The Christie
NHS Foundation Trust

CLINICAL GUIDANCE FOR METASTATIC SPINAL CORD COMPRESSION

Greater Manchester Pathway

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Target audience:	All clinical staff throughout Greater Manchester and East Cheshire		

Key points

- The complete management of patients through the MSCC pathway from symptoms, through diagnosis, treatment and rehabilitation.

CONTENTS

1. ASSOCIATED DOCUMENTS

- Standard operating procedure (SOP) for the management of patients with metastatic spinal cord compression (MSCC) within The Christie HIVE - SOP for the management of patients with metastatic spinal cord compression (MSCC) within The Christie

- Clinical guidance for the management of spinal metastases with impending metastatic spinal cord compression (impending MSCC) HIVE - Pathway and guidance for the management of spinal metastases with impending Metastatic Spinal Cord Compression (MSCC)

- Advanced practitioner/review radiographer led radiotherapy assessment for metastatic spinal cord compression and metastatic spinal disease within The Christie at Macclesfield site HIVE - Advanced practice radiotherapy assessment for MSCC - Macc Advice 7

2. INTRODUCTION

2.1 Purpose

The complete metastatic spinal cord compression (MSCC) pathway for the Greater Manchester MSCC service.

2.2 Scope

Metastatic spinal cord compression (MSCC) is defined as spinal cord or cauda equina compression by direct pressure and/or induction of vertebral collapse or instability by metastatic spread or direct extension of malignancy that threatens or causes neurological disability (NICE, 2008). MSCC is more common among patients with advanced prostate, lung, breast cancer, and myeloma. However, it can develop in any type of malignancy.

Delay in treatment results in paraplegia/quadriplegia (if cervical spine involved), loss of bowel and bladder control, devastating loss of independence, reduction in quality of life and markedly reduced survival.

This guideline covers the management of MSCC from suspected symptoms through to rehabilitation.

Key aims and objectives:

- Highlight the red flag signs and symptoms for MSCC.

- Ensure that all patients ‘at risk’ of MSCC receive information regarding the signs and symptoms and what to do if they suspect they have MSCC.

- Have a low threshold for MR scan. Delaying imaging to once symptoms are established is likely to have a significantly worse outcome for patients.

- Ensure immobilisation is considered for patients whose symptoms suggest spinal instability.

- Facilitate imaging to confirm diagnosis within the 24 hours of suspicion of MSCC or 7 days if symptoms suggest new bone metastasis or impending MSCC only (see MSCC Alert guide section 4.3).

- On confirmation of MSCC, liaise with the Network MSCC Co-ordinator (via Christie switchboard) to ensure effective clinical management and the most appropriate treatment decision (either surgery with post-operative radiotherapy, radiotherapy alone, systemic anti-cancer treatment or best supportive care)

- Ensure prompt treatment where possible within 24 hours of diagnosis and before any further deterioration in symptoms.

- Offer holistic care and support to MSCC patients to ensure concerns are identified and addressed.

- Create a timely and appropriate plan for rehabilitation and discharge, including specialist rehabilitation, based on ongoing reviews of the patient's management plan and holistic needs.

3. DEFINITIONS

Term	Meaning
MSCC	Metastatic spinal cord compression
NICE	National institute for health and care excellence
GM Alliance	Greater Manchester and east Cheshire healthcare organisations covered by the MSCC service.
Trust	The Christie NHS Foundation Trust

4. Greater Manchester Pathway for management of MSCC

4.1 Overview and pathway management of MSCC

These initial sections document each stage of the MSCC pathway and will reference later sections in the guideline which give further details on specific aspects of MSCC diagnosis and management. There is also an accompanying flowchart which gives an overview of the MSCC pathway from clinical suspicion, to diagnosis, through to treatment and rehabilitation (appendix 7.1).

4.1.1 Step 1: Identifying symptoms of MSCC

All health care professionals who may encounter a patient with MSCC must undertake education and training appropriate to their role, to ensure they are aware of the signs and symptoms of MSCC and how to achieve a diagnosis. This should include education updates and therefore regular training sessions should be made available to health care professional either face to face or via an online learning platform.

All patients 'at risk' of MSCC should be given the patient information leaflet: Spinal Cord Compression 'What you need to know', by a doctor, nurse, AHP or appropriate clinician, accompanied by a verbal explanation.

The aim of educating healthcare professionals and patients is to identify patients (or for the patient to present themselves) early, at the point where they do not have

neurological symptoms. The patient's pain and the particular characteristics of the pain can indicate suspicion of MSCC and should be acted upon before neurological symptoms develop.

Despite this, some patients will still present with later signs of MSCC such as a neurological deficit or bladder/bowel disturbance.

If there is uncertainty regarding MSCC signs, the network MSCC coordinator can be contacted for advice via The Christie switchboard (0161 446 3000).

4.1.2 Step 2: Confirming a diagnosis of MSCC

All patients where there is a high level of suspicion for MSCC will require urgent admission to their local hospital via A&E for clinical assessment and an MRI scan. In some circumstances, direct admission to The Christie may be appropriate, particularly for patients with rarer tumours or patients who are on certain clinical trials. This is at the discretion of the oncology team.

On suspicion of MSCC, consider starting steroids depending on the patients' symptoms, to prevent further neurological deterioration or to manage severe pain. Refer to section 4.6 for the complete steroid guideline, including who should receive steroids, dosing regime, advice for patients receiving steroids and considerations. This includes advice on steroids for patients with a potential haematological malignancy, who have not yet undergone diagnostic tests.

On suspicion of MSCC consider immobilising the patient based on symptoms of spinal instability. See section 4.4 for the complete immobilisation guideline including factors which influence spinal stability and advice for managing patients who have been immobilised.

An MRI whole spine scan is the imaging modality of choice and should be performed and reported within 24 hours of clinical suspicion of MSCC. Regardless of the spinal level of neurological deficit, an MR scan of the whole spine should be requested as the spinal level of neurological deficit does not always correlate with the spinal level of MSCC. For further guidance on facilitating an MRI scan out of hours, see section 4.2.3.

Where there is no definite established neurology and there is a lower level of suspicion, an OP MRI scan within the NICE 7-day pathway should be arranged. Safety net information should be given to patient to present urgently if any deterioration in pain or neurology.

A CT scan of the whole spine should be requested if an MRI scan is not possible (e.g. cardiac pacemaker or ICD which is not MRI compatible, metal implants, severe claustrophobia which cannot be managed pharmacologically). However, CT is inferior in the diagnosis of MSCC and every attempt should be made to facilitate an MRI scan where safe to do so.

The MRI scan must be reported urgently same day and include the epidural spinal cord compression (ESCC) score for any level of malignant infiltration which extends into the spinal canal. Where an emergency MR is requested to assess for MSCC, the referring clinician should read the verified report as a matter of urgency and act upon the findings. If an unexpected finding of MSCC, or 'high risk of MSCC' is found in a CT or MRI scan by reporting radiologist, this should be communicated urgently to the referring clinician in person.

Actioning MRI results:

If no MSCC or impending MSCC is found on MRI scan, inform the GP and oncology team to ensure continued monitoring of signs and symptoms. If symptoms persist or worsen review patient urgently.

If the MRI scan shows impending MSCC (ESCC score 1b and 1c) with no neurological deficit, refer to the 'Impending MSCC management' guideline available on the Christie MSCC webpage.

If the MRI scan confirms MSCC (ESCC score 2 and 3) regardless of symptoms, or impending MSCC (ESCC score 1b and 1c) with a neurological deficit, immediately contact the MSCC coordinator via The Christie switchboard (0161 446 3000).

4.1.3 Step 3: Referral to the network MSCC coordinator service for triage

A referral to the network MSCC coordinator must be made immediately on radiographic confirmation of MSCC. Referral to the MSCC coordination service is currently via Christie switchboard on 0161 446 3000 and requesting to be put through to the MSCC coordinator. Out of hours, the service is managed by the clinical oncology registrar on call at the Christie, who can also be reached via switchboard.

Patients with impending MSCC and an associated neurological deficit should be managed as per confirmed MSCC patients, with immediate referral to the MSCC coordinator.

Patients with impending MSCC who are neurologically intact can be managed by the appropriate disease specific oncologist. Neurology should be monitored and if there is any deterioration, a referral to MSCC coordinator for urgent triage should be made (see 'Impending MSCC management' guideline available on the Christie MSCC webpage).

The following details are required for clinical triage:

1. Demographics
    a. Name
    b. DOB
    c. Address
    d. Current location of patient
    e. Referring clinician

2. Details of Underlying Malignancy
    a. Known cancer?
    b. Unknown Cancer: Is a biopsy planned?
    c. Known Oncologist
    d. Current/previous treatment for cancer or not on active treatment

3. Details of MSCC
    a. Duration of symptoms
    b. Details of pain/motor/sensory/autonomic symptoms (including sphincter function)
    c. Full neurological examination including current worst MRC grade motor power (Oxford scale 0 to 5), sensation, tone, reflexes, coordination, proprioception and a PR examination.

d. Current mobility (walking aided, unaided, unable to walk due to loss of power or pain)?
e. When did the patient last walk?
f. Previous MSCC/XRT in the same area? How long ago?
g. Previous Spinal Surgery? When and where?
h. Performance Status (PS) prior to onset of MSCC (ECOG/WHO/Zubrod score) and current PS

4. Radiology
   a. MRI: Date/Findings
   b. CT (if appropriate) Date/Findings: for good prognosis patients a CT chest, abdo and pelvis with contrast, within the last 3-months is essential for triage. Patients with an unknown primary must also have staging CT chest, abdo and pelvis before a surgical opinion can be given.

Triage performed and documented on the Christie Clinical Web Portal MSCC Referral Form

Referring team will be informed of the triage decision within 4 hours (between 9 am and 6 pm). This is dependent upon all essential information (including scan results) being made available to the MSCC Co-ordinating service prior to triage. After 6 pm, the decision may be deferred to the following morning

The following 4 outcomes are possible:

- Clinical status and cancer diagnosis require urgent surgical opinion
- Clinical status and cancer diagnosis indicate immediate radiotherapy within 24 hours
- Clinical status and cancer diagnosis indicate systemic anti-cancer treatment (SACT)
- Clinical status and cancer diagnosis indicate best supportive care (BSC) only

4.1.4 Step 4: Treatment for MSCC

Surgery followed by post-operative radiotherapy has been shown to provide the best clinical and functional outcome in appropriately selected patients with MSCC. The decision to refer to the surgical team should first consider if surgery is appropriate from an oncological perspective, and should include discussion with a consultant oncologist or haematologist.

Surgery will be considered where:

- The general condition of the patient is suitable for general anaesthesia and surgery
- Estimated life expectancy of at least six months
- Limited spinal levels of cord compression on imaging
- Previous radiotherapy has already been given to this level
- The tumour is considered radio-resistant
- No underlying diagnosis has been made

For full details of the surgical pathway, see section 4.12.

Radiotherapy will be considered where:

- The patient is unfit for surgery
- There is extensive vertebral involvement
- Spinal cord compression and disease at multiple levels

- No previous radiotherapy (within the last 3-6 months) to level of compression
- Primary tumour is radio responsive.

Even if there is a major neurological deficit, radiotherapy may prevent loss of sphincter control if still intact and help with pain.

For full details of the radiotherapy pathway, see section 4.13

SACT will be considered where:
- The patient has a SACT sensitive tumour AND
- The patient has available treatment options which are likely to be of benefit.

BSC will be considered where:
- The patient has advanced disease or a prognosis of less than 6 weeks.
- The patient has recently received radiotherapy to the same spinal level.
- The patient is unable to tolerate lying flat for radiotherapy.
- The patient has chosen this.

Patients who are triaged for BSC should be referred to local palliative/supportive care team and should also receive rehabilitation and discharge planning as per sections 4.4.10 and 4.4.11.

Treating centres:

Surgery:
Patients who have been triaged by the MSCC Co-ordinating Service and considered to be suitable for surgical opinion following discussion with an oncologist will referred to the surgical team at Salford Royal Foundation Trust (SRFT). Patients with epidural MSCC will be referred to the spinal surgeons and patients with intradural MSCC will be referred to the neurosurgeons. Patients accepted for transfer to SRFT spinal or neuro surgical unit will retain a bed in their referring trust for 24 hours after transfer, to return to if they do not proceed to surgery. These patients will also be repatriated back to their referring trust following surgery if ongoing non-specialist rehab is required.

Radiotherapy:
Patients can receive radiotherapy at The Christie Withington, (central sector), The Christie at Salford Royal (NW sector), Christie at Royal Oldham (NE sector) and The Christie at Macclesfield (south sector). Suitability for radiotherapy at the satellite centre will be discussed between the MSCC, on call, and satellite teams on a patient-by-patient basis. During the weekend all patients requiring radiotherapy will receive this at The Christie Withington.

4.1.5 Step 5: Rehabilitation and ongoing care after treatment

If the patient requires a period of admission for specialised treatment at another hospital site, it is expected that their local hospital will accept the patient on completion of treatment for any continuing rehabilitation and care needs.

All patients should be referred to the Physiotherapy and Occupational Therapy (OT) department on admission and be assessed within 24 hours (physiotherapy) and 48 hours (OT). Rehabilitation is essential to enable patient to maximise function, independence and improve their quality of life. Rehabilitation must start on admission and continue after discharge, if necessary, until the rehabilitation goals have been met. See section 4.4.10 for complete rehabilitation guideline.

Patients who are admitted as inpatients to the Christie will be referred to the Christie rehabilitation team. However, patients attending The Christie for radiotherapy treatment from another care environment (hospital / hospice), should be referred to the local rehabilitation services. Patients admitted to SRFT for consideration of surgery should be referred to the rehabilitation team in the spinal / neuro-surgical unit.

Patients who were commenced on steroids should begin a reduction regime. See section 4.6 for complete steroid guideline.

MSCC coordinators to complete the MSCC referral and outcome forms to ensure comprehensive data collection and enable future audit.

4.2 Investigation of suspected MSCC

4.2.1 Referral

Clinical suspicion of cord compression requires urgent investigation and treatment.

4.2.2 Imaging choice

a. MRI whole spine: Gold standard imaging for diagnosing MSCC, the least invasive and most comfortable test.

   Note MRI contraindicated in the following:

   Absolute
   - incompatible cardiac pacemaker
   - intracranial aneurysm clips
   - cochlear implant
   - intraorbital metallic foreign bodies

   Relative
   - metal fragments or shrapnel injuries anywhere in the body
   - recent major surgery
   - metal implants e.g., joint replacements, Harrington rods or any type of implant
   - artificial heart valves
   - claustrophobia

   Discuss relative contraindications with radiographer / radiologist

b. CT: Although it cannot delineate the spinal cord in the same detail as MR, CT is more sensitive than conventional radiographs and an option for a patient ineligible for MRI. CT whole spine with thin slices and sagittal reconstruction should be requested, when there is no way to overcome the contraindications of MR.
c. Conventional radiographs: not indicated
d. Myelography: not indicated

4.2.3 Where should scan be performed?

- 7 day OP pathway: Use this pathway for patients with low level of clinical suspicion to rule out or confirm bone metastases, impending or early MSCC. Warn the patient to report any significant change in pain or neurology

(safety net red flags) immediately to GP, CNS, Christie Hotline, etc or attend A&E (see alert guide section 4.3)

- Urgent 24-hour Pathway**:** Request urgent MRI of the WHOLE SPINE to be performed and reported at the patients local or admitting hospital on the same day or within 24 hours of clinical suspicion.

MRI scan OOH (Out of hours):

a. Patients to be scanned at their local or admitting hospital – (Salford Royal Radiology department does not accept imaging requests from anywhere outside Salford).
b. If scan cannot be done locally, then referring medical consultant at referring DGH to discuss with RMO at SRFT (via switchboard 789 7373 bleep 3693). If Emergency Assessment Unit (EAU) at SRFT accept patient, they will request MR scan
c. A bed should be kept at referring DGH so that patient can be transferred back for on-going social/medical treatment (this should be clarified by EAU Consultant when accepting referral)

4.2.4 Scan timeframe and communicating findings

a. During the working week, it is recommended that each department keeps a daily slot allocated for suspected cord compression on the MRI lists. Preferably in the morning.
b. MRI scans should be performed and reported within 24 hours of referral.
c. The scan report should be available in writing (in patients notes or on SECTRA/care stream/vue explorer) as soon as possible following the scan.
d. Where an emergency MR is requested to assess for MSCC, the referring clinician should read the verified report as a matter of urgency and act upon the findings. If an unexpected finding of MSCC, or 'high risk of MSCC' is found in a CT or MRI scan by reporting radiologist, this should be communicated urgently to the referring clinician in person.

4.2.5 MRI technique

a. Patient preparation: Patient to be nursed as indicated based on immobilisation guidelines. If supine bed rest is indicated, this should be continued on the journey to/from the MRI department and during transfers between the trolley and MRI couch.
b. Coil: Phased array spine coil, coverage CI down to the lower Sacrum
c. Sequences:
   T1W sagittal
   T2W sagittal
   STIR sagittal
   Transaxial imaging through focal lesions (either T1W or T2W)
d. Intravenous Gadolinium administration:
   Not routinely applicable for cord compression. If the spinal cord / cauda equina appear thickened on the protocol sequences, administer Gadolinium to detect intradural disease.

4.2.6 CT Protocol

a. Spiral or multislice

b. Thin section coverage of the whole spine will entail a high radiation dose and the examination may have to be tailored somewhat to the clinical areas of abnormality
c. Intravenous contrast should be administered
d. Scan parameters depend on equipment available
e. Reformats in the sagittal plane required.

4.2.7 Staging CT Chest/Abdomen and Pelvis

a. Indicated for patients with no known primary
b. Indicated for patients with a good Tokuhashi score being considered for surgery if they do not have an up-to-date scan within the last 3 months

4.3 Alert guide to early recognition of MSCC and rapid response in primary care
This can be found on the following page.

LOW LEVEL OF CLINICAL SUSPICION

- Cancer diagnosis*
- New and persistent localised back pain, chest wall pain or other unexplained atypical pain
- Unilateral nerve root pain (radiates in dermatomal distribution)
- Pain on movement
- No abnormal neurological signs on examination

ACTION NOW:

- Keep possibility of evolving cord compression in mind
- Arrange MR whole spine to rule out / confirm this within the 7-day OP pathway (NICE 2008)
- Warn the patient to report any significant change in pain or neurology (safety net red flags) immediately to GP, CNS, Hotline, etc, or attend A&E
- Arrange early review of patient by yourself or another professional

REASSESS IF SYMPTOMS WORSEN/PROGRESS

HIGH LEVEL OF CLINICAL SUSPICION

- Cancer diagnosis* with or without documented bone metastases or myeloma
- Bilateral nerve root pain, tingling, burning, shooting and band-like pain around chest
- Acute escalation of severe spinal pain
- Unsteadiness/heaviness in legs
- Pain aggravated by movement, coughing, sneezing, straining and lying flat
- Neurological signs may be equivocal

ACTION NOW:

- Urgent referral (same day) to local hospital for MRI scan (CT scan if MRI contra-indicated)
- Commence spinal precautions if indicated based on symptoms (see immobilisation guidance section 4.4)
- Start dexamethasone 16 mg daily with PPI (see steroid guidance section 4.6)
- Refer to The Network and Christie guidelines (see link)
- Contact the Network MSCC Co-ordinator service via Christie switchboard on 0161 446 3000 if advise is required or if MSCC impending or confirmed on MR scan

DO NOT DELAY

DEFINITE CLINICAL DIAGNOSIS
Unequivocal neurological signs of spinal cord compression

- Weakness in limbs
- Altered sensation with a sensory level
- Urinary retention
- Upper motor neuron signs or sudden flaccid paralysis
- Saddle anaesthesia and sphincter disturbance (cauda equina lesions)

ACTION NOW:

- Urgent referral for MRI scan (CT scan if MRI contra-indicated): MRI scan via local hospital
- Contact the Network MSCC Co-ordinator service on 0161 446 3000 if MSCC impending or confirmed on MR scan
- If appropriate for surgery, MSCC Co-ordinator will liaise with spinal team at Salford Royal FT. Out of hours, the referring team are responsible for contacting the spinal team via Patient Pass after discussion with the clinical oncology registrar on call. If not for surgery, urgent radiotherapy within 24 hours
- Immobilise and start dexamethasone as per the guidelines GM network guidelines: Refer to The Network and Christie guidelines: https://www.christie.nhs.uk/MSCC

***NOTE: UP TO 25% OF PATIENTS PRESENT WITH MSCC AND HAVE NO PREVIOUS DIAGNOSIS OF CANCER**

4.4 Immobilisation, spinal stability and rehabilitation

4.4.1 Introduction

Spinal instability refers to the ongoing or potential for neurological damage as a result of movements of the diseased spine. In metastatic spinal disease, whether the spine is stable or not can be difficult to determine. Clinical studies in this subject are minimal, meaning the evidence base is lacking. Spinal stability isn't a fixed concept. Even patients judged to have a stable spine may develop instability following minor trauma or further tumour growth along the spinal column.

A frequently reported dilemma is when and how to mobilise a patient with MSCC. The aim of this document is to provide guidance to support healthcare professionals with making those decisions based on NICE Guidance and other available evidence/clinical experience. It has been shown that early mobilisation of appropriate patients leads to a decreased complication rate and therefore rehabilitation should begin at the earliest possible opportunity to facilitate this.

4.4.2 Initial management

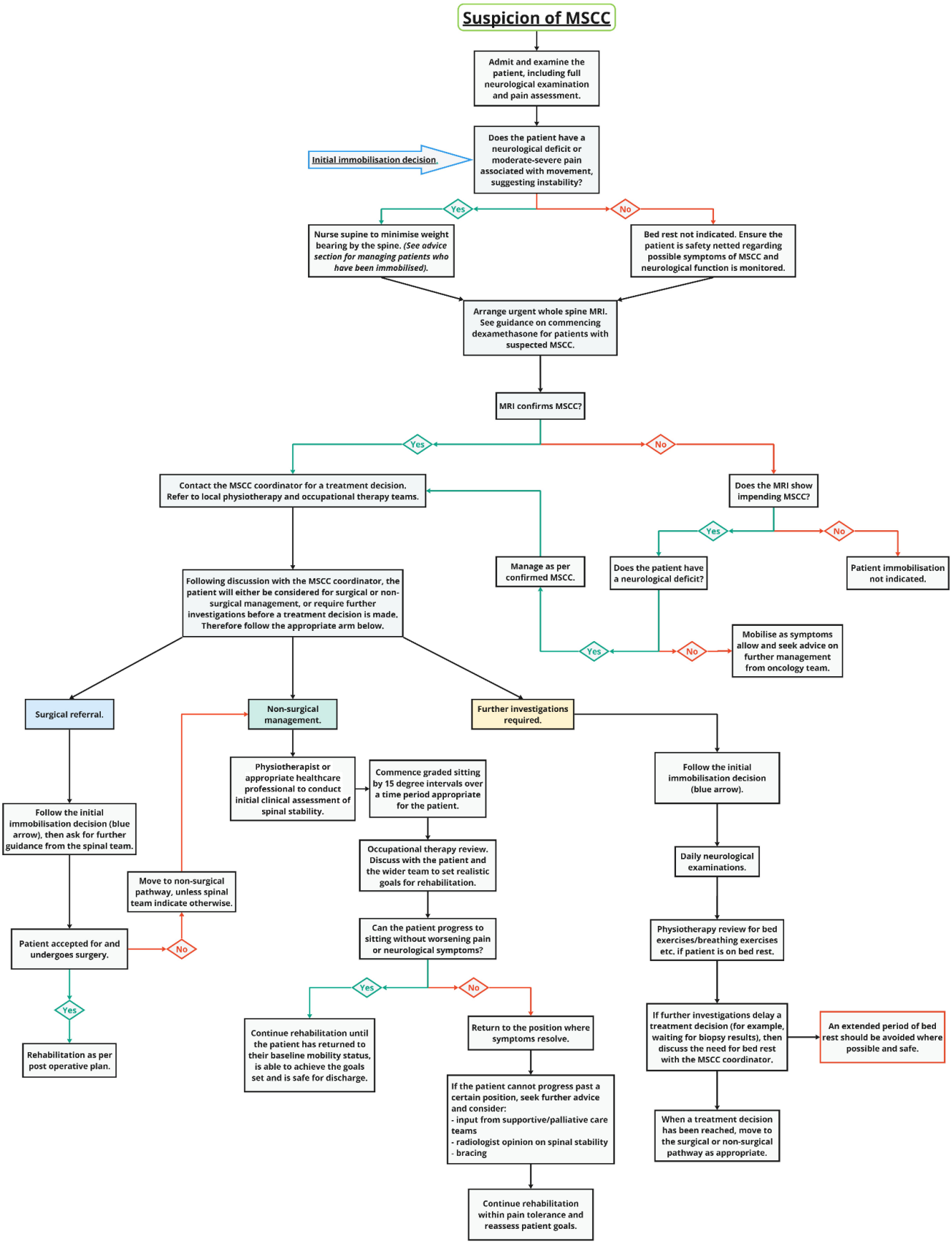
The initial decision on whether to immobilise a patient with suspected MSCC should be based on symptoms.

Start immobilisation without delay (including for transfer to hospital) for patients with suspected or confirmed MSCC and moderate-severe pain associated with movement or a neurological deficit suggesting spinal instability.

Consider fitting a cervical spine hard collar (e.g. Aspen Vista, Miami-J, Philadelphia or similar) in patients presenting with severe neck pain on movement or deteriorating upper limb neurology, even before an MR scan is performed. This should **not** be put on indefinitely and, before fitting, must have a documented plan for review and removal (see section 4.5).

If the patient does not have symptoms suggesting spinal instability, immobilisation is not indicated. The patient should be safety netted and advised to inform a healthcare professional immediately if worsening symptoms occur.

4.4.3 Management flowchart



4.4.4 Advice for managing patients who have been immobilised

Nurse people who are immobilised in a supine position to minimise weight bearing by the spine (lying flat or with partial elevation). If they cannot tolerate the supine position, for example, because of pain or breathlessness, try adjusting their position to reduce these symptoms.

Factors to consider when managing an immobilised patient with MSCC are:

- The patient's ability to self-feed and risk of aspiration while immobilised. Use the tilt function on the bed if the patient's symptoms mean they cannot tolerate bending at the hips. See nutritional care of MSCC patient's section 4.8 for further advice or refer to dietetics.

- Pain management. Pain caused by the MSCC may be exacerbated by immobilisation. Ensure adequate analgesia is available to manage the patient's pain. See pain management in patients with MSCC section 4.7 for further advice or refer to the local palliative/supportive care team.

- Bowel and bladder management. Aim to maintain continence where symptoms allow but monitor for signs of bladder/bowel dysfunction and manage promptly as per the nursing care plan for MSCC patients section 4.11 and refer to your local bowel function guidelines.

- Skin integrity and pressure areas. Refer to local policy for the prevention and management of pressure ulcers for advice on reducing the risk of pressure ulcers in immobilised patients.

- Venous thromboembolism (VTE) risk is increased with immobilisation, therefore consider VTE prophylaxis as per the venous thromboembolism in patients with MSCC guideline section 4.10.

Early physiotherapy input is recommended for assessment and to provide bed exercises for lower limbs and chest for immobilised patients. Input can include teaching passive/active leg exercises (providing symptoms are not exacerbated by this), calf massage (if not on anticoagulants), thoracic breathing exercises, and assisted cough (if applicable). Patients should also undergo a nursing assessment on admission during which a care plan should be created considering the factors above.

4.4.5 Confirmed MSCC

In most cases, MSCC will be confirmed on MR whole spine, which should be performed within 24 hours of the patient presenting with concerning symptoms. Referral should be made to physiotherapy within 24 hours of admission and occupational therapy within 48 hours, for initial assessment and planning of rehabilitation. Patients must also be referred to the MSCC coordinator for triage, immediately on confirmation of MSCC, via Christie switchboard 0161 446 3000.

4.4.6 Factors to consider, which influence spinal stability

The key factor to consider is the clinical picture. The patient should have a detailed clinical assessment of pain and neurological function on admission. This should be used with the radiological factors below when considering spinal stability.

Vertebral level

- For example, in the mid thoracic spine the presence of ribs and chest wall provide added support to the spinal column affected by metastatic disease. This is lacking in the cervical and lumbar spine. MSCC at or close to the junction of different spinal sections, such as between the cervical-thoracic spine or between the thoracic-lumbar spine has a high risk of instability, due to the mobility of the spine. This is compared to MSCC at rigid spinal levels such as mid thoracic or sacral spine.

Lytic vs sclerotic bone lesion

- Lytic disease in the spine is more at risk of collapse and instability than sclerotic disease.

Malalignment

- Deformity or malalignment of the spine, particularly subluxation or translation, but also kyphosis or scoliosis caused by the MSCC increases the risk of spinal instability.

Extent of tumour infiltration and vertebral collapse

- In general, the greater the tumour involvement of the vertebrae, the more likely it is that stability is compromised. Vertebra which have collapsed partially or fully have a higher risk of instability.

Posterior element involvement

- The posterior elements of a vertebra are defined as the pedicle, transverse process, lamina and spinous process. Disease extending into these posterior elements, particularly bilaterally, increases the risk of spinal instability.

The factors above, in conjunction with the nature of the patient's pain, form the SIN score (Spinal Instability Neoplastic Score). This is a validated spinal stability scoring system which can be used as an adjunct in the decision making when assessing spinal stability.

Spinal instability is often indeterminate and in the absence of clear radiological evidence of instability, clinical signs of instability should be assessed and guide further management. For example, severe pain at the site of the lesion, increasing on movement or worsening neurology when commencing mobilisation may indicate instability. This assessment will usually be undertaken by the physiotherapy and medical team as part of the patient's initial assessment.

4.4.7 Patients triaged for consideration of surgical management

After triage by the MSCC team and discussion with an oncologist, patients who are deemed to be surgical candidates from an oncological perspective, should be discussed with the spinal surgeons via patient pass. This should include seeking advice on spinal stability and mobilisation for the patient with MSCC, even if surgery is subsequently deemed not in the patient's best interest.

4.4.8 Patients triaged for non-surgical management

After triage by the MSCC team and discussion with an oncologist, patient who are deemed to be for non-surgical management of their MSCC should begin rehab immediately.

It is often difficult to determine spinal stability. Rehabilitation should begin with an initial assessment of the patient's symptoms and optimisation of analgesia (see initial

rehabilitation section 4.4.10.2.1). Consider referral to palliative/supportive care team if pain is not well controlled. Do not wait for radiotherapy to begin to start rehabilitation. Start rehabilitation as soon as the decision is confirmed for non-surgical management and the patient's symptoms are optimised to allow this.

4.4.9 Patients who require further investigations prior to a treatment decision

If immobilisation was deemed appropriate based on presenting symptoms, this should continue until a treatment decision has been made. However, in rare cases, further investigations may be required which take several days or longer. Extended periods of immobilisation should be avoided where possible and safe. If investigations delay the treatment decision, discuss with the responsible team or MSCC team for further advice on immobilisation.

4.4.10 Rehabilitation

Patients will commence rehabilitation as soon as possible following the treatment decision. See the below sections on rehabilitation following surgical and non-surgical management of MSCC.

Patients who present with minimal symptoms and who are deemed to not require immobilisation may be managed as outpatients. The reviewing clinician will make this decision on presentation. This also includes reviewing if the patient requires physiotherapy or occupational therapy input.

4.4.10.1 Rehabilitation following surgical management of MSCC

An initial physiotherapy assessment prior to surgery is advised where possible to document the patient's baseline function and neurological function, as well as discuss goals following surgery.

Following spinal stabilisation surgery for MSCC, spinal stability at the level of the fixation is no longer of concern and mobilisation can begin immediately, as soon as the patient's symptoms allow and in line with the post operative instructions of the surgical team.

The extent of rehabilitation required following surgery will depend on the patient's functional status. This should be assessed by a physiotherapist on day 1 post-op. See the relevant below sections for patients with no/minimal neurological deficit following surgery or significant neurological deficit following surgery.

4.4.10.1.1 Patients with no/minimal neurological deficit following surgery

This includes patients who, with ward level physiotherapy and occupational therapy, are able to return to their baseline function, or to improve their function to allow them to be safe for discharge with additional support.

On post-op assessment, if the patient can mobilise safely, including the safe use of stairs, and doesn't require any home adaptation, they can be discharged without further rehab follow up. They should receive the appropriate post-surgical guidance and accompanying leaflet prior to discharge.

On post-op assessment, if the patient has a mild neurological deficit, they will require a rehabilitation plan to be created, taking into account the patients' individual situations and goals. This rehabilitation plan should be commenced in the immediate post operative period on the ward and should be revised with any changes to the patient's

condition. When appropriate, the patient can be referred on to community rehabilitation teams on discharge, to continue to work towards agreed goals.

4.4.10.1.2 Patients with significant neurological deficit following surgery

This includes patients who, despite physio and OT input in the immediate post operative period, are unable to mobilise or return to their baseline to allow safe discharge into the community due to significant neurological deficits.

Ongoing rehab for these patients will be dependent on clinical status and prognosis. These patients should have a prognosis of >6 months as discussed with the MSCC coordinator/oncologist prior to surgery. They will also need a clear plan for oncological treatment to be discussed and documented. Patients can then be considered for referral to an inpatient neurological rehabilitation unit (INRU). The spinal injuries outreach team will support these rehabilitation pathways to INRU and onwards to community neurological rehabilitation teams.

Any patient with a sensory deficit in S2/3/4 dermatome should be referred to a medic or competent healthcare professional for further assessment of neurogenic bladder and bowel function, followed by onwards referral for specialist management. The local spinal injuries outreach team can assist in creating and implementing a bladder/bowel management regime before significant symptoms develop. All patients with a significant spinal cord injury due to MSCC can also be referred to the spinal injuries association (SIA). They recommend referral as soon as possible after diagnosis. As well as continuing support on bladder/bowel management, the SIA team can also provide support for patients as their care moves into the community and support for family and friends of patients with spinal cord injury. For full details of the services they offer, please visit www.spinal.co.uk

For patients who have significant neurological complications of surgery and a very good prognosis a referral to a specialist rehabilitation unit such as the northwest regional spinal injuries centre, may be appropriate. However, there are no dedicated spinal rehabilitation beds for oncology patients in our region and therefore acceptance into a specialist spinal rehabilitation unit is rare. To be considered for this level of inpatient rehabilitation, the patient must have a good prognosis and be at a point in their treatment where they can fully engage with intensive rehabilitation. If a patient fits these criteria, discussion with the SIA lead specialist nurse for the northwest region is recommended in the first instance.

4.4.10.2 Rehabilitation following non-surgical management of MSCC

4.4.10.2.1 Initial rehabilitation

The rehabilitation process below is aimed at patients who are symptomatic of MSCC, have been immobilised on admission and have not undergone surgery for their MSCC.

The patient should initially be assessed for clinical signs suggesting spinal instability which includes pain and neurological assessment, then any symptoms optimised. Once symptoms are optimised, careful graded sitting should commence. The timeframe for graded sitting will vary from patient to patient. It may be over a short number of hours or longer, depending on patient symptoms and clinical presentation, considering the patient's wishes and their overall holistic needs.

Starting from the position the patient is currently in, raise them in intervals of approximately 15 degrees. Each movement should be observed for a minimum of 5 minutes, although many patients will require much longer than this at each interval. If

the patient is already in a sitting position, do not return them to flat to commence graded sitting. If symptoms remain stable and the patient doesn't experience orthostatic hypotension, progress to unsupported sitting, followed by transferring, standing and walking (with/without mobility aids) as able.

Symptoms of potential spinal instability may not present until graded sitting has commenced. Therefore, patient assessment should continue throughout.

Graded sitting should be led by the Physiotherapy team, however, if out of hours, nursing staff or any other members of staff can initiate graded sitting providing continued assessment of pain and neurology is undertaken with each progressive movement increase. All patients with MSCC should be re-assessed for changes in their condition at least daily or after every progression of mobilisation. However, note information in the key considerations section regarding when this may not be appropriate.

During graded sitting, if the patient experiences mechanical pain or worsening neurological symptoms, return them to a position where the symptoms resolve, inform the medical team, and optimise pain relief. Specialist supportive oncology/palliative care input may be required. If symptoms resolve and after discussion with the medical team and the patient, graded sitting may continue.

If over multiple days the patient cannot progress in graded sitting due to uncontrollable pain or neurological deterioration on movement, then consider and discuss with the patient the use of a brace. Decisions regarding the use of a brace should consider the patient's overall prognosis and quality of life. Bracing should be used where it can help to promote mobility and prevent loss of range of limb movement. The clinician in conjunction with a physiotherapist should discuss and clearly document a date for removal or review of the brace. See orthotic device management – spinal bracing section 4.5 for further details.

If the patient develops worsening neurological symptoms which are not consistent with the presenting symptoms and do not appear to correlate with the area(s) of known MSCC, consider other causes and discuss with the medical team if further imaging would be appropriate. The MSCC team can also be contacted for advice.

Note: these are guidelines. Each rehabilitation plan and decision on mobilisation should be made on a patient-by-patient basis.

4.4.10.2.2 Key considerations

Patient's wishes - Positioning (for example lying flat, sitting up, standing or walking) and the use of spinal braces needs to be balanced against the patient's wishes, ensuring their comfort and individual preferences. Spinal bracing may be supportive and reduce pain and risk of collapse. However, spinal bracing will not completely prevent further collapse or spinal cord damage and may be uncomfortable or could result in pressure areas if not cared for correctly.

Psychological impact - Consider the psychological impact of assessment and rehabilitation. Daily neurological examinations may be difficult for a patient to tolerate if they have poor function and can become demoralising/frustrating or impede the patient's progress. Consider adapting rehabilitation assessments and treatment based on the holistic needs of the patient.

Changing stability - All patients and caregivers need to be educated with respect to the warning signs of progression of instability/cord compression and should be given the patient information leaflet.

Patients with a limited prognosis or approaching end of life - In patients with a limited life expectancy, the priority of rehabilitation should focus on comfort and individual preferences. Mobilisation decisions should focus on maintaining quality of life, even if instability is present. This requires sensitive discussion with the patients to ensure they are aware of the potential for progressive neurological deterioration.

4.4.10.2.3 Ongoing rehabilitation

The aim of rehabilitation is to improve quality of life, maintain or increase functional independence, prolong life by preventing complications and to return the patient to the community wherever possible.

Rehabilitation should be patient-centred with short-term, realistic goals, which focus on functional outcomes in order to achieve the best quality of life for each individual patient.

Even if functional outcome is limited; quality of life may be achieved by providing patients with physical, social and emotional support and a sense of control.

For a person with MSCC for whom surgery, radiotherapy or other oncology treatments are not appropriate, mobilisation should still be carried out if possible.

For patients with incomplete/complete paraplegia, consider sitting balance, establishing safe method of transfer out of bed and assess functional grip. Then progress to:

- rolling supine to side
- lying to sitting
- improving sitting balance
- sliding board transfers (alternative methods as indicated)
- pressure lifts / pressure care
- wheelchair assessment and training
- wheelchair skills
- advanced transfers
- assessment and practice of personal and domestic activities of daily living
- provide appropriate aids

If patient is struggling to achieve sitting balance, and symptoms allow, consider hoisting for transfers.

For patients who are unwell and/or bedbound teach passive leg exercises and teach relatives to perform calf massage. Also consider referral to the complementary therapy team

Any patient with a sensory deficit in S2/3/4 dermatome should be referred to a medic or competent healthcare professional for further assessment of neurogenic bladder and bowel function, followed by onwards referral for specialist management. All patients with a significant spinal cord injury due to MSCC can be referred to the spinal injuries association (SIA). This should be done as soon as possible after diagnosis to create and implement a bladder/bowel management regime before significant symptoms develop. The SIA team can also provide support for patients as their care

moves into the community and support for family and friends of patients with spinal cord injury. For full details of the services they offer, please visit www.spinal.co.uk

Specialist rehabilitation services should be accessible, tailored to the patient's functional status and treatment plan. Consider referring suitable MSCC patients to appropriate specialist rehabilitation services (including to specialist rehabilitation units). For those patients with a better prognosis and good rehab potential, the advice for referral to specialist rehabilitation services in the patients with significant neurological deficit following surgery section 4.4.10.1.2 above can also be followed.

4.4.11 Discharge planning

To avoid delays, discharge planning should begin on admission to hospital and will consider the patients' needs and wishes to ensure a smooth transition and continuity of care. Not all patients will require input from the discharge team but those who do should be referred as soon as possible.

For discharge information post-surgery, please also refer to the rehabilitation following surgical management of MSCC section 4.4.10.1.

Place of discharge will be dependent on patients wishes and function/care requirements following a diagnosis and treatment for MSCC. Communication between rehabilitation, discharge and community teams is essential. Places of discharge which can be considered include:

- Home with equipment and input from community services
- Intermediate care for rehabilitation (short-stay, defined goals, showing progress with rehabilitation, prognosis >6 months and not receiving ongoing oncology treatment)
- Inpatient neurorehabilitation at local unit (for patients demonstrating clinical rehabilitation potential, good general condition/long-term prognosis, i.e. > 6 months)
- Hospice for respite, short stay symptom management or end of life care if prognosis is less than 2 weeks.
- Nursing home or residential home depending on level of nursing needs (palliative, intermediate, long-term care, no prospect of rehabilitation,)
- Spinal unit/rehabilitation unit (for patients with good general condition/long-term prognosis, i.e. months to years)

The discharge team can apply for appropriate care funding depending on specific criteria. It is important that the correct funding is in place to ensure this is not revoked in the future. If the patient has a terminal diagnosis, rapidly deteriorating condition, increased level of dependence and a prognosis in the region of less than 3 months then they should be referred for fast track discharge. If they do not meet these criteria, they should be referred for social discharge. In each case, equipment and care can be put in place to support discharge.

Things to consider prior to discharge:

- Does the patient have capacity or is a best interest meeting required
- Equipment needs
- Preferred place of care/death discussions.
- District nurse referral
- Community palliative care referral
- Pressure area monitoring
- Collar training, send instructions to district nurses
- Update GP

- Few days' supply of pressure area care/dressing/creams etc
- Escalation plan/hotline contact
- Contact information for nursing equipment supplier or local loan stores

4.5 Orthotic device management - spinal bracing

4.5.1 Introduction

This document refers to patients with clinical signs of spinal instability who are being considered for a spinal orthosis. All patients with suspected spinal instability either in cervical and/ or any other area of the spine should be considered for appropriate external orthosis (brace). This will involve consultation between medical staff and physiotherapy/Occupational therapy staff and may require specialist orthotic assessment and fitting (GAIN 2014). Please note that even though spinal bracing could be an option, it may not be in the patient's best interest.

Considerations for collars and spinal bracing (GAIN 2014):

- Patients with suspected or unstable MSCC or awaiting surgery
- Patients with unstable MSCC but not suitable for surgery
- Patients with unstable MSCC but not suitable for surgery, with significant preservation of power and sensation, for protection of neurology
- Patients with significant mechanical pain to reduce pain
- Post-operative spinal surgery patients as per consultant recommendation

4.5.2 Referral

A referral for an assessment of an external orthosis must be made by a registrar or above. The reasoning for the assessment must be clearly stated in the medical notes. Medical documentation should include evidence of spinal instability and can include SIN score if available. Please refer to section 4.4.

4.5.3 Collar and brace supply

Orthosis should be discussed and/or provided by orthotic department, or rehabilitation staff in local trusts when no orthotic support is available on site.
Examples of commonly utilised spinal braces:

- Aspen vista cervical collar (C1-C7)
- Aspen Vista CTO (C1-T2)
- Aspen vista 464 TLSO (T3-S1)
- Aspen Vista CTLSO (C1-S1)
- Aspen Vista 637 LSO (T9-S1

4.5.4 Establishing provisions/ appropriateness of orthosis

Each patient presents with a different need and/or symptoms, therefore individualised care must be established for each case. There should be a clear discussion involving physiotherapist/Occupational therapist, orthotics (if available), patient and medical clinicians regarding bracing provisions. Once appropriateness is established then this discussion should be clearly documented on the patient's medical record. It should include:

- Reason for prescribing (i.e postural support while mobilizing, prevention of deformity, pain relief).

- Fitting position (i.e in lying or can be done in sitting) and number of people needed to fit.
- Duration/frequency of wearing in the day (e.g worn all through the day, needed for personal hygiene tasks such as showering, toileting or can be taken off during certain activities).
- Follow up management/ contacts. Consider review date in medical outpatient clinic.

4.5.5 At the Christie NHS foundation Trust

Referral:
If a patient has been identified as a potential candidate for a spinal orthosis, then a referral to the physiotherapy department should be made between normal working hours (8am-4pm). The referral should be made via the relevant CWP channel and an urgent alertive should be sent to the relevant physiotherapist. If a cervical collar fitting is urgently needed, and it is outside of normal working hours, then the on-call physiotherapist should be contacted via switch board. Please note initial collar fitting will only be eligible for on-call requests, not readjusting cervical collars. If a patient is a long-term user of a brace, a referral to local orthotics should be made for review/ long term management.

Orthotic input:
The Christie currently have a service level agreement with NCA (Salford) orthotic department. This can be accessed by therapy staff at the Christie NHS foundation trust (Withington site).

Ordering/ fitting:
There is a small stock of commonly utilised braces stored in the rehabilitation unit. If the brace needed is not available, then this should be ordered via the rehabilitation administration support staff. The product code, name, manufacturer and quantity should be provided to administration staff to ensure an efficient ordering process. Once the brace has been received the responsible physiotherapist will fit the brace. Spare pads will be provided accordingly from the rehabilitation department.

Follow-up:
Once a brace has been fitted, the responsible physiotherapist should then provide education to the patient/ carers to ensure optimal brace provisions and fitting are maintained. In some cases, teaching to external agencies may be needed to facilitate patient safety.

Long term follow-up:
All patients who are prescribed with a collar/brace require routine follow up by consulting team to review the need for continued use of orthosis. If long-term use of bracing required, patients should be referred to their local orthotics department for assessment and bespoke provision to ensure support is available locally.

4.5.6 At other organisations outside of The Christie NHS Foundation Trust

Arrangements for patients in other organisations should be discussed with the relevant clinicians, rehabilitation staff and orthotics department to determine: Appropriate orthotic devices, ordering and fitting arrangements including provisions and follow up pathway.

4.5.7 Care of braces

Once a brace has been fitted by the orthotic or physiotherapy team, the general care will be managed by the ward staff who have received training in fitting of the collar/brace. Nursing duties include:

- Removing/ replacing device for routine skins checks.
- Removing/ replacing device for patient hygiene.
- Removing/ replacing device for pad changes every 24 hours or earlier if indicated.
- Ensuring correct fitting following any procedure which has removed the device.
- Clear documentation of care of orthotic device including removal and refitting in daily nursing notes.

Training on application / care of the collar / brace can be provided by the orthotist or physiotherapist looking after the patient on initial fitting. Please note, at the Christie all staff receive collar fitting / care training during their manual handling training and introduction to MSCC clinical skills unit.

4.5.8. Optimising skin health

Routine skin care checks should be performed as per protocol. If routine skin care has been observed and the appropriately sized collar had been fitted, the patient's risk of skin compromise is low. If a skin concern is identified, please contact the trusts tissue visibility team urgently for support. If pressure areas do occur despite this, then this type of collar may not be suitable for the patient. Please contact the Physiotherapy Department for reassessment. For patients attending as an outpatient or transferring daily from another hospital then a referral should be made immediately to the Orthotics Department at the patient's local hospital for assessment for a different type of collar.
Check the position of the collar on the patient, ensuring that the padding extends beyond the plastic edges. This must only be performed by members of staff who have had previous training on fitting of collars.
If a brace appears in poor condition or not fit for purpose, then please contact the relevant physiotherapist (inpatients) or local orthotic department (outpatient) for review of brace.

4.5.9 Infection control

Occasionally an orthotic device maybe tried on but not suitable to the patients need. If the orthotic item is wipeable, then this can be reused following cleaning with Clinell wipes (green for non-infective patient, red for infective patient). If the orthotic item has material which cannot be cleaned according to your local infection control measure, then this must be discarded.

For spinal braces, often the material padding can be removed and discarded, and the plastic body can be cleaned accordingly and fitted with new padding.

4.5.10 Support for staff

- Orthotics departments associated with your trust.
- Patients' local orthotics.
- MSCC webpage: https://www.christie.nhs.uk/mscc
- Device manufactures representatives. Promedics are often utilised for spinal bracing. Please refer to their website for information/ fitting videos and care instructions. https://www.promedics.co.uk/

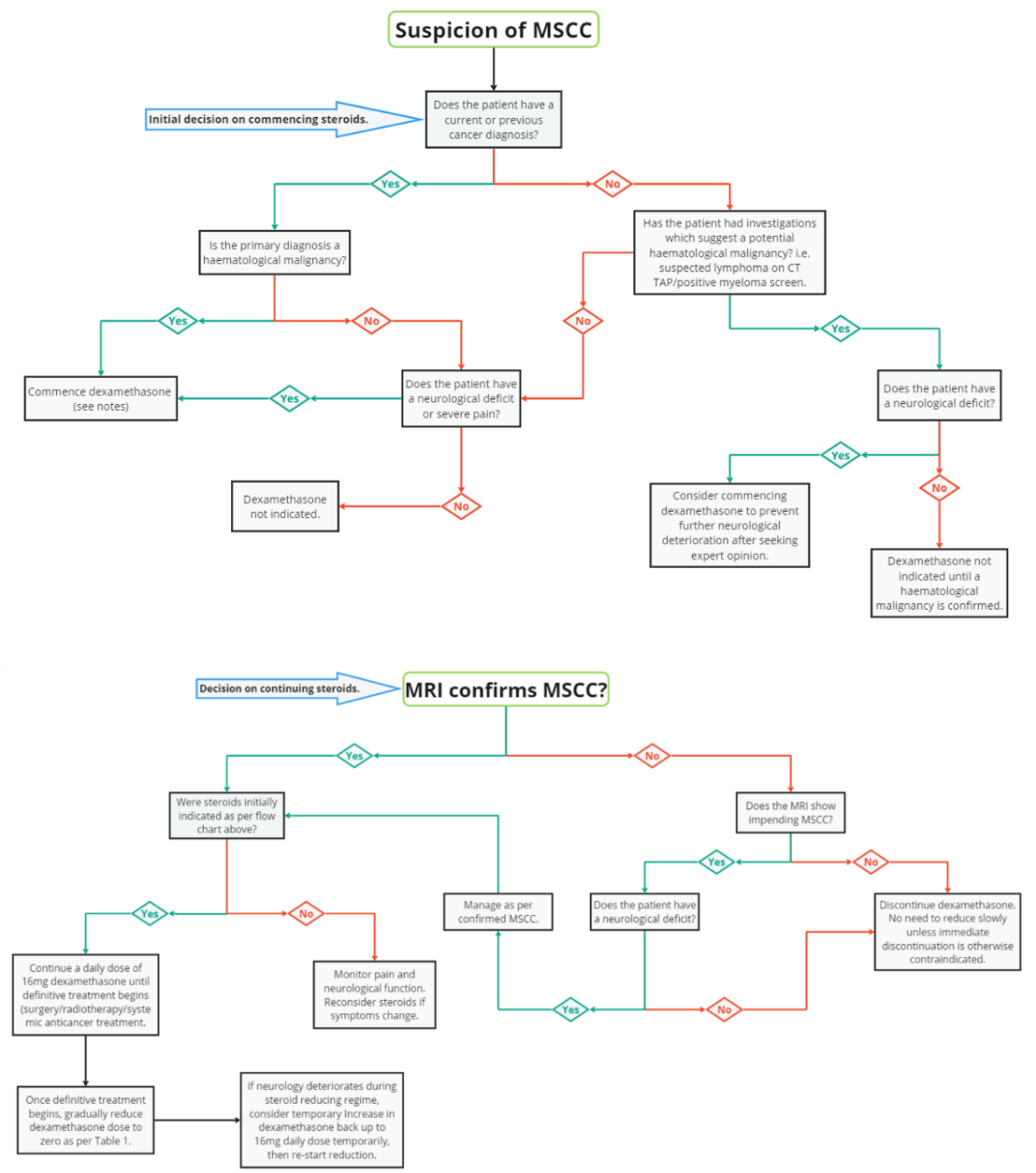
- Physiotherapy/ occupational therapy team within your trust.

4.6 Steroid use in patients with MSCC

For MSCC patients with neurological symptoms or signs, corticosteroids can reduce inflammation and promote stabilisation of blood vessel membranes at the compression site, consequently reducing back pain and neurological deficits. (National Institute of Health and Care Excellence [NICE], 2023)

To minimise the adverse effects of corticosteroids, the lowest effective dose should be prescribed for the minimum possible time (NICE, 2024).

Corticosteroids should be considered at the point of suspicion of MSCC, or when MSCC is confirmed if findings are incidental. The corticosteroid of choice is dexamethasone. To determine who should be commenced on this, please follow the flow chart and written guidance below.



4.6.1 Initial dosage

If dexamethasone is indicated as per the flowchart above, an initial loading dose of 16mg should be prescribed. This can be oral or intravenous. A proton pump inhibitor (PPI) should also be prescribed.

See section 4.6.4 advice for patients commenced on dexamethasone for further detail on safe prescribing of corticosteroids.

4.6.2 Awaiting a definitive treatment decision for MSCC

Prolonged dexamethasone use is associated with a higher likelihood of adverse effects and the length of use should be kept as short as possible. If there are any delays to definitive treatment, such as waiting for a biopsy, continuing high dose dexamethasone should be carefully considered, taking into account the risks and benefits. Please seek advice from the treating team or MSCC coordinator.

4.6.3 Patients with a suspected or confirmed haematological malignancy

For patients with a haematological malignancy, steroids are a key component in the definite treatment for MSCC and disease can respond quickly to them. This is helpful to prevent neurological deterioration but can reduce the likelihood of obtaining a successful biopsy sample.

Therefore, please follow the advice below in conjunction with the flowchart to decide if it is appropriate to prescribe steroids.

- For patients with radiological suspicion, or suspicion on blood tests, of a haematological malignancy and a neurological deficit discuss urgently with the haematology team if steroids should be commenced to preserve function.

- For patients with radiological suspicion, or suspicion on blood tests, of a haematological malignancy and no neurological deficit, do not start steroids until biopsy has confirmed a haematological malignancy. Monitor neurological function closely at least daily and reconsider steroids if any deterioration in function.

- For patients with a histologically confirmed haematological malignancy and suspicion of or confirmed MSCC, dexamethasone 16mg total daily dose should be commenced regardless of their symptoms, unless otherwise advised by the treating haematologist.

4.6.4 Advice for patients commenced on dexamethasone

- Document the indication for corticosteroid on the patient's Kardex.
- Indicate the length of course required on the Kardex and in the patient's notes.
- Following the loading dose, dexamethasone should be prescribed morning and afternoon (not evening) if to be given in divided bidaily doses.
- See appendix 7.2.1 for information on the use of dexamethasone by injection at The Christie
- Start prophylaxis with PPI when giving high dose corticosteroids. Ensure this is stopped when dexamethasone is stopped if no ongoing GI symptoms.
- Ensure appropriate patient information regarding corticosteroids and dose reduction regimen on discharge. Counsel if necessary.

- Monitor all patients on high dose steroids for:
  - Diabetes – see below
  - Dyspepsia/epigastric pain
  - Mania/hypomania/psychosis
- Plasma glucose must be checked on all patients commencing steroids. Capillary blood glucose testing (CBG) must continue whilst the patient is taking steroids and are an in-patient. CBG testing must continue when patient is discharged if CBG has been elevated as an in-patient. Please refer to local trusts Steroid and CBG monitoring guidance for further information.
- All patients requiring high dose steroids should be issued with a steroid emergency card with their prescription from pharmacy. See appendix 7.2.2 for link.

4.6.5 Discontinuing corticosteroids

If MSCC is ruled out on imaging performed within 24 hours of suspicion of MSCC, dexamethasone can be immediately discontinued.
If the patients has been on dexamethasone for an extended time or had recent high dose/long term steroids, then consider a weaning regime to reduce the risk of adrenal insufficiency.

If MSCC is confirmed, including impending MSCC with a neurological deficit, please refer to the flowchart above. If dexamethasone was indicated as per the flow chart, continue at a total daily dose of 16mg until definitive treatment is commenced. The reducing regime documented in table 1 should then be followed.
If there is a delay to definitive treatment (for example, awaiting biopsy or further investigations), consider the risks/benefits of beginning a reducing regime before definitive treatment has begun.

4.6.6 Corticosteroids for patients receiving radiotherapy for MSCC

If, after following the flowchart above, steroids are indicated for a patient triaged for radiotherapy, the reducing regime in table 1 should be followed, with day 1 being the first day of radiotherapy. See table 1.

If after following the flowchart above, steroids are not indicated for a patient triaged for radiotherapy, the lower dose steroid regime in table 2 should be followed from the first day of radiotherapy. This is to reduce any inflammation around the spinal cord caused by radiotherapy. See table 2.

Table 1 – Steroid reducing table for MSCC patients commenced on high dose corticosteroids.

Day from the start of definitive treatment	Dexamethasone daily oral dose (milligram = mg)	Dose/frequency of administration
Day 1-2 (2 days)	16mg	8mg B.D.*
Day 3-4 (2 days)	8mg	8mg O.D.**
Day 5-6 (2 days)	4mg	4mg O.D.**
Day 7-8 (2 days)	2mg	2mg O.D.**
*B.D. = Twice Daily (8am & 2pm)		**O.D. = Once Daily (8am)

Table 2 – Steroid regime for radiotherapy patients who DO NOT meet the criteria for high dose corticosteroids		
Day from the start of radiotherapy	**Dexamethasone daily oral dose (milligram = mg)**	**Frequency of administration**
Day 1-4 (4 days)	4mg	O.D.**
Day 5-8 (4 days)	2mg	O.D.**
	**O.D. = Once Daily (8am)	

4.7 Pain management

4.7.1 Mechanisms for pain

90% of patients with cancer who develop spinal cord compression have a history of localised spinal pain for some weeks or months prior to its development (Cancer Research UK, 2024). This may be due to bone (somatic) and soft tissue invasion in relation to vertebral metastases.

Compression of dorsal nerve roots gives rise to radicular pain on one or both sides of the body: pain radiating round in the dermal distribution which corresponds to the level of disease and is often aggravated by movement.

Compression of the cord itself may be associated with crescendo exacerbation of pain, often localised but may be described as radiating up and down the entire spine; electric shocks or partial paralysis of limbs which may occur on coughing, straining or movement. There may be an unpleasant tight band around the trunk at the level of compression: neuropathic pain, an unpleasant hypersensitivity or allodynia (light touch becomes painful), burning sensation or stabbing and shooting pain within this band or down the limbs.

4.7.2 Pain Assessment

Assess pain at rest and on movement

- Site
- Radiation
- Severity e.g. score 1/10
- Relieving factors e.g. position, response to dose of analgesia
- Exacerbating factors – e.g. movement, straining
- Neuropathic pains e.g. Sudden onset, catching
- Effect on activities of daily living e.g. sleep, mood, *personal care
- Assess pain at rest and on movement.

4.7.3 Pain management

Paracetamol and milder analgesia's may not help with the pain experienced with MSCC – however paracetamol may compliment opioids if given regularly.

4.7.3.1 Opiate - naive patients:
If moderate to severe pain, start a regular opioid with provision for breakthrough opioids, orally or the subcutaneous (SC) route.

Medication	Dose	Frequency	Route	
Morphine Sulphate IR	5mg	4 hourly	Oral	Prescribe on regular side of drug chart
Morphine Sulphate IR	5mg	1-2 hourly PRN	Oral	For breakthrough pain
Morphine Sulphate	2.5mg	1-2 hourly PRN	SC	If oral route not possible – consider syringe driver if requiring more than 3 doses in 24hrs

Or

Oxycodone IR	2.5mg	4 hourly	Oral	Prescribe on regular side of drug chart
Oxycodone IR	2.5mg	1-2 hourly PRN	Oral	For breakthrough pain
Oxycodone	1.25mg	1-2 hourly PRN	SC	If oral route not possible – consider syringe driver if requiring more than 3 doses in 24hrs

If appropriate these can be switched to the long-acting opioids.

NB. opioid transdermal patches unsuitable for unstable pain.
(Fentanyl 25mcg patch is equivalent to 60mg oral morphine so not for opioid naïve patients)

Consider reducing the doses of opioids for frail, elderly, hepatic or renally impaired patients – please refer to the Christie Supportive Care Team or your local Palliative Care Team for support and advice.

Prescribe laxatives (refer to local bowel management guidelines).
If opioid induced constipation is suspected, then other preparations are available.

Prescribe antiemetics for 5 days and then stop if asymptomatic. Symptoms often improve after 5-7 days**.** If symptoms persist despite an antiemetic, consider other possible causes before switching to another opioid. First line recommended antiemetics include either Metoclopramide OR Haloperidol, which may be prescribed as follows:

Medication	Dose	Frequency	Route
Haloperidol **OR**	0.5-1.5 mg	Nocte	Oral
Metoclopramide	10mg	TDS	Oral

Metoclopramide- there a risk of dystonic reactions, especially in younger women. Refer to the electronic BNF or Greater Manchester Palliative Care Pain and Symptom Control Guidelines for Adults for further information.
Metoclopramide and Haloperidol are not suitable in Parkinson's disease. Alternative antiemetics should be prescribed- seek specialist advice if required.

If oral route not suitable can have SC injection or a syringe pump started

4.7.3.2 Patients already on regular strong opioids:
Assess the patient's pain at rest and if moderate to severe increase the background long-acting analgesia based on their PRN opioid usage in the last 24hrs (by 30-50%).

Increase the breakthrough analgesia to reflect this – approximately 1/6th to 1/10th of the total long-acting dose.

For more information refer to NICE CG140 Overview | Palliative care for adults: strong opioids for pain relief | Guidance | NICE

4.7.4 Neuropathic pain

Where neuropathic pain has been identified consider the addition of the medication below:

Medication	Dose	Frequency	Other
Amitriptyline 1st Line	10mg PO	OD- Nocte	Increase every 3-7 days Maximum dose 75mg ON *Avoid in severe hepatic impairment*
Nortriptyline 1st Line	10mg PO	OD- Nocte	Increase every 3-7 days Maximum dose 75mg ON *Avoid in severe hepatic impairment* Less sedating and less anticholinergic side effects
Gabapentin* 2nd Line	300mg PO	OD (or 100mg TDS) Titrated to 300mg TDS initially	Increase by 300mg steps every 3-7 days Maximum 1200mg TDS *Monitor renal function* Seek Specialist advice if eGFR is < 60ml/min.
Pregabalin* 2nd Line	50-75mg PO	BD	Increase dose every 3-7 days. Maximum 300mg BD. *Monitor renal function* Seek Specialist advice if eGFR is < 60ml/min.
Duloxetine	30mg PO	OD- Nocte	When other treatments have failed – seek specialist advice when considering increasing the dose. Contraindicated if eGFR <30ml/min.

*Since 2019 gabapentin and pregabalin have been rescheduled to schedule 3 controlled drugs and therefore require controlled drug prescribing requirements.

NB - Consider lower starting doses and slower titration in frail, elderly, hepatic or renally impaired patients.

For further advice regarding starting doses and titration, refer to the Greater Manchester Pain and Symptom control Guidelines 5th Edition (2019).

4.7.5. Pain on movement

Ensure the administration of an immediate-release strong opioid e.g. morphine PO or SC about 30 minutes before any anticipated activity.
Immediate release oral transmucosal fentanyl preparations may be an option – refer to the Supportive care team or local Palliative Care Teams – they are particularly useful where there is:

- Intolerance to the 'usual' PRN medications (Morphine / Oxycodone)
- Movement related (incident) pain
- Difficulty swallowing oral medication

Fentanyl Products should **only** be initiated by or on advice from the Supportive Care Team or local Palliative Care services as they are specialist medicines.

Immediate-release fentanyl preparations can only be used if the patient is already taking at least 60mg (total 24h daily dose) of oral morphine (or equivalent).

Consider adjuvant methods of pain relief:

- Steroids can often dramatically reduce the pain associated with spinal cord compression.
- A short course of an anti-spasmodic benzodiazepine e.g., diazepam or lorazepam may be considered to reduce skeletal muscle spasm.
- Referral for an interventional pain procedure (via pain team).

In situations where there is frequent or continuous severe pain and/or failure to improve pain control within 24-48 hours, refer to The Supportive Care Team or your local Specialist Palliative Care team. And for further advice please referral to the Greater Manchester Pain and Symptom control guidelines (5th edition 2019) Palliative-Care-Pain-and-Symptom-Control-Guidelines.pdf

4.8 Nutritional care

4.8.1 Nutritional screening on admission

As per NICE guidance all patients admitted to hospital must be screened for risk of malnutrition with a validated nutrition screening tool. This is recommended on admission to hospital and repeated weekly during their inpatient stay or as clinically indicated. The responsible nurse will complete the local nutrition risk screening tool.

In newly diagnosed MSCC patients it may not be possible to weigh them on admission, if the patient requires immobilisation. In this case the nurse should obtain a recent weight history from the patient, relative or carer until the patient can be weighed.
Patients who trigger as high risk from the screening tool should be referred to the dietitian for a nutritional assessment and appropriate intervention.

4.8.2 Nutritional care plan

There are additional nutritional care needs to consider for MSCC patients requiring immobilisation. These include the following:

1. Patient's ability to self- feed whilst on bed rest

- Offer assistance with meals and drinks:
  MSCC patients will require assistance at meal and drink times when on bed rest. Ensure support is offered to help unwrap /cut up food /pour drinks. For frailty patients, assistance with eating and drinking at mealtimes and throughout the day may also be required to optimise their nutritional and fluid intake. A red serviette or tray system should be implemented for patients requiring assistance and extra time allocated to support them during protected mealtimes. Follow local guidance on mealtime assistance.

- If the patient is short of breath or has chewing difficulty offer texture modified meals such as IDDSI level 6/ 7.

- A finger food menu is an additional option to help maintain some independence with feeding for patients who do not have chewing or swallowing problems.

- Observe for any signs of aspiration and refer the patient to Speech therapy for swallow assessment as indicated.

- Observe for signs of upper limb weakness/ difficulties in holding cups/cutlery and refer to Occupational therapy for assessment and provision of feeding aids.

- Commence daily food and fluid intake charts for all MSCC patients whilst on bed rest.

- Offer first line supplements (e.g Aymes shakes/Complans) if the patient manages to eat less than ¾ of their meal.

- Record fluid intake on the patient's daily fluid balance chart and discuss with the medical team if the patient is not meeting their fluid requirements for appropriate IV fluid replacement.

- Commence daily stool monitoring charts in all patients with MSCC.

2. MSCC symptoms that can affect nutritional intake

- Acute/chronic pain can severely reduce appetite, hence offering the patient pre-meal analgesia (at least 30 minutes prior a meal) can help optimise pain control around mealtimes. Consider referral to Supportive Care team if pain control remains inadequate.

- Nausea can be a side effect of pain and constipation and regular pre-meal anti-emetics may need to be considered until the cause of nausea has resolved.

- Steroid induced hyperglycaemia can occur in MSCC patients. Patients will lose weight and have poor wound healing if blood sugars remain high. Monitor blood glucose 6 hourly and refer patient to the Diabetes nurse if blood glucose levels persist > 12 mmol/l.

- Neurogenic bowel patients can present with:
    - Faecal incontinence which is very distressing for the patient and can lead them to self- restrict food intake in an attempt to control their bowels.
    - Constipation can cause early satiety, abdominal distension, pain and nausea which all can hinder a patient's ability to eat. Follow bowel management guidance.
    - Early satiety i.e feeling full & bloated can limit the amount of food and drink tolerated. Offering food and drinks with a 'little & often' approach can help optimise intake.
    - Commence daily stool monitoring chart to monitor bowel function and help establish an individual bowel routine- remember to also document when bowels are not opening.

3. Post - acute phase of MSCC (remobilisation has commenced)
Once the patient is mobilising, then their ability to eat and drink should become easier. However, there are still additional consideration for MSCC patients:

- Patients with upper limb weakness will need ongoing occupational therapy support to optimise patient independence through the provision of splints / adapted cutlery / cups as appropriate.

- Safe weighing **–** Weigh the patient as soon as the Physiotherapist advises it is safe to do so. Agree and document which weighing method is most suitable (hoist /chair or standing scales).

- Document method of weighing on the patient's drug chart and /or in their care plan.

- For patients wearing a brace, weigh the brace separately when it is not in use and subtract this from the combined weight.

- Repeat nutritional risk tool once a week during admission and follow appropriate care plan.

- Continue daily food intake chart to help monitor if patient is eating an adequate amount.

- Record fluid intake on the patient's daily fluid balance chart and request IV fluid prescription from the medical team if fluid intake is inadequate.

- Offer first line supplements (e.g Aymes shakes/ Complans) if the patient manages less than ¾ of their meal.

- Blood glucose monitoring every 6 hours is essential until the patient is weaned off steroids and blood glucose has stabilised within acceptable range (6 – 12 mmol/l). Contact Diabetes Nurse if blood glucose levels remain elevated.

- Continue daily stool monitoring chart, remember to also document when bowels are not opening**.**

- Inform the dietitian if a pressure sore develops as the patient's nutritional requirements will need reviewing.

4.8.3 Discharge consideration

- For patients receiving nutritional supplements on the ward a TTO supply will be arrange by the ward pharmacist / dietitian.

- For patients still struggling with their nutritional intake and/or requiring ongoing nutritional supplements, the dietitian (with the patient's consent) will refer the patient to community dietitian for follow up on discharge and request ongoing supplement prescription via their GP.

4.9 Complimentary therapies

All complementary therapists working at The Christie NHS Trust must be aware of:

- High risk patient groups
- Signs and symptoms of metastatic spinal cord compression (MSCC)
- Signs and symptoms of primary spinal cord compression (SCC).
- Signs and symptoms of spinal metastases
- Internal pathways / guidance for working with these patient groups.
- External guidelines (NICE Guidance 2023)

All complementary therapists working at The Christie must attend a formal training session on MSCC, to be incorporated into Complementary Health & Wellbeing Team Mandatory Training.

A designated complementary therapist MSCC 'champion' will attend subsequent MSCC updates/training and cascade this knowledge to the rest of the Complementary Therapy team.

Any complementary therapies being considered for a patient undergoing treatment for/have been treated for or with suspected MSCC, **must** be discussed first with medical staff, physiotherapist or their nurse.

Any further queries may be discussed with the MSCC Coordinators at The Christie (contact Christie switchboard or internal via Alertive app)

Once the complementary therapist has satisfied him/herself that it is safe and appropriate to proceed with treatment, the following therapies, which may be of benefit, are as follows:

Emotional support:
To minimise any infection risk, non- touch methods will be considered in the first instance via face to face or telephone support for the patient, family, or support person. This may be in the form of providing a supportive ear, guide through stress management techniques and aid emotional resilience.

Touch therapies:
To be considered only where deemed necessary. Therapists to follow the Complementary Health & Wellbeing algorithm to reduce the risk of infection and potential increase in symptoms.

Massage:
The use of massage, with or without the use of essential oils, can be used to relax the mind and body, promote sleep, relieve tension, and improve the flow of blood and lymph. It can also reduce blood pressure and enhance mood in addition to reducing symptoms such as pain, nausea, anxiety, depression & fatigue.
Massage of the legs & feet/arms & hands may be beneficial if tolerated and does not cause any neurological signs & symptoms such as increased pain in the legs/arms or the back/neck.

Gentle head & face massage may be offered with caution, where there is no indication of spine instability and does not cause any pain or neurological symptoms. This would be avoided, if possible, due any prevalence of respiratory infections.
Depending on the level of spine affected, back/neck massages would be inadvisable and most often inappropriate.

Abdominal massage:
Abdominal massage with/without use of essential oils has been shown to help relieve constipation. Therapists need to be aware that this can increase intra-abdominal pressure and aggravate back pain or neurological symptoms in the MSCC patient. It is advisable to consult with the patient's medical staff, Physiotherapist, or nurse prior to providing abdominal massage.

Therapeutic touch:
For example, the HEARTS process (Hands on, Empathy, Aromas, Relaxation, Textures, Sound) to provide comfort and support. It is helpful for patients who are significantly unwell and where other forms of massage may be inadvisable.

Smoking & alcohol reduction or cessation:
Support for smoking & alcohol reduction or cessation is available to patients and their relatives/carers, this helps to improve the outcome of treatment.

4.10 Venous thromboprophylaxis

The risk of thromboembolism (DVT and/or PE) in patients with metastatic spine disease is high, especially if they are also immobile due to limb weakness. Other risk factors include, old age, obesity, anti-thrombin III, protein C&S and factor V Leidin deficiencies, previous history of DVT/PE and prolonged surgery.

In randomised trials of surgical patients, the wearing of TEDS or use of Intermittent Pneumatic Compression of calves (IPC: Flotron boots) reduces the incidence of DVT by approx. 50-60%. Likewise, low molecular weight heparin for 28 days has also been shown to reduce the incidence of DVT by at least 50%.

Assessment:

- Assess concurrent risk factors for thromboembolism
- Consider likely period of immobilisation
- Assess risk of bleeding, such as concurrent medications, thrombocytopenia, clotting disorders.
- Is patient already on Warfarin for other reasons?

Treatment:

- If appropriate, early ambulation and physiotherapy for all patients.
- For patients who are unlikely to be mobile for > 3 days consider TEDS where appropriate.
- For patients likely to be immobile >24 hours consider starting LMWH subcutaneously once a day, taking into consideration patient's general condition, any contra-indications and expected prognosis. This should be discussed with patient.
- If, despite the above, the patient develops clinical evidence of thromboembolism, full anticoagulation will be indicated.

4.11 Nursing care

The goal of nursing care for the MSCC patient is to identify potential problems at the earliest opportunity, maintain comfort and safety, and manage associated problems as effectively as possible.

4.11.1 Plan of care

- Ensure that a decision has been made and documented on immobilisation based on the patient's symptoms, as per section 4.4.
- Carry out an initial holistic nursing assessment and assess for specific signs and symptoms of MSCC e.g. back pain, upper and lower motor deficits, sensory deficits and autonomic dysfunction.
- Continue to monitor for changes to symptoms and therefore care needs. Educate the patient on red flags for MSCC and advise to alert a healthcare professional if they develop any of these.

- Provide the patient with the appropriate information leaflet based on the point in the pathway they are at. If they have suspected MSCC provide “Metastatic spinal cord compression: What to look out for”, if they have confirmed MSCC provide “Metastatic spinal cord compression: What it means and how it can be treated”.

4.11.2 Pain

- Observe for any pain and allow the patient to describe the nature of this pain (is it in one specific area, is it burning or shooting, does it feel like a pulling sensation, is it made worse by lying flat, coughing, sneezing or taking in a deep breath etc). Instigate Pain Care Plan.
- Give prescribed analgesia and observe effect. Seek advice from palliative / supportive care team if indicated, once initial assessments and management have been initiated by the medical team. Also refer to pain management in MSCC section 4.7.
- If initial decision indicated, continue to immobilise with careful positioning and handling to minimise further back pain until a treatment decision is made. Ensure referral has been made to physiotherapy.
- If the patient has symptoms of cervical spine instability refer to physiotherapy to consider fitting a cervical collar and give further advice to prevent movement of head.

4.11.3 Autonomic dysfunction:

- Observe for signs of urinary hesitancy or retention or incontinence, encourage regular toileting and promote forced diuresis. If incontinent of urine, catheterise on doctor’s instructions. Ensure catheter/skin care is carried out, adequate intake of oral fluids and monitor for infection. Instigate urinary catheter care plan as applicable.
- Observe the patient’s bowel habit daily, assessing for constipation, loss of urge to defecate or incontinence. Complete a stool chart for each patient. Give prescribed laxatives, administer suppositories/enema if necessary, providing dignity, support and skin care as appropriate. (refer to local bowel management guidelines).

- When providing continence care, use caution with regards to continence products in case of symptoms of spinal instability. Consider using Shewees/slipper pans or equivalent

4.11.4 Motor and sensory deficits (weakness, heaviness, stiffness, numbness, paraesthesia, loss of coordination or paralysis in limbs):

- Refer to physiotherapists as soon as possible who will conduct assessment of motor function and sensory deficits; and provide advice/instruction in respect of nursing management.
- Observe pressure areas every 4 hours to avoid injury to skin. Nurse the patient on a pressure relieving mattress but if concerns regarding pressure care, discuss with the clinical team if using an airflow mattress could be appropriate on an individual patient basis. Instigate relevant local care plan.
- Assist with personal hygiene, give effective analgesia prior to activity if required. Maintain privacy, dignity and (as far as possible) independence. Instigate relevant local care plan**.**

- Observe for signs of chest infection (increased respirations, pyrexia, cough, sputum) and report.
- Observe for any signs of DVT due to immobility and ensure medical team have completed the VTE assessment (refer to venous thromboprophylaxis section 4.10)**.**
- Assess the patient's psychological state, listen, support, explain and reassure as appropriate. If required refer for psychological assessment by trained personnel.
- If required, assist patient at all mealtimes to encourage good oral diet and fluid intake. Use the tilt action on the bed to enable safe eating and minimise risk of choking. Refer to the nutritional care section 4.8 and offer dietary supplements if necessary.

4.12 Surgical referral and management

All patients in the Greater Manchester area with MSCC who need a surgical opinion will be discussed only with the Salford Royal Spinal Surgical/Neurosurgical team

4.12.1 Urgent referral and initial management in patients with a known cancer diagnosis

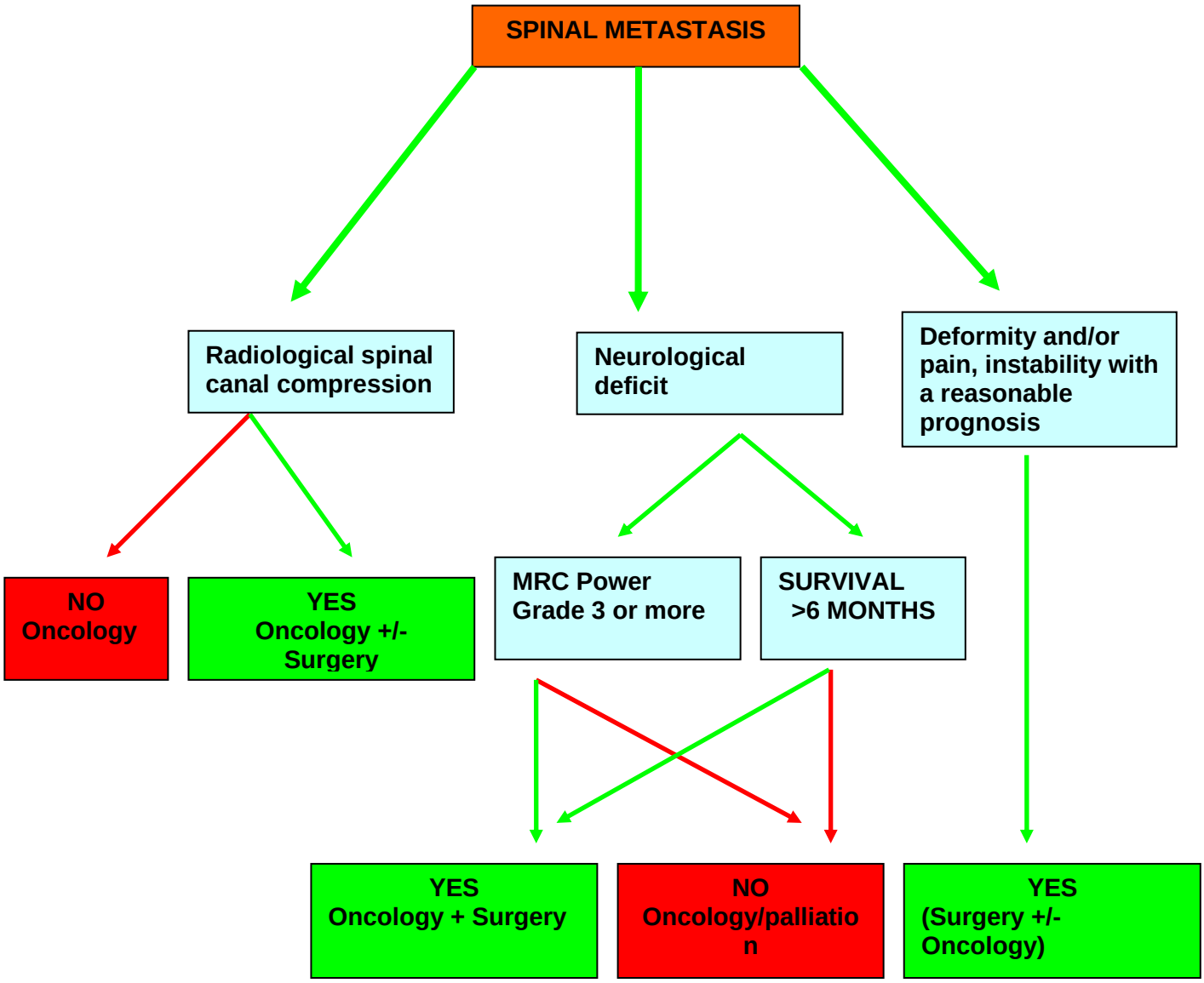
- Follow the guidance above on commencing dexamethasone and immobilisation based on the patient's symptoms.
- Urgent MRI scan of the whole spine INCLUDING STIR SEQUENCES to confirm diagnosis (to be performed and reported within 24 hrs.)
- Staging CT scan to identify extra-spinal metastasis and ensure that these are available on the shared PACS
- Discuss the clinical and radiological assessment with the MSCC co-ordinator service at The Christie.
- Surgical opinion requested (only after consultation with the MSCC coordinator) for:
    - Limited sites of spinal involvement
    - Cord/neural compression with neurological deficit
    - Radiological evidence of spinal cord compression
    - Radio-resistant tumours with options of other treatment
    - Patient is generally fit for a general anaesthetic
    - Life expectancy of more than 6 months

4.12.2 Urgent referral and management in patients with an unknown primary cancer

- Arrange emergency admission to patients' local hospital
- MRI scan of the whole spine INCLUDING STIR SEQUENCES to confirm diagnosis (to be done and reported within 24 hrs.)
- Follow the guidance above (section 4.6) on commencing dexamethasone.
- Discuss with MSCC co-ordinator
- CT scan of the chest abdomen and pelvis before surgical intervention to look for primary and to rule out renal primary which may require preoperative embolization of the spinal metastasis
- Consider biopsies if there are amenable sites and patient is neurologically intact

- Surgical opinion sought for decompression, stabilisation and biopsy by making a patient pass online referral for spines.
- Surgical team to inform referring team and MSCC service regarding surgical decision within 24 hours of referral.
- If patient is suitable for surgery, then the referring hospital and the surgical team will liaise and co-ordinate transfer and organise further clinical review with a view to surgery.
- Referring hospital must keep the patient's bed open for 24 hours after transfer to SRFT to allow immediate repatriation if the patient is deemed not suitable for surgery after initial assessment.
- MSCC Co-ordinator maintains contact with surgical team to ensure timeliness of pathway.
- Post-op, surgical team to refer to the oncology team for post-op radiotherapy, using post-op radiotherapy referral template which is e-mailed to the appropriate Clinical Oncology team - chn-tr.co-referrals@nhs.net . The MSCC Co-ordinator can advise the name of the consultant the patient should be referred to. This is recommended once the wounds have healed, usually at least 2 weeks after surgery.
- If patient is not suitable for surgery, then surgical team to contact the MSCC Co-ordinator to arrange for URGENT radiotherapy within 24 hours.

The MSCC Co-ordinator service will advise referral to the spinal team via patient pass https://patientpass.srft.nhs.uk/ or SRFT switchboard 0161 789 7373 between the hours of 08:00 hrs and 1930. After 19:30 the neurosurgical registrar via spinal patient pass or on 07623617892 or via switchboard. The referring clinician must only refer appropriate patients via patient pass after discussion with the MSCC coordinator or Christie on-call oncology registrar (out of hours) through Christie switchboard (0161 446 3000). If urgent discussion is required with SRFT, the spinal or neuro registrar can be contacted through SRFT switchboard and a patient pass referral to spinal surgery should be completed. The primary referral should be to the MSCC bleep holder in most cases.



- Early surgery before established neurological deficit produces the best outcome. However, if patients do have a significant neurological deficit below MRC power grade 3, surgical referral should still be considered as stabilisation may help with pain and allow the patient to engage with rehabilitation.
- Surgery is best undertaken before radiotherapy to reduce risk of wound problems
- Patients transferred to SRFT for either assessment or surgery would be expected to be repatriated to the referring hospital for rehabilitation and/or palliation
- The surgical pathway is not absolute and when in doubt please contact the relevant spinal/neuro surgical team at SRFT

4.13 Radiotherapy

4.13.1 Indications for radiotherapy

- Cancer diagnosis established (radiological or histological)
- Spinal cord compression confirmed by imaging
- Following clinical triage as per pathway
- Following spinal surgery for spinal cord compression unless the patient has had previous radiotherapy to the same level.
- Not suitable for surgery (see surgical guideline section 4.12)

4.13.2 Aims of radiotherapy

The aim of radiotherapy is to reduce pressure on the spinal cord through tumour shrinkage, and to achieve local tumour control at this site. This aims to prevent further neurological deterioration and, in some cases, can lead to some resolution of neurological symptoms and signs. It may also help to relieve spinal and radicular pain.

Results of radiotherapy are closely linked to neurological status at time of treatment and patients who are already paraplegic, especially for over 48 hours, with loss of bladder control are unlikely to have neurological recovery with radiation. NICE guidance advises that urgent radiotherapy should be offered to patients with complete tetraplegia or paraplegia that has been present for up to 2 weeks, even if pain is well controlled (NICE, 2023).

Relative contraindications to radiotherapy

- No histological diagnosis of cancer
- Relatively radio resistant tumour if surgery is an option (renal carcinoma, sarcoma, melanoma)
- Cord compression is due to vertebral displacement/spinal instability
- Previous radiotherapy to same spinal site
- Poor general condition due to other major and irreversible clinical problems
- Prognosis likely to be less than 1- 2 months

Indications for getting a surgical opinion
(see surgical guidelines section 4.12)

Surgery should be considered as first line treatment in patients who

- Are medically fit for a general anaesthetic,
- have a life expectancy greater than 6 months (Tokuhashi Score)
- have limited disease elsewhere,
- have limited levels of compression.

Surgery is also indicated if there is

- Spinal instability and/or deformity, particularly if there is mechanical pain uncontrolled by analgesia
- No tissue diagnosis
- Worsening of symptoms/disease progression during/after radiotherapy
- No scope for further radiotherapy to involved spinal site

4.13.3 Referral for radiotherapy

All patients should be referred via the MSCC co-ordinator service by calling The Christie switchboard on 0161 446 3000. All patients will then be triaged on the electronic form available on the internal Christie Clinical Web Portal.

If the triage decision is for radiotherapy, this will be arranged by the on-call clinical oncology Specialist Trainee (ST) in conjunction with the radiotherapy department. For inpatients at Oldham/Salford/Macclesfield, the ST should discuss with the local satellite centre to see if the patient's treatment can be simulated and delivered locally. If this is not possible, then patients should be brought to the Withington site.

It is the responsibility of the on call Clinical Oncology Specialty Trainee to inform the clinical oncology consultant on-call if urgent radiotherapy is indicated at weekends/bank holidays. All referrals need to be discussed with the responsible consultant or the on-call consultant. During weekdays, an opinion should be sought from the disease-site team regarding prognosis.

Aim to give radiotherapy within 24 hours of the confirmed diagnosis of spinal cord compression.

Spinal cord compression may be the first presentation of a new cancer diagnosis; these patients may have a localised primary tumour or evidence of disseminated disease. Where disease appears to be confined to the spine and it is believed the patient may be fit for SACT in the future, it is essential to obtain a guided biopsy at the referring hospital prior to radiotherapy treatment although urgent treatment will be given without waiting for the results. This can be discussed with the on-call oncology team.

4.13.4 Radiotherapy treatment planning

All radiotherapy treatment should be planned using the reported MRI (CT if MRI contraindicated) of the whole spine.

Treatment Volume

- The field is centred on the cord compression, including 1 vertebra above and below.
- Attention to the transverse axial imaging is important to ensure that any lateral or paravertebral extension is covered in the volume width.
- Treatment may be required to more than one level of compression.
- Junctional overlap with previously irradiated fields should be avoided / considered when deciding dose and fractionation.

Technique

- Treat supine using mega voltage beam through the DMAX or IBEAM couch as appropriate for the linac on which the patient is to be treated.
- Where the depth of field, as assessed by the MRI scan, exceeds the mid-plane, a parallel opposed pair arrangement is indicated.
- The upper cervical spine may be treated with a lateral opposed pair to reduce potential oral side effects (mucositis).

Note: If the patient has a pacemaker or cardia defibrillator in situ, it is the responsibility of the treating consultant to assess the risk of proceeding with treatment. The patient must be carefully counselled on the potential effects of treatment during the consent process, and the device must be checked following treatment. Please refer to the radiotherapy quality manual work instruction titled: management of patients with pacemakers and cardiac defibrillators in radiotherapy (document number XR3.563).

Dose and fractionation

The preliminary result of the SCORAD III Trial, presented at ASCO in 2017 suggests that a single exposure of 8Gy is as good as 20Gy in 5 fractions in terms of neurological recovery and overall survival (Hoskin, 2019). From previous non-RCT data there is an indication that patients who survive longer require more in-field retreatment with single exposures or short courses of treatment.

The standard recommended doses are (NICE, 2023; RCR 2024):

- 8Gy single exposure [suitable for most patients]
- 20Gy in 5 fractions [Where a long prognosis is expected or if there is significant soft tissue disease or large field size]
- 20Gy in 5 fractions [Post-spinal surgery only]

Prescription point: dose prescribed at depth. The recommended depth is the distance from the skin to the anterior edge of the spinal cord or the posterior edge of the vertebral body as assessed on the diagnostic MR/CT scan or the virtual simulation scan. The depth should be assessed at the centre of the planned field.

Poor prognosis patients:
Patients who are unlikely to improve following radiotherapy and maintain benefit:

- Estimated survival of less than 3 months (assess with Tokuhashi Score)
- Extensive or untreatable disease elsewhere
- Severe established neurological deficit (if complete tetraplegia/paraplegia for >2 weeks and pain well controlled)

Treatment is unlikely to lead to useful functional improvement but may contribute to pain relief. These patients may be treated with a single fraction of 800 cGy at depth. For patients with myeloma, 800-1000 cGy may be prescribed.

Post-operative radiotherapy:
Good prognosis patients would warrant fractionated treatment of 2000cGy in 5 fractions over 1 week or 3000cGy in 10 fractions over 2 weeks (RCR, 2024).

Post operative radiotherapy should be offered as soon as the patient has recovered from surgery, which is important to prevent adverse effects from radiotherapy such as wound breakdown and consequent infection (NICE, 2023). It should be considered that there is some evidence to suggest that patients have an increased risk of losing ambulatory function if post operative radiotherapy is delivered >6 weeks from surgical intervention (Han, 2022; Wang, 2024).

4.13.5 Radiotherapy and fertility

Radiotherapy fields for MSCC would not usually affect the gonads, so impact on fertility from MSCC treatment is usually low. If there is concern based on the field and patient factors (taking into account patients age and preferences) that fertility may be affected, then the impact of this should be discussed with the patient. The treatment of MSCC is usually urgent and fertility treatment can take time to organise and undertake in practice. Therefore, it is important to note that MSCC treatment should not be delayed awaiting further discussions with a fertility specialist (NICE, 2023).

4.13.6 Special Circumstances

There are some special circumstances that may warrant alternative fraction schedules, for example:

- Solitary plasmacytoma : this is a curative situation and the standard dose is 40 – 50 Gy in 20 – 25 fractions which is conformally planned. If the patient has cord compression this should be managed surgically in the first instance.
- For multiple myeloma the optimal treatment is systemic and response is usually rapid although short courses of radiotherapy can be given in patients not suitable for systemic treatment or who are known to be chemo- resistant but discussion with the haematology team is recommended.
- Lymphoma: these patients may have a much better prognosis and may benefit from a longer fractionation e.g 24-30 Gy in 12- 15 fractions.

However, first line treatment for lymphoma is systemic treatment which usually works quicker than radiotherapy and this should be discussed with the relevant on call haematologist because giving emergency radiotherapy may delay the commencement of chemotherapy (particularly anthracyclines due to their radio sensitising properties). Radiotherapy can however be given in some circumstances immediately after biopsy where there is likely to be a long delay in possible delivery of chemotherapy or when chemotherapy is not being planned. Delivery of high dose steroids can be used to allow time to discuss with relevant teams.

These cases should be discussed with a Clinical Oncologist specialising in lymphoma/myeloma management ASAP.

4.13.7 Re-treatment with radiotherapy

There is evidence of the benefit of retreatment after initial benefit from radiotherapy for recurrent MSCC and can be considered for patients who have had a good response to previous radiotherapy who have developed recurrent symptoms at least 3 months after initial radiotherapy. Consideration should be given to the total biological equivalent dose, the time interval between treatments and the volume of tissue to be irradiated. 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 schedule of treatment do not. (NICE, 2023; RCR, 2024)

The absolute maximum retreatment dose has not been established, but a cumulative BED (initial + re-irradiation) of 120 Gy_2 appears to be safe and effective (Nieder, 2006). The RCR dose fractionation guidelines suggest a cumulative BED of ≤135.5Gy to the cord when the interval is >6 months and each course is ≤99 Gy BED using and alpha/beta ratio of 2 (RCR, 2024).

Assuming alpha/beta ratio of 2:

- 20Gy/5# = BED 60Gy2
- 8Gy/1# = BED 40Gy2
- 30Gy/10# = BED 75Gy2

Re-irradiation should be considered for patients with a good performance status, absent or controlled visceral metastases and a slow development of motor deficit.
8 Gy single exposure or 20 Gy in 5 daily fractions prescribed at depth should be considered providing the cumulative BED is ≤120Gy (if 3-6 months – limited evidence in this area, recommended to keep to the lowest feasible level) or ≤135.5Gy if >6 months since previous treatment.

4.13.8 General care of patients receiving radiotherapy

All patients undergoing radiotherapy for MSCC should be offered dexamethasone in combination with appropriate PPI for gastric protection. This minimizes additional

nerve compression from increased inflammation/oedema cause by radiotherapy. The dose/regime will depend on symptoms at presentation with MSCC. Please see steroid section 4.6 for full details.

All patients should have a GM Cancer Metastatic Spinal Cord Compression Radiotherapy Treatment Summary completed, with a copy sent to the patient, GP and referring team (see GM Cancer Metastatic Spinal Cord Compression Radiotherapy Treatment Summary template document). A management of patients following radiotherapy for MSCC form (appendix 7.3) should also be complete and send back to the referring hospital with the patient.

Pain relief is important, especially as spinal disease may cause severe pain in relation to movement and changes in position.
Consider:

- Additional "breakthrough" medication prior to attempting simulation or treatment. This is often an opioid analgesic, by mouth if administered at least 45 minutes prior to moving patient, or by injection.
- Use of pneumatic mattress for transfer from trolley to couch
- Use of Entonox during movement and this can be used by the patient even during treatment itself, to enable them to maintain position
- Anti-emetics e.g. ondansetron 8 mg p.o. or i.v. should be given at least 30 minutes prior to treatment if the lower thoracic or upper lumbar spine is being irradiated.
- Patients should be warned about subsequent mucositis/oesophagitis where applicable and soluble paracetamol advised.

4.14 Links to education resources

Acute Oncology eLearning Resources – GM Cancer Academy - The GM Cancer Academy offer 3 free eLearning modules covering the complete MSCC pathway from red flags and diagnosis, through to triage, treatment and rehabilitation.

A fulfilled life- the final chapter - This is a free online course aimed at healthcare professionals and is designed to share knowledge and understanding of end-of-life care for people with spinal cord injury.

5. CONSULTATION, APPROVAL & RATIFICATION PROCESS

This document is produced via the Greater Manchester MSCC Steering Group, with internal Christie approval from The CSSS Quality and Governance Committee. The document is ratified by the Document Ratification Committee.

6. REFERENCES (IF APPLICABLE)

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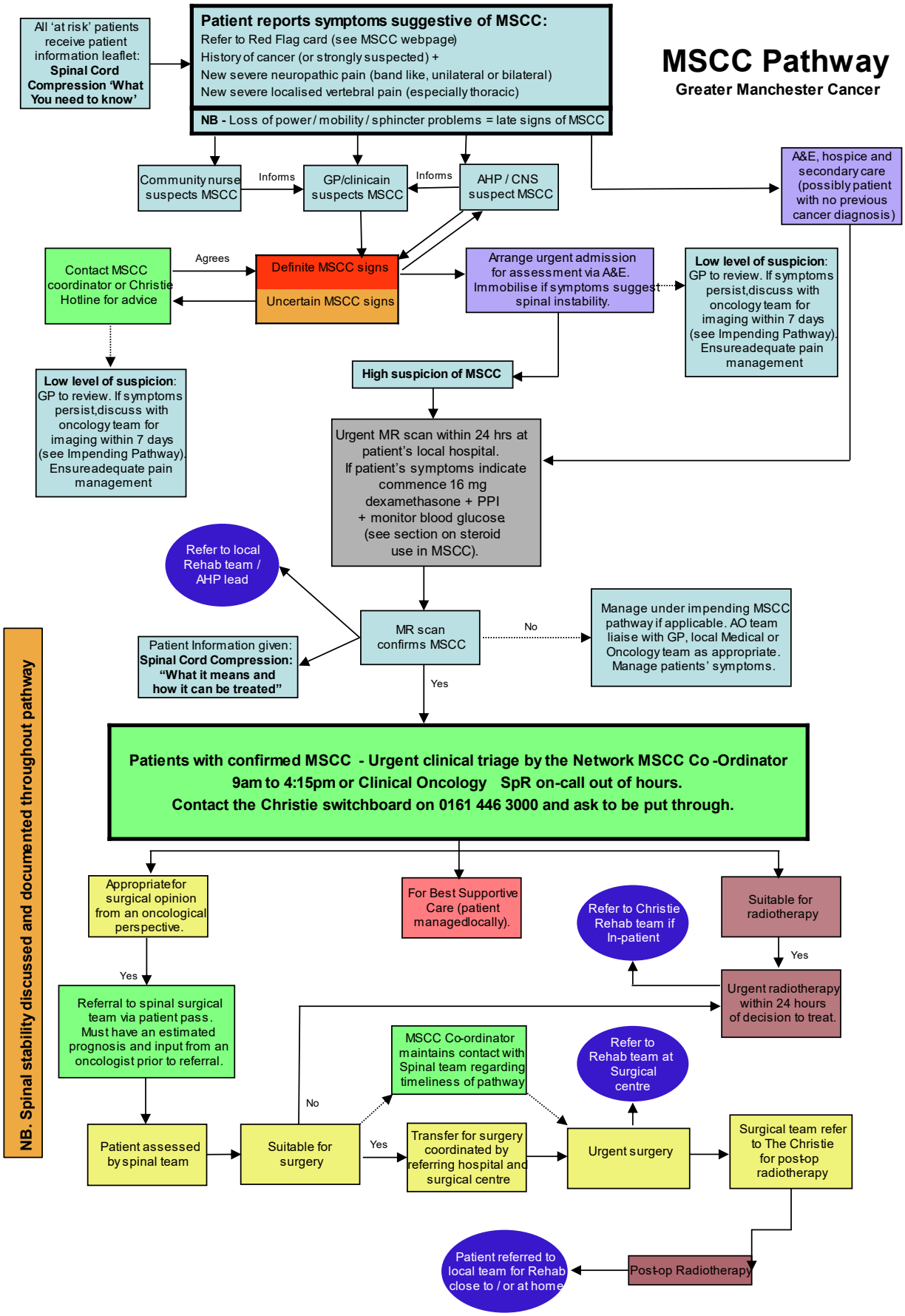
7. APPENDICES

7.1 MSCC Pathway Flowchart



7.2 Steroid Guidance Appendices

7.2.1 The use of dexamethasone Injections 4mg in 1ml at The Christie

There are currently 3 preparations of dexamethasone injection on the UK market. The Organon product (used at The Christie) has been reformulated resulting in changes to its concentration, storage conditions and presentation. In addition the marketing authorisation for the Organon product has now been transferred to Aspen.

As of 1st October 2014 there will be no new production of the 4mg/ml product. Therefore when stocks of this are exhausted the only available preparations of Dexamethasone injection will be those made by Aspen and Hamelin/Hospira.

	Aspen	**Hameln**	**Hospira**
Dexamethasone base (on packaging)	3.8mg/mL	3.3mg/mL	
Volume equivalence of 4mg base	1.05mL (only 1ml of will be available in each glass vial*)	1.2mL(only 1ml will be available in each glass ampoule *)	
Dexamethasone sodium phosphate	5.0mg/mL	4.3 mg/mL	
Dexamethasone phosphate	Not stated	4.0mg/mL	
Propylene glycol content	None	20mg/mL[6]	None
Storage	Store in a refrigerator (2-8°C)	Store below 25°C	
Presentation	Glass vial	Glass ampoule	

Following discussion at the Safe Medicines Practice Committee and the Drugs and Therapeutics Committee, we are recommending the following:

We will procure the Aspen branded product. 3.8mg/ml
For doses of 4mg Dexamethasone it is acceptable to substitute a dose of 3.8mg.
For doses of 8mg Dexamethasone it is acceptable to substitute a dose 7.6mg.
For doses of 16mg and above no dose adjustment will be made.

7.2.2 Steroid Emergency Card

All patients requiring high dose steroids should be issued with a steroid emergency card with their prescription from pharmacy.

Steroid Emergency Card (Adult) can be downloaded from this link - steroid-card.pdf (endocrinology.org). If this link fails, this website will have the latest version Adrenal crisis | Society for Endocrinology.

7.3 Management of patients following radiotherapy for MSCC – discharge information

The Christie NHS
NHS Foundation Trust

Management of Patients Following Radiotherapy for Metastatic Spinal Cord Compression

This form should be added to the patient notes for reference in on-going management

Patient Name: **Christie Hospital Number:** **NHS Number:** **Date of Birth:** *(Addressograph Label)*	Christie Consultant:	
	Patient reviewed by:	
	Primary Diagnosis:	

Pre – radiotherapy Patient Triage – Radiotherapy has been decided as the treatment of choice due to: *(Please Tick)*

	Poor patient prognosis / High risk of surgery		Patient declined surgical opinion
	Spinal team advised not for surgery following consultation		Other:

Prognosis – Estimated cancer specific survival…… **Patient is aware? (Tick)** ☐

1. Treatment details *(Radiotherapy prescription)*

A total dose of ……..Gray in …… treatment/s has been delivered to ……

…… Treatment start date: …… Planned completion date: ……

2. Patient Information - The patient has been provided with: *(Tick as appropriate)*

	MSCC: what it means and how it can be treated leaflet		MSCC: what to look out for leaflet
	Copy of radiotherapy consent form		

3. Side effects - These side effects may present over the next 10–14 days, before resolving: *(Tick as appropriate)*

	Increase in pain in treated area		Increase in bladder frequency		Sore throat
	Skin redness / itchiness in treated area		Nausea / Vomiting		Difficult/painful swallowing
	Loose stool / Increased bowel frequency		Oral Mucositis		Fatigue

4. Patient Management – During initial post treatment period (2 – 3 weeks): *(Tick as appropriate)*

	Review / optimise analgesia		Steroid reduction – (see section 6)
	Review need for anti – emetics		Use emollient in treated area to moisturise skin
✓	Refer to Acute Oncology & Palliative Care Team	✓	Refer to physiotherapy for rehabilitation/mobilisation
	Additional information:		

5. Mobilisation – Following the decision to give radiotherapy, graded sitting should commence, with a clinical assessment of spinal stability. This does not need to wait until after radiotherapy has been delivered.

6. Steroids - an initial decision on steroid use will have been made prior to radiotherapy. The result of this decision will dictate the use of steroids following radiotherapy as below. See guideline for details www.christie.nhs.uk/mscc

Reducing regime for patients commenced on high dose corticosteroids at diagnosis of MSCC.			**Steroid regime for radiotherapy patients who do not meet the criteria for high dose corticosteroids.**		
Day from #1	Total daily dose	Dose/frequency	Day from #1	Total daily dose	Dose/frequency
Day 1-2 (2 days)	16mg	8mg B.D.*	Day 1-4 (4 days)	4mg	O.D.**
Day 3-4 (2 days)	8mg	8mg O.D.**	Day 5-8 (4 days)	2mg	O.D.**
Day 5-6 (2 days)	4mg	4mg O.D.**	*B.D. = Twice Daily (8am & 2pm)		
Day 7-8 (2 days)	2mg	2mg O.D.**	**O.D. = Once Daily (8am)		

Ensure all patients on steroids are also prescribed a PPI and have regular blood glucose monitoring.

Cross through the table above which is not appropriate for this patient.

7. Follow-up *(Please complete details below)*

…… ☐ No Christie follow-up required

8. Problems / Concerns

The Christie Hotline (AOMS) can provide advice and support. Contact us 24 hours a day on 0161 446 3658.
Guidance on local contacts, steroid regimes and rehabilitation can be found at: www.christie.nhs.uk/mscc

Signed: …… **Print:**…… **Contact:** ……

8. VERSION CONTROL SHEET

Version	Date	Author	Status	Comment
V01	11/12/25	Claire Shanahan, MSCC Coordinator	Final	New overarching clinical guidance document that incorporates all previous standalone versions. Acknowledged Contributors: • Lena Richards • Sarah Tillott • Jennifer King • Zhu Chuen Oong • Vivek Misra • Melanie Cunningham • Annie Dewberry • Rachael Brennan • Shrijit Panikkar • Muhammad Dherijha • Emma Moohan • Caroline Morris • Richard Berman • Caroline Wilson • Rohit Kochhar • Robert McCreary • Louise McCahery • Vicky Phelan