The Effects of Virtual Reality on Procedural Sedation in Adults: Systematic Review and Meta-analysis.

- Abstract Type: Original Research

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Abstract

Was this study was industry sponsored?

Introduction

Virtual Reality (VR) is a relatively new intervention that can be used by patients during surgery whereby they are immersed and interact with a computer-generated environment. By distracting the mind, VR interferes with noxious stimuli processing and subsequently may provide analgesia and anxiolysis. Its effectiveness has previously been shown in burn dressing changes, pediatric patients, dental procedures, urological surgeries, and when combined with regional analgesia for operations in the outpatient setting. Furthermore, by improving pain and anxiety during surgery, sedative requirements may be reduced, which can also decrease the risks associated with over-sedation. This systematic review and meta-analysis aims to determine whether there is a reduction in sedation requirements compared to usual care.

Methods

A search up to February 2023 was conducted in four databases (Ovid MEDLINE, Embase, Web of Science, and Cochrane Library) using search terms for virtual reality, adult, and sedation. There were 928 initial results, and after duplicates were removed there was 748 citations. After review of the title, abstract, and full-text in adherence with PRISMA guidelines, 10 studies were included for quantitative and qualitative review. Studies were included that used VR during the procedure, had a non-VR comparator group, and reported outcomes of sedation (i.e. propofol, versed, fentanyl). Secondary outcomes included pain score, comfort, anxiety, PACU time, and procedure duration. Quality assessment of the included studies was performed according to Cochrane Risk of Bias tool and data analysis was performed using Comprehensive meta-analysis version 3.

Results

A total of 10 studies including 227 participants in the VR group (intervention) and 283 participants in the control group were selected for final analysis. The results showed a significant difference between VR and control groups for propofol dose (mean difference [MD]= -311 mg/hr, 95% CI: -493 to -129, P=0.001, n=4} (Figure 1), pain score (MD= -0.85, 95% CI: -1.7 to -0.004, P=0.049, n=5) (Figure 2), anxiety (MD= -1.07, 95% CI: -1.78 to -0.362, P=0.003, n=2) and PACU time (MD= -22.6 min, 95% CI: -37.08 to -7.98, P=0.002, n=2). No significant difference was seen for outcomes of comfort (MD= 0.294, 95% CI: -1.71 to 2.30, P=0.77, n=3) and procedure length (MD= 0.3 min, 95% CI: -4.86 to 4.32, P=0.91, n=7), as well as total amount of fentanyl (MD=0.01 mcg, 95% CI: -11.1 to 11.09, P=0.049, n=6) and versed administered (MD= 0.30 mg, 95% CI: -0.47 to 1.06, P=0.44, n=3), between the VR and control group.

Conclusion

VR when used as an adjuvant intraoperatively may reduce sedative requirements, improve pain scores, and result in quicker discharge from recovery without affecting surgical operation time. Further randomized-controlled trials with VR in the ambulatory setting should be performed to verify the results of this study.

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