

Cervical Radiofrequency Ablation in Patient with Cochlear Implant

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Introduction

Cervical radiofrequency ablation (RFA) is a widely used intervention for chronic neck pain, with utilization rising significantly in recent years. Cervical spondylosis, a leading cause of facet-mediated neck pain, affects up to 85% of individuals over age 60. Simultaneously, over 1 million people worldwide have received cochlear implants (CIs), including an increasing number of aging adults. Performing an RFA in CI patients presents a unique risk: the RF current may induce unintended electrical conduction through the implant’s internal electrode array, potentially leading to overheating, device failure, or permanent cochlear injury. Can a patient with CI receive an ablation to treat their neck pain without interfering with the device? CI manufacturers, including Advanced Bionics, explicitly contraindicate monopolar electrosurgery above the clavicles. Despite the rising overlap between CI recipients and pain patients, no published cases have described how to safely approach cervical RFA in this population. This report outlines the first known case of cervical facet RFA planning in a CI recipient and highlights the perioperative considerations required.

Case Description

A 78-year-old female with a history of prior C1-2 cervical fusion and left cochlear implant presented with right-sided axial neck pain consistent with cervical spondylosis. A diagnostic right third occipital nerve/C3/C4 medial branch block was performed, resulting in 90% relief. Concern of electromagnetic interference (EMI) with her cochlear implant system was raised while planning for her ablation. Risks and benefits were discussed with the audiologist, ENT specialist, and the patient, and the decision was made to proceed. Testing of the cochlear device was performed after the ablation without device complications.

Safety Considerations & Interventions

- Monopolar radiofrequency ablation (RFA) delivers current through an active tip and disperses it through a grounding pad placed elsewhere on the body.
- In patients with cochlear implants (CIs), especially systems like the Advanced Bionics Slim J 3D, this current path can become hazardous.
- The CI’s internal electrode array and processor components may act as unintended conductors, leading to:
 - Induced electromagnetic currents
 - Overheating of the cochlear array
 - Device malfunction or irreversible hearing loss
- Manufacturer warnings clearly contraindicate monopolar RF or electrosurgery above the clavicles, due to the risk of thermal or electrical injury.
- Prevention strategies include:
 - Deactivate or remove the external speech processor before the procedure
 - Position grounding pads to prevent current pathways crossing the head and neck
 - Avoid monopolar RF in favor of bipolar RFA, pulsed RF, or cryoablation
 - Consult audiology or otolaryngology pre-procedure to assess implant status and ensure safety

Discussion

Spondylosis related pain commonly presents in 85% individuals over 60 years of age, with radiographic evidence of degenerative changes. Over one million CI’s are implanted annually, and the internal leads can conduct inadvertent currents when exposed to electromagnetic fields. Cervical RFA is classically performed with monopolar radiofrequency energy that produce current paths that can crosses into the head and neck. CI manufactures warn against the use of monopolar electrosurgery or diathermy above the clavicle in CI recipients, due to the potential risk of injury to cochlear structures or the device. Awareness of this issue is critical as CIs and RFA has become more prevalent. No formal pain management guidelines address treatment of patients that may require both. This is the first case utilizing multidisciplinary care to highlight the achievable successful and safe use of RFA in patients with CI.

References

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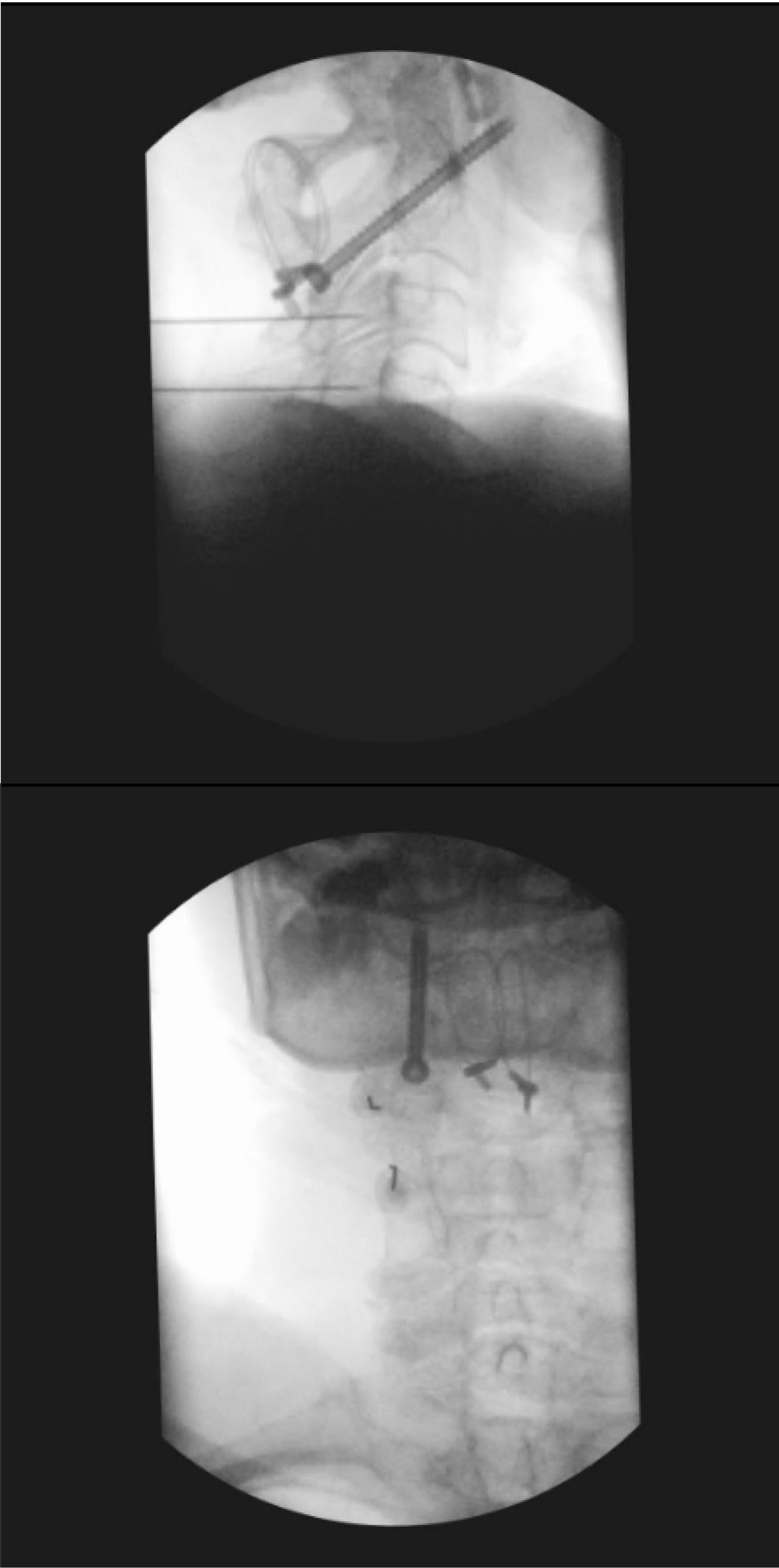


Fig 1-2. Fluoroscopic pain block imaging (lateral & AP)