The ISIS approach: Low Back Pain. Diagnosis and Treatment
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ISIS Practice Guidelines:

The most authoritative and best written book on safe and effective performance of spinal interventional procedures with sufficient levels of evidence of effectiveness.

Indevarande må være købt henne ved den indre arbejdsplads.
ISIS Precepts

- Understand the Anatomy (Nik Bogduk)
- Understand the Radiology (Charlie Aprill)
- Utilize Precision Diagnostic Injections to Arrive at a Diagnosis (Rick Derby)
- Utilize Therapeutic Injections and Neural Ablation to Achieve Longer Term Responses
- ISIS Technique Approaches To The Pain Generators Are Not the Only Techniques, but Represents the Consensus Best Approach To Ensure Accuracy and Avoid Complications

ISIS tro indsprøjtninger er anvendeligt for diagnose og omgås, men er ikke den bare metoder at burde pleje omgås kronisk jag
Sources of Spinal Pain

• Nociceptive pain due to inflammatory agents (zygapophyseal joints arthrosis, capsular tears, cartilagenous degradation)
• Nociceptive pain due to ingrowth of nerves into injured or degenerative structures (nucleus pulposis, annular rents)
• Neuropathic due to intraneural scarring and edema, NMDA receptor activation, WDR neuron activation, ubiquitin proteins, metastatic neural involvement
Differential Dx: Low Back Pain

Muscle strain
Ligament/tendon injury
Sacroiliac joint syndrome
Lower lumbar zygapophyseal joint syndrome
Hip joint pain
Compression fracture
Stress reaction

Stress fracture
Spondylolysis
Spondyloarthropathy
Marfan syndrome
Fibromyalgia
Myofascial pain syndrome
Disk Related Neoplastic disease

Identify the:

Anterior Elements (vertebral bodies, intervertebral discs, rami communicantes, lumbar sympathetic chain)

Middle Elements (pedicles, neural foramina & contents, central canal & contents)

Posterior Elements (facet joint, lamina, pars interarticularis, facet articular processes, paraspinous muscles, spinous process, SI joint)
The development and refinement of these various spinal injection procedures was prompted by our search for a structural diagnosis of chronic axial and referred spinal pain. We early developed algorithms for a more reasoned and methodical approach.

Limitations of Radiological Diagnostics:

- Even though macroscopically visible and histologically evident, it was not always possible to demonstrate experimental annulus injuries by contrast-enhanced magnetic resonance imaging. Spine. 2002 Dec 15;27(24):2806-10. The diagnostic value of contrast-enhanced magnetic resonance imaging in the detection of experimentally induced annular tears in sheep. Lappalainen AK, Kääpä E, Lamminen A, Laitinen OM, Gräfenblad M.

Predictive Value of MRI Annular Tears vs. Discogram


Study 2: Spine. 1998 Oct 1;23(19):2074-80. Interobserver reliability of detecting lumbar intervertebral disc high-intensity zone on magnetic resonance imaging and association of high-intensity zone with pain and anular disruption.

Therefore, myelography is insensitive to lateral recess lesions.

AP view
Patient Prone
Note lateral extent of dural root sleeves
Diagnostic Limitations of H&P

• “The existing literature does not support the use of historic or physical examination findings to diagnose lumbar zygapophysial joint pain.” Anesthesiology. 2007 Mar;106(3):591-614.

Pathogenesis, diagnosis, and treatment of lumbar zygapophysial (facet) joint pain. Cohen SP, Raja SN.

Diagnostic Spinal Injections

Diagnostic Injections

Selective Spinal Nerve Blocks
  Sacroiliac (17%)
  Facet – Zygaphysial (15-40%)
  Medial Branch
  Discography (40%)
  Sympathetic Blockade
Physical Examination

To assure that the patient is an appropriate candidate for the scheduled procedure without any contra-indications.

To diagnose by physical examination.

Patient 1

59 year old female, longstanding asthma glucocorticosteroid dependent with 2 month history of left sided pain and numbness in the anterior left thigh. Moderate extensor weakness of the knee. Straight leg raising negative. Crossed SLR not possible (hip pain).
Plain x-rays show hemi-vertebral collapse L3 and scoliosis

MRI demonstrates L3 Hemivertebrae Collapse With Foraminal Stenosis L3/4 Left

SSNB demonstrates a thin neurogram demonstrative of foraminal stenosis

**Selective Spinal Nerve Block (SSNB)**

2% Lidocaine 1cc injected with excellent relief >80%

DX: Foraminal Stenosis Induced Radiculopathy L3
Diagnostic Spinal Injections

Diagnostic injections answer the question: What anatomical structure is painful?

Where is the pain generator?

Surprisingly, the nociceptive pain generator model works for patients with mixed nociceptive/hypersensitization complexes.
Diagnostic Spinal Injections

Selective Spinal Nerve Block (SSNB)

Diagnostic Spinal Injections
Lumbar Radicular Pain

Defined by its mechanism

- Stimulation of:
  - Sensory (dorsal) root of spinal nerve
  - Dorsal root ganglion

IASP, 1994
Radicular Pain is not synonymous with Radiculopathy!

Radicular Pain is A Single and Subjective Clinical Feature that May Be Part of Radiculopathy

Radiculopathy

Pathological disorder affecting the function of nerve roots

Features - depending on which fibers affected:
- Sensory Loss (numbness)
- Motor Loss (weakness)
- Reflex Loss
- Paresthesia
- Pain

Objective Neurological Findings
Radicular Pain or Radiculopathy

Disc Herniation or Foraminal Stenosis
98 %

Other Lesions
2%

Lumbar Radicular Pain

Quality – Shooting, lancinating, electrical

Pattern - Band like

Distribution – Distal > Proximal

Cutaneous component
**Lumbar Radicular Pain**

**Differential Diagnosis**

*Entrapment Neuropathies (Peripheral)*

- Lateral femoral cutaneous nerve (*meralgia paresthetica*)
  - Sensory loss suggests L4
  - Obesity, pressure ASIS
  - History of DM often present

- Common Peroneal nerve - around head fibula
  - Etiology - tight cast (pressure), trauma
  - Sensory Loss - L5
  - Motor Loss - L5 - Ext Hallacis longus

- Posterior tibial nerve (Tarsal Tunnel)
  - Pain in ball of foot when standing
  - Sensory loss S1

*EMG will differentiate peripheral neuropathy from radicular pain.*

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**Lumbar Radiculopathy**

**Clinical features**

1. Root Pain
2. Root irritation signs (SLR)
3. Root Compression signs (motor, sensory)
4. Positive imaging

*When 3 out of 4, high likelihood of HNP or bony entrapment*
Lumbar Radiculopathy

Pretest probability suggests the diagnosis

- Young - HNP
- Old - Foraminal or spinal stenosis
- Post surgery - Epidural fibrosis with NR involvement

**A definitive diagnosis requires imaging**

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Lumbar Radiculopathy: Differential Diagnosis

- Psoas Myofascial Pain with Sciatic N. Irritation
- Extraforaminal Spinal Nerve Entrapment
- Plexopathy
Diagnosis: Lateral Recess Stenosis
Patient 1 Subsequently Had a Transforaminal Epidural Steroid Injection at L3/4 with 3cc 0.25% bupivacaine plus 80mg methylprednisolone

TFESI

Transforaminal Epidural Blocks are Similar to SSNB with the Exception Of Higher Volume to Assure Entry into the Epidural Space and the Use of Steroids Instead Of Local Anesthetics Only. It is Imperative To Be Assured No Vascular Uptake Is Occurring
Lateral Fluoroscopy View: TFESI

Proper Technique Will Demonstrate Contrast In the Epidural Space
Other Examples of Transforaminal Epidural Steroid Injections:

Transforaminal ESI

Not Diagnostic: Lateral Epidural Space Spread: Anesthetizing L5 and S1
Patient 1 Had No Relief from The TFESI But Desires Other Interventional Pain Modalities Prior to Considering Surgery.

TFESI In This Case May Have Been Insufficient Due To Degree of Stenosis
**Interlaminar Epidural**

**Indications**

**Radicular** symptoms unrelieved by conservative therapy

- Herniated nucleus pulposis
- Foramenal stenosis
- Spinal Stenosis
- Compression Fracture?

**Epidural Steroids**

**Interlaminar**

**Advantages**
- Many practitioners (any anesthesiologist, etc.)

**Disadvantages**
- Blind injections
  - Epidural space?
  - Level?
  - Spread of injectate to side of problem
- Drug injected usually fails to reach desired ventral epidural space
- Unable to use post-surgery

Fluoroscopy - Guarantees epidural injection only
Note Radicular pattern
Caudal ESI
Epidural Steroids

Caudal

Advantage
- Drug injected flows to ventral epidural space
- Less risk of dural puncture

Disadvantage
- Blind injections - up to 30% non-epidural
- Large volumes needed, therefore, low concentration of steroid

Fluoroscopy
- Guarantees epidural injection only
HighVolumes
MayBe
NeededFor
Increased
CephaladSpread

Contrast
To L4
Patient 2

29 Year Old Patient With 6 Month History Chronic Low Back Pain, Daily, Worse When Standing, No Prior Trauma But Does Work In a Heavy Lifting Job. Physiotherapy, TENS, medications have minimally helped.
Patient 2

**Physical Exam:** Mild Low Back Tenderness Over the L5 Spinous Process; No numbness, No weakness, Negative SLR. Trunk extension does not worsen pain. Flexion is possible only to 35 degrees due to low back pain. No muscle spasm.

Patient 2

**Trigger Point Injection:**

No relief, even temporarily
PATIENT 2: MRI

Disc Desiccation
No Significant Height Loss
No Osteophytosis or End Plate Lipping
No HNP or Bulging
HIZ Present (Red Arrow)

Presumptive Diagnosis:
Degenerative Disc Disease
Rule Out Zygapophyseal Arthropathy
Intra-articular ZJ Injections

Provided only 25% relief in this patient

Options:

Continue conservative therapy since it is not likely patient is a candidate for fusion based on maintenance of normal disc height and age.

Discography if further interventions are being considered (ADR, IDET, Biaculoplasty)
Den var ikke mig opgave

Lumbar Disc Stimulation

Discography Demonstrated Annular Tear With Concordant Pain L5/S1 Only

Radial and Circumferential Tears
Patient 3

65 Year Old Male, Former Laborer carrying heavy loads (>50kg) for 40 years. Gradual Onset of Low Back Pain with Referral Into the Buttocks and Posterior Thighs. Pain is Worsened By Getting Up From A Sitting Position, Truncal Flexion or Extension More Than 15 Degrees, and is an Deep Achy Quality. The Pain When Sitting Is in the Gluteal Area with Much Less Low Back Pain. On Lying Recumbent, the Pain in the Gluteal Area and Low Back Largely Disappears. No History of Trauma. No Numbess, No Weakness.
Physical Exam: Truncal flexion to 80 deg, extension to 5 deg only (sharp pain right low back). Extension plus rotation produces worsening low back pain. Tenderness over LS junction to deep palpation but also tenderness to deep palpation over PSIS. SLR (-), Reflexes normal, Motor normal, Sensory exam normal. Pelvic distraction positive for pain gluteal, Pelvic compression negative. FABER positive. No troch tenderness.
Link Between DDD and ZJ Arthropathy

Early Findings Facet Arthropathy

Subchondral sclerosis and cyst formation with osteophytic overgrowth
Late Findings Facet Arthropathy

Severe Disc Joint Space Narrowing With Irregular Joint Surfaces

End Stage Facet Arthropathy

Remodeling of the Joints with Severe Hypertrophic Changes and Medial Angulation of Posterior Joint
Other Causes Facet Pain

Delphi Experts Dx: Facet Arthropyathy

Positive response to facet joint injection, localized unilateral LBP, positive medial branch block, pain upon unilateral palpation of the LZJ or transverse process, lack of radicular features, pain eased by flexion, and pain, if referred, located above the knee.

Patient Has Diagnostic Lumbar Medial Branch Block L4 and L5

Results from Medial Branch Blocks:

Placebo control: 15% pain reduction

Bupivicaine MBB: 85% pain relief in the low back but persisting buttock pain

Reliability of Test and Patient: Good
Proceed with Radiofrequency Thermal Ablation of MBB

Needles Inserted To Maximize Active Tip (10-15mm) Contact Surface Area With Nerve
Proceed with Radiofrequency Thermal Ablation of MBB

60 sec ablation
80 deg Celsius
For each medial Branch

Low Back Pain 90% Improved But Continues Gluteal Pain

Possibilities:
Secondary myofascial pain
Sacroiliac Arthropathy
SI pain can mimic all other pain generators and radicular symptoms.
Long Term SI Treatments
(Investigational)

SINERGY
Laser Denervation (Ho YAG)
Bipolar or Unipolar Joint RF
Cryoneurolysis
Posterior Foraminal RF
Dorsal Lat Ramus Implantable Stimulator
Enbrel (AS, Psoriatic)

Thank You For Your Attention