

NON - TRAUMATIC; NON - TUBERCULOUS COMPRESSION OF THE SPINAL CORD

By K. S. Grewal, M.S., F.R.C.S.

and

Gurdev Singh Girgla, M.S.,

(Department of Orthopaedics, Medical College, Amritsar, India)

Compression of the spinal cord is frequently met with in Orthopaedics. Tumours of the cord and cauda equina may mimic the clinical features of massive prolapse of the inter-vertebral disc or compression by a tuberculous granuloma. Unless the orthopaedic surgeon is conversant with the various pathological conditions that arise in and around the cord he is likely to be puzzled when he comes across a curious pathological condition which he did not anticipate from the clinical findings. The present paper reflects the experience of the authors in the surgery of such lesions. Out of the total of 204 cases of compression of cord met with over the last fifteen years only 44 cases are included in this study, viz., 40 cases of primary neoplasms of the spine, 3 cases of pyogenic epidural infection and a case of hydatid cyst. (Tables I, II, III, IV & V).

NEOPLASMS

Though rare when compared with tumours of the brain yet all tumours that arise within the skull are met with in the spinal cord. Out of the 40 cases of tumours, eight (20%) were in relation to the parenchyma of the cord. Among these two were ependymomas, four astrocytomas, one a neuroblastoma and one a paraganglioma. Seven were intramedullary tumours and one ependymoma in the lumbosacral region arose from the filum terminale. Ten tumours (25%) arose from the meninges and thirteen (32.50%) from the nerve roots. Seven (17.5%) tumours were situated outside the dural tube and arose from the bony cage: two of these were chordomas, one an osteoma, one a plasma cell tumour and three dermoid cysts. There was one (2.5%) cavernous haemangioma of the cord and one (2.5%) blood cyst, both of them being extra-medullary and intradural. Table II shows the incidence of the various histological types of the tumours in the present series.

CLINICAL FEATURES

Backache, referred pain, sensory deficit, paralysis and disturbances of the bladder or bowel function are the usual symptoms in spinal tumours. However all the symptoms and signs were not present in every case; perhaps due to variations in the site, extent and stage of the growth of the tumour.

Twenty-one had backache and seventeen had referred pain. A sensory deficit was present in twenty-five cases. In six cases there was only incomplete paralysis. Fifteen cases had disturbances of bladder or bowel function to some extent. Table III gives an analysis of the symptoms and signs seen in each type of tumour.

On plain X-ray the enlargement of the vertebral canal is shown by the increase in the interpedicular distance in the A.P. view and in the antero-posterior diameter of the canal in the lateral view. (Figs. 1 & 2).

The extension of the tumour through the intervertebral foramina can also be demonstrated in both the views by the increase in its vertical diameter, and by the concavity in the adjoining border of the pedicles.

Myelography shows a complete or a partial block or a filling defect, according to the position and size of the tumour. (Figs. 3 & 4).

TUMOURS OF THE CORD PARENCHYMA

The incidence of these tumours varies from 3.45% to 24.46% in the various reports. (Table IV). In our series they were 20% of the total. Their pathology is such that their complete removal is a problem. Even benign tumours do not show a definite capsule. Their prognosis, therefore, is uncertain. The operative interference should be minimal. A laminectomy of two or three vertebrae over

TABLE I.
AN ANALYSIS OF CASES SEEN FROM 1.5.1949 TO 30.4.1964
AT THE DEPARTMENT OF ORTHOPAEDICS,
V. J. HOSPITAL AMRITSAR.
INTRA-SPINAL COMPRESSION.

CAUSES	NO. OF CASES	PERCENT
1. TRAUMA (FRACTURES AND DISLOCATIONS OF VERTIBRAE)	99	48.53
2. TUBERCULOSIS OF THE SPINE	57	27.94
3. MASSIVE PROLAPSE OF INTERVERTEBRAL DISC	4	1.96
4. NEOPLASMS (EXCLUSIVE OF SPINAL METASTASES)	40	19.61
5. EPIDURAL PYOGENIC INFECTIONS	3	1.47
6. PARASTIC (HYDATID CYST) INFESTATION	1	0.49
TOTAL	204	100.00

TABLE II.
PRIMARY NEOPLASMS
INCIDENCE OF THE VARIOUS
HISTOLOGICAL TYPES

Nature of Tumour	No. of Cases	Percent
NEUROFIBROMA	13	32.50
MENINGIOMA	10	25.00
ASTROCYTOMA	4	10.00
EPENDYMOMA	2	5.00
PARAGANGLIOMA	1	2.50
NEUROBLASTOMA	1	2.50
DERMOID CYST	3	7.50
HAEMANGIOMA	2	5.00
CHORDOMA	2	5.00
OSTEOMA	1	2.50
PLASMA CELL TUMOUR	1	2.50
TOTAL	40	100.00

TABLE III.
CLINICAL FEATURES

NATURE OF TUMOUR	No. of Cases	Backache	Referred Pain	Sensory Deficit	Paralysis	Disturbance in bladder &/or bowel function
NEUROFIBROMA	13	5	9	7	10	5
MENINGIOMA	10	7	3	7	9	2
ASTROCYTOMA	4	3	—	4	4	3
EPENDYMOMA	2	2	1	1	1	—
PARAGANGLIOMA	1	—	—	—	1	—
NEUROBLASTOMA	1	1	1	—	1	—
DERMOID CYST	3	2	1	1	2	2
HAEMANGIOMA	2	—	1	2	2	1
CHORDOMA	2	—	1	2	2	1
OSTEOMA	1	1	—	—	1	1
PLASMA CELL TUMOUR	1	—	—	1	1	—
TOTAL	40	21	17	25	34	15

TABLE IV.
INCIDENCE COMPARED WITH OTHER AUTHORS

AUTHORS	Total No. of Primary Spinal Tumours.	Tumours of Cord Parenchyma	Neurofibromas	Meningiomas	Dermoid and Epidermoids.	Plasma Cell Tumours.	Chordomas
1 PRESENT SERIES	40	8 (20.00%)	13 (32.50%)	10 (25.00%)	3 (7.5%)	1 (2.5%)	2 (5.00%)
2 ARMED FORCES INSTITUTE OF PATHOLOGY U.S.A. 1952	979	220 (22.5%)	293 (29.93%)	254 (25.9%)	10 (1.02%)	—	35 (3.6%)
3 JEROME H SHAPIRO 1961	58	2 (3.45%)	13 (22.41%)	21 (36.21%)	—	—	—
4 G LOMBARDI 1961	233	57 (24.46%)	74 (31.76%)	71 (30.47%)	2 (0.86%)	2 (0.86%)	—
5 JAMES Mc LELLAND 1962	105	16 (15.24%)	29 (27.62%)	25 (23.81%)	—	—	10 (9.52%)
6 B.B. OHR1 1963	14	1 (7.14%)	7 (50.00%)	4 (25.57%)	—	—	—
7 A. C. Da ROZA 1964	95	19 (20.00%)	25 (26.32%)	24 (25.26%)	7 (7.37%)	—	—

TABLE V.
EPIDURAL ABSCESSSES
(RESULTS OF TREATMENT)

Author	Total No. of Cases	Complete Recovery	Partial Recovery	No. Recovery	Deaths
PRESENT SERIES	3	1	2	0	0
HUME AND DOTT (1954)	25	5	6	5	9



Fig. 1. Shows widening of the vertebral canal and destruction of pedicles of the first two lumbar vertebrae by a tumour.



Fig. 3. Myelogram (A.P. view) shows a complete block above the last thoracic vertebra.



Fig. 2. Shows widening of the intervertebral foramina and erosion of the bodies by a tumour in the lumbar region.



Fig. 4. Myelogram (A.P. and Lat. views) showing obstruction to the passage of the dye in the thoracic region.

the site of the tumour, opening of the dural tube, and a longitudinal incision over the middle of the cord from behind should be enough as a first procedure. If the tumour immediately prolapses, as much of it as possible should be gently removed. Re-exploration after a week or 10 days may present a further prolapse of the tumour which is removed at this stage.

There was no immediate post-operative death. One case of astrocytoma died of hyperpyrexia 17 days after the operation and one case of ependymoma died 5 months after the operation from urinary infection. The other case of ependymoma in the lower lumbar spine recovered completely. The rest of the cases of medullary tumours showed a minimal improvement after the operation. However, they are doomed to die of complications.

NEUROFIBROMAS

The incidence varies from 22.14% to 50% (Table IV). In our series they were 32.50% of the total. Out of 13 nerve root tumours, 10 were neurofibromas and 3 schwannomas. Though all these tumours were benign yet the results were not good in all cases.

One case of schwannoma died two days after the operation. Another case of neurofibroma died 15 days after the operation. Two cases had no control over micturition both pre and post-operatively but, otherwise they showed improvement in their muscle power. The remaining cases showed a steady improvement in their signs and symptoms. In skilled hands the surgery of this group of nerve root tumours gives a happy result. If diagnosed and treated early they are likely to produce a complete return of function in the paralysed limbs and sphincters. Pain completely disappears. Some amount of stiffness persists in cases of thoracic and cervical tumours.

MENINGIOMAS

The incidence of meningiomas is variously reported from 23.18% to 36.21% (Table IV). In our series they were 25% of the total. In the 10 cases of meningiomas there was one post-operative death that occurred 36 hours after the operation. Another died one month after the operation. The rest of the patients

showed a steady improvement. Three of these cases had difficulty in micturition and continued to have the difficulty even after the operation. The urinary symptoms if early are likely to be relieved completely but if they are of longer duration they may prove a nuisance for the rest of life.

DERMOID CYSTS

The incidence of these rare tumours varies between 0.86% to 7.37% (Table IV). In our series they constituted 7.5%. All the three dermoid cysts were in the lumbar and lumbodorsal regions and extended over more than two vertebrae in every case. All of them suffered from a weakness of the lower limbs and backache.

Two had difficulty in micturition. One had no sensory loss. The latter had been operated upon elsewhere and was supposed to be suffering from tuberculosis. The diagnosis was no longer in doubt when on exploration cheesy material and a lot of hair were found in the cyst. All three had relief from their symptoms after the removal of their cysts.

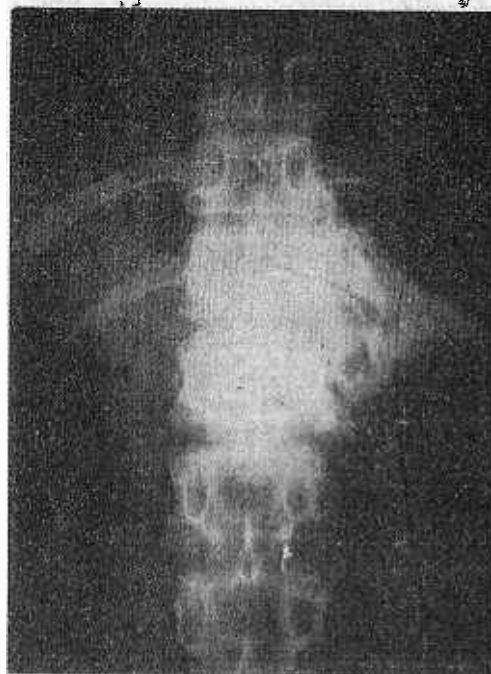


Fig. 5. Shows an osteoma in the region of last thoracic and first lumbar vertebrae.

OSTEOMA

The tumour was present at the dorsolumbar junction (Fig. 5). The case improved con-

siderably after the partial excision of the tumour. The whole of it however could not be removed as it was extending all round the vertebra.

PLASMA CELL TUMOURS

Lombardi (1961) reported 2 in 233 cases, i.e., 0.86% (Table IV). We had one case, i.e., 2.5% who had complete spastic paraplegia and loss of sensation below the level of umbilicus of six months duration. He died 12 days after the exploration of the spine.

CHORDOMAS

The incidence reported varies from 3.6% to 9.5% (Table IV). We had two cases, i.e., 5%. One chordoma arose in the thoracic region and was projecting into the chest cavity (Fig. 6). He had complete paraplegia of 7 month's duration and died 13 days after the operation. The other had a malignant chordoma of the lumbosacral region and had suffered from complete paraplegia for 2 years. As much as possible of the tumour was removed but the patient did not show any recovery.

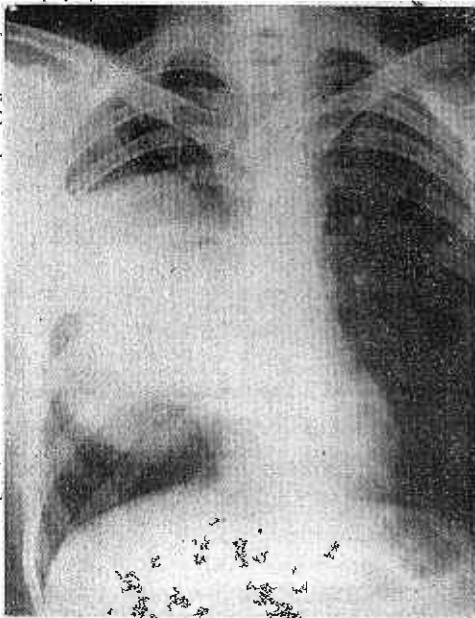


Fig. 6. Shows a large intra-thoracic mass projecting from the left side of the mediastinum. It was associated with spinal compression and turned out to be a chordoma.

EPIDURAL ABSCESSSES

Hume and Dott (1954) reported 25 cases from the Edinburgh Royal Infirmary and the

Department of Surgical Neurology at Bristol. In addition 245 cases had already been reported in the English literature. Almost all cases had pain in the spine followed by root pains and gradual paralysis. In acute cases pain is soon followed by paralysis and involvement of the sphincters. There is fever and leucocytosis.

In chronic cases it is sometimes difficult to differentiate them from tuberculosis or even tumours of the spine, as happened in two of our cases. The condition is rare and can be diagnosed only if its possibility is kept in mind and proper investigations are made. Myelography is useful to localise the lesion (Fig. 7). Plain X-ray is not useful.

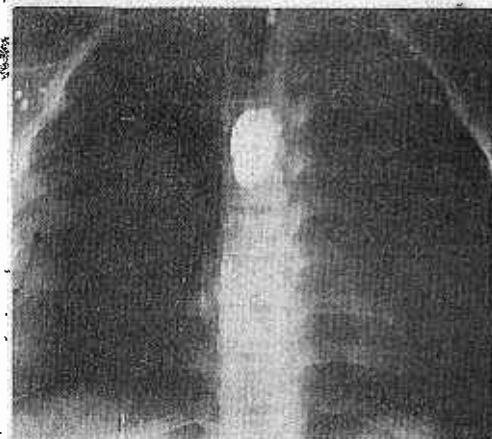


Fig. 7. Shows a block to the descending dye in case of epidural suppuration.

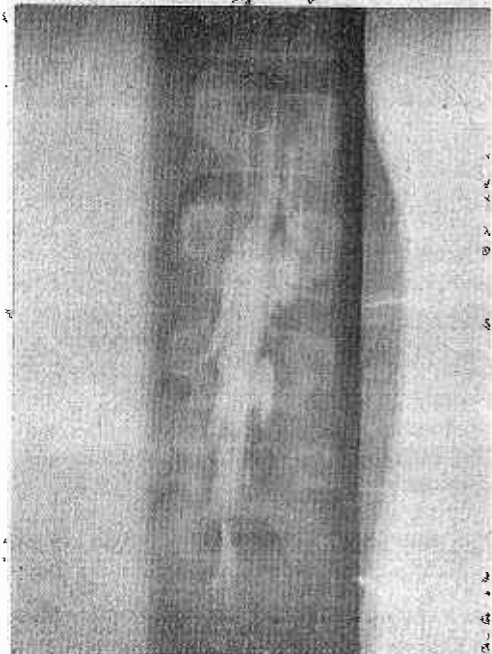


Fig. 8. Shows irregular extensive obstruction to the passage of dye in the case of pyogenic epidural suppuration.

Our first case was a child who developed a high fever, spinal pain and paralysis. Lumbar puncture brought out pus. As the signs and symptoms did not suggest suppurating meningitis, cisternal puncture was performed, and this showed clear fluid. The patient's fever subsided but the paralysis persisted. Myelography showed an extensive block (Fig. 8). Operation revealed soft granulation and fibrous tissue surrounding the dura and these were removed. The child made a good progress. The sphincteric functions recovered, paralysis improved partially and the child could walk though lamely.

Out of the other two cases one was a child of two years and another was an adult of 45 years. Both were running a low grade fever and were showing signs of lower motor neurone paralysis of their lower limbs and had sphincteric disturbances. It was difficult to distinguish between a tumour and tuberculosis.

The adult had scoliosis but no other evidence of compression was available in the X-ray of the spine. Having localised the lesion to the lumbar region, exploration was performed and this revealed a chronic granulation tissue of a non-specific nature surrounding the dural tube. The patient showed partial recovery after the operation. The results of 25 cases reported by Hume and Dott were: 9 deaths, 5 complete recoveries, 6 partial recoveries, and 5 no recovery. (Table V). Full recovery is expected in the acute but rarely in the chronic cases. The treatment should be energetic and quick. Antibiotics should be administered and decompression should be done immediately, otherwise thrombosis of the spinal vessels and degenerative changes in the spinal cord are likely to become permanent.

HYDATID CYST OF THE SPINE

Though hydatid disease of other organs is well-known the incidence in the spine is only 0.8% to 0.9% (Craig 1951). In 1954 Nigam and Gharpure (1954) reported a case of hydatid disease of the spine with paraplegia and claimed it to be the first report from India. Similarly single cases have been reported by Pritam Dass (1957), and by Aggarwal and Hardas Singh (1962). We have

seen only two hydatid cysts of the spinal cord. One case of paraplegia was looked after in the medical wards as a case of tuberculosis or tumour. At autopsy a typical hydatid cyst was found. The other case who came under our care had a paraplegia with low grade fever for one year. X-ray (Fig. 9) showed destruction of the vertebrae and a hazy paravertebral mass. On exploration a large hydatid cyst was removed from the thoracic spine. The patient improved after the operation but remained bedridden.



Fig. 9: Shows an elliptical soft tissue shadow around the irregularly destroyed mid-thoracic vertebrae resembling a paravertebral tuberculous abscess. On exploration it turned out to be a hydatid cyst.

REFERENCES

1. AGGARWAL, N. D. and HARDAS SINGH (1962): Hydatid Cyst — A cause of cauda equina lesion. *Indian Journal of Surgery*, 24, 553.
2. Armed Forces Institute of Pathology U.S.A. (1952): *Atlas of Tumour Pathology*.
3. CRAIG, C. F. and FAUST, E. C. (1951): *Clinical Parasitology*, Philadelphia, Lea & Febiger P. 598. (on the basis of statistics compiled from several workers).
4. DA ROZA, A. C. (1964): Primary intraspinal tumours: Their clinical presentation and diagnosis. *Jour. Bone & Joint Surg.*, 46-B, 8.
5. HULME, A. and DOTT, N. M. (1964): Spinal Epidural Abscess. *Brit. Med. J.*, 1, 64.
6. LOMBARDI, G. and PASSERINI, A. (1961): Spinal Cord Tumours, *Radiology* 76, 381.
7. McLELLAND, J. (1962): Tumours of the spinal canal (Section on Radiotherapy) *Proc of Royal Society of Medicine* 55, 103.

8. NIGAM, R. and GHARPURE, V. G. (1954): Hydatid disease of the spine. Indian Journal of Surgery, 16, 85.
 9. OHRI, B. B., OHRI, S. K., AKBAR ALI and JAIN, A. C. (1963): Compression of the spinal cord and spinal tumours, Indian Journal of Surgery, 25, 436.
 10. PRITAM DASS (1957): Subdural Spinal Hydatid. Indian Journal of Surgery, 19, 349.
 11. SHAPIRO, J. H., OCH, M., and JACOBSON, H. G. (1961): Differential Diagnosis of Intradural (Extramendullary) and Extradural Spinal Canal Tumours. Radiology 76, 718.
-