

The Safety and Efficacy of Radiofrequency Ablation (RFA) for Chronic Hip Pain in a Quadriplegic Patient with a Diaphragmatic Pacemaker



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Case Description

A 31-year-old C2 AIS A quadriplegic male with a left-sided diaphragmatic pacemaker to manage his respiratory failure, presented with severe, chronic right hip pain due to advanced degenerative disease. In the past he had seen multiple providers for management of his hip pain. The pain was constant but fluctuating, primarily on the posterior aspect of his hip and buttocks without radiation and described as sharp in quality. He achieved only minimal pain relief with conservative measures including NSAIDs, opiates, spasmolytics and medical cannabis. X-Rays of his hip showed advanced degenerative changes, osteoporosis, and inflammatory changes. He did achieve significant albeit transient pain relief after receiving an intra-articular corticosteroid injection to the hip.

After a discussion of various additional pain management strategies, it was agreed that the patient may benefit from Radiofrequency Ablation (RFA). First, the patient underwent a local anesthetic block to articular branches of the femoral and obturator nerves. He tolerated the procedure without complication and had temporary near complete pain relief. A decision was then made to proceed with RFA to these nerves. Because the patient was reliant on a diaphragmatic pacemaker there were concerns about the potential for interference and/or malfunction that might occur during the RFA procedure.

After discussion with the device manufacturer and patient, it was decided that the diaphragmatic pacemaker would be disabled during the procedure and respiratory support provided via mechanical ventilation through this tracheostomy tube. Cooled RFA was then executed with fluoroscopic and sonographic guidance. The diaphragmatic pacemaker was then restarted and resumed functioning at its baseline settings. The procedure resulted in near complete obliteration of the patient's chronic hip pain. At follow up several weeks later, the patient noted sustained pain relief without adverse effects.



Introduction

- Spinal cord injured patients with diaphragmatic pacemakers present unique challenges in the treatment of chronic pain
- RFA is a pain management modality, which generates electrical signals that can potentially cause pacemaker malfunction.
- There are limited studies and case reports on the use of RFA in patients with cardiac pacemakers, however the use of RFA in patients with diaphragmatic pacemakers has not been adequately studied

Discussion

- Device manufacturers have incorporated a variety of interference protection measures into implantable devices
- While there is a theoretical risk of RFA causing interference or malfunction with pacemakers, the literature examining the issue is decidedly mixed as to their actual impact.
- There have been reports of transient device interference during RFA in cardiac pacemakers, however there were virtually no instances of the procedure causing permanent damage.
- There is a dearth of literature on the safety and efficacy of performing RFA in patients with diaphragmatic pacemakers.

Conclusion

- **The management strategies employed in this patient show that RFA can potentially be applied safely and effectively to alleviate pain in patients with diaphragmatic pacemakers by taking appropriate precautions.**
- While the risk of adverse effect on pacemaker function during RFA is likely low it is worthwhile to follow some general mitigation strategies including: close patient monitoring, ensuring temporary pacing availability, avoiding direct contact between the catheter and the implanted device, and keeping the electrical current paths separated.
- The use of RFA in patients with diaphragmatic pacemakers warrants further study