Management Algorithm

Suspected spinal metastases or MSCC with prior diagnosis of Ca

Neurological deterioration

- Pain
- Pain + incomplete neurological injury
- Complete sensory and motor paraplegia over 24 hours

MRI within one week

MRI as soon as possible (within 24 hours)

MRI next available list

Instability

- Radiosensitive
  - Good surgical candidate:
    - life expectancy greater than 3/12
    - MDT oncology assessment
    - revised Tokuhashi score

Open/MIS stabilisation surgery

Radiotherapy

Vertebroplasty/kyphoplasty +/- Open/MIS stabilisation surgery

Decompression and open/MIS stabilisation surgery

Open/MIS stabilisation surgery

Rehabilitation
Prognosis

Table 1
Evaluation system for the prognosis of metastatic spine tumors (revised in 1999)\(^a\)

<table>
<thead>
<tr>
<th>Predictive Factor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>General condition (performance status)</td>
<td></td>
</tr>
<tr>
<td>Poor (PS 10%–40%)</td>
<td>0</td>
</tr>
<tr>
<td>Moderate (PS 50%–70%)</td>
<td>1</td>
</tr>
<tr>
<td>Good (PS 80%–100%)</td>
<td>2</td>
</tr>
<tr>
<td>Number of extraspinal bone metastases foci</td>
<td></td>
</tr>
<tr>
<td>(\geq 3)</td>
<td>0</td>
</tr>
<tr>
<td>1–2</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Number of metastases in the vertebral body</td>
<td></td>
</tr>
<tr>
<td>(\geq 3)</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Metastases to the major internal organs</td>
<td></td>
</tr>
<tr>
<td>Unremovable</td>
<td>0</td>
</tr>
<tr>
<td>Removable</td>
<td>1</td>
</tr>
<tr>
<td>No metastases</td>
<td>2</td>
</tr>
<tr>
<td>Primary site of the cancer</td>
<td></td>
</tr>
<tr>
<td>Lung, osteosarcoma, stomach, bladder, esophagus, pancreas</td>
<td>0</td>
</tr>
<tr>
<td>Liver, gall bladder, unidentified</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td>Kidney, uterus</td>
<td>3</td>
</tr>
<tr>
<td>Rectum</td>
<td>4</td>
</tr>
<tr>
<td>Thyroid, breast, prostate, carcinoid tumor</td>
<td>5</td>
</tr>
<tr>
<td>Palsy</td>
<td></td>
</tr>
<tr>
<td>Complete (Frankel A, B)</td>
<td>0</td>
</tr>
<tr>
<td>Incomplete (Frankel C, D)</td>
<td>1</td>
</tr>
<tr>
<td>None (Frankel E)</td>
<td>2</td>
</tr>
</tbody>
</table>

Abbreviation: PS, Karnofsky’s performance status.

\(^a\)Criteria for predicted prognosis: total score 0–8 \(< 6\) months’ survival; total score 9–11 \(\geq 6\) months’ survival; total score 12–15 \(\geq 1\) year’s survival.

Figure 1 - Tokushashi et al (Spine, 2005) - score < 8 = <6 month survival. Score 9-11 = < 1 year survival. Score >12 = >1 year survival.
En-bloc resection may offer potential curative surgery in isolated metastasis, but not in vogue. SRS still offered as the 1st line option instead.

Vascular tumours (renal, thyroid and hepatocellular ca.) should be embolised pre-operatively.

Vertebroplasty involves direct injection of PMMA cement into the vertebral body, whereas Kyphoplasty involves placing an expandable balloon to reduce kyphosis before filling with cement.

- Epidural compression of the spinal cord is a relative contra-indication, unless the patient is a poor surgical candidate.
- Can be combined with radiotherapy
- Complications rare – relate to leakage of cement
- Complete or near complete pain relief achieved in up to 84%

All patients on bed rest should have thigh-length TEDS and LMWH (enoxaparin), especially if paraplegic.

- Also require regular risk assessment for pressure ulcers, and log-rolling every 2-3 hours.

Changes in sphincter function assessed on initial presentation and daily thereafter.
Non-operative Management

- With the exception of chemosensitive tumours (e.g. Ewing’s sarcoma and neuroblastoma), chemotherapy has a limited role.

- Steroids are very effective:
  - Decrease oedema within the cord
  - Oncolytic effect in lymphoma and breast cancer
  - 4mg Dexamethasone QDS for 1 week pre-operatively (except in lymphoma)
  - Reduce dose over 1 week after surgery

- Bisphosphonates inhibit osteoclast activity and can be given orally or i.v.
  - Treat hypercalcaemia
  - Reduce pain
  - Decrease risk of fracture
  - *Especially useful in myeloma, breast and prostate cancer*

- Radiotherapy indications
  - Radiosensitive tumours: lymphoma, myeloma, small cell lung cancer
  - Life expectancy of < 3 months
  - Absence of neurological impairment, mechanical pain or instability
  - 8-10 fractions with a total dose of 25-40 Gy

- Can also be used as an adjunct to spinal stabilisation surgery, but only after the wound has healed – to avoid risks of wound infection or dehiscence

- Spinal stereotactic radiosurgery (SRS) is a new technique using multiple beams to converge on a narrow bony target and allow higher doses of radiation, while minimising collateral damage to normal tissue
  - Pain relieve can remain even after 1 year
  - In existing neurological compromise: 47% remained static and 31% improved

Operative Management

- If definitive management of MESCC is planned, treatment should commence within 24 hours
  - If rapid deterioration in neurological state, surgery should be ASAP
  - If gradual deterioration, surgery planned for next scheduled list

- *Patchell (2005, Lancet)* – RCT comparing surgical decompression and stabilisation with radiotherapy (n=50) vs. radiotherapy alone (n=51)
  - Better ability to walk (84% vs. 57%)
  - Retained mobility longer (122 days vs. 13 days)
  - If walking before treatment, then maintained mobility (94% vs. 74%)
  - If not walking before, then *regained* ability (62% vs. 19%)
  - Better maintenance of continence, muscle strength and functional ability (Frankel score)
  - Overall survival 26 days longer, but 30-day mortality unchanged.
Surgical Management of Metastatic Epidural Spinal Cord Compression (MESCC)

Quraishi NA et al 2010, JBJS, 92-B (8): 1054-1060

- **MESCC** defined radiologically as an epidural metastatic lesion causing displacement of the spinal cord.
  - Incidence: 5-10% of patients with cancer
  - Up to 40% in patients with existing bony metastases outside the spine
  - Most common in breast, prostate and lung cancers

- Symptomatic spinal metastasis can be the initial presentation of a cancer in 10%
  - Pain (83-95%)
    - Periosteal stretching from growing tumour mass and inflammatory process
    - Mechanical due to instability
    - Radicular from nerve root irritation
  - Motor weakness (60-85%)
    - Motor function at initially diagnosis correlates with prognosis of MESCC
    - Therefore early diagnosis and prompt treatment vital
    - *Any new onset of back or neck pain in a patient with known cancer, should be treated as spinal metastatic disease until proven otherwise*

- Treatment of MESCC is primarily palliative with the aims of:
  - restoring or preserving neurological function
  - relieving pain
  - maintaining or restoring spinal stability

- Instability defined by Kostuik as > 3 segment involvement, or angular deformity caused by collapse of >20°