Spinal subarachnoid metastatic spread from non-neuraxial primary neoplasms

Case report

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A rare case of metastasis to the spinal subarachnoid space from a non-neuraxial primary tumor is presented. Dissemination was shown by computerized tomography to be via the cerebrospinal fluid from secondary deposits in the central nervous system and meninges. This route would seem to be the most common mode of spread to the spinal subarachnoid space.

KEY WORDS cerebrospinal fluid • spinal cord compression • spinal cord neoplasm • computerized tomography

IN adults, some 20% to 30% of all spinal tumors are metastatic. Only a small minority of those originating outside the central nervous system (CNS) are confined within the spinal subarachnoid space. Investigation of a patient with such a lesion has shed further light on the way in which metastases to the spinal subarachnoid space may occur.

Case Report

This 74-year-old woman had undergone a left simple mastectomy for anaplastic carcinoma in 1969. At that time, metastases were found in the axillary lymph nodes. She received a course of radiotherapy and remained well for 8 years. She then developed low backache and pain down the back of both thighs, associated with weakness and spasms of the legs. Within a month she could not stand unsupported.

Examination. There was a symmetrical flaccid paraparesis but no convincing sensory deficit. The deep-tendon reflexes in the lower limbs were brisk, and the abdominal reflexes absent, but the plantar responses were downgoing. There was no clinical evidence of disseminated malignancy.

X-ray films of the chest revealed a paravertebral shadow to the right of T-11, but neither spine films nor a bone scan provided definite evidence of osseous metastases. Myodil myelography demonstrated a complete block to the cranial flow of contrast medium by an intrathecal lesion at the lower border of L-1. The cerebrospinal fluid (CSF) was markedly xanthochromic, with a protein content of 9 gm/liter. No abnormal cells were seen on microscopy.

Operation. A 4-cm extramedullary tumor lying within the subarachnoid space among the roots of the cauda equina was removed completely through a T12–L1 laminectomy. There was no attachment to the dura or nerve roots. The histological appearance was of a metastatic mucus-secreting adenocarcinoma, identical to the mammary carcinoma removed 8 years previously (Fig. 1).

The rarity of this lesion led to the further investigation of the patient by computerized tomography (CT). This revealed a high-density lesion in the left lateral ventricle (Fig. 2), which was clinically silent.

Postoperative Course. The patient’s postoperative course was uncomplicated, and 10 months later she is fully mobile with no neurological deficit.

Discussion

Spinal subarachnoid metastatic deposits arising from primary tumors outside the CNS are rare. They may be multiple or solitary, discrete or merely diffuse infiltrations recognizable only by microscopic study. Spread of metastatic lesions to the spinal subarachnoid space may occur in the following four ways:
1. Spread may be by direct extension. While vertebral and extradural metastatic deposits are common, the rarity of intradural lesions testifies to the fact that the spinal dura must present a formidable barrier to tumor invasion. Nonetheless, such direct spread is well documented.\(^2\,5\)

2. Spread may be via the lymphatic stream. Many reports claiming spread via the perineural and perivascular lymphatics traversing the intervertebral foramina are open to question because of coexistent blood-borne metastases in the CNS. If it occurs at all, such spread must be very rare.\(^4\)

3. Spread may be via the blood stream. The arterial and venous systems provide an obvious means of spread of metastases. Yet patients with numerous blood-borne metastases in other tissues seldom exhibit nodules in the meninges,\(^6\) and proven cases are rare.\(^9\)

4. Spread may be by way of the CSF. This route seems to be much the most common. There is considerable evidence to suggest that spinal subarachnoid metastases frequently develop as tertiary deposits from the passage of malignant cells in the CSF from secondary lesions elsewhere in the CNS and meninges. Willis\(^*\) quotes a number of reports of leptomeningeal deposits in association with metastases found at post-

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**Fig. 1.** Left: Photomicrograph of the mucus-secreting adenocarcinoma of the breast. H & E, X 470. Right: Photomicrograph of the spinal subarachnoid metastasis 8 years later. H & E, X 470.

**Fig. 2.** Computerized tomogram of same patient showing high-density lesion in the lateral wall of the left lateral ventricle following contrast enhancement.
Subarachnoid metastasis

mortem examination involving the walls of the lateral and fourth ventricles. The more abundant distribution of deposits around the base of the brain, in the thecal cul-de-sac, and over the posterior aspect of the cord suggests that free-floating tumor cells tend to settle out of the CSF by gravity. Furthermore, several reports describe the presence of tumor cells in the CSF during life.

The advent of CT has enabled a more detailed in vivo investigation of patients than was hitherto possible. The case described here is the first report of a living patient with a silent paraventricular lesion accompanying a spinal subarachnoid metastatic deposit. While tumor cells were not demonstrated in the CSF, the circumstantial evidence is strong that the spinal metastasis was indeed a tertiary lesion arising from the secondary deposit in the left lateral ventricle.

Thus, CT has provided further evidence to support the CSF as a vehicle for the spread of metastatic lesions, and it is suggested that this investigation should be performed whenever a spinal subarachnoid metastasis is thought to be solitary.

Summary

Spinal subarachnoid metastatic deposits arising from primary tumors outside the CNS are rare. Dissemination of tumor cells in the CSF seems to be the most common mode of spread, and further evidence for this is provided by a case report in which a silent paraventricular deposit was demonstrated in vivo by CT. It is suggested that this investigation should be performed whenever a spinal subarachnoid metastasis is thought to be solitary.

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References


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