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). Low 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 vertebrae end plates are found to be more innervated than intervertebral discs making the endplates susceptible to pain generation (Liu, et al., 2021).

Vertebrogenic back pain received an ICD code in October 2021 and the Intraossic Procedure that involves basivertebral nerve ablation received FDA clearance in 2018 for the treatment of chronic vertebrogenic lower back pain.

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

Background

Vertebrogenic pain is based on the existence of pain nociceptors at the vertebra endplates. These nociceptors send signal through the basivertebral nerve which send pain signals. Disc and endplate degeneration allows purulent inflammatory tissue to leak into the bone marrow which increases the nociception within the vertebra causing pain signals to be sent (Bayed 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 2 (fat) or Modic type 3 (erosions).

Modic changes indicate alteration 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 (erosions).

Patient Case

A 48 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 prolonging sitting. He is frustrated that he continues to have lower back pain despite all the treatments he underwent.

Medical History

- Degenerative disc disease L2-L3
- Degenerative facet arthropathy
- Moderate to severe canal stenosis at L2-L3 level
- Degenerative endplate changes between L2-L3 - Mixed Modic, largely type 1 between L2-3 and type II between L4-S1
- Postoperative changes at the L3-L4 and L4-L5 level

Diagnostic Test

- MRI of the lumbar spine from 10/28/2017:
  - Degenerative disc disease L2-S1
  - Degenerative facet arthropathy
  - Moderate to severe canal stenosis at L2-L3 level
  - Degenerative endplate changes between L2-L3 — Mixed Modic

- CT of the lumbar spine from 9/17/2023:
  - Endplate changes L2-S1
  - Same as prior study

Physical Exam

- Vital signs: T 97.2 F, P 90, RR 16, BP 150/80, Ht 59, Wt 171 lb

- General: well developed, well nourished. No acute distress. Alert and oriented x3
- Skin: normal with no lesions, erythema or ecchymosis
- Musculature: Lumbar spine, tenderness over the L4-L5 and L5-S1 lumbar vertebrae.
- Pain with lumbar flexion and extension, straight leg raise elicits lower back pain bilaterally
- Neuro: L5 exam: Strength 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

1/16: Patient underwent Basivertebral nerve (BNV) ablation - Intraossic Procedure L3, L4, L5 and S1 under MAC and local anesthesia. Opioid (Roclocone) 5mg one tab mouth every 8 hours for pain #9 prescribed for post-procedural pain.

1/18: 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.”

Discussion

A study that examined healthcare utilization results from three prospective clinical trials for BNV-TRAM-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 Interossis Procedure arm, VAS scores shows decreases in pain at 6 and 12 months (Fischgrund, et al., 2018).

Long-term results up to 5 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 to be done in the effectiveness and long-term uses.

References


Long-term results up to 5 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).

References


