Postoperative direct health care costs of lumbar discectomy are reduced with the use of a novel annular closure device in high-risk patients

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Reducing the incidence of reherniation and reoperation in skeletally mature patients with radiculopathy (with or without back pain) attributed to a posterior or posterolateral herniation, and confirmed by history, physical examination and imaging studies which demonstrate neural compression using MRI to treat a large anular defect (between 4-6 mm tall and between 6-10 mm wide) following a primary discectomy procedure (excision of herniated intervertebral disc) at a single level between L4 and S1.

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Abstract

Background Context: Lumbar discectomy is largely successful surgical procedure; however, reherniation rates in patients with large annular defects are as high as 27%. The expense associated with a revision surgery places significant burden on the healthcare system.

Purpose: To compare the direct health care costs through 5 years follow-up of conventional discectomy (Control) with those of discectomy supplemented by an adjunctive annular closure device (ACD) in high-risk patients with large annular defects.

Study Design: This was a cost-effectiveness study.

Methods: All-cause index level reoperations were reviewed from a multicenter, randomized controlled superiority trial that allocated 554 high-risk discectomy patients with large annular defects to either control or ACD. Medicare and private insurer (Humana) direct costs were derived from a commercially available payer database to estimate costs in the US healthcare system, including those associated with facility, surgeon, imaging, follow-up visits, physical therapy, and injections. A 50:50 split between Medicare and commercial insurers was assumed for the base case analysis. The analysis was also performed on a 80:20 commercial:Medicare payer basis. For the base case scenario, a 2-year time horizon and outpatient cost setting was established for the index procedure. Repeat discectomy was assumed to be performed on a 60:40 outpatient-to-inpatient basis. Complications requiring surgery, revisions, and/or fusion were assumed to be managed in the inpatient setting. Total costs of reoperation and per-patient costs of reoperation were compared between groups for both forms of insurers. One author received consulting fees of <$50,000 for the completion of this study, and the other eight authors did not have any financial associations with the current work. Funding for this study was provided by Intrinsic Therapeutics, but all analyses, interpretation, and writing were performed independently by the authors.

Results: At two years follow-up, use of the ACD reduced the rate of symptomatic reherniations in a large defect population to 13% compared with 25% in the control group ($p<.001$). This reduction in symptomatic reherniations in the ACD group translated to a savings of $2,802 per patient in direct health care costs compared with Control at 2 years and $5,315 per patient by 5 years based on 50% private and 50% public (Medicare) payer split. Under the scenario of 80:20 private:public insurance reimbursement, the estimated direct cost savings were $3,215 and $6,099 per patient at 2- and 5-years postoperatively, respectively, with the use of the ACD.

Conclusions: Symptomatic reherniation and reoperation rates were nearly double among control patients compared with ACD-treated patients, which translated to markedly greater per-patient healthcare costs in the control group, where the ACD was not used.

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