Multiple spinal epidural metastases; an unexpectedly frequent finding

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Abstract

In a prospective study, patients with known malignant disease who were suspected of having a spinal epidural metastasis, had myelography which was not confined to the clinically suspected site, but included at least the whole lumbar and thoracic spinal canal. Fifty four of the 106 myelograms revealed at least one epidural metastasis. Twelve of these 54 myelograms showed two separate lesions, and four myelograms showed three separate lesions. In all 16 cases with multiple lesions at least one of the lesions was asymptomatic at the time of the diagnosis. It is concluded that multiple spinal epidural metastases are of common occurrence and occur in about one third of the cases. This finding may have important clinical implications. Examination of the spinal canal for epidural metastases should not be confined to the clinically suspected site, but should include as extensive an area as possible of the spinal canal, whatever technique is to be used.

Spinal epidural metastases are estimated to occur in about 5 to 10% of patients with malignant disease,¹ and represent a common cause of serious disability, often by a permanent loss of ambulation. Therefore, the earliest possible recognition and treatment of spinal epidural metastases is of paramount importance. The medical history and a careful physical neurological examination will give an indication of the level of a spinal epidural tumour. However, spinal epidural metastases at a level unrelated to the clinical symptoms were reported to occur in 8% of the patients.² Remarkably little attention has been paid to multiple and asymptomatic epidural metastases. Multiple epidural metastases were reported only occasionally,^{3,4} and occurred in respectively 11% and 17% of the patients,^{5,6} without further details being given. This study was undertaken to investigate the occurrence of multiple spinal epidural metastases (MSEM) prospectively.

Methods

Since at least 85% of all spinal epidural metastases occur in the thoracic or lumbar spinal canal,⁷ we considered visualisation of at least this area sufficient to obtain an impression of the total incidence of MSEM. One

hundred and six consecutive myelograms with visualisation of at least the whole lumbar and thoracic spinal canal were therefore included in this study. These myelograms were performed with water-soluble contrast material via lumbar puncture, in patients with known malignant disease, when clinical evidence suggested an epidural lesion in the thoracic or lumbar region. Myelography was considered to be indicated when a patient developed radicular pain and/or clinical signs of radiculopathy or spinal cord or cauda equina compression, irrespective of the findings on plain radiographs and bone scan. When an obstructing lesion was found, both the upper and the lower border were visualised, if necessary, by additional cisternal puncture. In 10 of the 106 myelograms not only the lumbar and thoracic spinal canal, but also the whole cervical area could be visualised.

Results

Thirty nine (37%) of the 106 myelograms were performed on men, 67 (63%) on women. Age distribution ranged from 31 to 84 years, mean age being 53.8 years. The various sites of the primary tumours are shown in table 1. Myelographic findings consisted of epidural metastases in 54 myelograms (51%), degenerative abnormalities in 21 (20%), intradural metastases in five (5%), and no abnormalities in 26 myelograms (25%).

Multiple spinal epidural metastases (MSEM) were demonstrated in 16 (30%) of the 54 myelograms with epidural metastases. Twelve myelograms revealed two lesions, four myelograms revealed three lesions simultaneously. The characteristics of these sixteen cases are presented in table 2. Seven had breast carcinoma, and three had melanoma as the primary tumour. Interestingly, seven myelograms were performed in patients with melanoma; three revealed MSEM, three revealed single spinal epidural metastases (SSEM), and only one myelogram did not reveal metastasis, but a lumbar canal stenosis.

The symptomatic lesions occurred predominantly in the upper and middle part of the thoracic, and in the lumbosacral area. The asymptomatic lesions occurred mainly in the upper and middle thoracic area, and less frequently in the lumbosacral area (fig 1).

Comparison of MSEM (n = 16) and SSEM (n = 38) cases did not reveal a significant difference between these two groups for distribution of age, mean age and sex. The

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Table 1 Site of primary tumour in 106 cases with myelography including at least the whole lumbar and thoracic spinal canal

Primary tumour	Total numbers of myelograms	Myelograms with epidural metastases	Myelograms with multiple epidural metastases
Breast	47	29	7
Lymphoma	12	6	1
Lung	10	2	—
Melanoma	7	6	3
Genito-urinary	7	2	—
Gastro-intestinal	6	1	1
Unknown primary site	6	4	1
Nasopharynx	4	—	—
Thyroid	2	—	—
Sarcoma	2	2	1
Miscellaneous	3	2	2
Total	106	54	16

Table 2 Characteristics of patients with multiple epidural lesions

No	Age (yr)	Sex	Primary tumour	Level of epidural lesions*		
17	38	F	Melanoma	T6*	T11*	L1
24	84	F	Breast	T3	T11*	
49	49	M	Liposarcoma	T3-4*	T7-9	
60	65	F	Breast	T3-4*	T7*	S1
64	72	F	Breast	T10*	L5	
65	73	F	Breast	T4-5	L5*	
80	53	F	Breast	T7-8*	L5-S1	
92	51	M	Chondrosarcoma parotid gland carc.	T8*	T10-11	
102	35	F	Breast	T7*	T9-10	
103	53	F	Melanoma	T4*	T10*	S1
111	75	F	Multiple myeloma	T3-7	T9-10*	
117	32	M	Melanoma	T6-7*	T9-11	
122	31	M	Hodgkin's disease	T4	T12-L2*	
141	55	F	Breast	C5-C6*	T4*	T9
142	62	M	Adenocarcinoma of unknown origin	L3-L5	S1*	
155	38	M	Stomach	T9*	L1	

*Symptomatic lesions

Figure 1 Distribution of spinal epidural metastases on 54 myelograms of at least the whole thoracic and lumbar spinal canal.

mean latent interval between the diagnosis of the primary tumour and the moment of myelography was 4.6 years in the MSEM group, and 5.4 years in the SSEM group, while the mean duration of the neurological symptoms and signs leading to the myelography was two and 2.5 months respectively. In both groups clinical evidence of radicular compression occurred more frequently than spinal cord or cauda compression, while the

great majority in both groups was ambulatory: 13/16 of the MSEM, and 28/38 of the SSEM cases. Other distant, mainly osseous, metastases were present in all MSEM cases and in 33 of the 38 SSEM cases. The five remaining cases had no distant, but regional lymph-node metastases.

A complete myelographic block was found in about one quarter of the cases in both groups. All tumours causing a complete block were symptomatic. All partial, that is, nearly complete, myelographic blocks (six of the 16 MSEM, and nine of the 38 SSEM cases) were symptomatic except one (level T4 in case 103, table 2), and although it was the largest of the three lesions in this case, it was asymptomatic. Although most cases with a complete or partial myelographic block showed clinical evidence of spinal cord or cauda equina compression, the degree of the myelographic block did not correlate with the ambulatory status: most patients with complete or partial blocks were ambulatory (8/10 of the MSEM, and 12/18 of the SSEM cases).

Treatment consisted of radiotherapy in 75% of the MSEM and 71% of the SSEM cases. Seven of the 16 MSEM cases received radiotherapy to more than one lesion, depending on the site and extent of the asymptomatic lesions. Additional chemotherapy was administered in 31% of the MSEM and 13% of the SSEM cases, whereas chemotherapy alone was administered in 12% and 11% respectively. Very few patients (one MSEM, and two SSEM cases) had surgery, in combination with radiotherapy or chemotherapy. Hormonal therapy alone was prescribed in two SSEM cases, and treatment was abandoned in one MSEM and three SSEM cases.

The clinical course revealed neurological improvement in 62% of the MSEM and 53% of the SSEM cases, unchanged neurological condition in 25% and 34%, and deterioration in 12% and 13% respectively. After a median follow up of three months mortality was higher in the MSEM (94%) than in the SSEM group (63%), but this difference is not significant (log rank test; $p = 0.14$).

Discussion

Myelography with identification of the upper and lower border of the tumour is still the most widely used technique to establish the diagnosis of spinal epidural metastases.³ Spinal computed tomography (CT) can give valuable additional information, especially in identifying metastatic vertebral disease and the paraspinous extension of the tumour. CT with intrathecal contrast can also be used to visualise spinal epidural metastases,⁸ and may be helpful in defining the upper level of the tumour in cases with an apparent block at conventional lumbar myelography.⁹ More recently, magnetic resonance imaging (MRI) was shown to be a useful technique in establishing an early diagnosis of spinal epidural metastases.⁴ Although MRI is generally recommended to possibly avoid a lumbar puncture, to demonstrate paravertebral tumour extension, and to

identify additional osseous metastases,¹⁰⁻¹² studies comparing the clinical efficacy of MRI and myelography in patients with spinal epidural metastases are scarce,^{2,13} and with conflicting results. Small epidural deposits and root compressions might be better detected with myelography.¹³

Finally, even when MRI is being used in cancer patients to demonstrate spinal metastases, a lumbar puncture is still necessary to obtain cerebrospinal fluid (CSF) cytology to exclude meningeal carcinomatosis as the cause of the neurological symptoms and signs.

In this prospective study the number of MSEM is remarkably high (30%). This percentage might have been slightly higher if not only the thoracic and lumbar spinal canal would have been visualised, but also the cervical spinal canal in all cases (in this study in 10 of the 106 cases). However, only 15% of all spinal epidural metastases occur in the cervical area.⁷ Accordingly, the total occurrence of MSEM may not be estimated at 30%, but at 35%

$$\left(30\% + \frac{15}{85} \times \frac{96}{106} \times 30\% \right).$$

Another finding in this study was the frequent occurrence of MSEM in melanoma patients. Although the numbers are small, the results suggest an occurrence of MSEM in even 50% of melanoma patients with spinal epidural metastases.

Twelve of the 16 MSEM cases in this study showed two, and four showed even three separate metastases. In all these 16 cases, at least one epidural lesion was asymptomatic. Furthermore, it was shown that the great majority of patients with spinal epidural metastases have other distant, mainly osseous, metastases as well. Accordingly, not only local treatment, but also systemic therapy should be seriously considered in patients with spinal epidural metastases.

Finally, in case of apparent failure of local radiotherapy, the presence of another, previously asymptomatic, spinal metastasis might be the cause of the neurological deterioration. For these reasons, visualisation of not only the clinically suspected site, but also as extensive an area as possible of the spinal canal, should be recommended in patients with spinal epidural metastases.

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