E-learning, in its most rudimentary form, is the use of internet-based resources for teaching and learning purposes. In surgical specialties, this definition encompasses the use of virtual patient cases, digital modeling, online tutorials, as well as standardized video and imaging. As new technological frontiers rapidly emerge, e-learning may be an effective alternative to traditional teaching. Here we present a systematic review of the literature assessing specifically the efficacy of e-learning for otolaryngology education. We also discuss the relevance of these programs for both medical students and residents within the field.

Methods and Materials

This review was conducted following guidelines defined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement (PRISMA). Inclusion criteria were as follows:

1. Interventional studies involving an e-learning program, software, or curriculum
2. Subjects include otolaryngology students or residents
3. Studies published in English, in peer-reviewed journals

We conducted a systematic literature search in four databases: PubMed, Embase, Web of Science and the Cochrane Library. Our search strategy had three concepts. The concepts were linked together with the AND operator: (1) e-learning; (2) otolaryngology education; and (3) medical students or residents. Results were limited to articles published from January 1, 2005 to August 13, 2015.

Results

Included studies were divided into 2 main categories:

Group I: Medical students and otolaryngology education

There were 8 total studies with medical student subjects: 5 prospective RCT, 2 cohort studies, and 1 quasi-randomized study. These covered a range of outcomes including performance on written examination, student satisfaction with their learning modality, or a combination of the two. Most studies compared conventional learning approaches against online lectures, interactive modules, software modules and blended learning programs. Within 5 of the 8 total studies in Group I, e-learning was demonstrated to be superior to the control.

Group II: Residents and otolaryngology education

There were 4 total studies with resident subjects: 3 prospective RCT and 1 prospective cohort study. The studies included a variety of e-learning interventions focused primarily on technical clinical skills. In all 4 studies e-learning was shown to be superior to more traditional techniques.

Discussion

E-learning has significant potential for improving otolaryngology education, both at the student and resident level. Of the 12 studies included within this review, nearly all reported either improved objective performance in academic or clinical measures and higher satisfaction with the use of e-learning materials when compared to traditional teaching methods. Furthermore, these results were demonstrated in both medical student and, more prominently, resident cohorts. Our review describes the large array of educational modalities relevant to otolaryngology training and how these modalities enable students and residents to influence their own education.

Conclusions

As the landscape of medical education continues to change, students and teachers must also, adapt accordingly. E-learning resources have the potential to effectively improve otolaryngology education. While the current literature appears to support this claim, additional investigation is needed in order to concretely determine the role e-learning will play in the evolution of surgical education. Future work must include larger prospective randomized studies comparing e-learning modalities to traditional preclinical and clinical education. Furthermore, these should specifically pertain to otolaryngology training, as such literature is exceedingly sparse. As the volume of data addressing the role of e-learning in otolaryngology increases, so too will the need for larger, more comprehensive systematic reviews and meta-analyses.

References