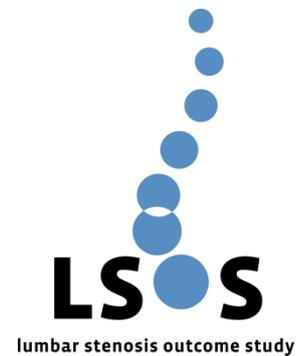**Abstract**

Cost Effectiveness of Conservative versus Surgical Treatment Strategies of Lumbar Spinal Stenosis - A Prospective Multicenter Study in the Swiss Setting

Aichmair A, Burgstaller JM, Schwenkglenks M, Steurer J, Porchet F, Farshad M

Purpose

Due to differing results regarding the cost-effectiveness of different treatment strategies for lumbar spinal stenosis published in the current literature, a consensus statement regarding the most cost-effective treatment strategy for lumbar spinal stenosis is missing. However, a detailed understanding of the cost-effectiveness of each treatment approach is warranted to define evidence-based guidelines on both a national and international level.

Methods/Materials

Patients prospectively enrolled in the Swiss multicenter Lumbar Stenosis Outcome Study (LSOS) with a minimum follow-up of 12 months were included. Health-related quality of life (HRQoL) weights/utilities were calculated based on EQ-5D data using the EQ-5D-3L Index Value Calculator with the EuroQol Group value set of Germany. Available questionnaires at the baseline examination, the follow-up at 6 and at 12 months, were utilized to calculate the area under the curve (AUC) of time-trade-off (TTO) utilities. Due to a follow-up period of 12 months, AUC utilities were multiplied by 1 year, revealing QALY. Based on prices per unit of utilized resources retrieved from institutional cost statistics, a consensus statement was defined for the average in- and out-patient standard treatment costs of each arm of the decision tree by the surgeons of the Spine Department. Cost effectiveness was calculated based on a decision tree analysis (TreeAge Pro 2016, TreeAge Software, Inc.), and incremental cost effectiveness ratio (ICER) was calculated. Willingness to pay (WTP) was set to 50.000 CHF. Robustness of the model was evaluated by a Monte Carlo probabilistic sensitivity analysis (PSA) with 10.000 cases, sampled from a normal distribution with means±standard deviations (SD).

Results

A total of 434 patients were included, treated surgically (n=170) or conservatively (n=264) for LSS. The majority of surgically treated patients underwent decompression only (82,9%), compared to 17,1% who underwent spinal fusion. There were 13 surgically treated patients, in whom a reoperation was performed (7,6%). In 10,2% of conservatively treated patients a single infiltration was sufficient (n=27), with no further infiltration or surgery required within the 12 months follow-up. However, 46 patients required multiple infiltrations (17,4%), and in 191 cases a subsequent surgical intervention was performed (72,4%). The AUC of the

HRQoL was 0,776 QALY in the surgical arm (0,776 and 0,790, decompression or fusion, respectively), compared to 0,778 in the conservative arm (ICER of 392.145 CHF). Treatment costs were estimated at 12.958 and 13.637 CHF in surgically and initially conservatively treated patients, respectively. Monte Carlo simulation identified the surgical approach as the preferred strategy in 69,5%.

Conclusion

Among surgical and conservative treatment options for lumbar spinal stenosis, lumbar decompressive surgery seems to be the most cost effective treatment approach. The majority of initially conservatively treated patients required multiple infiltrations or a subsequent surgical intervention.