Objectives: Session 2

- Identify appropriate Diagnostic Tests as further work-up to confirm diagnosis
- Discuss Treatment Algorithms – conservative and invasive

Diagnostic tests

- **Labs:**
  - Usually not necessary unless suspect Rheumatologic process, Infection or Malignancy
  - CBC with differential
  - ESR/CRP
  - Urine for Bence Jones Protein
  - SPEP / UPEP
  - Rheumatologic labs
Imaging studies

- X-rays
- MRI Scan LS spine, +/- Contrast ??
- EMG/NCV
- CT Scan, +/- Myelogram
- Bone Scan

X-rays: Indications

- Back pain in patients > 55 years old
- h/o violent trauma
- Persistent night / rest pain
- h/o CA
- Systemic illness / weight loss
- Associated morning stiffness, iritis, colitis, skin rash, urethral discharge

Views:

- AP/Lateral/Obliques
- Flexion / Extension views

Demonstrate:

- Bony anatomy
- Alignment
- Fractures
- DDD / DJD
- Rarely, CA
- Instability
- Spondylolysis
- Listhesis

MRI Scan

- Mainly soft tissue pathology
- Also shows bony architecture
- Disc: degeneration, herniation
- Nerve roots: compression
- Spinal stenosis: canal dimension
- HIZ on T2: Annular tear
- Intradural lesions
Definite indications of MRI

- Neurologic deficit
- Clinical suspicion of HNP: Radicular symptoms + Signs of nerve root tension +/- neurologic deficit
  - Initially / after failed conservative care ??
- Suspected Cord Compression

Relative indications of MRI

- “Red flags”: clinical suspicion of CA / mets / infection
  - 8-12 weeks of persistent LBP, despite treatment
- Recurrent radicular symptoms suggestive of recurrent / residual HNP (failed back)
- Spinal stenosis ??

When to add contrast?

- Suspect CA / mets (??)
  - Bone Scan ?
- Infection (??)
- Failed back syndrome:
  - To differentiate a recurrent disc vs scar infiltration

MRI: FALSE POSITIVE

MRI: Very sensitive, not specific in determining source of pain

- MRI findings must be carefully correlated with a patient’s clinical findings; as disc abnormalities are frequently found on MRI in asymptomatic patients
CT Scan

- Superior detection of bony detail
- Indications for plain CT:
  - Contra-indication to MRI (pacemakers, orbital FB, mechanical valves, shrapnel)
  - Better visualize bony tumors
  - Fractures
  - Rarely, to assess fusion mass

CT Myelogram

- Usually a test ordered by the neurosurgeons
- Indications:
  - C/I to MRI
  - Obese patients
  - Multiple herniations, polyradiculopathies
  - Decision making in spinal stenosis
  - Failed Back syndrome

Bone Scan: Indications

1. Suspicion of multiple bony mets
2. Early detection of bone infection (Indium scan more specific for infection than Gallium / Technetium)
3. Unexplained bone pain (especially in high-powered athletes: stress fractures)
- Radio-active dye used:
  - Indium¹¹¹ usually used for infection
  - Technetium or Gallium for others

Role of EMG/NCS

- Extension of physical exam:
  - Localizes level, acuity & severity of nerve root involvement
  - Co-relate anatomic findings with physiology

Indications of EMG/NCS

- Suspected radiculopathy / plexopathy, poor correlation between their radicular symptoms and neuroimaging
- Multilevel disease on neuroimaging
- Recurrent LBP after successful treatment

PUTTING IT ALL TOGETHER
**Differential Diagnosis**

- Lumbar strain / MPS
- DDD, DJD
- Facet arthropathy
- SI joint dysfunction
- Piriformis Syndrome
- Radiculopathy
- Neurogenic Claudication (Central canal stenosis)
- Spondylosis
- Spondylolysis
- Spondylolisthesis
- Ankylosing spondylitis
- Seronegative arthritis

**WHEN TO REFER FOR SURGICAL EVALUATION??**

**Absolute Indications**

1. Bowel / bladder incontinence (Cauda Equina Syndrome)
   - A true surgical emergency
2. Worsening neurologic deficit
3. Suspected spinal cord compression

**Relative Indications:**

- Neurologic deficit that persists after 6 weeks of conservative therapy
- Persistent sciatica after 4-6 weeks in a patient with positive SLR, consistent clinical findings, and favorable psychosocial circumstances

**Relative Indications:**

- Known Canal Stenosis with new radicular symptomatology and nerve root tension signs
- Failed Back Syndrome with recurrent symptoms suggestive of acute HNP
TREATMENT
STARTS WITH
PATIENT EDUCATION AND OUTLINING TREATMENT PLAN

Principles of Treatment
- Start conservative,
  - Except if any of the “red flags” are present
- Weight loss, in obese patients
- Abdominal brace
  - Kinesthetic reminder
- Vocational issues – change jobs ??
- Proceed with more invasive / aggressive techniques if conservative measures fail

Treatment Options
- Complete Bed Rest (CBR)
- PT
- Medications
- Interventional pain procedures
- Surgery

Indications of Complete Bed Rest
- Lumbar sprain / strain
- Acute radicular syndrome secondary to HNP
- Maximum period of Complete Bed Rest is 48-72 hours

Physical Therapy:
- Physical Therapy can:
  - Improve ROM
  - Reduce Pain & Spasm
  - Strengthen weak muscles
- Start with passive techniques
  - Active exercises not easily tolerated initially
  - Stretching, modalities including ice, heat, U/S, massage, TENS
Physical Therapy:
- Lumbar stabilization
  - Strengthens abdominals and paraspinals
  - Flexion based (Williams) vs Extension based (McEnzie)
  - If HNP: McEnzie extension exercises (centralize pain)
  - If LCS: Williams flexion exercises
- Back School: prevent recurrent episodes

Difficult to make scientific recommendation of one type of exercise versus another.

Therapy Prescription
- Name
- Diagnosis
- Therapy type (PT, OT e.g.)
- Instructions
- Frequency
- Duration
- Precautions
- Weight bearing restrictions, if applicable

Medications
- NSAIDs / Tylenol / Topicals:
  - mild to moderate pain
- Opioids:
  - moderate to severe pain
- Anticonvulsants
  - Neuropathic Pain
- Muscle relaxants
  - acute spasm
- Antidepressants ?? (Myofascial Pain)

INTERVENTION
1. TRIGGER POINT INJECTIONS
2. INTERVENTIONAL PAIN PROCEDURES
3. SURGERY

Trigger Point Injections
- Indicated for myofascial pain
- Lidocaine / Bupivacaine – 1cc per Trigger Point
- Dry needling
- Botulinum toxin – controversy over efficacy
- Knowledge of anatomy is important to identify trigger points and avoid complications with injection

INTERVENTIONAL PAIN PROCEDURES
Spine Injections:
- **FLUROSCOPY GUIDED INJECTIONS**
  - SI joint
  - Piriformis injections
  - Deep Joint injections (e.g. hip)

Spine Injections:
1. **Epidural steroids**
   - Selective Nerve Root Block
2. **Facet blocks (Medial Branch Blocks)**
   - If successful, facet rhizotomy by using RFA (Radio-frequency ablation)

New / Evolving Techniques
- IDET
- Chemonucleolysis
- Intra-discal Steroid injection
- Nucleoplasty
- Prolotherapy
- Intra-thecal therapy (Morphine, Ziconotide, clonidine, Baclofen)
- Spinal Cord Stimulator

EPIDURAL STEROIDS:
**INDICATIONS:**
- Lumbar stenosis
- Acute HNP

**Routes of administration**
- Caudal
- Interlaminar
- Transforaminal

**Selective Nerve Root Block**
Facet Blocks:
- Medial Branch Blocks
- Radio Frequency Ablation (Rhizotomy)

Indication:
- Facet arthritis

Interventional Pain (Contd):
- Discogram
- IDET
- Intra-thecal Morphine therapy

Discograms
- Very controversial
- Helps determine which disc or discs are the source of pain
- Dye is injected under low pressure into the center of the disc. Then a CT scan is performed to observe the amount of structural changes in each disc
**Discogram (contd)**

**INTRA-DISCAL ELECTRO- THERMOCOAGULATION (IDET)**

- **Indication:**
  - Low back pain caused by tears in the outer part of the intervertebral disc
  - Minimally invasive treatment option

- **Procedure:**
  - Involves the use of heat to theoretically modify the collagen fibers of the disc and destroy the pain receptors in the area

  - Place the catheter through a small incision on the back, into the disc space, under fluoroscopy
  - Once in the disc space, the catheter heats the disc to a temperature of 90°C over the course of 15-20 minutes
  - Pain relief may be seen in a few days following the procedure, or can take from six to eight weeks to be noticed
  - In some patients, the pain relief may continue for up to six months or longer

**ABSOLUTE** Indications for Pain management referral

- **ACUTE HNP**
  - radicular pain not controlled with adequate trial of meds, no significant neurologic deficit (SNRB vs LES)

- **CANAL STENOSIS**

- **RECURRENT HNP**

**RELATIVE** Indications for Pain management referral

- DDD (CHRONIC +/- ACUTE EXACERBATIONS)
- FAILED BACK SYNDROME

Interventional Pain Management

Evidence based Clinical Practice Guidelines from the American Pain Society (2009: SPINE, Vol. 34, Number 10, Pg 1066-1109)
SURGERY

- DISCECTOMY
  - LMD/percutaneous/laser
- LAMINECTOMY with decompression
- +/- SPINAL FUSION

Long term Results of Surgery

- Surgery for radiculopathy with herniated lumbar disc and symptomatic spinal stenosis is associated with short-term benefits compared to nonsurgical therapy.
- Benefits diminish with long-term follow-up in some trials.
- For nonradicular back pain with common degenerative changes, fusion is no more effective than intensive rehabilitation, but associated with small to moderate benefits compared to standard nonsurgical therapy.

Algorithm

- Establish Diagnosis
  - 90% can be diagnosed with H&P alone
- Start conservative
  - Lifestyle modification (weight loss, smoking / EtOH cessation)
  - PT, NSAIDs, Muscle relaxants (as indicated)
  - Allow 6 – 8 weeks for treatment

Add Medications as indicated, judicious use of Opioids

- Post-surgical, severe DDD, DJD
- Pain Management / Surgical referral, if indicated
- 10% become chronic pain syndromes
- Long acting Opioids usually required

Consider alternative treatment options

- Osteopathic / Chiropractic referral
- Acupuncture
- Tai Chi, Pilates

Consider alternative treatment options
Bibliography

   Lippincott, Williams & Wilkins

2. Low Back Pain: Medical Diagnosis and Comprehensive Management. Ed: Bernstein DG, Weisel SW 1989 WB Saunders


4. Evidence based Clinical Practice Guidelines from the American Pain Society (SPINE, Vol. 34, Number 10, Pg 1066-1109)

5. UpToDate
