Spinal Surgery:

National Suspected Cauda Equina Syndrome (CES) Pathway

February 2023

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GIRFT is part of an aligned set of programmes within NHS England

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1. Foreword

I am delighted to recommend this document supporting the national suspected Cauda Equina Syndrome pathway.

Published in 2019, the Getting it Right First Time (GIRFT) National Specialty Report for Spinal Services reviewed emerging themes and made recommendations for regional and national implementation based on visits to 127 spinal units. One opportunity found during visits was that many patients with suspected Cauda Equina Syndrome (CES) were not being referred for onward care in line with agreed treatment protocols.

CES is a serious spinal presentation, which, if not diagnosed and treated swiftly, can result in life-changing injury. 23% of litigated claims for spinal surgery in England relate to CES (based on GIRFT's assessment of litigated claims in England between 2013/15 -15/16).

This document – and the pathway it supports – aims to provide clinicians working in all care settings, with the ability to effectively diagnose and care for patients presenting with suspected Cauda Equina Syndrome. Our thanks go to all the health professionals involved in this document, from inception to completion. GIRFT cannot succeed without the backing of clinicians, managers and all of us involved in delivering patient care.

Professor Tim Briggs CBE
NHS England National Director for
Clinical Improvement and Elective Recovery

2. Introduction

Cauda Equina Syndrome (CES) is a spinal surgical emergency that requires urgent specialist assessment and intervention. If the condition is not managed in a timely manner, it can lead to a range of severe disabilities, including permanent limb paralysis and permanent loss of bowel, bladder and sexual function. This is devastating to a patient's quality of life.

When I carried out my GIRFT national review of spinal services in 2017-19, we saw clearly that there was significant unwarranted variation in the detection of CES, from the timing of imaging and the timing of surgical treatment to the postoperative care of these patients.

In 2021, a Healthcare Investigation Safety Branch (HSIB) review of the management of CES recommended the development of a national pathway for suspected CES, to help reduce this variation and improve outcomes.

I am delighted to have led a passionate, multidisciplinary group of more than 60 colleagues to create this pathway, and would like to thank all those individuals, the endorsing societies and patient groups who gave up their time to work on it over the past year. It has been a fantastically collaborative piece of work, acknowledging the difficulties of managing the condition in a timely way, but putting the interests and outcomes of patients with suspected CES at the centre of every decision and step in the pathway.

To release this in alignment with the Clinical Imaging Board's guidance *MRI provision for Cauda Equina Syndrome* is further testament to our close working with the Royal College of Radiologists, ensuring our joint focus remains on getting patients with suspected CES diagnosed and treated as quickly as practicably possible.

Implementation of this pathway is the next big challenge, aiming for the best practice outlined here to be reflected in improved patient outcomes. As we understand the condition further, we will work to update this resource, incorporating further evidence as it becomes available.

Mike Hutton

Consultant Spine Surgeon

Chair of The National Suspected Cauda Equina Syndrome Pathway

GIRFT Clinical Lead for spinal services

GIRFT is pleased to co-badge the Suspected Cauda Equina Syndrome pathway with:

- British Association of Spine Surgeons
- British Association of Urological Surgeons
- British Society of Skeletal Radiologists
- Cauda Equina Champions Charity
- Chartered Society of Physiotherapy
- National Spine Network
- The Royal College of Radiologists
- The Society of Radiographers
- Society of British Neurological Surgeons
- Spinal Injuries Association

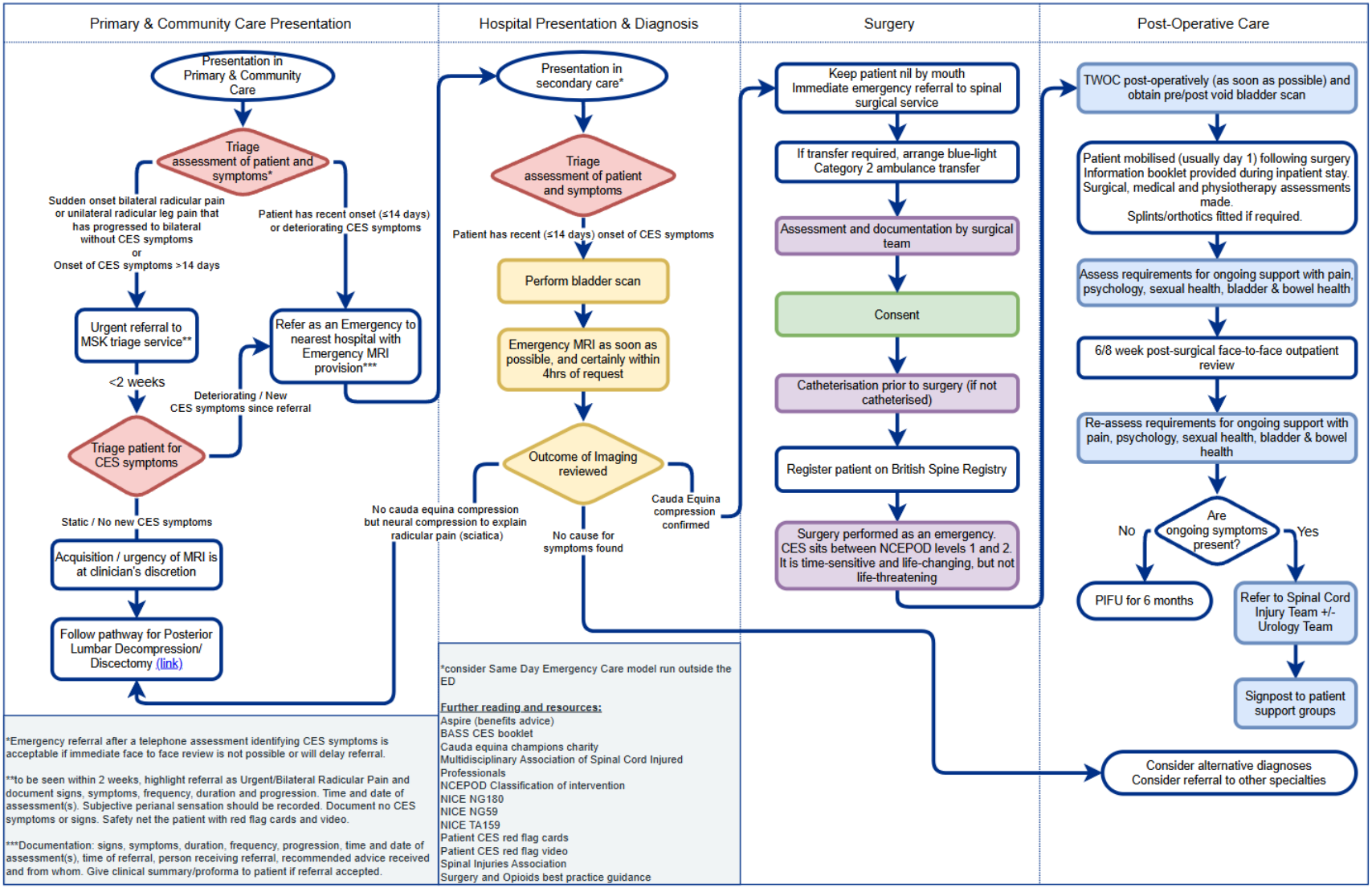
3. National suspected cauda equina pathway

To access the pathway with clickable links, please go to National Suspected Cauda Equina Pathway

GIRFT
GETTING IT RIGHT FIRST TIME

National Suspected Cauda Equina Syndrome Pathway

Spinal Services



Definition of Cauda Equina Syndrome

Radicular pain (sciatica) and/or back pain are common patient presentations to healthcare professionals. CES is a very rare (1 to 3 in 100,000 population) but serious spinal presentation of radicular and/or back pain that requires immediate assessment, investigation, and treatment. If it is unrecognised or surgical treatment is delayed, this may result in permanent loss of bladder and bowel function, loss of sexual function, and lower limb paralysis. Patients may continue to experience ongoing severe disability despite prompt treatment but, if it is treated before symptoms become severe, this can reduce the risk of permanent disability. CES is due to acute or rapidly progressive compression of the nerves in the lumbar or sacral spinal canal.

This pathway focuses on the commonest cause – a large lumbar disc prolapse – but CES can be due to rarer causes, such as haematoma, trauma, infection, tumour, or spinal/epidural anaesthetic. CES is a collection of patient symptoms and clinical signs, and a magnetic resonance imaging (MRI) scan on its own cannot diagnose CES. No single symptom or sign is pathognomonic.

The following pathway has been developed to assist all those involved in the care of these patients, from presentation to treatment. It sets out best practice timeframes and aims to streamline and improve the outcomes of patients with suspected and proven CES due to a proven large disc protrusion.

Clinical presentation

In this pathway, it is acknowledged that patients may present in a primary, community or acute setting. If the patient presents in an acute setting, it is not assumed that there is spinal provision or access to MRI at the time of presentation; in this case we have detailed the need for onward referral or transfer.

Triage of the patient is the first step in this pathway. It is important to note that CES does not have a set clinical pattern; no single symptom or combination of symptoms has good diagnostic accuracy. Additionally, negative physical tests do not rule out CES if positive subjective symptoms are present.

Symptoms

An emergency referral to the nearest facility with Emergency MRI provision is warranted for a patient presenting with leg pain and/or back pain, **plus**: recent onset (14 days or fewer) **or** deterioration of **any** of the following symptoms:

- difficulty initiating micturition or impaired sensation of urinary flow which may lead to incontinence (urinary incontinence without impaired sensation of urinary flow and/or saddle anaesthesia should have other causes of incontinence, such as urinary tract infection, stress incontinence and urge incontinence, considered as an alternative first).
- altered perianal, perineal or genital sensation S2-S5 dermatomes – the area may be small or as big as a horse's saddle (subjectively reported or objectively tested);
- severe or progressive neurological deficit of both legs, such as major motor weakness with knee extension, ankle eversion or foot dorsiflexion;

- loss of sensation of rectal fullness;
- sexual dysfunction – inability to achieve erection or to ejaculate, or loss of genital sensation.

Warning signs

Sudden onset bilateral radicular leg pain or unilateral radicular leg pain that has progressed to bilateral leg pain (sciatica) may be a warning symptom that CES may occur.

Sudden onset bilateral radicular leg pain (sciatica) or unilateral radicular leg pain that has progressed to bilateral without CES symptoms requires urgent referral (two-week wait) to an MSK triage service. See **Making an urgent referral**.

Safety netting

Safety netting for patients experiencing back pain with other symptoms is crucial to ensuring patients know how and when to seek help at the appropriate time.

A video and warning card from the Musculoskeletal Association of Chartered Physiotherapists (MACP) has been developed for a patient audience. It is accessible in 35 languages, and explains clearly when to access an urgent clinical opinion:

Cauda Equina Syndrome symptoms with pain radiating down one or both legs and/or severe lower back pain (any combination, seek help immediately);

- loss of feeling pins and needles between your inner thighs or genitals;
- numbness in or around your back passage or buttocks;
- altered feeling when using toilet paper to wipe yourself;
- increasing difficulty when you try to urinate;
- increasing difficulty when you try to stop or control your flow of urine;
- loss of sensation when you pass urine;
- leaking urine or recent need to use pads;
- not knowing when your bladder is either full or empty;
- inability to stop a bowel movement or leaking;
- loss of sensation when you pass a bowel motion;
- change in ability to achieve an erection or ejaculate;
- loss of sensation in genitals during sexual intercourse.

Making an emergency referral

The patient should be referred to the nearest hospital with emergency MRI facility (patient should attend hospital now) if they present with ongoing CES symptoms or signs which started within the last two weeks. An emergency referral after a telephone assessment identifying CES symptoms is acceptable if immediate face to face review is not possible or will delay referral.

In many cases, patients will be seen in an Emergency Department (ED). Integrated Care Systems should explore alternative solutions (for example, a dedicated team to review suspected CES patients in the ED or a same-day emergency care model run outside the ED) which might allow faster diagnosis and imaging. Examples of this have been highlighted in the GIRFT Emergency Medicine National Specialty Report (September 2021)

Emergency referral documentation

An emergency referral for suspected CES should document the following:

- patient assessment details;
- time and date of assessment;
- examination findings;
- physical examination of power and sensation in the lower limbs;
- signs and symptoms of CES present including duration, frequency and progression;
- who and at what time the case was referred to in secondary care;
- recommended advice received and from whom if felt did not require emergency referral;
- a digital rectal examination is not necessary, but subjective perianal sensation should be recorded.

The patient should be provided with their clinical summary/pro-forma to take to secondary care if the referral is accepted.

Making an urgent referral

The patient should be referred urgently (to be seen within two weeks) to the nearest MSK triage service if they present with sudden onset bilateral radicular leg pain (sciatica) or unilateral radicular leg pain that has progressed to bilateral **without** CES signs or symptoms.

During the wait for an urgent appointment, it is important that the patient knows how to identify and act upon any deterioration in their presentation. 'Safety Net' the patient with a warning card and access to the MACP video (see **Safety Netting**). If a patient then experiences and reports deteriorating or new CES symptoms, make an **emergency referral**.

If the symptoms are static, and remain so, the patient should continue with an **urgent referral** to the MSK triage service.

Emergency referral after a telephone assessment identifying CES symptoms is acceptable if immediate face to face review is not possible or will delay referral.

Urgent referral documentation

An urgent referral should document the following:

- flag referral as urgent;
- sudden onset bilateral radicular pain or unilateral radicular leg pain that has progressed to bilateral without CES symptoms **or** onset of CES symptoms >2weeks ago which are now static;

- signs and symptoms of bilateral sciatica and including duration, frequency and progression;
- details of assessment of patient;
- time and date of assessment(s);
- examination findings;
- physical examination of power and sensation in the lower limbs;
- a digital rectal examination is not necessary but subjective perianal sensation should be recorded.

The patient should be provided with their clinical summary/pro-forma to take to their appointment if the referral is accepted.

Bladder scan

A bladder scan is a useful adjunct in the assessment of a patient with suspected CES. Bladder scans should NOT be used in isolation or as a discriminator in deciding to request an MRI or undertake emergency surgery. 60% of patients who underwent emergency decompressive surgery for CES had a PVR of <200ml (Woodfield *et al*, 2023).

If a patient is **unable** to void then undertake a bladder scan and if > 600ml, catheterise the patient and document if sensate and perform a catheter tug.

If a patient is **able** to void, carefully document the following:

- pre-void volume;
- post-void residual volume (PVR):
    - if PVR <200ml this could not exclude CES;
    - if PVR >200ml in a patient with suspected CES, then CES is 20 times more likely;
    - if PVR >600ml catheterise and document if sensate and catheter tug (this avoids damage to the bladder – bladder distension injury).

Imaging

MRI at presenting hospital is best practice in and out of hours.

MRI imaging is a critical diagnostic investigation in the management of patients with suspected CES. An emergency MRI for suspected CES should be undertaken as soon as possible, and certainly within four hours of request to radiology. Local provision for this must be in place by June 2024.

Where this is not possible currently, a standard operating procedure in conjunction with local spinal and radiology services should be in place describing the local pathway for urgent out of hours scanning.

In cases where patients have been transferred for MRI, scanning should be undertaken as soon as possible after receiving unit clinical assessment, and certainly within four hours of this MRI request.

The following should be noted:

- discussion with the on-call spinal surgical service is not required prior to the MRI and may lead to unwarranted delay;
- keep the patient nil by mouth if requesting an emergency scan in case emergency surgery is required;
- an emergency MRI scan must take precedence over any routine or elective MRI cases;
- request for an MRI should be discussed with a senior decision maker (ST4 or equivalent, or above/consultant) before referral;
- if there is an absolute contradiction to MRI scanning, a CT scan or CT Myelogram may provide satisfactory imaging;
- on-call surgical teams are happy to review out-of-hours MRI scans before a radiologist report;
- Webpacs Links should be available to the surgical team to access imaging at different geographical sites within their network (image exchange portals can cause delay);

MRI safety checks:

- the patient should arrive in the MRI department with all necessary information to allow a final MR safety check to take place;
- the MRI department should be informed about all previous surgeries, implants and metallic foreign bodies the patient has at the earliest opportunity, so the safety of these can be established;
- the MRI department should have a procedure in place to establish patient safety when the patient is unable to complete their own safety questionnaire;
- where a patient has a contraindication to MRI, e.g., an MR Unsafe implant; the hospital should implement local policy for managing these patients without an MRI scan. CT might be a contingency imaging strategy;
- a local policy should also be in place to cover scanning of pregnant patients. Further guidance on scanning pregnant patients is available through Medicines and Health Products Regulatory Agency (MHRA) guidelines MHRA Implant Safety Guidance.

MRI protocol:

- A sagittal T2 weighted sequence is the single MRI sequence needed to screen for and demonstrate cauda equina (CE) compression. The 24/7 Cauda Equina Syndrome MRI screening protocol should prioritise this sequence. This is typically a 2D turbo spin echo sequence. There is indication in the literature that a limited emergency MRI protocol is effective for safely excluding compressive CES. Further imaging within the scan session should not be required for screening purposes.
- If CE compression is identified, additional images (axial T2 weighted and sagittal T1 weighted sequences) should be acquired;
- if no CE compression is identified by radiographers, a single T2 sagittal sequence covering the cervical and thoracic spine should be performed;
- MRI units should have a ‘shorter sequences CES MRI protocol’ for patients unable to lie still for a standard scan;

- MRI units should have a low specific absorption rate (SAR) protocol set up to reduce SAR levels for those patients with MR Conditional implants and a metal artefact reduction protocol (MAR) set up to reduce the artefact from any metal within the imaged area.

MRI reporting:

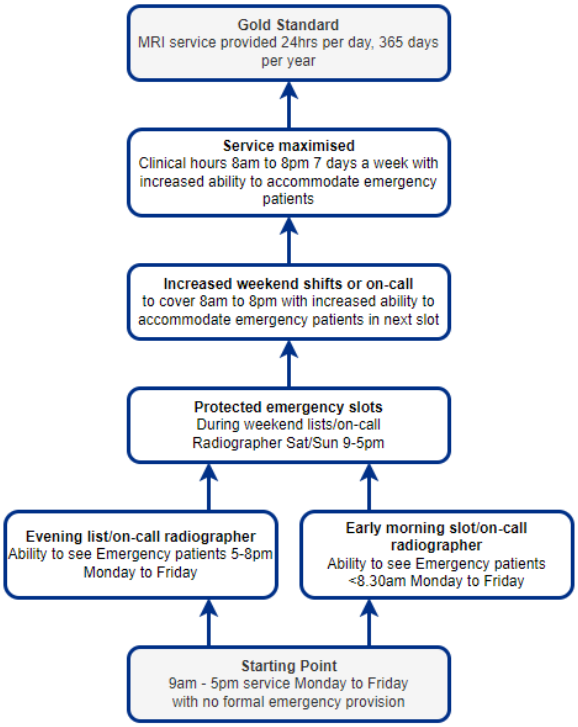
- to avoid delay, on-call surgical teams can review out of hours MRI scans before a radiologist report;
- Webpacs Links should be available to the surgical team to access imaging at different geographical sites within their network (image exchange portals can cause delay).
- The reporting of these examinations needs to be clearly defined in the SOP, either using on-call local radiologists or a reporting radiographer of an appropriate competence to sign off the examination. Where no local service is provided, clear local protocols with outsourcing reporting companies need to be established. This will allow a rapid 24/7 production of the report, which should be made available to the referring clinician within one hour.

Radiology service provision

A gap analysis should be undertaken, which includes a plan to progress from the level of service the department is providing currently to the provision of a 24/7 service. In the first instance, there should be protected daily slots to scan patients with suspected cauda equina syndrome or other emergency scans.

MRI 24/7 service development planner

This planner is intended to show the progress steps involved in moving a service towards the Gold Standard of year-round MRI provision.



When to refer to the spinal surgical team

Imaging outcome	Action required
Cauda Equina compression confirmed	Immediate referral to spinal surgical service Keep patient nil by mouth If transfer required after (response by surgical service) arrange Category 2 ambulance transfer
No Cauda Equina compression but neural compression to explain radicular pain (sciatica)	Safety net about progression of CES symptoms via video and card Advise patient that pain is very likely to improve Referral to MSK interface service/triage service
No cause for symptoms found	Consider alternative diagnoses Consider referral to other specialties

Emergency referral to surgical team with MRI

1. Review MRI with referral details.
2. If transfer required, advise Category 2 blue light ambulance.
3. Inform bed manager if referral accepted.

Assessment and documentation by surgical team

1. It is imperative that a time stamped documented review of history and examination is made by the surgical team prior to surgery;
2. Consent patient for surgery;
3. Register patient on British Spine Registry.

Surgical timing

Surgery for patients with incomplete symptoms (CESI) should be undertaken as quickly as possible, as an NCEPOD E1/E2 emergency. Cauda Equina sits between E1 and E2, as it is time-sensitive and life-changing, but not life-threatening. Any reason for delay should be documented.

Timing of surgery for patients who present with painless urinary retention and overflow incontinence (CES-R) is at the discretion of the operating surgeon. Surgery should still in this instance be undertaken within 24 hours of MRI imaging.

Whilst it is accepted that patients with painless urinary retention and overflow incontinence have a poorer prognosis around 70% of these patients will benefit from decompression.

Surgical technique:

- patients should be catheterised before the start of surgery avoiding distention of the bladder which can cause damage (bladder distension injury);
- total laminectomy/hemilaminectomy and laminotomy techniques are all acceptable;
- complication rates in CES decompressive surgery are six times higher than non-CES decompressive surgery;
- surgeons in training undertaking this surgery should have appropriate levels of supervision related to their level of training and competency;
- surgery undertaken where anaesthesia would start between the hours of midnight and 07:30 must have consultant on-call sanction.

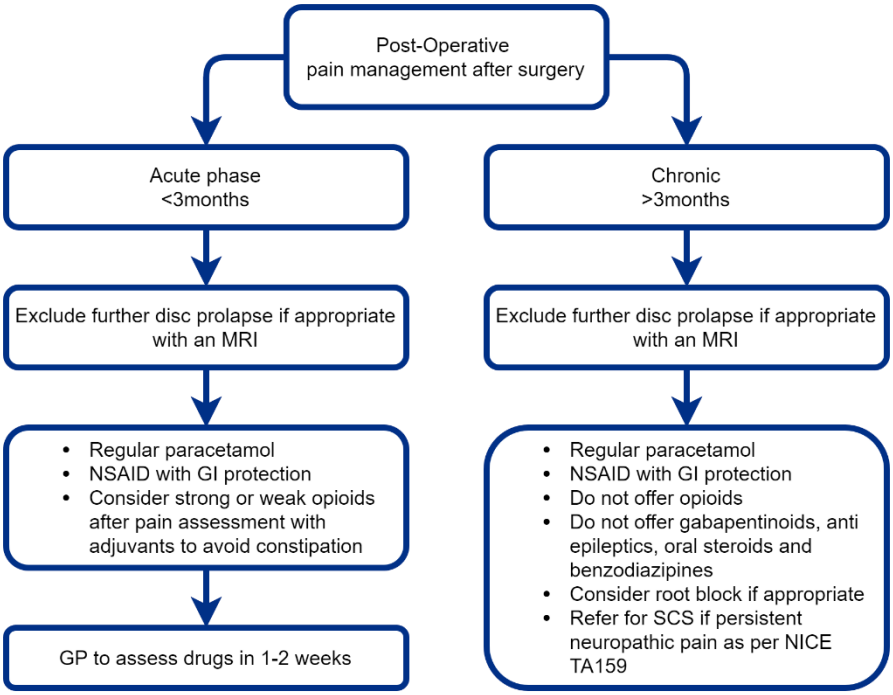
Post-operative care

All patients undergoing surgical intervention for cauda equina syndrome that have ongoing symptoms post-operatively should be referred to the regional spinal cord injury unit through the Online National Referral System.

Mobilisation:

- patients should be mobilised as soon as possible following surgery (usually the first post operative day);
- provision of an information booklet as an inpatient is advised;
- patients should be fully assessed by both the medical and physiotherapy team and any deficit in motor and/or sensory function recorded clearly in the notes prior to discharge;
- splints/orthotics should be fitted prior to discharge if required.

Pain



Urinary function and catheterisation

All patients should be catheterised as soon as possible once a decision to operate has been made.

A trial without catheter (TWOC) should be undertaken as soon as possible post-operatively and pre/post-void bladder scans obtained:

- If the pre-void bladder scan is >500mls (with no sensation to void) or patient hasn't voided for six hours, re-catheterise with long term catheter (with flip/flow) and refer to local services to learn self-catheterisation.
- If the post-void bladder scan is <100ml, no catheter is required at discharge.
- If the post-void bladder scan is >100ml or patient hasn't voided after six hours, re-catheterise with long term catheter (with flip/flow) and referral to local services to learn intermittent self-catheterisation (ISC) if possible.

DO NOT TWOC AGAIN at this stage; patients who fail TWOC must have follow-up with regional spinal cord injury (SCI) service or locally agreed urology service.

If flip/flow has been used, it should be opened as a minimum every four hours, including overnight (shorter time frames may be necessary, drinking dependent, aiming for a bladder volume less than 500mls). DO NOT rely on sensation/urge to void as a trigger to open flip/flow/self-catheterise

It is best practice to teach a patient ISC as quickly as possible post-surgery, where possible.

All patients must have bladder re-assessed as part of their surgical outpatient appointment, and if problems are reported should be referred to locally agreed urology service and/or SCI service.

Bowel function

All patients should be advised by medical/nursing team about potential for bowel issues. Immediate use of an information booklet as an inpatient is advised:

- prescribe bowel stimulants and a softener in the acute postoperative phase. E.g. Senna (stimulant) & Sodium Docusate (softener);
- patients should be educated to undertake digital rectal stimulation (DRS) followed by digital rectal evacuation (DRE);
- Management of Neurogenic Bowel Dysfunction MASCIP published guidelines should be followed;
- patients who have bowel issues must have follow-up with SCI service;
- all patients must have bowel function re-assessed as part of their surgical outpatient appointment and referral to local services or SCI service if an issue.

Psychological support

All patients should be advised by medical/nursing team about how CES can affect other areas of life. Immediate use of an information booklet as an inpatient is advised, e.g. BASS Cauda Equina Syndrome;

- patients should be signposted to support groups:

  Spinal Injuries Association (SIA)
  Cauda Equina Champions Charity
  Aspire (Benefits Advice);

- patients with ongoing cauda equina symptoms should be contacted by SCI psychology services.

Sexual function

All patients should be advised by the medical/nursing team about potential for sexual dysfunction:

- patients should be signposted to support groups:

  Spinal Injuries Association (SIA)
  Cauda Equina Champions Charity;
- patients who have sexual dysfunction must have follow-up with SCI service;
- all patients should have sexual function re-assessed as part of their surgical outpatient appointment and a referral should be made to local services or SCI service if an issue presents;
- it is worth trialling a phosphodiaesterase-5 inhibitor such as Tadenafil / Sildenafil in both men and women.

4. Contributors

Mike Hutton, the GIRFT Clinical lead for Spinal Services would like to thank all of the individuals and groups who contributed to this pathway for their time and expertise shared during this process.

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5. Further reading

Aspire Aspire supports people with Spinal Cord Injury

British Association of Spine Surgeons: Cauda Equina Syndrome 01820-22 BASS Cauda Equina Syndrome Surgical Options.indd (spinesurgeons.ac.uk)

British Association of Spine Surgeons: Consent for Cauda Equina Surgery BASS Cauda Equina Consent Form (v.Feb23).pdf (spinesurgeons.ac.uk)

Cauda Equina Champions Charity Promoting Positive Recoveries - Cauda Equina Champions Charity

East of England MSK service: Do your patients suffer with Cauda Equina Syndrome? Cauda Equina (eoemskservice.nhs.uk)

Faculty of Pain Medicine: Surgery and Opioids Best Practice Guidelines 2021 https://fpm.ac.uk/sites/fpm/files/documents/2021-03/surgery-and-opioids-2021_4.pdf

GIRFT Emergency Medicine National Specialty Report Link here

GIRFT Spinal Services National Specialty Report Link here

Multidisciplinary Association of Spinal Cord Injured Professionals (MACSIP): Guidelines for management of Neurogenic Bowel Dysfunction in Individuals with Central Neurological Conditions Management of Neurogenic Bowel Dysfunction | MASCIP

Medical and Healthcare Products Regulatory Agency: Safety Guidelines for Magnetic Resonance Imaging Equipment in Clinical Use https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/958486/MRI_guidance_2021-4-03c.pdf

Musculoskeletal Association of Chartered Physiotherapists: When you should seek help for your back pain (205) When you should seek urgent help for your backpain - YouTube

NICE guidance 59 https://www.nice.org.uk/guidance/ng59/chapter/Recommendations

NICE guidance 180 https://www.nice.org.uk/guidance/ng180/chapter/Recommendations

NICE technology appraisal guidance 159 https://www.nice.org.uk/guidance/ta159

National Spinal Cord Injury Database Spinal Cord Injury (nscisb.nhs.uk)

Spinal Cord Injury Association A fulfilled life for everyone affected by spinal cord injury - SIA new

The NCEPOD Classification of Intervention Classification of Intervention (ncepod.org.uk)

Woodfield et al (2023) 'Presentation, management, and outcomes of cauda equina syndrome up to one year after surgery, using clinician and participant reporting: a multi-centre prospective cohort study', The Lancet, 24 (100545). DOI: https://doi.org/10.1016/j.lanepe.2022.100545

About GIRFT and the GIRFT Academy

Getting It Right First Time (**GIRFT**) is an NHS programme designed to improve the quality of care within the NHS by reducing unwarranted variation. By tackling variation in the way services are delivered across the NHS, and by sharing best practice between trusts, GIRFT identifies changes that will help improve care and patient outcomes, as well as delivering efficiencies such as the reduction of unnecessary procedures and cost savings.

The GIRFT Academy has been established to provide easily accessible materials to support best practice delivery across specialties and adoption of innovations in care.

Importantly, GIRFT Academy is led by frontline clinicians who are expert in the areas they are working on. This means advice is developed by teams with a deep understanding of their discipline.

GIRFT Academy has also published other pathways and case studies on the best practice library. These are available at: Best Practice Library – Spinal Surgery – Getting It Right First Time – GIRFT

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