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UNILATERAL AND BILATERAL PARTIAL LAMINECTOMY IN LUMBAR DISC PROLAPSE

A Follow-up Study of 156 Patients

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The results of two comparable groups of in all 156 operated patients with lumbar disc prolapse were evaluated 4–9 years postoperatively. Sixty-seven patients had received bilateral and 89 unilateral partial laminectomy. At follow-up, the results of the bilaterally operated were all excellent or good, whereas 15 per cent with unilateral exposure were unchanged or worse. The unilaterally operated presented a significantly higher incidence of low back pain and recurrences of sciatica than the bilaterally operated. There were no reoperations for recurrent prolapses following the bilateral approach compared with four after unilateral approach. It is concluded that bilateral partial laminectomy affords a good view of the disc pathology and a greater possibility for obtaining relief of the symptoms without reducing the stability of the column.

Key words: lumbar disc prolapse; sciatica; intervertebral disc displacement; surgical approach; unilateral and bilateral partial laminectomy

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The best surgical approach in lumbar disc prolapse is still a matter for discussion. The communications in the literature vary considerably regarding the operative technique and the results of the operative treatment (Armstrong 1951, Connolly & Newman 1971, Hakelius 1970, O'Connell 1951, Raaf 1970, Rosen 1969, Simeone 1971). No method seems to be generally accepted.

One reason for this great divergence in results may be the preoperative heterogeneity of the various materials. In addition, the psychosocial and economic aspects of these lesions play an important and steadily increasing role and have a perceptible influence on the pre- and postoperative evaluation. Lastly, the diagnostic ability of the surgeon and his surgical skill must be taken into consideration.

Little has so far been reported about different operative methods in prolapse surgery from one department. The purpose of this study is to evaluate the late results of two different exposures, unilateral and bilateral partial laminectomy, especially concerning the relief of sciatica, postoperative low back pain, recurrence of severe sciatica and surgery for recurrent prolapse.

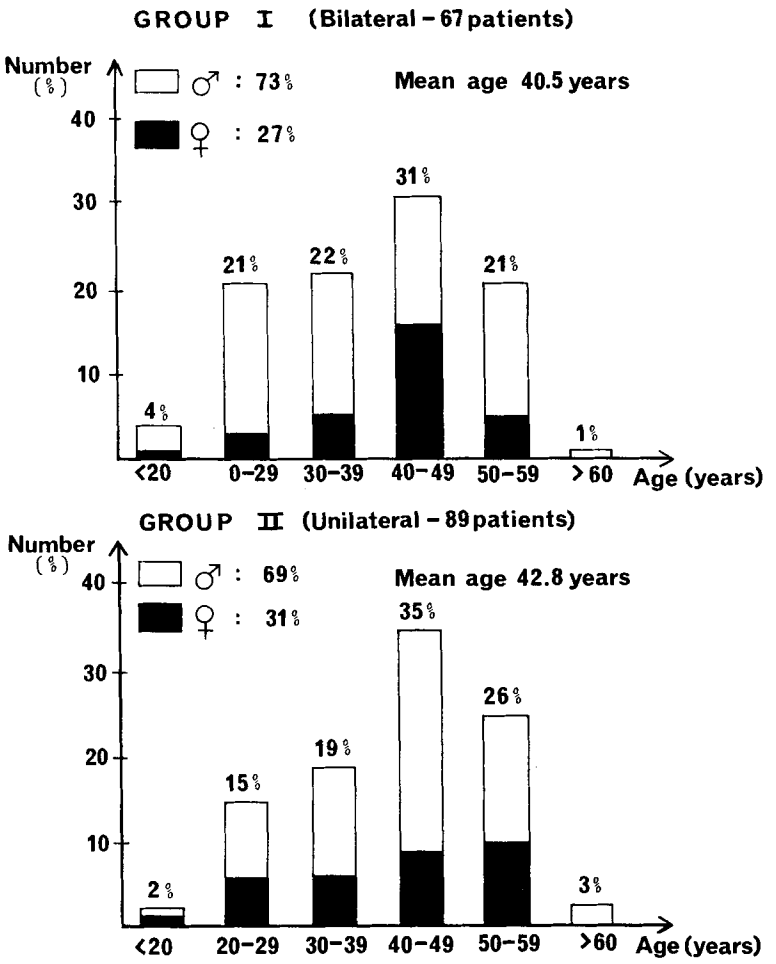

Figure 1. Sex and age distribution of 156 patients with unilateral and bilateral partial laminectomy.

MATERIAL AND METHODS

During the period 1967-1971, 249 patients were operated for lumbar disc prolapse at Martina Hansens Hospital. In order to get two comparable groups preoperatively with the exposure as the only variable parameter, 156 patients fulfilled the following criteria:

1) Maximum of 6 months duration of symptoms after the attack of sciatica which led to the operation.
2) Unilateral symptoms of sciatica.
3) Affection of the fifth lumbar and/or the first sacral nerve root.
4) No previous operation for lumbar disc prolapse or other back disease.

Treatment

In Group I, 67 patients were treated by bilateral partial laminectomy. The muscles were detached from the spinous processes and the laminae to the intervertebral joints. About one third of the spinous process facing the intervertebral space was chiselled off and the ligaments removed. The laminectomy was more extensive on the prolapse side, here occasionally including the medial border of the joint facet without destruction of the intervertebral joint. The disc was incised and completely emptied on both sides.

In Group II with 89 patients an interlaminar unilateral exposure was performed with detachment of the muscles and extirpation of the ligaments only on the prolapse side. After minimal removal of the adjacent edges of the laminae, the disc was incised and emptied as completely as possible from one side only.

All the patients were operated on in the prone position with rolls placed under the shoulders and the chest wall, and the table usually

flexed to spread the lumbar interlaminar spaces.

The choice of exposure was quite independent of the preoperative symptoms and signs. It only depended upon which method the surgeons, mostly four, experienced either as operators or assistants, were accustomed to use.

The surgical indications in our hospital are very restrictive. As a general rule surgical intervention is not considered justified without prior conservative therapy for at least 6 weeks. In addition, our department emphasizes the importance of pre- and postoperative treatment with exercises, and therefore, it is of interest to mention that the mean period of hospitalization was 45 days in both groups.

As can be seen in Figure 1 the sex and age distribution and the mean age at operation were rather similar in the two series.

The statistical analysis between the groups has been performed with the χ^2-test with Yates' correction.

Follow-up examination

All the 156 patients were examined 4–9 years after the operation, partly by personal examination and partly by a questionnaire, the average observation time being 5.7 years in Group I and 6.6 years in Group II. Three patients had died from heart disease, but sufficient information regarding their previous back disorder was given by the relatives and the postoperative examinations documented in the records.

RESULTS

As indicated in Table 1, there are only minor differences between the groups as regards the preoperative status defined according to various parameters in the clinical history. A similar uniformity regarding the preoperative signs and myelographic findings is documented in Table 2. Surgery was performed in only 9 cases (6 per cent) without prior myelographic examinations, the reason being hypersensitivity to the contrast medium or clinically convincing symptoms. By review of the X-rays of the lumbosacral column no preponderance of general lumbar disc degeneration was displayed in either of the series.

It can be seen from Table 3 that seven cases (8 per cent) in Group II were operated at the L_4/L_5 and the L_5/S_1 levels. Four had protrusions and two negative findings. The last one was only explored at one level and the discs were judged to be quite normal at the primary operation.

Table 1. Preoperative status in 156 patients with unilateral and bilateral partial laminectomy.

	Group I Per cent	Group II Per cent
Type of work		
heavy manual	26	24
manual	40	38
non-manual	34	38
Previous low back pain	84	91
Onset of sciatica		
acute	56	47
gradual	44	53
Localisation of sciatica		
right	50	49
left	50	51
Pain on coughing and sneezing	85	69
Duration of symptoms		
0–3 months	47	49
4–6 months	53	51

Table 2. Signs and myelographic findings in 156 patients with unilateral and bilateral partial laminectomy.

	Group I Per cent	Group II Per cent
Positive Lasègue's sign	97	84
Impaired sensibility	53	66
Impaired Achilles reflex	43	49
Pareses	47	55
Myelography		
positive	96	91
negative	1	1
not performed	3	8

The percentage of free, sequestrated prolapses is strikingly high, more so in Group I than in Group II, but the difference is not significant ($P > 0.10$). The designation "extruded prolapse" includes not only a free sequestrum in the spinal canal but also an extruding prolapse through a rupture of the annulus or the posterior longitudinal ligament.

The peroperative complication frequency in the material is 6 per cent dural ruptures in Group I against 11 per cent in Group II. In addition, late complications included one patient with discitis in the former group and one with spondylitis in the latter group.

Table 3. Disc levels and findings at operation in 156 patients with unilateral and bilateral partial laminectomy.

	Group I Per cent	Group II Per cent
Operated disc level		
L 4/L 5	54	50
L 5/S 1	46	42
L 4/L 5 + L 5/S 1	0	8
Findings at operation		
Extruded prolapse	43	33
Protrusion	57	64
Negative	0	3

At follow-up, the state of the patients was classified according to the criteria presented in Table 4, mainly judged from their subjective assessment of functional ability. The bilaterally operated were all "excellent" or "good" while 15 per cent with unilateral exposure were "unchanged" or "worse". This difference is statistically significant ($P < 0.005$). If only the "excellent" results are taken into consideration the difference is highly significant ($P < 0.001$). In Table 5 the significantly higher incidence of low back pain in Group II ($P < 0.05$) is noteworthy.

In addition, there were nine patients (13 per cent) in Group I and 23 patients (26 per cent) in Group II with recurrences of severe sciatica (Table 5). Whereas 6 and 18 patients in Groups I and II, respectively, had recurrences in the same limb as the initial syndrome, it was interesting to note that only two in Group I as against three in Group II experienced the new attack of sciatica on the opposite side to their previous prolapse. The last three patients reported that they had bilateral recurrences. The designation of an episode of severe sciatica as recurrent sciatica during the follow-up period implies an official sick registration or hospitalization for at least 3 weeks.

The three patients (4 per cent) receiving disability insurance and belonging to

Table 4. Results of follow-up examination in 156 patients with unilateral and bilateral partial laminectomy.

	Group I Per cent	Group II Per cent	
Excellent: Symptom-free or occasional minimal residual symptoms, normal working ability	64	34	
Good: Slight symptoms, full-time occupation in lighter work	36	51	91 per cent satisfactory
Unchanged: Significant symptoms, unable to work or doing light work periodically	0	2	
Poor: Not relieved of major preoperative symptoms or worse postoperatively, disability insurance owing to the back disease	0	13	9 per cent unsatisfactory

Group I were a 48-year-old woman with predominantly psychosocial problems, a 60-year-old man with co-existing painful hip arthrosis and a 61-year-old man with 50 per cent disability. Nevertheless, they stated the results of their operated back as being "good", which was also confirmed by objective examination.

Table 5. Long-term effects in 156 patients with unilateral and bilateral partial laminectomy.

	Group I Per cent	Group II Per cent
Low back pain	30	51
Recurrence of severe sciatica	13	26
Returned to work within ½ year postoperatively	91	80
Lighter work	12	9
Reduced physical activity	18	40
Disability insurance	4	12

Recurrences

Among the 156 patients six were reoperated during the follow-up time. Two surgical explorations for suspected recurrent prolapses in Group I revealed one case with discitis and one with adherences on the previously prolapsed side.

However, three patients in Group II were reoperated for massive, free, sequestrated prolapses at the same level and on the same side 1–2 years after the primary exposure. A free sequestrum was also present at the initial operation in two of them. The fourth patient with manifest clinical signs of prolapse was exposed unilaterally at one level in 1967, but the exploration of the last two lumbar spaces failed to provide any explanation for the condition. The decompression of the laminectomy apparently improved the symptoms, but bilateral laminectomy through two levels in 1969 revealed an overlooked sequestrated prolapse with adherences of the 5th and a new extrusion of the 4th disc.

DISCUSSION

The two groups can be compared reasonably well because of their similarity in composition and in the various parameters demonstrated. Therefore, the preponderance of successful results in Group I should indicate a more rational and effective surgical exposure.

However, strong objections can be raised. This is a retrospective study without randomized groups. Moreover, the surgeons have used only their own exposure routinely. Thirdly, a minor preponderance of free extruded prolapses in Group I, even if it is not statistically significant, might point to a more advanced process of degeneration, sequestration and extrusion among these patients. A more "ripe" prolapse is known to give a more successful result (Burns & Young 1951).

On the other hand, it is very doubtful whether the increased incidence of low back pain in Group II can be explained by the higher mean age at operation (2.3 years) and the longer follow-up period (0.9 year). These differences are considered too small to influence the results.

The arguments against the unilateral interlaminar approach are that it affords a poor view and prevents complete emptying of the disc. The importance of complete removal has been pointed out by several authors (Armstrong 1951, Raaf 1970, Rosen 1969). For these reasons a partial bilateral laminectomy should be preferred.

The objection to total laminectomy and to some extent hemilaminectomy is that it produces a reduced postoperative stability of the column, resulting in low back pain (Connolly & Newman 1971). However, Jackson (1971) and Naylor (1974) reported no difference in the incidence of low back pain among patients with wide laminectomy and those with the interlaminar approach.

The bilateral exposure as described in

the present study by no means implies such an extensive procedure as a total or hemilaminectomy. The anatomy of the spinal column presents great individual variations, especially in the width and the position of the laminae. In some patients the interlaminar space, particularly at the L_5/S_1 level, is sufficiently wide to permit removal of the protruding intervertebral disc with minimal bilateral excision of bone.

The incidence of recurrent herniations at the same or another level reported in the literature varies between 0 per cent and 24 per cent with an average of 10 per cent (Stauffer et al. 1971). In the present series the rate amounts to scarcely 2 per cent, and the only overlooked prolapse and the three recurrent prolapses at the same level were seen among the unilaterally exposed patients.

Recurrence at the level of the original prolapse is probably due to continuation of the biochemical, degenerative process resulting in a loose sequestrated nucleus or annulus fragment. Considerable degenerated tissue may be present, and after withdrawal of a free sequestrum or a bulging disc a radical removal of the interspace from both sides and across the midline with a conchotome is indicated. Lastly, a curettage is performed leaving only the anterior and lateral rims of the annulus intact. We have also found it valuable to record routinely the weight of the disc tissue removed at operation. At the follow-up examination this figure tells something of how radical the previous disc excision was.

The follow-up gives the impression that the bilateral partial laminectomy is a more valuable and safe procedure than the unilateral one, which perhaps may be insufficient in a given case. The better exposure affords a good view of the pathology and a greater possibility for ensuring relief of the symptoms. Bilateral exploration does not seem to induce an increased postoperative morbidity or to influence the integrity or the stability of the spinal column to any great extent. Our material indicates that postoperative adhesions with severe sciatica contralaterally to the previous prolapse rarely occur among bilaterally exposed patients.

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