Surgical Management of Degenerative Spondylolisthesis

Apurva Prasad, Sumeet G Pawar, Arjun Dhar, Premanand Ramani, Ali Akbar Malik, Sudhendoo Babhulkar

ABSTRACT

Decompressive surgery remains the gold standard for lumbar canal stenosis. The overall patient satisfaction is reduced due to factors, such as adjacent segment disease, recurrent stenosis and instability that develop several years after the decompressive procedure. Fusion procedures themselves are not devoid of complications. In the recent times, we have been using functionally posterior dynamic stabilization (PDS) with interlaminar device CoFlex following decompression with micro internal decompression for spinal stenosis (IDSS). We encountered three patients with spondylolisthesis whom we treated with PDS with satisfactory reduction and good clinical outcome. The follow-up period is short, but excellent patient satisfaction makes us feel this could be excellent surgical strategy to treat degenerative spondylolisthesis.

Keywords: Degenerative spondylolisthesis, Early experience, Posterior dynamic stabilization.


INTRODUCTION

In our department, we do surgical intervention on a large number of patients every year (Fig. 1). On an average, we operate 120 patients every year. The results and especially the patient satisfaction is good extending over period from 2 to 4 years. Recurrent stenosis, instability and adjacent segment degeneration reduces the patient satisfaction significantly.1-8 Use of instrumentation is known to augment fusion which can give better patient satisfaction.9 But the complications, extended time of surgery, blood loss and sometimes neurological damage makes instrumentation unsatisfactory.10-13 In recent times, we have been using posterior dynamic interlaminar stabilization by using CoFlex device. During this period, we encountered three patients with degenerative spondylolisthesis along with two level spinal stenosis.9 We have treated these patients by posterior dynamic stabilization (PDS) at two levels with satisfactory reduction of spondylolisthesis and good clinical outcome with reduction in Oswestry disability index (ODI) of more than 15 points. None required re-operation and there were no device related complications. The follow-up period is short but very excellent patient satisfaction makes us feel that this could be a good choice to surgically treat patients with degenerative spondylolisthesis.

MATERIALS AND METHODS

Patient One

A 55-year-old female presented with persistent low back pain for many years. For the last 1 year, she complained of severe back pain, bilateral leg pain, being worse on the left side, and increased on walking. She is non-diabetic, non-hypertensive with normal blood pressure. Her visual analog scale (VAS) score was 9/10 for pain. Straight leg raising (SLR) test was negative, plantars were flexors, there was no wasting of the muscles but knee jerk and ankle jerks were absent bilaterally. There was some hypoesthesia on the lower half lateral side of left leg. A variety of conservative treatments had failed to produce any relief. The preoperative ODI score was 72.

Dynamic X-rays of the lumbar spine showed Grade 1 spondylolisthesis of L4 over L5 with reduction in the L5 disk space and sacralization of L5 transverse process on the left side (Fig. 2). Magnetic resonance imaging (MRI)
lumbar spine showed lateral recess stenosis at L3-L4 and L4-L5 levels (Fig. 3).

At operation bilateral internal decompression for spinal stenosis (IDSS) at L3-L4 and L4-L5 was done. Foraminotomy was done bilaterally at L4-L5 and adequate decompression of the thecal sac and of the nerve roots was achieved. Posterior functionally dynamic stabilization was done using dynamic interlaminar device CoFlex 14 mm at L4-L5 and 12 mm at L3-L4. Her postoperative period was very satisfactory with decrease in the ODI score by 54. Postoperative X-ray showed two CoFlex devices with significant reduction in spondylolisthesis (Fig. 4).

**Patient Two**

A 46-year-old female presented with persistent low back pain and right sciatica since 5 years. During the last 2 months her symptoms had worsened in spite of conservative treatment and now she had developed left sciatica. She is non-diabetic, non-hypertensive and otherwise in good general condition. She could not walk even 20 steps for the last 2 months. The rating of her pain was 9/10 on the VAS score. On clinical examination, she did show any neurological signs except absent bilateral ankle jerks. Her ODI score was 76 (Figs 5 and 6).

At operation, the patient underwent bilateral IDSS at L3-4 and L4-L5 and PDS CoFlex of 12 mm each at both levels. Patient recovery was very satisfactory. The pain had reduced dramatically and the ODI score had come down to 17 (Fig. 7).

**Patient Three**

A 65-year-old male presented with persistent low back pain and bilateral sciatica (right > left) since last 3 years and severe neurogenic claudication during the same period. His VAS score for pain was 8/10 and ODI score was 76 (Figs 8 and 9).

At operation, bilateral IDSS was done at L3-L4 and L4-L5 and bilateral foraminotomy at L3-L4 with two dynamic interlaminar CoFlex devices of size 12 and 10 mm fixed in position. Complete reduction and stabilization of the unstable motion segment at L3-L4 with distraction. Postoperative he was completely relieved of pain and the ODI score had come down to 20 (Fig. 10).

**DISCUSSION**

For many years, degenerative lumbar canal instability in the past has been treated with decompression and fusion with or without instrumentation. The long-term outcome has not been very satisfactory leading to the search...
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Fig. 5: X-ray of lumbar spine dynamic view showing instability at L4-L5

Fig. 6: Magnetic resonance imaging lumbar spine showing lateral recess stenosis at L3-L4 and L4-L5

Fig. 7: Postoperative X-rays showing stabilization and reduction of listhesis

and development of motion preserving PDS. Although our experience in this procedure has been for the past 16 years, it is only recently that we have started using CoFlex dynamic interlaminar PDS device. Over a period of 8 months we have treated 58 patients and have used 82 CoFlex devices. During this period, we found three patients with degenerative lumbar canal stenosis associated with instability in a motion segment being degenerative spondylolisthesis in all the three and retrolisthesis in one. Although the instability was in one segment, lateral recess stenosis was present at two segments. In the past surgeons did only decompression but the long-term results were unsatisfactory.1-8 Adjacent segment degeneration rate was high.15-18 Finding instability in motion segment in such cases was common and in the
past analysis of this problem has been done in an era before PDS. Surgeons have resorted to doing facetectomy and reconstruction as the pathology mainly in degenerative lumbar canal stenosis (LCS) lies in the facet joints and the lateral recess. Posterior functionally dynamic stabilization was devised purely as a serendipity of dissatisfaction over the surgical options in the past. The history of CoFlex interlaminar PDS device is short and there are no reports separately analyzing degenerative lumbar segmental instability being managed with IDSS and PDS using interlaminar CoFlex devices. The short-term clinical outcome and patient satisfaction is good with no increase in ODI score at the time of writing this paper making us believe that thoughts on these lines could be the answer for future in the management of such cases. No complications related to the surgical procedure or implanted device have been encountered.
CONCLUSION

Three cases of motion segment instability in degenerative lumbar canal stenosis have been successfully treated with a surgical technique of bilateral IDSS, foraminotomy and PDS using dynamic interlaminar CoFlex device. The short-term clinical results have been good.

REFERENCES