Non Surgical Treatments of Chronic Back Pain

Recent Advances

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Disclosures

None
Talking points …

Recent Advances in
• Epidural Steroid Injections
• Facet mediated pain – Cooled Radiofrequency Ablation
• Spinal Cord stimulation
• Intrathecal drug delivery
Incidence of Chronic Pain
Pain of Spinal Origin

- 80% lifetime prevalence
- Most common cause of disability in patients < 45 years old

**Etiology**

- **Mechanical** (HNP, OA, spinal stenosis, spondylolisthesis, compression fracture)
- **Nonmechanical**
  - Tumor (metastases, MM, lymphoma)
  - Infection (osteomyelitis, diskitis)
  - Inflammatory arthritis (RA, AS)
Diagnostic interventions to identify the pain generator

• Lumbar Selective Nerve Root Block for radicular pain
• Lumbar Medial Branch Blocks for facet mediated pain
• Sacroiliac Joint Injections
• Lateral Branch Blocks for Sacroiliac joint mediated axial pain
• Discography
Interventional Spine Procedures

- Epidural Steroid Injections
  Interlaminar, Transforaminal
- Facet Interventions
  Intra-articular, Radiofrequency Ablation
- Sacroiliac Joint Interventions
  Intra-articular, Radiofrequency Ablation
- Sympathetic blocks
  Stellate ganglion and lumbar sympathetic
- Spinal Cord Stimulation (Neuromodulation)
- Intrathecal Pain Pump
Epidural Steroid Injections

• Lumbosacral radiculopathy secondary to disc herniation
  Supported by evidence – Yes
• Lumbar Spinal Stenosis with leg pain
  Supported by evidence – limited
• FBSS with leg pain
  Supported by evidence- Inconclusive
• Other causes of axial back pain
  Supported by evidence – No

The Effectiveness of Lumbar Transforaminal Injection of Steroids: A Comprehensive Review with Systemic Analysis of the Published Data. Pain Medicine 2013;14:14-28
A Randomized Trial of Epidural Glucocorticoid Injections for Spinal Stenosis.
NEJM 2014:371(1):11-21

• Multisite (16) randomized trial
• 400 patients , Central lumbar spinal stenosis, Buttock and/or leg pain > back pain
• Glucocorticoids + Lidocaine vs. Lidocaine alone
• No control group with sham injections

• Primary outcomes:
  • Roland-Morris Disability Questionnaire (0–24) and the intensity of leg pain (0–10)

• Secondary outcomes:
  • >30% relief at 6 weeks
  • >50% relief at 6 weeks
Results

• Both groups improved

• Subgroup analyses: Glucocorticoids-Lidocaine group reported better physical function on RMDQ (-2.5) and less leg pain (-0.9) at 3 weeks

• No statistically significant difference between the two groups at 6 weeks
Facet Mediated Pain

Cooled Radiofrequency vs Traditional

• Larger lesion size
• Controversy regarding temperature at lesion site/needle tip being effective
• Insurance implications
Sacroiliac Joint

- Requires large lesion area
- Role for cooled radiofrequency
- Evolving evidence
Spinal Cord Stimulation

• Trial
  – Patients can trial the therapy
    • Temporary system
    • Only component implanted is lead
    • Patient uses system 3-10 days
  – Successful trial can be followed by implant

• Implantation of neurostimulator, lead(s), and extensions(s) if trial effective
Evolving Technology

Multiple programs, variable stimulation patterns, new targets (DRG, peripheral nerves, subcutaneous)
SCS for pain of spinal origin

- Most studies of patients who have had at least 1 prior spinal surgical procedure and have persistent pain

- Usually focused on “neuropathic” pain = usually leg pain

Newer studies on new technology addressing axial back pain
High-Frequency Spinal Cord Stimulation for the Treatment of Chronic Back Pain Patients: Results of a Prospective Multicenter European Clinical Study

Jean-Pierre Van Buyten, MD\(^1\), Adnan Al-Kaisy, MD\(^2\), Iris Smet, MD\(^3\), Stefano Palmisani, MD\(^4\), Thomas Smith, MD\(^5\)

- 83 subjects: HF trial, 72 implanted
- 6 month data:
  - Back VAS: 8.4 → 2.7; Leg: 5.4 → 1.4
  - 74% had > 50% back pain reduction
  - Improved Oswestry, sleep, medication use
  - No control/comparison group

Follow up data: 24 months: sustained pain relief, decrease in opioid use, improved sleep and function

DRG Stimulation

- Prospective, multicenter trial with 32 subjects.
  - Initial trial with paresthesias
- Average of 2 leads/pt
- 6 months: average pain reduction 58%, most successful for foot
- Low energy requirements

Burst Stimulation

15 subjects, randomized, double blind placebo

Subset analysis of EEG: burst activates dorsal anterior cingulate and dorsolateral prefrontal cortex

Spinal Drug Delivery for Refractory Pain
Implantable infusion pump

- **Catheter:**
  - Tunneled under the skin
  - Attached to the pump

- **Pump:**
  - Implanted in a subcutaneous pocket in the abdomen

- 2 types of pump
  - Constant flow rate
  - Multiple flow rate, Programmable
Opioid conversion by route is

<table>
<thead>
<tr>
<th>Morphine</th>
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<tbody>
<tr>
<td>PO</td>
<td>300mg</td>
</tr>
<tr>
<td>IV</td>
<td>100mg</td>
</tr>
<tr>
<td>Epidural</td>
<td>10mg</td>
</tr>
<tr>
<td>Intrathecal</td>
<td>1 mg</td>
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• Intrathecal Morphine 3mg/day – Opioid equivalence?
• On about 12.5mg IV Morphine per hour or about 2.5mg per hour of IV Dilaudid (if we use 5:1 M:HM)
| Line #1: | (a) morphine ↔ (b) hydromorphone ↔ (c) ziconotide |
| Line #2: | (d) fentanyl ↔ (e) morphine/hydromorphone + ziconotide ↔ (f) morphine/hydromorphone + bupivacaine/clonidine |
| Line #3: | (g) clonidine ↔ (h) morphine/hydromorphone/fentanyl bupivacaine + clonidine + ziconotide |
| Line #4: | (i) sufentanil ↔ (j) sufentanil + bupivacaine + clonidine + ziconotide |
| Line #5: | ropivacaine, buprenorphine, midazolam meperidine, ketorolac |
| Line #6: | **Experimental Drugs**
- gabapentin, octreotide, conopeptide, Neostigmine, Adenosine,
- XEN2174, AM336, XEN, ZGX 160 |
Ziconitide (Prialt): Good potential, but side effects limit use

- Synthetic peptide derived from the venom of the marine snail *Conus magus*.
- IT Nonopioid blocks Ca channels in spinal cord to inhibit afferent pain signal
- FDA approved for refractory chronic pain
- Staats et al RCT vs Placebo for Refractory Cancer/AIDS Pain in JAMA 2004*
- High rate of cognitive impairment and psychiatric changes with dose escalation limit use

Adrenal Chromaffin Cells – intrathecal implantation

• Cell therapy using intrathecal chromaffin cell allograft is a promising approach for the management of cancer pain refractory to traditional drug therapy and pain lesion surgery.

• Preclinical studies on experimental pain models have enabled starting prospective clinical trials. Prior to transplantation, handling and preparation of the chromaffin tissue is critical for allograft viability.

• The initial results of clinical trials with human chromaffin cell grafts from intractable cancer pain have reported long-lasting pain relief, in correlation with met-enkephalin release into the CSF.

• The limitations of this innovative cell therapy and especially the lack of human adrenal gland availability point to the need for new sources of cells.

• Perspectives include xenogenic or engineered cell lines.

Summary

• Evolving evidence across the field
• Patient selection is key
• Multimodal approach has shown the most benefit