The radiological appearances of spinal extradural arachnoid cysts

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Of the earlier clinical descriptions of this condition, probably the most often quoted is that by Elsberg, Dyke, and Brewer (1934): 'The individual is an adolescent with the history of symptoms of a progressive spastic paraplegia. Pain is absent or not a prominent symptom. The objective disturbances of sensibility are slight and their upper level is in the mid-thoracic dermatome. The manometric tests demonstrate a subarachnoid block with the characteristic spinal fluid changes of cord compression. Measurements on A-P x-ray films show that the interpedicular spaces of three or more vertebrae are enlarged. The pedicles of the affected vertebrae, especially those of the sixth, seventh, and eighth, are narrowed and atrophic'. The authors go on to say that these cysts are due to congenital diverticula of the dura or to a herniation of the arachnoid through a congenital defect in the dura.

Cloward and Bucy (1937) added another component to this syndrome by drawing attention to the frequent association of kyphosis dorsalis juvenilis (Scheurmann's disease) with spinal extradural cysts. According to them the changes seen in the vertebral bodies were due to venous stasis and congestion, produced by the cyst occluding the large posterior central draining vein.

Turnbull (1939) and others have remarked upon the favourable effects of immobility, either in bed or in a plaster jacket, and the later recurrence of symptoms with activity.

Turner (1947) reported striking improvement after removal of the spinal fluid in the power of the lower extremities in an 11-year-old boy, and suggested that this could be taken as a possible diagnostic aid, for, in all other forms of spinal compression one would instead expect deterioration or no change after such a measure.

Wise and Foster (1955) discussed in detail all these features and reviewed 34 cases that they were able to gather from recorded material, adding one of their own.

In the present paper three cases are described and one observation common to all three offered as

another diagnostic aid, namely, the presence in antero-posterior radiographs of rounded paravertebral shadows caused by the lateral extensions of these cysts, a feature which to my knowledge has so far not even been mentioned.

CASE REPORTS

CASE 1 T.R., a Hindu male aged 15 years, was admitted to the K.E.M. Hospital, complaining of progressive tingling, numbness, and weakness in both lower limbs, starting six weeks previously on the right side and a fortnight later spreading to the left. He could only walk with the help of a stick but had no bladder or bowel disturbance. On examination he had a spastic paraparesis with impairment of position and vibration sense up to the groins and loss of touch, pain, and thermal sensibility below the ninth dorsal dermatome.

Radiographs of the dorsal spine showed compression of the pedicles with widening of the interpedicular spaces of the seventh to eleventh dorsal vertebrae; also there were two rounded soft tissue shadows on either side of the body of D₁₀, with some eburnation and hollowing of the neck of the right tenth rib (Fig. 1). A myelogram showed multiple well-filled pouches and a complete block at D₇ (Figs. 2 and 3).

At laminectomy two cysts were displayed lying dorsal to the dural tube and each communicating through a small oval gap in the dura with the general subarachnoid space. The lateral extensions of the lower and larger cyst could be easily delivered into the wound by slight traction and blunt dissection. The cysts were ligated at their necks and excised and both gaps in the dura sutured. The spinal canal appeared expanded to twice its normal capacity.

In three weeks he was able to walk without assistance and two weeks later, when discharged, sensory recovery was complete, and the only abnormality was a slight increase of tone and tendon reflexes.

CASE 2 B.B., a male Hindu hawker aged 40 years, was admitted to the K.E.M. Hospital also in April 1958, and operated upon 10 days after case 1. He had been suffering from paraesthesiae, weakness, and wasting of the right leg for about eight years and complained of a similar disturbance of eight months' duration in his left. All along he had had an aching pain in the legs,

FIG. 1. Case 1. Note the rounded shadows on either side of D_{10} . Eburnation and hollowing of the neck of the right tenth rib is seen better in Figure 2.

FIG. 3.
Case 1.
Patient on his side.

FIG. 2.
Case 1.
Patient prone.

FIG. 4. Case 2. Note rounded shadow to the right of D_{11} and D_{12} and a smaller, barely visible shadow to the left.

FIG. 5.

FIG. 6.

FIG. 7.

FIG. 5. Case 2. Patient prone, in Trendelenburg position, with Myodil in loculus to the right.

FIG. 6. Case 2. Patient standing. Lower end of cyst just outlined.

FIG. 7. Case 2. Lower end of cyst now better filled.

similar to that of intermittent claudication and immediately relieved by rest, but for a few months before admission relief had not been constant. On examination he had a paraparesis with marked distal bilateral weakness and wasting, and also a uniform weakness of all remaining muscle groups on the right; the tendon reflexes were present and equal and the plantar responses flexor. There was no visceral or sensory disturbance. The femoral, dorsalis pedis, and posterior tibial pulsations were normal.

Radiographs showed compression of the pedicles with widening of the interpedicular spaces of the eleventh dorsal to second lumbar vertebrae; there was a rounded soft tissue shadow to the right of the bodies of D_{11} and D_{12} and a smaller fainter shadow to their left (Fig. 4). A myelogram showed a partial block at D_{11} with a large pouch filling to the right and a smaller pointing upwards (Fig. 5). On standing the patient, Myodil was seen to leave the upper pouches and collect in a large, hitherto unsuspected, lower pouch at the upper border of L_3 (Figs 6 and 7).

At laminectomy a giant solitary cyst with a loculus to the right was displayed immediately under the bone, expanding the spinal canal to more than twice its capacity. The cyst was emptied and its wall dissected off the dura down to its small oval neck at D_{11} into which was seen prolapsing a posterior nerve root. The cyst was ligated at its neck and excised and the gap in the dura closed with two interrupted sutures.

When the patient was discharged four weeks later,

FIG. 8.

FIG. 9.

FIG. 8. Case 3. Note lobulated soft tissue shadow to the left of D_8 and D_9 . Also partial fusion of bodies of D_3 and D_4 just visible. (Film taken in 1948 when patient was 19 years of age.)

FIG. 9. Case 3. Myelogram in 1961 after three earlier exploratory operations.

power in the proximal muscles had recovered fully but bilateral foot-drop persisted. The aching pain in the legs had been relieved and he could comfortably walk up to two miles in a foot-drop appliance. He was seen again in April 1962, four years after the operation, and examination showed that power had not improved, but he was still free from pain, and continues to hawk his wares.

CASE 3 B.L., a male Hindu aged 19 years, was admitted to the K.E.M. Hospital in 1948 under Mr. R. N. Cooper. The patient had a paraplegia with sensory impairment to just above the umbilicus but no visceral disturbance.

The radiograph showed a dorsal kyphoscoliosis, fusion of the bodies of D_3 and D_4 , compression of the pedicles with expansion of the interpedicular spaces of D_6 to D_{10} , and most striking of all a large, lobulated soft tissue shadow to the left of the bodies of D_8 and D_9 (Fig. 8). The myelogram then showed Myodil entering these pouches and similar but much smaller ones in the upper lumbar region.

At laminectomy multiple extradural arachnoid cysts

were excised, resulting in marked initial improvement, but a year later the patient was again becoming paralysed and was twice explored in 1950 and 1953 without any benefit. However, Mr. N. R. Cooper, though retired for many years, retained an almost paternal interest in this patient and referred him to the neurosurgical unit in 1961. He then had a paraplegia with a sensory level at D_{10} , severe constipation, and urinary incontinence with retention. A cisternal myelogram showed an irregular block from D_6 to D_{11} , more in keeping with spinal arachnoiditis than any other condition (Fig. 9). The dorso-lumbar region was explored through dense scar, for the fourth time, and tense, blue wide-necked arachnoid cysts were displayed, bulging through multiple large dural defects. On opening these the nervous tissue appeared considerably depleted and a few stray roots were seen displaced far laterally along the wall of the cyst. The cavity was again more than twice the normal width and quite prominent humps produced by intervertebral discs were seen anteriorly.

The patient's post-operative course was complicated by a bladder infection and flexor spasms, but after

prolonged physiotherapy he was discharged many months later, confident in the use of a harness and crutches.

SUMMARY

The radiographic demonstration of rounded paravertebral soft tissue shadows in three patients with spinal extradural arachnoid cysts suggests that these might provide another useful diagnostic aid.

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