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Case Presentation

Cephalad Lead Migration During a Spinal Cord Stimulation Trial: A Case Presentation

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Abstract

Spinal cord stimulation is used in the treatment of a variety of pain conditions. Lead migration is among the most common complications associated with spinal cord stimulation. Although there have been reports of caudal lead migration, there have been no reports of significant cephalad lead migration during a spinal cord stimulation trial. Here we report what is potentially the first case of significant cephalad lead migration (from the initial T8 position to C2) during a spinal cord stimulation trial. This case demonstrates that significant lead migration is possible, and this case highlights the importance of adequately securing leads during a trial.

Level of Evidence: To be determined.

Introduction

Spinal cord stimulation (SCS) is used in the treatment of a variety of pain conditions including failed back surgery syndrome, complex regional pain syndrome, and other chronic neuropathic pain states [1-3]. An SCS trial is done before the permanent implantation to verify effective pain relief [4].

Complication rates associated with spinal cord stimulator trials are reported to be as low as 0.7%, with lead migration being the most common [5]. Lead migration is defined as a displacement of the lead from its original location and can cause loss of optimal pain coverage. Although there have been reports of caudal lead migration, there have been no reports of significant cephalad lead migration during SCS trials. Osborne et al investigated migration of percutaneous spinal cord stimulator leads with 20 patients during a 3-day trial and found that leads migrate caudally [6]. Leads anchored with tape migrated inferiorly an average of 8.72 mm (standard deviation [SD] = 5.77), and only 1 lead out of 20 migrated cephalad by 0.3 mm.

There have been reports of cephalad lead migration following permanent spinal cord implantation [7,8], but no reports in the current literature of lead migration associated with SCS trials. We report an unusual case of significant cephalad lead migration during a SCS trial.

Case Presentation

A 61-year-old man presented with intractable, chronic back pain and bilateral lower limb pain for approximately 5 years. He had a history of multiple surgical procedures including C5-C7 anterior cervical diskectomy and fusion, L1-L5 laminectomy, and L2-L4 posterior pedicle screw instrumentation. Physical therapy, medications, and interventional procedures were not successful for him. The patient was seen by a physician at an academic spine center with 10 years of experience with SCS. Physical examination demonstrated significant for guarding of the lumbar spine with range of motion and paramidline tenderness to palpation over the lower lumbar spine bilaterally. Magnetic resonance imaging of the lumbar spine demonstrated multilevel disk height loss, most severe at L1-L2 where a disk bulge and facet arthropathy caused moderate spinal canal stenosis and moderate-severe bilateral neural foraminal narrowing. The decision was made for the patient to undergo an SCS trial.

Immediately before the trial, the patient received 2 g of intravenous cephazolin. Two SCS leads (Vectris Trial Lead 1x8 Compact Model 977D260, Medtronic, Minneapolis, MN) were used for the trial. The epidural space was entered at T12-L1, and 2 leads were advanced in the posterior epidural space. The leads were positioned so as to gain adequate paresthesia coverage of the

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patient's pain. This was done by advancing the cephalad portion of the 2 leads to the top of T8 (Figure 1). Skin closure tape (Steri-Strips, 3M, St. Paul, MN) was used to anchor stimulator leads to the skin. Numerous skin closure tape strips were placed across the leads horizontally at the skin entry site and distal to it. Transparent dressing (Tegaderm, 3M, St. Paul, MN) was used cover the leads, and then a large 28 × 20-cm adhesive bandage (Medipore, 3M, St Paul, MN) covered the leads and pulse generator. The patient was placed on prophylactic cephalexin for the duration of the 5-day trial.

During the trial, the patient's large adhesive bandage came off and the patient replaced it at home with another adhesive bandage. The patient later noticed paresthesias in his right upper limb. He came back to the clinic at the end of the 5 days, and a radiograph showed lead migration of 1 lead up to C2 (Figure 1). The leads were removed, and a dressing was applied. Given

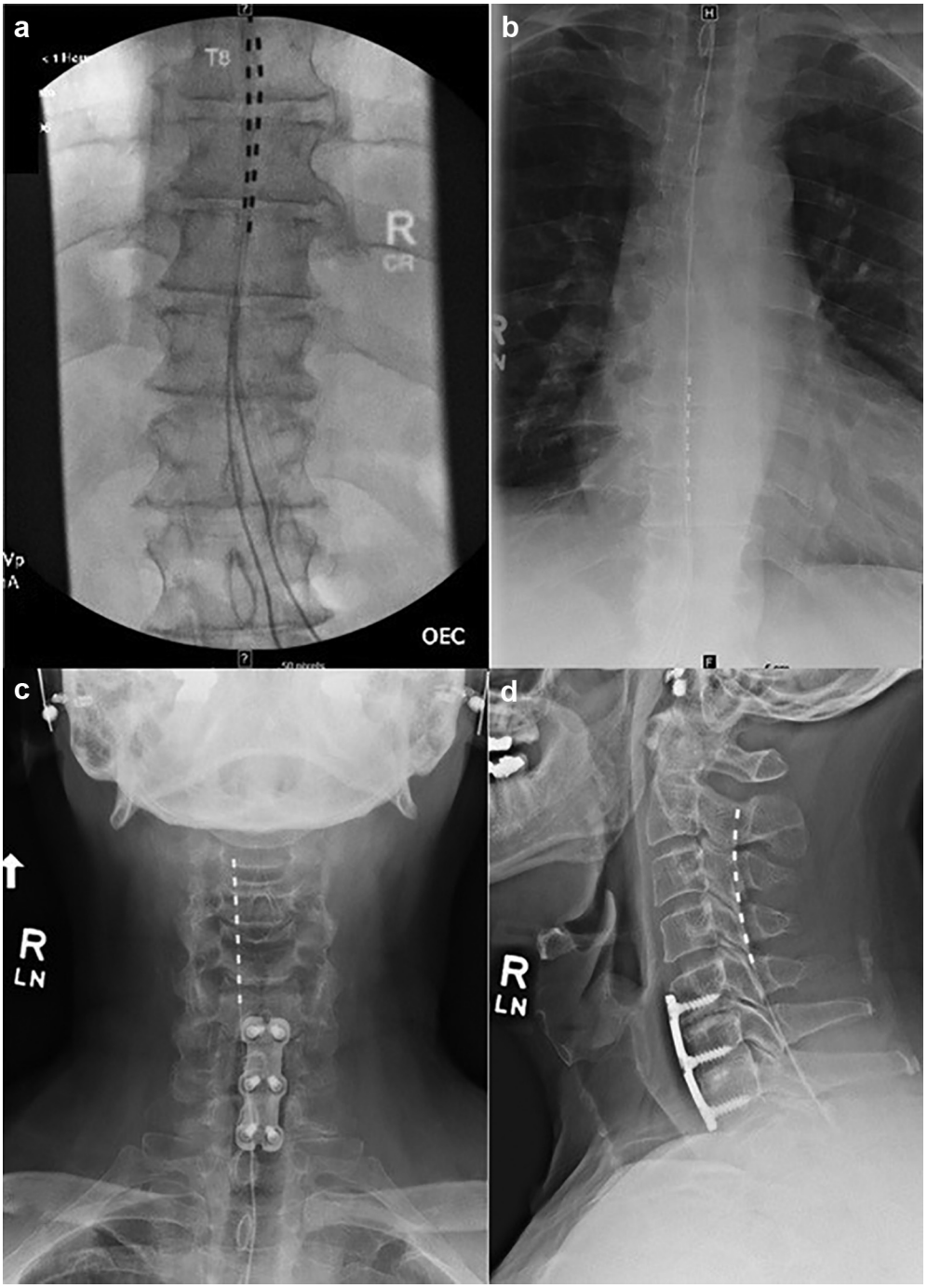

Figure 1. (a) Spinal cord stimulation (SCS) trial procedure. Last fluoroscopy image showing both leads near the top of T8. (b) Lead migration. Thoracic anteroposterior (AP) radiograph showing 1 lead at T8 and the other tracking cephalad. (c, d) Lead migration. Cervical spine AP and lateral radiographs showing lead migration up to C2.