



Improving Functional Status for Cardiac Transplant After Knee Cryoneurolysis

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Introduction

Knee pain in patients with end-stage heart failure can significantly hinder their mobility and overall quality of life, complicating their candidacy for heart transplantation. Cryoneurolysis has emerged as a potential solution to alleviate knee pain and improve physical function by targeting the superficial sensory nerves responsible for knee pain transmission. Cryoneurolysis provides rapid and long-lasting relief that's minimally invasive. This technique shows promise in enhancing functional outcomes and facilitating rehabilitation, potentially improving surgical outcomes for heart transplant candidates given its minimal invasiveness and friendliness to patients on chronic anticoagulation. Here, we explore the use of Cryoneurolysis in a heart transplant candidate, with a focus on improving knee function and optimizing the patient's overall readiness for transplant surgery.

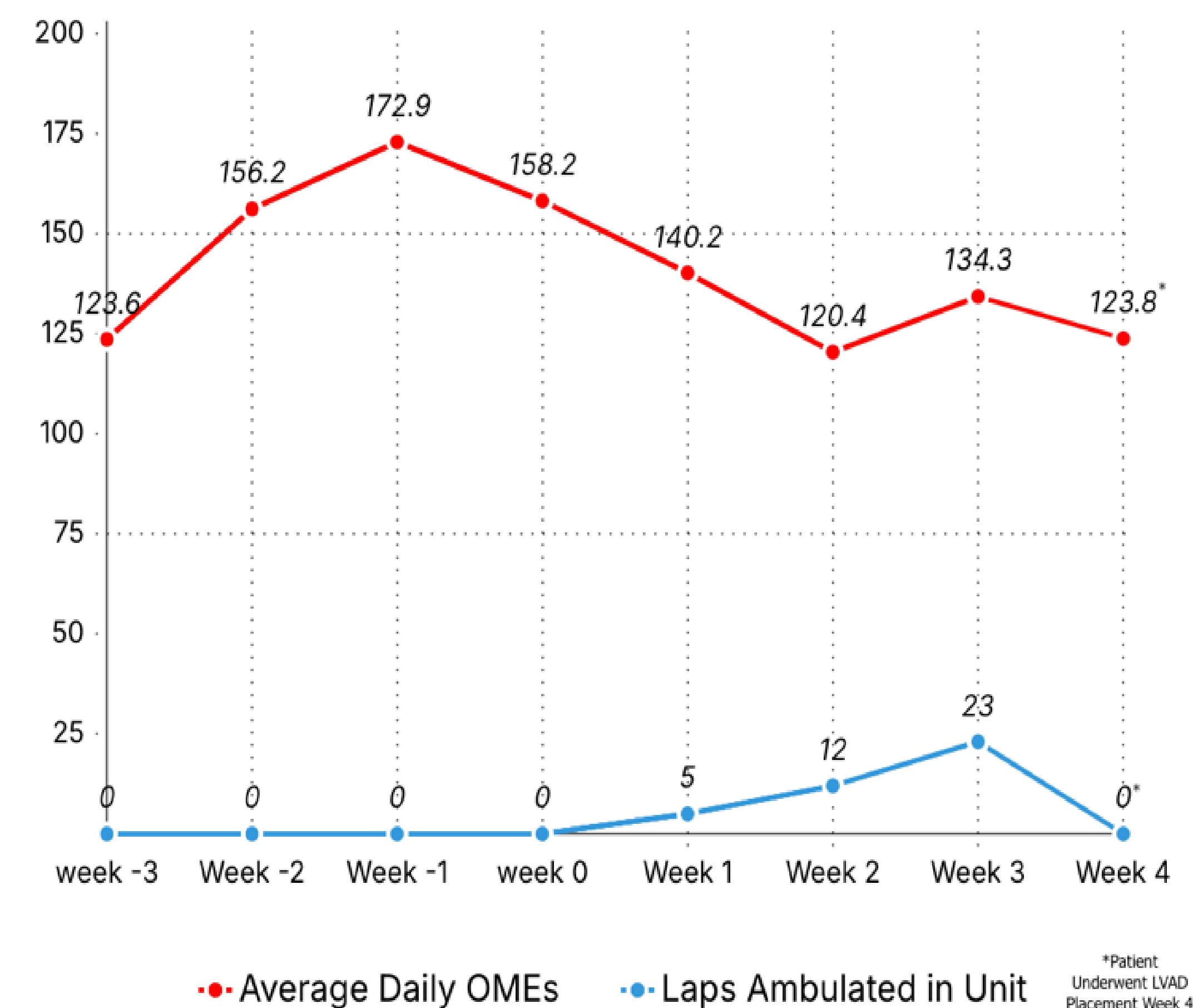
Methods

Informed consent was obtained from the patient. IRB approval was waived. Data was gathered using medical records and patient encounters.

Case Presentation

A patient with HFrEF (EF 20-25%) and chronic bilateral knee osteoarthritis presenting after ICD shock for ventricular fibrillation and subsequent fall. The patient landed on his right knee, causing swelling and severe immobility. The patient developed an acute heart failure exacerbation requiring IABP and ICU admission, and was deemed not a candidate for advanced therapies, including LVAD and cardiac transplant, secondary to immobility/frailty. The patient received an intra-articular steroid and Synvisc injection without improvement. Cryoneurolysis was then performed, which reduced patient pain scores and OME requirements. It also improved the patient's functional status to tolerate rehabilitation and enhance optimization for evaluation of a heart transplant. The patient is now status post LVAD placement and being medically optimized for cardiac transplant.

OME's and Functional Capacity



Discussion

Cryoneurolysis induces reversible Wallerian degeneration while preserving the nerve sheath, allowing functional regeneration at ~1–2 mm/day. [1] For chronic knee pain due to osteoarthritis, randomized controlled trials have shown that cryoneurolysis can provide statistically significant pain reduction compared to sham at 1–3 months, but the clinical relevance of this effect is modest. [2] A recent double-blind sham-controlled trial found no clinically meaningful difference at 2 weeks, but a small benefit at 6 months, with both groups improving from baseline, suggesting a possible placebo or non-specific effect. [3] A recent meta-analysis concluded that the certainty of evidence for cryoneurolysis is very low, with only minimal short-term effects on pain and function. [4] The American Academy of Orthopaedic Surgeons, in its guideline on non-arthroplasty management of knee osteoarthritis, notes that cryoneurolysis improves pain and function compared to placebo, but the overall evidence is limited and does not support routine use.[5]

For heart transplant candidates, functional capacity is essential for candidacy and postoperative outcomes. Chronic knee pain may limit a patient's physiologic reserve and impair rehabilitation potential. By significantly reducing knee pain over several months, cryoneurolysis could enable improved ambulation, exercise tolerance, and participation in conditioning programs while minimizing reliance on systemic medications. Further studies regarding cryoneurolysis efficacy in preparing transplant candidates for surgery are necessary to institute formal recommendations for therapy.

Acknowledgement

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