

Recurrent Lumbar Disc Prolapse Review of Thirty-Two Cases

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Abstract

Objective: The purpose of the study was to detect any specific risk factors for development of recurrent lumbar disc prolapse. **Patients and methods:** This is a retrospective clinical analysis. Between 2004 and 2006, at the Department of Neurosurgery, Cairo University Hospitals, thirty two cases with recurrent lumbar disc prolapse were retrospectively studied and evaluated as regards their personal criteria, their clinical presentations, their MRI pictures, types of operations performed. **Results :** Males were affected more than females, diabetes mellitus was a significant risk factor in conjunction with smoking, young age at the first presentation was a significant risk, median period after the first operation was one year, the most constant symptom was sciatica, the most significant accurate investigation was MRI with contrast, conservative treatment had no role in recurrent lumbar disc, the most constant operative procedures were laminotomy, recurrent discectomy, and foraminotomy, outcome was very promising after operative intervention. **Conclusion:** Recurrent lumbar disc prolapse has certain associated risk factors for its development as, young age at first presentation, male gender with heavy working duties, diabetes mellitus, and smoking.

Keywords: Recurrent lumbar disc, risk factors, management, outcome.

INTRODUCTION

The natural history of the degenerative spine dictates that there will inevitably be an incidence of primary disc herniation. (1)

A number of these patients will be treated by surgical intervention. (2)

The rate of recurrent disc herniation after lumbar discectomy is 5 to 15 %.(3,4)

There are numerous risk factors predicting recurrent disc herniation. Those factors will eventually affect the success rate of the primary disc surgery.

The revision operation has always been a challenge for the spinal

surgeon. Particular care is necessary to define the appropriate clinical situation for additional surgery. The surgeon should be attuned to these suitable clinical circumstances and also be technically able to address the unique milieu of anatomy and pathology posed by repeated surgery. Identification of the factors and circumstances that influence a successful patient outcome is underscored (5).

PATIENTS AND METHODS

Between 2004 and 2006, 32 consecutive patients were treated for recurrent lumbar disc herniation at the

Department of Neurosurgery, Cairo University Hospitals.

The patients clinical data were retrospectively analyzed as regards the duration before the recurrence of

symptoms, the site of new symptoms, the type of the previous operation, the type of new operation, outcome after these procedure, and special character to detect any specific risk factors.

RESULTS

Table (1) PERSONAL FACTORS & TIME INTERVALS

| CASE | AGE | SEX | TRAUMA | DIABETES MELLITUS | SMOKING | RECURRENCE TIME | REOPERATION TIME | FOLLOW UP PERIOD AFTER 2nd OPERATION |
|------|-----|-----|--------|-------------------|---------|-----------------|------------------|--------------------------------------|
| 1 | 41 | F | • | • | | 7 m | 10 m | 9 m |
| 2 | 50 | M | • | • | • | 9 m | 19 m | 12 m |
| 3 | 39 | M | | | • | 13 m | 22 m | 11 m |
| 4 | 45 | F | • | • | | 11 m | 16 m | 16 m |
| 5 | 56 | M | • | • | • | 8 m | 18 m | 3 m |
| 6 | 60 | F | • | | | 15 m | 14 m | 15 m |
| 7 | 49 | M | | • | • | 14 m | 16 m | 6 m |
| 8 | 60 | M | | • | • | 7 m | 17 m | 10 m |
| 9 | 47 | M | | • | • | 17 m | 11 m | 13 m |
| 10 | 43 | M | | • | • | 16 m | 19 m | 14 m |
| 11 | 63 | M | • | • | | 12 m | 20 m | 7 m |
| 12 | 48 | F | • | • | | 14 m | 17 m | 11 m |
| 13 | 55 | M | | | • | 16 m | 18 m | 10 m |
| 14 | 46 | M | | • | • | 8 m | 15 m | 2 m |
| 15 | 58 | M | • | • | | 9 m | 14 m | 15 m |
| 16 | 52 | F | • | • | | 7 m | 18 m | 8 m |
| 17 | 61 | M | | • | • | 10 m | 19 m | 11 m |
| 18 | 64 | M | | • | • | 13 m | 21 m | 9 m |
| 19 | 47 | M | • | • | | 13 m | 14 m | 11 m |
| 20 | 46 | F | • | | | 16 m | 15 m | 4 m |
| 21 | 41 | M | | | | 14 m | 14 m | 9 m |
| 22 | 39 | M | • | • | | 11 m | 18 m | 5 m |
| 23 | 44 | F | | | | 9 m | 20 m | 7 m |
| 24 | 63 | F | | • | | 15 m | 19 m | 10 m |
| 25 | 65 | M | • | | • | 17 m | 11 m | 9 m |
| 26 | 55 | M | • | | | 8 m | 11 m | 3 m |
| 27 | 51 | M | • | • | • | 12 m | 18 m | 2 m |
| 28 | 59 | M | | • | | 14 m | 19 m | 8 m |
| 29 | 49 | M | | | • | 16 m | 14 m | 6 m |
| 30 | 57 | M | • | • | • | 8 m | 13 m | 4 m |
| 31 | 45 | F | | • | | 9 m | 16 m | 13 m |
| 32 | 43 | M | • | | • | 11 m | 17 m | 11 m |

Table (2) Summary of personal characteristics

| | |
|---|----------------------------|
| Age (at time of initial operation) | 52.33 (\pm 13.76) yrs 3 |
| Gender (M/F) | 23/9 |
| Occupation | |
| - hard | 15 |
| - light | 9 |
| - non | 8 |
| Trauma | |
| - lifting heavy object | 8 |
| - sudden twisting | 4 |
| - vehicle accident | 2 |
| - fall | 3 |
| - no history | 15 |
| Diabetes mellitus | |
| - no history | 13 |
| - controlled | 12 |
| - uncontrolled | 7 |
| Smoking | 16 |
| Conservative treatment | 3 months |
| Time interval before recurrence of pain | 12.44 (\pm 5.9) m |

Table (3) Pre-operative clinical findings

| SYMPTOMS & SIGNS | PATIENT'S NUMBER |
|--|------------------|
| Back pain | 30 |
| Sciatic pain | 32 |
| - Unilateral | 29 |
| - Bilateral | 3 |
| Intermittent claudications | 4 |
| Bladder dysfunction | 2 |
| Lumbar tenderness | 30 |
| Positive straight-leg raising test | 28 |
| Motor deficit | 24 |
| - Weakness in foot dorsi-flexion | 18 |
| - Weakness in flexion of the great toe | 6 |
| Sensory deficit | 20 |
| - L4 root | 1 |
| - L5 root | 15 |
| - S1 root | 4 |
| Reduced reflex | 9 |
| - Patellar | 3 |
| - Ankle | 6 |

Fig (1) Common presentations in patients with recurrent disc

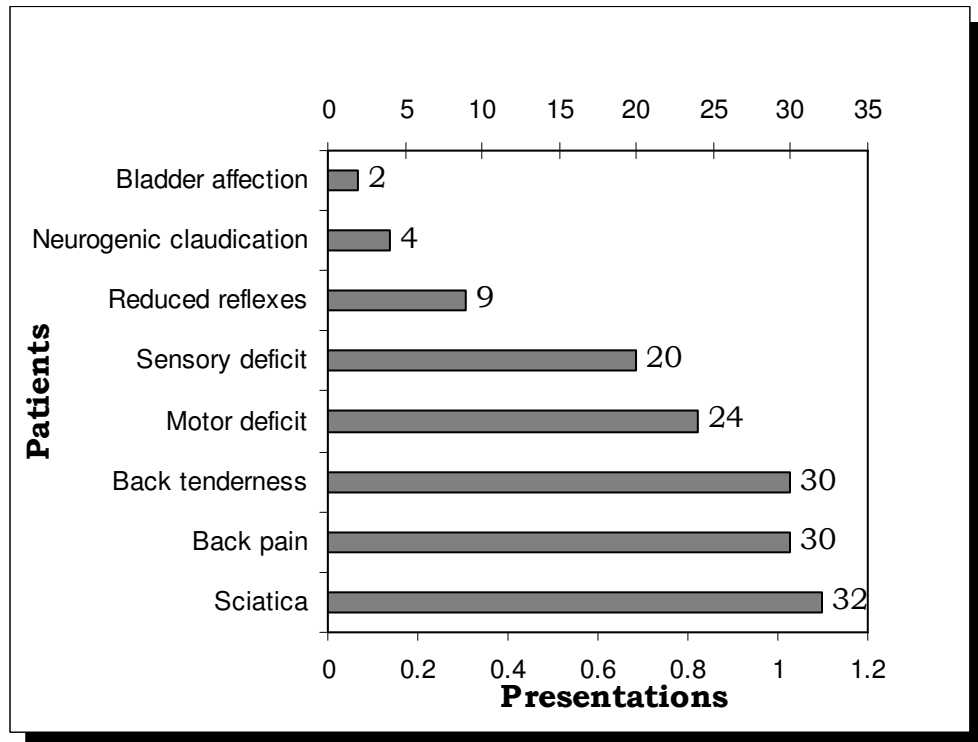
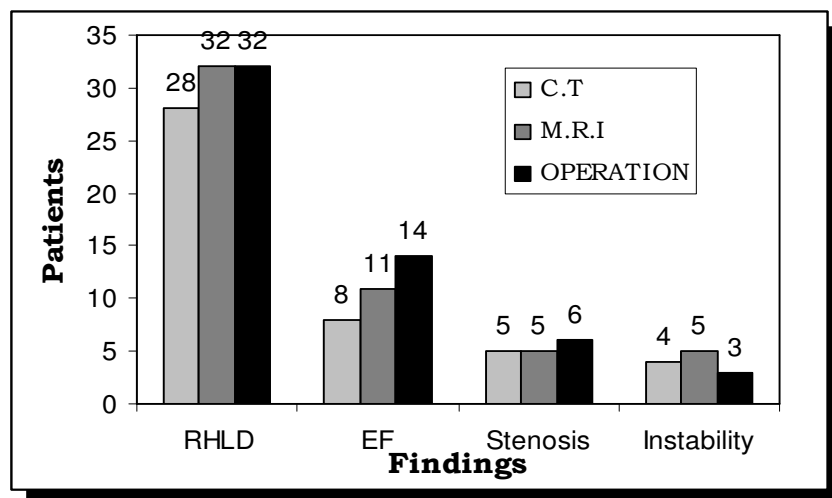


Table (4) Imaging and operative findings

| CASE | PREVIOUS OPERATION | | | RADIO IMAGING | | | | | | | | | INTRA OPERATIVE FINDING | | | | | | |
|------|--------------------|------------------|-----------------------|---------------|-------------|-------------|------------|------|----------|-------------|------------|------|-------------------------|------------|------|----------|----------|--|---|
| | LAMINOTOMY | HEMI LAMINECTOMY | BILATERAL LAMINECTOMY | X-RAY | | C:T | | | MRI | | | | INSTABILITY | RECURRENCE | SCAR | STENOSIS | | | |
| | | | | LEVEL | INSTABILITY | INSTABILITY | RECURRENCE | SCAR | STENOSIS | INSTABILITY | RECURRENCE | SCAR | | | | | STENOSIS | | |
| 1 | | | • | 4,5 | • | • | • | | | | • | • | | | • | • | | | |
| 2 | | • | | 5 | | | • | | • | | | • | | | | • | | | • |
| 3 | | | • | 5 | | | | • | | | | • | • | | | • | • | | |
| 4 | | | • | 4 | | | • | • | | | | • | • | | | • | | | |
| 5 | • | | | 3 | | | • | | | | | • | | | | • | | | |
| 6 | | • | | 4 | | | • | | | | | • | | | | • | | | |
| 7 | | | • | 4,5 | | | • | | | | | • | | | | • | | | |
| 8 | | | • | 4 | | | | • | | | | • | • | | | • | • | | |
| 9 | | | • | 4,5 | • | • | • | • | | | • | • | • | | | • | • | | |
| 10 | | | • | 5 | | | • | • | | | | • | • | | | • | • | | |
| 11 | | • | | 4 | | | • | | • | | | • | | | • | • | | | • |
| 12 | | | • | 4 | | | • | | | | | • | | | | • | | | |
| 13 | | • | | 5 | | | • | | • | | | • | | | | • | | | |
| 14 | | | • | 4 | | | • | • | | | | • | • | | | • | • | | |
| 15 | | | • | 5 | • | • | • | | | | • | • | | | • | • | | | |
| 16 | • | | | 5 | | | • | | | | | • | | | | • | | | |
| 17 | | | • | 5 | | | • | | | | | • | • | | | • | • | | |
| 18 | | | • | 5 | | | • | | | | | • | • | | | • | • | | |
| 19 | | • | | 4 | | | • | | | | | • | | | | • | | | |
| 20 | | | • | 5 | | | • | | | | | • | | | | • | | | |
| 21 | | • | | 5 | | | • | | | | | • | | | | • | | | |
| 22 | | | • | 4,5 | | | | • | | | | • | • | | | • | • | | • |
| 23 | | | • | 4 | • | • | • | | | | • | • | | | | • | | | |
| 24 | • | | | 4 | | | • | | | | | • | | | | • | | | |
| 25 | | | • | 5 | | | • | | | | | • | • | | | • | • | | |
| 26 | | | • | 4,5 | | | • | | • | | • | • | | | • | • | | | • |
| 27 | | • | | 5 | | | • | | | | | • | | | | • | | | |
| 28 | | | • | 4 | | | • | | | | | • | | | | • | | | |
| 29 | | | • | 5 | | | | • | | | | • | • | | | • | • | | • |
| 30 | | | • | 4 | | | • | | | | | • | | | | • | | | |
| 31 | | | • | 5 | | | • | | | | | • | • | | | • | • | | |
| 32 | | | • | 5 | | | • | | | | | • | | | | • | | | |

Fig (2) Validity of Preoperative Radio Diagnosis *RHLD* recurrent herniated lumbar disc, *EF* epidural fibrosis



Tab (5) Summary of significant pre-operative investigations

| TYPE OF INVESTIGATION | FINDINGS | PATIENTS |
|--|--|--|
| Plasma glucose level (Fasting & post prandial) | - High in non diabetics - High in diabetics | 3 10 |
| X-ray lumbosacral spine <ul style="list-style-type: none"> • Site of previous laminectomy • Signs of instability | - L3 - L4 - L5 Spondylolisthesis at same level | - 1 - 20 - 16 4 |
| C.T scan lumbosacral spine (with contrast) | - Recurrent disc - Associated EF - Canal stenosis - Spondylolisthesis | 28 8 5 4 |
| M.R.I lumbosacral spine (with contrast) | - Recurrent disc . Central . Postero-lateral . Far lateral . Ipsilateral . Contralateral - Associated epidural fibrosis - Canal stenosis - Instability | 32 11 19 2 16 5 11 5 5 |

Table (6) Pre- and post-operative JOA score

| SCORE SUBGROUPS | PRE OPERATIVE | POST OPERATIVE |
|-----------------|---------------|----------------|
| -6 to -1 | 1 | 0 |
| 0 to 5 | 5 | 1 |
| 6 to 11 | 9 | 3 |
| 12 to 17 | 10 | 6 |
| 18 to 23 | 7 | 10 |
| 24 to 29 | 0 | 12 |

Fig (3) pre- and post-operative JOA score

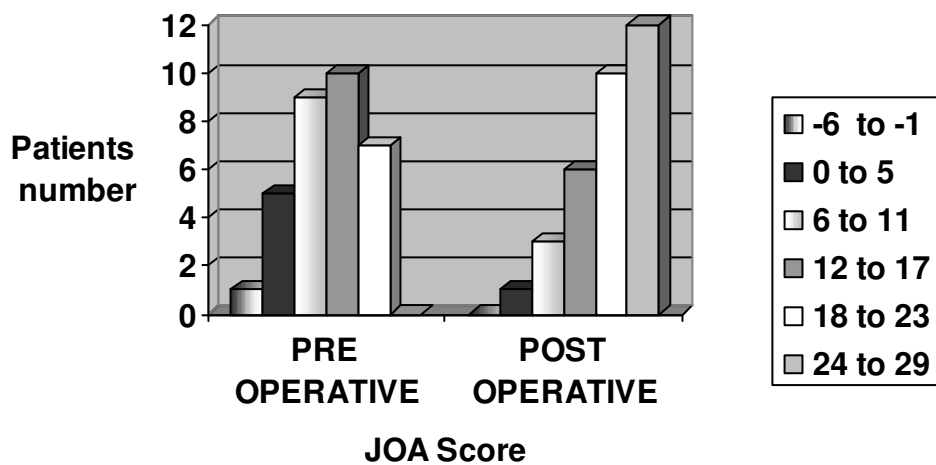


Table (7) Post-operative functional capacity recovery

| DEGREE OF RECOVERY | CLINICAL STATUS | NO. OF PATIENTS |
|--------------------|--|-----------------|
| Excellent | No symptoms and normal objective findings (neurologically intact) | 12 |
| Good | Marked improvement and no disabilities (minor sensory deficit and paresis grade 4/5 with improvement at least one grade) | 14 |
| Fair | Some residual symptoms (minor complaints) and abnormal objective findings (minor sensory deficit, mild atrophy, and paresis grade 3/5 or 4/5 with improvement of at least one grade) | 5 |
| Poor | No improvement (major complaints, marked deficits and atrophy) or deterioration. | 1 |

For those patients graded excellent & good, they returned to their previous work status or normal daily activity. And for those graded fair, all of them had marked improvement but 2 of them needed to continue on analgesic drugs.

Fig (4) Functional capacity recovery

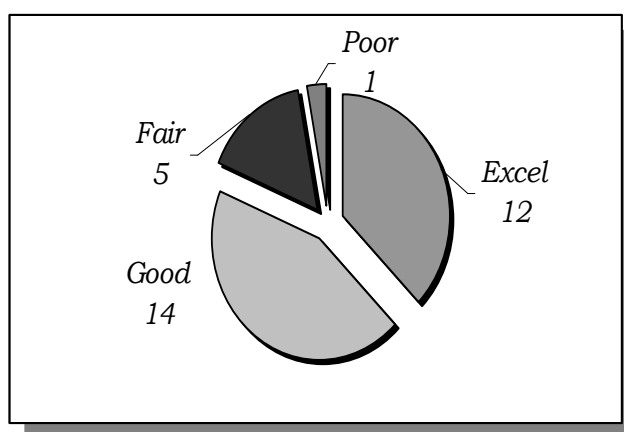


Table (8) Operative findings

| ITEMS | NUMBER OF PATIENTS |
|---|--------------------|
| Type of previous operation | |
| • Discectomy with laminotomy | 3 |
| • Discectomy with hemi-laminectomy | 7 |
| • Discectomy with total bilateral laminectomy | 22 |
| Intra-operative findings: | |
| • Herniated disc | 32 |
| • Associated Epidural fibrosis | 14 |
| • Type of disc herniation | |
| - Contained | 8 |
| - Non contained | 24 |
| • Instability | 3 |
| • Canal stenosis | 5 |
| Re-operation: | |
| • Discectomy with hemi-laminectomy | 7 |
| • Discectomy with total bilateral laminectomy | 25 |
| • Added foraminotomy with nerve root Neurolysis | 32 |
| • Added resection of scar tissue | |
| • Added medial hemifacetectomy | |
| - Unilateral | 10 |
| - Bilateral | 10 |
| • Added transpedicular fixation | 20 |
| • Added canal decompression | 3 |
| | 5 |
| Complication: | |
| • Dural tear | 5 |
| Directly repaired with sutures | 2 |
| • Wound infection | 2 |
| • CSF leak | 1 |
| Need for a third surgery | 0 |

Fig (5) MRI axial & sagittal views showing recurrent herniated disc

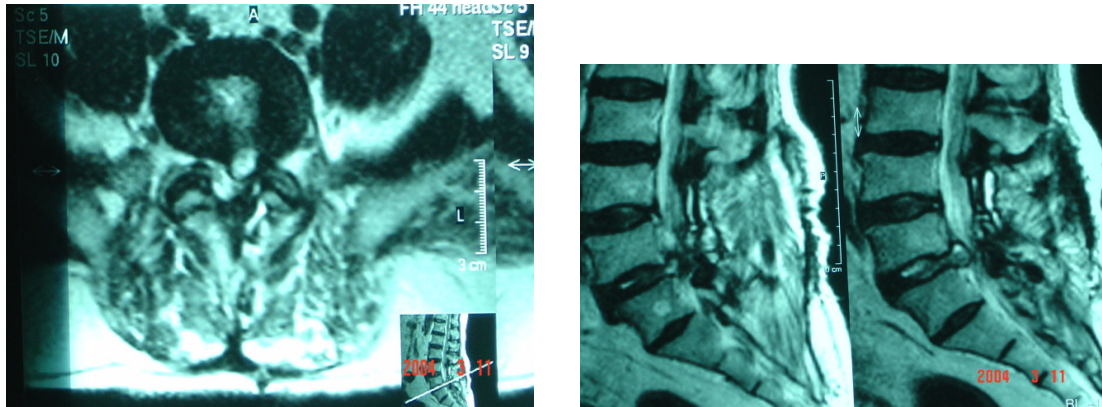
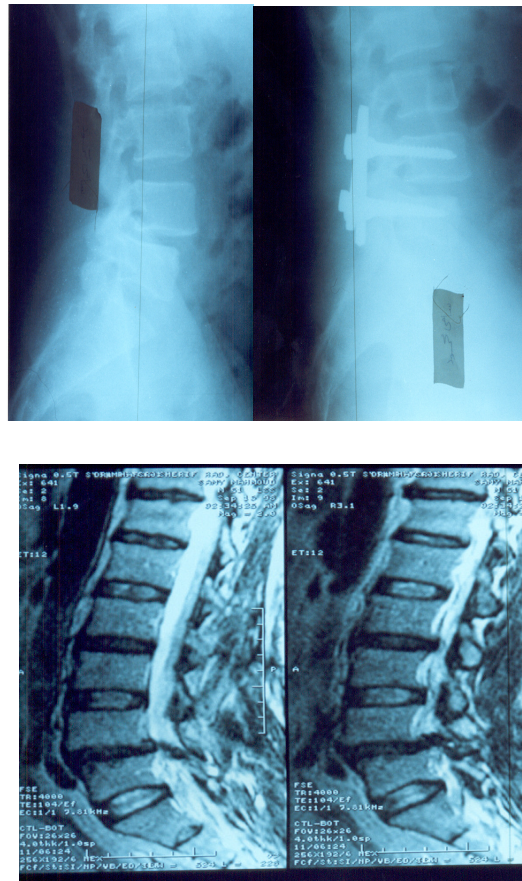


Fig (6) (Top) lateral X-ray showing L4 over L5 spondylolisthesis (left) & after transpedicular fixation (right) ... (Bottom) sagittal T2 showing recurrent L4-5 disc with spondylolisthesis



DISCUSSION

The definition of recurrent disc herniation has varied among the different authors. A recurrent disc herniation was sometimes defined as the disc herniation developing in the

same level as the prior discectomy (6), either on the same or the opposite side, whereas more authors included the herniation at a new level in their study series (7). In our opinion, the latter situation should be considered as a new herniation.

Recurrent disc herniation has been reported in varied proportions among patients after discectomy.

Davis (1994) (8) retrospectively analyzed 984 patients who underwent standard discectomy, 970 (88%) of who presented the following after an average follow-up of 10.8 years: 6% of the patients were submitted to repeat surgery for a recurrent or new herniation. Of these, 50% had a recurrent herniation, 34% herniated at a new level, and 16% had a contralateral herniation at the operated level.

Ozgen et al (1999)(9) reported findings of revision surgery in 114 patients with prior lumbar discectomy. Disc herniation was noted at the operated level, on the same or the opposite side, in 56 patients (49.1%).

Lewis et al (1987)(10) found after following up prospectively 100 patients who had undergone standard discectomy for 10 years, a recurrent herniation in 13 of 16 patients during revision surgery.

All 32 patients in the current study although operated initially in the same hospital, the incidence of recurrent disc herniation could not be determined, due to the fact that despite keeping a record for the total number of patients operated upon for herniated lumbar disc, multiple follow-up drop outs due to patients non-compliance and defective follow-up data recording, render calculating such an incidence a misleading effort.

There were no demonstrated effects ($P < .05$) from age at prior surgery, traumatic events, level of herniation, side of recurrence, period of conservative treatment, preoperative JOA score, associated spinal stenosis, direction of recurrent disc herniation or dural tear on the recovery rate.

Still remarkable in the middle east region is the fact that males contribute to the majority of cases

counted in our studies, in contrary to ones carried in other world regions, but this is more due to the higher hard occupation rate and better feasibility to seek treatment, rather than a true pure gender-related prevalence.

In the present study we found that the young age at the first operation for lumbar disc herniation, was a significant risk factor for development of recurrent herniated lumbar disc which is closely similar to many studies. (2,9,11)

The present study showed that the symptoms and signs of patients with recurrent disc herniation were not different from those with a primary disc herniation. We also found that typical sciatic pain was problematic in all patients, but associated low back pain & tenderness were also a predominant complaint of the patients. This finding was similar to the results of Jonsson and Stromqvist (1996) (11).

In addition, 4 patients in our series had both sciatic pain and intermittent claudications. All of them were more than 55 years old. This clinical feature may be associated with the decreased capacity of the spinal canal, caused by degeneration of the lumbar vertebrae (12).

Preoperative radiological differentiation of the causes leading to recurrence of symptoms, especially epidural fibrosis and recurrent disc, is important not only for surgical planning, but also for predicting outcome. The scar may surround the nerve roots and cause symptoms by means of neural tension, decreased axoplasmic transport, restriction of blood flow, or of venous return (13). In classical teaching, a scar does not benefit from reoperation and in fact may result in worse outcomes (14). Sensitivity and validity of diagnostic tools used can not as yet be considered to be optimal. A strong positive correlation between CT (83% in our

study) and operative findings suggests that post-contrast CT may be used as one of the reliable method for preoperative differentiation of recurrent disc from epidural fibrosis. But sensitivity of MR as verified by reoperation was found to be over 99 per cent and this is the diagnostic tool to be recommend for making the differential diagnosis of recurrent disc. We observed some discordance between the radiological and surgical findings in our re-operated cases, but being very few and non catastrophic, makes it fairly acceptable.

It has been reported that the long-term outcomes of patients surgically treated for recurrent disc herniation have a wide range of variation (15). There are many outcome scales that make it difficult to compare the results of different centers (16). That may be related to the different inclusion criteria applied in these studies.

Patients with recurrent herniation were often reviewed together with those presenting with herniation at a new level (17) or those with failed lumbar surgery due to other causes (18). But it is widely accepted that the results after repeated surgery on recurrent disc are comparable to those of the first intervention

Cinotti et al (1998, 1999)(19,20), prospectively analyzed patients with recurrent disc herniation at the same level as the primary discectomy, either on the same or the opposite side, demonstrating no significant difference in clinical outcome of discectomy between patients with recurrent herniation and without recurrent herniation. In other words, the same percentage of patients obtains a good result from their initial disc operation as they do if they have an operation for a true recurrent disc herniation.

Satisfactory outcomes were also obtained from the current study. Only one of the patients experienced no improvement, and 2 patients, although with pain relief at different degrees still needed analgesic drugs.

Thus, poor outcome was encountered in only one patient after being re-operated for a recurrent disc. Interestingly, she had associated dense epidural fibrosis at the previous laminotomy site. So, co-existence of two discrete types of compressive lesions predicted a high risk of bad outcome.

Fortunately, preoperative diagnosis of such a co-existence was not problematic in our patients, especially with MRI. Despite inverse relation between the outcome and number of operations, we could have expected a third operation for this patient. However, we could not detect any surgically remediable lesion and decided to treat her conservatively.

In conclusion, the patient with recurrent disc herniation, recurrent stenosis or instability can achieve potentially good results with repeat surgery.

Different factors that influence the long-term outcome of revision surgery for recurrent disc herniation have been shown to be a predictive value for prognosis.

Length of the time interval for resuffering of sciatica after the initial operation correlated well with outcome. Patients whose symptoms recurred in delayed manner seemed to have better outcomes ($p < 0.05$).

On the other side, Nygaard et al (1994)(21) retrospectively reviewed 93 consecutive primary discectomies to evaluate the prognostic value of symptoms (lumbar pain and sciatica) and sick leave. They found that the duration of the present attack of sciatica and sick leave before surgery was significantly longer in the group

with an unsatisfactory outcome compared with the group with a satisfactory outcome.

Vucetic et al (1999) (22), also had similar findings. In a prospective 2-year follow-up study of 160 consecutive patients undergoing primary surgery for suspected lumbar disc herniation, they demonstrated that the duration of sciatica of less than 7 months was one of the factors predicting return to work within 1 year.

Also, Baba et al (1995)(23) and O'Sullivan et al (1999)(24) noted that the outcome was inversely related to the times of operation. The patients who had an early revision had an earlier improvement and better results.

The previous two findings were matching the results of this study.

In the current study, we routinely performed limited discectomy on the patients with recurrent disc herniation, where only herniated disc fragments were removed and a thorough curettage of the disc space was not necessary. Removal of as much as possible of the remaining nucleus and annulus during revision surgery has been recommended by some authors (23). However, radical discectomy, has been believed to compromise the stabilizing function of the disc and increase the severity of postoperative low back pain. (25)

As for the extent of posterior element removed, it was preferable to widen the previous exposure proximally, distally, and bilaterally to identify and expose the intervertebral disc and the index nerve root to limit exposure in the defect left over by the primary surgery. Thus, medial facetectomy, unilateral or bilateral, was usually necessary before discectomy was performed.

Utilizing the microscope added safety and positive impact on our results.

Fusion with or without instrumentation is only indicated when postoperative segmental instability is inevitable or preexisting instability will be progressive after decompression. Of the patients who underwent bilateral total laminectomy, posterolateral fusion with transpedicular screw fixation was supplemented in 3 patients with associated degenerative spondylolisthesis.

A discectomy was performed coupled with decompression for severe spinal stenosis. If coexisting spinal canal stenosis was a conditional but not absolute determinant of neural compression, discectomy without thorough canal decompression was usually sufficient.

Far lateral disc herniations applies to herniation of discs that compresses the nerve root at the same level and often migrates laterally and cranially into and/or lateral of the intervertebral foramen. In this series, there were 2 extreme lateral disc herniations, including 1 ipsi-lateral and 1 contralateral herniation compared with the prior posterolateral disc herniation. The same operative procedure was followed as in other patterns of recurrent disc herniation. The direction of recurrent disc herniation had no significant influence on the recovery rate.

Several aspects of the study might have affected the validity and demonstrated results. The causes of failure of primary discectomy might be multiple. That would make the patient group not homogenous. First; the patients enrolled in this series might have undergone primary surgeries by different procedures for different indication. Therefore, it was impossible to evaluate the amount of

removed disc during the primary surgery and its impact on the recurrence of disc herniation. Also inability to record the type of disc fragment in the initial operation passed the chance to determine one of the risk factors.

Second, we have analyzed a mixed patient population treated with several surgical techniques including laminotomy, hemi-laminectomy, bilateral laminectomy, and posterior instrumented fusion when repeat discectomy was performed. The effect of operative techniques upon the outcome of repeat discectomy has not been further analyzed because of the relatively small sample size.

Finally, no factors were found to be statistically related to the outcome of revision surgery for recurrent disc herniation ($P \geq .05$). However, the strength of this finding might be weak. That is, the insignificant results in relating the factors with the outcome of surgery might be due to insufficient patient numbers to fully demonstrate the differences. Thus a following study involving higher number of patients might help to confirm or exclude significance of such risk factors .e.g. smoking & diabetes, by comparing to normal population prevalence.

In conclusion Recurrent lumbar disc prolapse has certain associated risk factors for its development as, young age at first presentation, male gender with heavy working duties, diabetes mellitus, and smoking.

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الغضروف القطني المرتجع : مراجعة لإثنين وثلاثون حالة

الملخص العربي

كان الهدف من هذه الدراسة هو تحديد أي عوامل قد تؤدي إلي زيادة نسبة حدوث غضروف قطني مرتجع. تمت هذه الدراسة الإكلينيكية علي 32 حالة في قسم جراحة المخ والأعصاب جامعة القاهرة. بمراجعة البيانات الخاصة بالمرضي تفصيلاً تبين أن صغر سن المرضي عند الإصابة بالغضروف أول مرة ، وكذلك الذكور وبخاصة الذين يعملون أعمال ثقيلة ، والمدخنين والصابين بمرض الداء السكري أكثر عرضة لحدوث ارتجاع للغضروف القطني عن المرضي الآخرين.