Thoracolumbar disc herniation

Thoracolumbar disc herniation (TLDH) is a rare and progressively disabling disorder occurring T10/T11, T11/T12, T12/L1, L1/L2 levels. It constitute about 0.25% to 5% of all lumbar degeneration diseases.

see also Upper Lumbar Disc Herniation.

Upper lumbar discs have been reported as only L1-L2 and L2-L3 by some authors, and by others as T12-L1, L1-L2, and L2-L3.

Most previous studies of upper lumbar disc herniations included the L1-L2, L2-L3, and L3-L4 levels. Upper lumbar disc herniations have been reported to occur with a frequency of less than 5% of all disc herniations.

Clinical features

It may cause various symptoms attributable to the polytropic neuromechanism in different levels.

Treatment

Posterior decompressive laminectomy was the most common operation of TLDH before.

Anterolateral retroperitoneal approach, anterior transthoracic approach, posterolateral, and lateral approaches are performed in discectomy with or without fusion and internal fixation. However, patients who have undergone any operation at these levels are predisposed to postoperative recurrence, neurological aggravation, and adjacent segment degeneration, and the outcomes are
inferior than those in lower lumbar spine $^{2,3}$. 

Posterior approach operation is an ideal surgical technique for treatment of TLDH; the operative time, blood loss, hospitalization duration, and symptomatic improvement are favorable $^{4}$. 

Complications

Surgical procedures predispose the subjects to high incidence of complications including recurrence, neurological aggravation, and adjacent segment degeneration.

Case series

Ten patients with TLDH underwent posterior approach operation in the Department of Orthopaedics, General Hospital of Jinan Military Region, from January, 2006 to December, 2015. The mean preoperative duration of clinical symptoms was 16.5 months. The clinical data including operative time, blood loss, and hospitalization duration were investigated. Furthermore, pre and postoperative neurological status was evaluated by the Modified Japanese Orthopaedic Association scale and pain by visual analog scale (VAS) scoring system. The mean operative time was 176.50±20.55 minutes, the mean blood loss was 435.00±89.58 mL, and the mean hospitalization length was 13.30±2.97 days. All patients were followed with a mean period of 35.1 months. The mean JOA score of all patients before operation, at discharge, 3 months after operation, and at last follow-up was 6.50±1.28, 7.60±1.22, 8.90±0.99, and 9.00±0.92, respectively. The differences between the pre and postoperative JOA and VAS scores were significant (P<.05). However, the differences of JOA and VAS scores at postoperative 3 months and final follow-up were not statistically significant. Posterior approach operation is an ideal surgical technique for treatment of TLDH; the operative time, blood loss, hospitalization duration, and symptomatic improvement are favorable $^{5}$. 

A retrospective analysis of 33 patients with single level TLJ disc herniations undergoing operations was performed. Medical records, operative findings, and radiologic data were assessed. TLJ was defined as the level from T11-12 to L2-3. The mean follow-up period was 21.8 months.

Mean age was 47.3 years. Affected disc levels were T11-T12 in 5 patients, T12-L1 in 2 patients, L1-L2 in 6 patients, and L2-L3 in 20 patients. Soft disc herniations were detected in 24 patients, while the remainder showed hard disc herniations such as a bony spur or calcification. Thirty-one patients presented with pain as their chief complaint and radicular pain was the most common symptom(n=14). Various neurologic deficits including upper motor neuron syndrome, lower motor neuron syndrome, and radiculopathy were observed in 27 patients and were not related to the affected levels. Twenty-four patients with lateral disc herniations or central soft disc herniations underwent partial hemilaminectomy and facetectomy, and the remaining patients(n=9) with central disc herniations or severely calcified disc herniations underwent total facetectomy and subsequent posterior fusion. There were 7 cases with complications including dural tear, mild motor and sensory deficits, and bladder and bowel dysfunction without permanent morbidities. TLJ disc herniation shows variable symptoms and signs due to its unique anatomy. It can be safely managed by the correct surgical approach as determined by the location and type of disc herniation $^{6}$. 

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A cohort of 63 patients with symptomatic TLDH, who had surgery was investigated. Incidences of associated *Scheuermann's disease* (SD) and four radiographic signs of SD that were Schmorl's node, irregular vertebral end plate, posterior bony avulsion of the vertebra and wedge-shaped vertebra, average thoracolumbar kyphotic angle and incidences of disc herniation at segments with and without radiographic signs of SD were examined. Data from the TLDH group were compared with 57 patients undergoing surgery for lower lumbar disc herniation (LDH, L3/4-L5/S1) in the same period.

The incidences of the four radiographic signs of SD and the incidence of associated SD were all significantly higher in the TLDH group than in the LDH group. 95.2 % of the patients in the TLDH group were diagnosed with SD (either classical SD or its atypical form). The average thoracolumbar kyphotic angle of the TLDH group was 16.9°, while that of the LDH group was 7.6° (P = 0.000). In the TLDH group, the incidences of disc herniation at segments with radiographic signs of SD were all significantly higher than at segments where no sign of SD was found.

The high proportion of associated SD and the tendency of SD's signs to promote disc herniation in symptomatic TLDH patients suggest a close relationship between these two disorders. Symptomatic TLDH should be seen as a truly different surgical entity, that is, a special form of SD rather than just an indicator of a failing back.

Reports concerning MIS-TLIF at the thoracolumbar junction are rare. Thus, Wang et al., performed a retrospective analysis of the clinical outcomes of 10 patients with thoracolumbar junction disc herniation treated by MIS-TLIF between December 2007 and October 2010. The purpose of the study was to investigate the efficacy and safety of MIS-TLIF for disc herniation in the thoracolumbar junction. Clinical and radiological data were collected and analyzed. Fusion levels included T12-L1 (two patients), L1-L2 (four patients) and L2-L3 (four patients). Clinical outcome was assessed using the Visual Analogue Scale (VAS) and Oswestry Disability Index (ODI). The average follow-up period was 39.2 months, with a minimum of 24 months. The mean ± standard error of the mean of the operative time, intraoperative blood loss, and x-ray exposure were 128 ± 36 minutes, 204 ± 35 mL, and 43 ± 12 seconds, respectively. The VAS for back and leg pain decreased significantly postoperatively from 6.4 ± 2.7 to 1.5 ± 0.6 (p<0.01), and from 7.1 ± 2.4 to 1.3 ± 0.4 (p<0.01) respectively, as did the ODI from 39.3 ± 11.2 to 16.5 ± 4.7 (p<0.01). Bone fusion was observed in eight patients. There were no other major complications at last follow-up. MIS-TIF is a safe and effective procedure for disc herniation in the thoracolumbar junction. Occurrence of non-union is relatively high compared to previous findings.

The clinical features of 26 patients who had undergone operations for single disc herniations at T10-T11 through L2-L3 were investigated. Affected levels were as follows: 2 patients with disc herniation at T10-T11 disc, 4 patients at T11-T12, 3 patients at T12-L1, 6 patients at L1-L2, and 11 patients at L2-L3. The level of disc space of interest was confirmed with whole-spine plain roentgenograms. The caudal end of the cord was judged by magnetic resonance imaging and computed tomographic myelogram.

Two patients with T10-T11 disc herniation showed moderate lower extremity weakness, increased patellar tendon reflex, and sensory disturbance of the entire lower extremities. Three of four patients with T11-T12 disc herniation experienced lower extremity weakness, and three patients had...
accentuated patellar tendon reflex. Sensory disturbance was observed in the anterolateral aspect of
the thigh in one patient and on the entire leg in three patients. Bowel and bladder dysfunction was
noted in three patients. In the T12-L1 disc herniation group (n = 3), muscle weakness and atrophy
below the leg were advanced, and bowel and bladder dysfunction were also noted. Two of these three
patients had bilateral drop foot, and one patient had unilateral drop foot; sensory disturbance was
noted in the sole or foot and around the circumference of the anus, and the patellar tendon reflex and
Achilles tendon reflex were absent. All six patients with L1-L2 disc herniation showed severe thigh
pain and sensory disturbance at the anterior aspect or lateral aspect of the thigh. On the other hand,
there were no clear signs of lower extremity weakness, muscle atrophy, deep tendon reflex, or bowel
and bladder dysfunction in these patients. In the L2-L3 disc herniation group (n = 11), all patients had
severe thigh pain and sensory disturbance of the anterior aspect or the lateral aspect of the thigh.
Weakness in the quadriceps was noted in five patients and weakness in the tibialis anterior in two
patients. Decreased or absence of patellar tendon reflex was observed in nine patients. Five patients
had positive straight leg raising test results, and eight patients showed positive femoral nerve stretch
test results.

Among thoracolumbar junction disc herniations, T10-T11 and T11-T12 disc herniations were
considered upper neuron disorders, T12-L1 disc herniations were considered lower neuron disorders,
L1-L2 disc herniations were considered mild disorders of the cauda equina and radiculopathy, and L2-
L3 disc herniations were considered radiculopathy. These findings had relatively distinct differences
among herniated disc levels 9).

References

4) Kang J, Chang Z, Huang W, Yu X. The posterior approach operation to treat thoracolumbar disc
herniation: A minimal 2-year follow-up study. Medicine (Baltimore). 2018 Apr;97(16):e0458. doi:
10.1097/MD.00000000000010458. PubMed PMID: 29668617; PubMed Central PMCID: PMC5916692.
6) Liu N, Chen Z, Qi Q, Shi Z. The relationship of symptomatic thoracolumbar disc herniation and