

SPINAL PATHWAY

Community and Primary Care Suspected Cauda Equina Syndrome Pathway

Protocol

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This Version	V1	Status	<i>Draft/final</i>
Replaces	-		
Approval Date		Where	
Ratification Date		Where	
Date of issue		Review date	
Applies to	All NHS employed clinicians involved in identifying Cauda Equina Syndrome in Somerset's Community and Primary Care settings.	Exclusions	-

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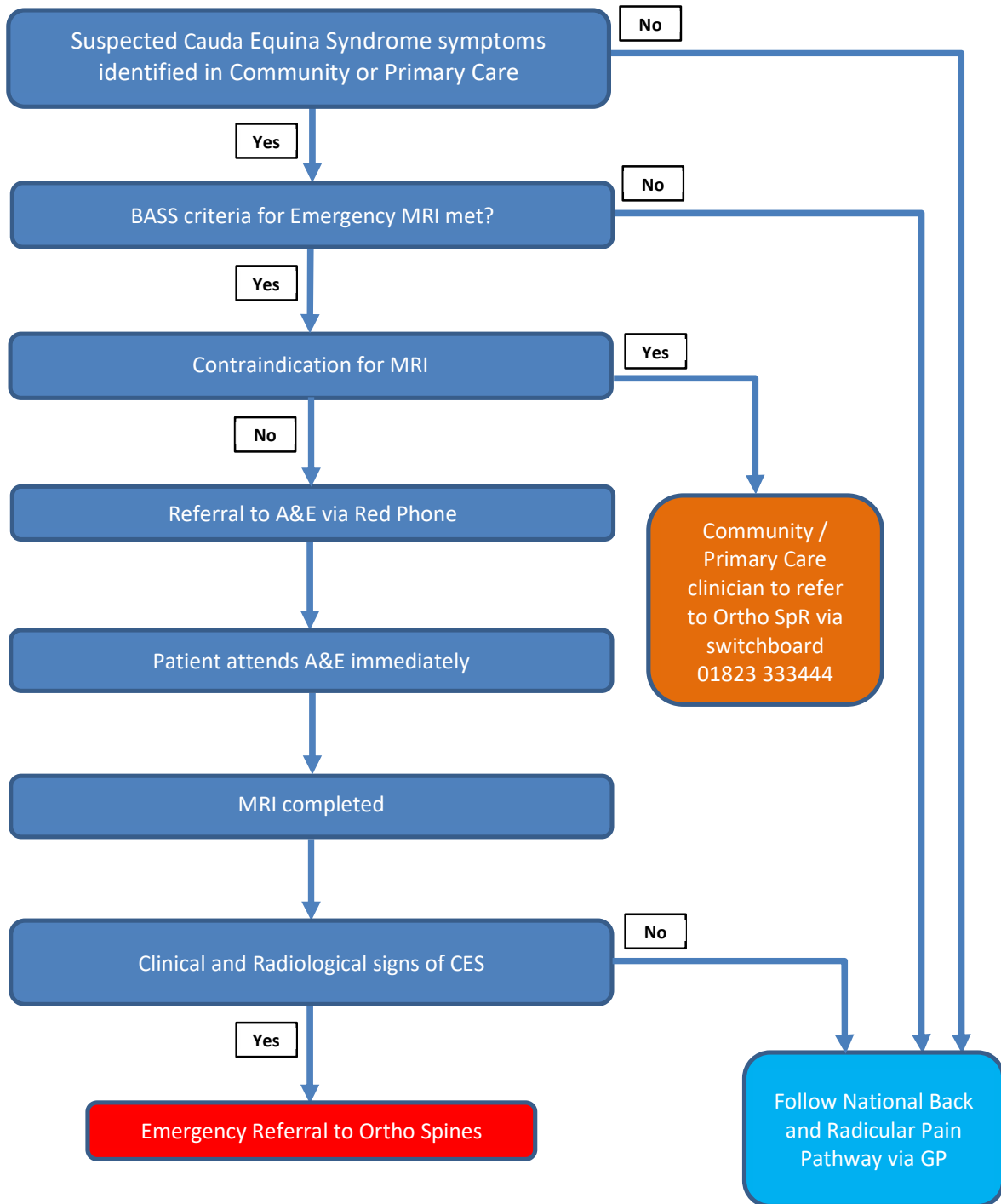
1.0 PATHWAY OVERVIEW

This pathway is for referral of patient who present to a medical professional in the locality of Musgrove Park Hospital. If the patient is seen closer to Yeovil District, Weston General, or Royal United Hospitals they should be referred to that hospital, following that hospital's own Cauda Equina Syndrome Pathway.

For detailed flow charts please see:

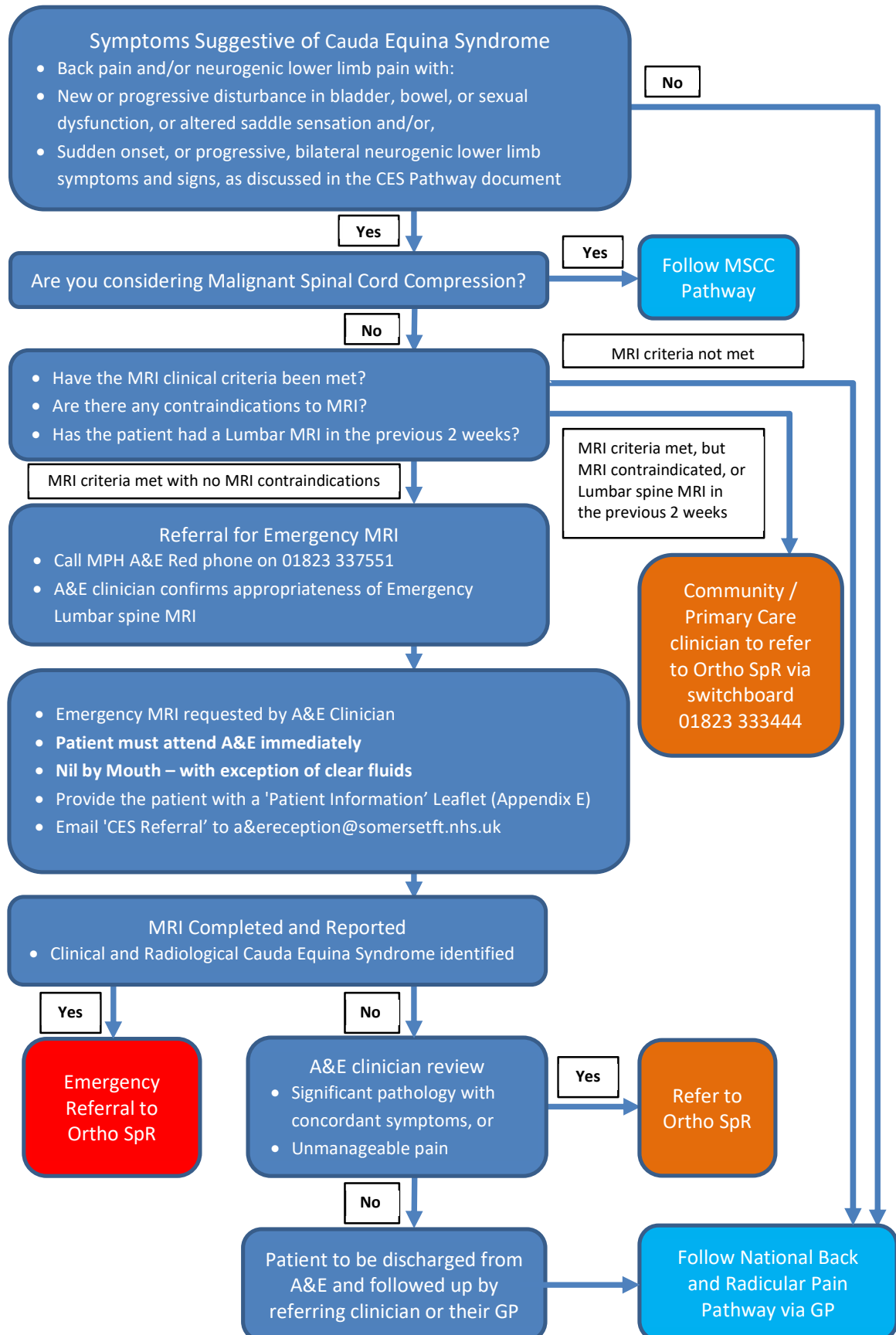
[Community and Primary Care Clinician](#)

[A&E Department Clinicians](#)

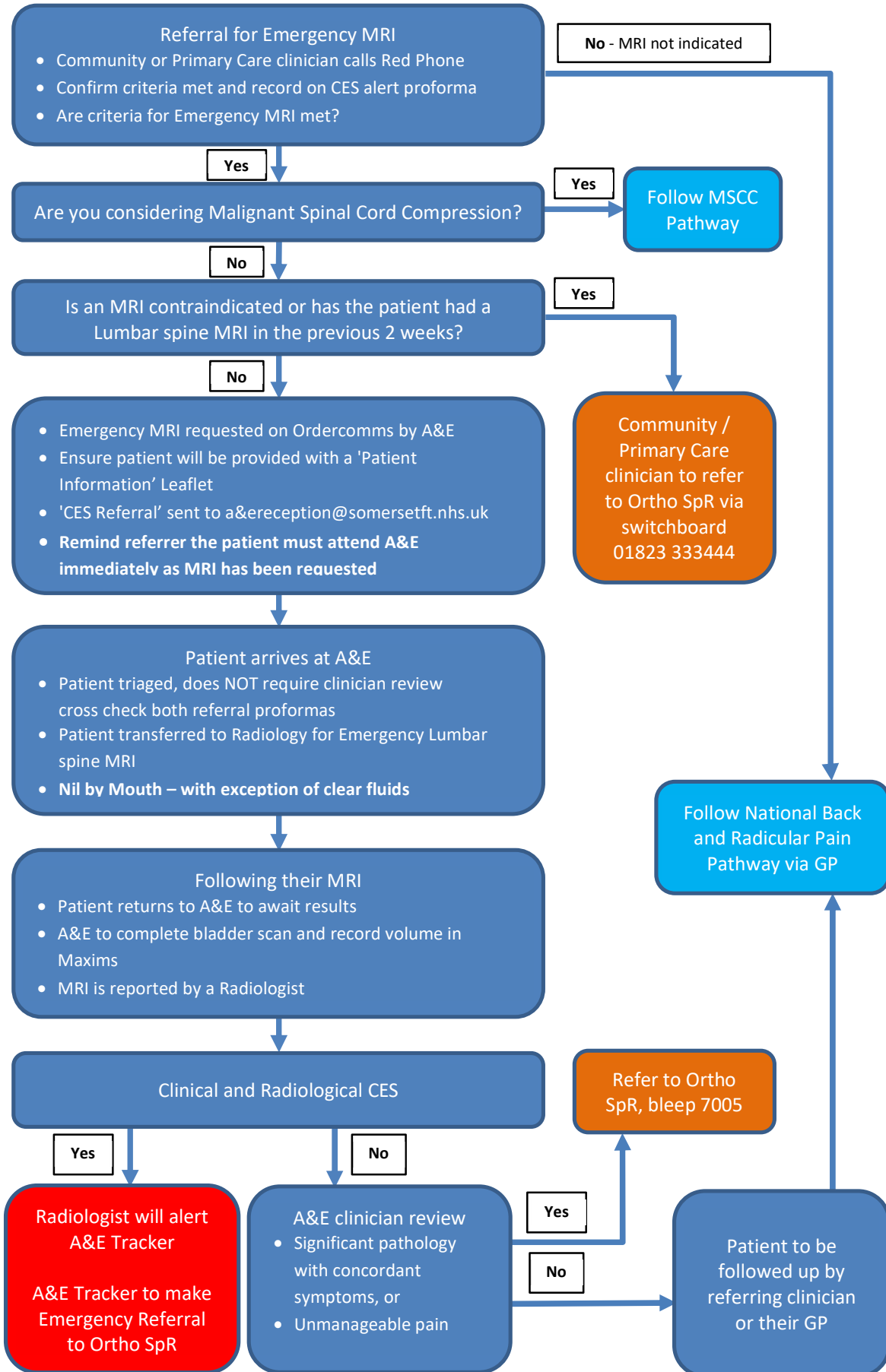


1.1 COMMUNITY AND PRIMARY CARE CLINICIAN REFERRAL FLOWCHART

If MPH is not the patient's local hospital, please refer the patient to the local hospital using their CES pathway



1.2 ACCIDENT AND EMERGENCY CLINICIAN REFERRAL FLOWCHART



2.0 INTRODUCTION

2.1

This document outlines the clinical pathway for suspected Cauda Equina Syndrome in patients assessed in the Community and Primary Care setting in Somerset. The aim is to provide a streamlined process for this patient group to access the appropriate investigation and management in a timely manner.

2.2

Cauda Equina Syndrome (CES) is a very rare spinal condition with approximately 0.3-7.0 cases per 100,000 per year in the general population¹. It is caused by compression of the lumbosacral nerve roots, otherwise known as the cauda equina. It constitutes a surgical emergency with the need for timely surgical decompression of the compromised nerve roots. Delay in diagnosis and intervention can lead to devastating consequences, resulting in long-term reduction in quality of life, including but not limited to changes in bladder, bowel and sexual function², along with psychosocial sequelae³. In litigation cases specifically related to CES, The Spinal Services GIRFT report highlighted 'delay or failure of diagnosis' was the primary factor cited in 44% of cases; more specifically 'failure to obtain an MRI scan' was cited in 13%².

3.0 DEFINITIONS

3.1

A&E	Accident and Emergency Department
APP	Advanced Physiotherapy Practitioner
CES	Cauda Equina Syndrome
Community and Primary Care	Services within Somerset that are not based at a Secondary care facility
GIRFT	'Getting It Right First Time' programme
MACP	Musculoskeletal Association of Chartered Physiotherapists
MPH	Musgrove Park Hospital
MRI	Magnetic Resonance Imaging
MSCC	Malignant Spinal Cord Compression
NBRPP	National Low Back and Radicular Pain Pathway
Neurogenic/Neuropathic pain	Pain caused by a lesion or disease of the somatosensory nervous system ⁴
Radicular pain	Burning, tingling, electric, searing, or crawling pain felt in a specific dermatome ^{5,6}
Radiculopathy	Weakness, pain or paraesthesia felt in a specific myotome or dermatome; diminished reflexes may exist ^{5,7}
RCEM	Royal College of Emergency Medicine
SLR	Straight leg raise
SpR	Specialist Registrar
+ve / -ve	Positive / Negative

4.0 ROLES and RESPONSIBILITIES

4.1

REFERRING CLINICIAN

Referring clinicians are limited to:

- Somerset based General Practitioners
- Somerset based Primary Care Advanced Clinical Practitioners
- Somerset based Minor Injury Unit General Practitioners and Advanced Clinicians
- Somerset NHS FT Spinal Surgery Team
- Somerset NHS FT Musculoskeletal Physiotherapists
- Devon Docs/MeddCare clinicians for out of hour services:
Monday – Sunday 18:00-08:00 and all day on bank holidays

The referrer's role is to assess and identify patients with suspected CES in Community and Primary Care settings. They are responsible for following the steps, set out in this document, to expedite investigation for patients they have assessed and have a high index of suspicion for actual or impending CES.

4.2

MUSGROVE PARK HOSPITAL A&E CLINICIAN

A&E clinicians are responsible for receiving the referral via the 'Red Phone' and ensuring the patient has met the criteria set out in this document (see 5.9). If the patient does not meet the criteria, advise the referrer on the next steps as identified in the flow chart (see 1.1). For patients that do meet the criteria, request an emergency lumbar spine MRI scan, and follow the guidance for informing the MRI department (Appendix F). In the situation of a CES scan positive, inform the on-call Orthopaedic SpR via switch. In the case of CES scan negative, process the discharge of the patient back to the referrer or their GP. This should include copying the MRI report into the discharge letter to enable GP access.

4.3

MUSGROVE PARK HOSPITAL MRI CLINICIAN

Follow the process set out by the Radiology Department for organising an emergency lumbar spine MRI scan. Follow the pathway (Appendix F) for liaising with A&E regarding the transfer of patients between departments.

4.4

MUSGROVE PARK HOSPITAL SPINAL SURGERY SERVICE CLINICIAN

The spinal team must urgently review CES scan positive patients referred from A&E. Accept appropriate CES referrals that do not meet the inclusion criteria for this pathway. Accept appropriate referrals for significant pathology with concordant clinical findings, that is not CES. Liaise with A&E clinicians regarding support for patients with unmanageable pain.

5.0 PROCESS DESCRIPTION

5.1

Early identification and treatment of CES is vital to optimise a successful outcome. Key components include:

- High level communication between all parties to enable effective gathering of information, as well as smooth referral and progress through the pathway
- Advanced knowledge of symptoms and signs for cauda equina compression, as well as knowledge of the appropriate objective tests to be completed
- Emergency investigation in the local receiving hospital, ideally by MRI, and emergency referral of appropriate patients to a hospital with a 24/7 specialist spinal service
- Emergency decompression of compromised nerve roots

For patients who do not meet the criteria for emergency investigation and intervention, appropriate safety netting is vital; it is imperative to educate the patient for their need to present to an Accident and Emergency Department if symptoms deteriorate. Safe practice would be to highlight Musgrove Park, Yeovil District, Weston General, and Royal United Hospitals as having MRI facilities.

5.2

BASS STATEMENT⁸

“A patient presenting with back pain and/or sciatic pain with any disturbance of their bladder or bowel function and/or saddle or genital sensory disturbance or bilateral leg pain should be suspected of having a threatened or actual CES”

The complexity of this patient group is recognised⁹, along with the need for expert management throughout their pathway. Early access to radiological examination is vital to ensure provision of the highest quality care^{2,9,10}.

5.3

SYMPTOMS

The 5 characteristic features of CES³ are:

- Bilateral neurogenic sciatica:
Pain associated with back and/or bilateral leg symptoms may be present
- Reduced perineal sensation:
Loss of sensation in the perineum and saddle region is one of the most commonly reported symptoms
- Altered bladder function leading to painless urinary retention:
Bladder dysfunction is the other most commonly reported symptom, and can range from increased urinary frequency, difficulty to micturate, change in urine stream, urinary incontinence, and urinary retention
- Loss of anal tone:
Loss of or reduced anal tone on rectal examination may be evident if a patient reports bowel dysfunction. Bowel dysfunction may include faecal incontinence, inability to control bowel motions and/or inability to feel when the bowel is full with consequent overflow

- Loss of sexual function:
Sexual dysfunction is not widely mentioned in the literature but is an important aspect of health and wellbeing that needs discussion with patients, despite the potential embarrassment for both patient and therapist

Significant, severe, or progressive neurological deficit in the legs has also been identified as a sign¹¹. We define this as major motor weakness of 3/5 or less on the MRC grading (Appendix A).

5.4

CLASSIFICATION¹²

Cauda Equina Syndrome Suspected (CES-S)	Bilateral radicular symptoms and signs
Cauda Equina Syndrome Incomplete (CES-I)	Urinary difficulties of neurogenic origin, altered urinary sensation, loss of desire to void, poor urinary stream, need to strain to micturate
Cauda Equina Syndrome Retention (CES-R)	Painless urinary retention and overflow incontinence where the bladder is no longer under executive control
Cauda Equina Syndrome Complete (CES-C)	Loss of all cauda equina function, absent perineal sensation, patulous anus, paralysed insensate bladder and bowel

Bilateral Lower Limb Symptoms

Cauda Equina Syndrome Suspected (CES-S) is defined as bilateral lower limb symptoms and signs in the absence of the classic CES symptoms that are associated with bladder, bowel or sexual dysfunction, or saddle anaesthesia¹². For the condition to be defined as CES-S we believe that clear neurogenic lower limb radicular pain and/or radiculopathy, referred to a particular dermatome/s, is needed. We would expect the pain and/or paraesthesia to be distributed throughout most of the dermatome (e.g., below the knee in L4-S2 nerve root lesions), but would almost always travel below the knee. Positive neurodynamic testing (e.g., straight leg raise) may also be present¹¹. Bilateral lower limb symptoms are not uncommon in community or primary care; not all presentations will require an emergency MRI scan. Utilisation of sound clinical reasoning is vital to highlight the most appropriate patient group to refer for emergency MRI, and the ones that can safely follow the National Low Back and Radicular Pain Pathway (NBRPP)¹³ via their GP. Sudden onset or progressive bilateral lower limb symptoms are more concerning and may warrant an emergency MRI scan to rule out impending CES¹⁴. In the setting of isolated bilateral lower limb symptoms, if clinical uncertainty is felt by the assessing clinician it would be appropriate for them to seek a second opinion from a clinical specialist (e.g., Orthopaedic registrar on-call, or specialist spinal APP). If bilateral lower limb symptoms present with any other CES features this would indicate CES-I and warrant referral for emergency MRI. All patients with lower limb symptoms that do not meet the threshold described for emergency MRI need clear and documented safety netting as discussed below.

Unilateral or bilateral lower limb neurogenic symptoms are classic features of neurogenic claudication. This patient population commonly have undifferentiated bladder and bowel symptoms that are related to other origins (e.g., prostate)¹⁵. In this population our level of concern would be greater for bladder and bowel symptoms of sudden onset and/or recent deterioration, and this would warrant an emergency MRI. Chronic bladder and bowel changes that have not deteriorated would not warrant an emergency MRI and routine MRI would be appropriate. Safety netting is also vital with this patient group.

5.5

SUBJECTIVE ASSESSMENT

There are certain pertinent questions that need to be asked when considering CES. Their importance should be highlighted to the patient, and as such the questions need to be posed in a clear, unambiguous way to reduce the risk of miscommunication between the clinician and patient. The life changing aspect of CES should be explained to the patient, but this should be contextualised by the rarity of the condition. The occurrence of CES in patients presenting with back pain in primary care is estimated to be 0.08%, and 0.27% in a secondary care setting¹. The table below suggests basic questions that should be asked. Further probing questions will be needed in the event of positive responses, this will assist in clinically reasoning the relevance of the information gained. Comprehensive guidance is available in Appendix D.

Bladder	<ul style="list-style-type: none">• Are you aware of the urge to pass urine?• Can you start the flow of urine?• Does the effort and flow feel normal for you?• Do you fully empty your bladder?• Do you unknowingly wet yourself?
Bowel	<ul style="list-style-type: none">• Do you have the sensation of a stool passing when you open your bowels?• Do you unknowingly soil yourself?• Do you experience constipation?
Sensation	<ul style="list-style-type: none">• Do you have normal feeling on and/or around your anus when you wipe with toilet paper?• Do you feel a stool passing when you open your bowels?• Do you have normal sensation to your penis or testicles / vulva or vagina?
Sexual function	<ul style="list-style-type: none">• Can you gain an erection? (males)• Do you have normal sensation during sexual intercourse?• Can you reach an orgasm as normal?

5.6

OBJECTIVE ASSESSMENT

Clinical examination must include a full neurological examination to comprise:

- Muscle bulk/tone
- Myotomes
- Dermatomes
- Plantar response
- Clonus
- Deep tendon reflexes
- Neurodynamic testing

Recent literature suggests digital rectal examination is not an essential part of the objective assessment for CES in the primary care setting^{14,16}. Therefore, there is not an expectation this examination needs to be completed by community or primary care clinicians referring patients into secondary care. Likewise, we believe, perianal sensation testing does not need to be completed as part of a standard referral process from the community or primary care setting. With a specificity of 85%, perianal sensation testing has been shown to be one of the more reliable objective examinations for CES; however, clinical utility of the test in ruling out CES is poor, with a sensitivity of 38%¹⁷. If subjective information raises the suspicion of actual or impending CES, we do not feel a negative perianal sensation examination would alter a clinician's decision to refer on for investigations. Considering this, and the intimacy of the

examination, we do not mandate this examination in the community or primary care setting. However, direct questioning of the patient to establish subjective altered sensation in the saddle region is a mandatory part of the assessment.

Please refer to Appendix B for a myotome table and Appendix C for a dermatomal map.

5.7

VIRTUAL CONSULTATIONS

Over recent months virtual consultations have become an established part of all healthcare settings. This method of consultation will continue following the COVID-19 pandemic; by 2024 all patients will have access to 'digital' consultations as part of their normal care¹⁸, with an initial target of 25% being sought in 2021/22¹⁹. We recognise the limitation of the objective assessment in virtual consultations. However, the poor utility of objective tests is well documented¹⁷, with low sensitivity (range: 19–43%) across all recognised tests. This means objective tests are unable to safely rule out CES. We feel, following an in depth and comprehensive subjective assessment, the likelihood of a clinician altering their clinical decision to perform an emergency MRI scan is low, and therefore delaying a patient access to MRI is not appropriate. For this reason, if a consultation is completed virtually and the clinician has a high index of suspicion for actual or impending CES the pathway should be activated, and emergency referral completed without delay or need to complete an objective assessment.

5.8

BLADDER SCANNING

Bladder scanning has been proposed as a reliable method of evaluating bladder function; detrusor muscle activity and sphincter control can be assessed and, by proxy, provide information about the functionality of the S2-4 nerve roots^{20,21}. A post void residual volume of greater than 200ml has been shown to increase the likelihood of a CES positive MRI scan 20-fold²¹. However, no safe cut-off volume is accepted in the literature. It is recognised that access to a portable bladder scanner, and up to date training, is inconsistent in the community or primary care setting and therefore bladder scanning is not a pre-requisite for referral to secondary care for a patient suspected of having CES. But, if available, scanning would provide valuable information about the integrity of the cauda equina nerve roots²².

5.9

MRI

MRI is the gold standard assessment for diagnosing CES and should be completed as an emergency as soon as possible. Due to the high scan negative rates, it is important patients should be referred for MRI scans locally^{2,9}. Therefore, patients who have been assessed in the Community or Primary Care should be referred to their nearest hospital with MRI capabilities, and kept nil by mouth (with the exception of clear fluids). The four local hospitals with MRI capabilities are: Musgrove Park, Yeovil District, Weston General, and Royal United Hospitals. For these initial investigations to be completed the hospital does not need to have a spinal service on-site. This reduces the burden for patients, optimises resource utilisation, and ensures only appropriate patients are transferred to specialist centres⁹. Appropriate out of area patients should only be referred once a positive CES scan is identified, unless a pre-existing service level agreement is in place¹⁰. Any reason for a delay in referral must be clearly documented. Any written requests and communication must be timed, dated, and signed

clearly and legibly. If MRI is contraindicated, then liaison with the local Orthopaedic department will be required to enable identification of a suitable alternative.

MRI inclusion criteria:

The MRI inclusion criteria set out in this document is based on the BASS standards⁸.

CLINICAL CRITERIA

Clinical criteria for suspected CES justifying an emergency lumbar spine MRI	Y	N
1. Does the patient have new, or an exacerbation of pre-existing back pain and/or lower limb symptoms		
If Yes: Does, the patient also have any suggestion of:		
I. New or progressive bilateral neurogenic lower limb symptoms		
II. New or progressive alteration/disturbance of bladder function		
III. New or progressive alteration/disturbance of bowel function		
IV. New or progressive alteration/disturbance of sexual function		
V. Altered pin prick sensation in the saddle region		
If Yes to (1) and ANY of (2), then the patient requires an emergency MRI scan		

Consideration of the development, timing, and inter-relationship of symptoms is vital in the clinical reasoning process.

MRI exclusion:

If yes is answered to any of the following the MRI may be contraindicated. Further discussion with the on-call Orthopaedic SpR via switch is recommended.

MRI SAFETY CRITERIA

Does your patient have any of the following?	Y	N
1. Pacemaker		
2. Internal defibrillator		
3. Pacing wires or intra-cranial aneurysm clips		
4. Metallic foreign bodies in or around their eyes?		
5. Any other metalwork, electrical device, other implant, or foreign body, including coronary, aortic (EVAR) and other stents (vascular and non-vascular)?		
If YES is answered to any criteria, then referral to the MPH Orthopaedic SpR via 01823 333444		
6. Is the patient able to understand and sign a safety form?		

5.10

SAFETY NETTING

Safety netting is the process of providing the patient information regarding their actions and responsibilities in the circumstance of further deterioration; empowering them to act early. This will be relevant for all cases of back and/or radicular lower limb pain where a diagnosis of CES is not made^{13,16}.

Safety netting should include²³:

- The likely time course of symptoms
- Specific red flag warning the symptoms and signs of serious disease
- Specific information about when and how to re-consult if symptoms do not resolve, [or deteriorate], in the expected time frame
- Clear, documented safety netting instructions

Safety netting can potentially improve diagnostic and care pathways and is recognised as best practice²⁴. The MACP has released [CES cue cards](#) (Appendix E) in a wide variety of languages that can be given to patients for future reference.

5.11

REFERRAL INFORMATION REQUIRED

- Onset and duration of symptoms
- How the symptoms are developing
- Nature of CES symptoms
- Nature of lower limb symptoms
- Neurological examination (if seen face to face)
- Post void bladder volume, if assessed
- Relevant past medical and medication history

6.0 MEDICOLEGAL

6.1

While the results of inadequately treated CES can be medically and medicolegally devastating, a clinician may decide against, or choose to delay, investigation or treatment based on their clinical or radiological assessment. Whatever the outcome of this decision, it is important that the clinician making the decision feels supported. One must remember that, of the patients with a clinical history suggestive of CES only 19% were found to have radiologically confirmed CES¹. A local audit at MPH found an even lower rate of 8-10% requiring emergency surgery. If a clinician decides to delay referral for an MRI scan, or delay decompressive surgery, they must document their clinical reasoning for this decision. As long as their reasoning is sound and the circumstances are relevant, this is defensible. In the context of delayed management, it is strongly recommended that safety netting is completed; clear documentation of this is essential, as is the provision of written information to the patient²⁴.

7.0 TRAINING/COMPETENCE REQUIREMENTS

7.1

Somerset NHS Foundation Trust Physiotherapy staff will receive internal training as part of the induction into their relevant role.

7.2

Completion of e-learning for health module: Serious pathology of the [spine](#) (Appendix E).

7.3

Review of:

- Protocol for the diagnosis and management of malignant bone disease in adults (Appendix E).
- Malignant Spinal Cord Compression in Adults (Management of Suspected or Diagnosed) Appendix E)

8.0 REFERENCES

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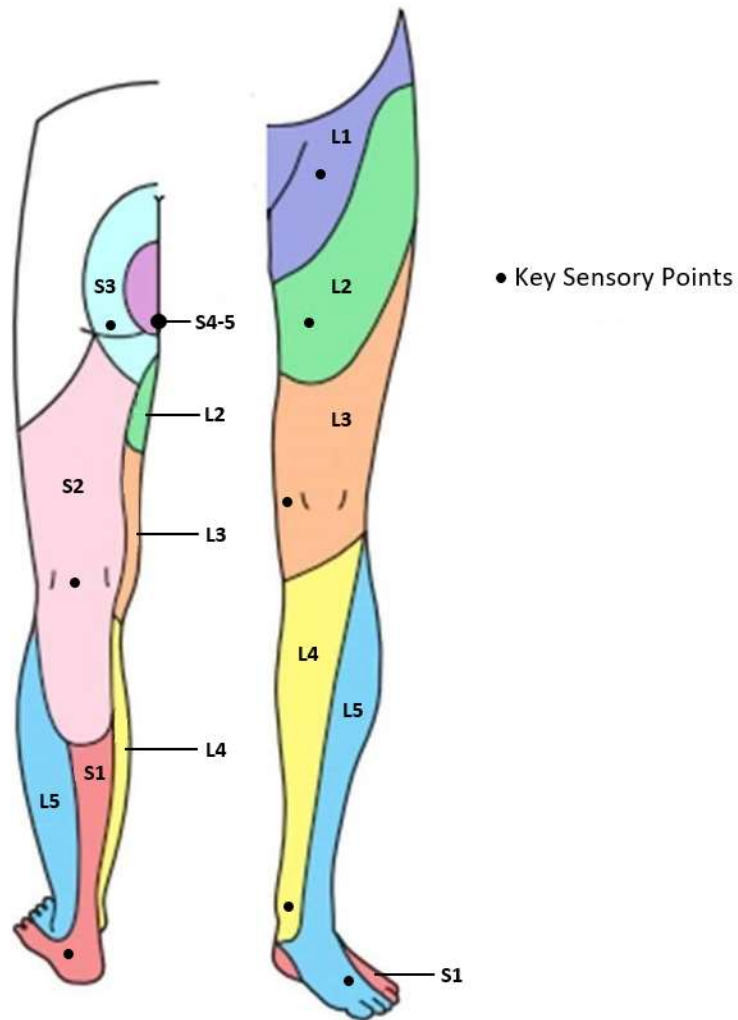
APPENDIX A: MEDICAL RESEARCH COUNCIL (MRC) GRADING²⁵

Score	Description
0	No contraction
1	Flicker or trace of contraction
2	Active movement, with gravity eliminated
3	Active movement against gravity
4	Active movement against gravity with resistance
5	Normal power

APPENDIX B: LOWER LIMB MYOTOMES²⁶

Nerve Root	Action	Muscles
L1-2	Hip flexion	Psoas, iliacus, sartorius, pectineus, adductor longus, adductor brevis
L3	Knee extension	Quadriceps adductor longus, magnus, and brevis
L4	Ankle dorsiflexion	Tibialis anterior, quadriceps, tensor fascia latae, adductor magnus, obturator externus, tibialis posterior
L5	Great toe extension	Extensor hallucis longus, extensor digitorum longus, gluteus medius and minimus, obturator internus, semimembranosus, semitendinosus, peroneus tertius, popliteus
S1	Ankle plantar flexion Ankle eversion Hip extension Knee flexion	Gastrocnemius., soleus, gluteus maximus, obturator internus, piriformis, bicep femoris, semitendinosus, popliteus, peroneus longus and brevis, extensor digitorum brevis
S2	Hip extension Knee flexion	Biceps femoris, piriformis, soleus, gastrocnemius, flexor digitorum longus, flexor hallucis longus, intrinsic foot muscles
S3		Intrinsic foot muscles (except abductor hallucis), flexor hallucis brevis, flexor digitorum brevis, extensor digitorum brevis

APPENDIX C: LOWER LIMB DERMATOMAL MAP²⁷



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APPENDIX D: SYMPTOMS OF CAUDA EQUINA SYNDROME RECOMMENDED FURTHER QUESTIONS¹⁶

Subjective Symptoms • Level of Evidence	Context	Further Questions	Low Clinical Suspicion	High Clinical Suspicion
Sensory change (lower limbs) • Low	<ul style="list-style-type: none"> History of symptoms, pattern, progression, and time scale Consider existing comorbidities (e.g., multiple sclerosis, diabetes) 	<ul style="list-style-type: none"> When did the sensation problems in your leg(s) start? Where did they begin and how did those symptoms change as time went on? Exactly where in your legs do you feel the symptoms? Do you have any other medical conditions? 	Normal neurology	Sensory change (lower limbs)
Motor weakness (lower limbs) • Low	<ul style="list-style-type: none"> Time scales of perceived weakness and progression are important to establish Consider existing comorbidities (e.g., aortic aneurysm) 	<ul style="list-style-type: none"> When did the weakness problems in your leg(s) start? Where did the weakness begin and how did those symptoms change as time went on? Do you have any other medical conditions? 	Normal neurology	Motor weakness (lower limbs)
Saddle sensory disturbance • Low	<ul style="list-style-type: none"> Precise extent of pins and needles and/or numbness (e.g., difference between bicycle/horse saddle) Previous history Trauma/surgery Other potential pudendal nerve compression (e.g., cycling) 	<ul style="list-style-type: none"> See CES cue card Exactly where do you feel the numbness in your bottom, inner thighs, or genitals? Where did it start and how has the numbness and/or pins and needles changed over time? Do you have normal sensation when you wipe after toileting? How long has this been present? What hobbies do you have? Were any interventions used during childbirth? (where appropriate) Have you had any previous surgery? 	NA	Saddle sensory disturbance
Change in ability to achieve an erection or ejaculate • Low	<ul style="list-style-type: none"> History of symptoms, progression, and time scale comorbidities (eg, diabetes) Side effects from pharmacology (neuropathic medications, codeine) Age: older people may have spinal stenosis and are less likely to have acute CES Functional symptoms: psychosocial presentation and health care utilization 	<ul style="list-style-type: none"> See CES cue card When did these symptoms begin? <ul style="list-style-type: none"> If it was some time ago, are these symptoms different? Do you have any other medical conditions? Have you started any new medication? Were the symptoms present before you began this medication or after? Routine questions related to psychosocial distress 	NA	Recent change in ability to achieve an erection or ejaculate
Loss of sensation in genitals during sexual intercourse • Low	<ul style="list-style-type: none"> Previous history of sexual dysfunction? <ul style="list-style-type: none"> Is this different? 	<ul style="list-style-type: none"> See CES cue card for relevant questions that need to be asked, including the following: <ul style="list-style-type: none"> When did these symptoms begin? If it was some time ago, are these symptoms different? Do you have any other medical conditions? Ask routine questions related to psychosocial distress 	NA	Loss of sensation in genitals during sexual intercourse

Subjective Symptoms • Level of Evidence	Context	Further Questions	Low Clinical Suspicion	High Clinical Suspicion
Urinary function (eg, frequency) • Low	<ul style="list-style-type: none"> • Previous history of bladder disturbance • Establish precise change in function, such as hesitancy, change in stream, loss of sensation passing urine, inability to feel when the bladder is full or empty, and sensation of incomplete voiding 	<ul style="list-style-type: none"> • See CES cue card for relevant questions that need to be asked, including the following: <ul style="list-style-type: none"> • When did the changes begin? • Describe the changes in urine function • Do you have any other medical conditions? • Have you started any new medication? • Were the symptoms present before you began this medication or after? 	NA	Urinary function (eg, frequency)
Urinary retention • Low	<ul style="list-style-type: none"> • Previous history of bladder disturbance • Most of these people will not have critical cauda equina compression. However, in the absence of reliably predictive symptoms and signs, there should be a low threshold for investigation with an emergency MRI scan • Age: older people may have spinal stenosis and are less likely to have acute CES • Functional symptoms: psychosocial presentation and health care utilization • Be aware of an increase in health-seeking behaviour 	<ul style="list-style-type: none"> • See CES cue card for relevant questions that need to be asked, including the following: <ul style="list-style-type: none"> • When did the changes begin? • When did you last pass urine? • Have you started any new medication? • Were the symptoms present before you began this medication or after? • Do you have any other medical conditions? • Have you attended any other health care setting (GP, surgery, clinic, hospital, etc) because of this problem? <ul style="list-style-type: none"> ▪ - If so, who did you see and when? 	NA	Urinary retention
Urinary incontinence • Low	<ul style="list-style-type: none"> • Previous history of bladder disturbance 	<ul style="list-style-type: none"> • See CES cue card for relevant questions that need to be asked, including the following: <ul style="list-style-type: none"> • When did the changes begin? • When did you last pass urine? • Have you started any new medication? • Were the symptoms present before you began this medication or after? • Do you have any other medical conditions? • Have you attended any other health care setting (GP, surgery, clinic, hospital, etc) because of this problem? <ul style="list-style-type: none"> ▪ - If so, who did you see and when? 	NA	Urinary incontinence

Subjective Symptoms • Level of Evidence	Context	Further Questions	Low Clinical Suspicion	High Clinical Suspicion
Bowel incontinence • Low	<ul style="list-style-type: none"> Previous history of bowel disturbance 	<ul style="list-style-type: none"> See CES cue card for relevant questions that need to be asked, including the following: <ul style="list-style-type: none"> When did the changes begin? When did you last open your bowels? Have you started any new medication? Were the symptoms present before you began this medication or after? Do you have any other medical conditions? Have you attended any other health care setting (GP, surgery, clinic, hospital, etc) because of this problem? <ul style="list-style-type: none"> If so, who did you see and when? 	NA	Bowel incontinence
Constipation • Low	<ul style="list-style-type: none"> Previous history of bowel disturbance History of symptoms and time scale Side effects from pharmacology (neuropathic medications, codeine) Age: older people may have spinal stenosis and are less likely to have acute CES Functional symptoms: psychosocial presentation and health care utilization 	<ul style="list-style-type: none"> See CES cue card <ul style="list-style-type: none"> When did the changes begin? When did you last pass a stool? Have you started any new medication? Were the symptoms present before you began this medication or after? Do you have any other medical conditions? Have you attended any other health care setting (GP, surgery, clinic, hospital, etc) because of this problem? <ul style="list-style-type: none"> If so, who did you see and when? 	-	Constipation
Unilateral/bilateral leg pain • Low	<ul style="list-style-type: none"> Unilateral radicular leg pain progressing to bilateral radicular leg pain is a concerning presentation The prevalence of bilateral leg pain in primary care is not known Consider other causes of leg pain: <ul style="list-style-type: none"> Smoker Cardiovascular disease Lesion higher in the spine 	<ul style="list-style-type: none"> When did the pain progress from 1 leg to 2? How far down each leg does the pain go? Do you have any conditions that affect your heart or circulation? 	No CES symptoms	Unilateral/bilateral leg pain

Subjective Symptoms • Level of Evidence	Context	Further Questions	Low Clinical Suspicion	High Clinical Suspicion
Low back pain • Low	<ul style="list-style-type: none"> • Presentations that increase the probability of acute threatened cauda equina • Back pain with: <ul style="list-style-type: none"> • Presence of new saddle anaesthesia, bladder or bowel disturbance • Age, <50 y • Unilateral onset progressing to bilateral leg pain • Alternating leg pain • Presence of new motor weakness • Obesity • History of symptoms and time scale 	<ul style="list-style-type: none"> • When did your back pain begin? • How has it progressed? • Do you have or have you had leg symptoms? <ul style="list-style-type: none"> • If so, where exactly is your leg pain? • Consider questions on CES cue card if symptoms progress 	See context	Low back pain
Abbreviations: CES, cauda equina syndrome; GP, general practitioner; MRI, magnetic resonance imaging; NA, not applicable				

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APPENDIX E: RELEVANT DOCUMENTS

- CES template referral form: <https://www.somersetft.nhs.uk/trauma-and-orthopaedics/trauma-and-orthopaedics/spinal-surgery-service/cauda-equina-syndrome-gp-referral-form/>
- Patient information leaflet: <https://www.somersetft.nhs.uk/trauma-and-orthopaedics/?document=cauda-equina-syndrome-patient-information-leaflet-july-2021>
- E-Learning for Healthcare Serious pathology of the spine: https://portal.e-lfh.org.uk/myElearning/Index?HierarchyId=0_43501_43523&programmeld=43501
- CES cue cards: <https://www.eoemskservice.nhs.uk/advice-and-leaflets/lower-back/cauda-equina>
- Pathways stored on Somerset NHS Foundation Trust Repository (The Portfolio)
 - Malignant Spinal Cord Compression in Adults (Management of Suspected or Diagnosed)
 - Protocol for the Diagnosis and Management of Malignant Bone Disease in Adults

Expected Cauda Equina Emergency MRI

