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Cost-effectiveness of a Bone-anchored Annular Closure Device Versus Conventional Lumbar Discectomy in Treating Lumbar Disc Herniations

Spine (Phila Pa 1976). 2019 Jan 1;44(1):5-16.
https://doi.org/10.1097/BRS.0000000000002746
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Abstract

Study Design: Cost-utility analysis of an annular closure device (ACD) based on data from a prospective, multicenter randomized controlled trial (RCT) OBJECTIVE.: The aim of this study was to determine the cost-effectiveness of a novel ACD in a patient population at high risk for recurrent herniation following discectomy.

Summary Of Background Data: Lumbar disc herniation patients with annular defect widths ≥6 mm are at high risk for recurrent herniation following limited discectomy. Recurrent herniation is associated with worse clinical outcomes and greater healthcare costs. A novel ACD may reduce the incidence of recurrent herniation and the associated burdens.

Methods: A decision analytical modeling approach with a Markov method was used to evaluate the cost-effectiveness of the ACD versus conventional discectomy. Health states were created by projecting visual analogue scale (VAS) onto Oswestry Disability Index (ODI). Direct costs were calculated based on Humana and Medicare 2014 claims to represent private and public payer data, respectively. Indirect costs were calculated for lost work days using 2016 US average annual wages. The incremental cost-effectiveness ratio (ICER) in dollars per quality-adjusted life year (QALY) was compared to willingness-to-pay thresholds. Sensitivity analyses were also conducted.

Results: Patients with the ACD had less symptomatic reherniations, reoperations, and complications and gained 0.0328 QALYs within the first 2 years. Total direct medical costs for the ACD group were similar to control. When productivity loss was considered, using the ACD became $2076 cheaper, per patient, than conventional discectomy. Based on direct costs alone, the ICER comparing ACD to control equaled $6030 per QALY. When indirect costs are included, the ICER became negative, which indicates that superior quality of life was attained at less cost.

Conclusion: For lumbar disc herniations patients with annular defects ≥6 mm, the ACD was, at 2 years, a highly cost-effective surgical modality compared to conventional lumbar discectomy.

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