Back pain in malignant disease – metastatic spinal cord compression?

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SUMMARY POINTS

- Be alert to possible spinal cord compression in patients who are at risk and who present with warning signs and symptoms
- Maintain a low threshold for further investigation of such patients and for discussing them with specialist colleagues
- If MSCC is suspected, commence high dose steroids (16mg dexamethasone orally in the morning) immediately
- Ensure imaging to confirm diagnosis of MSCC is carried out within 24 hours of clinical suspicion
- Ensure prompt treatment within 24 hours of diagnosis

Introduction

Patients with metastatic spinal cord compression (MSCC) can often first present to healthcare professionals with pain and is an oncological emergency. This paper reviews the background, presentation and pathophysiology of MSCC and aims to help professionals identify possible cases, guide further investigation and implement appropriate management. The impact of MSCC on patients, their carers and the healthcare system is also explored.

The importance of MSCC, and the perception that it is frequently misdiagnosed, or diagnosed too late for treatment to be effective, indicates that professionals need to develop their understanding of the risk factors, nature and management of this significant problem. Reflection upon current practice is encouraged, as is consideration of ways in which awareness of MSCC can be integrated into routine clinical care.

Background

Pain is a common feature of malignant disease, and can be a presenting feature to general practitioners, pain specialists, oncologists and specialist palliative medicine physicians among others. Often, pain is directly related to the primary site of disease, but may also be due to tumour spread, as well as the result of 'usual' pathological processes of degenerative disease (e.g. osteoarthritis).

Malignant disease often progresses despite treatment and MSCC is a well-recognised complication of such progression in patients. It has been estimated that spinal metastases occur in 3-5% of all patients with malignant disease¹ and their development may cause pain, collapse at single or multiple vertebral levels and development of MSCC. The risk in this situation increases in part with disease duration, and with known widespread disease.¹ MSCC is most frequently seen (approximately 50% of all cases) in patients with lung, prostate and breast cancer although, in a significant proportion of cases (7%), no primary site of malignancy is identified.^{2,3} MSCC can be described as progressive paraplegia in cancer patients and is an oncological emergency (i.e. requires comprehensive investigation to confirm the diagnosis, and definitive management within a specific time period, usually 24-48 hours).

MSCC is the result of compression of the spinal cord or cauda equina due to direct tumour expansion or collapse of a vertebra. Left untreated, the consequence of MSCC is irreversible neurological damage and paraplegia² and, therefore, early detection, diagnosis and treatment are vital where MSCC is suspected. Once paraplegia develops, which can be accompanied by loss of bladder and/or bowel function, loss of independence and marked reduction in quality of life, improvement in function is not usually achievable. This has a significant impact on quality of life of both the patient and those close to them; major resource implications for health and social services through increased medical, nursing and care requirements; and can adversely affect the patient's survival.^{3,4} For these reasons, instigation of appropriate management plans should be immediate and unacceptable delays should not be tolerated.

Pathophysiology

The majority of cases of MSCC (85%) are the result of vertebral collapse leading to compression of the spinal cord or cauda equina. Such collapse is itself the result of haematological spread of malignant disease to the spine.^{5,3} Compression can also occur due to direct tumour expansion (vertebral or soft tissue) or by means of direct cancer cell deposition within the spinal cord.⁵

MSCC most frequently occurs in the thoracic spine, with a significant minority (4-7%) in the cervical spine,^{2,4,6} with obvious more serious implications for both function and survival. Levack et al found that 17% of patients had two or more levels of MSCC.²

The results of compression are similar to those seen in other tissues – oedema and venous congestion – but the resulting cell damage is characterised by neural demyelination and, with prolonged, untreated compression, infarction of the spinal cord results. There is little chance of significant functional improvement after this occurs.⁷ Sudden onset MSCC has a worse functional prognosis than gradual, slow onset MSCC, as there is less time for tissues to adapt.

Signs & symptoms

Awareness of the potential meaning of symptoms described by patients that may indicate possible MSCC is of greater importance than ability to recite such signs and symptoms as a list. Indeed, a 'hierarchy' of symptoms of MSCC is neither appropriate nor possible, as all patients present differently and recognition of the possibility of MSCC is of far greater importance than limiting its recognition and diagnosis to a diagnostic algorithm. Back pain is a frequent early symptom of MSCC described by the vast majority of patients, but is experienced by a great many patients without MSCC, and therefore its importance may be overlooked. Pain may precede other clinical signs of MSCC.^{3,8,9} Back pain, especially that which is localised, which is persistent or not improving in patients with known malignancy should always be discussed urgently with oncology / specialist palliative care colleagues to determine whether further investigation is necessary. It must be acknowledged however, that absence of pain does not exclude MSCC.

Back pain, when present, frequently precedes any onset of neurological symptoms or signs, and sudden onset or increase in severity of back pain should be investigated promptly. A common misconception is that MSCC is not present unless limb weakness, bladder and / or bowel dysfunction and altered sensation are present. Levack et al found that 85% of patients with MSCC experienced limb weakness.³ However, such weakness can go unrecognised and be difficult to detect accurately. Sensory deficits do occur, and can relate to the level of spinal involvement¹⁰ but aren't necessarily indicative of degree of spinal damage due to compression.³ Bladder and bowel dysfunction, signs of significant autonomic nerve disturbance, occur late in development of MSCC.

Investigation

Magnetic Resonance Imaging (MRI) of the whole spine is the investigation of choice in investigating suspected cases of MSCC. It should be requested urgently and performed within 24 hours of clinical suspicion. In some cases (e.g. pacemaker, metal implants, severe claustrophobia), MRI is not possible and Computerised Tomography (CT) may have to be performed instead. Clinicians should liaise with local Radiology specialists to discuss appropriate investigation of suspected cases of MSCC.

Management

All patients with confirmed MSCC should be discussed with the on-call Clinical Oncology or Neurosurgery specialist (Consultant or Specialist Registrar) or the relevant MSCC contact according to local guidelines / protocols. Initial management options include steroid treatment, surgery and radiotherapy with subsequent rehabilitation. Guidelines for specific nursing and medical management are available⁽¹⁾ and are not discussed in detail here.

Steroid treatment

If there is a high index of clinical suspicion of MSCC, high dose steroids should be commenced without delay in an attempt to reduce inflammation at the site of compression (dexamethasone 16mg orally or intravenously as an immediate dose, then 16mg once daily *before noon*).^{1,11} It is advisable that patients should also receive gastroprotection (e.g. lansoprazole 30mg once daily), as high dose dexamethasone has the potential to cause clinically significant gastric irritation. High dose steroid treatment should be continued for five days from the start of radiotherapy (if it is given) to reduce radiation-induced inflammation and peri-tumour swelling. Steroid treatment should then be reduced gradually, rather than being stopped abruptly (e.g. reducing by 2mg every three days providing pain or neurological deficit do not increase).¹ Patients should be monitored for steroid-related side effects, including candidiasis and elevated blood glucose.

If investigation by imaging (MRI or CT scan) confirms the diagnosis of MSCC, a senior clinician (Consultant or Specialist Registrar) must refer the patient to specialist colleagues in Oncology or Neurosurgery for consideration of further, urgent specialist treatment. Ideally, this should be within 24 hours of onset of neurological symptoms and certainly within 24 hours of radiological diagnosis by imaging.

Surgery

Some cases of MSCC are amenable to surgery and referral should be made to local neurosurgery or spinal orthopaedic services, with imaging available, as a matter of urgency. Surgery may include spinal cord decompression, spinal column stabilisation or resection / reconstruction.¹ Surgery may be considered where:

- there are limited levels of cord compression on imaging;
- there is minor neurological impairment;

- previous radiotherapy has already been given at the level of MSCC;
- spinal instability is present;
- general anaesthesia and surgery are not contra-indicated for other reasons; and
- prognosis is estimated to be six months or longer.

Early surgery, before the patient has developed severe neurological deficits, produces the best outcome and is best undertaken prior to radiotherapy, as there is less risk of wound complications. Surgery for metastatic spinal disease is undertaken for neurological deficits, pain and deformity. However, some patients who fulfil the above criteria may not be suitable candidates for surgical intervention following neurosurgical consideration due to comorbidity, poor functional status prior to development of MSCC or short prognosis, among others.

Radiotherapy

The aims of radiotherapy are to reduce pressure on the spinal cord through tumour shrinkage and to achieve local tumour control at this site, but may also be given as a palliative measure to provide control of pain. Radiotherapy may be appropriate where there is an established diagnosis of metastatic cancer and:

- the patient is not fit to undergo surgery;
- there is extensive vertebral involvement;
- there is disease and MSCC at multiple vertebral levels;
- the patient has not previously received radiotherapy to the area; and
- the tumour type is sensitive to radiotherapy (e.g. small cell lung cancer, myeloma).

Radiotherapy may still be of benefit, even in the case of a patient with major neurological deficit, as it may help prevent loss of remaining sphincter control and help reduce pain. Results of radiotherapy are closely linked to neurological status at the time of treatment – advanced loss of neurological function is unlikely to be improved by treatment.¹

In patients with advanced metastatic disease and confirmed MSCC, most would receive radiotherapy either as a single treatment or as a course of fractionated treatment. This would depend on their clinical condition at the time. In certain cases, patients previously treated with radiotherapy may be considered for re-treatment, depending on multiple factors including time since initial treatment, previous dose, likely prognosis and area of treatment overlap.

Rehabilitation

The focus of care for patients with life-limiting disease should always be on the promotion of independence and quality of life. Supportive care and rehabilitation are key to achieving these goals and are integral to the approach to and management of MSCC. NICE guidance on supportive and palliative care specifically promotes a patient-centred approach to care.¹²

Components of rehabilitation include considerations of thromboprophylaxis, management of pressure ulcers, bladder and bowel management and maintaining circulation and respiratory function, as well as physiotherapy, occupational therapy, psychological support and nursing and social care.

Prognosis

Patient survival following diagnosis of MSCC has been linked to the patient's ability to walk at the time of diagnosis.³ However, median survival of patients who receive no treatment for MSCC is approximately one month.⁴ In all patients, median survival is approximately 2-3 months.^{3,4} MSCC can thus be regarded as a life-limiting consequence of metastatic malignant disease.

The longest survival has been reported in patients with haematological malignancies and prostate cancer,⁴ with the shortest survival in patients with lung cancer, although this data may be influenced by the underlying disease processes as well as MSCC.

Patients who receive surgery as the primary management of MSCC appear to have a significantly improved rate of survival.³ This is likely to be linked to patients' appropriateness for surgical intervention rather than a direct result of surgery itself.

Impact of MSCC

MSCC has been identified as an oncological emergency and, as such, approach and care could very easily become focused on the medical aspects of diagnosis and management of the condition. However, it should be remembered that signs, symptoms, resulting disability and the 'healthcare-centred' processes of diagnosis and management all have a significant impact on the patient, their family and / or carers and those healthcare professionals involved in their care.

Diagnosis of MSCC can cause significant psychological distress in patients with cancer and those close to them¹ and it is therefore important that all those involved in a patient's care be mindful of the potential support that may be needed, both at initial diagnosis and throughout treatment and rehabilitation. The patient and their carers are dealing not only with a life-limiting illness, but have the added burdens of a new neurological disability, complex decision-making regarding management and the uncertainty of treatment outcomes. Disability associated with MSCC adversely affects quality of life for both patients and carers, and can often result in significant changes to

living arrangements, independence and social interactions. All need to be considered when managing patients with MSCC.

Research into patient experience of MSCC and detailed exploration of patient narratives have revealed several recurring themes in the experiences of professionals, patients and those caring for them.¹ Often, patients are not aware of the early 'warning' signs of MSCC. There may also be a lack of awareness among some professionals of early symptoms and signs of MSCC. In addition, there can be delays in diagnosis of MSCC once an 'at risk' patient is referred to secondary care, reduction in options for management of MSCC due to delays in the diagnostic / management process and variable provision in options and availability of supportive care and rehabilitation post diagnosis / initial treatment. Communication during the patient journey through presentation, diagnosis, initial treatment and ongoing management phases has also been highlighted as an area requiring attention, with most patients in one study being dissatisfied with communication throughout their care.¹

Such findings highlight the need for effective, clear and consistent communication with patients and those caring for them from the first recognition of the possibility of diagnosis of MSCC. Patients should, wherever possible, be fully informed about their condition and options for management, as well as being involved in decisions regarding both initial and ongoing treatment.

Patients with MSCC and their families should be offered emotional and psychological support appropriate to their needs and should be provided with information at all stages of the diagnostic / treatment processes.

Summary

MSCC is an oncological emergency and can present with new, altered or increased back pain. The detection and diagnosis of MSCC relies almost entirely on obtaining a thorough and accurate history and the diagnostic clinical skills of the health professional assessing the patient. All clinicians managing such patients should ensure they are familiar with MSCC and its management by making themselves familiar with published, local and national guidelines and keeping up-to-date through continuing professional development.¹³

Thinking points

Given that many patients you encounter have both bone metastases and back pain, how do you distinguish between patients at risk of MSCC and those who you feel do not need further examination or investigation?

Are you aware of any local guidelines regarding the diagnosis and management of MSCC? If not, consider investigating this further.

Will your practice change (and how?) in light of your new understanding of the mechanisms and presentation of MSCC?

How would such a patient be cared for and supported in your area? Who would need to be involved? What (if any) difficulties might arise? Reflect on your role in this process.

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