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Assessment of Esophagectomy Videos on YouTube: Is Peer Review Necessary for Quality?

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ABSTRACT

Introduction: Various online platforms, such as YouTube, are used for surgical education. Esophageal surgery is sophisticated and surgical videos may help reduce the time it takes for surgeons to learn these complicated operations. There is no clear consensus regarding the quality and reliability of esophagectomy videos on YouTube. We aimed to evaluate esophageal surgery videos published on YouTube in terms of quality and reliability.

Methods: The keywords "esophagectomy" and "surgery" were both searched on YouTube and the first 150 results were evaluated. Eighty two videos were included in the analysis. The quality and reliability of the videos were determined using the esophagectomy scoring system (ESS) developed by the authors, the Journal of the American Medical Association benchmark criteria, and the video power index.

Results: A total of 82 videos were reviewed. About two-thirds of the videos demonstrated the Ivor Lewis technique and included surgeries performed using the thoracoscopic/laparoscopic method. The videos were analyzed as per the source of the upload: academic (25.7%), industry-sponsored (9.7%), or individual (64.6%). When the scores were compared by the origin of the videos, industry-sponsored videos scored significantly higher than the videos produced by individuals and academic centers ($P = 0.01$). While the ESS and Journal of the American Medical Association benchmark criteria scores were significantly correlated ($P = 0.00$), no correlation was found between video length, video power index score, and ESS score.

Conclusions: Conducting a professional evaluation of videos before they are published on YouTube may enhance video quality. Moreover, valuable videos of better quality can be produced by improving the ESS and by assessing more videos.

Introduction

Introducing social media into our lives has changed surgical training. Various online platforms contribute to surgical education. One of these platforms is YouTube. We searched PubMed using the keyword "YouTube" in July 2021 and found that there have been an increasing number of articles about surgical videos on this platform since 2007. These approximately 2000 articles show that, recently, online videos have become a part of medical education. This video-based medical education method in medicine will probably develop like other disciplines after COVID-19.[1-5]

Today, as the use of online video platforms in surgical education increases, different methods are used to evaluate and

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improve the quality of these videos. The critical view of safety, the global operative assessment of laparoscopic skills, the video power index (VPI), the Journal of the American Medical Association (JAMA) benchmark criteria, and the laparoscopic surgery video educational guidelines (LAP-VEGaS) are the most common methods and guidelines.[6] Reliability and quality studies for various surgical procedures published on YouTube have been carried out frequently in recent years. There is no clear consensus about the results regarding the quality and reliability of surgical videos on YouTube.[7]

Esophageal surgery is complicated and has a long learning curve. Improving newly developed, minimally invasive surgical techniques may take years.[8] Videos may help reduce the learning curve of these complicated operations.[9] No previous studies of videos of esophageal surgery in this field have been undertaken. Our study evaluated esophageal surgery videos published on YouTube in terms of quality and reliability.

Materials and Methods

"Esophagectomy" and "surgery" were searched for on YouTube (https://www.youtube.com, Language: English) in January 2021. The top 150 videos sorted by relevance using the default filtering and sorting options were evaluated. Advertisements, patient experiences, patient education, non-English videos, and theoretical content videos were excluded. Videos that included only a part of the surgery were also excluded (Fig.). Two independent surgeons reviewed the remaining videos individually.

The authors developed a new scoring system, the esophagectomy scoring system (ESS), which was modified from components of Zhang *et al.*'s scoring system.[10] The ESS includes 15 items worth one point each (Table 1). Points that could not be scored in terms of anatomical differences in Ivor Lewis, transhiatal, and McKeown esophagectomy surgeries were labeled as not applicable (e.g., upper mediastinal lymph node dissection in Ivor Lewis esophagectomy). The average score of both evaluators was taken and the scores were evaluated of 100 (the score found was divided by the number of questions evaluated and multiplied by 100).

The JAMA benchmark criteria score was used to assess video quality (Table 2).[11] Channels with only the doctor's personal information in the channel name and description were described as individual, and channels related to medical associations, hospitals, universities, and medical journals were defined as stemming from academic centers. Commercially supported peer-reviewed surgical video channels were defined as originating from the industry. In addition, the number of times a video had been viewed, its source (academic center, individual, or industry), the number of likes it received, and whether it depicted a surgery that was open, laparoscopic, or robotic were recorded.

The VPI was used to assess both the view ratio and the like ratio of the videos. The formula for calculating the VPI was as follows: [(like count/dislike count + like count) × 100] × [(number of views/days) × 100].[12]

Descriptive research was conducted by examining publicly accessible videos on the Internet. No human participants or animals were included in this study. Since no patient data or materials were used and all videos are publicly available on a social media website (YouTube.com), there was no need to obtain an institutional review board or ethics committee approval for this study.

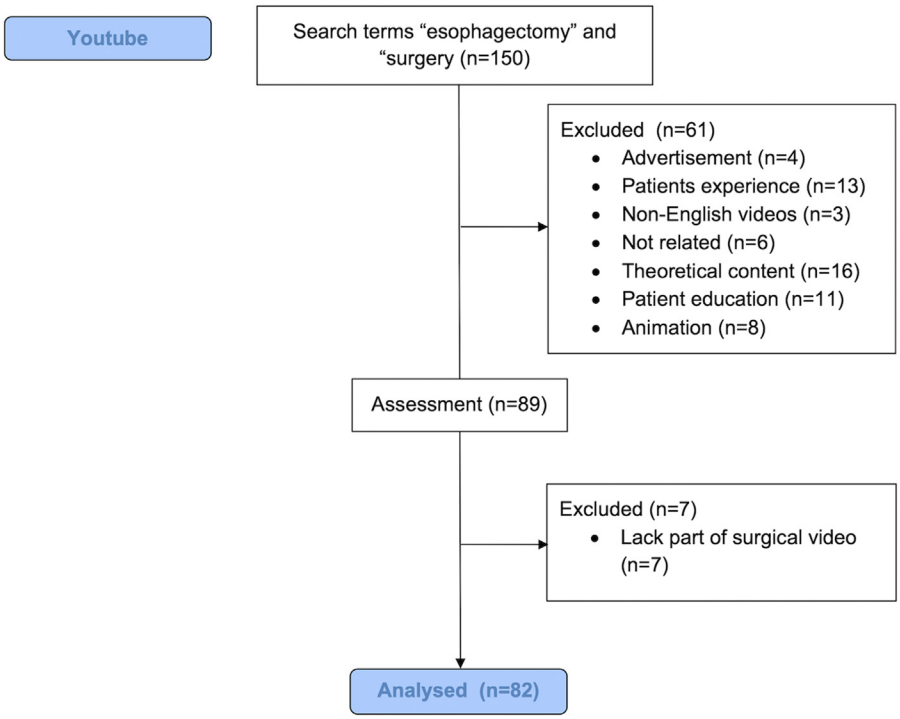

Fig. – Flowchart of video selection.

Table 1 – Esophagectomy scoring system (ESS) for YouTube videos.

Content		Score
Videos resolution	High resolution (≥1280 × 720 pixels)	1
Preoperative evaluation	Age, gender, body mass index, indication for surgery (at least one of them)	1
	Extent of esophagectomy	1
	Extent of lymph node dissection and tumor location	1
	Detailed reconstruction method	1
Procedure description	Subtitle or voice comment	1
During surgery	Port location	1
	Infradiaphragmatic lymph nodes	1
	Lower mediastinal lymph nodes	1
	Upper mediastinal lymph nodes (just upper esophageal tumors)	1
	Stapler or suture for anastomosis specified or not?	1
	Surgical procedure should be described in standardized steps/Demonstration of key anatomical landmarks.	1
	Operating time	1
After surgery	Surgical outcomes	1
	Pathological stage	1

Statistics

Data analysis was performed with SPSS statistics (Version 24 for Mac, IBM Corporation). Descriptive statistics were presented as frequencies (*n*) and percentages (%) for categorical variables and as mean or median (standard deviation or range) for continuous and ordinal variables. Spearman's Rho was calculated to assess the degree of correlation between the performance measures and the video parameters. Continuous data were tested for normal distribution using the Shapiro–Wilk and Kolmogorov–Smirnov normality tests. In comparing videos of high and low quality, Student's *t*-test was used for data with a noncategorical normal distribution. The Mann–Whitney *U*-test was used for data without a normal distribution. The Chi-squared test was used for categorical data. A *P* value less than 0.05 was considered significant.

Results

A total of 82 videos were reviewed and approximately two-thirds of these videos were about the Ivor Lewis technique and the thoracoscopic/laparoscopic method. Most of these videos (64%) were uploaded using personal accounts. General information about the scores and lengths of these videos is presented in Table 3.

The median score of the videos for the ESS was 50 (range: 6-86). No difference was observed among the three surgical methods ($P = 0.55$) in terms of the ESS score. Similarly, no significant difference in ESS scores was found between the surgical technique groups ($P = 0.52$). However, the ESS scores of the industry-sponsored videos were significantly higher than those of the videos uploaded by individual accounts and academic resource centers ($P = 0.01$). Posthoc tests showed a significant difference ($P = 0.01$) between the ESS scores of the industry-sponsored videos and those uploaded by individual accounts.

When the scores were classified as either < 50 or ≥ 50, no difference was observed between the surgical technique and type of group ($P = 0.33$ and $P = 0.06$, respectively). However, industry-sponsored videos were significantly higher in the group with an ESS score of ≥ 50 ($P = 0.01$) (Table 4).

When we examined the correlation between major variables, the ESS and JAMA criteria scores were significantly correlated ($P = 0.00$); however, no significant correlation between VPI and other scoring systems was found (ESS and JAMA). Meanwhile, videos with an earlier upload date were significantly negatively correlated with ESS score ($P = 0.02$) (Table 5).

Table 2 – The Journal of the American Medical Association (JAMA) benchmark criteria.

Criteria	Description
Authorship	Author and contributor credentials and their affiliations should be provided.
Attribution	Clearly lists all copyright information and states references and sources for content.
Currency	Initial date of posted content and subsequent updates to content should be provided.
Disclosure	Conflicts of interest, funding, sponsorship, advertising, support, and video ownership should be fully disclosed.

Table 3 – Characteristics of the videos included in the analysis.

Characteristics	Total $n = 82$ (%)
Surgical technique	
Ivor Lewis	49 (59.8)
McKeown	16 (19.5)
Transhiatal	17 (20.7)
Operative approach	
Open	10 (12.1)
Thoracoscopic/laparoscopic	54 (65.9)
Robotic	18 (22)
Video source	
Academic	21 (25.7)
Industry*	8 (9.7)
Individual	53 (64.6)
Length (s) (median) (range)	638 (144-8004)
Esophagectomy scoring system (median)	50 (6-86)
JAMA score	
1	0
2	23 (28)
3	36 (43.9)
4	23 (28)
VPI score (median)	0.5 (0.01-36)

JAMA = The Journal of the American Medical Association benchmark criteria; VPI = video power index.
* A peer-reviewed surgical video database.

Discussion

Given that it is a complicated procedure, esophageal surgery entails a long learning curve and is time-consuming.[13] YouTube and other online platforms now serve as auxiliary instructional tools in surgical learning.[14-16] However, whether these platforms offer quality content remains to be determined.[17] Many studies have evaluated surgical videos on YouTube.[3,18-20] However, to our knowledge, this study is the first to assess esophagectomy videos uploaded on this platform.

The LAP-VEGaS video assessment tool is used to select acceptable videos for conference presentation and publication.[21,22] However, an effective tool for assessing esophagectomy videos is needed. For this reason, we established a scoring system that can be used to evaluate such videos. Future studies can evaluate ESS validation by assessing laparoscopic esophagectomy videos with ESS and LAP-VEGaS.

In this study, the ESS and JAMA criteria used to evaluate the quality and reliability of surgical videos were significantly positively correlated with each other. In addition, the industry-sponsored videos had higher ESS scores. These industry-sponsored videos were qualified through a peer review, which could help improve video quality and ensure an accurate demonstration of the entire surgical procedure. Although most videos on YouTube belong to personal accounts, industry and tertiary centers have started to produce content in recent years. Apparently, industry-sponsored content receives high ESS scores. This result may be

Table 4 – Comparison of YouTube characteristics and JAMA-VPI scores among ESS.

Variables	Score <50	Score >50	P value
Surgical technique			0.33
Ivor Lewis	28	21	
McKeown	6	10	
Transhiatal	8	9	
Operative approach			0.06
Open	2	8	
Thoracoscopic/laparoscopic	28	26	
Robotic	12	16	
Video source			0.01
Academic	8	13	
Individual	33	20	
Industry	1	7	
Length (s)	1277	858	0.11
JAMA score			<0.001
2	19	4	
3	20	16	
4	3	20	
VPI score (mean)	1.1	3.3	0.08

JAMA = The Journal of the American Medical Association benchmark criteria; VPI = video power index.

Table 5 – Correlations between score variables, video length, and time.

Parameters		ESS	Video length	JAMA score	VPI score	Time since video upload date
ESS	r	1	−0.165	0.550	0.199	−0.255
	P		0.138	0.000	0.073	0.021
Video length	r	−0.165	1	−0.208	0.003	−0.264
	P	0.138		0.060	0.980	0.017
JAMA score	r	0.550	−0.208	1	0.114	0.126
	P	0.000	0.060		0.310	0.259
VPI score	r	0.199	0.003	0.114	1	0.255
	P	0.073	0.980	0.310		0.021
Time since video upload date	r	−0.255	−0.264	0.126	0.255	1
	P	0.021	0.017	0.259	0.021	

JAMA = The Journal of the American Medical Association benchmark criteria; VPI = video power index; ESS = esophagectomy scoring system.

attributed to the evaluation and editing process, which might have been more professionally carried out compared with the evaluation and editing of videos uploaded on personal accounts.

A study evaluating laparoscopic fundoplication has found that videos run for more than 7 min on average and that academic resource centers play an essential role in the quality of videos. However, view counts were not related to quality. As a result, a filtering process that evaluates specific parameters leading to the accessibility of high-quality videos would be beneficial.[19] In our study, video duration was not associated with either the ESS or JAMA criteria scores. Some studies have shown a correlation between video duration and higher JAMA criteria scores and it is indeed possible that information of good quality is delivered by longer videos.[23] However, many studies have shown that there is no correlation between video duration and quality.[12] Similarly, our results showed no significant correlation between the quality and duration of videos. Nevertheless, we found that the average duration of videos with higher scores was shorter, although the difference was not statistically significant.

VPI score, which accounts for views, likes, and dislikes, is frequently used in similar studies. It has been thought that the ratio between views and likes is related to the informative value of a video.[12] However, we did not observe a significant correlation between VPI and ESS scores. Given that open platforms such as YouTube are accessible, and thus uploaded videos may be watched and assessed by everyone and not just by healthcare workers, likes and views do not always indicate the quality and informative value of a video.

A surgeon's field of view during an actual operation differs from the recorded image of an open surgery. Given that videos of laparoscopic surgery may show the entire procedure, a large number of laparoscopic surgery videos have been uploaded on YouTube. Our study showed that laparoscopic and robotic esophagectomy operations are the predominant videos that have been uploaded. In this context, our results showed that as time elapses since the upload date, ESS scores decrease and video duration decreases. These results are significantly related to technological developments, including the extended recording capacity and high-quality video recording of minimally invasive surgeries. As the role of surgical videos in education increases, more evaluations will be published on this subject. Thus, the awareness of video makers will increase and contribute to the creation of higher-quality content. In our opinion, ESS can be developed further and used as a tool for reviewers in a peer review. While there are many methods and/or guidelines for assessing the content and quality of the videos in peer-review systems, we think that ESS can be helpful for a specific area (esophageal surgery).

The limitations of this study are that the scoring system was new and that only a few videos were assessed using this scoring system. Another limitation is the use of "snapshot" analysis. While video content may change over time, videos are searched based on relevance, which is the default ranking setting on YouTube. Results may change when videos are sorted differently, for instance, based on duration, video resolution, and likes, by the YouTube algorithm.

Conclusions

Standardized videos may be created for the benefit of surgeons who intend to improve their skills in esophageal surgery. A professional evaluation of videos before they are published on YouTube may enhance video quality. Moreover, valuable videos of better quality can be produced by improving the ESS and by assessing more videos.

Author Contributions

All listed authors meet the ICMJE criteria. We attest that all authors contributed significantly to the creation of this manuscript, each having fulfilled the criteria as established by the ICMJE. We confirm that the manuscript has been read and approved by all named authors.

Disclosure

This manuscript has not been published or presented and is not under consideration for publication elsewhere. The authors have no relevant financial or nonfinancial interests to disclose.

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Availability of Data

The datasets generated during and/or analyzed during the present study are available from the corresponding author on reasonable request.

CRediT authorship contribution statement

Tevfik Kıvılcım Uprak: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Funding acquisition, Resources, Supervision. **Muhammer Ergenç:** Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Funding acquisition, Resources, Supervision.

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