

Impact of 3-D Virtual Reality Visualization on Patient Education, Engagement, and Satisfaction in Pre-Surgical Consultation

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Introduction

Given the need to improve communication between physicians and patients, we assessed whether a 360-degree Virtual Reality (360°VR) visualization platform for face-to-face neurosurgical consultations could enhance patient engagement and satisfaction.

Methods

For each patient, a personalized 360°VR rendering was created from their high-resolution MRI and/or CT scans and was presented using VR headsets (Fig. 1). In total, fortyseven and fourteen patients at UCLA and GWU, respectively, utilized the 360°VR and were prospectively surveyed with consent. One physician consulted all patients at each site. These patients completed eight 5-point Likert scalebased questions (1 = "strongly")disagree" to 5 = "strongly agree") comparing prior (without 360°VR) and current 360°VR consult experience. Wilcoxon signed-rank test was used to calculate statistical significance.

Learning Objectives

1.To assess whether immersive VR technology is an effective tool for pre -surgical consultations.

2.To examine the extent to which VR technology can help

Results

Most patients sought consultation for cerebrovascular pathology (91%) (Figure 2), and 94% at UCLA and 100% at GWU "strongly agreed" that 360°VR helped to improve their understanding and overall satisfaction with the consultation (Fig. 2). At both institutions, patients felt overall satisfaction was significantly improved (Figure 3) (p<0.05 UCLA and GWU) and that their neurosurgeon explained their conditions significantly clearer compared to prior consultations (p<0.001; UCLA).

Additionally, 91% (UCLA) and 93% (GWU) "strongly agreed", and 9% (UCLA) and 7% (GWU) "agreed", that 360°VR helped improve their comfort level with the proposed management options.

All patients (100%) agreed that they understood the different management options well enough to make an informed decision during the consultation, and 96% (UCLA) and 86% (GWU) agreed they selected a management option together with their neurosurgeon during the consultation.

Conclusions

We found enhanced patient engagement and satisfaction as a result of incorporating an immersive 360°VR technology into neurosurgical consultation. Findings from this multi-institutional study support the 360°VR technology as a potential tool to enhance patient education, engagement and Figure 1



The portable unit is commonly used in both 2D and 3D immersive VR by employing a VR headset. The physician then guides the patient, using a hand-held video game controller, through the construct in whatever manner she chooses.



Patients were more satisfied with the VR consultation than previous consultations

References

1.Kliot T et al. The impact of a patient education bundle on neurosurgery patient satisfaction. Surg Neurol Int. 2015;6(Suppl 22):S567-572. 2.Ha JF et al. Doctor-patient communication: a review. Ochsner J. 2010;10(1):38-43.



UCLA

A: A case of fusiform giant aneurysms, the one of which was treated by arterial bypass and proximal ligation. B: A case of medulloblastoma with involvement of the left superior cerebellar peduncle, underwent complete resection but suffered a transient posterior fossa syndrome.C: A case of a tentorial cerebellar arteriovenous malformation, treated via an interhemispheric transtentorial approach.

D: A case of choroid plexus carcinoma that was completely resected.

References continued:

3 . Dascal JR, M et al. Virtual reality and medical inpatients: a systematic review of randomized, controlled trials. Innovations in Clinical Neuroscience. 2017;14(1-2):14-21.