When Spinal Cord Stimulation Falls Short: Successful Basivertebral Nerve Ablation for Persistent Vertebrogenic Low Back Pain

Renira Rugnath MD, Joseph Pongetti MD, Kyle Kennedy MD, Michelle Sheth MD, Anesh Rugnath MD

The University of Mississippi Medical Center, Department of Anesthesiology and Pain Medicine

ASRA PAIN MEDICINE
American Society of Regional Anesthesia and Pain Medicine

Introduction

- Chronic low back pain (CLBP) is a leading cause of disability and often involves multiple pain generators.
- CLBP is multifactorial and may persist despite successful neuromodulation.
- Spinal cord stimulation (SCS) effectively treats neuropathic and radicular pain but may not address vertebrogenic pain arising from vertebral endplates.
- Vertebrogenic pain, mediated by the basivertebral nerve and associated with Modic type 1 or 2 endplate changes, is an increasingly recognized source of axial low back pain.
- Persistent pain despite SCS should prompt reassessment for an alternative pain generator amenable to targeted intervention.

Objectives

1. Identify vertebrogenic pain as the etiology of persistent axial low back pain after SCS
2. Highlight the importance of appropriate imaging and diagnostic workup
3. Demonstrate the effectiveness of basivertebral nerve ablation (BVNA) in managing vertebrogenic pain

Materials and Methods

- As this is a Case Report devoid of patient identifiers, no IRB approval was required per UMMC policy.
- Informed consent was obtained from the patient for this presentation.

Case Report



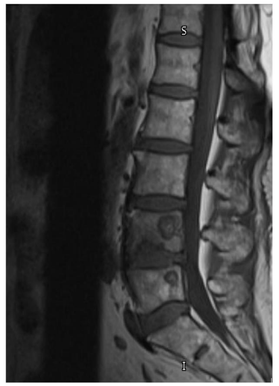
A 68-year-old woman with chronic low back pain, lumbar spondylosis, and bilateral lower-extremity radiculopathy underwent SCS implantation on December 11, 2025, after a trial provided >75% pain relief. SCS significantly improved her low back and radicular pain from 9–10/10 to 3–5/10 and improved overall function; however, she continued to experience severe midline axial pain, particularly with forward flexion and rotation. Lumbar MRI demonstrated Modic type 1 endplate changes involving L4 and L5, consistent with vertebrogenic pain. Given her history of breast cancer and concerning vertebral marrow abnormalities, L4 vertebral biopsy was performed and demonstrated benign findings. She subsequently underwent BVNA at L4 and L5 on June 1, 2026. At follow-up on July 29, she reported significant improvement in her axial vertebrogenic pain and approximately 80% overall improvement in pain since SCS implantation.

Post-procedure MRI findings initially interpreted as metastatic disease were subsequently reviewed by neuroradiology and determined to represent expected post-BVNA ablation zones, highlighting the importance of recognizing procedural imaging changes.

Relevant Images



IMPRESSION:
Diffuse marrow enhancement of the L4 vertebral body and bilateral facets corresponding to signal abnormality on most recent lumbar spine MRI. This may represent metastatic disease and is progressed from 10/6/2024.
Similar right greater than left facet joint effusions L4-L5 and soft tissue edema surrounding the right L4-L5 facet joint as discussed on prior.
Edema and enhancement anterior superior endplate of L5 is similar to prior and may be degenerative.
Multilevel degenerative changes greatest at L4-L5 are similar to an further described on recent prior MRI 3/4/2026.



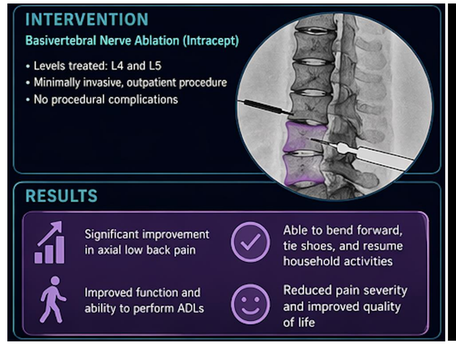
1. Postprocedural changes from left transpedicular approach basivertebral nerve ablation (BVNA) at L4 and L5. New well-circumscribed T1 hypointense enhancing lesions in the posterior aspect of the L4 and L5 vertebral bodies which are consistent with post-BVNA ablation zones and are not consistent with metastatic disease.
2. T1 hypointense marrow replacement, edema, and enhancement in the L4 vertebral body is mildly improved since 3/21/2026, previously biopsied with benign results.

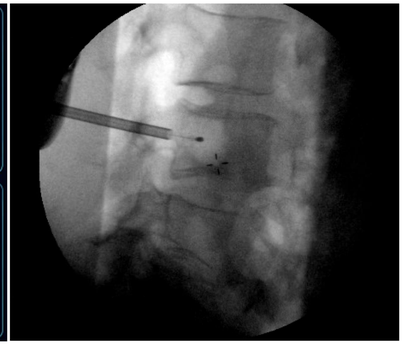
Discussion

- This case demonstrates the importance of identifying distinct pain generators in patients with persistent pain despite successful neuromodulation.
- SCS effectively reduced the patient's radicular and overall pain but did not fully address her vertebrogenic axial pain.
- BVNA provided significant additional relief after identification of Modic endplate changes.
- Additionally, recognition of expected post-ablation imaging findings is important, particularly in patients with a history of malignancy, to avoid misinterpreting ablation zones as metastatic disease.

Conclusion

- Persistent axial low back pain after SCS may represent untreated vertebrogenic pain rather than device failure.
- Identification of Modic changes and appropriate diagnostic evaluation are essential.
- This is particularly true in patients with a history of malignancy.
- It is fundamental to avoid misinterpretation of ablation zones as metastatic disease; therefore, thorough communication between Pain Medicine and neuroradiology is vital.
- BVNA provides a safe and effective, targeted treatment option that can significantly improve pain and functional outcomes.





References

1. FischgrundJS,RhyneA,FrankeJ,etal.Intraosseousbasivertebralnerveablationforthetreatmentofchroniclowbackpain:aprospective randomized double-blind sham-controlled multicenter study. European Spine Journal. 2018;27(5):1146-1156.
2. DeerTR,MekhailN,ProvenzanoD,etal.Theappropriateuseofneurostimulation:newguidelinesandrecommendationsfromthe Neuromodulation Appropriateness Consensus Committee. Neuromodulation. 2014;17(6):515-550.
3. KhalilJG,SmuckM,KoreckijT,etal.Aprospective,randomized,multicenterstudyofintravertebralbasivertebralnerveablationforthe treatment of chronic low back pain. Spine Journal. 2019;19(10):1620-1632.
4. FischgrundJS, RhyneA,FrankeJ,etal. Intraosseousbasivertebralnerveablation:long-termclinicaloutcomesoftheSMARTtrial.Spine Journal. 2020;20(9):1457-1465.
5. ModicMT,SteinbergPM,RossJS,MasarykTJ,CarterJR.Degenerativediskdisease:assessmentofchangesinvertebralbodymarrowwith MR imaging. Radiology. 1988;166(1 Pt 1):193-199.