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Spinal Intradural Metastases of Extraneural Origin

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With 5 Figures

Summary

Three cases of intradural extramedullary (spinal subdural) metastases, originating from outside the central nervous system, are presented. Two were located at the cervico-dorsal junction, and one was mid-dorsal. A breast ductus carcinoma, a cervical neuroblastoma, and an apoduma of unknown origin, were the primary neoplasms. All presented clinically with a short history typical of cancerous spinal cord compression. Plain X-rays of the spine did not show areas of destruction. Myelography in two cases clearly suggested the intradural location of the tumour. The relative frequency of these tumours and their pathogenesis are briefly reviewed. It is stressed that primary tumours are mainly in the breast or lung. Their metastases are mainly found in the cervico-dorsal region. It is assumed that they really are metastases of the dura mater itself, growing inward. The importance of the lymphatic and venous pathways in their spread into the dura mater is emphasized.

Keywords: Spinal cord compression; metastatic spinal tumour; intradural.

Introduction

Extradural metastases are the usual cause of rapidly developing spinal cord compression. Diagnosis of intrathecal spinal secondary deposits is almost always made at operation. It is hoped that the report of these additional three cases may contribute to preoperative diagnosis.

Case Report

Case 1

This 63-year-old housewife was admitted to the Rambam Medical Centre on 20 May 1965 complaining of pain in the interscapular region of six months' duration. In the last weeks prior to admission a progressive weakness of both

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lower extremities and urinary retention developed. Past history revealed that she had suffered from marked dorsal kypho-scoliosis since childhood. In 1954 she had undergone right radical mastectomy for duct carcinoma. Subsequently, radiotherapy was applied. In 1963 she had a lumbar laminectomy for extradural metastases, after which she made an uneventful recovery. On admission a spastic paraparesis was found with a sensory level at D 3. At this level there was extreme tenderness on percussion. Plain X-rays of the thoracic spine were normal. On lumbar puncture the Queckenstedt test was abnormal. The cerebrospinal fluid showed a protein content of 200 mg% without cells. Pantopaque myelography

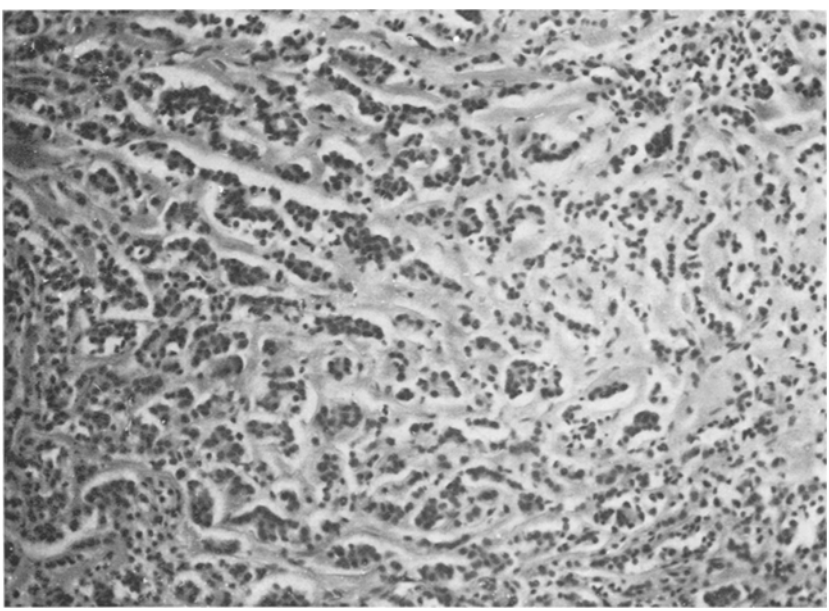

Fig. 1. Typical area of metastatic duct carcinoma (H & E/125)

revealed a complete block at the D 2–3 level. On 21 May a laminectomy from C 6 to D 3 was performed. No bone destruction or epidural tumour was seen. The dura was opened. To the right and anterior to the spinal cord, a firm red-greyish, very vascular tumour was found. Because of heavy bleeding only partial removal could be achieved. The dura mater was closed. Histology: the specimen consisted of small elastic tissue fragments, histologically compatible with metastatic duct carcinoma of the breast infiltrating in fibrotic tissue (Fig. 1). It was identical to the one removed at the time of the mastectomy. Radiation therapy ensued, but the patient's condition deteriorated, and she died soon after operation.

Case 2

This 38-year-old labourer was admitted to the Rambam Medical Centre on 24 April 1979 because of severe weakness of both legs. Three months prior to admission he began to complain of pain in his back radiating down the left leg. Subsequently paraesthesias along this leg and numbness of the right sole ensued. Finally, progressive paraparesis and urinary retention developed. On admission

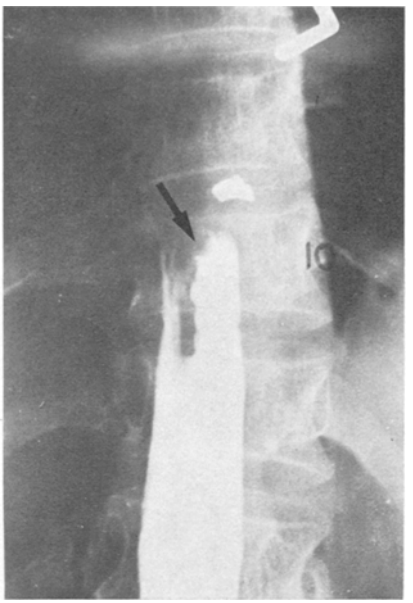

Fig. 2. Positive contrast myelography. Irregular, partly "cap-like" filling defect (arrow)

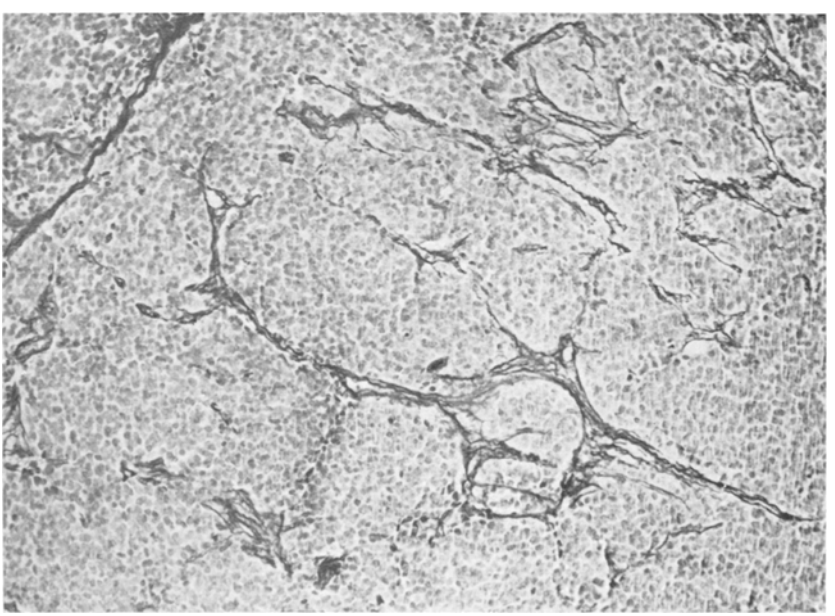

Fig. 3. Sheaths of small cells surrounded by thin septa (H & E/125)

he had spastic paraparesis, worse on the left, and a sensory level at the tenth dorsal segment. Percussion over the lower dorsal spine was painful. Lumbar puncture yielded clear cerebrospinal fluid with 1,550 mg% protein. Plain X-rays of the spine did not show osseous destruction. Myelography demonstrated a complete block at the tenth thoracic segment compatible with an intradural filling defect (Fig. 2). On 25 April a laminectomy was done from D 9 to D 11. No bone or extradural pathology was seen. Within the dura mater a fleshy, dark red tumour was found extramedullary, posterior, and to the right of the cord. The pia mater looked infiltrated. A subtotal resection was done, including several

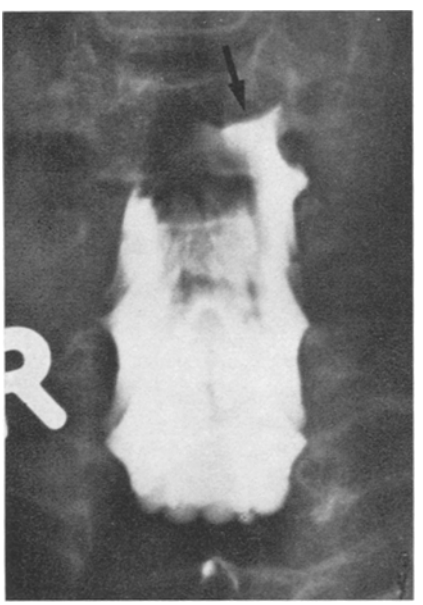

Fig. 4. Positive contrast myelography. A classic "cap-like" filling defect is seen to the left (arrow)

nerve roots. Histology: an oval soft brownish nodule surrounded by a thin capsule, measuring 3/1.5/1 cm was studied. The microscopical examination disclosed a highly cellular tumour of round and polygonal cells, arranged in solid groups, delimited by delicate fibrovascular septa (Fig. 3). Stains for argentaffin and argyrophil granules were negative, but the pattern was that of a metastatic apudoma. Meticulous search for the primary tumour failed. Radiation therapy followed. When last seen nine months after surgery he was able to walk unaided and had full sphincter control.

Case 3

This 29-year-old farmer was admitted to the Rambam Medical Centre on 21 December 1979 complaining of paraesthesias in all limbs followed by progressive tetraparesis of four weeks' duration. Lately, retention of urine had appeared. In 1973 a tumour had been radically removed from the right side of his neck. This tumour had been growing slowly for two years. Histological diagnosis was

neuroblastoma. The patient was lost to follow up until 1976. He then had a local recurrence, and a biopsy was done. He again disappeared until 1977. When a radical excision of the recurrent tumour together with neck dissection was performed. This operation was complicated by a proximal paralysis of the right upper limb, possibly due to brachial plexus damage. Combined chemo- and radiotherapy were added and intermittently continued for two years. Neurological examination on admission revealed spastic tetraparesis and a sensory level at the D 3 segment. Spinal percussion elicited tenderness over the spinous processes of C 6 and C 7. Plain X-rays of the spine failed to reveal any destructive lesion.

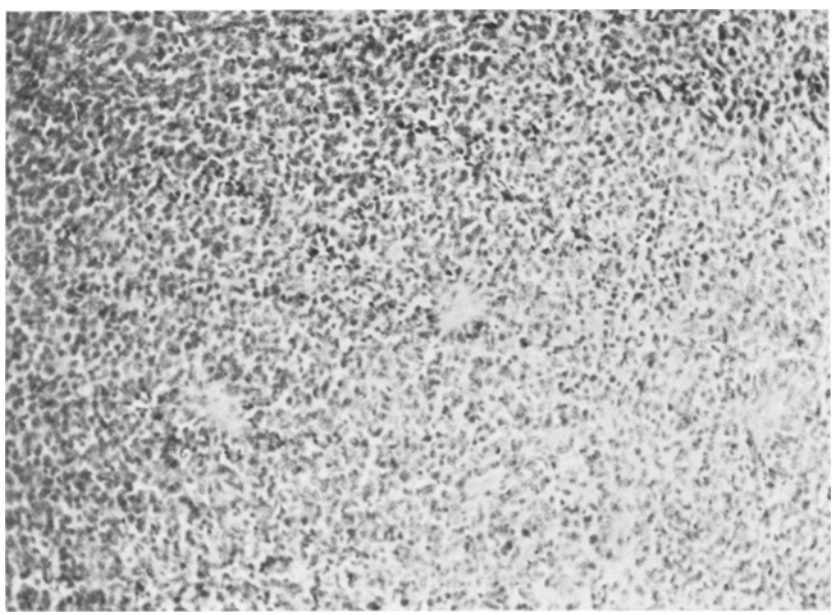

Fig. 5. Small round cells with few rosettes (H & E/125)

Chest X-rays discovered a mass in the antero-superior lobe of the left lung, compatible with a metastatic deposit. At lumbar puncture manometry was abnormal; the cerebro-spinal fluid was clear, with 240 mg% protein. A bone scan showed an increased uptake over the lower cervical spine. Myelography revealed a complete spinal block at the level of the fifth cervical vertebra compatible with an intradural tumour (Fig. 4). On 25 December a laminectomy was done from C 6 to C 4, and was extended to C 2 because of absent dural pulsations. No bone or extradural pathology was found. Within the dura the spinal cord looked swollen in the lower cervical region. The dentate ligaments were cut. A soft, purple tumour, ventral to the spinal cord, and intermingled with the motor roots, was uncovered. A biopsy was taken, and the dura mater was left open. Histology: tiny fragments of soft greyish tissue were obtained. Histological examination revealed a neoplasm of small round cells with a few scattered rosettes. No signs of maturation (Fig. 5). The above findings were consistent with metastatic neuroblastoma. There was an immediate marked neurological improvement. Subsequently he again deteriorated and died six weeks later.

Discussion

Intradural extramedullary metastases are very rare. They are hardly mentioned in neuropathological texts [10, 11]. Articles dealing with intradural extramedullary tumours in general fail to refer to metastases by name [7]. Very few papers have been specifically devoted to them [1, 3, 6]. Many authors consider spinal subdural, subarachnoid, and intramedullary deposits together without distinguishing between them [4, 5, 8]. Rogers and Heard [9] published a case of spinal subdural metastases but their discussion is entirely dedicated to intramedullary secondaries. In our Department 130 spinal metastases have been operated on from 1965 to 1979. Three were intradural and 127 extradural. No intramedullary deposits were seen. Beehler [1] had one subdural location among 25 spinal secondaries. Chandler *et al.* [2] found two out of 49 and Wilson and Rupp [14] had 2 subdural metastases among 53 spinal ones. This makes the frequency of spinal subdural metastases between 2.3 and 4% of the number of extradural deposits. Intradural metastases are roughly half as frequent as intramedullary secondary deposits [8].

These tumours lie in the subdural space, actually a potential space. It does not communicate with the subarachnoid space. Instead, it communicates with the lymph spaces within the dura mater, "the dural lakes" [12, 13]. The dura in turn fuses with the epineurium. In this way, a free communication between the subdural space, the dural lakes, and the perineural lymphatic network is provided. As lung and breast tumours predominate among those metastasizing into the subdural space, and as the cervico-thoracic region is the preferred location, it can be assumed that the perineural lymphatics are the principal avenues taken by the neoplastic emboli [1, 3, 6, 8, 9]. Our cervical neuroblastoma was in the vicinity of the brachial plexus. Other tumours known to metastasize to the subdural space arise in the kidneys, adrenals, ovaries, or lymph nodes. They spread possibly in the same way, entering the retroperitoneal lymphatic channels. Seeding through venous channels could be an alternative [1, 3], but this route seems more important in cases of vertebral and extradural deposits.

Differential diagnosis is very difficult, especially because of the rarity of this subdural malignant tumour location. Clinically these tumours cannot be separated from the intramedullary or extradural secondaries. The absence of bone destruction on plain X-rays or a normal bone scan are not conclusive. Extradural metastases can exist without bone involvement. Findings in the cerebrospinal fluid might help. Pleocytosis in a case of rapidly progressive spinal cord

compression is suggestive of an intradural location [8]. Myelography instead may be decisive when demonstrating a subdural type of filling defect (cap-like), coupled with a short history of spinal cord compression. This was the case in two of our patients. Of course, the coincidence of a known malignancy with an intrathecal benign lesion is always possible.

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