuntw@163.com

Author 5 - Qiong Tang - Review and correct the manuscript.

Email: tangqiongtj@qq.com

Author 6 - Yutao Jia - Review and correct the manuscript.

Email: jiyutao@hotmail.com