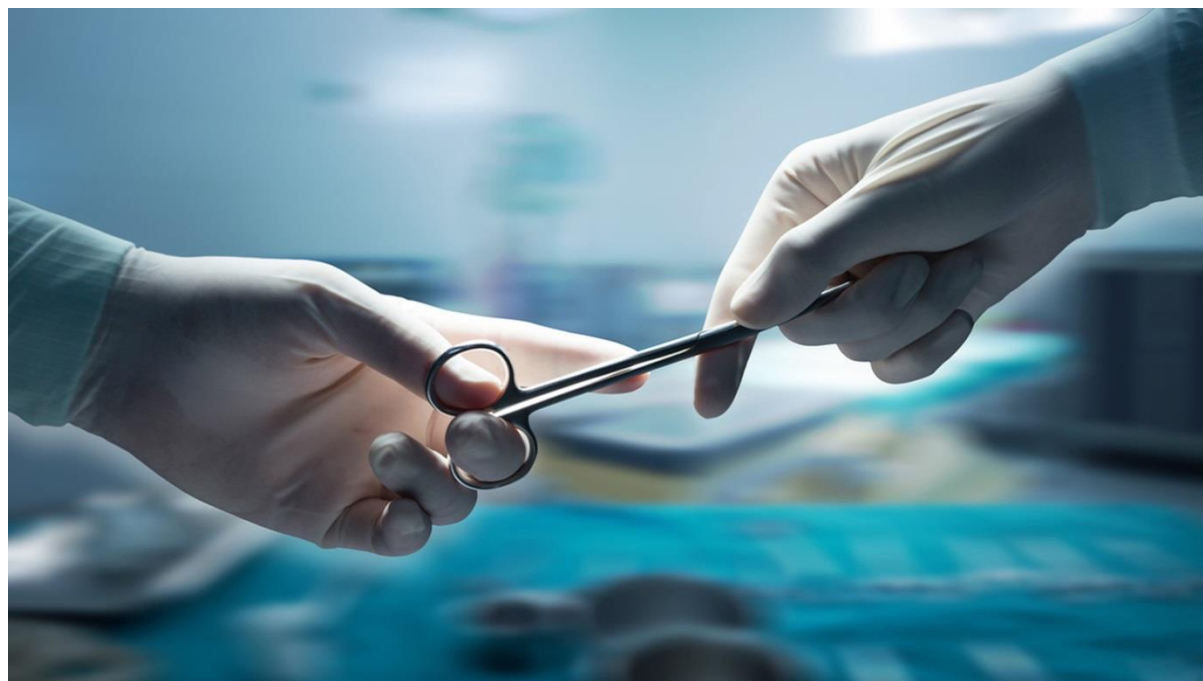


West Midlands Regional Spine Network



Cauda equina syndrome guidelines

January 2020

Category	Operational Delivery Network policy document West Midlands Regional Spine Network (WMRSN)
Purpose	To provide a guideline for recognition, referral and initial management of cauda equina syndrome
Version	1.0
Previous versions	Nil
Supporting documents	NICE CKS Sciatica (lumbar radiculopathy) GIRFT Programme National Spinal Services Report (2019) WMRSN MRI policy WMRSN Emergency disorders policy SBNS and BASS position statements on CES
Responsible working group	WMRSN Board
Sign off	WMRSN board
Related networks	N/A
Distribution	All WMRSN hospital COO and Medical director Clinical leads ED / spine surgery / radiology / MSK & Spine triage or interface services Chair STPs / CCG Betsi Cadwaladr health board
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INTRODUCTION

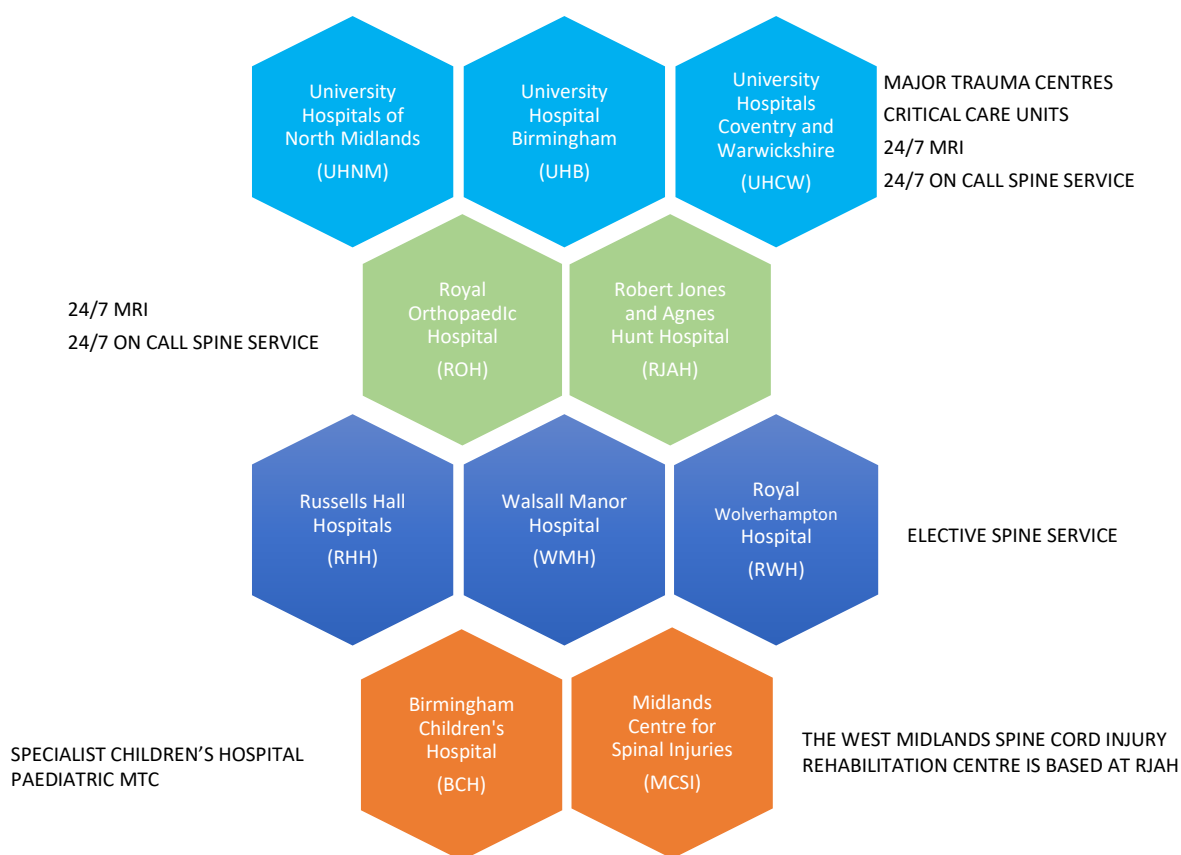
The West Midlands Regional Spine Network (WM RSN) includes 3 major trauma centres (MTC), 2 specialist orthopaedic hospitals, 3 neuroscience centres and 3 spine partner hospitals. There is also a specialist children's hospital, a regional specialist spinal cord injury rehabilitation centre and neurorehabilitation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

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									✓

TYPES OF EMERGENCY DISORDERS ACCEPTED FOR MANAGEMENT BY HOSPITAL

*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 is to guide assessment, initial management and referral of patients with cauda equina syndrome (CES) across the network.
- CES due to compression of nerve roots constitutes a surgical emergency.
- Red flags include
 - Severe or progressive bilateral neurological deficit
 - Difficulty initiating micturition or impaired sensation of urinary flow
 - Loss of sensation of rectal fullness
 - Perianal, perineal or genital sensory loss
 - Laxity of the anal sphincter
 - Urinary or faecal incontinence
 - Bilateral sciatica (see main text if this is the ONLY symptom)
- Patients referred only after established incontinence and saddle anaesthesia may be referred too late.
- There is no clinical discriminator and only an MRI scan can establish a surgical diagnosis.
- Patients should only be referred for spine surgery after the diagnosis of a surgical pathology is established with imaging in the form of an MRI (unless contraindicated).
- MRI scans should take place within 2 hours of presentation of red flag symptoms.
- 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.
- When surgery is warranted, it should be performed safely but emergently. This is a time sensitive condition and surgery should not be delayed.

What is the guideline trying to achieve?

The guideline aims to improve 3 important aspects relating to cauda equina syndrome:

1. Ensuring recognition of potential cauda equina syndrome in a patient
2. Ensuring timely investigations are carried out for suspected cauda equina syndrome
3. Ensuring patients are referred for emergency surgery when a surgical cauda equina syndrome is demonstrated on appropriate timely imaging

The clinical outcome of an untreated cauda equina syndrome is that of double incontinence with sexual dysfunction and loss of function in the legs. As this is a time-sensitive condition that is potentially reversible, the emphasis is on early and rapid recognition, investigation and definitive treatment once diagnosed.

The litigation costs for delay in diagnosis or treating cauda equina syndrome are significant for the NHS.

Clarifying the terms used.

CES or cauda equina syndrome refers to an evolving or established sphincter disturbance with or without numbness or weakness in the legs which is secondary to compression of the lumbar and sacral nerve roots with a potential surgical solution.

CES-I means cauda equina syndrome incomplete. This refers to a clinical syndrome of loss of perianal sensation and bladder or rectal sensation but without urinary retention and overflow incontinence. It is looked upon as evolving cauda equina that could be reversible.

CES-R means cauda equina syndrome with retention. This refers to a full blown clinical syndrome of saddle anaesthesia, a painless atonic bladder and overflow incontinence.

Lumbar spine and low back are synonymous terms in this document.

Sciatica pain refers to radicular (or nerve root related) pain secondary to nerve root compression in the lumbar spine at any level causing buttock, groin or leg pain concordant with concordant compression identified on an MRI scan (or equivalent imaging).

Neurogenic claudication refers to the clumsiness and or pain in the legs on activity due to nerve root compression secondary to lumbar spinal stenosis.

GP refers to a general practitioner or equivalent in a primary care setting.

Triage service refers to a primary/secondary care interface triage service. It often takes the form of a musculoskeletal integrated service.

ED refers to an Emergency Department in an acute hospital.

Secondary care refers to spine surgical services, pain clinic services and rheumatology services (even if based in primary care).

What is Cauda Equina Syndrome (CES)?

Cauda equina syndrome is a clinical syndrome of evolving sphincter disturbance due to compression of the lumbosacral nerve roots which constitutes a surgical emergency, when supported with imaging evidence of pathology compressing the appropriate nerve roots.

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 70-80% of apparent CES is found not to have compressive pathology on MRI scan; meaning no surgical input is required.

IMPORTANT FACT

CES does NOT have to be end stage with painless urinary retention and or incontinence (termed CES-R) before referral. In fact, it could be argued that this is too late as it is probably irreversible.

The presence of loss of bladder sensation, difficulty initiating micturition, urinary dribbling, saddle anaesthesia with or without bilateral leg pain even without incontinence is sufficient to warrant emergency MRI scan to assess for CES incomplete (termed CES-I). Appropriate MRI compression warrants emergency referral and surgery even in CES-I. It is widely felt that CES-I is reversible and early intervention could prevent progression to full blown CES-R with established incontinence.

What are the symptoms of CES?

Patients may present with symptoms of CES or simply with degenerative lumbar symptoms of low back pain and or sciatica.

In either scenario, the red flag symptoms should be enquired about and presence or absence documented.

[NICE](#) has updated the red flags for cauda equina syndrome as:

- Severe or progressive bilateral neurological deficit
- Difficulty initiating micturition or impaired sensation of urinary flow
- Loss of sensation of rectal fullness
- Perianal, perineal or genital sensory loss
- Laxity of the anal sphincter
- Urinary or faecal incontinence
- Bilateral sciatica (see main text if this is the ONLY symptom)

Remember, established incontinence and saddle anaesthesia are not the only symptoms to look out for. For example someone with low back pain and sciatica with loss of the normal sensation to need to pass water could be a cauda equina syndrome in evolution or incomplete (CES-I).

Any one symptom in isolation or in combination is not diagnostic of CES.

Some symptoms probable carry a higher weighting for suspicion than others.

Bilateral sciatica, for example, on its own can be entirely benign. Bilateral sciatica in addition to any of the other features is higher risk for being CES.

When bilateral sciatica is the **predominant symptom** then take the following *DISC* acronym into account:

1. **Duration** – if the symptoms have been present for months to years then it is unlikely to indicate CES and emergent referral is not warranted. Safety net the patient and follow the radicular pain pathway (see WMRSN NLBP statement).
2. **Isolated** – if the bilateral sciatica is an isolated symptom with no other features of CES (as listed above) then it is unlikely to indicate CES and emergent referral is not warranted. Safety net the patient and follow the radicular pain pathway (see WMRSN NLBP statement). If it is not isolated and any other feature is present, then refer into the emergency pathway.
3. **Severity** - if the symptoms are sudden and equally severe on both sides, limiting function then the chance of CES is higher and urgent MRI scan should be considered with appropriate safety netting.
4. **Continuation of care** – despite appropriate safety netting, these patients should not be lost in the system. They should be flagged as patients that potentially have a serious condition. Once an MRI has been requested it should be reviewed by the referrer on an urgent basis. If a large disc prolapse is identified compressing the cauda equina roots, then the patient should be contacted. If the patient still has no other CES symptoms then refer urgently. If CES symptoms have developed then refer emergently.

How urgent is urgent?

If you have identified features of a CES-I or CES-R then this may constitute a surgical emergency and requires consideration of referral for an emergency MRI or urgent MRI.

The following guidance may help you.

Symptom duration guiding urgency

< 72 hours – emergency referral

If a patient presents with acute onset or progressive CES symptoms (72 hours or less) scans should be completed emergently (**and ideally within 2 hours of presentation**).

72 hours – 2 weeks – urgent assessment / scan within 24 hours

If a patient presents with recent onset non-progressive symptoms (more than 72 hours and less than 2 weeks) urgent scanning is reasonable to be completed no later than next day.

>2 weeks – urgent within 48 hours scan / assessment

If symptoms are chronic and non-progressive then an emergent scan is not required and within 48 hours is reasonable.

If you have concerns – ring your spine surgical service for advice.

Safety Netting

Any patient that is referred for non-emergent scanning or a radicular pain pathway with bilateral sciatica should be safety netted against the progression of symptoms with clear written instructions.

The Musculoskeletal Association of Chartered Physiotherapists has designed a CES warning credit card that can be used for this purpose. A downloadable copy is available [here](#).

What does a GP or triage practitioner do next?

Once you have identified that a patient may have CES-I or CES-R then you should complete a neurological examination and document it as a baseline.

If you have access to a bladder scanner then a post micturition bladder scan can be helpful. A residual volume of more than 200 mls in addition to CES symptoms warrants emergency referral.

As a GP or triage practitioner, there is no merit in carrying out a rectal examination if there are clear features of CES as listed above that will result in a referral. The patient will have a rectal examination in secondary care. If you do not feel the patient needs to be referred than documenting a full neurological rectal examination that is normal may protect you from medicolegal consequences.

Assess the urgency of your patient and refer as appropriate.

An emergency category patient should be referred to the emergency referral pathway agreed in your area.

Urgent category patients (bilateral sciatica only or long duration) may be able to have urgent scans within the time frame stated if requested by GP or triage practitioner.

Remember to follow this through – do not assume scans will be done and ensure MRI scans will be reported urgently to help you decide if your patient needs emergent or urgent referral.

Any patients requiring emergency referral should be kept nil by mouth.

What about scans that report CES compression unexpectedly?

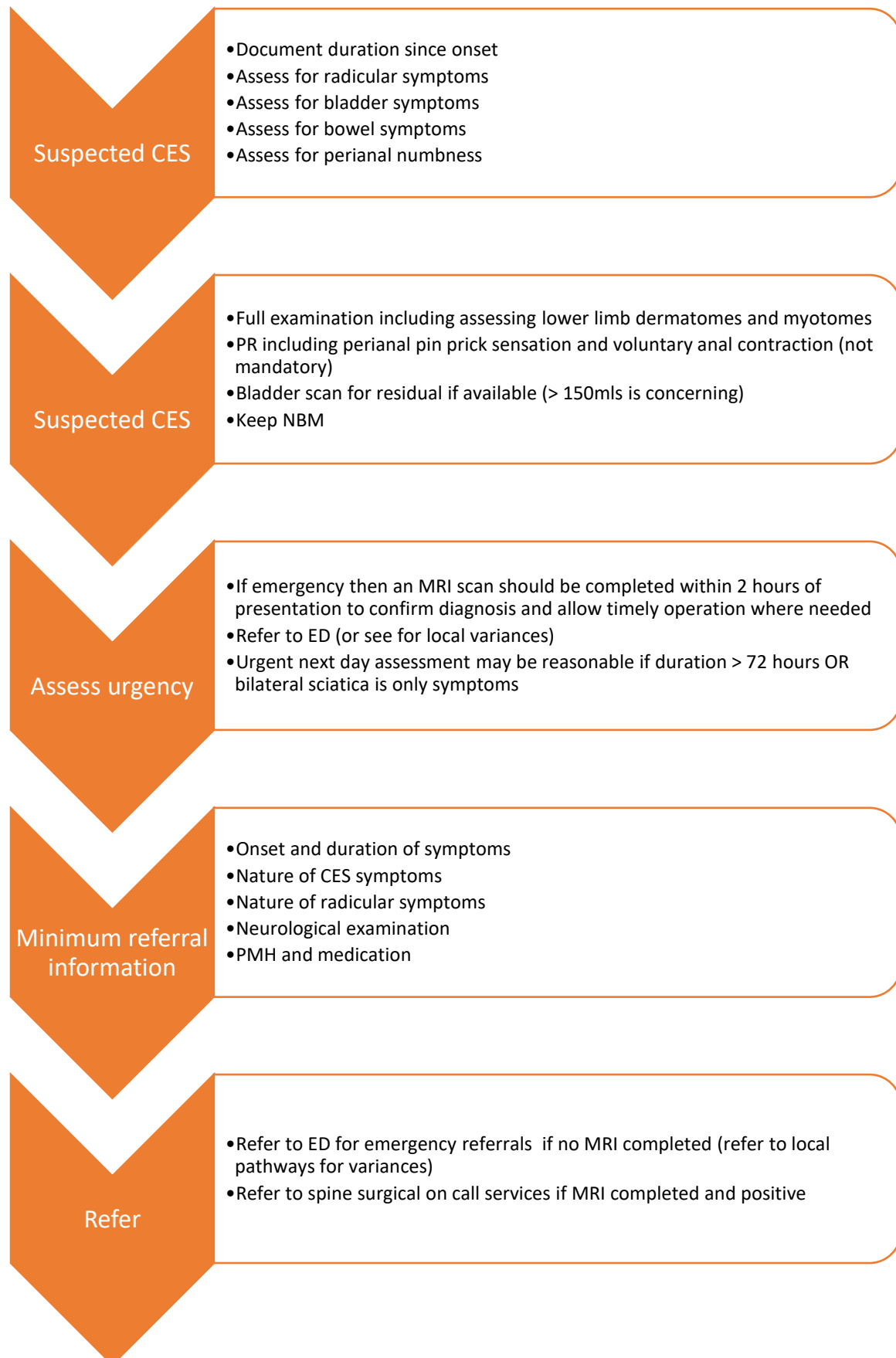
For patients without CES symptoms that have an MRI scan report returned as demonstrating a large disc compressing the cauda equina, the patients should be contacted by the initial referrer and screened for CES symptoms.

If CES symptoms are present, the patient should be asked to remain NBM and referred to the emergency spine surgical service.

If no CES symptoms are present, the patient should be safety netted and referred as an urgent patient to the spine surgical service.

If in doubt, call the on call spine surgical service for advice.

GP / Triage service workflow



What does an ED department or other hospital service do?

If the patient has presented to ED or another secondary care department and CES-I or CES-R is suspected then a full assessment including a neurological examination should be completed and documented as a baseline. This should include a rectal examination and a post micturition bladder scan. The patient should be kept nil by mouth.

Initial neurological examination for a possible CES

Lower limbs:

Straight leg raise restriction / tone / power / pinprick sensation / reflexes

Rectal examination:

Pin prick sensibility perianally

Resting tone and voluntary anal contraction

Post micturition bladder scan:

There is no defined acceptable value for the post micturition bladder volume. In general a residual volume less than 150 ml is taken as reassuring in the absence of other concerning features.

As mentioned previously, a history and examination is not sufficient to exclude a CES. Only an MRI scan can confirm or refute a surgical CES.

This is a time sensitive situation and waiting to transfer a patient to another hospital for an MRI or awaiting assessment by a surgical specialty before MRI scan is only going to delay necessary emergent investigations.

As 80% of patients that present with a possible CES are negative, an emergency MRI scan is mandatory before referral to a Spine Surgical Service to ensure that a surgical referral is required.

Any referring hospital or department must request and perform the MRI scan.

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 at the referring hospital.

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 SLA must be available with the hub to achieve this and resource the hub for carrying out MRI scans for a referring hospital.

An MRI scan should take place as an emergency within 2 hours of presentation – any transfers should be via a blue light ambulance.

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 T1 and T2 sequences and T2 TSE axials through areas of abnormality as an emergency.

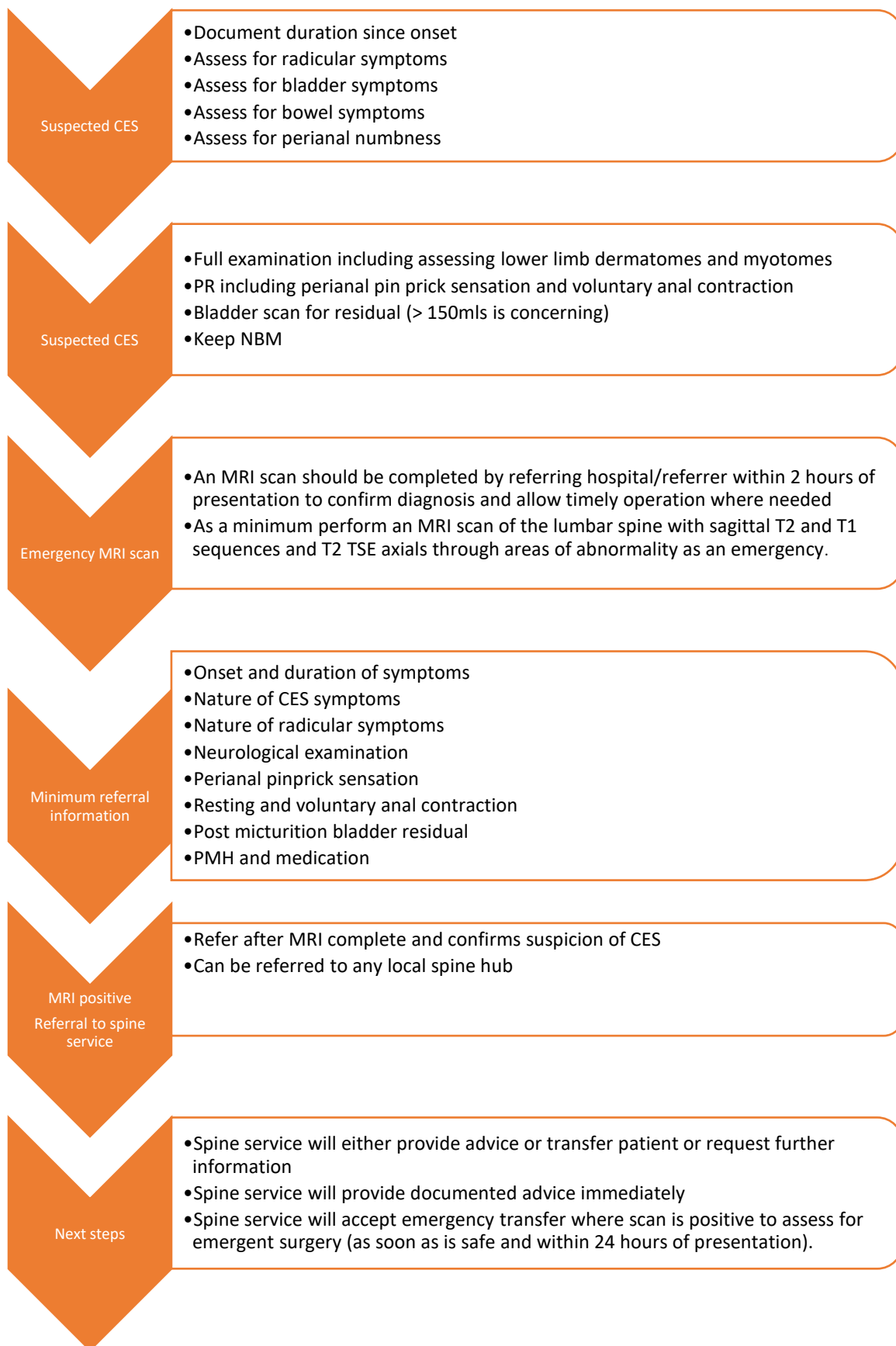
Referral

- The patient can be referred to your local spinal hub once imaging is available or for out of hours imaging as agreed (UHNH/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).
- The patient should be kept NBM

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

ED / Hospital CES workflow



What imaging is needed?

The gold standard and definitive investigation for CES is an MRI scan.

If a patient cannot have an MRI scan, they should be discussed with the Spine Hub if there is a high index of suspicion for CES-I or CES-R. MRI conditional and some non-conditional implants may be able to undergo MRI scanning at the Spine Hub. Alternatives such as CT-myelography are usually only carried out at the Spine Hub. Any investigation should be flagged as an emergency request if the assessment by the Spine Hub still raises a suspicion of CES.

The timing of MRI scan is clear when CES is of recent onset (<72 hours) and the index of suspicion is high. The MRI scan should be completed within 2 hours of presentation to allow a definitive diagnosis and transfer for surgery when appropriate.

Low suspicion cases (severe isolated bilateral sciatica) or longer duration symptoms (>72 hours) can undergo scanning within 24 hours (next or same day scan).

The MRI should be a T1 and T2 weighted sagittal sequence of the lumbosacral spine with T2 TSE axials through abnormal areas as a minimum investigation.

Imaging requirements

MRI scan lumbosacral spine T1 / T2 sagittal and T2 TSE axials through abnormal areas

High index of suspicion and < 72 hours duration aim for scan by 2 hours after presentation

Low index of suspicion or > 72 hours duration same day or next day scan (within 24 hours)

>2 weeks of duration scan within 48 hours

Spine Surgery

Any referral for a potential CES should be taken seriously and documented advice to perform an MRI scan within the appropriate timescales should be given.

For referrals after a positive MRI scan, transfer should be emergent.

The patient should be kept NBM and assessment for surgery should be undertaken.

The patient should be informed of the risks and rewards of surgery.

In the event of CES-I, emergent surgery should be planned in order to prevent progression to CES-R. The timing of surgery is not defined for CES-I, but if the facilities are available, emergent operating within 6-12 hours of **initial** presentation is being advocated. Certainly surgery should not be delayed beyond 24 hours after initial presentation if facilities for safe surgery are not immediately available.

In the event of CES-R, there is a body of opinion that recovery is unlikely and emergent surgery is not warranted. Surgery can still be offered, but the patient should be made aware that surgery may not reverse established incontinence or weakness. Radicular pain may still be improved. Surgery on the next available operating list is being advocated where surgery is consented for.

The spine surgical service must facilitate emergent transfer of MRI positive patients with symptoms of CES.

Facilities for emergent operating should be made available to reduce the risk of progression to established CES-R.

Referrer obligations

The referrer must ensure that:

1. The patient has had baseline neurology documented.
2. The patient has been kept NBM.
3. The patient has had an MRI scan before referral to spine surgery services.
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. Advice should be written and ideally in a digital format that the referring hospitals can access.
6. Any agreed transfer takes place emergently and on the same day.
7. There should be facilities to allow emergent spine surgery to reduce the risk of established CES-R
8. There is continued access for advice as required.

FINALLY

This document provides guidance for recognition, assessment and initial management of cauda equina syndrome. It is not exhaustive and all the spine services in the WMRSN are happy to accept calls for advice.

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.

RESOURCES

[NICE Clinical Knowledge Summary Sciatica](#)

[MACP CES safety netting credit card](#)

Recommended MRI protocols*

Degenerative disease (eg lumbar stenosis)	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)
Trauma	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)
Cauda equina syndrome	Lumbar spine sagittal T1 and T2 Axial T2 TSE of affected levels (whole spine sagittal T2 to assess cord may be added)
MSCC	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)
Spondylodiscitis	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

University Hospital of North Midlands	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.
University Hospital Birmingham	Contact on call team
University Hospital of Coventry and Warwickshire	Contact on call team
Royal Orthopaedic Hospital	Contact on call team
Robert Jones & Agnes Hunt Hospital	Please ensure that you have sent any images via the Image Exchange Portal (IEP) to RJA. In office hours a phone call is required to the PACS team in RJA in order to allocate the images to the correct patients. Out of hour they can be sent as blue light transfers.
Russells Hall Hospitals	Contact hospital directly
Walsall Manor Hospital	Contact hospital directly
Royal Wolverhampton Hospital	Contact hospital directly
Birmingham Children’s Hospital	Contact hospital directly

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