Long-Term Consequences of Spinal Cord Stimulation: Retained Leads Adjacent to Facet Joint Ossification Precluding Safe Explantation Two Decades After Implantation

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INTRODUCTION

In the United States, hundreds of thousands of neurostimulators have been implanted to treat chronic pain, and an estimated 50,000 spinal cord stimulators (SCS) are implanted each year.[1] Despite this wide use, few studies have examined what happens to these devices decades after implantation. We present a case that illustrates this gap.

CASE PRESENTATION

A woman in her early 70s with post-laminectomy syndrome and chronic low back pain with bilateral sciatica had an SCS implanted approximately 20 years earlier. The device stopped working about 10 years after implantation and was not removed.

She was referred to neurosurgery for explantation after she developed new tenderness and incisional-type pain over the generator pocket, different from her chronic baseline pain. There were no red flags (no weakness, saddle anesthesia, or bowel/bladder dysfunction). Neurological exam showed full strength and intact sensation, and the incision was well healed without signs of infection.

CT of the lumbar and thoracic spine showed the generator and two retained leads: one along the right ventrolateral cord and one along the dorsal cord. On two separate evaluations, neurosurgery described the dorsal lead as appearing ossified or calcified into the left T9-T10 facet joint. Formal radiology reports (thoracic CT, 2022 and 2025) described a longstanding, unchanged ossification of the left T9-T10 facet with mass effect on the thecal sac, and the lead terminating immediately adjacent to the ossified bone, without confirmed lead-bone continuity.

Because of the 20-year implantation and the lead's proximity to dense ossified bone, removal was judged high-risk: more pain, more scar tissue, and possible incomplete retrieval of the leads. The leads are not MRI-conditional, so incomplete removal would not restore MRI access. After discussion of risks, benefits, and alternatives, the patient chose to defer explantation and continue conservative management.

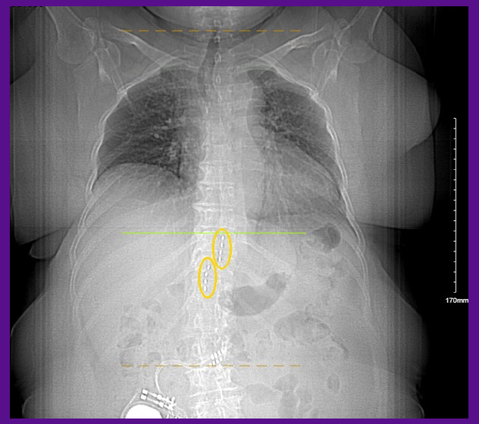


Figure 1. CT scout showing the pulse generator and retained lead arrays (circled) along the lower thoracic spine.

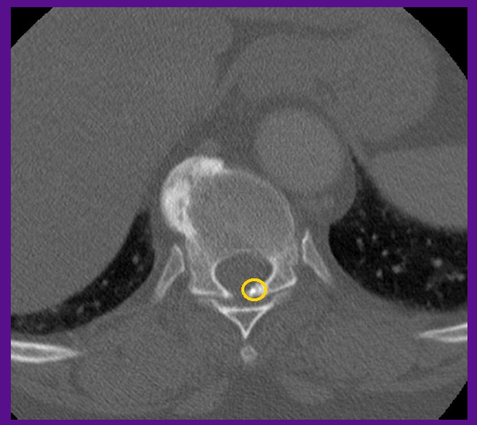


Figure 2. Axial thoracic CT showing the retained dorsal lead (circled) within the spinal canal.

DISCUSSION

Encasing fibrosis around retained leads has been reported, including thoracic myelopathy from dense epidural fibrosis around a retained paddle lead that resolved after surgical removal.[2]

In this case, two neurosurgical evaluations judged the lead to be ossified into bone, while radiology described it as adjacent to pre-existing facet ossification. Standard CT may not reliably separate true lead-bone incorporation from close proximity, yet this distinction changes the perceived surgical risk. Thin-cut CT focused on the lead-bone interface, or intraoperative assessment, may be needed to clarify it. Given 20 years of implantation, the team proceeded on the more conservative assumption of incorporation.

Retained non-MRI-conditional leads are an absolute contraindication to MRI under manufacturer guidance.[3] Conditional labeling applies to the complete system, not to individual retained components.[4-6] This patient's MRI access is permanently limited, whether or not the generator is removed.

CONCLUSIONS

Long-dwelling, non-functional SCS leads may lie adjacent to, or possibly within, degenerative bone, and standard imaging cannot always tell these apart. Clinicians should consider periodic imaging of retained hardware, account for this uncertainty in surgical planning, and counsel patients early about long-term MRI access.

References
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