46th Annual Regional Anesthesiology & Acute Pain Medicine Meeting
May 13-15, 2021 | asra.com | #ASRASPRING21
Disney's Yacht & Beach Club Resort, Lake Buena Vista, FL

Abstract: 1968

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A Randomized controlled feasibility trial of peripheral nerve stimulation for acute and subacute post-amputation pain

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Introduction

Amputees commonly experience acute and chronic phantom limb pain (PLP) and residual limb pain (RLP). Effective management of acute and subacute postoperative pain is particularly challenging following lower extremity amputation, especially in patients with multiple preexisting comorbidities, chronic opioid usage, or high predicted acute pain severity. Percutaneous peripheral nerve stimulation (PNS) has been shown to be effective for chronic and post-operative pain, including chronic RLP and PLP, and its use within the first week after amputation may help to manage PLP and RLP, improve functional outcomes, and spare the use of opioids, but PNS has not been studied in the acute or subacute postoperative period following amputation. This pilot study evaluated the feasibility of using percutaneous PNS in the acute to subacute postoperative setting to improve pain scores and secondarily assessed opioid consumption, functional independence measures, and other key metrics of improvement and rehabilitation following amputation.

Materials and Methods

Sixteen Veterans experiencing moderate pain 2-7 days after transfemoral or transtibial amputation surgery provided written informed consent then were enrolled and randomized to receive either 8 weeks of percutaneous PNS and standard medical therapy (SMT) or SMT alone. The study protocol and written informed consent were IRB-approved. Residual and phantom limb pain scores and opioid consumption were compared between the groups, in addition to secondary endpoints such as readmission rate, length of hospital stay, psychometric scales, and functional outcomes.
The variables studied included 1) Brief Pain Inventory Short Form (Worst, Best, and Average pain scores and Pain Interference), 2) Patient Global Impression of Change, 3) Pain Disability Index, 4) Pain Catastrophizing Scale, 5) Functional Independence Measure, 6) Oral Morphine Equivalents, 7) Hospital Discharge compared to the Veterans Affairs Surgical Quality Improvement Program (VASQIP) Database.

Results/Case Report

Subjects reported greater reductions in phantom (PLP) and residual limb pain (RLP) following PNS compared to SMT alone through 3 months post-amputation. At the end of the 8 weeks of PNS treatment, average PLP and RLP were reduced 76% and 86% from post-operative baseline, while PLP and RLP were reduced 29% and 52% from post-operative baseline after 8 weeks of SMT alone.

Subjects in the PNS group also reported less opioid usage, including a lower proportion of participants taking opioids after the 8-week PNS treatment period and greater reductions in average daily usage compared to preoperative levels. Readmission rates and length of hospital stay were each lower in the PNS group compared to the SMT group. There were no unanticipated serious adverse study-related events.

Discussion

This study demonstrated the feasibility of safely employing percutaneous PNS as a non-pharmacologic therapy with the potential to lower pain scores and opioid consumption in the acute to subacute postoperative period after lower limb amputation. These initial results for temporary PNS therapy following lower extremity amputation are promising as an alternative non-opioid, temporary, non-local anesthetic pain treatment modality in the acute and sub-acute postoperative setting.

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Disclosures

No

Tables / Images