

INTRODUCTION

- Lumbar discectomy is a surgical procedure that is widely used worldwide in the treatment of lumbar disc herniation resulting in back and leg pain.
- The overall risk of recurrent disc herniation varies between 2-18% in reported literature⁶Atlas, S, et al: Long-Term Outcomes of Surgical and Nonsurgical Management of Sciatica Secondary to a Lumbar Disc Herniation: 10 Year Results from the Maine Lumbar Spine Study. *Spine* 2005; 30(8): 927-935.,⁷Weinstein, J, et al: Surgical Versus Nonoperative Treatment for Lumbar Disc Herniation: Four-Year Results for the Spine Patient Outcomes Research Trial (SPORT). *Spine* 2008; 33(25):2789-2800.,⁸Watters WC and McGirt MJ. An evidence-based review of the literature on the consequences of conservative versus aggressive discectomy for the treatment of primary disc herniation with radiculopathy. *The Spine Journal* 9: 240-57. 2009. There is strong evidence that reherniation rate is influenced by the size of the defect in the annulus. Patients with small or slit defects in the annulus have as low as 1% risk of recurrence while those with larger defects have between 18-27% risk⁹Carragee, E, et al. Clinical Outcomes After Lumbar Discectomy for Sciatica: The Effects of Fragment Type and Anular Competence. *JBJS*: 85-A (1): 102-108. 2003.,¹⁰McGirt MJ et al. A Prospective Cohort Study of Close Interval Computed Tomography and Magnetic Resonance Imaging After Primary Lumbar Discectomy: Factors Associated With Recurrent Disc Herniation and Disc Height Loss. *Spine* 34: 2044-51. 2009.. - See more at: <http://www.in-thera.com/en/healthcare-professionals/the-reality-of-lumbar-discectomy#sthash.KluNCjWM.dpuf>.
- Anular closing technique is among the techniques developed to prevent reherniation and associated re-operations. Current evidence suggests that anular closure device reduces the risk of reherniation in patients with large annulus defect.

OBJECTIVE

- The objective of this study is to assess the cost effectiveness of the use of anular closure device in treatment of lumbar disc herniation in Turkey in patients with large anular defects, approximately 18% of the entire lumbar discectomy patient population.

METHODOLOGY

- A simple decision analysis model was used to assess the cost effectiveness of the use of anular closure technique.
- The time horizon was 12 months.
- The study was performed from the healthcare payer perspective.
- Expert opinion was used to determine the resource utilization where there was no published data.
- Resource utilization data were obtained from expert clinical opinion and included pre-op, post-op and follow-up costs, etc. Unit costs were taken from the Social Security Institution's official price list.
- The comparison was made between discectomy alone vs. discectomy with anular closure device
- The primary clinical endpoint was determined as the number of prevented reherniations.
- Results were presented as incremental cost/number of prevented reherniations.
- Robustness of the study was tested through one-way sensitivity analysis.

INPUTS OF THE MODEL

- According to the data obtained from expert opinion and Social Security Institution's price tariffs for the costs of lumbar discectomy, lumbar fusion and total treatment costs with and without anular closure device are presented in tables 1,2 and 3.
- The average resource utilization frequency, average resource usage amount, and the average lifetime of the resources are obtained from the expert opinions and took the average of the responses received from the experts.

Table 1. Lumbar discectomy costs

Lumbar discectomy steps	Costs (TL)
Operation	1,164.56
Maintenance treatment (annual)	151.33
Total	1,315.89

Table 2. Lumbar fusion costs

Lumbar fusion steps	Costs (TL)
Diagnosis and treatment costs of preoperation	283,97
Operation	1,980.14
Postoperation treatment	217.24
Maintenance cost (annual)	1,434.91
Total	3,916.26

Table 3. Total treatment costs

Unit costs	Using anular closure (TL)	Not using anular closure (TL)
Anular closure	7,000	
Discectomy	1,315.89	1,315.89
Total	8,315.89	1,315.89

RESULTS

- The incremental cost-effectiveness ratio (ICER) for anular closure device was 27,136 TL (Table 4)
- The number of patients in this study represents 18% of the total discectomy patients per the published failure rates in the literature. This corresponds to 17.049 discectomy patients for 2014 .
- Carragee et al. (2006) reported 18% reherniation rate for patients with large defects. Bouma et al. (2013) reported 1.5% reherniation rate when the anular closure device is used in the same patient population. Estimations of the number of patients with reherniation were made by using these findings.
- The robustness of the results were tested by using one-way sensitivity analysis and the SGK surgery and anular device costs were taken as the main variables. The analysis show that it was cost effective to use anular closure device the cost effectiveness results were robust.

Table 4. Results- Cost effectiveness analysis

Treatments	Number of patient recurrence	Number of additional recurrence prevention	Total Cost (TL)	Additional Cost (TL)	Incremental cost-effectiveness ratio (ICER)
Using anular closure device	256	4.398	141.777.609	119.343.000	
Not using anular closure device	4.654		22.434.609		27.136

DISCUSSION

- There is no threshold that can be used in interpreting the result of cost-effectiveness analysis in Turkey. Therefore, World Health Organization's standard of three times a country's per capita gross domestic product is used for the calculation of the threshold. If this criteria is taken into account, the use of anular device in treatment of lumbar discectomy in Turkey is within the limits of acceptable thresholds (in 2012 10,504 GDP per capita)
- This is a mute point since the cost of the complications are already included in the failed portion of the patients. No additional complications or costs.

CONCLUSION

- Use of anular closure device in patients with large anular defects in lumbar discectomy surgery is a cost-effective treatment option in Turkey.
- This analysis presents an additional evidence for decision-makers and medical practice in Turkey.

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