Safety and Efficacy of Epidural Injections

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Types of Epidural Injections

- Blind or Xray guided
- Caudal
- Intralaminar
- Transforaminal (TFE)

The data strongly supports that target specific injections are greatly superior in relief of pain and improvement of disability.

Lumbar Epidurals Efficacy


- At month 6, results were significantly better for transforaminal injection concerning: pain, daily activities, work, leisure activities, anxiety and depression, with a decline in the Roland-Morris score. In recent discal radiculalgia, the efficacy of radio-guided transforaminal epidural corticosteroid injections was significantly higher than that obtained with interspinous epidural injections.
**Disc Herniation**

**Lumbar TFE Corticosteroid Injections**
- Prospective study, serial patients with lumbar HNP and radiculopathy
- TFE injection resulted in sustained long term improvement in 75.4% of acute lumbar HNP with an average of 1.8 inj. per person
- 8o month follow up
- 78.7% patient satisfaction.

*Lutz, Arch PM&R Nov. 1988, 79*

**Cervical Epidurals Efficacy**
- Mixed Population, HNP 70%, Stenosis 30%
- Three injections done:
  - Plexus block, 29% relief
  - Intralaminar epidural, 16% relief
  - Transforaminal epidural, 72% relief
- 39 month f/u with 76% relief of arm pain


**Transformal Epidural Injection**
- Accesses the ventral epidural space and the epiradicular space
- Allows specific treatment of the involved root and disc herniation or stenosis
- Goal is to reduce radiculitis to facilitate rehabilitation
- Not a stand alone intervention.

**Lumbar Epidural Injection Medications**
Prior literature raised the issue of efficacy of epidural steroid injections showing similar outcomes with injection of steroids, local anesthetic, or saline.
The efficacy of transforaminal injection of steroids for the treatment of lumbar radicular pain

- Prospective randomized study
- Five treatment arms assess comparative effectiveness
- TFE with steroid and local
- TFE with local
- TFE with saline
- Deep paraspinal intramuscular injection mimicking the technique of TFE with Steroids, or IM saline.

Patient Selection

- Lumbar HNP on scan with a +SLR < 45 degrees, and 7/10 or > neuropathic pain.
- Chronic and acute patients, mean duration of symptoms 96 weeks. Moderate to severe disability on Roland-Morris and SF-36
- Excluded severe motor deficit, substance abuse Hx, or inability to comply with the study.

Results

- Patients who classified as improved were relieved of > 50% their pain and were restored to normal or near normal function, and reduced their need for other health care interventions to simple exercises or over the counter medications.
- All patients who had previously required opioids ceased opioids.
- No difference in the acute versus chronic patients outcomes.

Results:

Percentages with greater than 50% reduction in pain

- TFE with local and steroid 54%
- TFE local only 7%
- TFE with saline 19%
- IM steroid 21%
- IM saline 13%
Predictors of a Favorable Response to Transforaminal Injection of Steroids in Patients with Lumbar Radicular Pain Due to Disc Herniation

- The response to transforaminal injection of steroids is primarily affected by the nature of the disc herniation responsible for the pain.
- The success rate of a single transforaminal injection of steroids rises to 75% in patients with lesser degrees of nerve root compression, but is only 26% in patients with high grade compression.

Risks and Complications

Transforaminal injection of steroids is potentially hazardous if not performed meticulously and by physicians who are experts in fluoroscopically guided spinal interventions.

Spinal cord injury can occur if injection into a medullary artery is not recognized during the injection of contrast medium, and if particulate steroids are injected into that artery.

Infarction is felt do to intravascular injection of particulate steroids blocking arterioles and causing ischemia.

No complications have been recorded in any of the controlled trials, and none have been reported when operators have followed prescribed guidelines for the conduct of the procedure.

Risk Mitigation

- Technique & Experience
- Small particulate steroid
- Needle selection
- Digital Subtraction angiography
Intravascular injection

- Prospective evaluation of 2145 transforaminal injections with two observers assessing the injection.
- Age, habitus, diagnosis, injection level and side, prior surgery and prior injections histories assessed.

* Nahm, Lee, Lee, Anaesthesia, 2010; 65: 917-921

**Results**

Intravascular injection by level:

- Cervical 20.1%
- Sacral 10.5%
- Thoracic 8.2%
- Lumbar 6.1%

**Radiculomedullary artery location (Artery of Adamakiewicz)**

Review of spinal angiograms from the Mayo Clinic:

- Location by level:
  - T8-L1 92%
  - T10 28%
  - Left sided 8%

* Murthy, Mans, Behns, Pain Medicine, 2010; 11: 1756-64*
Radiculomedullary artery (Artery of Adamakiewicz)

Location in the neural foramen:
• 92% in the sup 1/2
• 88% in the upper 1/3
• 9% in the mid 1/3
• 2% in the lower 1/3

Minor complications of Lumbar Transforaminal injections

• Injection site pain, 17% - 11.5%
• Short term increased radicular pain, 8.8%
• Light headedness, 6.5%
• Increased spinal pain, 5.1%
• Nonspecific headache, 1.4%

Minor complications of Lumbar Transforaminal injections

• Vomiting, 0.5%
• Other reported minor side effects, vasovagal reactions, flushing (up to 5%)
• Karaman: Vasovagal 8.7%
  Intravascular penetration 7.4%

Huston, Slipman, Pain Physician, 2007; 10: 697-705
Karaman et al, Spine 2011; 36(13): E819-824
Internal Disc Disruption Syndromes

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