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CLINICAL ASPECTS, OPERATIVE TREATMENT AND REHABILITATION OF PARAPLEGIA CAUSED BY LIPOMAS OF THE SPINAL CORD—WITH PARTICULAR EMPHASIS OF THE 'INTRAMEDULLARY' LIPOMAS

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AMONG the spinal cord lesions of congenital origin, spinal lipomas are a rare but interesting group. Lipomas usually represent about 1 per cent. of all spinal tumours. Clinically and histopathologically we differentiate between extradural and intradural lipomas.

Three cases are presented to demonstrate the clinical aspects, the operative treatment and the prospects of rehabilitation (fig. 1).

FIG. 1

Three cases of spinal lipomas: Localisation and correlation with surrounding tissues.

Cases I and II were extradural spinal lipomas of the lumbar region, combined with other malformations: Spina bifida, subcutaneous lipoma; in the second case a meningocele was also found. The third case was an intramedullary lipoma of the midthoracic region.

Extradural lipomas are either discovered casually or as a cause of a progressive compression syndrome. Their history is usually short, occurring in all age groups.

A frequent association with dysraphic lesions emphasises their relationship to congenital malformations.

About 50 per cent. of the extradural lipomas consist of mature fat-tissue, the

others contain fibromatous, myxomatous and angiolipomatous tissue-components. In our first case a gliomangioma¹ was found inside the fat tissue. This combination has—as far as we know—not yet been described.

In both of our first cases a typical stalk connected the extradural lipoma with the subcutaneous lipoma.

Intradural lipomas are rare. Since the first description by Gowers in 1876 about 100 cases have been published, half of them being intramedullary lipomas.

FIG. 2

Length of clinical history, observed in 'intramedullary' lipomas.

(From W. Bischof and W. Müller: *Dtsch. Z. Nervenheilk.* 189, 1-10 (1966); by courtesy of the authors and the Springer-Verlag, Berlin-Heidelberg-New York).

Giuffré presented the latest review in 1966. According to Zülch (1956) the intradural lipomas are derived from the leptomeninx. They consist of mature fat-tissue and only a few blood vessels. The intradural lipomas usually compress the spinal cord dorsally and may invade it. It must be emphasised that the intradural and especially the intramedullary lipomas are not separated by a capsule from the nervous tissue of the cord.

Patients with intradural lipomas usually have a case history of many years, as can be seen in a diagram of intramedullary lipomas (fig. 2) taken from a paper of Bischoff and Müller (1966).

¹ Histopathological details will be published elsewhere by Dr. Vitzthum, Max-Planck-Institut für Hirnforschung, Frankfurt a.M.

The neurological findings are determined by the level and the size of the tumour.

Another diagram (fig. 3) shows that the intradural lipomas are mainly found in the lower cervical and thoracic region.

Weakness, spasticity and atrophy of the lower extremities with the usual alterations of reflexes are the most outstanding clinical manifestations of intradural lipomas. Sensory deficits are less marked. The neurological symptoms are slowly progressive, showing long-lasting remissions. Diagnostically this may mislead in the direction of a degenerative nervous disease.

FIG. 3

Level and size of 'intramedullary' lipomas.

(From W. Bischof, and W. Müller: *Dtsch. Z. Nervenheilk.* **189**, 1-10 (1966); by courtesy of the authors and the Springer-Verlag).

As described by Wycis (1953), scoliosis, Klippel-Feil-syndrome or other dysraphic malformations may be diagnostic hints.

In all cases with uncharacteristic and changing signs of spinal disfunction the attempt of an early X-ray diagnosis cannot be overemphasised. If roentgenograms, especially the tomography of the vertebral column, reveal an atrophy of the pedicles and a widening of the spinal canal, this is strongly suggestive of a slowly expanding spinal tumour. In about 50 per cent. of intradural lipomas these signs are observed.

But, of course, only the myelography allows the actual tumour localisation.

If a spinal cord or root compression is evident, operative treatment is indicated.

The encapsulated extradural lipomas usually can be removed completely. Normally there are no operative problems.

As already mentioned, the intramedullary lipomas are not clearly separated

by a capsular membrane from the spinal cord, but rather show a tendency of invading and destroying the cord.

Paraplegia as a result of an attempted radical removal of intramedullary lipomas has been reported. Experienced neurosurgeons therefore discourage such attempts. The operative decompression alone or only a partial removal of the

FIG. 4

Fig. 4.—Roentgenogram in a case of a spinal lipoma shows a moderate kyphoscoliosis and a widening of the pedicular distances.

FIG. 5

Fig. 5.—In the same case myelography reveals a complete stop at D5.

lipoma without any damage of the nervous tissue leads mostly to a long-lasting recovery from the paraparesis. Giuffré (1966), pointed out that such operation results are not dependent upon the level and the size of the lipoma.

Early post-operative mobilisation and activation of patients by means of physiotherapy is essential. As soon as possible an individual rehabilitation programme should be carried out. The resocialisation of patients with extradural lipomas is normally unproblematic, since these patients have not had serious neurological deficits.

FIG. 6

A, Intradural lipoma: typical fat-tissue enclosing a nerve of peripheral type.
B, demonstrates clearly the epineurium of this 'peripheral nerve' inside the lipoma.

(Figure 6, A and B by courtesy of Prof. Dr. W. Krücke, Max Planck-Institut f. Hirnforschung, Frankfurt a.M.)

The diagnosis of the very rare intramedullary lipomas usually occurs at a rather late stage. Therefore, unfortunately, the operation is not performed before the onset of a marked paraparesis. Because of the satisfactory prognosis however, it is advisable to make use of all possibilities of resocialisation including professional rehabilitation.

The benefit of such efforts is exemplified by our representative patient with a large intramedullary lipoma. His history is briefly reviewed:

A 17-year-old farmer's son was admitted with an initial diagnosis of multiple sclerosis. Neurological examination revealed an incomplete paraparesis and changing sensory disturbances below D5. Roentgenograms showed a kyphoscoliosis and a widening of the pedicular distances in the mid-thoracic region (fig. 4). Myelography revealed a complete stop at D5 (fig. 5). After partial removal of an intermedullary lipoma between D5 and D8 and a short recovery period only a slight right-sided foot-drop remained.

Thereafter he was found unfit for farm-work. He was brought into a bank business-training programme. For more than 4½ years he was quite well and worked full-time.

During an extensive motor-trip in 1970 a complete paraplegia developed within a few hours. Reintervention was carried out. A large decompression stretching over six segments was performed and major parts of the lipoma were removed by use of the microscope, in order to avoid any damage to the nervous tissue. Within a few weeks a rapid recovery was observed.

Figure 6, A and B show a nerve of peripheral type inside the removed intramedullary lipoma-tissue. This underlines the fact, that the intradural lipomas are hamartomas.

During the last follow-up period of more than 2 years the patient is able to walk freely, only using a drop-foot brace. There is no bladder, bowel or sexual dysfunction. He is working fulltime as a bank clerk and plays a rather active part in local party-political activities.

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Discussion

SIR LUDWIG GUTTMANN (G.B.). In his excellent review on the classification of lipomas of the spinal cord, Professor Fromm mentioned the rare occurrence of intradural lipomas which, according to Zülch are derived from the leptomeninx. I remember a case of such an intradural lipoma when I was working with Professor Foerster in Breslau. The tumour had a length of over eight segments and occupied the posterior part of the intradural space compressing the cord dorsally and invading it between the posterior columns. Most of the tumour was removed in three sessions, and although there was no improvement of the paraplegia, the patient lived for several years.