FROM THE ORTHOPEDIC CLINIC OF LUND, SWEDEN
(PHYSICIAN-IN-CHIEF: G. FRISING, M.D)

CASE OF OPERATED EXTRADURAL NEURINOMA OF PARTICULAR DIAGNOSTIC INTEREST

BY
NILS LINDSTRÖM

There can be no doubt about the great importance of myelography to the diagnosis of spinal cord tumors. This method of examination implies some risk, however, and in order to avoid this risk attempts have been made to reduce the amount of injected lipiodol. For the same reason, great efforts have been made in America in the last few years to make the X-ray diagnosis in cases of spinal cord tumors more precise, in order to render myelography unnecessary—as far as possible. For it is not found advisable to use a smaller quantity of lipiodol than 5 c.c.—because diagnostic mistakes may easily be made with smaller quantities of lipiodol—and it is emphasized at the same time that myelography should be resorted to only in cases where the diagnosis cannot be made in other ways. Elsberg and Dyke thus were able by measuring the arch distance to make the segmental diagnosis without myelography in 42 % of 67 examined spinal cord tumors. But even without this special technic it is possible in a great many cases to demonstrate osseous changes that allow of a local diagnosis. Camp and Adson, for example, were able to demonstrate such skeletal changes in 42 % of cases operated for neurofibroma in the Mayo Clinic in 1930—32. As here in the Orthopedic Clinic of Lund we have operated a case of neurinoma[1]) of the spinal cord with typical changes in the 4th lumbar vertebra (according to Camp's report from the Mayo Clinic), and as the case is interesting also in other respects, I have found it worth describing in detail.

[1]) In the medical literature the neurinoma is still by many authors called neurofibroma.

CASE RECORD

G. A., female, 13 years old. Rec. No. 340/33 and 461/33.

Anamnesis. Measles in childhood; otherwise past history of good health. Since Christmas 1932 the patient has been »dragging« her left leg and complaining of pain in it, especially in the evening. The pain was referred to the inguin and the anterior surface of the thigh; she had no pain while resting. She has not missed school at any time on that account. Since the beginning of March 1933 she has bicycled regularly to and from school, which is 7 km. from her home. She has not complained of any backache, but her mother thinks that she has been somewhat stooping when walking. This trouble has remained rather unchanged, but yesterday she thought the pain was more severe and that she got more tired in her leg than usual, and there was nothing to account for this change. The parents then decided to consult the Orthopedic Out-patient Clinic in Lund, whence she was admitted to the hospital on April 18, 1933.

Physical examination. General condition good; panniculus scanty; complexion good. Examination of the heart, lungs and abdomen reveals no abnormalities. Rectal exploration negative.

Back: S-formed scoliosis with the convexity to the left in the lumbar part of the spinal column. In the upper part of the lumbar vertebral column there is also a slight degree of kyphosis. No tenderness whatever—neither direct nor indirect—over the vertebræ. She is not able to bend forward further than to the horizontal plane, on account of a tightening strain over the posterior surface of the left leg. Otherwise good mobility of the back, without pain. No tenderness to pressure over the muscles of the back.

Lasègue positive, 45° for the left leg, 80° for the right. No tenderness over the posterior surface of the leg.

Knee-jerks: very active on the right side, difficult to elicit on the left side. Achilles reflexes: right normal, left absent. Babinski negative on both sides. Mobility, muscle power and sensibility normal in both legs. Other neurological findings normal.

X-ray examination: In the posterior part of the body of the

4th lumbar vertebra there appears a faint rarification of the shadow, surrounded by a faint sclerotic border. This sclerotic border projects to the posterior, upper and lower corners, forming between them a smoothly rounded, semicircular arch extending 1.5 cm. from the posterior margin of the body of this vertebra. There is perhaps no definite but merely an apparent sclerosis in the border-line along the body of the vertebra, result-

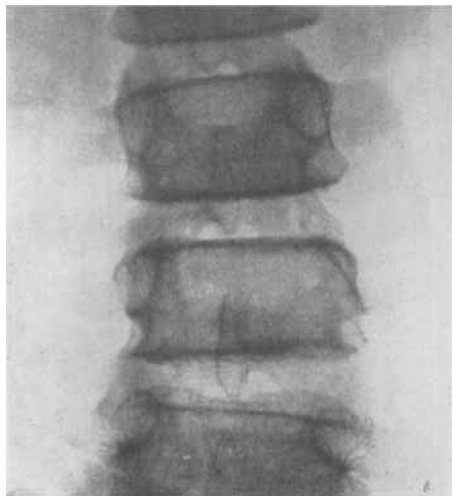

Fig. 1.

ing from the sharp definition of the rarification (Dr. Frising), see Figs. 1 and 2.

Pirquet positive. Wassermann negative .Hæmoglobin 78 %. Red blood count 4,640,000. White blood count 5400. Differential count: Neutrophils 68 %; eosinophils 5 %; basophils 2 %; lymphocytes 17 %; monocytes 8 %.

Lumbar puncture, April 20th: The needle is introduced between the 4th and 5th lumbar vertebræ and seems to enter the spinal canal normally, without any difficulty. The patient complains of severe pain in the left leg, and as blood flows from the needle in rather rapid drops, the puncture is discontinued.

Lumbar puncture, June 3rd: The needle is introduced be-

tween the 2nd and 3rd vertebræ, without any difficulty. Initial pressure 155 mm. Withdrawal of 5 c.c. clear colourless fluid. Movements free. Final pressure 110 mm. Nonne and Pandy negative. Lymphocytes 0.9 per c.mm.; leucocytes 1.2. Wassermann negative.

May 26, 1933: The patient is transferred to the Medical

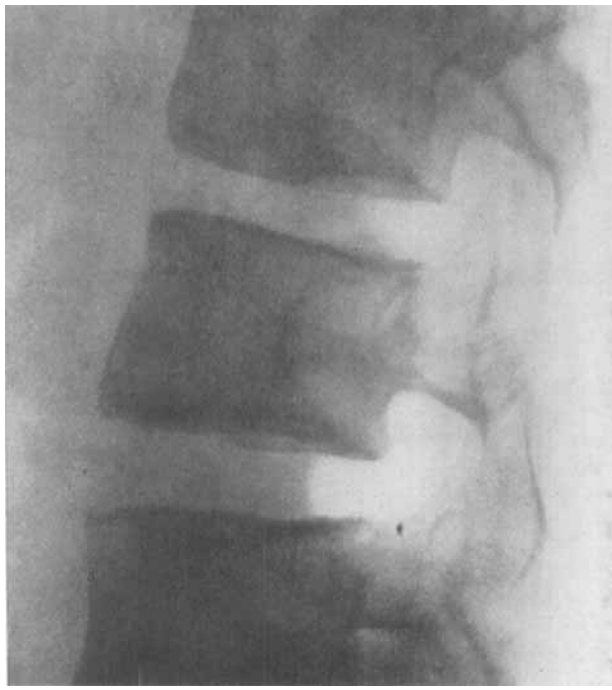

Fig. 2.

Department for further examination and, eventually, myelography.

Here her condition is found to be as recorded above.

Suboccipital puncture, May 31st: 15 c.c. of clear fluid drops from the needle without aspiration. 0.25 c.c. of lipiodol is injected.

X-ray exam.: The posterior part of the body of the 4th lumbar vertebra has undergone destruction; this process extends

from the posterior surface of the vertebral body maximally 1 cm. into the vertebral body. The outline of this process is convex anteriorly, nicely rounded and particularly well-defined. This contour is somewhat denser in structure that the adjacent bone, especially in its lower part. In vertical direction the destruction extends almost to the upper and lower extremities of the verte-

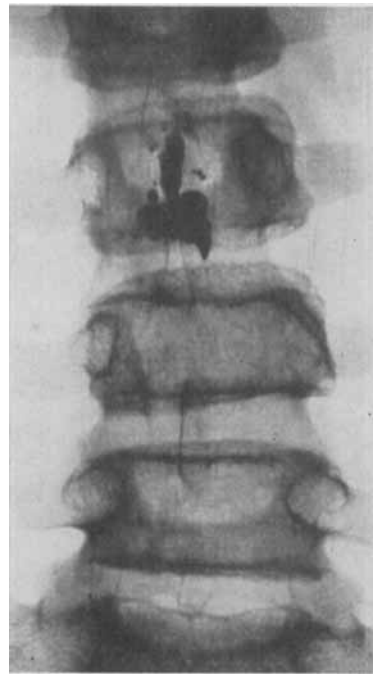

Fig. 3.

bral body. The pedicles of the vertebral arch are markedly decalcified. This reduction in the lime content seems to extend to the middle of the arch.

The normal lumbar lordosis is replaced by a slight but indisputable kyphosis. In addition there is a slight degree of scoliosis with the convexity to the left.

After suboccipital injection of 0.25 c.c. of lipiodol it is found that the contrast is checked at the level of the lower margin of

the 3rd lumbar vertebra. The contrast is displaced distinctly in dorsal direction. The column is in the midline and has a downward concave border.

Pictures taken the next day show that a few small drops of lipiodol have passed the obstruction; the greater part of the injected lipiodol is still remaining above the obstruction.

Fig. 4.

Summary of X-ray findings: There is an anteriorly particularly well-defined and partially incapsulated destructive process in the posterior part of the body of the 4th lumbar vertebra. Evidently the destruction involves also the left part of the arch. The process projects markedly into the vertebral canal, where it has displaced the spinal cord backwards (Dr. Hellmer), see Figs. 3 and 4.

June 2nd: The patient is transferred back to the Orthopedic Departement for operation.

June 7th: Operation (Dr. Frising): Extirpation of extradural tumor at the 4th lumbar vertebra: Ether anæsthesia. In-

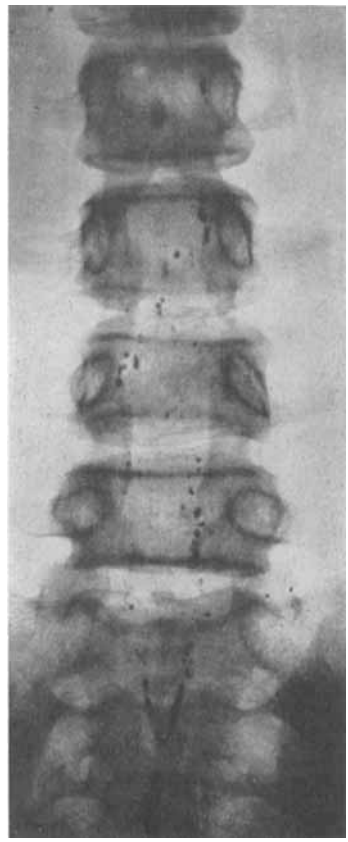

Fig. 5.

cision in the midline over L. II—L. V. The musculature is loosened (by raspatorium and chisel) from the spinous processes and the lamina on both sides. The spinous processes of L. II—L. V are pinched off; then the arches of these vertebræ are cut off cautiously. Now the dural sac is seen to protrude markedly

at a level of L. III—L. IV. No changes in the bone structure of the resected arches observed. There is no marked bleeding. The epidural fat is loosened, so that the dura lies free. The dural sac is found to be greatly displaced to the right and posteriorly by an elongated tumor, about the size of a large walnut, located along L. III and L. IV. The tumor is well defined against the

Fig. 6.

surroundings and enveloped by a dense membrane, which is laid open without escape of any spinal fluid. The tumor is enucleated, most of it easily, and the bottom part of it is found to fill up the roentgenographically visible defect in the body of L. IV. The tumor is more adherent at the posterior root of the 3rd lumbar nerve on the left side, and in dissecting it free a little hole is made in the dura, so that a small amount of spinal fluid escapes and the arachnoid is uncovered; the tumor appears to originate from this site. The defect in the dura is closed precisely with fine catgut.

Microscopic exam. of tumor: Typical neurinoma (Prof. Sjövall).

June 17th: Sutures removed. Healing *per primam.*

Post-operative course uneventful, without any disturbances of the sensibility, but with a slight paresis of the left knee extensors that improved gradually. August 8th: Bergonie and passive motions. Aug. 21th: Sit up in bed. September 26th: Discharged from the hospital.

After-examination in out-patient clinic, March 17, 1934: Good muscle power in both legs; sensibility normal; Lasègue negative. No complaints.

Reexamination, October 12, 1935: Since her discharge the patient has been perfectly free from symptoms and able to do any kind of work: She has had no trouble whatever with her back or legs, and she never gets tired in her back. Physical exam.: There is still a slight scoliosis and kyphosis in the upper part of the lumbar vertebral column. No direct or indirect tenderness over the vertebræ. Free mobility of the back, without pain. Lasègue negative. Gross muscle power good everywhere. Sensibility normal. Left kneejerk sluggish, right active. Left Achilles reflex cannot be elicited Babinski negative. X-ray exam.: The 4th lumbar vertebra shows now a perfectly body; no sign of the previous defect can be made out (Dr. Frising), see Figs. 5 and 6.

COMMENTS

According to the studies carried out by Camp and Adson on cases of neurofibroma operated in the Mayo Clinic in 1930—1932, the earliest roentgenographic changes consist in attrition and flattening of the radix arcus. Subsequently the arch is enlarged, and finally there is a limited concave attrition of the posterior or posterolateral part of the vertebral body; a compression fracture may take place in extreme cases. Continued growth of the tumor takes place typically through the intervertebral foramen, which is widened, and the pedicles and transverse processes may undergo pressure atrophy.

In 1933 Elsberg published a comparative analysis of 113

extradural tumors. 70 per cent of which were made up of meningeomas and neurofibromas. As to the differential diagnosis between these two types. Elsberg points out that neurofibroma in this material occurs equally often in the two sexes, and that the anamnesis is either very short or longer than two years, whereas meningeoma is found most often in women over 40 years with an anamnesis between one and two years. Neurofibroma occurred with the same relative frequency in the cervical, thoracic and lumbar parts of the spinal column, whereas meningeoma was localized preferably to the thoracic part. As neurofibroma generally originates from the posterior root, unilateral pain and radicular sensory disturbances are naturally far more frequent with this tumor than with meningeoma.

In our particular case the patient is a girl who had been troubled with pain in the left leg for some months. Psysical examination shows reflex disturbances in this leg, and roentgenography reveals a well-defined concave destruction of the posterior part of the body of the 4th lumbar vertebra and, most probably, also a destructive process in the left half of the arch. For diagnostic purpose we have here, as usually, employed myelography with a small amount of lipiodol. In this case, however, we have an instance where the local diagnosis can be established with certainty by roentgenography without myelography; and it has to be admitted that myelography in cases like this is not only unnecessary but even inadvisable, as emphasized by American authors, on account of the risk implied. Moreover, the X-ray plates show here such characteristic changes that a correlation of these with the clinical findings will enable the clinician with great probability to make the diagnosis neurinoma. Such marked roentgenological changes are generally not encountered as an early symptom. Our cases illustrates very strikingly, however, that neurinoma—at any rate in children —may give really great roentgenological changes from pressure atrophy at such an early stage of its course that there are hardly any demonstrable neurological changes. The subsequent course of this case shows that such changes in young persons may subside completely after the tumor has been removed, and that the vertebra may thus resume a normal form.

RÉSUMÉ

Il est donné la description du cas d'une jeune fille, de 13 ans, souffrant d'un neurinom dans une vertèbre lombaire. On voit ici des modifications radiologiques typiques avec atrophie par pression concave de la partie postérieure de la 4ème vertèbre lombaire, ainsi que des modifications dans la partie gauche de l'arc; ces modifications ont pris place avant que modifications neurologiques prononcées se soient manifestées. Les modifications radiologiques ont permis de poser le diagnostic de la vertèbre, sans myélographie et la myélographie ne doit pas être pratiquée dans de tels cas. Après l'opération—résection de la tumeur—la vertèbre reprend graduellement sa forme normale.

SUMMARY

Description is given of the case of a girl, 13 years old, suffering from neurinom in the lumbar vertebræ. Here are typical roentgenological changes with concave pressure atrophy of the posterior part of the 4th lumbar vertebra and also changes in the left part of the arch; these changes have taken place before the manifestation of any pronounced neurological changes. The roentgenological changes make a segment diagnosis possible without myelography, and myelography ought not to be employed in such cases. After operation—resection of the tumor — the vertebra resumes gradually its normal form.

ZUSAMMENFASSUNG

Beschrieben ist der Fall eines 13-jährigen Mädchens, das an einem Neurinom in inem Lendenwirbel leidet. Man sieht hier die typischen röntgenologischen Veränderungen mit einer Atrophie infolge konkaven Drucks des hinteren Teiles des vierten Lendenwirbels und ebenso Veränderungen im linken Teil des Bogens; diese Veränderungen haben stattgefunden, bevor

sich irgend welche ausgesprochenen neurologischen Veränderungen bemerkbar gemacht haben. Die röntgenologischen Veränderungen ermöglichen die Diagnose des Wirbels ohne Myelographie, die sich in solchen Fällen erübrigt. Nach der Operation — Resection des Tumors — nimmt der Wirbel nach und nach seine normale Form wieder an.

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