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ORIGINAL CONTRIBUTIONS

Comparison of New Era's Education Platforms, YouTube® and WebSurg®, in Sleeve Gastrectomy

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Abstract

Introduction The Internet is a widely used resource for obtaining medical information. However, the quality of information on online platforms is still debated. Our goal in this quality-controlled WebSurg® and YouTube®–based study was to compare these two online video platforms in terms of the accuracy and quality of information about sleeve gastrectomy videos.

Methods Most viewed (popular) videos returned by YouTube® search engine in response to the keyword "sleeve gastrectomy" were included in the study. The educational accuracy and quality of the videos were evaluated according to known scoring systems. A novel scoring system measured technical quality. The ten most viewed (popular) videos in WebSurg® in response to the keyword "sleeve gastrectomy" were compared with ten YouTube® videos with the highest educational/technical scores.

Results Scoring systems measuring the educational accuracy and quality of WebSurg® videos were significantly higher than ten YouTube® videos which have the most top technical scores ($p < 0.05$), and no significant difference was found in the assessment of ten YouTube® videos that have the highest technical ratings compared with WebSurg® videos (p 0.481).

Conclusions WebSurg® videos, which were passed through a reviewing process and were mostly prepared by academicians, remained below the expected quality. The main limitation of WebSurg® and YouTube® is the lack of information on preoperative and postoperative processes.

Keywords Internet · YouTube · WebSurg · Sleeve gastrectomy · Continuing surgical education

Introduction

In the twentieth century, medical journals, books, and meetings helped surgeons gain insight into new knowledge and developments. However, these sources remained a weak alternative to visual and practical education [1]. At the end of the twentieth century, the websites which interact directly with the users spread rapidly all over the world. This phenomenon was named Web 2.0 by DiNucci [2]. One of the best representatives of this phenomenon today is YouTube®, a fast-growing, easily accessible online video platform that exceeds 2 billion views and 100 million viewers per day [3, 4]. As with all over the world, YouTube's popularity snowballed among medical professionals, and with the development of online media flow, surgeons showed interest in this resource, which had more visual and auditory interactions than reading journals and books [5]. However, the diversity of the authors/publishers/uploaders and non-confirmation of the accuracy of the information led to the publication of false or misleading health information [4, 6].

WebSurg®, another representative of the Web 2.0 phenomenon, is a website that provides education on minimally invasive surgical procedures within the scope of continuous medical education. WebSurg® offers a large number of educational surgical videos from 213 different countries with high resolution and is the first Web site in the scope of continuous

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surgical education/training. When the statistics of the sites are examined, it is seen that the number of members increased by 1980% and the number of visitors by 740%, and the number of video views increased by 3300% between 2004 and 2010. These rates indicate that this virtual university attracts the attention of surgeons [7].

Bariatric and metabolic surgical procedures are the only long-term and effective treatments of morbid obesity. The American Society of Metabolic and Bariatric Surgery has accepted sleeve gastrectomy, and laparoscopic sleeve gastrectomy, as an option in the surgical treatment of morbid obesity since 2009, and sleeve gastrectomy was added to 9th International Disease Classification coding system (ICD-9-CM) in 2011 [8, 9]. After these developments, the interest in the sleeve gastrectomy procedure among surgeons and the desire to reach up-to-date information on this subject have increased rapidly [10]. In response to this demand, YouTube® and later WebSurg®'s popularity has risen day by day [7, 11]. However, there are doubts about the accuracy and quality of information on online video sites that provide visual and audio communication.

In this study, first, we aimed to compare the technical quality of the first ten most popular sleeve gastrectomy videos on WebSurg® which identifies itself as a virtual university about surgical techniques/training, and the top ten videos having the best technical quality selected from the first 100 sleeve gastrectomy videos on YouTube®. And secondly, we aimed to answer the question: "Have these online video platforms had sufficient technical quality for surgical training?"

Materials and Methods

Inclusion Criteria for YouTube® Videos We performed research on YouTube® by using the keyword "sleeve gastrectomy" on June 1, 2018, and videos were sorted in order of popularity. Videos including any surgical technique, commercial videos, and videos recorded by patients or educational videos were analyzed, and the first ten of the 100 videos assessed having the highest sleeve gastrectomy scoring system score (SGSS) were included to the study.

Inclusion Criteria for WebSurg® Videos We performed another research simultaneously on WebSurg® by using the same keyword, then by sorting the videos in order of popularity. The first ten most viewed (popular) videos were included to the study.

Assessments of videos All videos were assessed by three bariatric surgeons performing sleeve gastrectomy in routine daily practice.

Classification of Videos According to Source and Content All videos were classified under two main topics based on their source and content. Categories classified according to the source were (1) medical (if the video was uploaded by a medical doctor) and (2) other (if a medical doctor did not upload the video). Categories classified according to content were (1) surgical technique, (2) information about disease or surgery, (3) lecture, and (4) other.

Video Power Index Video power index (VPI) which was first described by Erdem MN et al. was used to evaluate the popularity of the videos. The formula calculated video power index: like ratio × view ratio/100 [12].

DISCERN Questionnaire To determine the quality of the information and offered treatment choices, the DISCERN questionnaire which was developed by professionals at Oxford University in the UK was used [13]. This questionnaire system varies from 0 to 80 points and has three sections including 16 questions.

Global Quality Scor It is a five-point scale described by Bernard et al. that was used to assess the educational value of each video (1—poor quality, very unlikely to be of any use to patients; 2—poor quality but some information present, of very limited use to patients; 3—suboptimal flow, some information covered but important topics are missing, somewhat useful to patients; 4—good quality and flow, most important topics covered, useful to patients; 5—excellent quality and flow, highly useful to patients) [14].

JAMA Benchmark Criteria The transparency and publication information of each video were evaluated according to Journal of American Medical Association (JAMA) benchmark criteria which range from 0 to 4 and suggested by Silberg et al. (authorship: authors and contributors, their affiliations, and relevant credentials should be provided; attribution: references and sources for all content should be listed clearly, and all relevant copyright information noted; disclosure: Web site "ownership" should be prominently and fully disclosed, as should any sponsorship, advertising, underwriting, commercial funding arrangements or support, or potential conflicts of interest; currency: dates that content was posted and updated should be indicated) [15].

Sleeve Gastrectomy Scoring System We used a specific scoring system for preoperative, perioperative, and postoperative technical assessments of the sleeve gastrectomy procedure which was used in our previous study published in *Obesity Surgery* [16]. This scoring system was modified from the guideline of the American Heath Association/American College of Cardiology/The Obesity Society and American Society for Metabolic and Bariatric Surgery (Table 1) [16,

Table 1 Sleeve Gastrectomy Scoring System

A- Preoperative evaluation

1- Was the age of the patient specified on video?
2- Was the gender of the patient specified on video?
3- Was the body mass index value of the patient specified on video?
4- Was preoperative upper gastrointestinal endoscopy findings specified on video?
5- Was the patient's comorbid diseases stated on video?
6- Was preoperative abdominal imaging findings specified on video?
7- Was preoperative psychiatric evaluation findings specified on video?
8- Has he / she made a diet before surgery and was any information about this topic specified on video?
9- Was information about patient's previous surgery history stated?
10- Was any medical treatment about deep vein thrombosis prophylaxis specified on video?

B- During surgery

1- Was the port locations specified on video?
2- Was the diameters of the ports specified on video?
3- Was the patient's position specified on video?
4- Was the left diaphragmatic crus seen on video?
5- Was the distance from the stapler's starting point to the pylorus specified on video?
6- Was the stapler kind/feature specified on video?
7- Was any other material/s used to enforce stapler line (Tisseel, suture, omentoraphé, etc.) on video?
8- Was the usage or not usage of drain specified on video?
9- Has it been specified whether the leak test (perioperative) was performed or not on video?
10-Was bougie used or not on video?

C- After surgery

1- Was whether the postoperative complication developed or not specified on video?
2- Was the hospitalization period or discharge time specified on video?
3- Was the oral diet start day specified on video?
4- Was any radiological examination performed for post-operative leak examination and was any information about this topic specified on video?

Questions were answered as yes or no: yes = 1 point; no = 0 point

17]. Based on the SGSS checklist, each of the 24 criteria was given 1 point if presented orally or written in the video.

Statistical Analysis

The NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) program was used for statistical analysis. Descriptive statistical methods (mean, standard deviation, median, first quadrant, the third quadrant, frequency, percentage, minimum, maximum) were used when study data were evaluated. Average distributions of quantitative data were tested with the Shapiro-Wilk test and graphical tests. Independent groups *t*-test was used in the comparison of two groups of quantitative variables with normal distribution. Mann-Whitney *U* test was used to compare the two groups of quantitative variables without normal distribution. The Kruskal-Wallis test and the Dunn-Bonferroni test were used for two-way intergroup comparisons of quantitative variables with no normal distribution. Fisher's exact test and Fisher-Freeman-Halton exact correlation analysis were used to evaluate the relationships between quantitative variables. Statistical significance was accepted as $p < 0.05$.

Results

Assessment of YouTube® Videos According to the video source of 100 YouTube® videos, 51% of the videos are classified as medical. Surgical technique (53%) is the most dominant video content of YouTube® videos (36% other, 7% information about disease or surgery, 4% lecture). DISCERN, JAMAS, GQS, and SGSS scores of medical sourced videos of YouTube® were significantly higher than those of other sourced YouTube® videos ($p < 0.001$, $p < 0.001$, $p < 0.001$, $p < 0.001$, respectively). However, the VPI score of other sourced videos was significantly higher than that of medical videos ($p < 0.001$). Also, surgical technique videos had significantly higher DISCERN, JAMAS, GQS, and SGSS scores than other videos ($p < 0.001$, $p < 0.001$, $p < 0.001$, $p < 0.001$, respectively). However, VPI scores of other videos were significantly higher than those of surgical technique videos ($p < 0.001$) (Table 2).

Comparison of YouTube® and WebSurg® Videos In the evaluation of most viewed WebSurg® and first ten YouTube® videos which have the highest SGSS scores, DISCERN, JAMAS, and GQS scores of WebSurg® videos are significantly higher ($p = 0.035$, $p = 0.002$, $p = 0.035$, respectively). And, no significant difference was observed between groups according to SGSS scores ($p = 0.481$) (Table 3).

Discussion

This study revealed that carefully selected YouTube® videos are nearly as good as WebSurg® videos.

The study of Keelan et al. on immunization was the first to evaluate the quality of videos on YouTube® [18]. Many researchers followed Keelan et al. and examined the medical videos uploaded on YouTube® concerning quality and accuracy. Also, most of these studies revealed that the quality and accuracy of many videos were less than expected [19–24]. The lack of references and data sources in YouTube® videos and the lack of a review process to assess the reliability of the information forced researchers to question the academic competence of YouTube® videos [25, 26]. Our previous study showed less accurate and less reliable videos are more favorable by open-access video platform YouTube® users. Also, the open-access nature of YouTube® complicates the filter process of video quality and accuracy [16]. Due to the open-access characteristics of YouTube®, we think that it is

Table 2 Comparison of scores according of descriptive characteristics of 100 YouTube® videos

	VPI	DS	JAMAS	GQS	SS
Video source					
Medical	101.71 (3.00, 2893.68)	3 (2, 4)	2 (1, 3)	3 (2, 4)	6 (4, 9)
Others	200,958.51 (2401.00, 279,760.75)	1 (1, 1)	0 (0, 0)	1 (1, 1)	0 (0, 0)
p	< 0.001***	< 0.001***	< 0.001***	< 0.001***	< 0.001***
Video content					
Surgical technique	9.51 (1.82, 164.90)	2 (1, 3)	1 (1, 2)	2 (1, 3)	5 (4, 8)
Lecture	6095.48 (1231.68, 173,788.66)	1 (1, 2.5)	0 (0, 0.5)	1 (1, 2)	0 (0, 0)
Information about disease or surgery	13,194.09 (1394.95, 272,307.66)	1 (1, 1)	0 (0, 0)	1 (1, 1)	0 (0, 0)
Other	820,194.07 (473.20, 39,801,280)	1 (1, 1)	0 (0, 0)	1 (1, 1)	0 (0, 0)
p	< 0.001***	< 0.001***	< 0.001***	< 0.001***	< 0.001***

Kruskal-Wallis test, reported as median (first quartile, third quartile)

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

impossible to meet the academic publishing criteria fully. We also found that the DISCERN, JAMAS, and GQS scores of WebSurg® videos were higher than those of YouTube® videos. Unlike YouTube®, the academic filters of WebSurg® cause this difference.

In our study, the SGSS score for WebSurg® was found to be 10.3 of 24, and 12 of 24 for the top 10 videos of YouTube®, and there was no statistically significant difference between the SGSS scores of both online video platforms (*p* 0.481). The reason for these close scores is that six of the top ten videos on YouTube® have been uploaded by surgeons affiliated with a university and the remaining four videos are also uploaded by surgeons not affiliated with a university. However, we think that the low SGSS scores in both groups are an indirect sign that the information expected to be transferred from both YouTube® and WebSurg® is half or less than half. In parallel with the results of our study, Lee SJ et al. concluded that videos published on YouTube® and prepared by physicians affiliated with a university had higher quality of education [27]. Many studies have directly or indirectly emphasized that videos published by health professionals affiliated with a university are more reliable [26, 28–31]. Following these studies, we found that the WebSurg® videos, which are all prepared by physicians who are affiliated with a university, are more reliable and more educative than most of the videos on YouTube®. There are many possible explanations of why many YouTube® videos are a source of insufficient education. First, we believe that the purpose of many videos is to show patients a live surgical procedure; this makes it difficult to find high-quality,

Table 3 Comparison of scores of videos according to Web site

		WebSurg® (*n* 10)	First Ten YouTube® (*n* 10)	*p*
VPI†	Mean ± SD	2519.99 ± 2159.35	4613.16 ± 7160.78	[a]0.684
	Median (Q1, Q3)	1848.34 (1158.25, 2155.1)	1505 (4.76, 4450.56)	
DS†	Mean ± SD	41.8 ± 3.79	37.4 ± 5.4	[a]0.035*
	Median (Q1, Q3)	41.5 (39, 45)	38 (37, 39)	
JBC†	Mean ± SD	3.3 ± 0.48	1.9 ± 0.88	[a]0.002**
	Median (Q1, Q3)	3 (3, 4)	2 (1, 3)	
GQS†	Mean ± SD	3.7 ± 0.48	3 ± 0.67	[a]0.035*
	Median (Q1, Q3)	4 (3, 4)	3 (3, 3)	
SGSS†	Mean ± SD	10.3 ± 3.13	12 ± 4.81	[a]0.481
	Median (Q1, Q3)	9.5 (8, 12)	11 (9, 12)	

*$p < 0.05$; **$p < 0.01$

[a] Mann-Whitney *U* test

comprehensive training videos. Secondly, the fact that only half of the videos were prepared by health professionals suggests that the remaining videos could be potentially misleading.

The open-access characteristic of YouTube® and the lack of academic filtration/review process make evaluation difficult in the same ways as WebSurg®. Unlike YouTube®, all videos of WebSurg® are uploaded by medical doctors after a scientific filtration. Because of the heterogeneous characteristics of YouTube® uploaders, the same inclusion criteria cannot be applied to both YouTube® and WebSurg®. We think this is the main limitation of our study.

Targeting the most viewed/popular sleeve gastrectomy videos on WebSurg® can be seen as another limitation of the presented study. However, we aimed to evaluate the most viewed videos by surgeons, not evaluate the videos with the least number of viewers. Analyzing videos with fewer viewers would not serve the purpose of the study.

Conclusion

In our study, it was realized that educational quality could be increased in both YouTube® and WebSurg®. WebSurg® videos, which passed through a reviewing process and were mostly prepared by academicians, remained below the expected quality. Another outcome of the presented study is that carefully selected YouTube® videos are nearly as good as WebSurg® videos. Despite all its disadvantages, the educational value or potential of YouTube® cannot be ignored. The main limitations of both platforms are the lack of information on preoperative and postoperative processes and the need for improvement efforts to improve the quality of the two online video platforms.

Authors' Contributions MFF, AcK collected the information, reviewed the literature, and wrote the manuscript. AIF and AK critically reviewed the manuscript and approved the final form. All authors read and approved the final manuscript.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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