HERNIATED INTERVERTEBRAL LUMBAR DISC IN THE TEENAGER

S. Bulos, Beirut, Lebanon

From the American University of Beirut

The first report of an operation for herniation of a lumbar disc in a child (twelve years old) was published in 1945 by Wahren. Since then few reports have appeared in the literature dealing with this condition in the adolescent.

MATERIAL

In the eleven years 1961 to 1971, a total of 456 patients were treated by the author for lumbar disc herniation. Of these, only seventy-six or 17 per cent were subjected to operation. Included in the group were eight patients aged between fourteen and nineteen: five of these were operated upon, two refused operation, and one was treated by bed rest.

![Figure 1](image.png)  
**Figure 1**—Histogram of the ages of all 76 patients.  
**Figure 2**—Histogram of the level of discs removed.

The criteria for the diagnosis of herniation of a lumbar disc were clinical: low back pain or sciatica, accompanied by muscle spasm, list to one side, sometimes a neurological deficit in the lower extremities, and a positive straight leg raising test. Disc degeneration without evidence of nerve root impingement was not included.

The criteria for operation were the same both for adults and adolescents—namely one or more of the following: neurological deficit, failure of conservative treatment, and frequent recurrent attacks. With one exception, myelography was done before operation in all patients.

Analysis of the ages of patients and the level of the discs removed is shown in Figures 1 and 2. The discrepancy in the number of patients operated upon and the number of discs removed is accounted for by excision of more than one disc in seven patients, and further operation in one patient for a recurrence. The commonest level of disc removal was L4–5 both for adults and adolescents.

CLINICAL DETAILS

Table I summarises the eight cases in adolescents. Seven were boys, and there was a definite history of injury in six. With one exception they all presented with severe spasm of the erector spinae muscles virtually immobilising the whole of the spine; when they were asked to bend, all they were capable of doing was to nod (Figs. 3 and 4). All had changes in gait.
characterised by a peculiar shuffle in an involuntary effort to immobilise the pelvis and to prevent the swing-through phase of the lower limbs. Straight leg raising was severely limited, but despite the seeming severity of the nerve root impingement, no patient had any appreciable neurological deficit.

Seven patients failed to respond to conservative treatment which had been tried for not less than three months, and were advised to undergo operation. Five accepted operation but two refused it despite continued pain and disability. Although relief of pain after operation was prompt, recovery of spinal mobility was very slow, and muscle spasm and list took many months to disappear. Recovery was ultimately complete and the patients were released for sports activities within six to twelve months. One patient (Case 4), whose recovery six months after operation was incomplete in that although he had little pain considerable spasm and list of the spine persisted, was readmitted to hospital. Further myelography revealed a defect at the level of the pedicle of the fifth lumbar vertebra on the right which had not been shown before. At a further laminectomy—of the fifth lumbar vertebra—a loose fragment of fibrocartilage was found lying in the canal next to the pedicle on the right, the source of which was not clear. The patient recovered fairly rapidly thereafter; the list disappeared within two months and there was gradual but slow improvement in mobility.

The findings at operation were interesting. Except in one case, the disc was found to be bulging tightly right across, with no visible evidence of disc degeneration. This exception (Case 1) was the youngest patient, whose disc had ruptured postero-laterally on the right, with consequent sequestration of a fragment. This patient had had symptoms for longer than any other, and was the slowest to recover mobility of the spine.

TABLE 1
SUMMARY OF THE CLINICAL FEATURES

<table>
<thead>
<tr>
<th>Case number</th>
<th>Age* (years)</th>
<th>Sex</th>
<th>Duration of symptoms</th>
<th>Injury</th>
<th>Spine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>Male</td>
<td>1 year</td>
<td>Yes; doing somersault at gymnastics</td>
<td>Rigid and list to right</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>Male</td>
<td>7 months</td>
<td>No</td>
<td>Mild spasm</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>Male</td>
<td>6 months</td>
<td>No</td>
<td>Severe spasm. Obliteration of lordosis and list to right. Rigid</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>Male</td>
<td>6 months</td>
<td>Yes; motorcycle</td>
<td>Severe spasm and scoliosis to right. Rigid</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>Male</td>
<td>3½ months</td>
<td>Yes: football</td>
<td>Severe spasm and list. Obliteration of lordosis. Rigid</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
<td>Male</td>
<td>9 months</td>
<td>Yes; fell on stairs</td>
<td>Severe spasm and list. Limitation of flexion</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
<td>Male</td>
<td>Failed conservative treatment</td>
<td>Yes; weight lifting</td>
<td>Severe spasm with list</td>
</tr>
<tr>
<td>8</td>
<td>19</td>
<td>Female</td>
<td>3 weeks</td>
<td>Yes; at gymnastics</td>
<td>Severe spasm. No flexion</td>
</tr>
</tbody>
</table>

* The age of the patients when first seen and not at the onset of symptoms.
TABLE 1—continued
SUMMARY OF THE CLINICAL FEATURES

<table>
<thead>
<tr>
<th>Neurological findings</th>
<th>Straight leg raising right/left (degrees)</th>
<th>Myelography</th>
<th>Operation</th>
<th>Time to complete spinal mobility</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>No deficit</td>
<td>0/50</td>
<td>Positive L.5-S.1 Postero-lateral defect (R)</td>
<td>Excision L.5-S.1 disc Dec. 1969</td>
<td>6 months</td>
<td>Full, Follow-up 2 years</td>
</tr>
<tr>
<td>No deficit</td>
<td>30/70</td>
<td>Positive L.4-5 Central block</td>
<td>Excision L.4-5 disc Oct. 1969</td>
<td>3 months</td>
<td>Full, Follow-up 2 1/2 years</td>
</tr>
<tr>
<td>Absent right ankle jerk</td>
<td>0.30</td>
<td>Positive L.4-5 block</td>
<td>Excision L.4-5 disc Nov. 1970</td>
<td>2 months</td>
<td>Full, Follow-up 1 1/2 years</td>
</tr>
<tr>
<td>No deficit</td>
<td>0/10</td>
<td>Questionable L.4-5</td>
<td>1) Excision L.4-5 disc April 1971 2) Laminectomy L.5 Nov. 1971</td>
<td>More than 8 months</td>
<td>1) Limited, 2) Full excluding sport</td>
</tr>
<tr>
<td>No deficit</td>
<td>25/60</td>
<td>Positive L.4-5</td>
<td>Excision L.4-5 disc Aug. 1968</td>
<td>3 months</td>
<td>Full, Follow-up 3 1/2 years</td>
</tr>
<tr>
<td>No deficit</td>
<td>50/80</td>
<td>—</td>
<td>Refused</td>
<td>—</td>
<td>Limited with pain, spasm and stiff back</td>
</tr>
<tr>
<td>No deficit</td>
<td>30/30</td>
<td>Positive L.4-5 block</td>
<td>Refused</td>
<td>—</td>
<td>Limited</td>
</tr>
<tr>
<td>No deficit</td>
<td>40/40</td>
<td>No</td>
<td>No. Improved on conservative treatment</td>
<td>—</td>
<td>Full</td>
</tr>
</tbody>
</table>

DISCUSSION

Lumbar disc herniation in patients under twenty years is uncommon. Since 1946 there have been a few published reports (Mixter and Barr 1934, Key 1950, King 1959, Epstein and Lavine 1964, Rugtveit 1966, Day 1967, MacGee 1968, Bradford and Garcia 1969). Webb, Svien and Kennedy (1954) reported sixty cases in patients under eighteen years of age out of 6,500 lumbar disc herniations operated upon. They found no significant differences in the clinical or pathological features from those in adults who had similar lesions.

Bradford and Garcia (1969) reported thirty cases of surgically treated lumbar intervertebral disc herniations in children and adolescents. They pointed out that the awareness of the condition by physicians in general was inadequate, which tended to delay the diagnosis, and they suggested that some “disc space infections” of children might in fact be herniations of the lumbar intervertebral disc.

Rugtveit (1966) reported seven patients between the ages of eleven and seventeen years out of 840 patients operated upon for lumbar disc herniation. He noted no differences in the pathogenesis of the condition from that in adults. Epstein and Lavine (1964) reported ten patients between fifteen and nineteen years out of 560 lumbar disc herniations operated upon, and Day (1967) reported nineteen teenage patients with herniated lumbar disc, eleven of whom were operated upon. Again no significant differences were noted in the pathogenesis of the condition from that in adults.

In the present study clinical differences were noted between the adolescents and adults, as well as in their pattern of recovery after operation. Whereas lumbar disc herniation in the adult is largely secondary to degenerative disc disease as evidenced by the operative findings and by routine pathological examination of specimens removed, often with large sequestered fragments, disc herniation in the adolescent is usually seen after severe injury,
with a direct causal relationship. The operation findings in most of the adolescents—a tightly bulging but intact annulus and gelatinous core—suggested absence of degeneration. Histological examination of excised material, however, did not reveal any differences from material removed from adults. In the series reported by Bradford and Garcia (1969) the pathologist reported the disc material to be normal in seventeen cases and degenerate in eight.

Myelography is essential before operation because there are practically no specific localising signs. Apart from one case in which it was unconvincing (but proved to be correct), myelography was unequivocal and was well correlated with the operative findings (Figs. 5 to 8).

The incidence of disc herniation in the adolescent in this group was only 1.7 per cent. Because of its rarity it often goes unrecognised for some time: the average duration of severe symptoms was seven months. As noted by Rugtveit (1966), while similar subjective symptoms and objective signs may be present in both adolescents and adults with herniated lumbar disc, the objective findings dominate the picture in adolescents and their complaints are minor, whereas in adults the opposite is usually the case.

Conservative treatment failed in seven out of eight patients. Two of the seven have so far refused operation: their activities are restricted and they still have symptoms and more prominent signs.

Operation gave gratifying results, with gradual recovery and eventual return to full activity including sports. An interesting feature however was the slowness of the recovery of spinal mobility. In one patient persistence of the rigidity and list was due to a loose fragment in the spinal canal at a lower level. It is notable that those with the longest history of symptoms and apparently greatest severity of injury were the slowest to recover spinal movement and normal gait after operation. One wonders whether earlier operation might have resulted in more rapid recovery. In a recent case in a woman of twenty-five who had had recurrent sciatica with spasm of the erector spinae muscles and list ever since she was sixteen years of age, five months elapsed after operation before the spinal list was corrected.
Case 5—Plain radiographs of the spine. The spinal list and obliteration of the lumbar lordosis are well shown.

Case 5—The myelograph of one patient.
SUMMARY

1. Of 456 patients with features of herniated intervertebral disc eight were under twenty years of age.
2. Differences in the pattern of clinical presentation of the herniated disc syndrome in adults and in adolescents are discussed.
3. Whereas in the adult conservative treatment is usually successful, this is not so in the adolescent, in whom the symptoms and signs tend to persist for many months.
4. It is suggested that in the adolescent conservative treatment should not be prolonged despite the absence of neurological deficit; operation should be undertaken early after confirmation of the diagnosis by myelography.

REFERENCES