THE NORTHERN HOSPITAL

BACK PAIN - MUSCULOSKELETAL

Jefferson Davis and his Southern Belle, wife Varina, 1845.

"Reading that telegram, he looked so grieved that I feared some evil had befallen our family. After a few minutes he told me, as a man might speak of a sentence of death"

Varina Davis.

"Upon my head were showered smiles, plaudits, and flowers - but beyond them I saw troubles innumerable"

Jefferson Davis.

"The feeling among the Southern members for the dissolution of the Union is becoming more general. Men are now beginning to talk of it seriously, who twelve months ago hardly permitted themselves to think of it. The crisis is not far ahead"
(Alexander Stephens)

The country was coming apart. In the presidential election of 1860, Buchanan happily stepped aside, but not before his ruling democratic party was fatally split over the issue of slavery. The Republicans, a new party, saw their chance and nominated Abraham Lincoln, a moderate. His platform pledged only to halt slavery's further spread.

"On that point, hold firm as with a chain of steel. Those who deny freedom to others deserve it not for themselves, and under a just God cannot long retain it".
(Abraham Lincoln)

Radical abolitionists in the north complained that Lincoln's opposition to slavery did not go far enough. But to most people in the south, the prospect of Lincoln's election posed a lethal threat. The 1860 campaign had become a referendum on the Southern way of life. On November 6, 1860, Abraham Lincoln won the presidency with only 40% of the vote. He did not even appear on the ballot in 10 Southern states.

"The election of Mr. Lincoln is undoubtedly the greatest evil that has ever befallen this country, but the mischief is done and the only relief for the American people is to shorten sail, send down the top masts, and prepare for a hurricane".
(Richmond Whig).

In the south, Lincoln was burned in effigy. Now the South Carolina legislature called for a convention to consider seceding from the Union.

Southerners would have told you they were fighting for self-government. They believed the gathering of power in Washington was against them. When they entered into that Federation, they certainly would never have entered into it if they hadn't believed it would be possible to get out. And when the time came that they wanted to get out, they thought they had every right. The Southerners saw the election of Lincoln as a sign that the Union was about to be radicalized and that they were about to be taken in directions they did not care to go. The abolitionist aspect of it was very strong, and they figured they were about to lose what they called their property and faced ruin.
(Shelby Foote, Civil War Historian)

Yet many Southerners thought secession was madness

"South Carolina", one Southern politician wrote, "is too small for a republic and too large for an insane asylum!".

"November 19, 1860 - A most gloomy day in Wall street. Everything at a deadlock. First class paper not negotiable. Stocks falling"
(George Templeton Strong)

In New York emotions were no less explosive, and George Templeton Strong, a conservative lawyer who distrusted Lincoln began to keep track of events in his diary.

"The bird of our country is a debilitated chicken, disguised in eagle feathers. We have never been a nation. We are only an aggregate of communities, ready to fall apart at the first serious shock".
(George Templeton Strong)

When Abraham Lincoln was elected President, there were 33 states in the Union, and a 34th, Free Kansas, was about to join. By the time of his inauguration five months later, just 27 states would remain. The suddenness of succession took everyone by surprise.

South Carolina led the way on December 20th. A bell in Charleston tolled the succession of departing states - Mississippi on January 9, Florida on the 10th, then Alabama, Georgia, Louisiana

In Texas Governor Sam Houston was deposed when he tried to stop his state from joining the Confederacy.

"Let me tell you what is coming. After the sacrifice of countless millions of treasure and hundreds of thousands of lives you may win Southern independence, but I doubt it. The North is determined to preserve this Union. They are not a fiery, impulsive people as you are, for they live in colder climates. But when they begin to move in a given direction, they move with a steady momentum and a perseverance of a mighty avalanche"
(Sam Houston) .

Texas, left anyway. Even Virginia, the most populous Southern state, birthplace of seven presidents, seemed sure to follow.

"All the indications are that this treasonable inflammation, "secessionitis", keeps on making steady progress, week by week. If disunion becomes an established fact, we have one consolation - the self-amputated members were diseased beyond immediate cure, and their virus will infect our system no longer".
(George Templeton Strong)

The Charleston Mercury: "The tea has been thrown overboard. The Revolution of 1860 has been initiated"

After South Carolina seceded, the handful of Federal troops still stationed in Charleston withdrew to Fort Sumpter, far out in the harbor. Their commander, Major Robert Anderson, said he had moved his men in order to prevent the effusion of blood. They were quickly surrounded by rebel batteries

"Thank God we have a country at last, to live for, to pray for, and if need be, to die for".
(Lucius Quintus Lamar)

On February 18, a few minutes after noon, Jefferson Davis stood on the steps of the Alabama Statehouse at Montgomery and took the oath of office as President of the Provisional Confederate States of America. The crowds cheered, wept, sang Farwell to the Star Spangled Banner, and Dixie a minstrel tune written by a Northerner.

He was brittle, nervous, often unable to sleep, and partly blind in one eye. Accustomed to being obeyed, he scorned the bargaining that made Democratic government work. Sam Houston said he was as cold as a lizard and ambitious as Lucifer. Like Lincoln, he was a Kentuckian, the son of an itinerant farmer. But he had been educated at West Point, fought in Mexico, and served as Secretary of War. As senator from Mississippi, he resisted secession as long as he could. But when his state withdrew from the Union, he headed home to his plantation, Brierfield, south of Vicksburg. He and his wife Varina were there, clipping roses in the garden, when word came that he had been elected President.

"Reading that telegram, he looked so grieved that I feared some evil had befallen our family. After a few minutes he told me, as a man might speak of a sentence of death"
(Varina Davis)

"Upon my head were showered smiles, plaudits, and flowers, but beyond them I saw troubles innumerable"
(Jefferson Davis)

David McCullough and Shelby Foote in Ken Burns', "The Civil War", 1990.

Musculoskeletal back pain counts for a significant burden of Emergency Department presentations. Attempts at the efficient "processing" of these numerous presentations are frequently devised, particularly in the form of management "pathways" often designed merely facilitate completely arbitrary non-clinical time-based "KPIs" that take little heed of the reality of the complexities of assessment of these presentations.

Back pain has a vast differential diagnosis and included amoung these are a multitude of potentially lethal conditions. "Red Flags" must always be carefully considered in any patient who presents with a complaint of back pain. For those junior inexperienced clinicians who deem their patient suitable for the preordained maze of the back pain pathway, they will find their heads showered with smiles, plaudits, and flowers by medical administrators devoid of any sense of the complexities of clinical assessment. For more older, wiser and experienced clinicians however, may perceive, beyond the sacred "pathway", troubles innumerable! Every clinician who practices long enough - on the floor - will inevitably be caught out by a serious pathology which they initially assumed to be merely "musculoskeletal".

In the modern Emergency Department, we must remain ever wary of placing the quick "KPI win" of the spread sheet over the safety, indeed the very life of our patients. It may be well, for those who aspire to the corridors of "administration" to spare a thought for Jefferson Davis - though he gratefully accepted the accolades showered upon him, both he and Varina ultimately had no illusions as to just exactly what it was they were accepting - a poisoned chalice!

BACK PAIN - MUSCULOSKELETAL

Introduction

Back pain is a very common presentation to the ED

In board terms back pain can be considered in terms of:

1. **Non- Musculoskeletal.**
2. **Musculoskeletal:**
    - **Trauma**
    - **Non-Trauma**

The commonest cause will be a musculoskeletal condition.

"Musculoskeletal" generally refers to:

1. Acute paraspinal muscle strain/ spasm
2. Acute paraspinal ligamentous strain
3. Acute intervertebral cartilaginous disc problems, (even though not strictly muscle or bone)
4. Exacerbation of degenerative osteoarthritis of the spine
5. Acute exacerbation of sciatica
6. Acute bony spine problems (such as vertebral crush fracture).

Important issues that will need to be addressed in the ED will include:

1. Have important **non-musculoskeletal** causes been considered and ruled out?
2. Is the patient at high risk for potentially a serious condition?

    This is the most important aspect to consider in patients who present with back pain.

    The classic "red flag" features of back pain that may indicate a serious underlying pathology must always be carefully considered.

3. Are there any neurological features?
4. Has there been any trauma?

5. What investigations and management has the patient had in the past for this problem?

6. Adequate analgesia.

7. Assessment of the patient's co-morbidities and functional ability to cope.

8. Formulation of a disposition and follow-up plan.

9. Are there any significant psychosocial factors (or "**yellow flags**") that may negatively impact on the patient's ability to recover or deal with their back pain or develop chronic pain.

These following refers specifically to presumed non-traumatic musculoskeletal causes of back pain.

See also separate documents for:

- **Back Pain (General approach to the Clinical Presentation of - including "red flags" for back pain presentations - in Clinical Presentations folder).**
- **Sciatica (in Orthopedics folder)**
- **Cauda Equina Syndrome (in Neurosurgical folder)**
- **Spinal Cord Compression Non Trauma (in Neurosurgical folder)**
- **Spinal Canal Stenosis (in Orthopedics folder)**
- **Bone Pain in the Oncology Patient (in Oncology folder)**

Pathophysiology

The principal causes of acute musculoskeletal back pain will include:

1. Acute paraspinal muscle strain/ spasm

2. Acute paraspinal ligamentous strain

3. Acute intervertebral cartilaginous disc problems, (even though not strictly muscle or bone)

4. Exacerbation of degenerative osteoarthritis of the spine

5. Acute exacerbation of sciatica

6. Acute non-traumatic bony spine problems (such as osteoporotic vertebral crush fracture).

Clinical Assessment

When a assessing a patient for back pain it is important not to be too ready to dismiss them as simply "musculo-skeletal"

There are well document "red flag" symptoms that raise suspicion for possible serious underlying pathology, and these should be carefully considered in each patient who presents with back pain.

See Back Pain Document in Clinical Presentations Folder for important differential diagnoses and "red flags"

Important points of history:

1. Has there been any acute trauma?

2. Is there a past history of back pain and if so:

    - What investigations have been performed?
    - What treatment has been provided?
    - Who is the patient's usual medical practitioner with regard to the management of this?

3. Has there been any recent back surgery?

4. Medications:

    Important considerations include:

    - Warfarin or NOACs, (consider retroperitoneal hematoma or epidural hematoma)
    - Steroids, (consider osteoporosis/ crush fractures)
    - Immunosuppressants (consider epidural abscess or paraspinal abscess)
    - Analgesic agents normally taken or newly taken

5. Does the patient have a **drug dependency**?

    - Back pain is a common presentation in drug seeking patients.

      Obviously the patient may not volunteer this, however indirect indicators can often be found on questioning, or by the patient's past medical record.

6. Does the patient have any significant **psychosocial comorbidities**, likely to impact on **ability *or* motivation** to recover or **deal** with their back pain or to develop **chronic back** pain?

   This is an important aspect in the assessment of any patient who presents with musculoskeletal back pain, *particularly when subactute or chronic.*

   Psychosocial comorbidities, are frequently overlooked or underappreciated when assessing patients with musculoskeletal back pain. Indeed these comorbidities, have been termed "**Yellow Flags**": [3]

   Significant psychosocial barriers to recovery can include: [3]

   - **Fear of re-injury**
   - **Depression / anxiety or other mental health issues**
   - **Social and emotional stresses**
   - **Low job satisfaction.**

7. Ability to cope:

   - How severe are the patient's symptoms and how are they coping with these?
   - What are the patient's home circumstances?
   - What supports do they have?

8. Past history:

   - Assess for any possible **risk factors** of relevance to back pain.

Important points of examination:

1. Check vital signs, especially for **fever/ hypotension.**

2. Is there **midline point tenderness** of diffuse tenderness?

   - Point tenderness may indicate significant disc prolapse, but may also indicate osteomyelitis, spinal epidural abscess or bony metastases.

3. **Neurological examination**

   It is vital to always rule out significant neurological deficit. Important considerations in this regard include:

   - Saddle anesthesia, (cauda equine syndrome)

- Bowel or bladder symptoms
- Muscular weakness

Loss of reflexes and sensory changes are much more difficult to asses and very patient subjective. These features in most cases are unhelpful in assessment.

Patients with malignancy:

- Spinal cord compression must be *considered* in any oncology patient with back pain and/or leg weakness, no matter how subtle, with or without leg weakness, with or without bowel or bladder dysfunction.
- Consider spinal cord compression in any patient with increasingly severe back pain, often with localized tenderness.
- **Do not** expect "classical" or "objective" neurological signs.

  The classical findings of a sensory level and UMN signs occur late and imply irreversible damage.

4. Signs of sciatica:
   - Nerve root compression usually results in radiated pain into the toes. Straight leg raising testing can highlight this symptom.
   - Referred musculo-ligamentous does not usually radiate past the knees.
5. Old surgery:
   - Is there any old scarring from previous surgery?

Investigations

In many cases a clinical diagnosis of an uncomplicated muscular-skeletal problem is clear and there will be no need for investigation

The nature and extent of investigation will depend on the degree of suspicion for any given pathology and this will be guided by the clinical findings as well as the risk factors the patient may have.

Investigation will be necessary:

- To rule out serious alternative diagnoses.
- Spinal cord compression
- Injury in cases of acute trauma

Considerations include:

Blood tests:

1. FBE
    - Elevated WCC (consider an alternate diagnosis)
2. CRP
    - Consider infection/ malignancy/ rheumatologic disorders.
3. U&Es/ glucose.
4. Calcium, (in malignant disease).

Others are done as clinically indicated.

FWT:

If renal disease, kidney stone, or urinary tract infection is suspected.

Plain radiology:

Plain x-rays are generally not helpful but may be useful for:

- Documenting the degree of degenerative change.
- Documenting vertebral collapse in patients with osteoporosis.
- Gaining *indirect* evidence of other pathology such as spinal malignancy or osteomyelitis.

Plain radiology of the thoracolumbar spine has been traditionally done for **traumatic** injury, however CT scan is now considered the imaging modality of choice, (as for cervical spine injury).

In general however plain radiology is **not** helpful in clear cut cases of musculoskeletal back pain, and is **not** routinely indicated.

FAST Scan:

This is a particularly useful examination in the patient who may have an AAA.

Look for aneurysm or free fluid.

CT scan:

This is useful in:

- Ruling out some important **alternative diagnoses**, such as aortic aneurysm or retroperitoneal hematoma.

- Severely debilitating cases of pain, in particular for **disc prolapse.**

Note that CT is a good investigation for disc prolapse problems which are common. Although MRI is the best investigation, this is not always readily available, and CT is usually able to diagnose significant disc pathology.

Note that CT scan may be urgent in some cases. A severely prolapsed disc may result in spinal cord compromise and urgent intervention may be required, (**see Appendix 1 below**).

MRI:

This is the best investigation for back pain as it is the most sensitive and most specific for musculoskeletal pathology and in particular for soft tissue spinal cord pathology.

Important examples of spinal cord pathology include transverse myelitis, vascular lesions, epidural abscess and epidural hematoma.

It is mandatory and urgent in cases of suspected spinal cord compression, especially involving the acute onset of weakness or autonomic disturbances, (bladder/ bowel dysfunction), (see also acute spinal cord compression guidelines)

Bone scan:

This is useful for suspected bony metastases.

Management

Once **serious alternative diagnoses have been considered and excluded,** initial management for **musculoskeletal** pain in the ED will include:

1. Initial general management in milder cases includes:

    - Postural advice
    - Minimising bed rest
    - Staying active
    - Heat wrap therapy

These are all effective in low back pain.

2. Analgesia:

Options include:

Paracetamol:

- Unlikely to be effective alone however in cases that have warranted an ED presentation.

  In general long acting preparations of paracetamol, such as "**paracetamol osteo**" are far better options than standard release preparations, in the setting of **chronic** back pain.

NSAIDS:

- Aspirin
- Other NSAIDs (oral or topical)

  Topical NSAID formulations are widely used in the treatment of local musculoskeletal disorders. This route is generally a safer alternative to oral NSAIDs, however they are usually absorbed only in small amounts and so may be somewhat less effective, (eTG - July 2017).

Benzodiazepines (used as "skeletal muscle relaxants"):

- Supposed skeletal muscle relaxants such as diazepam and orphenadrine, (Norflex) are commonly prescribed to alleviate muscular spasm, in addition to providing some sedation.

  There is however, evidence to suggest that the addition of diazepam to an NSAID, does **not** confer any benefit, in cases of ED patients with acute, non-traumatic, non-radicular low back pain at 1 week and 3 months after ED discharge. [4]

  Given this finding benzodiazepines are best avoided as they will only increase the risk of adverse effects and the potential for psychological or physical addiction.

Opioids:

- Codeine/ oxycodone:

  Oxycodone if used is preferred to codeine as this is less liable to variable metabolism than is codeine, in individual patients and so has a more efficacious and predicable response in general.

Note, however that oxycodone should be avoided if possible and then only used for *acute* management, rather than as a long term solution to chronic back pain.

Subtherapeutic doses of codeine (< 30 mg) were commonly incorporated into multi-formulation "over the counter" simple analgesics in the past. These doses of codeine add no real benefit over and above their accompanying NSAIDs, aspirin or paracetamol, and only increased the risk of codeine abuse and dependence.

- Oral morphine:

  When oral opioids are used, morphine may be preferred to oxycodone, as it is associated with a lesser degree of euphoria compared with oxycodone, though both have similar analgesic efficacy. This may help limit abuse potential. [5, 6]

  Opioid prescription to patients to be discharged from the ED should only be for a limited periods (e.g. 2 -3 days) - until review by their GP.

  Patients should always be counseled on the risks of developing tolerance and dependence when using opioids.

- **Parenteral opioids**

  These are best **avoided where possible**:

  Particularly in *chronic* conditions, as this may engender long term opioid dependence.

  "Back pain" is also a common presentation in drug seekers, and this possibility must be kept in mind when dealing with demanding patients, particularly those who claim, "nothing else works" and / or are "allergic" to everything else.

  They are best reserved for cases of acute trauma, but may be required in very severe cases of acute musculoskeletal back pain.

  Morphine and tramadol, (providing there are no specific contra-indications) are two options.

Tramadol / tapentadol:

- These may be better options than the pure opioids when longer term use is necessary

Corticosteroids:

- A short course of steroids has been advocated, however there is insufficient evidence for these to be used as a routine, nor do they appear to convey any longer term benefit.

Anti-neuropathic agents: [4]

- People with chronic low back pain, may experience **nociceptive pain** secondary to degenerative / arthritic changes *or* **neuropathic pain** secondary to direct nerve root irritation, or **both** types of pain.

  Around 10 - 17 % of patients with low back pain will suffer neuropathic pain.

  If neuropathic pain is thought to be contributing to the patient's symptoms then an anti- neuropathic agent may be trialed

  It should be noted, however that neuropathic pain medications are *not* proven for **acute** pain and their peak effect may not be apparent for 1 - 2 weeks.

  Current expert opinion recommends the following 4 agents:

  - ♥ Pregabalin
  - ♥ Gabapentin
  - ♥ Duloxetine
  - ♥ Amitriptylline

  It should further be noted that even though pain management experts classify amitriptyline as a "first line agent", from the perspective of an Emergency Medicine Physician its use is significantly limited by its potential for life-threatening toxicity in overdose.

  The group of patients that suffer chronic pain syndromes frequently have significant psychological or psychiatric comorbidities which put them into a high risk group for overdose.

  Careful patient selection is vitally important when considering this "first line" agent for neuropathic pain.

Suggested regime for acute ED treatment: [1]

For less severe pain use:

- *Paracetamol 1gram orally 4 hourly prn (to a maximum dose of 4gram per 24 hour period)*

And/or

- *Ibuprofen 400mg orally 6 hourly prn*

** For moderate pain in patients who are opioid naïve, start with 5mg oxycodone. If this is tolerated, but there is an inadequate response, a further 5mg may be given after 30 to 60 minutes. Larger and more frequent doses may be necessary.*

NSAIDS should be used with caution, if at all, in the elderly or in presence of renal disease and peptic ulcer disease.

For more severe pain use: [1]

- *Oxycodone immediate release 5 to 10 mg orally 4 to 6 hourly prn*

And

- *Paracetamol 1gram orally 4 hourly prn (to a maximum dose of 4gram per 24 hour period)*

And/or

- *Ibuprofen 400 mg orally 6 hourly prn*

Failure of analgesic effect with the above regimes may then be an indication to move to titrated IV morphine.

Following analgesia a period of observation in the ED in order to assess the response will be required.

3. **Physiotherapy:**

In many cases a physiotherapy assessment in the ED will prove invaluable in:

- Assessing the degree of disability
- In encouraging a patient to mobilize.
- Initiating a treatment strategy.

4. Radiological intervention:

- Following orthopedic assessment CT guided injections of steroid/ local anesthetic may provide some relief of severe symptoms.

5. Surgical options:

In severe cases Orthopedic intervention may be required.

Options that may be considered include:

- Discectomy:
  - ♥ Discectomy is a minimally invasive procedure in which herniated disc material is removed, while the support structure of the disc is kept intact.
- Spinal fusion:
  - ♥ Spinal fusion is a process during which a number of vertebrae are fused together.
- Laminectomy:
  - ♥ This involves the removal of a significant posterior portion of the bony spinal lamina. It is performed to relieve pressure on the spinal cord.

Disposition:

When symptoms have settled, most **uncomplicated** cases of musculoskeletal back pain will be suitable for discharge and follow-up by their GP.

Physiotherapy referral should be made for those with more significant symptoms.

Non urgent follow-up CT scans or MRIs may be ordered and followed up by the GP, as appropriate.

In some cases admission to hospital may be necessary, in particular where:

- The patient's symptoms are severely debilitating
- The patient is unable to cope
- Alternative more serious diagnoses need to be excluded

Cases of uncomplicated musculoskeletal pain may be admitted under the orthopedic unit or a general medical unit, following orthopedic consultation.

Alternatively some cases may be suitable for an Emergency department **Short Stay Unit** (or similar) admission - although any "**Yellow Flags**" will need to be taken into consideration when assessing patients for this disposition.

Patients whose symptoms remain severe and unrelenting should have imaging done on, before discharge from hospital, (case in point, demonstrated by the case report below).

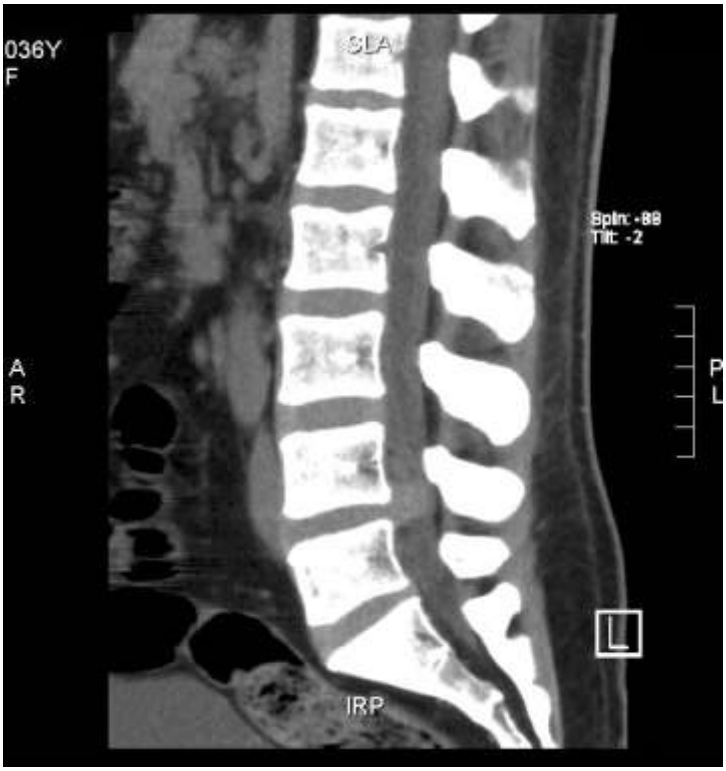
Patients with chronic and significantly debilitating symptoms will require referral to an Orthopedic surgeon ***specializing*** **in back conditions.**

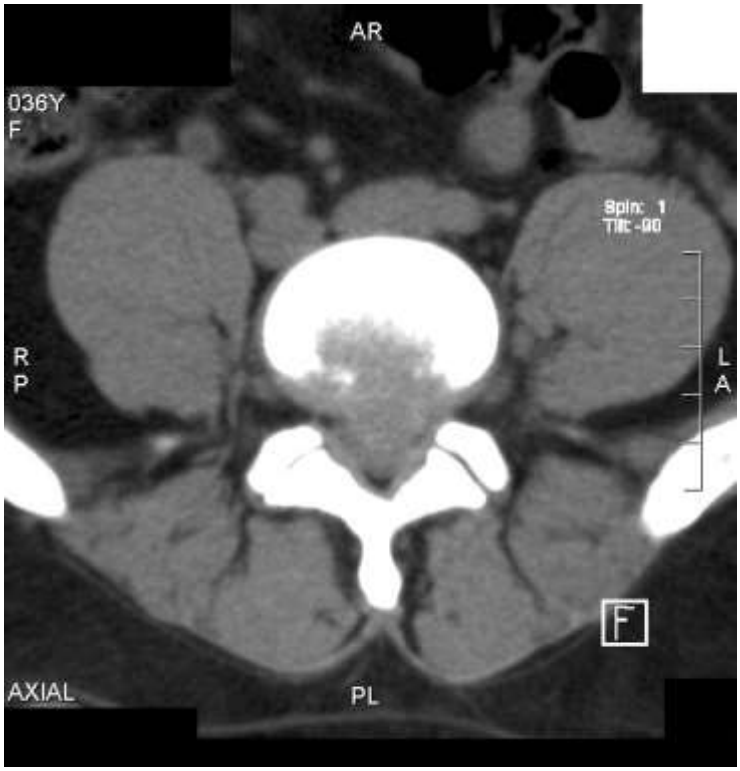
Patients with chronic pain should also be considered for referral to:

- A Chronic Pain Clinic
- A Psychologist

Appendix 1

Case Report:





Left: Saggital CT scan showing a very severe posterior disc prolapse at L3-4. Right: transverse section, showing significant impingement on the spinal cord. This patient was a 36 year old man with a history of chronic back pain who presented with an acute exacerbation of his pain.

Surprisingly he had only moderate sensory loss in his left leg, motor power and autonomic function was intact. CT was done on an urgent basis as the patient was unable to tolerate his pain and unable to mobilize despite repeated attempts guided by a physiotherapist. Because of the severity of the prolapse the patient underwent an urgent laminectomy which in all likelihood saved him from an imminent and catastrophic cauda equina syndrome.

Jefferson Davis - accepts the poisoned chalice - his swearing in as President of the Confederate States of America, 1861.

"After a few minutes he told me, as a man might speak of sentence of death", Varina Davis.

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