(FROM THE ORTHOPEDIC CLINIC AT KAROLINSKA INSTITUTET, STOCKHOLM. CHIEF: PROFESSOR STEN FRIBERG)

RETROPERITONEAL DISC FENESTRATION IN LOW-BACK PAIN AND SCIATICA

A Preliminary Report.

By

L. HULT, M.D.

The reader is referred to Dr. Hirsch's article in this issue for the patho-anatomic and patho-histologic process on which the following views are based.

A rupture in the annulus prepares the way for fragments of the disc to be ejected, and whether or not pain develops will depend on the extent and direction of the rupture. It has been proved (Hovelaque, Roofe, Wiberg) that there are numerous nerve ends in the posterior parts of the annulus, while none have been found in the interior or the anterior part of the disc. Therefore, if an antero-lateral incision is made in the disc, it should be possible to divert the pressure in that direction and thereby prevent it from being transmitted posteriorly to the sensitive posterior longitudinal ligament or the nerve roots. Anyone who has done a lumbar sympathectomy knows that it is simple to reach behind the peritoneum through a hypogastric incision and in that way provide a convenient antero-lateral approach to the lumbar discs.

On the basis of this reasoning, we operated on four cases at the end of 1947 and the beginning of 1948. At the same time we attempted to achieve intercorporal fusion. The main difficulty was to determine which disc was causing the symptoms. If the X-rays and myelography were negative, we could not decide from which disc the trouble emanated. Even if the X-rays showed signs of degeneration in a disc we could not be sure that we had found the true culprit; the symptoms might just as well originate from some other disc which looked perfectly normal. In their anatomic investigations Friberg and Hirsch show definitively that extensive disc degeneration may be present despite negative X-rays.

Hirsch also showed that the patient's symptoms can be elicited by puncturing the disc and injecting Ringer's solution under pressure. Lindblom made similar experiments, but instead injected contrast fluid and then took X-rays. He was able to show in a clinical material that extensive disc degeneration was very common, even when the X-ray was negative, and that herniation was present in numerous cases in which myelography was negative. The essential point in this connexion is, however, that it seems possible to decide from which disc the symptoms emanate, since an injection in the right disc immediately provokes or makes worse the patient's low-back pain or sciatica. It seems to me, therefore, that discography provides a combined morphologic and functional method which yields very useful information. This method also bears out the theory that pure lumbago, too, is definitely segmental, so that it is often possible to decide clinically, on the basis of the radiation of the pain and the tenderness in the spinous process, the level at which the symptoms have their origin.

On the lines of this diagnostic method, we began to operate in February 1950 on certain cases of chronic low-back pain and sciatica through an antero-lateral approach, but limited our intervention to partial excision of the disc, or what we call fenestration. By means of an ordinary appendectomy incision—made on the left side to avoid the vena cava—it is a simple matter to reach the spinal column behind the peritoneum. The third and fourth lumbar discs are very easily reached; the fifth is somewhat less accessible owing to the iliac vein which crosses it. A hole one-centimeter square is then made in the disc up to the nucleus, thus providing a wide communication. We generally try to remove sequestrated disc tissue. Bleeding is usually scanty, and the intervention is technically a simple one.

From February up to August 1950 we operated on 30 cases according to this method. Myelography was negative in all of them, except one, which reinspection showed to be positive. Most of the patients were severe, chronic cases, had been completely incapacitated for periods ranging from six months to three years, and had been submitted to all the various forms of conservative therapy. Some had been operated on earlier by the posterior approach. Although certain sciatic symptoms were generally present, the principal symptom in the majority of the patients was constant, severe low-back pain, often worst in the recumbent position. Four cases were operated on even though discography did not definitely provoke symptoms; the results were poor in all four. In the remaining 26 cases discography caused a distinct pain reaction from one or more discs. In five cases, the fourth disc was operated on, in eleven cases, the fifth, and in fourteen,

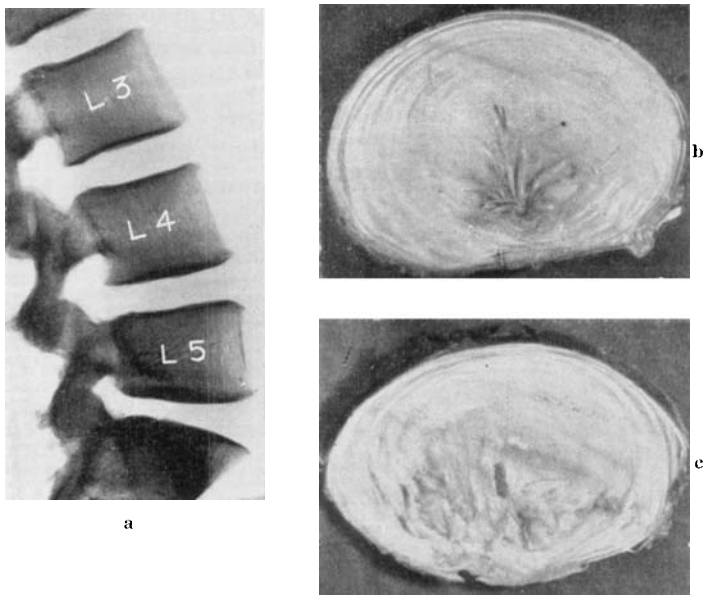

Fig. 1. (From Friberg & Hirsch).

a) Normal radiograph of the lumbar spine.

b) The disc L_{4-5} showing early degenerative changes though normal radiograph.

c) The disc L_5-S_I. Extensive degenerative changes—normal radiograph.

both the fourth and fifth lumbar discs. With the exception of abscesses in the abdominal wound in two cases, there were no postoperative complications.

It is noteworthy that practically all low-back or sciatic pain had disappeared the day after the operation in the great majority of the cases. The patients were delighted and optimistic, but when they were allowed up about one week after the operation they nearly all suffered from typical symptoms which to all intents and purposes were those of pronounced vertebral insufficiency. They complained of tired backs, had not the strength to remain up for more than one hour or so at a time, found it difficult to bend forward, were unable to carry or lift any weight, frequently had pain on coughing or sneezing, and experienced back pain if they twisted or turned suddenly. These evidences of insufficiency regressed slowly, generally taking two to four months to disappear. After six or seven months some patients still suffered from such a degree of vertebral insufficiency that they were unable to perform any work to speak of. Even these patients were nevertheless

exceedingly grateful to have been relieved of their constant backache and reported that their condition was improving slowly but surely.

Even though it is regrettable that these signs of insufficiency delay complete recovery, it is of interest to note that they must have a somewhat different genesis than the low-back pain. It has been our belief that they are tied up with a state of instability in the disc, resulting in part from the wide incision in the annulus. This theory is borne out by the fact that they appear to be more pronounced than those following an ordinary disc operation using the posterior approach, and that they regress slowly. Stability appears to be achieved gradually. It should also be realized that low-back pain and sciatica of as chronic and severe a nature as in the cases in question give rise to a state of inflammatory irritation in the sensitive posterior parts of the annulus, which may well be likened to a sore caused by chafing. Healing will depend on the extent of the "sore" and on the local circulation.

There is good reason to believe that the circulation and the sympathetic nervous system play an important part in the origin and intensity of the pain. It has long been known that a paravertebral sympathetic block may cure chronic low-back pain for a short period or sometimes even permanently. By giving an intravenous injection of tetra-ethyl-ammonium bromide, which selectively blocks the sympathetic and parasympathetic synapses it can be proved, and I have frequently done so, that the above curative action is really caused by the sympathetic block. This injection produces the same curative effect as the paravertebral sympathetic block with procaine. This would seem to prove that it is the blocking of the sympathetic nervous system that relieves the pain. In one of the cases, lumbar sympathectomy was done in connexion with fenestration. This was the only one of the 30 patients operated on who did not suffer any appreciable symptoms of insufficiency following the operation.

Among the objective symptoms, Lasegue's sign usually regressed slowly. The tenderness over the spinous process remained for some time and was even seen in patients who had otherwise recovered completely. On the other hand, in several cases, moderate paresis or reduced sensibility was seen to regress relatively soon after the operation while ankle jerks returned to normal in two cases.

A re-examination of the 30 patients operated on in November 1950, three to nine months after operation, revealed the following:

1) Ten cases (33 %), incapacitated for 6 to 18 months prior to operation (average 11 months), were back at their old occupation, practically completely free from symptoms.

2) Four cases (13 %), incapacitated for 1 to 3 years prior to operation, still had some trouble from vertebral insufficiency but were doing light work.

3) Eight cases (27 %), incapacitated for 6 months to 3 years prior to the operation (average 1⅓ years), were free from the constant pain but still had such pronounced symptoms of insufficiency that they were unable to do any real work (five of them were operated on in

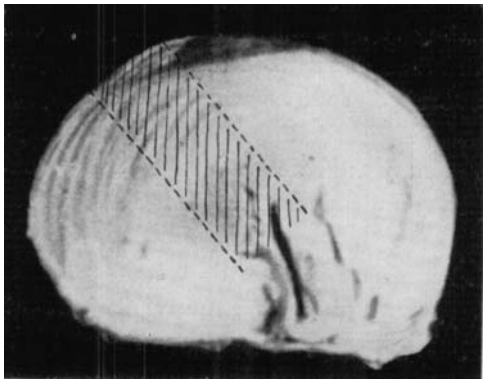

Fig. 2.
Cross section of a degenerated lumbar disc (from Friberg & Hirsch). In such a case the disc substance could be evacuated by fenestration as indicated.

August 1950). Re-examination in February 1951 revealed that seven of these patients were back at work.

4) Four cases (13 %) had improved slightly or only temporarily. Three of them had been operated on previously by means of the posterior approach, and two had revealed no definite pain reaction on discography.

5) Four cases (13 %) showed no effect of the operation. Three of them had been operated on previously by the posterior approach, and two had revealed no pain reaction on discography. In one of the cases with a definite pain reaction from the fifth disc, fenestration yielded very little from the highly fibrous disc, and the operation had no effect whatsoever. Subsequent exploration of the fourth and fifth discs from the back showed no rupture but relieved the patient of his symptoms. On re-examination in November 1950 he was back at his old work.

Judging from the present material, disc degeneration as such does not necessarily give rise to symptoms, and the symptoms emanate from more than one disc much more frequently than previously be-

lieved. Therefore, we now subject the three lowest lumbar discs to discography as a matter of routine. Patients in whom discography does not elicit a distinct pain reaction from any of the punctured discs should not be subjected to operation. The best results would appear to be achieved in cases with constant low-back pain, patients with purely insufficiency symptoms being less suited to operation. Sciatic pain as an accompanying symptom usually disappeared immediately after the operation. A handful of cases had transitory left-sided sciatic symptoms, which they had never had before, a short time after the operation. Because of the postoperative insufficiency symptoms, it would seem that a convalescence of two to four months, or as long as six to seven months in exceptional cases, must be expected, at least in cases in which the condition has been present as long as in those under discussion. It might be that a combination of fenestration and lumbar sympathectomy would be a more satisfactory method.

The principles of antero-lateral partial excision, or retroperitoneal fenestration, are not much different from those of the ordinary disc operation, but the former method has certain advantages that occasionally render it more appropriate than the latter. Technically the intervention is a simple one, and it provides a better approach to the disc. There is no danger of damaging the nerve roots or the dura, around which no scar tissue remains. We would like to believe, too, that the risk of recurrence in the disc operated on is small. It is still too early to express any opinion on the final results, but the primary results are promising. The operations performed on dogs, on which a preliminary report is submitted by Dr. S. E. Olsson in the present issue, confirm our optimism.

SUMMARY

A report is presented of 30 cases with chronic low-back pain and sciatica, operated on by antero-lateral partial excision (retro-peritoneal fenestration) of the disc or discs considered to be the main cause of the symptoms. Discography revealed the discs requiring operation. The patho-anatomic basis of low-back pain and sciatica is discussed, and the part played by the sympathetic nervous system in the pain is pointed out. The results of the operations were good, but complete recovery was usually delayed by symptoms of vertebral insufficiency which gradually regressed. The operation appears to be advisable in certain cases of chronic low-back pain with or without sciatica.

ZUSAMMENFASSUNG

Der Verfasser berichtet über 30 Fälle von Lumbago und Ischias, die mittels einer teilweisen antero-lateralen Excision (retroperitoneale Fensterung) derjenigen Bandscheiben behandelt wurden, die als die Hauptursache der Symptome angesehen wurden. Diskographie zeigte die Bandscheiben an, welche Operation erforderten. Die patho-anatomische Grundlage von Lumbago und Ischias wird besprochen und die Rolle, die das sympatische Nervensystem bei der Entstehung der Schmerzen spielt, wird hervorgehoben. Die Resultate der Operation waren gute, aber vollständige Wiederherstellung war im allgemeinen verzögert infolge von Symptomen von Wirbelsäuleninsuffizienz, die langsam zurückgingen. Die Operation scheint empfehlenswert zu sein in gewissen Fällen chronischer Lumbago mit oder ohne Ischias.

RESUME

Il est rendu compte de 30 cas de douleurs lombaires chroniques et de sciatiques opérés par excision partielle antéro-latérale (fénestration rétropéritonéale) du ou des disques considérés comme étant la cause principale des symptômes. Une discographie révéla que le disque devait être opéré. Discussion de la base anatomo-pathologique des douleurs lombaires et de la sciatique. Le rôle joué par le système nerveux sympathique est notamment relevé. Les résultats des opérations ont été bons, mais la guérison complète a généralement été retardée par des symptômes d'insuffisance vertébrale qui s'atténuèrent graduellement. Il semble que l'opération soit à conseiller dans certains cas chroniques de douleurs lombaires avec ou sans sciatique.

REFERENCES

Friberg & Hirsch: Acta orthop. scand. XIX: 222-242, 1949.
Hirsch: Acta orthopaed. scand. XVIII, 132-140, 1948.
— Acta orthopaed. scand.; this issue.
Hovelacque: Ann. d'anat. pathol. 2, 435, 1925.
Kiær, S.: Acta orthopaed. scand. XIX, 383, 1950.
Lindblom: Acta orthopaed. scand.: this issue.
Olsson, S. E.: Acta orthopaed. scand.: this issue.
Roofe, P.: Arch. of Neurol. & Psych. 44, 100, 1940.
Wiberg: Acta orthopaed. scand. XIX, 211, 1949.