

CONTRAST MEDIUM EXAMINATION OF THE INTER- VERTEBRAL DISCS OF THE LOWER LUMBAR SPINE

By

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After disc prolapse, a common cause of lumbago and sciatica, became the object of operative treatment, the need for an exact diagnosis also increased. In many cases the diagnosis "disc prolapse" can be made clinically but it is often very difficult to decide which disc has been affected. In most cases Norlén's investigations make it possible to decide which nerve root has been compressed. A hernia situated medially in an intervertebral disc or one situated laterally in the lower intervertebral disc can press against the same nerve root and thus give the same clinical picture. The commonest method of examination to ascertain which intervertebral disc is the source of the prolapse, is that of myelography. In the lumbar region the dural sac does not lie tight against the intervertebral discs. Small disc hernias, in a medial position, need not necessarily produce any impression on the dura (Hirsch). Furthermore it is known that lateral disc hernias in fact do not cause an impression on the dura. Disc puncture has been discussed as a method of localising these hernias also, but it has not achieved any widespread use. Many authors, amongst others, Pease, Gellman and Lindgren, have pointed out that the procedure is dangerous. It has been said that the disc tissue is a very vulnerable tissue and that the path of the needle might pave a way for a prolapse.

In 1941 and 1944 K. Lindblom published anatomical studies of discs injected with red lead, but he did not follow-up his original idea until Hirsch had pointed out that a puncture during operation does not cause an immediate prolapse via the path of the puncture, nor does it cause any other complications. In 1947 Lindblom published reports of 13 cases, comprising 15 discs examined with contrast medium. The following year Lindblom published 16 cases; in these, normal saline under pressure and novocain were injected into the discs.

It has proved best and technically easiest to use the method reported by Lindblom. The patient lies on his stomach and an Antoni needle (double needle) is inserted some centimeters from the body's middle line under roentgenoscopy, so that the point of the outer needle lies in the lig. flavum; then the inner needle continues through the



Fig. 1 a-b.



dura and into the disc. A hole in the dura and disc, 0.5 mms in diameter, then exists. Afterwards 2 ml 35 % umbradil are injected. If one uses a 50 % solution of iodine contrast medium in water there is a risk of necrosis (Lindblom). 12 hours after the injection the contrast medium is no longer observable on the roentgenological pictures. Against this, if 3 ccs or more are injected, the contrast medium still exists after 12 hours. The greatest technical difficulty is to get the point of the needle into the centre of the disc.

I have examined 35 patients with contrast medium, and always the 4th and 5th discs were punctured—in two cases, the 3rd also. 11 patients were examined by means of the Antoni needle and suffered no ill effects at all from the examination, the remaining 14 had their punctures with the normal lumbar needle and 7 of these had troublesome effects, which should be attributed to the examination. 5 had headaches. One of these also had vomiting attacks. The temperatures of 2 rose, in the one case up to 39°C. The temperature fell gradually so that he recovered completely after 6 days. All the others were free of trouble after 3 days.

One patient, whose 4th and 5th discs I examined with contrast medium and whom I operated upon for a prolapse of the 4th disc, returned 2 months after his discharge suffering from peritonitis followed by appendicitis and died of this after one week. At the autopsy the 5th disc was removed; this had been examined with contrast

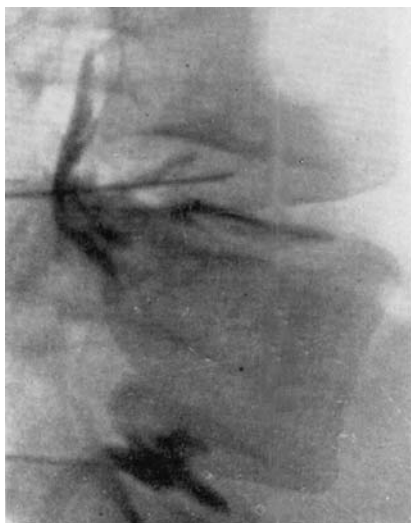


Fig. 2.



Fig. 3.

medium but not operated upon. Macroscopically no marks of the injection needle were to be found, neither was there any necrosis following the contrast medium. The microscopical examination was performed by Docent N. Ringertz. He was unable to see any necrosis of the disc tissue. With regard to the injection path the following statement was made: "At the back of the disc, on the aspect facing the spinal canal, several foci were found in the annulus fibrosus; these consist of sinusoid capillary blood vessels grown into the cartilage and around them, in some places, small haemorrhages together with some connective tissue showing unspecific chronic inflammation. These pictures seem to me to correspond to what would remain following a disc puncture, performed 2 months before death."

18 of the 35 patients were also examined with aero-myelography. In most cases the myelography was carried out before the puncture, so as not to let any haematoma, arising extra-durally upon puncture, cause an impression on the column of air which might resemble a disc hernia. 6 out of these 18 were operated on as a result of the diagnosis obtained from the disc puncture but the aero-myelography

was negative or doubtful. In contrast to this one had a negative result from the puncture but positive aero-myelography. All 7 had prolapses. (Fig. 1-5).

20 out of all those who underwent disc punctures were operated upon, and in all cases except 3 the roentgenological diagnosis agreed with the operative findings. 1 of these patients had a prolapse not

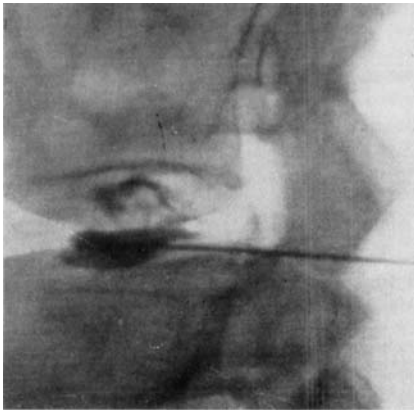


Fig. 4.

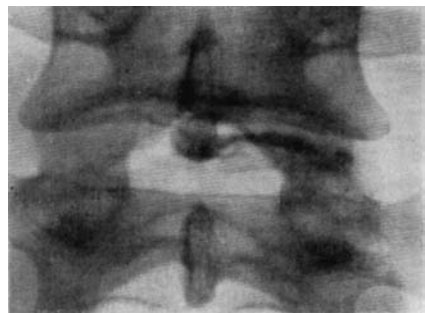


Fig. 5.

visible on puncture. The other 2 patients reported no pain upon the injection of the contrast medium but on the roentgen film a completely degenerated disc was seen, with a rupture through which the contrast medium ran out into the extradural space. No prolapse could be found on operation. (Fig. 6).

It is interesting to note that of these 35 cases I found 6 who had severe lumbago without sciatica but with disc prolapse. 4 of these underwent aero-myelography and 3 of them had negative roentgenological findings.

In 9 cases out of all those examined, the skeletal pictures alone lacked clear signs of degeneration. No fallen intervertebral discs, no exostosis and no instability—Knutsson's method of examination was used. Of these 9, 3 had degenerative disc changes, 4 had prolapses and 2 were normal.

Summarising, it may be said that disc puncture is an extremely valuable complementary examination to myelography. The photographic material is still too small to enable the roentgenological photographs to be judged with certainty. It cannot be said with assurance that the contrast medium must always seep out through a rupture with or without prolapse. Whether the patient with a rupture and without a demonstrable prolapse has a so-called "sliding prolapse" is

difficult to say. I have only noticed two cases of sliding prolapse, published by Bell. He has taken pictures of standing patients, whose dural sacs are filled with pantopaque, and in this way he has discovered prolapses which were not observable in the recumbent position. I have tried to take pictures of standing patients whose discs were filled with contrast medium but without results.

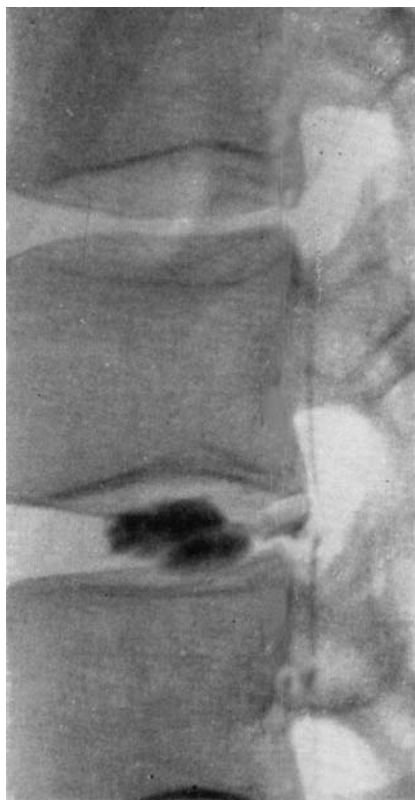
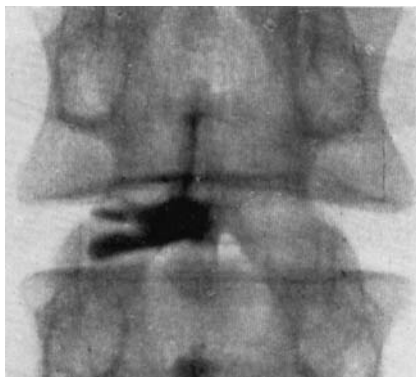


Fig. 6 a-b.



Disc puncture may be further widely employed to estimate the size of an intended fusion. As Friberg and Hirsch, amongst others, have shown, disc degeneration may exist without being demonstrated by the usual roentgenological examination and in these cases it is of great value to be able to examine the disc.

It is of very great interest to observe the patient's sensations of pain at the examination. A number of patients report lumbago pains, when the point of the needle touches the lig. long. post. on a level with one of the discs, which is plainly the cause of the patient's pain. The pain is further advanced via the sino-vertebral nerves which have been

described by Wiberg, amongst others. Hult has begun to operate on these by means of disc fenestration at the orthopaedical department of the Karolinska Institutet.

When contrast medium is injected other patients have sciatic pains of a customary type for the patient concerned. The material is still too small to be able to judge if these pains, which have different etiologies, possess definite diagnostic value.

S U M M A R Y

In 1947 Lindholm published the procedure and results of contrast examination of the intervertebral discs of the lower lumbar spine. I have examined 35 patients, upon 14 of which I used the Antoni needle (double needle). None of these had any trouble at the examination. One patient, who died of an intercurrent disease 2 months after examination, showed no signs of necrosis at the autopsy and the injection canal was filled with connective tissue. On comparison with aëromyelography it is shown that it is possible to find a disc prolapse with this method, not visible on the myelography. The reverse occurred in one case. 20 of those examined were operated upon, and in every case except 3 the roentgen diagnosis agreed with the operative findings.

Puncturing of the discs is an extremely valuable, complementary examination to myelography. The pains which the patients report at the examination are of great interest. Some get lumbago pains when the ligamentum long. post. is touched at a certain level, others have sciatic pains upon injection of the disc. The former pains, produced via the sino-vertebral nerve, can be of great diagnostic value. The latter is due to the fact that the contrast medium fills out a disc hernia.

R E S U M E

En 1947, Lindblom a publié un article sur la méthode des examens des disques intervertébraux de la colonne lombaire inférieure au moyen de contrastant, avec les résultats obtenus. J'ai examiné 35 malades en utilisant chez 14 l'aiguille d'Antoni (aiguille double). Aucun trouble résultant de l'examen n'a été observé. Chez un malade décédé d'une maladie intercurrente deux mois après l'examen, on n'a trouvé à l'autopsie aucun signe de nécrose et le canal de l'injection était rempli de tissu connectif. Par comparaison avec l'aéromyélographie, ceci démontre qu'il est possible, à l'aide de cette méthode, de découvrir un prolapsus discal qui n'est pas visible à la myélographie. L'inverse s'est

toutefois présenté dans un cas. 20 des cas examinés ont été opérés et chez tous sauf 3 le diagnostic radiographique concordait avec les trouvailles opératoires.

La ponction des disques est un examen complémentaire de la myélographie extrêmement précieux. Les douleurs dont se plaignent les malades pendant l'examen ont un grand intérêt. Certains ont des douleurs de lumbago lorsqu'on touche au long ligamen postérieur à un certain niveau, d'autres des douleurs de sciatique après l'injection dans le disque. Les premières douleurs, produites par le nerf sino-vertébral peuvent présenter une très grande valeur au point de vue du diagnostic. Les dernières sont dues au fait que le contrastant remplit une hernie du disque.

ZUSAMMENFASSUNG

Lindblom veröffentlichte im 1947 das Verfahren und die Ergebnisse der Kontrastuntersuchung der Zwischenwirbelscheiben der unteren Lendenwirbelsäule. Bei 14, der von mir untersuchten 35 Patienten, benützte ich die Antoni Nadel (Doppelnadel). Keiner von diesen Patienten hatte irgendwelche Beschwerden bei der Untersuchung. Ein Patient, der zwei Monate nach der Untersuchung an einer interkurrenten Erkrankung starb, zeigte keinerlei Zeichen von Nekrose bei der Obduktion und der Injektionskanal war mit Bindegewebe ausgefüllt. Vergleiche mit der Luftmyelographie ergeben, dass es möglich ist einen Diskusprolaps, der mittels der Myelographie nicht sichtbar gemacht werden kann, mit der neuen Methode zu finden. Das Entgegengesetzte geschah in einem Falle. 20 der untersuchten Patienten wurden operiert und in jedem Falle, abgesehen von dreien, stimmte die Röntgendiagnose mit den operativen Befunden überein.

Die Punktion des Diskus ist eine sehr wertvolle, die Myelographie ergänzende Untersuchungsmethode. Die Schmerzen, welche die Patienten während der Untersuchung angeben sind von grossem Interesse. Einige bekommen lumbagoartige Schmerzen, wenn das lig. longit. post. in einer gewissen Höhe berührt wird. Andere haben ischialgiforme Schmerzen, sobald die Injektion in den Diskus vorgenommen wird. Die zuerst beschriebenen Schmerzen, die über den sino-vertebralen Nerv hervorgerufen werden, können von grossem diagnostischen Werte sein. Die letzteren haben ihren Ursprung in der Tatsache, dass das Kontrastmittel einen Diskusprolaps ausfüllt.

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