

ORIGINAL ARTICLE

Evaluation of Radiological and Clinical Findings of TLIF (Transformational Lumbar Inter-Body Fusion)

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ABSTRACT

Objective: The purpose of this research study was to assess radiological as well as clinical outcome of TLIF.

Methodology: This is a retrospective research study which covered a time span from May 2018 to June 2021. In this research study, we included the patients who were suffering from chronic pain in their lower back because of degenerative disc disease (DDD), recurring herniation of lumbar disc and degenerative spondylolisthesis. We performed a retrospective review of the record files to evaluate the pre-operative as well as post-operative outcomes. We used the fusion and Oswestry Disability Index (ODI) on already set standard for the evaluation of the outcomes.

Results: Total twenty-five patients diagnosed with DDD in which 64.0% (n: 16) patients were male and 36.0% (n: 9) patients were females. The average age of these patients was 40.90 years. Four patients were present with recurring disc herniation and twelve patients were suffering from degenerative spondylolisthesis. ODI and VAS (Visual Analogue Scale) for pain displayed the noteworthy improvement from pre-operatively 42.30 and 7.10 to 17.50 and 2.50 post-operatively. The observation of fusion was 92%.

Conclusion: There are very effective radiological and clinical results of TLIF in the treatment of chronic back pain in lower part.

Keywords: TLIF, radiological outcome, clinical outcome, Back pain.

INTRODUCTION

LIF (Transforaminal lumbar Inter-body Fusion) is an acknowledged surgical intervention in treating the chronic pain in lower back because of degenerative spondylolisthesis. The production of the bony fusion between two vertebrae, neural structure's decompressions and sagittal plane alignment's restoration are the main objectives [1]. There are different techniques of fusion available in this particular literature with the utilization of different fusion materials, vertebral fixation and methods [2]. TLIF is a progressively popular surgical procedure that is being utilized to accomplish circumferential arthrodesis in treating the diseases of lumbar spine and there are evidences that good results have been achieved with performing the open TLIF from many years [3].

The procedure of TLIF is very similar to the established procedure of PLIF (Posterior-LIF), in which there is achievement of fusion with no requirement of a detached anterior approach [4]. In comparison to PLIF, far-lateral approach provides the access to disc space after removal of facet in the procedure of TLIF approach. This approach restricts the theca sac's mobilization thus leading to very risk of retraction damage to the roots of nerves [5]. The purpose of this research study was to find out the results of TLIF approach, where the key burden is the subjects suffering from chronic pain in their lower back because of lumbar spine complications as DDD, degenerative and recurring disc herniation leading to spine instability after surgical intervention.

METHODOLOGY

This is a retrospective research study which started in May 2018 and lasted up to June 2021. All the patients present

with chronic pain in lower back because of DDD, recurring disc herniation and degenerative spondylolisthesis, who got treatment with TLIF approach at Departments of Orthopaedics and Trauma were the participants of this research study. This research work comprised the files review as well as radiological research studies to evaluate the pre-operative and post-operative symptomatology, radiological traits, and outcomes of clinical examination of those patients who underwent TLIF approach in the duration of this research work. The same TLIF procure was performed by a single spine specialist in all the patients. In this study, we included only the patients suffering from chronic pain in their lower back having leg pain or without leg pain additionally because of DDD, degenerative spondylolisthesis and recurring herniation of lumbar disc. A single surgeon performed the bi-lateral posterior pedicle screw rod instrumentation using the surgical approach. Prone position was the placement position of the patient. After the fluoroscopy, the placement of pedicle screws and a posterior midline incision was completed with rod fixation. Then, there was removal of cartilaginous endplates and disc of the adjacent vertebrae.

There was application of distraction and placement of cage filled with autogenous bone-graft was carried out for the achievement of compression. The closing of the wound was carried out. We started the physiotherapy very next day. The removal of the drain was carried out after complete two days of surgical intervention and the patients got discharge when they were capable of self-care. The assessment of the clinical outcome was carried out with utilizing the ODI system of scoring which is an international acknowledged tool for the measurement of outcome in spine surgeries. Additionally, the evaluation of the pain was

carried out with the use of VAS. International criteria were used for the establishment of bony fusion.

RESULTS

There were total 64.0% (n: 16) male and 36.0% (n: 9) females patients in this study. The range of age of these patients was 20 to 60 years with an average age of forty years. All these patients underwent this surgical intervention from May 2018 to June 2021. Range of the follow up period was 12 to 24 months with average follow up duration of 18 months. Table-1 and Table-2 are elaborating these variables.

Table 1: Gender Distribution

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|--------|-----------|---------|---------------|--------------------|
| Valid | male | 16 | 64.0 | 64.0 | 64.0 |
| | female | 9 | 36.0 | 36.0 | 100.0 |
| | Total | 25 | 100.0 | 100.0 | |

Table 2: Age Range in Patients Underwent TLIF

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|------------|-----------|---------|---------------|--------------------|
| Valid | 20-40years | 15 | 60.0 | 60.0 | 60.0 |
| | 40-60years | 10 | 40.0 | 40.0 | 100.0 |
| | Total | 25 | 100.0 | 100.0 | |

There was diagnosis of DDD in nine patients, twelve patients were suffering from degenerative spondylolisthesis and four patients were having recurring disc herniation as elaborated in Figure-1.

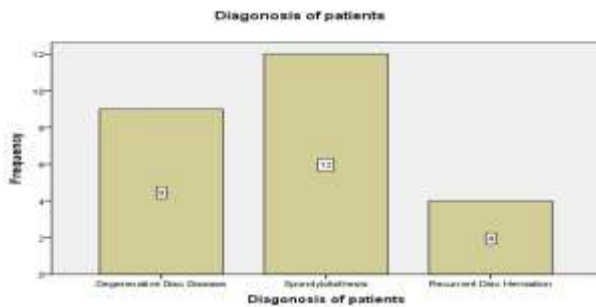


Figure 1 : Diagnosis of the Patients who underwent TLIF

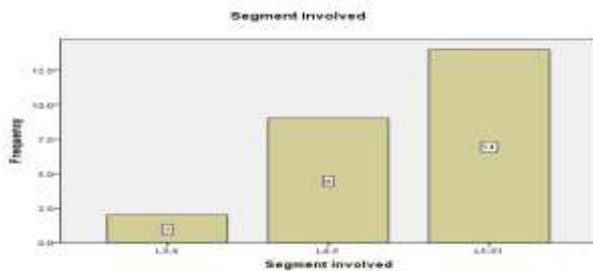


Figure 2: Spinal Segment Involved

Of these total twenty five patients who underwent surgical intervention of TLIF, fusion was informed in 56.0% (n: 14) patients at the segment L5-S1, in 36.0% (n: 9) patients, it was performed at L4-L5 and in only 8.0% (n: 8) patients, it was performed at the segment of L3-L4 as described in Figure-2.

We observed the improvement with reduction in the symptoms of lower back pain in 76% (n: 19) patients of twenty five patients, pain in legs in 83.30% (n: 15) patients among eighteen and there was improvement in sensory and motor deficit in 66.67% (n: 4) and 40% (n: 2) patients after surgical intervention as described in Table-3.

Table 3: Symptoms Improvement after TLIF in 25 Patients

| Pre-operative Symptoms | Improved | No Change | Total Overall |
|------------------------|--------------|--------------|---------------|
| Back pain | 19 (76.00 %) | 06 (24.00 %) | 25 (100 %) |
| Leg pain | 15 (83.33 %) | 03 (16.67 %) | 18 (100 %) |
| Sensory loss | 04 (66.67 %) | 02 (33.33 %) | 06 (100 %) |
| Motor deficit | 02 (40.00 %) | 03 (60.00 %) | 05 (100 %) |

On the basis of ODI and VAS, clinical findings of twenty five patients who underwent the TLIF approach stated the noteworthy improvement from pre-operatively 42.30 and 7.10 to 17.50 and 2.50 scores of ODI &VAS scale at eighteen months after the surgical intervention respectively. There was an overall improvement of 24.80 ODI scores and 4.60 scores on VAS as elaborated in Table-4.

Table 4: Clinical Outcome at 18 Months Postoperatively After TLIF

| Outcome measures | Pre-operative score | Post-operative score | Overall improvement |
|-----------------------|---------------------|----------------------|---------------------|
| VAS (Back & Leg pain) | 7.1 | 2.5 | 4.6 |
| ODI Score | 42.3 | 17.5 | 24.8 |

VAS: Visual Analogue Pain Scale
 ODI: Oswestry Disability Index
 All P < 0.05

There was observance of radiological fusion at eighteen month after the surgical intervention on AP (Antero-posterior) and lateral X-rays following already set standard in twenty three (92%) out of total twenty five patients. The outcomes of the fusion in patients after the TLIF approach are available in Figures 3 to 7.

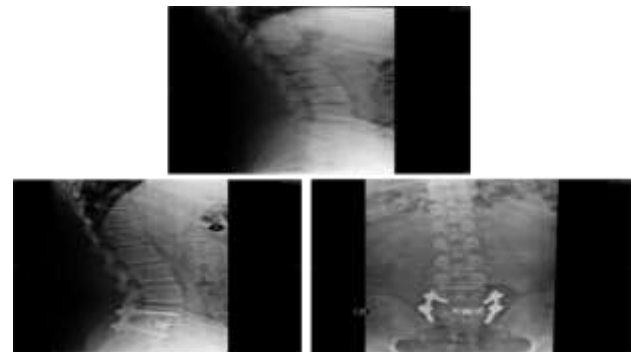


Figure 3, 4, 5: Pre and Postoperative X-Rays After

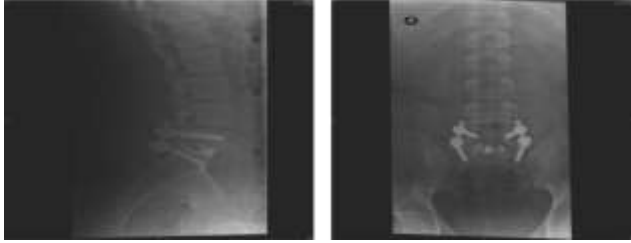


Figure 6, 7: Pre and Postoperative X-Rays after TLIF

DISCUSSION

We found a significant improvement in the function and pain relieve in the patients presented with degenerative spondylolisthesis, DDD and recurring disc herniation when got surgical intervention of TLIF in this research study. We used the VAS and ODI for the evaluation of the functional outcomes. Clinical outcomes were much improved with noteworthy improvement in ODI as well as VAS scores from pre-operatively 42.30 and 7.10 to 17.50 and 2.50 respectively at one and half year after the operation. There was an overall improvement of 4.60 VAS scores and 24.80 scores of ODI. We observed the radiological fusion at eighteen months after the operation in 92.0% (n: 23) out of 25 patients. The well-established procedure for the cure of chronic pain in lower back in the patients of spondylolisthesis is inter-vertebral fusion and there is recent description of the TLIF approach as a substitute method in the patients suffering from isthmic as well as degenerative spondylolisthesis [6]. There are high fusion rates of LIF approaches with some special advantages as fast anterior-column load sharing, capability for the restoration of the normal sagittal contour [7]. TLIF is the much effectual treatment of chronic back pain because of DDD as compared to the conservative management [8].

Bio-mechanically, TLIF approach establishes the anterior-column support and a posterior-band. It can be achieved securely with the utilization of unilateral posterior technique any level of vertebrae. TLIF has the ability to provide passable surface region for a solid fusion [9]. In one research work on thirty-three patients, there was association of TLIF approach with improved clinical outcomes with back pain improvement of 67.0% and improvement in leg pain as 80.0% and there was occurrence of high fusion in all patients of recurring disc herniation and spondylolisthesis [4]. One other research study conducted on thirty-nine patients suffering from degenerative spondylolisthesis who got treatment with TLIF approach, there was decrease of ODI scores in all the patients from 23.50 to 13.50 points after completion of two years, the rate of radiological fusion was 94.80% and there

was reduction in the sagittal translation from 23.0% to 15.0% [6]. One research study on one hundred and twelve patients who received TLIF, after two years of surgical intervention, of 141 fused levels, 78.0% (n: 110) were fused and 72.0% was the functional outcome [10]. The results of this research study with the utilization of TLIF approach provided the confirmation of different findings of previous research studies and stated that TLIF approach provides high fusion rate and better clinical outcomes.

CONCLUSION

TLIF is very effective procedure for the treatment of chronic back pain in the patients with degenerative spondylolisthesis, DDD and recurring disc herniation. The findings of this research study confirm the option that TLIF has an association with remarkable radiological and clinical results.

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