

## PHYSIOTHERAPY GUIDELINE

### CAUDA EQUINA SYNDROME (CES) – EARLY RECOGNITION

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All documents must be reviewed by the last day of the month shown under “review date”, or before this if changes occur in the meantime.

#### **FAST FIND:**

**To see a graphical representation of the patient pathway, go to :-  
(Appendix 1. Suspected CES Pathway - page 8)**

**For the questioning proforma, go to PDF File :-  
(Y1076\_03\_12 Suspected Cauda Equina Syndrome Questioning Proforma)**

**For Clinical Definitions go to:-  
(Appendix 2. Clinical Definitions – page 9)**

**For Cauda Equina Syndrome scenarios, go to:-  
(Appendix 3. Cauda Equina Syndrome scenarios –pages 10 and 11)**

**For the summary of clinical recommendations, see Section 5.**

#### **DOCUMENT OVERVIEW:**

- **This document sets out evidence information recommendations to facilitate best practice in clinical decision making and timely action by Physiotherapists when assessing patients with potential or actual Cauda Equina Syndrome (CES).**

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Subjective Questioning Proforma (PDF file)

**(Y1076\_03\_12 Suspected Cauda Equina Syndrome Questioning Proforma\_PRINT)**

## CAUDA EQUINA SYNDROME – EARLY RECOGNITION

### 1. INTRODUCTION

This document sets out evidence information recommendations to facilitate best practice in clinical decision making and timely action by Physiotherapists when assessing patients with potential or actual Cauda Equina Syndrome (CES).

### 2. DEFINITIONS

Word/Term	Descriptor
<b>Cauda Equina Syndrome (CES)</b>	Neurological dysfunction that follows a massive central or centro-lateral disc prolapse, usually at L4/5 or L5/S1 (can occur as high as T11/12 or T12/L1, but at this level the conus medullaris is affected). The lower the level, the less the degree of motor and sensory deficit to lower limbs, but at all levels the parasympathetic supply to the pelvic viscera and the sensory nerves to the perineum is involved.  CES results from the dysfunction of multiple sacral and lumbar nerve roots in the lumbar vertebral canal. Such root dysfunction can cause a combination of clinical features, but the term “CES” is used only when these include impairment of bladder, bowel or sexual function AND perianal or “saddle” numbness – <b>see recommendation i.</b>
<b>Paraesthesia</b>	Abnormal sensation (such as burning, prickling, formication), whether spontaneous or evoked

### 3. PURPOSE

To ensure that clinical recommendations are adhered to and that patients presenting with suspected CES are treated in a timely and appropriate way.

### 4. ROLES AND RESPONSIBILITIES

Post/Group	Details	Resources	Review/ Monitoring	Implementation	Records	Reporting	HR
<b>Physiotherapists</b> working with patients with Musculoskeletal conditions	<ul style="list-style-type: none"> <li>ALL must demonstrate awareness of this guideline.</li> <li>ALL ask for a second opinion in Physiotherapy.</li> <li>All make appropriate referrals.</li> </ul>		Incident reports				
<b>Experienced and Advanced Practitioner Physiotherapists</b> working with patients with Musculoskeletal conditions	<ul style="list-style-type: none"> <li>ALL must have awareness of this guideline and have responsibility for giving a Physiotherapist a second opinion.</li> <li>All make appropriate referrals</li> </ul>		Incident reports				

## 5. SUMMARY OF CLINICAL RECOMMENDATIONS FOR PHYSIOTHERAPISTS

- i. The term CES will be used only when clinical features include impairments of bladder, bowel or sexual function AND perianal or “saddle” numbness.
- ii. Staff will seek an immediate Physiotherapy second opinion where suspicious or uncertain of the clinical diagnosis, which is difficult even for the most experienced staff; and will attempt to distinguish CES subcategories where able.
- iii. Staff will use the Suspected Cauda Equina Questioning Proforma (PDF) and Appendix 2. Clinical Definitions assisting early recognition of CES.
- iv. Detailed clinical examination of neurological integrity will be carried out if in clinic (including signs/symptoms of nerve roots and spinal cord involvement).
- v. Patient consent to examination will be gained and the need for a chaperone will be considered.
- vi. Physiotherapists are not routinely trained to perform “saddle”, rectal or bladder examination but may proceed where competent and patient consents.
- vii. All suspected cases will be managed as an emergency due to complexities of timing symptom onset and devastating consequences of complete CES (Appendix 1. Suspected CES pathway)
- viii. The rare but potential warning signs and symptoms of CES will be discussed with all patients presenting with disc related back pain. Patients will be advised that in the event of developing symptoms it is recommended they seek emergency opinion.
- ix. The detailed patient examination, explanation and all action taken will be documented accurately.

## 6. CLINICAL PRESENTATION

A history of perianal sensory loss and sphincter disturbance, with or without urinary retention suggests the presence of CES.

Signs and Symptoms	Sensitivity of signs and symptoms of CES
	Sensitivity
Urinary retention	0.90
Unilateral or bilateral sciatica	>0.80
Sensory or motor deficit and reduced SLR	>0.80
Saddle anaesthesia	0.75

*NB: Sensitivity is the proportion of true positives identified by the test.*

There are 3 classic presentations:-

- a) Acutely as the first symptom of lumbar disc herniation.
- b) After a long history of chronic back pain with or without sciatica.
- c) Insidiously, in a more chronic way, with slow progression to numbness and urinary symptoms.

CES scenarios are available in Appendix 3.

### 6.1 Evolution of Symptoms in CES and Timescales

It is important to understand how CES develops and evolves. More commonly symptoms **evolve over a few days to a week** although CES has been seen to develop ranging from a couple of days to a few weeks.

- Evolution of increasing back pain and sciatica
- Involvement of the other leg
- Numbness in both legs
- Saddle area subjective sensory changes “ feels odd”
- Saddle area objective evidence sensory impairment
- Urinary changes –frequency, difficulty initiating passing, loss of desire to void
- Abnormal sensation while passing urine
- Decreased sensation or appreciation of passing urine
- Incontinence- typically dribbling overflow urinary incontinence

In the case of tumour in the lumbar canal or at the conus evolution may take a few weeks or months. It is a late manifestation as it implies the tumour has grown to a large volume.

## 6.2 Categories:

Most clinicians now divide CES into two categories:-

1. Complete CES = CES with established urinary retention. The syndrome becomes complete when the bladder is no longer under voluntary control and the patient has urinary retention with dribbling overflow incontinence with loss of anal tone.
2. Incomplete CES = Reduced urinary sensation, loss of desire to void, or poor stream and difficulty with micturition, but no established retention or overflow incontinence.

**See Recommendation ii.**

## 7. CLINICAL EXAMINATION

Detailed subjective history is crucial to minimise the risks of missing early identification of patients with disc herniation at risk of developing CES. The whole clinical picture needs to be considered on clinical decision making – **see Recommendations iii and iv.**

Components of lumbar roots

Nerve level	Motor innervation	Sensory innervation	Reflexes
L2	Hip flexors, thigh adductors	Upper thigh	
L3	Quadriceps, knee extensors	Anterolateral thigh	
L4	Knee extensors and foot dorsi-flexors	Anteromedial calf	Patella, knee
L5	Foot and toe dorsi-flexors (Extensor hallucis)	Lateral calf, dorsum of foot	
S1, 2	Foot and toe plantar flexors	Lateral side of foot, sole of foot	Ankle
S2,3, 4, 5	Sphincters	Perianal and saddle	Bulbocavernous

### 7.1 “Saddle” (Perineal and Perianal), Rectal and Bladder Examination

**See Recommendations v and vi** and the following notes for competent practitioners performing these examinations.

**Chaperones:** The role of a chaperone is as an impartial observer, present for the safety of the patient and/or the therapist. Chaperones provided by the physiotherapist should be adequately trained in a variety of skills including listening skills, observational skills, documentation, issues of confidentiality, when and how to intervene, informed consent procedures, responsibility and accountability. Chaperones should read and sign physiotherapy patient records when the session is completed.

**“Saddle” (Perineal and Perianal) Sensation Examination:** In the early stages the patient may have intact sensation to light touch and pin prick although they report subjective change. When a patient develops sensory change it may be unilateral initially but becomes bilateral, (Gleave and Macfarlane 2002). Sensation may be tested in side lying from the outside toward the sphincter using gentle gloved finger stroke and, if there is any uncertainty, a folded tissue (Lavy et al 2009); or consider the use of a neurotip.

**Trigone Sensation:** This may be tested in the Emergency Department. The Trigone is a smooth triangular region of the internal urinary bladder very sensitive to stretch. An inserted and inflated Foley catheter is gently pulled with the patient unaware called the “catheter tug test”. This should produce a desire to urinate. Abnormal deficit in sensation may indicate neurogenic abnormality such as CES.

**Bladder /Abdominal Palpation:** Palpate for an enlarged or percussable bladder. Acute urinary retention is defined as a painful palpable percussable bladder.

**Bladder Ultrasound and Catheter Drainage:** Ultrasound scan of the bladder and measurement of residual volume drained from bladder catheterisation may be further useful test to assess for retention of urine performed by competent practitioners more likely in the Emergency Department.

#### **Rectal Examination:**

**Rectal Reflexes:** Loss or diminution of bulbocavernous reflex (whereby stimulation of the glans, penis, or clitoris causes reflex contraction of the anal sphincter) is suggestive of CES as the reflex is mediated through the sacral roots.

**Anal Tone:** Anal sphincter tone maybe diminished in about 60 to 80% of cases.

### **8. TIMING FOR SURGERY AND PROGNOSIS**

The urgency of surgery remains controversial for two main reasons:

- Time of onset of symptoms is difficult to specify therefore delay between symptoms and surgery difficult to define
- Research series often contain a mixture of incomplete cauda equina syndrome and cauda equina syndrome with retention, i.e. complete CES.

Good retrospective evidence supports urgent surgery especially in early cases – **see Recommendation vii.**

Prognosis: Established urinary incontinence at presentation is a poor prognostic indicator.

### **9. MINIMISING THE RISKS OF MISSED OR DELAYED DIAGNOSIS**

The clinical diagnosis is not easy. The consequences of delay or missed diagnosis may be catastrophic – **see Recommendation viii.**

### **10. DOCUMENTATION**

Litigation is common when the patient has residual symptoms; always ensure accurate documentation according to **Recommendation ix.**

### **11. TRAINING**

Physiotherapists will be made aware of the document and pathway in new staff induction and receive training through observed practice and questions to seniors or peers.

### **12. MONITORING OF COMPLIANCE**

<b>Objective</b>	<b>Frequency/timescale</b>	<b>Methodology</b>
All cases of suspected CES presenting to Physiotherapy Services are referred to an emergency department	Ongoing	Review of incident forms

### 13. REFERENCES

Abrams, P et al. (2002) 'The standardisation of terminology of lower urinary tract function: Report from the standardisation sub-committee of the International Continence Society'. *Neurology and Urodynamics*, 21, pp.167-178.

Ahn, UM et al. (2000) 'Cauda equine syndrome secondary to lumbar disc herniation: a meta-analysis of surgical outcomes'. *Spine*, 25, pp.1515-1522.

Chartered Society of Physiotherapy. (2013) 'Information Paper Chaperoning and related issues'. *PD104/ERUS IP24*.

DeLong, WB et al. (2008) 'Timing of surgery in cauda equina syndrome with urinary retention: meta-analysis of observational studies'. *J Neurosurg Spine*, 8, pp.305-320.

Deyo, RA et al. (1992) 'What can the History and Physical Examination Tell us about Low Back Pain?' *JAMA*, 268, 6, pp.760-765.

Fergusson, F. (2007) Cauda equine syndrome: The development of a citywide physiotherapy pathway of care. *Int J of Ther Rehab*, Vol.14, No.1, pp.24-29.

Gardner, A et al. (2011) 'Cauda equina syndrome: a review of the current clinical and medico-legal position.' *Eur Spine Journal*, Vol.20, No.5, pp.690-7. doi: 10.1007/s00586-010-1668-3. Epub 2010 Dec 31.

German, T et al. (2015) 'British Association of Spine Surgeons standards of care for cauda equina syndrome.' *The Spine Journal*, Vol.15, No.3, Supplement, pp. S2–S4.

Gleave, JRW, Macfarlane R. (2002) 'Cauda equina syndrome: what is the relationship between timing of surgery and outcome?' *Br J Neurosurg*, Vol.16, No.3, pp.325-328.

Greenhalgh S, Selfe J.(2006) 'Red Flags. A Guide to Identifying Serious Pathology of the Spine.' Churchill Livingstone, Edinburgh.

Greenhalgh S, Truman C, et al. (2016) Development of a toolkit for early identification of cauda equine syndrome. *Primary Health Care Research & Development*, Vol.17, pp.559-567.

<http://www.fowlersyndrome.co.uk/>

Jaloh I, Minhas P. (2007) 'Delays in the treatment of cauda equine syndrome due to its variable clinical features in patients presenting to the emergency department.' *Emergency Medicine*, Vol.24, pp.33-34. doi:10.1136/emj.2006.038182.

Jerwood D and Todd NV. Reanalysis of the timing of cauda equine surgery. *Br J of Neurosurg*, Vol.20, pp.178-179.

Lavy C et al. (2009) 'Cauda Equina Syndrome.' *BMJ*, Vol.338, pp.881-884. doi:10.1136/bmj.b936

Todd NV. (2009) 'An Algorithm for suspected cauda equine syndrome.' *RCS Eng. Annals*, Vol.91, No.4, pp.358-359. <http://publishing.rcseng.ac.uk/doi/10.1308/003588409X428487>

Todd NV. (2011) 'Causes and outcomes of cauda equina syndrome in medico-legal practice: a single neurosurgical experience of 40 consecutive cases.' *Br J Neurosurg*, Vol.25, No.4, pp.503-8. doi: 10.3109/02688697.2010.550344. Epub 2011 Apr 22

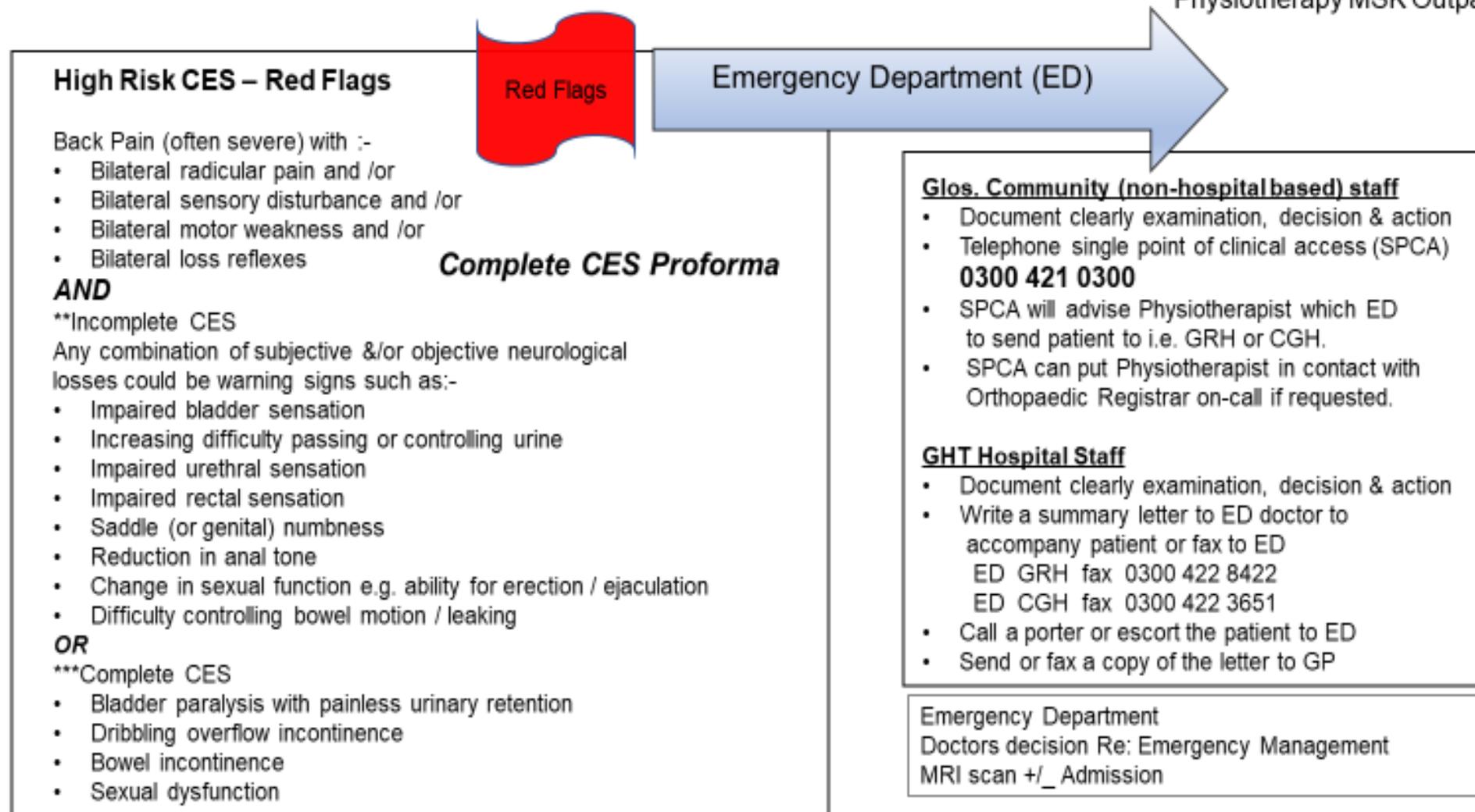
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## Suspected Cauda Equina Syndrome (CES) Pathway

GHNHSFT Therapy Service  
Physiotherapy MSK Outpatients

S. Durrell Consultant Physiotherapist 2017

**Physiotherapy Guideline  
Cauda Equina Syndrome (CES) – Early Recognition**

**Clinical Definitions**

<b>Bladder sensation</b>	
Normal	The individual is aware of bladder filling and increased sensation up to a desire to void.
Increased	The individual feels an early and persistent desire to void.
Absent	The individual reports no sensation of bladder filling or desire to void.
Non-specific	The individual reports no specific bladder sensation, but may perceive bladder filling as abdominal fullness, vegetative symptoms or spasticity.
Abrams, 2002	
<b>Daytime frequency</b>	The number of voids recorded during waking hours. Normal 6-8 times daily
<b>Nocturia</b>	Is the complaint that the individual has to wake at night one or more times to void. Normal night time frequency: - Greater than 70yrs = two times / Less than 70yrs = one time
<b>Urinary incontinence</b>	
Stress urinary incontinence	The complaint of involuntary leakage on effort or exertion, or on sneezing or coughing.
Urgency urinary incontinence	Is the complaint of involuntary leakage accompanied or immediately preceded by urgency. Haylen, et al 2009
Nocturnal enuresis	Is the complaint of loss of urine occurring during sleep.
Abrams, 2002	
<b>Retention</b>	
Acute retention of urine	Is defined as a painful, palpable or percussable bladder, when the patient is unable to pass any urine.
Chronic retention of urine	Is defined as a non-painful bladder which remains palpable or percussable after the patient has passed urine. Such patients may be incontinent.
Abrams, 2002	
<b>Faecal incontinence</b>	No agreed definition but can be defined by symptom e.g. whether the patient has an urge before leakage (urge faecal incontinence) or has no sensation (passive soiling).
NICE CG 49, 2007	
<b>Anaesthesia</b>	A state characterised by loss of feeling or sensation, i.e. numbness.
<a href="http://www.online-medical-dictionary.org">www.online-medical-dictionary.org</a>	
<b>Parathesia</b>	An abnormal sensation (such as burning, prickling formication), whether spontaneous or evoked.
British Pain Society	

Compiled by Rebecca Carr, Clinical Specialist Physiotherapist, Women's Health, GHNHSFT.

## Cauda Equina Syndrome Scenarios

### Scenario 1. Common Presentation

Most cases are people between 20 to 40 years who present with back pain and sciatica; most commonly due to lumbar disc prolapse; but whom deteriorate. A significant compression of the nerve root is indicated by pain remaining severe for more than 4 to 6 weeks, or by the patient developing foot drop (L4/L5 disc). Progression to CES is possible. The majority of patients who progress to CES have a history of LBP and sciatica but some progress at first episode.

Often the patient develops increasing pain in their back and leg, and then may develop pain in the other leg (bilateral sciatica) = risk factor for progression CES. Then they may complain that it does 'not feel right' in the saddle area = symptom of developing CES. Sensory disturbance in the saddle area in early stages is subjective e.g. patient feels that it is 'not right' and they may complain that it 'felt odd' when sitting on the toilet. In the early stages sensory testing may reveal intact pinprick and light touch sensation although the patient has a subjective change. Objective signs may develop and initially saddle sensory impairment is often unilateral but becomes bilateral. Soon after this the patient may develop problems with bladder function. This may include frequency, difficulty initiating passing, loss of desire to void, poor stream and lack of a full feeling when passing urine.

In the full blown CES the patient is unable to pass urine and then becomes incontinent but does not have a sensation of passing urine. The patient usually complains of bladder problems before bowel problems. Sexual function is also lost. Not infrequently when the sensory disturbance becomes established (objective) the patient may describe that the pain in the legs decreases but the feeling in their legs becomes more 'abnormal', 'feeling like jelly'.

### Red Flags

- Progressive development of bilateral sciatica
- Complaint of sensory disturbance of saddle /inner thighs/genital area
- Increasing difficulty with passing urine and controlling urine

### Occurrence

Various authors report the occurrence as follows:-

- 1 to 2% of all disc herniations, coming to surgery, which is 0.0004 of all back pains, ( Deyo et al 1992).
- Estimated each year 0.12% of herniated discs is likely to cause CES, using US data on annual incidence of symptomatic disc herniation, but suspect this is an underestimation, (Lavy et al 2009).
- Up to 1% of all disc herniations, (Shapiro 2000).
- Less than 2% (Ng et al 2004) or 2 to 3% (Gleave & Macfarlane 2002), or of all lumbar disc operations.

### Scenario 2. Less Common Presentation

Back pain and unilateral sciatica, remains unilateral, then develops saddle sensory impairment and bladder dysfunction. This can occur e.g. if disc prolapse is at L5/S1, or if prolapse affects one side but is large and a ruptured free fragment occurs and migrates downwards. It then compresses nerves within the canal below L5/S1 disc and spares the S1 nerve root. Compression below this level does not usually give severe pain radiating down the leg. Compression just below L5/S1 can involve nerves to bladder and bowel and progress to CES.

## Differential Diagnoses and Confusing Scenarios

It is not uncommon for patients with severe back and leg pain to complain of difficulty passing urine due to the following possible causes:-

- Severe pain. This can inhibit bladder functioning or disrupt normal function.
- Opiate analgesia. Strong pain killers are usually opiates (Morphine type drugs) and these affect the bladder sphincters.
- Other genito-urinary problems are many.

Differential Clues:-

- Normally the above causes of bladder dysfunction are temporary or intermittent short lasting few hours only.
- Anxiety plays a part in bladder function problems usually with pain control and relaxation the patient can pass urine.
- These patients usually do not have a significant complaint of sensory impairment in the saddle region.

*NB: Often the bladder problem is in isolation in these cases.*

## Urinary Retention

There are many possible causes of urinary retention including obstruction of the urinary tract or problems of the nervous system. Consider the following:

1. Nerve Disease or Nerve / Spinal Cord Injury – E.g. vaginal childbirth, infections of brain or spinal cord, diabetes, stroke, injury to nervous system of spine or pelvis, Multiple Sclerosis, heavy metal poisoning.
2. Prostate Enlargement- The male prostate gland may enlarge with age (benign prostatic hyperplasia or consider malignancy). As the prostate enlarges it presses on the urethra resulting in the bladder wall becoming thicker and irritable. The bladder may then contract even when holding only small amount of urine = frequency. Eventually the bladder may weaken and loses the ability to empty itself, so urine remains.
3. Infection- A urinary tract infection (UTI) may cause retention if the urethra becomes inflamed and swells shut.
4. Surgery- Post –operative temporary urinary retention is not uncommon due to anaesthetic nerve block.
5. Medication- Many medications work by calming overactive nerve signals. Some of the following groups of drugs that may cause urinary retention are:- Antihistamines ; Anticholinergics/antispasmodics to treat stomach cramps, muscle cramps and incontinence; Tricyclic antidepressants.
6. Bladder Stone - urinary tract blockage
7. Prolapse of anterior or posterior vaginal wall structures– could cause urinary incontinence or retention.
8. Constipation – Hard stool in the rectum can pinch shut the urethra – more likely in the presence of retrocele.
9. Urethral Stricture – narrowing or closure of urethra E.g. trauma or infection.
10. Fowler's Syndrome – retention of urine without evidence of urological, gynaecological or neurological disease.