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Original Article

Evaluation of the clinical and demographic data of patients requiring revision after lumbar spinal stenosis surger

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Abstract

Aim: This study aimed to evaluate the clinical and demographic data of patients requiring revision surgery after lumbar spinal stenosis (LSS) surgery and to provide a guide us in choosing primary surgical options.

Material and Methods: This study was conducted as a single-center, descriptive, and retrospective study. LSS patients, who were operated upon using the same implant technique between 2012 and 2017, and subsequently underwent revision surgery due to implant failure and operated by the same surgeon were included. Medical records, preoperative and postoperative two-plan radiographs, and computed tomography (CT) scans of the primary and revision surgeries of the patients were evaluated.

Results: A total of 19 patients (5 males, 14 females) with a mean age of 64.16 ± 7.9 years (range: 47 to 77 years) were included in the study. Most of the patients who underwent revision surgery were over 65 years of age and had a normal body mass index (BMI). In addition, 16 patients (84.2%) who underwent revision surgery were operated without transforaminal lumbar inter-body fusion (non-TLIF). L5-S1 was the most commonly seen level for spinal stenosis revision. The mean revision time was 245.26 ± 65.1 days (range: 135 to 342).

Conclusion: Debates are ongoing between transforaminal lumbar inter-body fusion (TLIF) and non-TLIF surgery. In light of the data obtained through this study, we think that TLIF cage surgery should be included in the primary surgical procedure, especially at the lumbosacral junction, where it is difficult to obtain fusion to avoid revision in patients undergoing LSS surgery.

Keywords: Lumbar spinal stenosis; transforaminal lumbar inter-body fusion; revision

INTRODUCTION

Lumbar spinal stenosis (LSS), due to the narrowing of the spinal canal of the lumbar spine, characterized by low back pain, radiculopathy, and neurogenic claudication, is the most common spinal disease in the elderly patients (1). When no results can be obtained with conservative treatment, the preferred approach is either fusion or non-fusion surgical treatment (2-4). It is difficult to obtain fusion in the lumbosacral region because of its mobility. In recent years, with the increase in decompression surgery, the complexity of the procedure and complication rates have also increased (5). It is known that the rate of revision surgery increases when a good fusion cannot be obtained (2). The transforaminal lumbar inter-body fusion (TLIF) approach was described as a modification of the posterior lumbar inter-body fusion (PLIF) procedure (6). There are reports in the literature of TLIF cage surgery being carried out in addition to posterolateral fusion surgery, successfully reducing the need for revision (7,8). However, debates are ongoing between TLIF and non-TLIF surgery, due to the additional morbidity and complications of TLIF surgery. Therefore, we aimed to evaluate the clinical and demographic characteristics of patients requiring revision after LSS surgery, to constitute a guide for choosing between primary surgical options.

MATERIAL and METHODS

Study design and participants

After getting the approval of the local ethics committee, this study was conducted retrospectively. LSS patients, who were operated using the same implant technique between 2012 and 2017, by the same surgical team in the tertiary hospital, and subsequently underwent revision surgery due to implant failure carried out by the same orthopedic surgeon again were included. Exclusion criteria were; previous revision surgery, infection, trauma, and chronic diseases that would lead to non-union / delayed union.

Data collection and assessment tools

The data were obtained from the patients' files. Clinical and demographic characteristics (age, sex, body mass

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index [BMI], stenosis types and levels) were recorded. Medical records, preoperative and postoperative two-plan radiographs (anteroposterior and lateral), and computed tomography (CT) scans of the primary and revision surgeries of the patients were evaluated.

Surgical method

The procedures were performed with the posterior surgical approach by the same surgical team (the same senior surgeon) with the patient in the prone position on the radiolucent surgical table. All patients were evaluated before surgery with C-arm fluoroscopy under general anesthesia. The surgical procedure included facet joint resection, instrumentation with pedicle screws, bilateral laminectomy and decompression, segmental distraction and discectomy. Then, TLIF cage surgery was performed according to the bleeding and general condition of the patients and posterolateral arthrodesis with posterior iliac crest auto-graft was included in the procedure. Spreaders were used to ensure a proper fit. The auto-graft was placed in the inter-body cage and in the disc space in front of the cage, after which cage was impacted. After that, screw and TLIF cage placements were checked with C-arm fluoroscopy on two planes and the surgical procedure was terminated. All patients were encouraged to be mobilized one day after the surgery. After discharge, the patients were evaluated clinically every 2 weeks and radiologically every 4 weeks.

Statistical analyses

Statistical analyses were performed using statistical package for the social sciences software (SPSS Inc., version 16, Chicago, IL, USA). Descriptive data were reported as mean ± standard deviation or median (interquartile range) values.

RESULTS

Table 1. Clinical and demographic features of patients

Age (years)	64.16 ± 7.9
Gender	
Male	5 (26.3)
Female	14 (73.7)
Age (years)	
< 65	7 (36.8)
≥ 65	12 (63.2)
BMI (kg/m^2)	24.57 ± 3.7
BMI (kg/m2)	
Normal	12 (63.2)
Overweight	5 (26.3)
Obese	2 (10.5)
Stenosis Type	
Foraminal	10 (52.6)
Central	9 (47.4)
Operation Type	
TLIF group	3 (15.8)
Non-TLIF group	16 (84.2)
Stenosis Level	
L4-5	4 (21.1)
L5-S1	15 (78.9)
Revision Time (days)	245.26 ± 65.1

The data are given as mean ± standard deviation or n, (%); BMI: Body mass index; TLIF: Transforaminal inter-body fusion; L: Lumbar; S: Sacral

A total of 19 patients (5 males, 14 females) with a mean age of 64.16 ± 7.9 years (range: 47 to 77 years) were included in the current study. Their clinical and demographic features are summarized in Table 1. Most of the patients who underwent revision surgery were over 65 years of age, with a normal BMI. In addition, 16 patients (84.2%) who underwent revision surgery were non-TLIF operated patients. L5-S1 was the most commonly seen level for spinal stenosis revision. The mean revision time was 245.26 ± 65.1 days (ranges: 135 to 342).

DISCUSSION

In this retrospective study, we aimed to evaluate the data of patients who had been operated for LSS in our center and to discuss our findings in line with the information in the current literature. LSS is the most common spinal disease in elderly patients over 65 years of age, as well as the most common cause of lumbar spinal surgeries. It is a degenerative disease with narrowing of the lumbosacral canal and compression of the lumbosacral nerve roots. When the disease becomes symptomatic, low-back pain, radiculopathy, and neurogenic claudication are observed. When there is no result with conservative treatment, the preferred approach is surgical treatment with or without fusion (5, 9-11). In the literature, surgical treatment is seen as a more effective option in LSS management (7,8,12,13). The traditional surgical technique is bilateral resection of facet joints, lamina and spinous process, decompression of neurological structures, instrumentation of vertebrae with pedicle screws, and addition of fusion surgery to them. Today, bilateral laminectomy and decompression, and indirect decompression methods, especially in elderly patients, are also the treatment options that can be applied (14-16). We prefer total laminectomy, decompression, instrumentation, distraction and posterolateral fusion and TLIF cage surgery in our study as a routine procedure. In recent years the TLIF procedure has rapidly gained popularity, because the technique requires less retraction of the thecal sac and neural elements (6). Furthermore, compared to non-TLIF cage surgery, disadvantages such as long surgery time, increased infection and implant malposition risk, as well as adequate decompression and high fusion rates are seen to be the advantages of this method (5,9,17). When compared with similar anterior fusion techniques it has advantages, such as unilateral implementation, less blood loss, and shorter surgery time (6).

In the literature, spinal stenosis is most frequently seen at the L4-5 level, and secondly, at L5-S1 level (18). When the first operation of our patients who underwent revision in our study was examined, stenosis levels were in the L5-S1 segment in fifteen patients and the L4-5 segment in four patients. Sixteen patients underwent decompression, instrumentation, and posterolateral fusion; and TLIF surgery in addition to three. In addition, an auto-graft was used for fusion in all patients. Considering the data obtained, it is seen that those fusion problems and implant failure due to metal fatigue are frequently found in the lumbosacral junction (L5-S1) per the literature.

LIMITATIONS

The main limitations of our study were the small number of participants and the absence of a control group. Other limitations were the retrospective study design and the fact that other less common lumbar spine levels, such as L1-2, L2-3, L3-4, were not included in the study.

CONCLUSION

Posterolateral fusion with or without TLIF cage surgery is the preferred surgical approach in LSS patients. However, debates are ongoing between TLIF and non-TLIF cage surgery. In light of the data obtained from this study, we think that TLIF cage surgery should be included in the primary surgical procedure, especially in the lumbosacral junction, where it is difficult to obtain fusion to avoid revision in patients requiring LSS surgery. Looking ahead, we believe that prospective studies with larger patient samples are needed to support our results.

Competing interests: The authors declare that they have no competing interest.

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