

Navigating CLBP: A Case Study on Vertebrogenic Pain and Role of Novel Basivertebral Nerve Ablation Procedure

Introduction

Lower back pain is the leading global cause of years lived in disability (YLDs) with a global age standardized prevalence of 7.5% (Wu, et al., 2020).

Lower back pain causes increased healthcare spending, prescription opioid usage and loss of productivity.

Chronic lower back pain has long been thought to originate from discogenic pain, however there has been increasing evidence that vertebral end plates are found to be more innervated than intervertebral discs making the endplates susceptible to pain generation (Urits, et al., 2021)

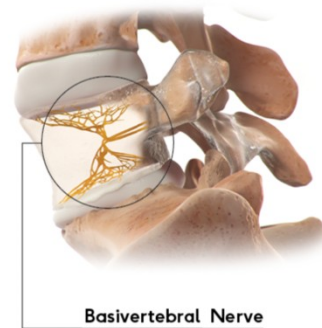


Figure 1. Image of Basivertebral nerve. From *A Certain Nerve Is the Key*, by Intracept by Relevant. n.d., <https://www.relevant.com/intracept/intracept-basics/>. Copyright 2023 by Intracept by Relevant.

Vertebrogenic back pain received a ICD code in October 2021 and the Intracept Procedure that involves basivertebral nerve ablation received FDA clearance in 2016 for the treatment of chronic vertebrogenic lower back pain.

We will explore how the Intracept Procedure compares to standard treatments in decreasing pain in patients with chronic lower back pain that display the characteristic of vertebrogenic sources.

Background

Vertebrogenic pain is based on the existence of pain nociceptors at the vertebral endplate. These receptors trace back to the basivertebral nerve which send pain signals. Disc and endplate degeneration allows proinflammatory disc tissue to leak into the bone marrow which increases inflammation within the vertebrae causing pain signals to be sent (Sayed et al., 2022).

Patients with chronic lower back pain that exhibit midline back pain that is aggravated with prolonged sitting and flexion along with Modic changes type 1 or 2 on their MRI can be diagnosed for vertebrogenic back pain.

Modic changes indicate alternation of the bone marrow signal intensity in the vertebra. These changes are classified as Modic type 1 (edema), Modic type 2 (fat) and Modic type 3 (sclerosis).

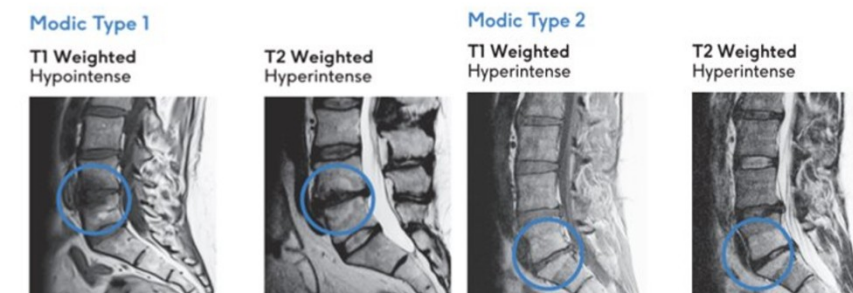


Figure 2. Modic changes seen on MRI. From *Modic Indication Card*, by Intracept by Relevant. n.d., <https://www.relevant.com/resources/modic-changes/>. Copyright 2023 by Intracept by Relevant.

Patient Case

A 78 year old male presents with the chief complaint of lower back pain. He has history of chronic lower back pain for 15 years. He underwent L3-L4 and L4-L5 decompression surgery in 2015 which provided minimal relief. He continues to have lower back pain that is described to be achy aggravated by bending forward and prolonged sitting. He is frustrated that he continues to have lower back pain despite all the treatments he underwent.

Medical History

- Medications:**
- Buprenorphine SL (Subutex) 8 mg 1 tab po 8-12 hours PO
 - Duloxetine DR (Cymbalta) 60 mg once tab daily PO

Allergies: Doxycycline - NV

FHx: (mother) stroke, schizophrenia, depression, (father) alcoholism

Social history: retired, 5-7 standard drinks of alcohol per week.

Previous Procedures

- Xstop procedure
- Abbott SCS
- Bilateral S1 TFESI (11/5/2020)
- Bilateral SI joint injections (09/10/2020)
- Bilateral L3, L4, L5 medial branch radiofrequency ablation (02/18/2021/03/04/2021)

Physical Exam

Vital signs: T 97.2 F, P 90, RR 16, BP 150/80, Ht 5'9, Wt 171 lb

General: well developed, well nourished. No acute distress. Alert and oriented x3

Skin: normal with no lesions, erythema or ecchymosis

MSK:

Lumbar spine: tenderness over the bilateral L4-5 and L5-S1 lumbar paravertebral

Pain with lumbar flexion and extension, straight leg raise elicits lower back pain bilaterally

Neuro:

LE Exam: Strengthen 5/5 on all lower extremities except bilateral hip flexor 4+/5.

Psych: alert and oriented x 3, no signs of oversedation or aberrant behavior, normal affect

Gait: antalgic gait, normal heel toe procedure

Results

11/6: Patient underwent Basivertebral nerve (BVN) ablation– Intracept Procedure L3, L4, L5 and S1 under MAC and local anesthesia Oxycodone (Roxicodone) 5 mg one tab mouth every 8 hours for pain #9 prescribed for post-procedural pain.

11/8: Patient reports a decrease from 5/10 to 2/10 VAS score days after procedure. He was recommended to reduce Subutex 8 mg to 12 hours daily since receiving pain relief.

Message to Provider:

“Thank you very much. Sometimes in life you are truly grateful. I’m truly grateful.”

Diagnostic Test



- MRI of the lumbar spine from 10/28/2017:**
 - Degenerative disc disease L2-S1
 - Multilevel disc bulging, facet arthropathy, spondylosis
 - Moderate to severe canal stenosis at L2-3 level
 - Degenerative endplate changes between L2-S1 → Mixed Modic, largely type 1 between L2-3 and type II between L4-S1
 - Postoperative changes at the L3-L4 and L4-L5 level
- CT of the lumbar spine from 9/17/2023:**
 - Endplate changes L2-S1
 - Same as prior study

Assessment

- While the patient has MRI findings of DDD, lumbar facet arthropathy, spinal stenosis, his current symptoms align with vertebrogenic pain.
- Based on his symptoms of midline lower back pain aggravated with prolonged sitting and forward flexion and findings of Modic changes at L2-3 and L4-5 level on MRI. Vertebrogenic lower back pain is the diagnosis.

Procedure

The Intracept Procedure is minimally invasive and takes 60-90 minutes to complete under general anesthesia. The basivertebral nerve is not myelinated and in theory should not regenerate.

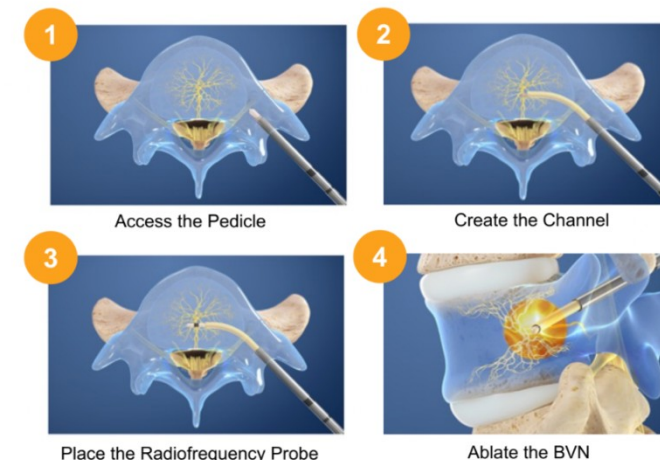


Figure 3. Image of Intracept Procedure. From *Straightforward Procedure Step*, by Intracept by Relevant. n.d., Expanded Physician Education Presentation. Copyright 2023 by Intracept by Relevant.

Discussion

A study that examined healthcare utilization results from three prospective clinical trials for BVNA-treated participants shows a 40.3% reduction of opioid use at one year (McCormick, et. al., 2024).

In a study comparing a sham arm vs Intercept Procedure arm, VAS scores shows decreases in pain at 6 and 12 months (Fischgrund, et al., 2018).

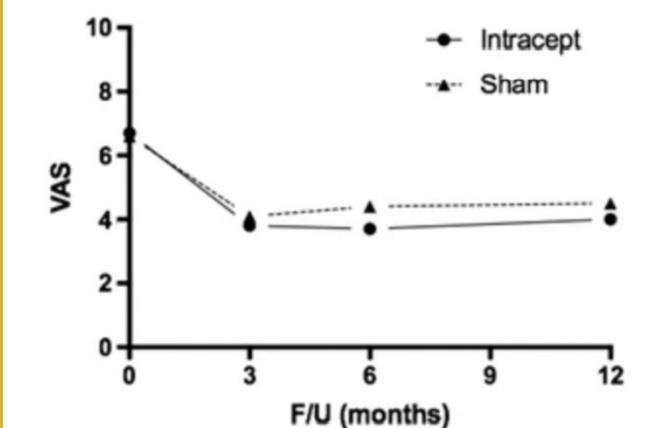


Figure 4. VAS scores Intracept Vs Sham in 1 year. From *Summary of CDI and VAS scores*, by J.Fischgrund, et la., 2018, <https://doi.org/10.1007/s00586-018-5496-1>. Copyright 2018, The Author(s).

Long-term results up to five years post-procedure demonstrated sustained improvement, with two-thirds of patients reported a 50% reduction in pain, nearly half experienced a 75% reduction, and 34% reported no pain at all (Fischgrund, et al., 2020).

Conclusions

It is important to understand, recognize and properly diagnose different etiologies of lower back pain. It is imperative to obtain a detailed physical and history to pinpoint the etiology of the pain.

Properly treating vertebrogenic lower back pain can improve healthcare utilization by decreasing patient dependence on pain medications

Vertebrogenic lower back pain is a relatively new diagnosis that is paired with an innovative procedure. There is more research done on the effectiveness and longevity.

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