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PHLEBOGRAPHY OF THE INTERVERTEBRAL PLEXUS

By

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In spite of the great progress which has been made during the last decade in the attempt to discover the causes for lumbago and lumbago-ischias there still remains a large group of patients whose troubles cannot be explained. The importance of disc degeneration (3, 4, 5, 7) is now generally accepted, but a relationship between the degree of disc degeneration and subjective pain cannot be demonstrated on normal material (8, 9). This discrepancy may suggest that influence of functional factors plays a part and indicates studies of the circulatory phenomena involved. Batson (1, 2) has reported on the role of the vertebral veins in the spread of metastases and infectious processes. The clinical importance of the venous intervertebral plexus has been discussed by others but not thoroughly investigated. The interest in this problem has been mainly from an anatomical point of view (Fig. 1). Since the venous vessels in question now can be visualized with contrast media by angiography and the functional points of view judged by timed, serial recording, this procedure can be used for diagnostical purposes. In lesions, solely restricted to the intervertebral disc, the myelography, in selected cases combined with discography, will certainly remain the routine diagnostical approach. In the more rare cases of altered morphology (haemangiomata, extradural tumors, etc.) and especially in cases affecting the function of the circulation—extravasal effects by fractures and haematoms, as well as intravasal disturbances —this serial phlebography may be diagnostically utilized. Work with similar aspects is reported in (13).

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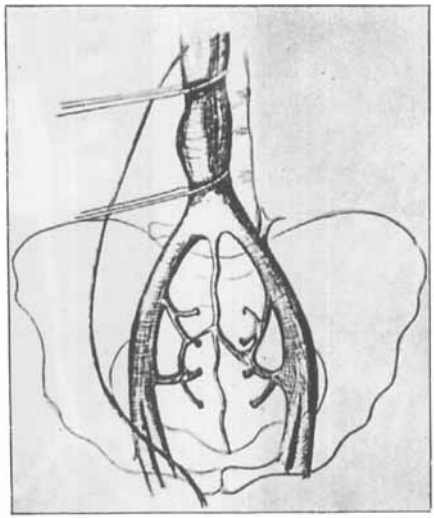


Fig. 1.
The figure demonstrates the common iliac veins converging into the inferior vena cava. The common iliac veins and the lateral sacral veins are connected with the long vertebral sinus. (Figure after R. Northway and G. Greenway).

In the Wenner-Gren Research Laboratory it was observed at heart catheterization on infants (10) that the catheter inserted in the vena cava blocked the normal passage of the contrast material injected into the heart and that he contrast medium instead took its course through the intervertebral plexus (Fig. 2). On other children, no catheter had been inserted in the vena cava but nevertheless, the contrast medium injected into the malleolar vein flowed partly through the vena cava and partly through the intervertebral plexus (Fig. 3). The patient lies on the back during the examination and the contrast material injected (Urokon 70 %) has a higher specific weight than the blood and segmentation follows, but it is still remarkable that such a large quantity passes into the intervertebral plexus. In order to test the reliability of the method mentioned below, contrast medium has been injected post mortem (zinnober in ether oil suspension) into the saphenous vein simultaneously as a clamp is put on the vena cava. After that, the lumbar spine is extracted and x-rayed. See Figs. 4 a and b.

Clinically, it has long been felt that this plexus is not unimportant (ex stas) as a pain-producing factor. We have therefore started a clinical examination of adult patients with pain in the back. Only patients who have been incapable of work for a long time because of backache and who have had every conservative treatment, as well as negative myelograms, have ben examined. The method described by

Fig. 2.
Left anterior oblique projection. The catheter is inserted into the inferior vena cava. The long vertebral sinus is visualized as well as the ascending lumbar vein and its continuation into the azygos vein.

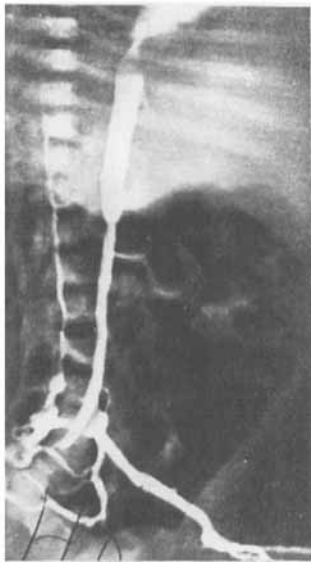
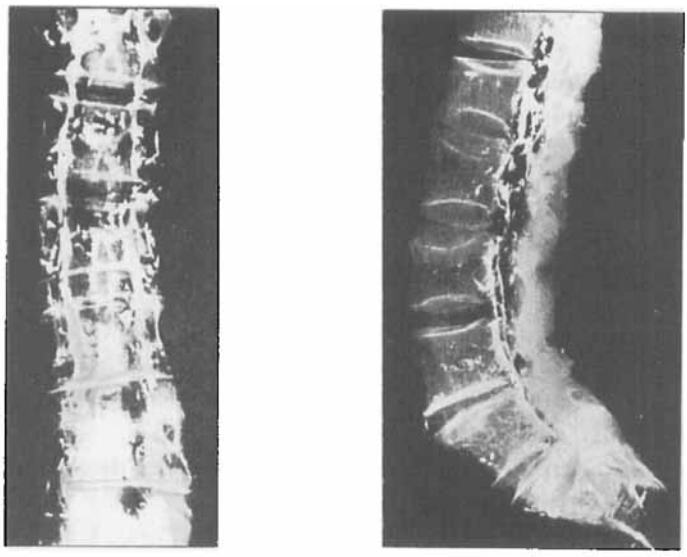


Fig. 3.
Contrast injection into the long saphenous vein at the wrist. No catheter. The contrast material flows partly into the inferior vena cava and partly via the lateral sacral vein into the long vertebral sinus and then segmentally into vena azygos.

Hanson (6) and Nordenström (14) has been used; insertion of a catheter with balloon through the vena saphena so that the balloon, when filled with contrast medium, blocks the lower part of the vena cava. After that, injection of 20–40 cc 70 % contrast material into the vena saphena is carried out with simultaneous running of two synchronous film changers (35 × 35 cm) with exposures in frontal and lateral views at a rate of 1.5 picture/sec. (Fig. 5). The patients have been quite unaffected by the examination and have left the x-ray table without any aid. By means of pictures in rapid series with even time intervals, it is possible to form an opinion about the speed of the flow of the contrast medium. Without drawing any conclusions, we have found that 5 out of 10 patients examined this way sensed their usual back pain at the injection of contrast material (an increase of the venous pressure in these vessels). There is therefore reason to believe that the estimation of the circulatory dynamics now made possible in this field may contribute to the explanation of certain troubles of the back not yet unravelled.



a b

Fig. 4 a and b.

These figures demonstrate frontal and lateral views of post mortem injection of contrast material.

Fig. 5.

Detail of lateral view of the lumbar spine. The catheter with balloon in vena cava.

SUMMARY

The known phenomenon of occasional contrast-visualized intervertebral venous plexus by angiography has been used for intentional phlebography of this region in selected cases of adults with low back pain. The technique is reported and the expected diagnostical utilization discussed.

RESUME

Le phénomène connu du contraste occasionnel observé dans le plexus veineux intervertébral par angiographie a été utilisé dans la phlebographie intentionelle de cette région dans des cas sélectionnés chez des adultes souffrant de douleurs dans le bas du dos.

Il est rendu compte de la technique appliquée et de son utilisation diagnostique éventuelle.

ZUSAMMENFASSUNG

Die bekannte Erscheinung, dass gelegentlich der venöse intervertebral Plexus durch Angiographie dargestellt wird, wurde zur bewussten Phlebographie dieses Gebietes in ausgewählten Fällen bei Erwachsenen mit Lumbago angewendet. Die Technik wird beschrieben und der zu erwartende diagnostische Wert wird besprochen.

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