

Lumbar Disc Prolapse in Adolescent Patients

Khalid Bin Madhi¹, Ghaleb Awadh¹, Mohamed A. Ragaee^{2*} 

¹Neurosurgery Department, Hadhramout University, Hadhramout, Yemen

²Neurosurgery Department, Assiut University, Assiut, Egypt

Email: *mohamedragae1980@hotmail.com

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Abstract

Objective: To discuss the surgical treatment of prolapsed lumbar intervertebral disc in adolescents and its long-term results (PLID). **Background:** PLID is very rare in adolescence. Heavy lifting and trauma are the main causes; back pain and radicular pain are the most common clinical presentations, and surgical treatment gives satisfactory outcome after failure of conservative treatment. **Methods:** During period from January 2014-January 2019 twenty patients between 14 - 20 years old underwent for lumbar disc surgery in Neurosurgery department, Hadramawt University, Yemen, 18 patients were males while 2 were females. **Results:** Twenty patients 18 males (80%) while 2 females (20%) all patients have low back pain (100%), unilateral sciatica in (90%), bilateral sciatica in (10%) and sphincter disturbance in (10%). The most common affected level is L4/5 represent (80%) while L5/S1 (20%), partial lumbar laminectomy in (40%) and microdiscectomy and fenestration in (60%). Complication rate was (15%) and recurrence only (5%). **Conclusion:** PLID in adolescence is very rare; back pain and sciatica were the main clinical presentation. Meticulous surgical procedures give satisfactory outcome and excellent result.

Keywords

Lumbar Disc, Adolescents, Sciatica, Microdiscectomy

1. Introduction

Lumbar disc herniation is one of the most common disease in elderly people, but very rare in adolescent and children [1].

Adolescent patients represent 0.5% - 6.8% of all PLID patients [2] [3].

Numerous studies reported early diagnosis and surgical treatment contribute excellent results.

The commonest etiology of PLID in adolescent was heavy lifting and trauma. Clinical presentation was low back pain and radicular pain [4].

Conservative treatment is the recommended first choice treatment for six to twelve weeks [3].

Surgery is recommended in case of failure conservative treatment and occurrence of any neurological deterioration. The goal of surgical treatment for adolescent lumbar disc herniation is to make immediate relieve of symptoms and allow early return to school [3]. Due to rarity of this condition worldwide, a few reports discuss this adolescent's health problem and there is still controversy regarding the ideal treatment plane. Dang L. *et al.* mentioned that conservative treatment usually takes long time and results may not be satisfactory to some patients at the end of treatment. Also there is some controversy about the long term results of surgical treatment and the recurrence of the disc prolapse with the problem of decreasing the disc height and adjacent level disease [3] [4]. The aim of this study is to review our short and long term results in surgical treatment of PLID in adolescent patients and review the efficacy and safety of surgical treatment.

2. Patients and Method

In this retrospective descriptive study, we reviewed all patients presented with PLID and treated in department of Neurosurgery in Hadramawt University, Yemen in a period of 5 years (January 2014 to January 2019), we found that only 20 adolescents (18 males, 2 females) presented with PLID and treated surgically after failed conservative treatment, with Age range between 14 - 20 years old diagnosed with prolapsed lumbar intervertebral disc (PLID).

All patients treated by conservative treatment for at least 6 weeks.

Intractable back pain, sciatica, failure to respond to conservative treatment after 6 weeks and presence of any sphincter disturbance and/or weakness were indication for surgery.

Detailed history, Clinical examination and Imaging of lumbosacral spine were done for all patients. Magnetic resonance imaging (MRI) of lumbosacral spine was the imaging technique of choice for all patients (**Figures 1-3**). All patients did a dynamic x-ray of the lumbosacral spine.

All patients prepared for surgery by doing complete routine blood investigations and preoperative physical fitness. All patients and their first-degree relatives informed about their condition, the disease, about the risks of surgery and anesthesia and also informed about the other treatment options. All patients signed an informed consent.

The main surgical approach was interlaminar approach and fenestration for most of patients. We used it as a minimal invasive approach for microdiscectomy. Some patients had a stenosis of the spinal canal in association with the PLID and in those cases we had to do partial laminectomy with the discectomy.

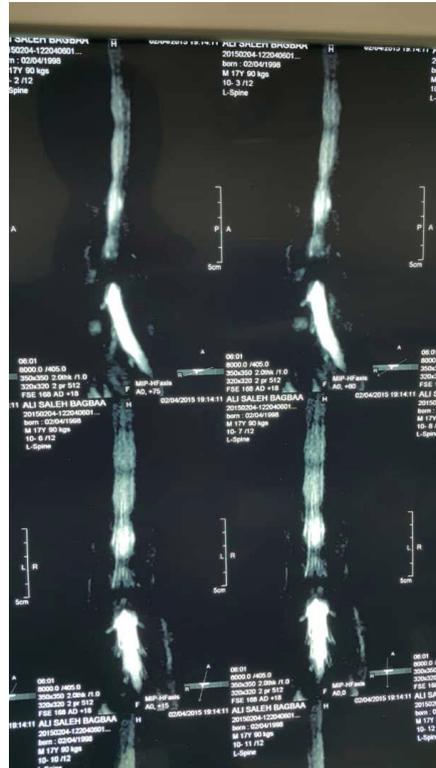


Figure 1. MRI lumbosacral spine myelogram of male patient 18 years old with L4/5 disc herniation.



Figure 2. MRI lumbosacral spine, sagittal view of male patient 18 years old with L4/5 disc herniation.

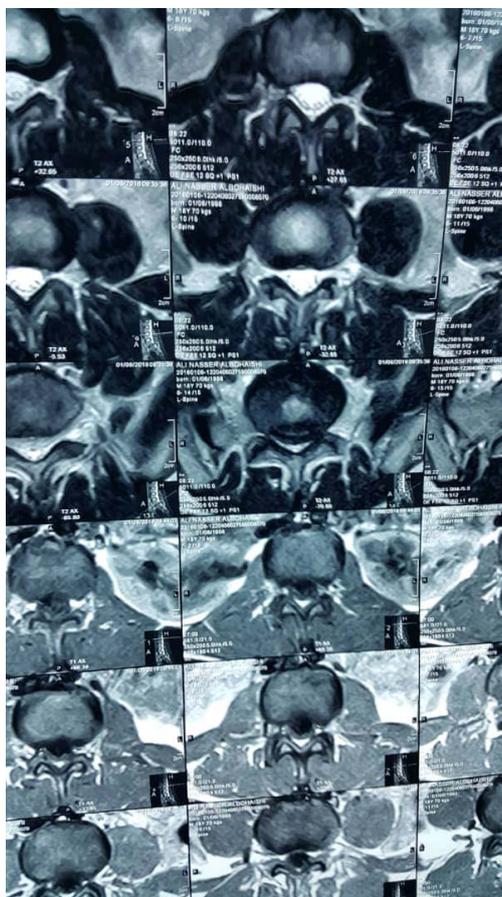


Figure 3. MRI lumbar spine, axial view of male patient 16 years old with L5/S1 disc herniation.

3. Result

In this study, patients were 18 males (90%) and 2 females (10%). Regarding to age distribution the most common affected age group was between 18 - 20 years 10 patients (50%), between 16 - 18 years old 6 patients (30%) and 14 - 16 years old only 4 patients (20%) (**Table 1**).

L4/5 level is the most commonly affected level (80%), then L5/S1 level (20%). 14 patients (70%) had protruded or extruded lateral disc prolapse, while 6 patients (30%) had central disc prolapsed (**Table 2**).

According to clinical presentation in our study the back pain was the most common complaint represent (100%) of patients, followed by unilateral sciatica represent (90%) of patients, then bilateral sciatica represents (10%) of patients.

Two patients presented with sphincter disturbance (10%), one presented with urine retention and the other patient presented with urgency of urine and both of them presented to us within the first 48 hours after start of the urinary symptoms. Both of them improved after surgery (**Table 3**).

Regarding the operative approach, we did microdiscectomy to 12 patients (60%) and we had to do partial laminectomy and discectomy for 8 patients (40%) (**Table 4**).

Table 1. Age and sex distribution.

| Age group | Sex distribution | | | |
|--------------|------------------|----|--------|----|
| | Male | | Female | |
| | No. | % | No. | % |
| 14 - 16 | 4 | 20 | - | - |
| 16 - 18 | 6 | 30 | - | - |
| 18 - 20 | 8 | 40 | 2 | 10 |
| Total | 18 | 90 | 2 | 10 |

Table 2. Levels of lumber disc.

| Disc level | No. | % |
|--------------|-----|-----|
| L4-5 | 16 | 80 |
| L5-S1 | 4 | 20 |
| Total | 20 | 100 |

Table 3. Clinical presentation.

| Clinical presentation | No. | % | Rt. | Lt. | |
|-----------------------|-----|----|-----|-----|---|
| Back pain | +ve | 20 | 100 | - | - |
| Unilateral sciatica | +ve | 18 | 90 | 14 | 4 |
| Bilateral sciatica | +ve | 2 | 10 | - | - |
| Sphincter dist | +ve | 2 | 10 | - | - |

Table 4. Type of surgery.

| Type of surgery | No. | % |
|----------------------------------|-----|----|
| Partial lumbar laminectomy | 8 | 40 |
| Fenestration and microdiscectomy | 12 | 60 |

Outcome and Follow Up

The mean follow up period was 1 year \pm 6 months. All patients did an MRI follow up after 6 months of surgery. All patients were asked about their pain immediately after surgery (after 2 days and during the follow up period), back pain and sciatica improved in all patients immediately after surgery except 3 patients (15%) with minimal post-operative back pain and improved sciatica. The 3 patients with back pain improved gradually within the follow up period by using medical treatment and physiotherapy. 2 patients (10%) with sphincter disturbance improved after surgery.

Recurrence

We had recurrence only in one patient (5%), male patient had L4/5 disc and complaint of left sciatica, post-operative he was improved, after 2 years he presented with back pain and right sciatica.

4. Discussion

Lumbar intervertebral disc herniation is the most common disorder in adult with life time occurrence about 40%, but rare in adolescent and young population (0.5% - 6.8%) [2] [5].

Adolescent patient with lumbar disc herniation has more severe symptoms as he always has a greater nerve root tension than in adult herniated lumbar disc, which interferes with practicing his daily activities [3] [6].

The main aim of the treatment is to improve the symptoms and early return to normal life style and school. Conservative treatment is the first treatment for all patients with PLID (bed rest, muscle relaxants, anti-inflammatory, analgesics and physiotherapy) for at least 6 weeks. In Kuirahara A. *et al.* study done in 1980, only 40% of patients responded to conservative treatment [7]. We noticed that many surgeons prefer not to do surgery for adolescents with PLID mostly due to fear of failed back surgery in this young age.

Surgical treatment has good results and excellent outcome and many studies recommend it after failure of conservative treatment [7] [8].

We reviewed our results in surgical treatment of PLID in adolescents over a period of 5 years (January 2014 to January 2019) to assess outcome of surgical treatment of PLID in this young age and answer a question if it really carries a high risk of failure or recurrence or not.

Low back pain and sciatica were the most common clinical presentation in our study (100% of patients), the same as Durham SR, *et al.* [9] study and Abd El-kader *et al.*, who reported 80% of patients included in his study complained of back pain [5].

In our study, the most common cause of lumbar disc herniation in adolescent patients was lifting heavy objects. In Durham SR, *et al.* study, most patients have history of trauma before onset of the pain [9].

In our study MRI was the diagnostic method of choice for PLID. 14 (70%) patients had disc location posterolateral, while 6 (30%) patients had central disc. This is consistent with Abd El-Kader study [5].

The most common involved level was L4/5 (80% of patients), this was the same result of PragyanSarma, *et al.* study [4].

Three patients in our study (15%) had complications post-operative as all the 3 patients had persistent low back pain which was less in severity than their pain before operation. Patients improved on physiotherapy and muscle relaxants. This result is close to Abd El-Kader [5] as he had 3 patients with persistent low back pain (12%) with a total complication rate 24%. Ahn Y *et al.* reported persistent back pain was the most common complication in adolescent [1].

Pragyan Sarma *et al.*, he reported no recurrence in his study [4]. In our study there is only one case (5%) with recurrence of L4/5 disc herniation and new L5/S1 disc herniation after 2 years of the first surgery and a second surgery was done for him. Chen LH *et al.* had also one patient with recurrence of PLID 3 months after first surgery and treated with second operation [8].

The overall results of surgery of PLID in adolescent were satisfactory in our study as all patients returned to their normal life style within 3 to 4 weeks after surgery with minimal restrictions like heavy weight lifting, this usually takes longer time in conservative treatment with more restrictions and difficulty in practicing the daily activities and more chance for the severe symptoms to reoccur. Also, Kuh *et al.*, reported excellent results after surgery in adolescent patient [10]. Deluca PF. *et al.* reported more favorable results of surgical treatment than conservative one [11].

5. Conclusion

PLID in adolescent is very rare. Lifting heavy objects and trauma are the main causes in the adolescent patients. Surgical treatment when indicated, gives satisfactory outcome, low rate of complications, low rate of recurrence and early return to normal life activities.

6. Recommendation

We recommend making a further study with increase of the number of patients by sharing the experience of multiple centers and comparing the results of surgical treatment with the results of conservative treatment.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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