Diagnosis and treatment of malignant spinal cord

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Malignant spinal cord compression occurs in up to 10 per cent of people with cancer, and advances in treatments may increase its incidence as patients live longer. Nurses have an important role in all aspects of care, including early detection. Prompt treatment significantly improves patients’ chances of avoiding permanent disability. However, the condition is characteristic of advanced cancer and therefore is in itself an indicator of poor prognosis.

Malignant spinal cord compression (MSCC) occurs in 2–10 per cent of people with cancer (Ingham et al, 1993; Falk and Fallon, 1997; Frank, 1998; Huff, 2001). Its incidence is likely to increase as medical advances enable patients to live longer, exposing them to the complications associated with advanced disease. MSCC is an oncological emergency, and the patient’s neurological status at the onset of treatment for the condition is the main prognostic indicator. Staff working in cancer care should be alert to the possibility of MSCC, particularly in patients whose cancer is associated with its development (Box 1; Siegal et al, 2002). However, failure to investigate urgently and delay in diagnosis and initiation of appropriate treatment, are not uncommon.

Anatomy of the spinal cord

The vertebral column extends from the base of the skull and terminates within the pelvis. It contains 26 separate vertebrae, which in adults are grouped together as:

- Seven cervical;
- Twelve thoracic;
- Five lumbar;
- The sacrum (the fusion of five sacral vertebrae);
- The coccyx (the fusion of four coccygeal vertebrae).

All vertebrae have a similar structure and a typical cervical vertebra is shown in Fig 1.

An elaborate system of ligaments and muscles provide the necessary support for the vertebral column and allow movement. The major connecting ligaments are the anterior and posterior longitudinal ligaments, which run down the front and back of the spine from neck to sacrum. Short ligaments connect each vertebra to the one above and below. Although movements between individual vertebrae are limited, the vertebral column as a whole can move extensively, including flexion and, to a lesser degree, extension, lateral flexion and rotation. Discs act as shock absorbers between neighbouring vertebrae and allow the spine to move. They are cushion-like pads composed of a ring of strong fibrocartilage filled with semifluid. At points of compression, the discs flatten and bulge out a little from the intervertebral spaces. They are thickest in the cervical and lumbar regions, which enhances the flexibility of these areas.

The spinal cord is located within the vertebral canal. It begins as a continuation of the medulla oblongata (the inferior part of the brain stem) and extends to the second lumbar vertebra, where it tapers into the conus medullaris. Arising from this is the filum terminale, fibrous tissue that extends inferiorly to attach to the coccyx. The fact that the spinal cord is shorter than the vertebral column means there is an area where cerebrospinal fluid (CSF) can be removed without the risk of cord damage.

Three membranes known as meninges cover the spinal cord and brain. The outer one, the dura mater, is dense, fibrous connective tissue. Between this and the wall of the vertebral canal is the epidural space – filled with fat, connective tissue and blood vessels. The middle menin-
Most patients do not present for treatment until a degree of walking, while 5–15 per cent of those who present with already affected, only 35 per cent regain the ability to walk. The start of treatment is the most important factor in determining outcome. Between 70 and 85 per cent of MSCC (Huff, 2001; Falk and Fallon, 1997), due to extension of a vertebral body metastasis into the epidural space or metastatic destruction of the vertebral body and subsequent vertebral collapse.

Compression can occur within any area of the spine – approximately 10 per cent of MSCCs are cervical, 20 per cent are lumbar and 70 per cent are thoracic (Siegal et al, 2002). However, about 30 per cent of patients are affected in multiple areas (Huff, 2001). There is a correlation between the type of primary tumour and the site of metastases, with cervical metastases often associated with breast cancer; thoracic with lung, breast and prostate cancer; and lumbar with gastrointestinal and prostate cancer (Bucholtz, 1999; Flounders and Ott, 2003).

**Physiology of MSCC**

A number of mechanisms are responsible for causing MSCC (Box 2) (Flounders and Ott, 2003). Extrudural pressure as a result of vertebral metastases accounts for 85 per cent of MSCC (Huff, 2001; Falk and Fallon, 1997), due to extension of a vertebral body metastasis into the epidural space or metastatic destruction of the vertebral body and subsequent vertebral collapse.

Signs and symptoms

The presenting signs of MSCC vary depending on the degree and site of compression. Neurological status at the start of treatment is the most important factor in determining outcome. Between 70 and 85 per cent of patients who are ambulatory at the start of treatment walk after it is completed. Of those whose mobility is already affected, only 35 per cent regain the ability to walk, while 5–15 per cent of those who present with paraplegia regain their mobility (Neal and Hoskin, 2003). Most patients do not present for treatment until a degree of weakness is evident.

Early signs are often vague and may be attributed to a less serious cause such as muscular strain, arthritis or ageing. Neck or back pain is often the earliest symptom and may precede actual compression and neurological symptoms by weeks or months. Initially, pain may be localised over the affected vertebrae and is usually constant, dull, aching and progressive (Fuller et al, 2001).

As the tumour grows, nerve involvement occurs and the nature of the pain changes, often described as ‘shooting’ or ‘burning’. When the lesion is in the thoracic spine, pain may be described in terms of a tight band around the chest (Bucholtz, 1999; Falk and Fallon, 1997). Pain may be constant or worse on movement, especially when coughing, sneezing or straining, and may be exacerbated by lying down and eased on sitting. Patients may therefore report difficulty in sleeping (Flounders and Ott, 2003; Frank, 1998).

As the tumour compresses the spinal cord, neurological symptoms start to manifest themselves, and tend to progress more rapidly than the initial pain. Motor loss often starts as a sensation of limb weakness or heaviness but, if untreated, will progress to paralysis. Sensory loss includes numbness and paraesthesia, progressing to loss of thermal sensation and proprioception (Flounders and Ott, 2003). Sensory dysfunction usually starts in the feet and ascends until it reaches the level of compression.

Autonomic dysfunctions, such as changes in bladder function, bowel function and sphincter control, are late-presenting signs. Increasing compression of the spinal cord may result in the pain becoming less or more severe.

Patients who are known to be at risk of MSCC and present with neck or back pain must be thoroughly examined, with a careful history of the pain being taken, including its onset, site, severity, quality and exacerbating factors. Those for whom back pain is a chronic feature of their cancer should be asked to report any changes in the nature of their pain.

A patient history should also include an assessment of:

- Motor function (changes may be subtle, with patients saying things like ‘my legs feel heavy’, ‘I find I need to rest more’, and ‘I struggle to climb the stairs’);
- Sensory changes (‘I get pins and needles in my legs’, ‘My legs don’t feel right’);
- Changes to bladder and bowel function.

Clinical examination of the musculoskeletal and neurological systems may reveal areas of motor and sensory dysfunction and may help localise the site of the lesion.

Despite the widespread acceptance that a positive outcome depends on early diagnosis and prompt treatment, unacceptable delays occur at all stages of care delivery, from diagnosis to referral (Husband, 1998). In addition, patients may delay seeking medical advice due to the vagueness of early signs. Loblaw and Lapeniere (1998) and Husband (1998) suggest that it would be beneficial to educate those at high risk about signs and symptoms, and encourage self-referral to the nearest oncology centre.

**Investigation and treatment**

Radiological investigation will confirm diagnosis. While a plain X-ray of the spine may show features such as a plain X-ray of the spine may show features such as a
large paravertebral mass, vertebral erosion or vertebral collapse in up to 85 per cent of cases (Flounders and Ott, 2003; Falk and Fallon, 1997), it will not detect smaller lesions or those extending through the foramina. Magnetic resonance imaging is the investigation of choice. Myelography with computerised tomography is useful for those for whom MRI is contraindicated.

MSCC is an indicator of poor prognosis, representing the advancement of cancer, and the majority of patients die within one year (Siegal et al, 2002). However, MSCC itself seldom causes death (unless it is high in the cervical region) and the aim of treatment is to preserve the patient’s quality of life for as long as possible.

There are no definitive guidelines for the treatment of MSCC, although several protocols have been proposed (Pease et al, 2004; Siegal et al, 2002). Steroids are almost always beneficial and should be initiated as soon as MSCC is suspected, before a definite diagnosis is made (Pease et al, 2004). They should be gradually reduced once a more definitive treatment has been commenced. For patients who are too weak to undergo more intensive regimens, steroids may be the only treatment.

Radiotherapy tends to be the favoured treatment for MSCC (Neal and Hoskin, 2003), but its effectiveness depends on the radiosensitivity of the tumour, the patient’s neurological status at the onset of treatment and the maintenance of spinal stability. It may take several days before any positive effects can be seen.

Chemotherapy may be considered in patients with chemosensitive tumours (such as lymphoma, germ cell tumour and neuroblastoma), where the neurological deficit is mild and there is no sign of rapid deterioration. It may also be considered in chemosensitive tumours that have relapsed in a previously irradiated area (Siegal et al, 2002; Fuller et al, 2001).

Surgery may be offered to patients with spinal instability or compression caused by a fragment of bone. Radiotherapy may follow. Surgery may also be considered for tumours that are resistant to radiotherapy, or where neurological deterioration occurs during the treatment (Siegal et al, 2002; Fuller et al, 2001). Just as there are no definitive treatment guidelines for MSCC, there is no clear care pathway. Patients with suspected or confirmed MSCC are usually nursed supine until radiotherapy has been completed (5–7 days). This is followed by a gradual programme of siting up in bed (over several days), and subsequent mobilisation as their condition allows (Pease et al, 2004). Bed rest aims to protect the spinal cord from further damage caused by an unstable vertebral column. However, prolonged bed rest is associated with increased morbidity. For example:

- Increased risk of pressure ulcers, chest infections, deep vein thrombosis and urinary tract infections;
- Delayed discharge (of particular significance when prognosis is poor);
- Increased dependence (personal hygiene, use of the toilet and feeding);
- Deteriorating mental state (confusion, low mood).

Pease et al (2004) suggest that the complications associated with bed rest should be avoided if possible. By ascertaining the stability of the spine at the onset of treatment, patients for whom it will be safe to commence mobilisation and rehabilitation earlier can be identified.

Nursing implications

Nurses have a key role to play in all stages of patient care (Haas, 2003; Bucholtz, 1999), and by alerting at-risk patients to the signs and symptoms they can make a valuable contribution before compression has occurred. This information must be given in a sensitive manner and supported in writing, including who to contact if concerns arise.

Nurses are often in the closest and most frequent contact with patients, so all those working with patients at risk of MSCC must be alert for early signs of its onset. There must also be a clear protocol to follow if MSCC is suspected and nurses should be familiar with it.

Patients with advanced MSCC require a high standard of physical care, including pressure- ulcer prevention, safe

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**REFERENCES**


manual handling, pain relief, monitoring bowel and bladder function (making appropriate interventions as necessary) and ensuring nutritional needs are met. Since patients may have increased dependence and subsequent care needs as a result of their MSCC, nurses play a major role in coordinating members of the hospital multidisciplinary team and liaising with community services when planning discharge. The needs of close family members must not be overlooked, and they should be fully involved in the discharge planning process.

The importance of communication

MSCC represents a serious threat to patients’ psychological well-being. Not only can the condition have a sudden and possibly permanent effect on their independence, but as it represents the progression of their cancer it raises issues of mortality. Patients and their families need substantial psychological support.

Communication with patients must be open but sensitive. Spinal cord compression can bring with it a great deal of uncertainty. Questions such as ‘Will I walk again?’ require a sensitive response. Before answering, the professional should be clear what patients understand about the condition, if necessary asking them directly. Knowledge of their level of mobility at the onset of treatment may give an indication of likely outcome status, but the honest reply is often ‘We don’t know’, while emphasising the need for time to assess the outcome of treatment and physiotherapy. It is often beneficial to warn patients sensitively that improvements do not always occur.

Although their expectations may need to be reduced, patients should not be left without any hope. However, professionals must avoid giving false hope or fostering unrealistic expectations (Twycross, 2003). If a patient insists on maintaining unrealistic expectations of recovery, it is more prudent to give a ‘Let's wait and see’ response, or ‘Let’s plan for the current situation, while hoping for improvement’.

Denial is a legitimate coping strategy in those who are not ready to face the full impact of their situation. If a patient’s unrealistic attitude appears to be denial (as opposed to positive thought or misunderstanding), its strength can be tested. For example, a patient who insists he will walk again, despite all evidence to the contrary, may be gently asked, ‘You say you will walk again, but is there any time, if only briefly, when you feel that may not happen?’ (Faulkner, 1998).

It is important not to make assumptions about what patients’ concerns are. They may have quite specific worries, such as financial, employment or family issues, and the only way these can be discovered is by giving them the opportunity to verbalise such concerns.

Professionals may need to clarify the meaning behind some comments. For example, the statement ‘I don’t think I’m going to get better’ could mean ‘I am not going to walk again’ or ‘I am dying’. If patients use ambiguous words or phrases they should be asked to explain further.

Time taken to build up a supportive relationship is invaluable as it encourages patients to verbalise their concerns. This can be facilitated by the use of open questions. In this respect, the quality of the time spent with the patient is often more important than the quantity.

Good communication with the patient cannot happen unless it exists between all members of the multidisciplinary team, so that their opinions and collaboration can be sought. Doctors, nurses, social workers, physiotherapists and occupational therapists all have key roles in care and discharge planning.

Collaborative meetings and clear documentation are essential to ensure care is integrated. Communication must also extend to community professionals who will be involved in providing care after the patient has been discharged from hospital. Every effort must be made to involve patients and their families in the decision-making process and to inform them of treatment options and their implications.

Conclusion

As treatments improve and people live longer with cancer, it is likely that the incidence of MSCC will increase. All health care professionals working with at-risk patients, and patients themselves, should be aware of its early signs and symptoms to ensure they are referred for investigations and treatment as early as possible. This will ensure the best possible outcome.

Although the onset of MSCC is itself an indicator of poor prognosis, representing the advancement of the underlying cancer, prompt treatment positively affects patients’ quality of life in the time they have left. Nurses have a key role in ensuring this is as high as possible, and that patients and their families are supported.

GUIDED REFLECTION

Each week NT publishes a guided reflection article to help you with your CPD. After reading the article use the following points to help you write your reflection:

- Describe your area of work and how many of your patients are at risk from spinal cord compression;
- Note down the important signs and symptoms and consider your action if you noticed them in a patient;
- Briefly explain the anatomy of the spinal cord;
- Write about how you would use this knowledge of anatomy to explain spinal cord compression to a patient;
- Summarise the most important facts you learnt from reading this article and how you will follow up this learning.

REFERENCES

