INPLASY

Comparison of Hybrid Surgery and Two-Level ACDF in Treating Consecutive Cervical Degenerative Disc Disease: A Systematic Review and Meta-Analysis

INPLASY202430047

doi: 10.37766/inplasy2024.3.0047

Received: 12 March 2024

Published: 12 March 2024

Corresponding author:
Yihan Yang

yangyihan0326@163.com

Author Affiliation:
Beijing Chaoyang Hospital, Capital Medical University.

Yang, YH[1]; Liang, WS[2]; Sun, D[3]; Han, B[4]; Yin, P[5]; Hai, Y[6].

ADMINISTRATIVE INFORMATION

Support - 1、 the National Key Research and Development Program of China (No. 2022YFC2407206); 2、Beijing Hospitals Authority Youth Programme (No. QML20230315); 3、Beijing Natural Science Foundation (No. 7242061).

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

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202430047

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 12 March 2024 and was last updated on 12 March 2024.

INTRODUCTION

Review question / Objective This study was aimed to compare hybrid surgery (HS) and two-level anterior discectomy and fusion (ACDF) in treating consecutive two-level cervical degenerative disc disease (CDDD).

Condition being studied ACDF is the most accepted surgery for treatment of CDDD, which removes a herniated or degenerative disc in the neck. Due to its negative influence on adjacent segment motion, a more optimal surgery is required. HS, an emerging surgery combining artificial disc replacement and ACDF, receives lots of attention globally. However, there is no clear conclusion today as to which surgery is more favorable to two-level consecutive CDDD postoperatively and in the long-term follow-up.

METHODS

Participant or population patients diagnosed with two-level CDDD who underwent hybrid surgery or two-level ACDF.

Intervention clinical studies comparing patients who underwent hybrid surgery (intervention group) with those who underwent two-level ACDF (control group).

Comparator This study will compare radiographic and clinical outcomes of patients who underwent hybrid surgery (intervention group) with those underwent two-level ACDF (control group).

Study designs to be included This study will include any clinical research articles published in a peer-reviewed journal, excluding case reports,

reviews, biomechanical analysis, letters and conferences.

Eligibility criteria The inclusion criteria for the present study were as follows:(1) Target population: patients diagnosed with two-level CDDD. (2) Interventions and controls: clinical studies comparing patients who underwent hybrid surgery (intervention group) with those who underwent two-level ACDF (control group).(3) Outcomes: 1) operation parameters: operation time, intra-operation blood loss; 2) radiographic outcomes: C2-C7 range of motion (C2-C7 ROM), superior adjacent segment range of motion (SAS ROM), inferior adjacent segment range of motion (IAS ROM); 3) clinical outcomes: neck disability index (NDI) score, Japanese orthopaedic association (JOA) score, visual analogue scale (VAS) score; 4) complication rate.(4) Article types: any clinical research articles published in a peer-reviewed journal, excluding case reports, reviews, biomechanical analysis, letters and conferences.

Information sources A comprhensive serach strategy was implemented across Embase, PubMed, Web of Science, Wanfang, China National Knowledge Infrastructure (CNKI) and VIP databases.

Main outcome(s) 1) operation parameters: operation time, intra-operation blood loss; 2) radiographic outcomes: C2-C7 range of motion (C2-C7 ROM), superior adjacent segment range of motion (SAS ROM), inferior adjacent segment range of motion (IAS ROM); 3) clinical outcomes: neck disability index (NDI) score, Japanese orthopaedic association (JOA) score, visual analogue scale (VAS) score; 4) complication rate.

Quality assessment / Risk of bias analysis The quality of the included studies was assessed using previously published guidelines. Two researchers independently evaluated the quality of the literature according to the PRISMA recommendations. The methodological quality for each included study was conducted in accordance with the Methodological Index for Non-Randomized Studies (MINORS).20 A scoring system categorized studies as poor quality (≤14), moderate quality (15-22), or good quality (23-24) for comparative studies. Discrepancies during quality assessment were resolved through discussion, with involvement of a third professor-level researcher if consensus was not achieved. What's more, the risk of bias for each included study was also assessed by the following seven items using the Cochrane risk-of-bias tool (Review Manager 5.3).

Strategy of data synthesis Statistical analyses were performed using Review Manager 5.3. Heterogeneity among studies was evaluated via the Cochran Q test (with $P \leq 0.05$ indicating substantial heterogeneity) and I2 test (with values >0%, >50%, and >75% representing mild, moderate, and considerable heterogeneity, respectively). Random-effect models were employed in cases of high heterogeneity ($I2 \geq 50\%$ and P value for Q test ≤0.05), while fixed-effect models were used with low heterogeneity (I20.05).

Subgroup analysis If $P>0.05$ or $I2>50\%$, we conducted subgroup analysis to explain the heterogeneity, and sensitivity analyses were conducted if needed. $P<0.05$ represented a substantial significance.

Sensitivity analysis Upon the exclusion of each study, a subsequent meta-analysis was undertaken to evaluate any alterations in the effect size. In instances where the outcomes post-deletion deviated from the overall combined results pre-deletion, the study is deemed to exert a substantial impact on the overall effect size.

Country(ies) involved China.

Keywords Cervical degenerative disc disease, Hybrid surgery, Anterior cervical decompression and fusion, Meta-analysis.

Contributions of each author

Author 1 - Yihan Yang - The contributions of Author 1: Conceptualization, Data curation, Formal analysis, Methodology, Visualization, Writing - original draft, Writing - review &editing.
Email: yangyihan0326@163.com
Author 2 - Weishi Liang - The contributions of Author 2: Conceptualization, Data curation, Formal analysis, Visualization, Writing - original draft.
Email: liangweishi97@163.com
Author 3 - Duan Sun - The contributions of Author 3: Data curation, Formal analysis, Methodology, Writing - original draft, Writing - review & editing.
Email: sunduan87@126.com
Author 4 - Bo Han - The contributions of Author 4: Conceptualization, Data curation, Formal analysis, Methodology.
Email: sanmaohanbo@126.com
Author 5 - Peng Yin - The contributions of Author 5: Conceptualization, Data curation, Formal analysis, Funding acquisition, Writing - review & editing.
Email: yinpeng3904@126.com
Author 6 - Yong Hai - The contributions of Author 6: Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology,

Project administration, Visualization, Writing - review & editing.
Email: yong.hai@ccmu.edu.cn