Acta orthop. Scandinav. 43, 32–38, 1972

Department of Neurosurgery, Odense University Hospital, Odense, Denmark.

EXTRADURAL CYST OF LIGAMENTUM FLAVUM L 4 – A CASE

JENS HAASE

Accepted 15.x.71

Intraspinal, extradural lumbar cysts are very rare (Law 1965, Glasauer 1966, Cloward 1968, Kao 1968, Zöch 1969, Gritzka 1970). A case of ligamental radical compression due to an extradural cyst of the ligamentum flavum is reported, as a review of the literature has not revealed any previous mention of a cyst of this type.

CASE HISTORY

The patient is a 64-year-old woman who complained of a feeling of tiredness in the lower part of her back, which during the course of the past five years had intensified until she was suffering from intermittent pain in the loins with some slight radiation to the backs of both thighs. For six months previous to admission she had also experienced gradually increasing root pain in the right leg, along the posterio-lateral surface of the thigh and calf, radiating over the back of the foot to the big toe. There was accentuation of the pain on coughing and lifting. The patient had been unable to work for three months, and conservative treatment with massage, back exercises and a supporting corset had no effect on the symptoms.

On admission to the Department of Neurosurgery the patient was found to be in moderate pain, the lumbar lordosis was diminished and the hip fixed, and there was moderate tenderness in the right paravertebral muscles. There was tenderness along the course of the right sciatic nerve, but no tumour was palpable along its course over femur. It was possible to demonstrate a slight atrophy of the right extensor digitalis brevis muscle, but there was no paresis. There was slight hypalgesia on the back of the right foot and the lateral aspect of the leg. The tendon reflexes were normal. Crossed Lasegue sign was positive 20/70. X-ray of the lumbar spine revealed a slight narrowing

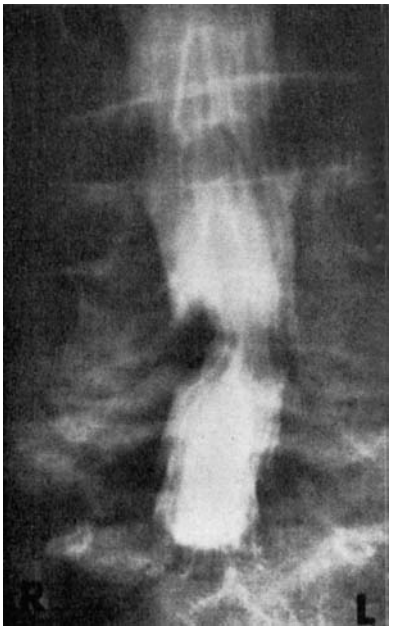

Figure 1. Conray® myelogram, prone.

of the 4th lumbar intervertebral disc with osteophytes along the edges of the adjacent vertebrae, and moderately severe sclerosis of the apophyseal joint at this level. Conray® myelography revealed an obvious impression in the column of contrast on the right behind the 4th lumbar intervertebral disc (Figure 1), whereas lateral films

Figure 2. Ligamentum flavum, with ganglion cyst opened.

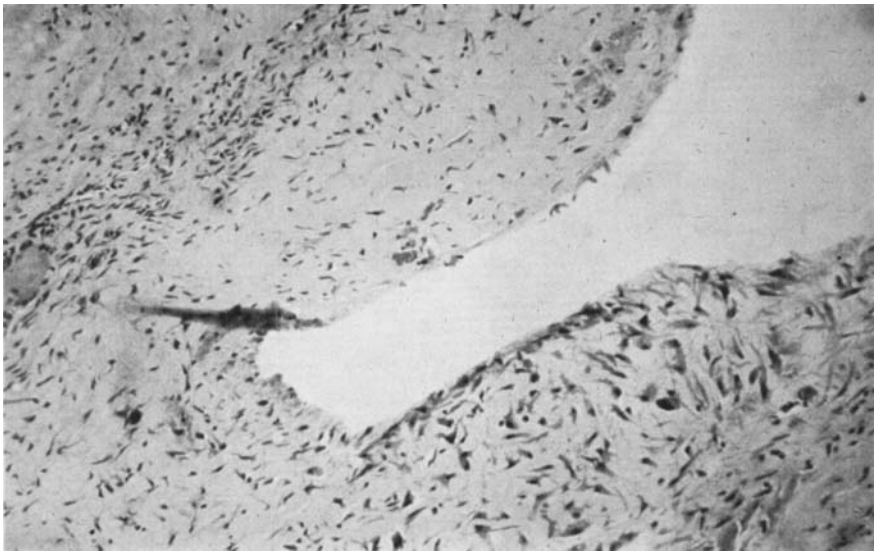

Figure 3. Part of the cyst wall—note the lack of epithelial covering (hematoxylin-eosin stain).

revealed only insignificant protrusion of the 4th lumbar intervertebral disc. The cerebrospinal fluid protein was 29 mg per cent.

Right-sided partial hemilaminectomy was carried out on the 4th lumbar vertebra, and revealed moderate thickening of the capsule of the apophyseal joint, whereas the ligamentum flavum was greatly thickened, in parts very hard, and extensively adherent to the lamina. In the ligament there was a well-defined cyst, 1 cm in diameter, with tough, yellowish, viscous contents (Figure 2). The cyst and the ligament were adherent to the dura, although there was no communication with the subarachnoid space or connection with the apophyseal joint. The root of the right 5th lumbar nerve was compressed and pushed laterally by ligament and cyst, and after the removal of these it lay completely free. There was no evidence of protrusion of the intervertebral disc. The postoperative course was uncomplicated and the patient was discharged free of pain.

Microscopic examination of the cyst wall revealed that this was built up of closely packed collagen fibrils with occasional lymphocytes and areas of calcification and hyalinization (Figure 3). There was no nerve tissue in the wall and it was not covered by epithelium. In the vicinity of the cyst was a large, normal vessel.

DISCUSSION

The intraspinal cysts most commonly reported as giving rise to radicular and medullary compression are the extradural, "congenital" arachnoid cysts (Kronborg 1967, Cloward 1968). These cysts are, however, most commonly found in the thoracic region in young persons and a lumbar localization is unusual (Glasauer 1966). The cysts may be multiple, and in up to half of the cases they are found to communicate with the subarachnoid space. This type of cyst has never been found embedded in the ligamentum flavum.

Intraspinal dermoid cysts are rare but most commonly seen in the lumbar-sacral region (Bailey 1970). They show intradural extension and differ in this way from the cysts described above.

In rare cases cystic neurofibromata may lie in the extradural space in the lumbar region (Broager 1953).

One case of lumbar, extradural ecchinococcal cyst has been described from New Zealand. These cysts are otherwise most frequently found in the sacral canal (Plewes 1970). These cysts are usually dural and extradural (Law 1965).

Sacral-nerve cysts, previously known as "Tarlow" cysts, may be found in the sacral canal (Plewes 1970). These cysts are usually multiple and always communicate with the subarachnoid space.

Four intraspinal cysts which resembled ganglions and apparently originated from the apophyseal joints in the lumbar spine have been reported previously: two by Kao et al. (1968), one by Zöch (1969) and one by Gritzka et al. (1970). There are two descriptions of similar cysts arising from the apophyseal joint, but lying dorsal in the sacrospinal muscle (Schölner 1967, Kao 1968). All four intraspinal cysts compressed the lumbar nerve roots; this was confirmed by myelography and at operation. These four intraspinal cysts, and the ligamentum flavum cyst described here, would seem to resemble one another closely and to be histologically indistinguishable from the typical ganglion normally found on the wrist. The only difference between the reported cysts seem to be that the ligamentum flavum cyst lay medial and was completely enclosed in the ligament without any demonstrable communication with the apophyseal joint. The comprehensive publications of Naffziger et al. (1938) and Malmros (1941) on ligamentary root compression contain no mention of cysts arising within the ligament.

All five cysts which have been mentioned here must be charac-

terised both macroscopically and microscopically as "typical" ganglion cysts. A ganglion cyst is usually defined as "a cystic tumour with viscous, jelly-like contents, lying in contact with fibrous tissue in the joint capsule or tendon sheath" (Carp 1928, De Orsay 1937, Imhäuser 1957, Soren 1966, Hvid-Hansen 1970). However, Borchardt (1900), De Orsay (1937) and Goldman et al. (1969) all mention the possibility that ganglion cysts may arise in connective tissue elsewhere. The aetiology is unknown (Soren 1966); numerous possibilities have been suggested, most commonly cystic degeneration in the connective tissue of the joint capsule (Carp 1928, De Orsay 1927), metaplasia with secretion from spheroidal cells in the synovial membrane (King 1932) and, more recently, proliferation of fibroblasts or non-specific mesenchymal cells in the subchondrial connective tissue with hyaluronic acid production and secondary formation of cysts (Goldman 1969). More than 80 per cent of ganglion cysts are found in the region of the wrist in young women (Imhäuser 1957) but there have been descriptions of single cases of widely varied distribution, such as in the tendon sheaths (Sarpyener 1968, Hvid-Hansen 1970), enclosed in tendons (Borchardt 1900), in the interspinous ligaments (Casuccio 1962), in the periostium (Goldman 1969), in the menisci (Imhäuser 1957), in peripheral nerves (Brooks 1952, Clarke 1961), in bones (Seymour 1968), and perhaps in the corium in the form of cutaneous myxoid cysts (Johnson 1965). It is often mentioned that there is no direct communication with the neighbouring joint, but that it is possible to demonstrate a fibrous connection with the joint (Carp 1928, Brooks 1952). However, these connections have never been demonstrated histologically and are more reminiscent of dissection phenomena (King 1932). This might provide an explanation for the fibrous band between the cyst and apophyseal joint drawn as described by Gritzka et al. (1970), especially when it is borne in mind that in addition to adipose tissue the ligamentum flavum also contains connective tissue which is directly intermixed with the interspinous ligaments and the capsule of the apophyseal joints (Callander 1939).

Despite the fact that five lumbar intraspinal ganglion cysts have now been described in the literature, this form must be considered to be extremely rare. Thus Zöch (1969), who reviewed a material including 7586 patients operated upon for protrusion of lumbar intervertebral discs and 901 patients operated upon for intraspinal tumours, seen over the course of 31 years, found only one case of intraspinal ganglion cyst.

SUMMARY

A case of lumbar nerve root compression due to an extradural cyst resembling a ganglion in the ligamentum flavum is described. The differential diagnosis from other extradural cysts is discussed. A review of the literature has revealed that no cyst in this localization had been described previously and that intraspinal ganglion cysts are extremely rare.

REFERENCES

Bailey, I. C. (1970) Dermoid tumors of the spinal cord. *J. Neurosurg.* **33**, 676–681.

Borchardt, X. (1900) Zur pathogenese der ganglien. *Dtsch. med. Wschr.* **26**, 254.

Broager, B. (1953) Spinal neurinoma (thesis). *Acta psychiat. scand., Suppl.* **85**.

Brooks, D. M. (1952) Nerve compression by simple ganglia. *J. Bone Jt Surg.* **34**-B, 391–400.

Callander, C. L. (1939) *Surgical anatomy*, 2nd ed., p. 534. W. B. Saunders Co. Philadelphia & London.

Carp, L. & Stout, A. P. (1928) A study of ganglion. *Surg. Gynec. Obstet.* **47**, 460–468.

Casuccio, C. & Scapinelli, R. (1962) Clinical and anatomico-radiological studies of pathological changes in the vertebral spinous processes and adjacent soft tissues. *J. Bone Jt Surg.* **44**-B, 218.

Clarke, K. (1961) Ganglion of the lateral popliteal nerve. *J. Bone Jt Surg.* **43**-B, 778–783.

Cloward, R. B. (1968) Congenital spinal extradural cysts. *Ann. Surg.* **168**, 851–864.

De Orsay, R. H., McCray, P. M., Jr. & Ferguson, L. K. (1937) Pathology and treatment of ganglion. *Amer. J. Surg.* **36**, 313–319.

Glasauer, F. E. (1966) Lumbar extradural cysts. *J. Neurosurg.* **25**, 567–570.

Goldman, R. L. & Friedman, N. B. (1969) Ganglia ("synovial" cysts) arising in unusual locations. *Clin. Orthop.* **63**, 184–189.

Gritzka, T. L. & Taylor, T. K. F. (1970) A ganglion arising from a lumbar articular facet associated with low back pain and sciatica. *J. Bone Jt Surg.* **52**-B, 528–531.

Hvid-Hansen, O. (1970) On the treatment of ganglia. *Acta chir. scand.* **136**, 471–476.

Imhäuser, G. (1957) In *Handbuch der Orthopädie*, ed. Hohmann et al., vol. **1**, pp. 474–479. Georg Thieme Verlag, Stuttgart.

Johnson, W. C., Graham, J. H. & Helwig, E. B. (1965) Cutaneus myxoid cyst. *J. Amer. med. Ass.* **191**, 15–20.

Kao, C. C., Uilhein, A., Bichel, W. H. & Soule, E. H. (1968) Lumbar intraspinal extradural ganglion. *J. Neurosurg.* **29**, 168–172.

King, E. S. J. (1932) The pathology of ganglion. *Aust. N. Z. J. Surg.* **1**, 367–381.

Kronborg, O. (1967) Extradural spinal cysts. *Dan. med. Bull.* **14**, 46–48.

Law, W. B. (1965) Extradural spinal hydatid cyst. *Aust. N. Z. J. Surg.* **34**, 215–217.

Malmros, R. (1942) Den lumbale discusprolaps og ligamentære rodkompression (thesis). Munksgaard, Copenhagen.

Naffziger, H. C., Imman, V. & Saunders, I. B. (1958) Lesions of the intervertebral disc and lig. flava. *Surg. Gynec. Obstet.* **66**, 288–299.

Plewes, J. L. & Jacobsen, I. (1970) Sciatica caused by sacral-nerve-root cysts. *Lancet II*, 799–802.

Sarpyener, M. A., Ozcurumez, O. & Seyhan, F. (1968) Multiple ganglions of tendon sheaths. *J. Bone Jt Surg.* **50**-A, 985–990.

Schölner, D. (1967) Ganglion an einem Wirbelgelenk. *Z. Orthop.* **102**, 619–620.

Seymour, N. (1968) Intraosseous ganglia. *J. Bone Jt Surg.* **50**-B, 134–137.

Soren, A. (1966) Pathogenesis and treatment of ganglion. *Clin. Orthop.* **48**, 173–179.

Zöch, K. (1969) Über ein vertebrales gelenksganglion mit den symptomen der intraspinalen raumforderung. *Schweiz. Arch. Neurol. Neurochir. Psychiat.* **105**, 323–327.

Correspondence to:

Dr. Jens Haase
Dept. of Neurosurgery
Odense Hospital
5000 Odense
Denmark