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Metastatic spinal cord compression (MSCC)

Background

Patients with symptoms suggestive of spinal cord compression, particularly severe back or root pain, should be investigated urgently with whole-spine magnetic resonance imaging (MRI) to define sites and levels of compression accurately.¹ Multiple levels of compression are seen in up to one-third of patients.²

On clinical suspicion of MSCC or once a diagnosis has been established, all patients should be started on steroids; give dexamethasone in 16 milligrams (mg) daily.²

Systemic anti-cancer treatment may be more appropriate than radiotherapy for some malignancies, such as lymphomas, plasma-cell tumours, germ cell tumours or untreated small cell cancers.

Long-term outcome from MSCC depends on the degree of paralysis and overall prognosis for the cancer; poorer outcomes are associated with non-ambulatory status, poor performance status, ≥ 3 involved vertebrae, presence of other bone metastases, presence of visceral metastases and shorter time to developing motor deficits. Breast, prostate and haematological primary origin confer the best prognosis; lung and bladder sites have a poor outcome (Level 2c).^{3,4}

Ideally, the prognosis of patients should be objectively assessed using validated scores such as the SCORAD index, which identifies primary breast or prostate cancer and good ambulatory status at presentation as favourable prognostic factors for both survival and ambulation after treatment (Level 2b).⁵

Patients with a good expected prognosis, especially those who are ambulatory, should be discussed with a spinal or neurosurgeon to consider spinal decompression and stabilisation surgery followed by radiotherapy. This intervention has been shown to improve neurological status and overall survival in selected patients with a single site of MSCC and prognosis >3 months (Level 1b) compared with radiotherapy alone.⁶

For good-prognosis or ambulatory patients who are not suitable for surgery, urgent radiotherapy should be given before further neurological deterioration.²

For poor-prognosis ambulatory patients, radiotherapy should be considered to preserve neurological function.

For non-ambulatory patients, if paraplegia has been established for >24 hours, radiotherapy has a role for pain relief but little improvement in function can be expected.²

A systematic review and meta-analysis of published studies comparing short course (8 Gy in 1 dose or 20 Gy in 5 fractions) with long course (all schedules >1 week) identified 14 studies with 2,239 patients. The analysis showed similar survival rates and functional outcome between the two groups although local control rates were higher in the group receiving longer-course schedules. Ambulant patients with an expected better prognosis may therefore benefit from longer courses of treatment to prevent recurrence and need for retreatment.⁷

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The SCORAD trial randomised 686 patients with metastatic spinal cord or cauda equina compression, life expectancy greater than 8 weeks and no previous radiotherapy to the same area to receive either 20 Gy in 5 fractions or a single dose of 8 Gy.⁸ While the primary endpoint of non-inferiority (defined at -11%) difference was not met, there was no significant difference in all other endpoints including ambulatory status, pain and survival at 4, 8 and 12 weeks. SCORAD was included in a meta-analysis including three randomised trials comparing single doses of 8–10 Gy with fractionated radiotherapy.⁹ There was no observed difference with respect to motor response, bladder dysfunction and OS between the two groups. It should be noted that these studies included patients with a median survival of only 3 to 4 months.

The NICE guidelines have been updated and recommend a single dose of 8 Gy for all patients with consideration of SBRT if the patient has ≤ 3 metastases.¹⁰

Recommendations

Metastatic spinal cord compression: non-ambulant patients or ambulant patients with a prognosis <6 months:

- 8 Gy single dose (Grade A)

Metastatic spinal cord compression: ambulant patients with a good prognosis or post-spinal surgery:

- 20 Gy in 5 daily fractions over 1 week (Grade B) or
- 30 Gy in 10 daily fractions over 2 weeks (Grade B)

The types of evidence and the grading of recommendations used within this review are based on those proposed by the Oxford Centre for Evidence-Based Medicine.¹¹

There is response to retreatment after initial benefit from radiotherapy for recurrent MSCC.

Using conventional radiotherapy techniques a cumulative biologically equivalent dose (BED) of ≤ 135.5 Gy when the interval is >6 months and each course is ≤ 99 Gy BED using an α/β ratio of 2 is recommended (50 Gy in 25 fractions = BED 100 Gy² and 20 Gy in 5 fractions = BED 60 Gy²).¹² Evidence indicates that the effect of previous radiation, time to develop motor deficit, presence of visceral metastases and performance status have an impact on effectiveness of repeat treatment but treatment schedule does not (Level 2c).¹³

Stereotactic body radiotherapy (SBRT) may be considered for reirradiation but dose tolerances for the spinal cord are based on only a small number of cases. The spinal Dmax is quoted as the relevant cumulative dose constraint; a median Dmax of 25 Gy² BED from SBRT and cumulative Dmax of 105 Gy² BED with a minimum interval of 5 months is recommended.¹⁴

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Recommendations

Metastatic spinal cord compression: reirradiation after 8 Gy single dose or 20 Gy in 5 fractions:

Conventional radiotherapy prescribed at depth:

- 8 Gy single dose or 20 Gy in 5 daily fractions; maximum cumulative BED \leq 135.5 Gy 2 (Grade C)

or using SBRT, defined at Dmax:

- 9 Gy in 1 dose, 12.2 Gy in 2 fractions or 14.5 Gy in 3 fractions (Grade C)

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References

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