

Cost-effectiveness of anterior surgical decompression surgery for cervical degenerative disc disease: a systematic review of economic evaluations

V. N. E. Schuermans, MD^{1,2,3}, A.Y.J.M. Smeets MD, PhD^{1,2}, A.F.M. Boselie MD, PhD^{1,2}, O. Zarrouk, BSc^{1,2}, S. M.M. Hermans, BSc⁴, R. Droeghaag, BSc⁴, I. Curfs MD, PhD⁴, S.M.A.A. Evers MD, PhD^{3, 5,6}, H. Van Santbrink MD, PhD^{1,2,3}

Affiliations

1 Dept. Of Neurosurgery, Maastricht University Medical Center, Maastricht, the Netherlands

2 Dept. Of Neurosurgery, Zuyderland Medical Center, Heerlen, the Netherlands

3 CAPHRI School for Public Health and Primary Care, Maastricht University, Maastricht, the Netherlands

4 Dept. of Orthopedic Surgery & Traumatology, Zuyderland Medical Center, Heerlen, the Netherlands

5 Department of Health Services Research, Maastricht University, the Netherlands - Focusing on Value-Based Care and Ageing –

6 Trimbos Institute, Netherlands Institute of Mental Health and Addiction, Center of Economic Evaluation & Machine Learning, Utrecht, the Netherlands

Abstract

Introduction: No clear consensus exists on which anterior surgical technique is most cost-effective for treating cervical degenerative disc disease (CDDD). One of the most common treatment options is anterior cervical discectomy with fusion (ACDF). Anterior cervical discectomy with arthroplasty (ACDA) was developed in an effort to reduce the incidence of clinical adjacent segment pathology (CASP) and associated additional surgeries by preserving motion.

Research question: This study aims to evaluate the evidence regarding the cost-effectiveness of anterior surgical decompression techniques used to treat radiculopathy and/or myelopathy caused by CDDD.

Design: Systematic review of economic evaluations.

Methods: The search was conducted in PubMed, EMBASE, Web of Science, CINAHL, EconLit, NHS-EED and the Cochrane Library. Studies were included if both healthcare costs and utility or effectivity measurements were mentioned.

Results: A total of 23 studies were included out of the 1327 identified studies. In 9 of the 13 studies directly comparing ACDA and ACDF, ACDA was the most cost-effective technique, with an incremental cost effectiveness ratio (ICER) ranging from \$2.900/QALY to \$98.475/QALY. There was great heterogeneity between the costs of due to different in- and exclusion criteria of costs and charges, cost perspective, baseline characteristics, and calculation methods. The methodological quality of the included studies was moderate.

Discussion: The majority of studies report ACDA to be a more cost-effective technique in comparison to ACDF. The most important result is the lack of uniform literature concerning the subject, which impedes any solid conclusions to be drawn. There is a need for high-quality cost-effectiveness research and uniformity in the conduct, design and reporting of economic evaluations concerning the treatment of CDDD.