Cancer-induced bone pain

Scottish Palliative Care Guidelines

Healthcare Improvement Scotland

Introduction

Cancer-induced bone pain (CIBP) is challenging to manage and requires a holistic and multidisciplinary approach.[1,2]

CIBP consists of both nociceptive and neuropathic components. It is exacerbated by movement and weight-bearing, which can have a significant impact on functional ability and quality of life.[1,3]

Pharmacological and non-pharmacological measures are required to manage CIBP, and early involvement of specialist palliative care is recommended. Collaboration within the multidisciplinary team and between specialists is crucial.[1,2]

Assessment

Refer to the pain assessment guideline for an overview of assessment of pain.

Clinical features of CIBP

- Often localised to a site of known bone metastases.
- Can be referred or present as radicular pain.
- Common sites: lower back, pelvis, long bones and ribs.
- Often described as gnawing, aching, nagging, constant or dull. [3,4]
- Can consist of all or some of the following:
    - background pain
    - breakthrough pain, and
    - incident pain: rapid onset pain that is associated with movement.[5,6]

Skeletal-related events

Assess for skeletal-related events associated with CIBP.

Hypercalcaemia

Check routine bloods, where appropriate, including calcium and magnesium levels. Be aware that hypercalcaemia itself can cause bone pain.

If hypercalcaemia is identified, refer to the hypercalcaemia guideline.

Malignant spinal cord compression (MSCC)

Refer to the malignant spinal cord compression guideline for key signs or symptoms suggestive of MSCC, and approach to investigation and management. **Early recognition is critical to prevent irreversible neurological damage.**

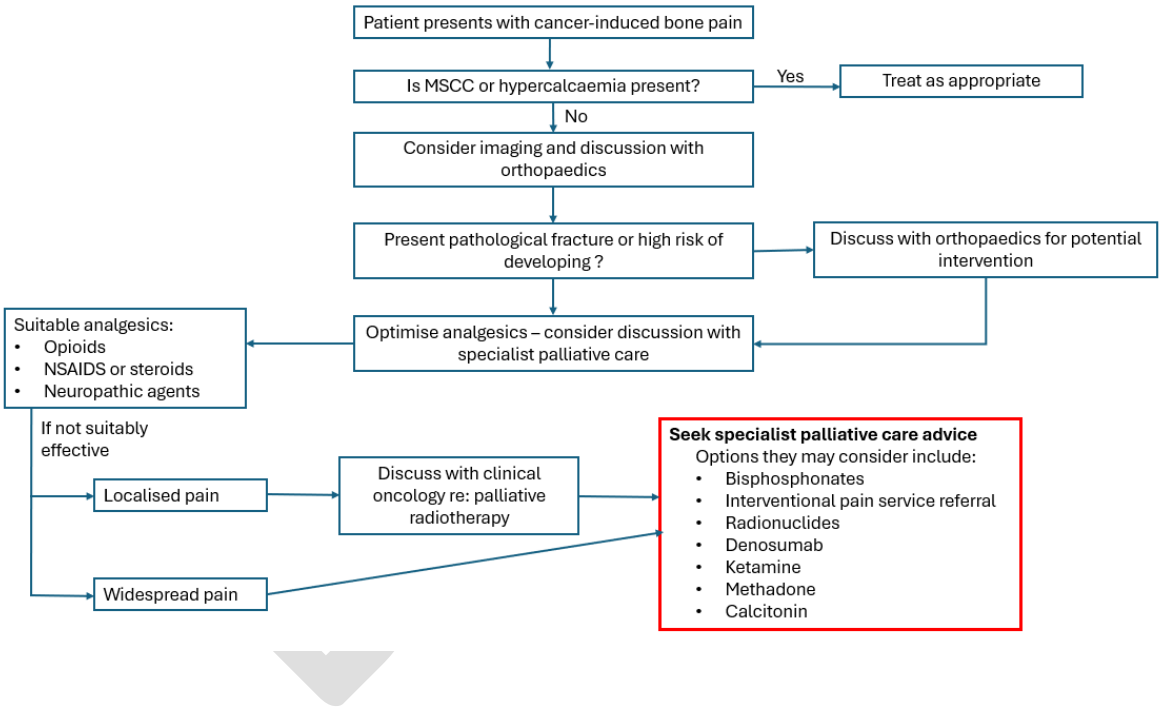
Pathological fracture

Pathological fractures occur in approximately 10% of patients with bone metastases and are associated with increased pain, reduced quality of life and higher mortality.[7]

Seek urgent advice from orthopaedics where current or impending pathological fracture is suspected.[8] This will guide imaging and potential surgical management.

Mirels' scoring system may be used to predict the risk of pathological fracture and guide decisions on fixation based on pain, anatomical site, lesion size and radiographic appearance.[7,9,10]

Management



Multidisciplinary approach

It is important to consider discussion and collaboration with other specialities including oncology, orthopaedics and interventional cancer pain services, as well as psychological support, allied health professional (AHP) input and complimentary therapies.

Oncology

- External beam radiotherapy and radioisotope treatment has a role in CIBP management.[11,12]
- Advice on possible use of osteoclast inhibitors.

Orthopaedics - surgical intervention may be considered for:

- actual or impending pathological fractures
- compromised stability of weight-bearing joints, or
- persistent pain unresponsive to other management[13].

Surgical options include fixation, reconstruction, arthroplasty, cementoplasty and resection, aiming to relieve pain and restore function.[9]

Allied health professional (AHP) input.

- Physiotherapy: maintain mobility, risk management, energy conservation and mobility aids.
- Occupational therapy: home adaptations and aids to reduce pain and maximise function.
- Orthotics.

Emotional and spiritual assessment

- Identify and address total pain, encompassing physical, psychological, social, and spiritual struggles.[14]
- Consider a trauma-informed care approach depending on how CIBP and the patient's cancer experience interacts with previous trauma.
- Refer to the care for spiritual distress guideline for further information.

Non-pharmacological measures

The application of hot or cold packs to the site of pain can be beneficial.[8]

Pharmacological measures

The mainstay of pharmacological management for CIBP is opioids.

Adjuvant analgesics, such as non-steroidal anti-inflammatory drugs (NSAIDS), corticosteroids, osteoclast inhibitors and neuropathic agents, can be considered to relieve pain that fails to respond to opioids or to reduce side effects by reducing the total dose of opioid required.[15,16]

A stepwise approach to analgesia should be used. Refer to pain management guidelines.

Opioids

CIBP is likely to be at least partially opioid sensitive.

- Patients usually require modified release (MR) background opioid, and immediate release (IR) as required or pro re nata (PRN) opioid to manage breakthrough and incident pain.
- It can be helpful to administer IR opioid in anticipation of painful events such as 15 minutes before care or before mobilising.
- Where IR opioid is used for incident pain it should **not** routinely be used in calculations to titrate the MR background opioid, as this is likely to result in toxicity at rest.[16]
- **In consultation with specialist palliative care only**, the use of rapid onset opioids (short-acting fentanyl products) for management of incident pain may be considered when patients are already established on 60 mg oral morphine or equivalent pain relief per 24 hours. Patients should take their prescribed dose 10–30 minutes prior to anticipated movement.

Adjuvants

Corticosteroids

There is strong evidence that corticosteroids are effective in the management of CIBP.[11] Doses of dexamethasone range from 2–8 mg per day given either once daily in the morning or divided between a morning and lunchtime dose.

- The side effects of steroid use, including avascular necrosis, should be considered.
- Avoid co-prescription of corticosteroids and NSAIDs.
- Gastroprotection and blood glucose monitoring are recommended.
- Ensure a clear plan for review and reducing doses to avoid unnecessary, prolonged use.
- If ongoing use is required for symptom control, aim to continue at the lowest effective dose.
- A short course of corticosteroids can be helpful in managing pain flares after radiotherapy. This could be 8 mg dexamethasone daily for 5 days.[17]

NSAIDs

NSAIDs can be a helpful adjuvant analgesic when patients are not on corticosteroids. They are usually administered via the oral route. If the oral route is not available, please consult medicine information leaflets (MILS) for guidance on subcutaneous administration. These documents are also part of the November 2025 consultation.

NSAID use in the context of orthopaedic surgery should be at the lowest effective dose for the shortest period necessary.[18] NSAID use can confer a higher risk of

delayed fracture healing, but not at low doses or for short durations. Seek local orthopaedic advice.

Gastroprotection should be coprescribed with NSAIDs to reduce risk of gastrointestinal bleeding.

Neuropathic agents

There is mixed evidence for the role of neuropathic agents such as gabapentin and pregabalin in the management of CIBP. See advice on general neuropathic pain.

Considerations under specialist advice

Osteoclast inhibitors, such as bisphosphonates or denosumab

These drugs work by reducing excessive bone resorption which occurs in the context of bony metastases. There is weak evidence to support an analgesic role for bisphosphonates and denosumab in CIBP.[19] Bisphosphonates and denosumab may prevent pain by delaying the onset of bone pain rather than by producing an analgesic effect.

- Consider when analgesics +/- radiotherapy have been ineffective[20] and where prognosis is more than two weeks. [21]
- Zoledronic acid and pamidronate are commonly used, and denosumab is an alternative.
- Onset of benefit is about two weeks.

Some people may be prescribed bisphosphonates prophylactically to reduce the risk of developing painful skeletal-related events (SREs) in the context of metastatic hormone-relapsed prostate cancer, breast cancer and myeloma. [21]

Practice points

- Bisphosphonates and denosumab have a well recognised role in preventing bone pain through primary prevention of SREs. [20]
- The role of bisphosphonates and denosumab in the treatment of pain remains to be established.
- Bisphosphonates or denosumab should only be initiated for established bone pain on specialist palliative care advice where first- and second-line analgesics have been ineffective.
- Consider coprescription of a colecalciferol with calcium supplement, choice as per local formulary guidance.
- Blood monitoring seven days later is necessary to exclude hypocalcaemia, hypomagnesaemia or other electrolyte disturbances, particularly in patients with normal or low calcium prior to administration.

Complex pain

In complex situations with refractory bone pain, alternatives such as calcitonin, methadone or ketamine may be considered by specialist palliative care.

Interventional cancer pain service

Consider referral to interventional cancer pain services if there is uncontrolled pain or intolerable side effects. Cordotomy may be helpful for unilateral bone pain. In Scotland this can be discussed with the West of Scotland Interventional Cancer Pain Service based at the Beatson and is available nationwide. Delivery of intrathecal analgesia, where available, may also be considered. [22]

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