3-Dimensional Virtual Reality for Pain Control in Orthopaedic Patients: A Prospective Randomized Control Study

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Purpose: There is increasing interest in nonpharmacologic modalities to reduce opioid use. Growing evidence suggests 3-dimensional (3D) virtual reality (VR) is an effective pain management adjunct. The purpose of this study was to compare 3D VR (VR) to a 2D audio-visual (2D) experience for postoperative pain control and opioid use in orthopaedic inpatients. We hypothesized that VR would decrease pain and opioid intake (morphine milliequivalents [MME]).

Methods: We performed a prospective randomized control trial (RCT) at a single Level I trauma center from November 2017 to July 2017. Patients with visual analog scale pain scores (VAS) >3 and an orthopaedic extremity surgery were consented and randomized to receive either VR or 2D as an adjunct to standard pain management. The VR cohort was given an immersive headset and 21 possible VR experiences while the 2D cohort utilized the hospital health and wellness TV channel for guided relaxation. The 2D cohort was an active control receiving the current standard of care for postoperative pain control. Mean VAS and opioid use (MME) were pulled from patients' charts for the 48 hours prior to enrollment and 48 hours after enrollment. Patients had 24-hour access to their assigned treatment and were instructed to use the VR or 2D treatment 3 times per day and as needed (PRN) for uncontrolled pain. Likelihood to recommend the modality was assessed on a 5-point Likert scale. VAS and MME were compared using a linear mixed model.

Results: 54 patients (2D: 30 and VR: 24) completed the study. Demographics, orthopaedic injuries, and pre-intervention VAS and MME were not significantly different between cohorts. Multivariate analysis demonstrated that VR patients could expect a post-intervention VAS score of 0.54 points lower than 2D. Post-intervention MME trended toward less opioid use in the VR cohort (78.45 vs 92.22 MME). 95% of VR patients recommended VR versus 50% in the 2D cohort.

Conclusion: In this prospective RCT pilot study, there was a statistically significant reduction in VAS pain scores in the VR group compared to the 2D intervention, and a nonsignificant trend towards decreased MME. Patients were more likely to recommend VR as a future pain management modality. Virtual reality is a novel adjunct to pain control that warrants further investigation.