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Research Article

Educational Quality of Thyroidectomy YouTube Videos

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Abstract

Background: Surgical videos have proliferated in the public domain.

Objective: This study seeks to evaluate the educational quality of YouTube videos on thyroidectomy and to survey trainee use of online videos in preparation for thyroidectomies.

Methods: Twenty thyroidectomy videos were reviewed from YouTube searches in 2019. The video length, views, likes and publish date were noted. Videos were rated on the Global Score for Educational Value (GSEV) (1-5 poor to excellent), VAS for video quality (1-10 poor to excellent), and a modified Hemithyroid Specific Scale (HSS) (1-5 unacceptable to excellent). Utilization of YouTube as an educational resource was polled among trainees at our institution and among the AAO-HNS Section for Residents and Fellows.

Results: Average length for videos was 15:27 (+12:09), average time published was 4.04 years, with 9410 views/year with a 0.89 like rate. The average GSEV was 3.4 (± 1.2), average VAS was 6.1 (± 2.4), while average HSS was 3.4 (± 0.8). GSEV was positively correlated with HSS (R=0.93, P< 0.00001). There was no correlation between GSEV and video length, like rate or views/yr. Videos were more likely to show dissection of recurrent laryngeal nerve (95%) than dissection of superior and inferior parathyroids (60%), skin closure (60%) and anesthetic considerations (15%) (p< 0.05). Of 17 respondents, 6 (35%) listed YouTube as a source in preparation for thyroid surgery.

Conclusion: On average YouTube videos for thyroidectomy showed adequate technique and were moderate in educational quality. YouTube videos may be helpful in thyroid surgery; however, faculty should vet resources due to variability in quality.

Keywords: Thyroidectomy; YouTube; Global Score for Educational Value (GSEV); Otolaryngology; Surgery

Introduction

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) implemented an 80-hour work-week limit for all residency programs in an effort to decrease resident fatigue, promote resident well-being, decrease medical errors, and prevent adverse patient outcomes. In the surgical fields, many were concerned about decreased operative experience, further straining the challenge of acquiring the technical skills required to be a competent and safe surgeon [1]. Despite these restrictions, surgical subspecialties including otolaryngology have continued to adapt and thrive, balancing the restrictions set forth by the ACGME and the skills and knowledge required to become a successful surgeon [2]. With adequate education and training, measures of surgical safety show that resident performed procedures are comparable to faculty performed procedures [3,4].

In a time-strained learning environment, knowledge of adult learning theory can improve efficient learning. Multiple theories exist including the social cognitive theory, reflective practice, transformative learning, experiential learning, and self-directed learning [5]. Surgical textbooks, atlases, lectures, and one-on-one teaching are classic ways that residents and medical students have prepared. However, with new, widely available technologies, educational content has spread to multimedia formats including videos, simulation, and augmented reality. Such a shift has the potential to improve efficient, adult learning. Niel Fleming's VARK model of learning divides learning preferences into Visual, Aural, Reading/Writing and Kinesthetic modalities [6]. The use of multimedia formats, therefore, has the potential to appeal to more learners and has shown promise for improving surgical outcomes. For instance, a randomized trial demonstrated that trainees who prepared with a standardized surgical video performed significantly better than their counterparts when performing a laparoscopic right colectomy [7]. Educational videos have demonstrated ability to improve technical skills. In a small study of 6 residents, there was objective improvement in their procedural skills before and after viewing relevant surgical education videos [8].

YouTube was founded in 2005 as an online video search engine. More than half of American adults use the site, including 90% of millennials, and 65% of adults report visiting the site for self-directed learning [9]. With its ease of access, it is not surprising that studies have shown YouTube to be an educational source for surgical residents [10,11], and one of the most commonly used video sources for surgical preparation [12]. Some evidence has suggested that younger surgeons are resorting to more video usage as compared to more senior surgeons [13]. In contrast to edited books and journal articles, there is a lack of rigorous review for these publicly available videos. Quality of surgical videos found on YouTube is variable, but their potential value as an educational tool combining visual, aural and in some cases reading materials cannot be overlooked. Some evaluation of surgical videos for Otolaryngology procedures is needed.

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Thyroidectomy is a commonly performed procedure and is one of the key indicator surgeries within the ACGME case log for Otolaryngology. Previous work has demonstrated that the availability of high-quality thyroidectomy videos can lead to improved knowledge [14]. Surgical proficiency in thyroidectomy can be tracked *via* quality metrics such rates of bleeding, hypocalcemia and recurrent laryngeal paresis/paralysis [3,4,15]. The current study seeks to assess the availability, educational value, and thyroid specific quality of thyroidectomy videos found on YouTube based on analyses by thyroid surgeons within an academic Otolaryngology Department. Additionally, we surveyed the use of YouTube as a video source for residents and medical students who participated in thyroidectomy.

Materials and Methods

This study was approved by the Baylor College of Medicine Institutional Review Board (H-44818). In May 2019, a YouTube search was performed using the search terms "thyroid surgery", "thyroid removal", "thyroid lobectomy", "thyroidectomy", "hemithyroidectomy", "partial thyroidectomy" and "total thyroidectomy". The search was performed on a depersonalized browser with website history, cookies and cache deleted and with no user signed into YouTube. Videos were included if there was English narration or annotation and if live or recorded thyroid surgery was shown. Patient narratives of surgery and animations of surgery were excluded. The top ten videos from each search term were collated and were cross referenced on three different browsers (Safari, Internet Explorer, and Mozilla Firefox). A total of 20 thyroidectomy videos were reviewed based on the criteria.

The video length, views, likes and publish date were noted. Like rate was calculated by dividing the number of likes by the number of years published. Videos were rated by three academic Otolaryngologists utilizing the Global Score for Educational Value (GSEV) (1-5 poor to excellent), Visual Analog Scale (VAS) for video quality (0-10 poor to excellent), and modified Hemithyroid Specific Scale (HSS) (1-5 unacceptable to excellent). The GSEV is a score from 1-5 which has been utilized to grade overall video educational quality, initially developed by Singh et al. [16] and more recently used by Fischer et al. [17] to grade the quality of YouTube videos for knee arthrocentesis. The VAS is a score from 0-10 assessing video resolution, adequate view, lighting, ability to follow surgical steps, and level of engagement. The Hemithyroid Specific Scale is a scoring tool specific for thyroid surgery developed by Stack et al. [15] which includes both pre-procedural and procedural steps critical to safe thyroid surgery. Steps were rated on a scale of 1-5 which included consideration of anesthesia/airway, patient safety, positioning, skin incision, elevation of subplatysmal flaps, division and retraction of the strap muscles, dissection of the superior pole vessels, tracheoesophageal groove dissection, parathyroid preservation, division of Berry's ligament, isthmusectomy, irrigation and hemostasis, RLN stimulation, layered wound closure, and overall knowledge of thyroidectomy technique. Descriptive statistics were performed using Graphpad Prism (Graphpad Software Company, California).

Utilization of YouTube as an educational resource was polled among trainees of our institution, and among the Academy Academy of Otolarygngology- Head and Neck Surgery Section for Residents and Fellows using a Survey Monkey Survey of which there were 17 respondents.

Results

Average length for videos was 15:27 (SD=+12:09, Range 3:57-51.33). The average time published was 4.04 years (range 0.91-9.05 years), with 9410 views/year (range 257-31902 views/year) with a 0.89 like rate. Five videos were both narrated and annotated, 5 were annotated only, 4 narrated only and 6 videos were neither annotated nor narrated.

The average GSEV was 3.4 (± 1.2), average VAS was 6.1 (± 2.4), while average HSS was 3.4 (± 0.8). GSEV was positively correlated with HSS (R=0.93, P<.00001). There was no correlation between GSEV and video length, like rate or views/yr. Videos were more likely to show dissection of the recurrent laryngeal nerve (95%) than dissection of the superior and inferior parathyroids (60%), skin closure (60%) and anesthetic considerations (15%) ($p< 0.05$) (Figure 1). Videos that were both annotated and narrated had higher average GSEV scores when compared to videos that only had annotation or narration. Videos without annotation or narration had the lowest GSEV (2.8) (Figure 2). With regards to trainee surveys a total of 17 respondents were acquired. Since the survey was published to an online forum and not directed to certain people, a response rate was unable to be calculated. Of these respondents, 6 (35%) listed YouTube as a source in preparation for thyroid surgery.

Discussion

Surgical resident education continues to be a challenging process that spans multiple domains not only in medical knowledge and management, but also in the technical aspects of performing surgery. Over the past several decades, graduate medical education has changed to include more semi-objective measurements of resident performance in six main domains: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice. For surgical training, additional evaluations have been developed which grade operative flow, knowledge of anatomy, handling of tissue, economy of motion, and others. In a time-constrained learning environment, multimedia sources of information have the potential to increase the rate of learning and provide access to high-quality resources. The value of multimedia presentations of anatomy and surgical steps makes inherent sense and has been proven. For example, a study of medical students who studied anatomy using a surgical video had better anatomy test scores when compared to those utilizing a traditional textbook atlas [14]. A randomized trial demonstrated that surgical residents who prepared with a standardized surgical video performed significantly better than their counterparts when performing a laparoscopic right colectomy [7]. In a survey of participants from a single institution's Department of Surgery, 90% of respondents reported using videos for surgical preparation, with the most common source being YouTube [12].

The popularity of YouTube among surgical trainees is likely a reflection of a younger generation of learners who have grown up with multimedia forms of education. Indeed, many medical students graduate having had the opportunity to stream multimedia lectures rather than attend traditional in-person didactics [18]. The other benefits of YouTube are also clear - when compared to traditional peer-reviewed sources, YouTube offers ease of access, lack of pay wall, and an unmatched quantity of available videos to browse. The price of this ease of accessibility, however, is a lack of quality control and peer review. As an example, a similar study on the quality of YouTube laparoscopic cholecystectomy videos found that only 1 out of 160 videos met the authors' criteria for adequacy, with the majority of them being poor [11]. Such quality verification and curation by teaching faculty is needed if the YouTube videos are going to continue to be an effective resource for surgical residents.

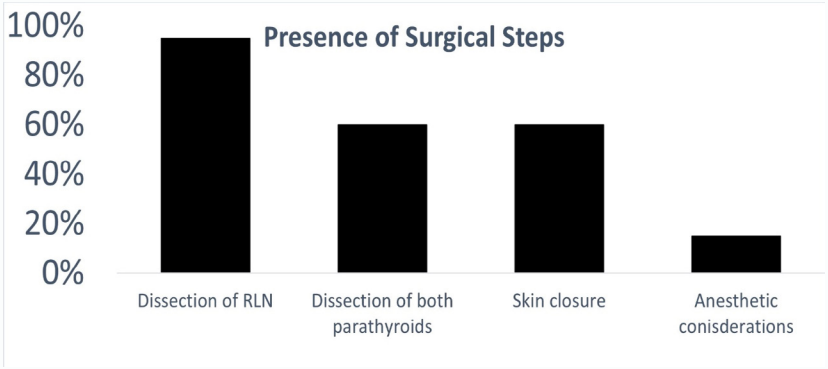

Figure 1: Percentage of videos demonstrating the above steps.

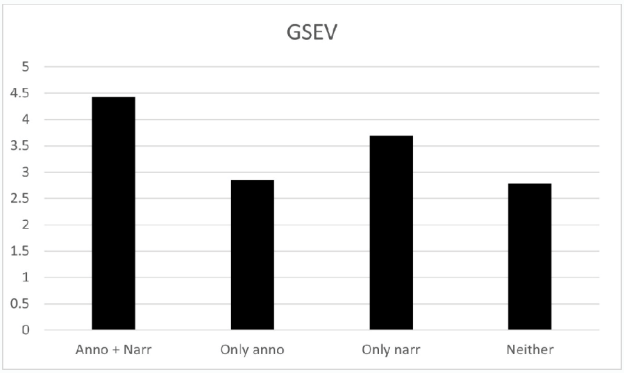

Figure 2: Average Global Scale for Educational Value (GSEV) by annotation and/or narration.

Our study sought to evaluate the quality of YouTube videos demonstrating surgical steps in a common otolaryngologic procedure, thyroidectomy, by sampling 20 videos found on YouTube. Using the GSEV for overall quality, VAS for visual clarity, and HSS for adequate depiction of thyroid surgery, we demonstrated that the sampled YouTube videos were of only modest quality. We further did not find a correlation between the "like/dislike" ratio and higher GSEV or HSS scores, indicating that YouTube's native rating system does not select for higher quality educational videos. These results are consistent with multiple other investigations into the quality of YouTube videos with regards to medical and surgical education [16,19-21]. We also surveyed trainee utilization of YouTube as an educational resource. In our survey, 35% of 17 trainees reported YouTube use. This is lower than other reports and may represent sampling error or an institutional preference.

Given the open-source nature of YouTube, it is unlikely that the average overall quality of videos will improve. Instead, it is important to recognize the limitations of using YouTube as an educational resource and to recognize which videos are of higher educational quality. Surgical society videos, which are often peer-reviewed and of higher quality, do not necessarily, end up at the top of a search on YouTube. Greater access to these videos on society websites may help to draw trainees.

There are some limitations to our study. First, the number of raters was low and inter-rater reliability was not measured. We chose 20 YouTube videos for consideration which may be a small sample of the entire YouTube video space. The videos that we chose were subject to the YouTube search algorithm and higher quality videos may have been missed. Additionally, the scoring system utilized was validated, but semi-subjective. Other limitations include our small sample size when surveying trainees who used YouTube as an educational resource.

Conclusion

Multimedia educational resources have the potential to provide high quality content to residents in a time-constrained learning environment. The most popular open-source video repository, YouTube, unfortunately only has modest quality videos when assessed by our group of academic otolaryngologists. Further studies are need to the vet the quality of YouTube videos which will undoubtedly continue to comprise a significant portion of resident education and preparation for surgery. Such assessments will help to elucidate the potential limitations of YouTube as a learning resource.

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