INTRODUCTION

Acquiring technical skills is essential for performing a successful surgery. They are embodied in the Accreditation Council for Graduate Medical Education (ACGME) competency of patient care. Simulators contribute to patient care by providing a safer ground for practicing technical skills before applying them on an actual patient. Moreover, unlimited repetitiveness of procedures and generation of rare cases provides an additional advantage over traditional patient-based training.

Whether virtual reality simulators are really helpful in attaining surgical competency in Otolaryngology Head and Neck surgery has not been thoroughly assessed.

Therefore, the purpose of this study was to determine whether a virtual reality temporal bone simulator could be used as a potential tool to attain surgical competency at a faster rate.

METHODS AND MATERIALS

Participants

Five residents working at the Johns Hopkins Department of Otolaryngology Head and Neck Surgery (OHNS) from postgraduate years (PGY)-1 to PGY-4 participated in the study. Residents were classified into Otology 1 (novice) or 2 (experienced) based on their level of training.

Assessment and Settings

Participants were shown a ten-minute orientation video on Virtual Reality (VR) temporal bone simulator and were provided standardized instructions. While participants performed mastoidectomy on the simulator, they were assessed on four tasks: a) defining tegmen, b) defining sigmoid and sino-dural angle, c) use of drill, and d) overall surgical performance.

Data were evaluated by four otology faculty members using a validated task-based checklist (TBC) and global assessment of mastoidectomy skills.

Statistical methods

Means and standard deviations were calculated for continuous data. Box plots were created to assess the distribution of scores between Otology 1 and Otology 2 residents. The mean score obtained on VR temporal bone simulator for each task were compared between two Otology groups and between settings using t-tests. Data were analyzed using STATA 10.

RESULTS

A total of 39 evaluations of mastoidectomy procedure were obtained from three settings.

The mean total score obtained for residents on VR temporal bone simulator was 2.54±0.75, 3.13±0.55 for OR, and 2.18±0.29 for temporal bone laboratory (Table I). The mean total score obtained from all settings for Otology 1 was 2.27±0.72, and for Otology 2 was 2.76±0.20 (Table III).

DISCUSSION

Present otology training constitutes active training of a resident in temporal bone laboratory prior to performance on an actual patient in the OR. Harvesting, processing, and maintenance of a temporal bone is a costly process. Hence, exploration of alternative means of learning is deemed essential.

Virtual Reality simulation, in recent years, has evolved into a promising training and objective assessment modality. Zirkle has demonstrated the efficacy of VR temporal bone simulator in training. However, the evidence of transferability of performance from the simulator to the OR is scarce.

In our pilot-study, the concordance between the scores on the VR temporal bone simulator and the temporal bone laboratory suggests that performance on the simulator might be equivalent to the performance in the OR. Moreover, an increase in the scores of experienced residents was noted when compared to the novice residents.

One of the limitations of our pilot study is that we compared simulator data with previous OR and laboratory data. A prospective design is required to validate the Virtual Reality simulator in the Otolaryngology curriculum.

CONCLUSIONS

The performance on the VR temporal bone simulator corresponds to the performance in the temporal bone laboratory suggesting an indirect evidence of transferability of technical skills.

The training on the (VR) temporal bone simulator in conjunction with the temporal bone laboratory can optimize performance in the operating room and help attain surgical competency at a faster rate.

Incorporation of VR temporal bone simulator in the surgical curriculum is likely to enhance surgical outcomes and thus improve patient care.

REFERENCES


