

# West Midlands Regional Spine Network



## Emergency Spine Disorders

November 2018

<b>Category</b>	<b>Operational Delivery Network policy document West Midlands Regional Spine Network (WMRSN)</b>
<b>Purpose</b>	<b>To provide a summary of WMRSN hospitals dealing with spine emergencies, initial assessment and referral guidance and obligations</b>
<b>Version</b>	<b>1.0</b>
<b>Previous versions</b>	<b>Nil</b>
<b>Supporting documents</b>	<b>NICE CG 75 (2008 and reviews) NICE QS 56 (2017) WMRSN MRI policy RSN mandatory items SBNS and BASS position statements on CES</b>
<b>Responsible working group</b>	<b>WMRSN Board</b>
<b>Sign off</b>	<b>WMRSN board</b>
<b>Related networks</b>	<b>Major trauma network</b>
<b>Distribution</b>	<b>All WMRSN hospital COO and Medical director Clinical leads ED / oncology / acute medicine / spine surgery / radiology Chair STPs Betsi Cadwaladr health board</b>
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## INTRODUCTION

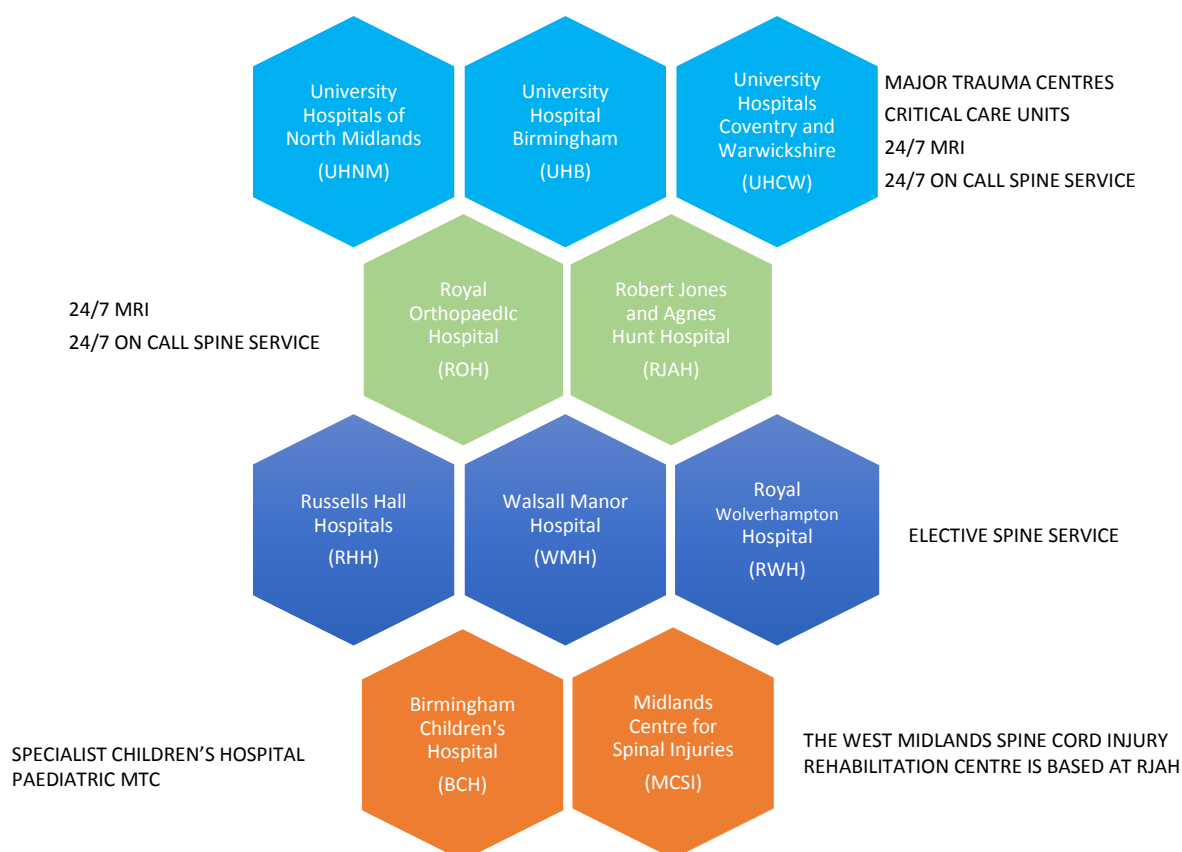
The West Midlands Regional Spine Network (WM RSN) includes 3 major trauma centres (MTC), 2 specialist orthopaedic hospitals, 3 neuroscience centres and 3 spine partner hospitals. There is also a specialist children’s hospital, a regional specialist spinal cord injury rehabilitation centre and neurorehabilitation centres associated with the MTCs.

UHNM, UHB, UHCW, ROH and RJAH are known as spine hubs as they provide 24 hours spine on call cover. RWH, Walsall Manor and RHH are spine partners as they provide a spine service but without 24 hours on call cover.

This document outlines the emergency services provided by each hospital, the expectation on referral and hospital specific process and pathways for referrals.

There are obligations on the referrer as well as the receiving Spine Centre that this document also outlines.

## WM RSN EMERGENCY SERVICE OUTLINE



UHNM, UHB, UHCW are adult MTCs. BCH is a paediatric MTC for the region. BCH takes all non-trauma paediatric spine emergencies for Birmingham as well. The MCSI is a regional specialist rehabilitation centre for spinal cord injury. The MTC all have acute rehabilitation services and neurorehabilitation services that also look after some spinal cord injured patients.

## TYPES OF EMERGENCY DISORDERS ACCEPTED FOR MANAGEMENT BY HOSPITAL

Hospital	Major Trauma	Isolated spine trauma (ISS < 9)	Osteoporotic and elderly trauma (no neurology)	Cauda Equina Syndrome	MSCC	Intradural pathology	Primary sarcoma	Spinal cord injury (acute)	Spinal cord injury specialist rehabilitation
UHNM	✓	✓	✓	✓	✓	✓		✓	
UHB	✓	✓	✓	✓	✓	✓		✓	
UHCW	✓	✓	✓	✓	✓	✓		✓	
ROH		✓	✓	✓	✓		✓		
RJAH		✓	✓	✓	✓		✓		
RHH		✓*	✓*						
WMH		✓*	✓*						
RWH		✓*	✓*						
BCH	✓^	✓^			✓^	✓^			
MCSI									✓

\*can manage isolated spine trauma presenting at own ED if no requirement for surgery

^paediatric major trauma centre and specialist children's hospital

### EXECUTIVE SUMMARY

- The aim of this policy is to ensure rapid assessment, initial management and transfer of emergency spine disorder patients across the region to the appropriate service.
- All the spine hubs and spine partners will give advice if required.
- If in doubt, initially immobilise the patient in bed in the patient's normal neutral position with log roll turns until assessment is complete and advice is sought.
- Patients should only be referred after the diagnosis of a surgical pathology is established with minimal imaging as outlined (CT and or MRI). Plain radiographs alone are not suitably diagnostic for referral to a spine service.
- If the referring hospital does not have the facility for out of hours MRI scanning then there needs to be an SLA with a hub or partner hospital that does. The scanning hospital must take the patient emergently. The referring hospital must reserve a bed and repatriate if no surgical pathology is identified or conservative management is advised.
- Referrals should be in a digital format with appropriate data protection compliance.
- Spine services must respond to a referral within 2 hours of receipt. Accepted patients should be transferred the same day (within 24 hours) and sooner if the clinical situation warrants it.
- Referring hospitals must repatriate patients after acute intervention within 24 hours.
- UHNM, UHB, UHCW are adult MTCs and will take all pathology. RJAH and ROH are specialist hospitals and will take all non-trauma emergencies and ISS<9 traumatic injuries. RHH, WMH and RWH will take fractures that do not need surgical intervention.
- BCH is the regional paediatric MTC. UHNM will take non MTC paediatric spine emergencies.
- MCSI is the regional spine cord rehabilitation centre.

## **SPECIFIC CONDITIONS**

The conditions described are the commonest ones referred to an on call spine service. This is not an exhaustive list and the spine centres will accept referrals for other conditions and requests for advice. The management described is simply an outline and not detailed. Detailed management plans will be received on discussion with your spine centre.

### **Spine Trauma ([see workflow](#))**

All trauma patients need to be assessed and initially managed with a validated and locally agreed trauma protocol (such as the ATLS or ETC) from the time of the accident. The following statements refer to the spine trauma assuming the patient is being globally assessed and reassessed as part of that protocol.

All spine trauma or suspicion of spine trauma needs to be assessed and managed in the pre-hospital setting making an assumption that the injury is unstable. The spine trauma patient needs to be handled keeping this in mind and maintained in their neutral position (note for ankylosing spondylitis this may be in their usual kyphotic position). They will need to be immobilised with usual validated protocols. Variances from this should be documented with the reason why.

On admission to ED the spine board should be removed as it is only a transport system. All spine trauma admitted to an ED should be assessed by a senior ED physician and by the on call orthopaedic team in all partner hospitals. In the hubs the ED physician or trauma team will call in the appropriate specialty doctors after initial investigation.

The initial clinical assessment of the spine trauma patient must include documentation of neurology on an [ASIA](#) score sheet. If neurology is abnormal it should be repeated at 2 hours and the patient rapidly referred to the MTC.

#### **Initial assessment**

ATLS or similar trauma protocol should be used. Tenderness of the spine should be assessed for and neurology should be documented on the ASIA score sheet.

In a spine cord injured patient the mean arterial pressure should be maintained > 65mmHg, oxygenation optimised and any autonomic consequences such as profound bradycardia addressed. High cervical cord injuries must be monitored for respiratory compromise. The patient must be immobilised but with care to look after pressure areas. They should already have been catheterised and the urine output should be monitored and optimised. The use of steroids is not recommended in the initial management of these patients.

#### **Mobility status**

The patient must be managed with full spinal precautions until advised otherwise by the receiving spine service.

#### **Initial imaging**

Any suspected spine trauma or injury identified on plain radiographs must have a computerised tomogram (CT) of the area of concern, with raw axial data and 2D reformats in the sagittal and coronal planes, as an emergency. Plain radiographs alone are not suitable for referral. Reformats of pan scans when completed are acceptable.

MRI scans where required should be of the whole spine with sagittal STIR of the whole spine and T1 and T2 sagittals of the injured section with T1 and T2 TSE axials of the injured section (and optional T2 gradient echo sequences to assess the cord).

## Referral

- Any spine trauma associated with other injuries resulting in an ISS  $\geq$  9 OR with neurology or impending neurology should be referred to your local Major Trauma Centre in line with the WM Trauma Network policy (UHNM/UHB/UHCW).
- An isolated spine trauma without neurology and an ISS  $<$  9 can be referred to any local spine hub (UHNM/UHB/UHCW/ROH/RJAH).
- Isolated spine trauma with no neurology and an ISS  $<$  9 attending ED at RHH / WMH / RWH can be managed locally by the spine surgical service if there is no requirement for surgery.
- Progressive or incomplete neurology should be considered a surgical emergency requiring rapid transfer and surgical intervention.
- Primary care should refer suspected injuries to ED.

## Minimal clinical information for referral

- Mechanism of injury
- Injuries sustained and primary and secondary survey summary
- Nature of spine injury suspected
- Immobilisation status
- Neurological status as documented on ASIA (including neurological PR)
- PMH and medication
- Transfer images on an emergent basis

## Isolated low energy osteoporotic fractures without neurology

### Isolated C2 odontoid peg fractures with minimal displacement and no neurology

[\(see workflow\)](#)

Patients in this category can be referred for advice to any of the spine hubs and spine partners.

## Initial assessment

Initial assessment and management should include a suspicion of a serious injury, but where it is clear that the injury pattern is stable then prolonged flat bed rest with full spinal precautions may be detrimental.

If images confirm an undisplaced or minimally displaced C2 odontoid peg fracture OR a low energy osteoporotic fracture and patient is neurologically intact

- Maintain in line immobilisation (and Aspen or Miami J collar if cervical injury)
- Allow 40 degree head up tilt
- Look for active medical issues (eg CAP / UTI)
- Refer for advice

## Mobility status

For isolated C2 odontoid peg fractures in the elderly with no significant displacement a well-fitting semi-rigid collar such as an Aspen collar or a Miami J collar will be adequate to allow the patient to sit up.

Osteoporotic fractures of the thoracic, thoracolumbar or lumbar spine can be tilted head up and once the injury is clearly deemed to be stable and osteoporotic sitting flexed at the hips is safe and relatively comfortable.

### **Initial imaging**

Any suspected spine trauma or injury identified on plain radiographs must have a computerised tomogram (CT) of the area of concern, with raw axial data and 2D reformats in the sagittal and coronal planes, as an emergency.

Reformats of pan scans when completed are acceptable.

MRI is not mandatory on referral but when requested should be of the whole spine with sagittal STIR of the whole spine and T1 and T2 sagittals of the injured section with T1 and T2 TSE axials of the injured section (and optional T2 gradient echo sequences to assess the cord).

### **Referral**

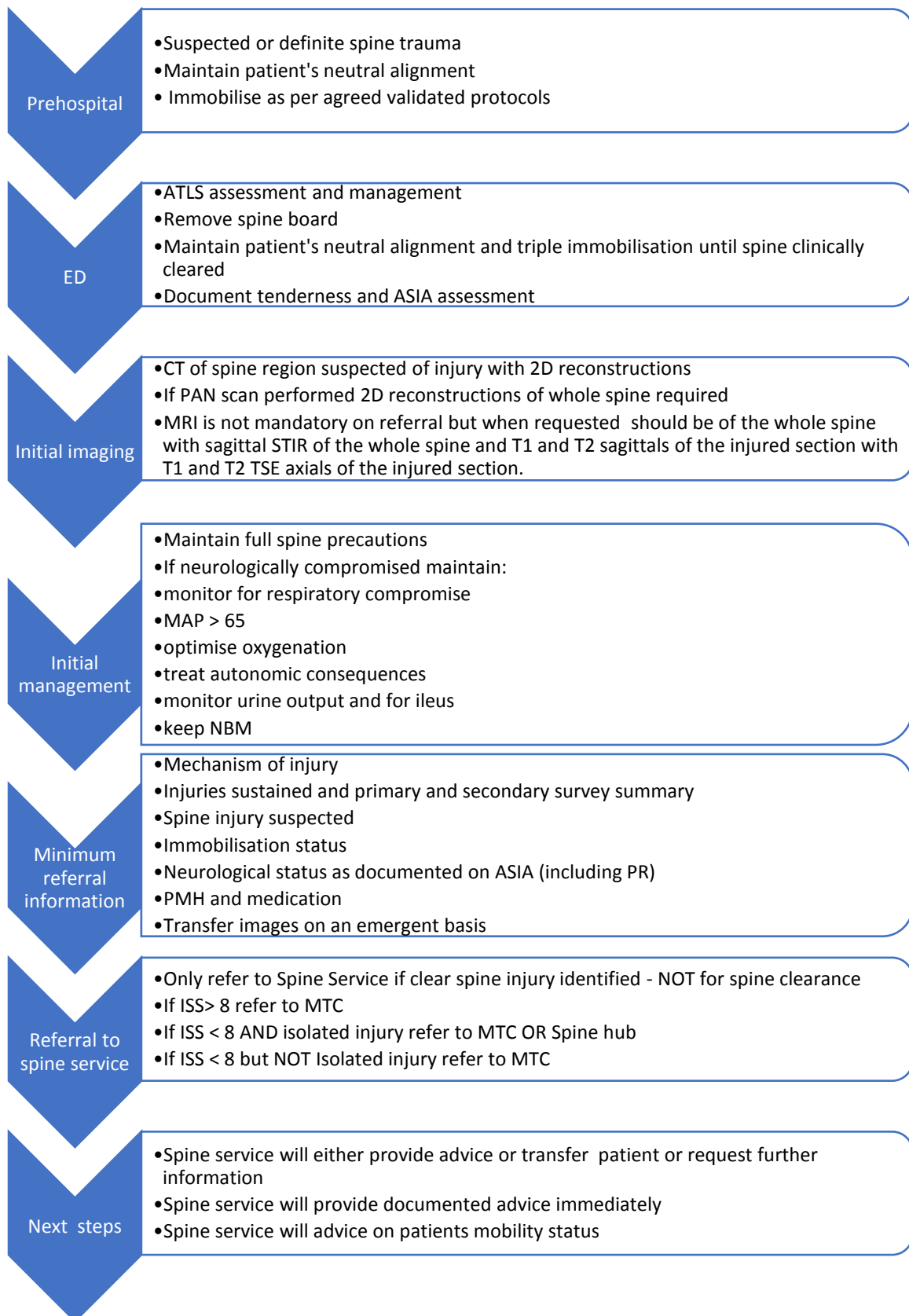
- The majority of these fractures do not need transferring to a spinal hub.
- Referral for advice is acceptable and these patients can be referred to any of your local Spine Centre hospitals outlined above (UHNM/UHB/UHCW/ROH/RJAH/RHH/WMH/RWH).
- Primary care should refer suspected cases to ED.

### **Minimal clinical information for referral**

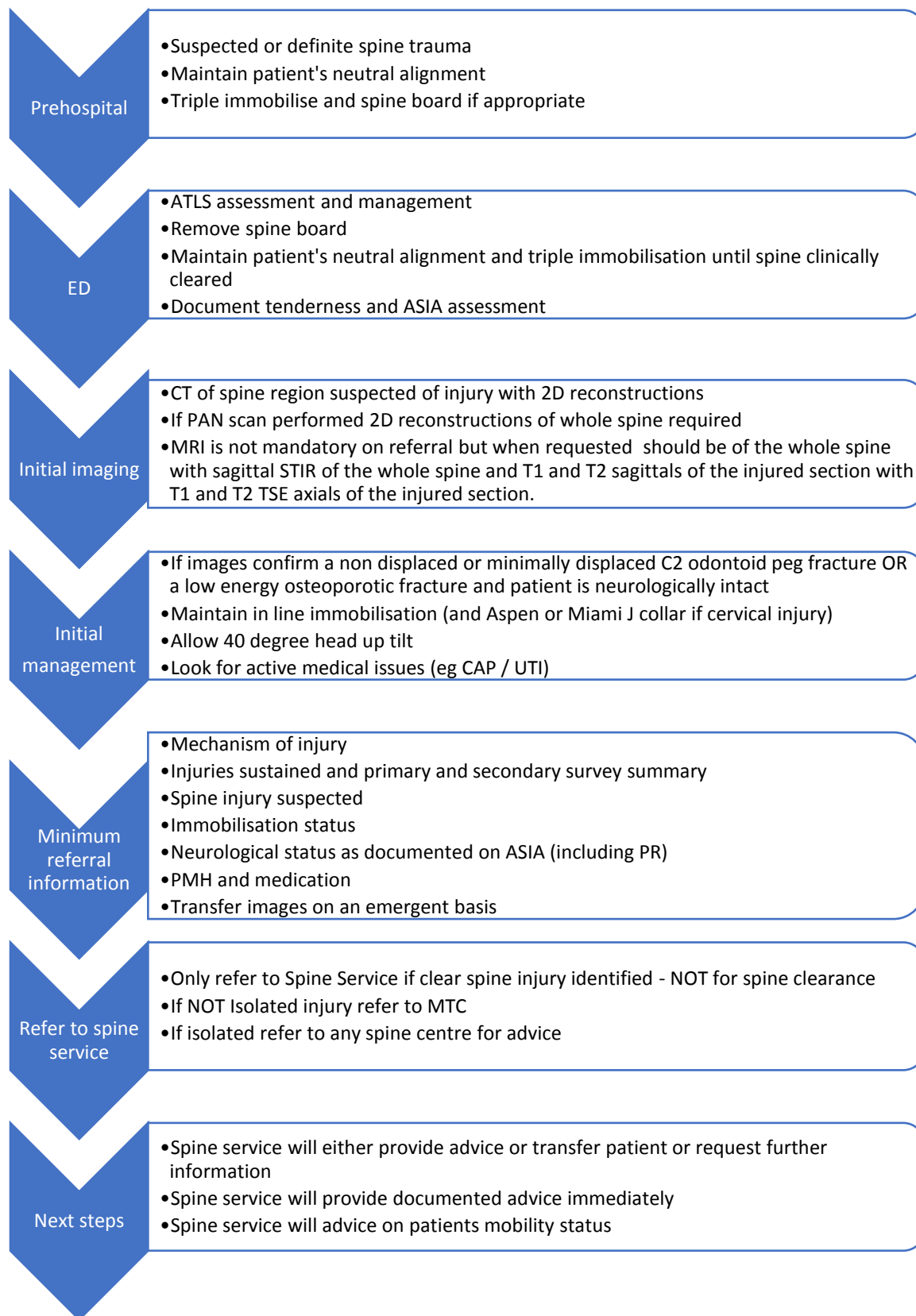
- Mechanism of injury
- Injuries sustained and primary and secondary survey summary
- Nature of spine injury suspected
- Immobilisation status
- Neurological status as documented on ASIA (including neurological PR)
- PMH and medication
- Transfer images on an emergent basis



## SPINE TRAUMA WORKFLOW



## ISOLATED C2 ODONTOID PEG FRACTURE / LOW ENERGY OSTEOPOROTIC FRACTURE



## **Cauda Equina Syndrome (CES) ([see workflow](#))**

This is a clinical syndrome of sphincter disturbance due to compression of the lumbosacral nerve roots which, when supported with MRI evidence of pathology compressing the appropriate nerve roots, constitutes a surgical emergency. Delaying treatment can lead to irreversible incontinence and or numbness and weakness in the legs.

Unfortunately there is no good clinical discriminator for this disorder and 60-70% of apparent CES is found not to have compressive pathology on MRI scan; meaning no surgical referral is required. Note that CES does NOT have to be end stage with painless urinary retention and or incontinence (CES-R). The presence of loss of bladder sensation, difficulty initiating micturition, urinary dribbling, saddle anaesthesia with or without bilateral leg pain is sufficient to warrant emergency MRI scan to assess for CES incomplete (so called CES-I). Appropriate MRI compression warrants emergency referral even in CES-I.

If a patient presents with acute onset or progressive CES symptoms (72 hours or less) scans should be requested emergently (and ideally within 2 hours of presentation). If a patient presents with recent onset non-progressive symptoms (more than 72 hours and less than 2 weeks), next day urgent scanning is reasonable. If symptoms are chronic and non-progressive (months) then an emergent scan is not required and within 48 - 72 hours is reasonable.

### **Initial assessment**

The patient should have a full clinical assessment. Specifically neurology should be assessed including a rectal examination assessing pin prick sensibility perianally, resting and voluntary anal contraction and a post micturition bladder scan (if not available a post micturition catheter should be inserted and the immediate residual measured). There is no defined acceptable value for the post micturition bladder volume. In general a residual volume less than 150 mls is taken as reassuring in the absence of other concerning features.

An emergency MRI scan is mandatory before referral to a Spine Service to ensure that a surgical referral is required. The referring hospital must perform this if the patient presents in office hours. Out of hours any initiative lists should be broken into to perform the MRI scan. Otherwise an out of hours MRI scan service should be available for this purpose. Where there is no feasibility for an MRI scan, referral to one of the hubs must happen urgently and the referring hospital must maintain a bed for repatriation if the scan is normal. An MRI scan should take place as an emergency within 2 hours of presentation.

Please note that litigation for delay in scanning at referring hospitals and for delay in operating is a real risk.

### **Mobility status**

Patients do not need immobilisation.

### **Initial imaging**

As a minimum MRI scan of the lumbar spine with sagittal T2 and T1 sequences and T1 and T2 TSE axials through areas of abnormality as an emergency.

### **Referral**

- The patient can be referred to your local spinal hub once imaging is available or for out of hours imaging as agreed (UJNM/UHB/UHCW/ROH/RJAH).
- A diagnosis of CES should be considered a surgical emergency. There are statements from SBNS and BASS supporting early surgery. Ideally surgery should take place within 24 hours of symptom onset for acute or progressive symptoms.
- Primary care should refer suspected cases to ED (refer to local pathways for variances).

**Minimal clinical information for referral (CES)**

- Onset and duration of symptoms
- Nature of CES symptoms
- Nature of radicular symptoms
- Neurological examination
- Perianal pinprick sensation
- Resting and voluntary anal contraction
- Post micturition bladder residual
- PMH and medication
- Transfer images on an emergent basis

## CES WORKFLOW



## **Metastatic Spinal Cord Compression (MSCC) ([see workflow](#))**

MSCC has been written about extensively with [NICE guidelines](#) already published and updated.

MSCC refers to impending or actual neurological deficit due to metastatic spread to vertebra and consequent cord compression.

To prevent irreversible neurological deficit, the assessment, investigation and treatment of MSCC should be performed expediently.

Due to the nature of the disease, patients will require senior radiological, oncological and spinal surgical input. Surgery (including vertebroplasty) should be considered where prognosis is more than 3-6 months and reconstruction is possible.

### **Initial assessment**

Consider MSCC particularly in any patient with a known malignancy and symptoms of:

- pain in the middle (thoracic) or upper (cervical) spine
- progressive lower (lumbar) spinal pain
- severe unremitting lower spinal pain
- spinal pain aggravated by straining (for example, at stool, or when coughing or sneezing)
- localised spinal tenderness
- nocturnal spinal pain preventing sleep
- neurological symptoms including radicular pain, any limb weakness, difficulty in walking, sensory loss or bladder or bowel dysfunction
- neurological signs of spinal cord or cauda equina compression.

The patient should be assessed for their performance status and general health. If the primary is unknown, the clinical assessment should look for the primary site. Tenderness and deformity should be noted and a neurological assessment of upper and lower limbs should be performed.

When MSCC is suspected the patient should be referred for an MRI within a maximum of 24 hours of onset of neurological symptoms or signs. If spinal pain is the only abnormality and the patient remains ambulant then MRI scan should be within a maximum of 1 week.

Patients with suspected MSCC, a poor performance status and widespread metastatic disease or those who have been completely paraplegic or tetraplegic for more than 24 hours should wherever possible be discussed with their primary tumour site clinician and spinal senior clinical adviser before any urgent imaging or hospital transfer.

Once the diagnosis is suspected or confirmed the MSCC coordinator of the spinal hub should be notified. The spine surgical service will only be notified once the MRI is complete and an oncological prognosis has been established. A senior oncologist must be involved in the decision making.

Steroids (with PPI cover) are usually prescribed on diagnosis unless contraindicated (eg high suspicion of lymphoma). The oncologist, MSCC coordinator or spine service will advise on the preferred dosage and timing on referral (usually 16mg loading dose followed by 8mg bd).

### **Mobility status**

If in the outpatient setting where the patient is clearly mobile without severe pain, there is no need to immobilise.

If the patient has severe pain that impairs mobility or any neurology they should be bed rested until advised otherwise by the spine service or oncologist.

**Initial imaging**

An MRI scan of the whole spine with sagittal STIR / T2 and T1 sequences and T1 and T2 TSE axials through areas of abnormality should be done within 24 hours of onset of neurological symptoms or spinal pain affecting ambulation. For ambulatory spinal pain only the scan should be within 1 week.

Consider a CT scan of an abnormal area to assess stability and to plan interventions including vertebral body augmentation.

CT chest / abdomen and pelvis should be done to assist staging.

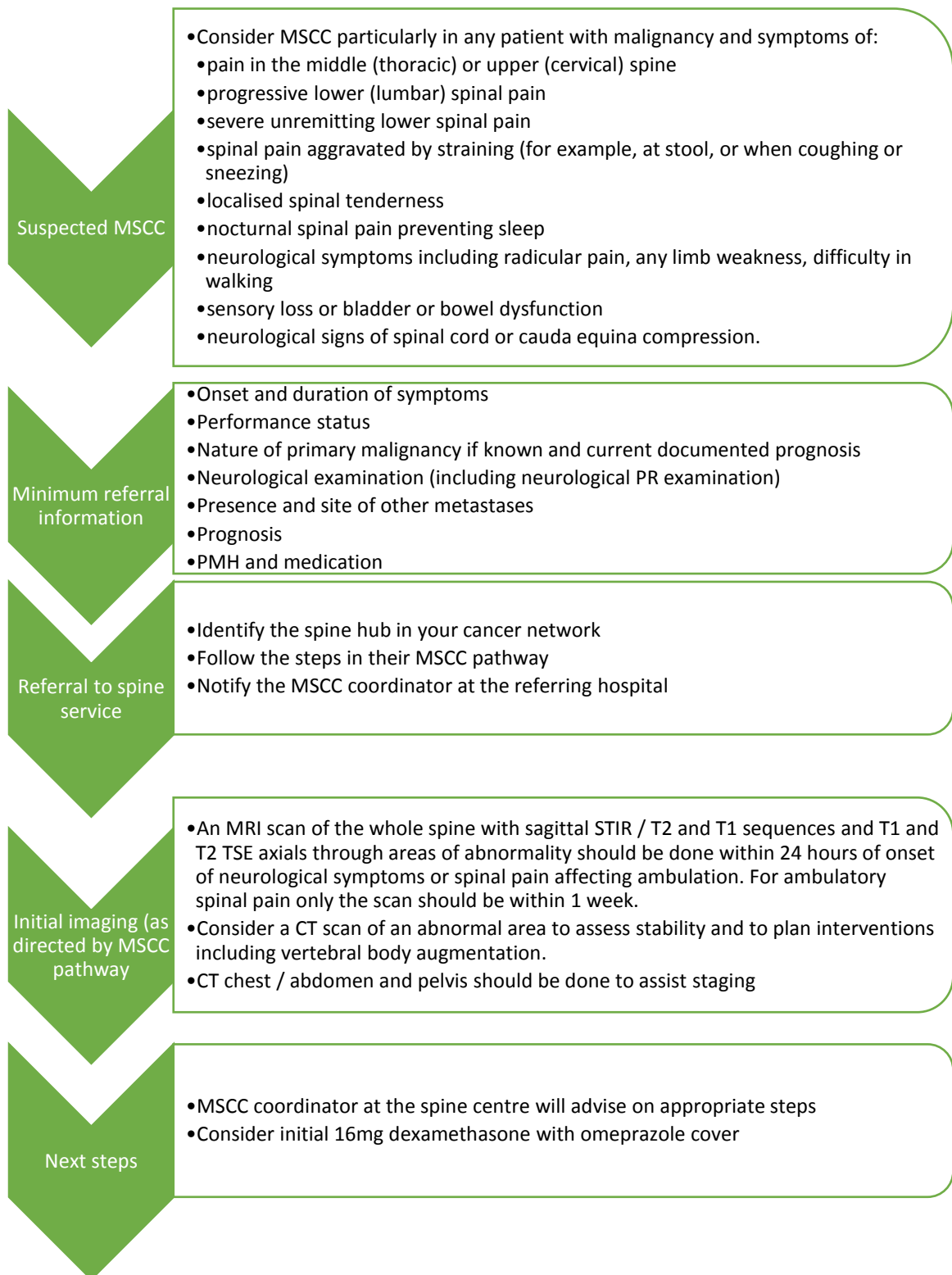
**Referral**

- The patient can be referred to your local spinal hub once imaging is available (UHNM/UHB/UHCW/ROH/RJAH).
- Use the hospital's own MSCC pathway.
- Primary care should refer according to the hospital's MSCC pathway.

**Minimal clinical information for referral**

- Onset and duration of symptoms
- Performance status
- Nature, extent and treatment to date of primary malignancy if known and current documented prognosis
- Neurological examination (including neurological PR examination)
- Presence and site of other metastases
- Prognosis
- PMH and medication
- Transfer images on an emergent basis

## MSCC WORKFLOW





## **Spondylodiscitis (Spinal infection) [\(see workflow\)](#)**

This refers to infection (not related to a surgical site infection). Spondylodiscitis usually occurs in the immuno-compromised patient (diabetic, renal failure, steroid usage, concomitant infection such as HIV/AIDS) but not inevitably. There is usually a source of sepsis (skin infection, urinary tract infection, dental infection, septicaemia). It is not unusual for the only presentation to be severe back pain with malaise and pyrexia.

Back pain with raised inflammatory markers should raise the suspicion of spondylodiscitis.

The possible clinical syndromes are:

- Sepsis
- Neurological spontaneous compromise (due to instability or epidural abscess)
- Back pain only
- Kyphosis or other deformity

### **Initial assessment**

A general assessment is required for a source of sepsis and to recognise a critically ill patient.

- If the patient is septic, the patient should be resuscitated appropriately and blood cultures taken. Empirical antibiotics should be commenced with advice from local microbiological guidance and sepsis guidelines.
- If there is neurological impairment then, again, empirical antibiotics after initial blood cultures may be advised (take advice from your local spine service).
- For patients who are not septic or do not have neurological compromise, microbiological samples and sensitivities should be aimed for before starting antibiotics.

FBC, ESR, renal function (AKI is common), LFTS (check for low albumin), MSU and blood cultures should be taken.

There should be plans made for an echocardiogram (looking for vegetations) and HIV testing.

### **Mobility status**

If the patient has severe pain that impairs mobility or neurology then the patient should be bed rested until further advice is received from the spine service.

Where the infection is in the cervical spine a collar such as Miami J or Aspen Collar should be applied.

### **Initial imaging**

Although plain radiographs may show abnormalities they are not always diagnostic.

MRI scans should be done before referral to confirm diagnosis. A whole spine sagittal STIR and T1/T2 sagittals of the region involved with T1 and T2 TSE axials of involved areas. Contrast studies may be helpful to establish the diagnosis.

CT scan may be helpful to confirm the diagnosis and assess the degree of bony destruction.

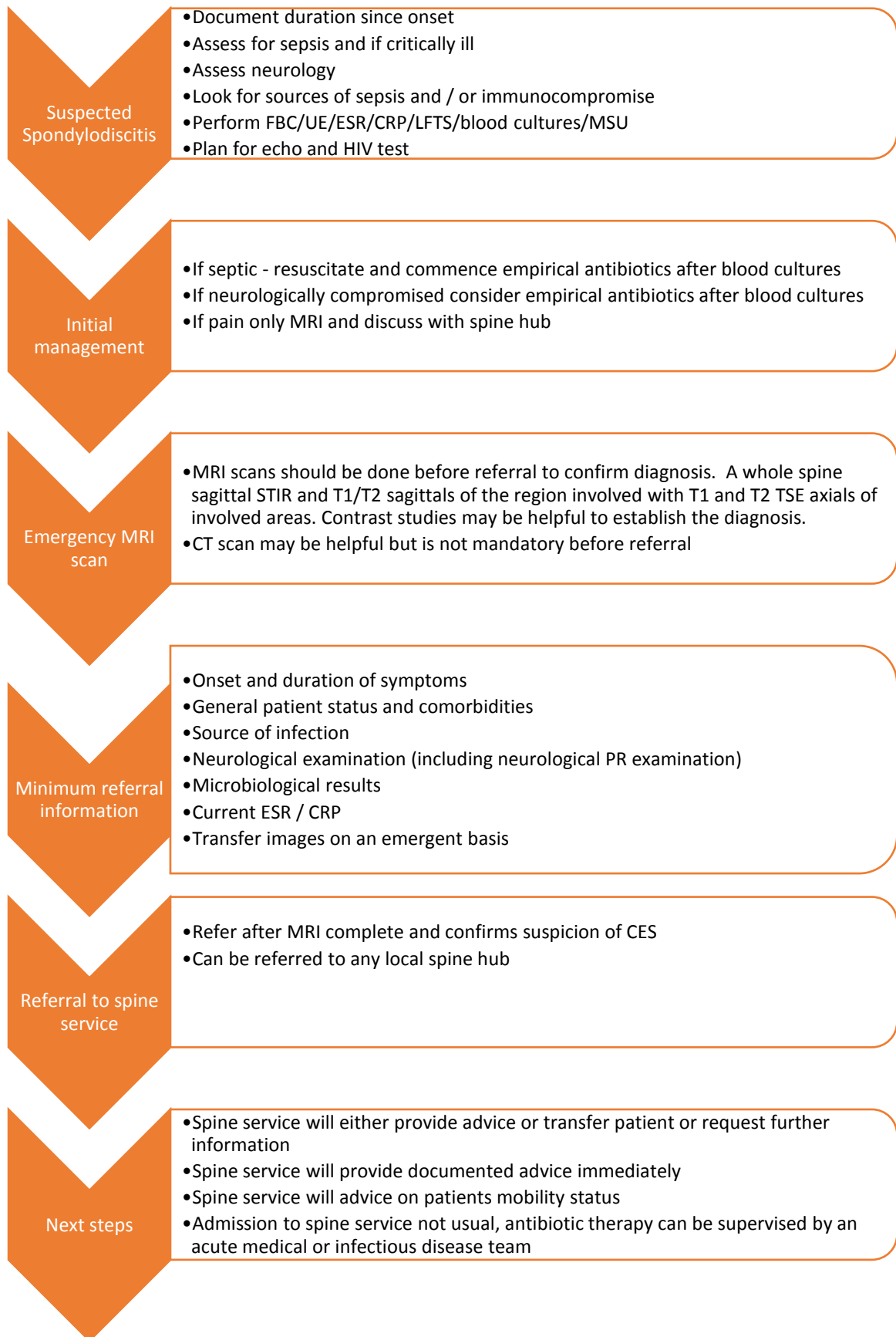
**Referral**

- The patient can be referred to your local spinal hub once imaging is available (UHNM/UHB/UHCW/ROH/RJAH).
- Not all patients require transfer to a surgical service. Advice for initial management and follow up studies may be advised. The majority of cases require antibiotic therapy only without surgical input under the guidance of an acute medical or infectious disease team.
- Primary care will need to refer to the spine service if MRI positive finding of infection with neurology. Suspicion of infection would require referral according to presenting symptoms (eg systemically unwell due to infection to acute medical team first).

**Minimal clinical information for referral**

- Onset and duration of symptoms
- General patient status and comorbidities
- Source of infection
- Neurological examination (including neurological PR examination)
- Microbiological results
- Current ESR / CRP
- Transfer images on an emergent basis

## SPONDYLODISCITIS WORKFLOW



## Referrer obligations

The referring unit must ensure that:

1. The patient is reviewed and referred by registrar grade or above and discussed with the supervising consultant.
2. The patient has been appropriately assessed and resuscitated from a general point of view.
3. The patient is appropriately immobilised.
4. That the patient has been assessed for fitness for transfer and for potential surgery.
5. All appropriate initial imaging has been completed.
6. All imaging has been digitally transferred to the appropriate emergency portal as directed by the spine service.
7. The referral is in a written format ideally in a digital format as used by the spine service. Any referrals requiring immediate attention are flagged as such and followed up by a phone call.
8. The initial management plans outlined by the spine service are carried out.
9. Any agreed transfer takes place rapidly and after ensuring the patient is fit for transfer.
10. They agree to repatriate the patient when acute spinal intervention is complete. Repatriation should occur within 24 hours of request and failure to repatriate should be escalated through to senior management.

## Receiving spine service obligations

The spine service receiving the referral must ensure that:

1. They provide a clear and constantly available contact point for referrers.
2. Any referral received must have been reviewed by registrar grade or above and discussed with the supervising consultant.
3. Any digital or verbal referral is reviewed and a response given in less than 2 hours from receipt of referral. Any referral requiring immediate attention is actioned within ½ hour of receipt of all information.
4. There is a clear written protocol for urgent image transfer available to the referring service that allows the receiving clinical team to access images on an emergent basis to facilitate expedient provision of advice.
5. Clear advice is given outlining recommended action plan including plans for medication, mobility status, orthotics, further imaging and transfer plans. The advice should be written and ideally in a digital format that the referring hospitals can access.
6. Any agreed transfer takes place expediently and on the same day. The referring hospital must be updated if transfer does not happen the same day. Failure to transfer should be escalated through senior management.
7. Any patient ready for transfer must be assessed and documented as fit for transfer.
8. On repatriation or discharge, a written discharge summary must be provided to the referring service with a clear outline of management undertaken, orthotic advice (if appropriate), wound management (if appropriate) and a rehabilitation prescription. Clear follow up instructions should be given.
9. All postoperative imaging is provided to the referring centre.
10. There is continued access for advice as required.

## FINALLY

This document outlines the expected initial management and referral pathway for common spine conditions. It is not exhaustive and all the spine services in the WMRSN are happy to accept calls for advice for conditions not described in this document.

The document is a guideline and reflects the collective view of the spine services and partner hospitals in the WMRSN at the time of writing.

# ASIA CHART

Patient Name \_\_\_\_\_

Examiner Name \_\_\_\_\_ Date/Time of Exam \_\_\_\_\_



## STANDARD NEUROLOGICAL CLASSIFICATION OF SPINAL CORD INJURY



### MOTOR

**KEY MUSCLES**  
*(scoring on reverse side)*

	R	L	
C5	<input type="checkbox"/>	<input type="checkbox"/>	Elbow flexors
C6	<input type="checkbox"/>	<input type="checkbox"/>	Wrist extensors
C7	<input type="checkbox"/>	<input type="checkbox"/>	Elbow extensors
C8	<input type="checkbox"/>	<input type="checkbox"/>	Finger flexors (distal phalanx of middle finger)
T1	<input type="checkbox"/>	<input type="checkbox"/>	Finger abductors (little finger)

UPPER LIMB TOTAL (MAXIMUM)  +  =   
(25) (25) (50)

### SENSORY

**KEY SENSORY POINTS**

0 = absent  
1 = impaired  
2 = normal  
NT = not testable

Any anal sensation (N/A)

PIN PRICK SCORE (max 716)

LIGHT TOUCH SCORE (max 712)

	R	L	
C2	<input type="checkbox"/>	<input type="checkbox"/>	
C3	<input type="checkbox"/>	<input type="checkbox"/>	
C4	<input type="checkbox"/>	<input type="checkbox"/>	
C5	<input type="checkbox"/>	<input type="checkbox"/>	
C6	<input type="checkbox"/>	<input type="checkbox"/>	
C7	<input type="checkbox"/>	<input type="checkbox"/>	
C8	<input type="checkbox"/>	<input type="checkbox"/>	
T1	<input type="checkbox"/>	<input type="checkbox"/>	
T2	<input type="checkbox"/>	<input type="checkbox"/>	
T3	<input type="checkbox"/>	<input type="checkbox"/>	
T4	<input type="checkbox"/>	<input type="checkbox"/>	
T5	<input type="checkbox"/>	<input type="checkbox"/>	
T6	<input type="checkbox"/>	<input type="checkbox"/>	
T7	<input type="checkbox"/>	<input type="checkbox"/>	
T8	<input type="checkbox"/>	<input type="checkbox"/>	
T9	<input type="checkbox"/>	<input type="checkbox"/>	
T10	<input type="checkbox"/>	<input type="checkbox"/>	
T11	<input type="checkbox"/>	<input type="checkbox"/>	
T12	<input type="checkbox"/>	<input type="checkbox"/>	
L1	<input type="checkbox"/>	<input type="checkbox"/>	
L2	<input type="checkbox"/>	<input type="checkbox"/>	
L3	<input type="checkbox"/>	<input type="checkbox"/>	
L4	<input type="checkbox"/>	<input type="checkbox"/>	
L5	<input type="checkbox"/>	<input type="checkbox"/>	
S1	<input type="checkbox"/>	<input type="checkbox"/>	
S2	<input type="checkbox"/>	<input type="checkbox"/>	
S3	<input type="checkbox"/>	<input type="checkbox"/>	
S4-5	<input type="checkbox"/>	<input type="checkbox"/>	

LOWER LIMB TOTAL (MAXIMUM)  +  =   
(35) (35) (70)

TOTALS (MAXIMUM)  +  =   
(50) (50) (100)

Comments: \_\_\_\_\_

NEUROLOGICAL LEVEL:  R  L

COMPLETE OR INCOMPLETE?

Zone of Partial Preservation:

ASIA IMPAIRMENT SCALE:

This form may be copied freely but should not be altered without permission from the American Spinal Injury Association.

REV 02/00

## Recommended MRI protocols\*

<b>Degenerative disease (eg lumbar stenosis)</b>	Region affected only T1 and T2 sagittal sequences T2 TSE axial sequences of abnormal levels (additional T2 gradient echo axial sequence for cord assessment may be added)
<b>Trauma</b>	Whole spine sagittal STIR with sagittal T1 and T2 Axial T1 and T2 TSE of affected levels (additional T2 gradient echo axial sequence for cord assessment may be added)
<b>Cauda equina syndrome</b>	Lumbar spine sagittal T1 and T2 Axial T1 and T2 TSE of affected levels (whole spine sagittal T2 to assess cord may be added)
<b>MSSC</b>	Whole spine sagittal STIR and T1 Sagittal T2, axial T1 and T2 TSE of affected levels (additional T2 gradient echo axial sequence for cord assessment may be added)
<b>Spondylodiscitis</b>	Whole spine sagittal STIR T1 and T2 sagittals of the region involved with T1 and T2 TSE axials of involved areas (additional T2 gradient echo axial sequence for cord assessment may be added)

\*It is accepted that individual institutions may have additional sequences for specific disorders. The listed sequences are the minimal recommended to establish a diagnosis, aid surgical planning and where appropriate to exclude lesions in the rest of the spine.

## Emergency image transfer protocols

<b>University Hospital of North Midlands</b>	Please ensure that you have sent any images via the Image Exchange Portal (IEP) to UHNM – Royal Stoke. For all urgent / trauma or out of hours referrals images please select “Tertiary PACS” and “blue light” priority to ensure clinician see the images immediately.
<b>University Hospital Birmingham</b>	Contact on call team
<b>University Hospital of Coventry and Warwickshire</b>	Contact on call team
<b>Royal Orthopaedic Hospital</b>	Contact on call team
<b>Robert Jones Agnes Hunt Hospital</b>	Please ensure that you have sent any images via the Image Exchange Portal (IEP) to RJAH. In office hours a phone call is required to the PACS team in RJAH in order to allocate the images to the correct patients. Out of hour they can be sent as blue light transfers.
<b>Russells Hall Hospitals</b>	Contact hospital directly
<b>Walsall Manor Hospital</b>	Contact hospital directly
<b>Royal Wolverhampton Hospital</b>	Contact hospital directly
<b>Birmingham Children’s Hospital</b>	Contact hospital directly

## Contributors

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