



Reliability and Educational Value of Laparoscopic Sleeve Gastrectomy Surgery Videos on YouTube

Karamollah Toolabi¹ · Reza Parsaei¹  · Fezzeh Elyasinia¹ · Abbas Zamanian²

Published online: 9 May 2019

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Abstract

Introduction Many surgery videos can be found in different social networks and video sharing websites. Watching surgeries performed by different surgical experts of various institutions can be an invaluable supplement to traditional methods of learning surgery. YouTube is a quite popular video sharing website, and many surgeons and trainees refer to it as a source of surgery videos. However, since its content is not peer-reviewed, there is a concern over reliability and educational value of its surgical videos. In this study, we aimed to investigate the reliability and educational value of laparoscopic sleeve gastrectomy (LSG) videos on YouTube.

Methods We searched YouTube for videos of “Laparoscopic sleeve gastrectomy” on 20 July 2018. In order to assess videos, we evaluated ten key steps in laparoscopic sleeve gastrectomy. The videos were reviewed by two experienced surgeons in the field of bariatric surgery to determine their reliability.

Results A total of 74 videos were selected. After reviewing videos, 32 (43%) of them were considered as reliable. There was no relationship between reliability and views, likes, dislikes, resolution, and year of upload and affiliation of videos. Only 6 (8% of all) reliable videos showed operation setup and port placement and included voice commentary.

Conclusion Importance of online media in the education of surgery cannot be overestimated. However, trainees are advised to search for peer-reviewed contents dedicated to education.

Keywords Laparoscopic sleeve gastrectomy · Bariatric surgery · Surgery video · YouTube · Education

Introduction

Internet and social media are being used increasingly as a source of health information. Many surgeons, physicians, and institutions have websites or channels and pages on

social media. They use the internet and social networks to educate patients, pool their information and experiences with colleagues, and advertise their practice [1, 2]. Multimedia capability of online sources makes them appealing and valuable tools for education and their potential benefits cannot be overestimated [3]. Many videos of surgeries are found in different social networks and video sharing websites. Patients and the general population watch these videos for learning about surgeries or mere curiosity. On the other hand, they are used by professionals for improving their practice and continued education [4]. Surgical trainees watch and perform different surgical procedures during their education course. However, observing surgeries performed by different surgical experts from various institutions provides wider learning opportunities for them. Surgery videos can be invaluable for trainees and practicing surgeons to keep up with the latest improvements in surgical techniques. This would be especially true in operations that a surgeon performs in lower volumes and is less familiar with them.

✉ Reza Parsaei
rezparsaei@gmail.com

Karamollah Toolabi
toulabika@gmail.com

Fezzeh Elyasinia
elyasiniaf@gmail.com

Abbas Zamanian
dr.zamanian2008@gmail.com

¹ Department of Surgery, Tehran University of Medical Sciences, Tehran, Iran

² Department of Surgery, Erfan Hospital, Tehran, Iran

YouTube is a quite popular video sharing website that contains thousands of surgery videos. It can be a potential tool for sharing experience among professionals, and many surgeons and trainees refer to it as a source of surgery videos [4]. However, since YouTube's content is not peer-reviewed, there is concern over the reliability and educational value of its surgery videos.

Laparoscopic sleeve gastrectomy (LSG) is a pure restrictive bariatric surgery that is being performed increasingly. Long-term follow-ups suggest that laparoscopic Roux-en-Y gastric bypass (LRYGB) may produce more persistent weight loss [5]. However, LSG is a relatively easier technique and less alteration of gastrointestinal anatomy and promising results have contributed to its popularity among patients and surgeons. Sleeve gastrectomy is the most frequently performed bariatric surgery worldwide [6]. Indeed, LSG may incline many surgeons with less extensive experience in advanced laparoscopy towards the field of bariatric surgery. In this study, we aimed to investigate the reliability and educational value of LSG videos shared on YouTube.

Materials and Methods

We searched YouTube for videos of “Laparoscopic sleeve gastrectomy” on 20 July 2018. We made our search on three setting categories. First, the search was done based on the website's default settings. Second, we sorted videos by number of views, and finally, we filtered long videos, longer than 20 min, assuming that longer videos may have better educational values. Videos that contained lectures, animations, patient experiences, or additional surgical procedures that altered LSG surgical technique, like band removal or single anastomosis sleeve ileal bypass, were excluded. We selected the first 30 eligible videos in each search category for evaluation (Fig. 1). For assessing the reliability of videos, we evaluated ten key steps in each laparoscopic sleeve gastrectomy video. Key steps were taken from a Delphi consensus published by Kaijser et al. [7] with some modifications (Table 1). Two experienced surgeons in the field of bariatric surgery reviewed videos together. Each key step was described as either appropriate or inappropriate by reviewers. We declared a video as reliable if all key steps in procedures were appropriate by the verdict of reviewers. Characteristics of videos including views, views per month, likes, dislikes, region, resolution of video, year of upload, having voice commentary, showing operation setup and port placement, buttressing stapler line, duration, search category, and affiliation (personal, institutional) were recorded.

Statistical Analysis

Comparison of the categorical variables in three different search categories and reliable-unreliable groups was

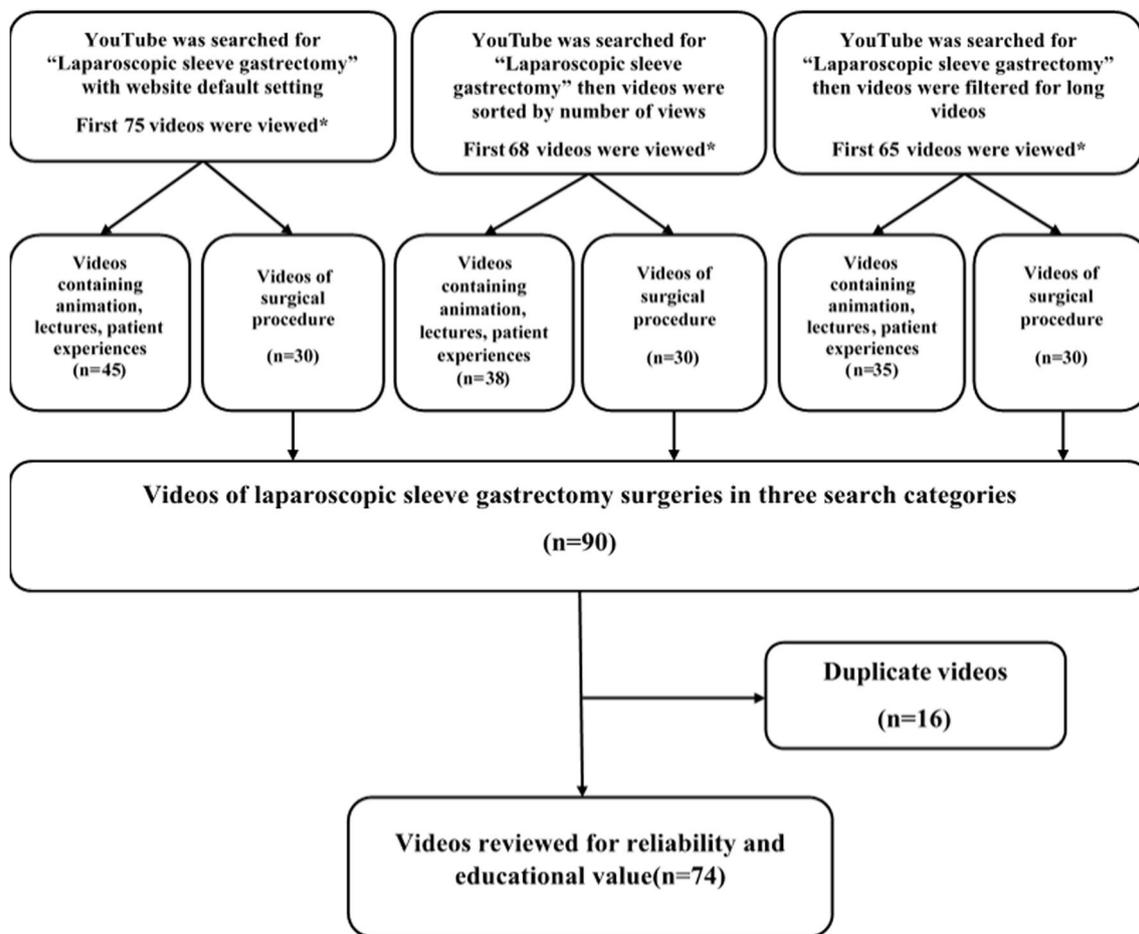
performed by chi-square test. Comparison of continuous variables was performed by Mann-Whitney U and Kruskal-Wallis test. A p value less than 0.05 was considered significant. We used IBM SPSS statistics for windows, version 22 (Armonk, NY, IBM Corp.) for statistical analysis.

Results

In each three search category, we retrieved the first 30 videos that met our inclusion criteria. The 30th eligible video in default search category was the 75th video that has appeared in YouTube search result. Orders of 30th eligible videos in most viewed and long videos search categories were 68th and 65th in YouTube search result respectively. Some videos were common in three different search categories. After removing duplicate videos, 74 videos were selected for evaluation [8–81]. Mean duration of videos was equal to 20 min. In 16 (22%) of the videos, operating setup and port placement were shown. Voice commentary was present in 25 (34%) videos. HD resolution was provided in 29 (39%) videos. Most videos were from the USA, 27 (36%), followed by the Middle East and South Asia, 22 (30%), and Europe, 15 (20%). After reviewing the videos, 32 (43%) of them were considered as reliable. Only 11 (14% of all videos) of reliable videos included voice commentary. Six reliable videos (8% of all videos) showed operation setup, and 14 (19% of all videos) reliable videos had HD resolution. Views of videos had a non-parametric distribution with high skewness and significant outliers. After removing two outliers, there was no significant difference between reliable and unreliable videos in terms of number of views (Mann-Whitney U test, $U=499$, $z=-1.491$, $p=0.136$, $r=0.17$) and views per month (Mann-Whitney U test, $U=490$, $z=-1.599$, $p=0.110$, $r=0.18$). Videos of various regions had no different reliabilities according to the results of the chi-square test ($3, n=74$) = 0.803, $p=0.850$. There was also no significant relationship between the reliability of videos and likes, dislikes, resolution, having voice commentary, duration, and showing setup of operation. Characteristics of reliable and unreliable videos are shown in Table 2.

Videos shared in recent years, namely 2017 and 2018, were not more reliable than older videos. However, an increasing number of HD resolution videos were uploaded over recent years, based on the results of the chi-square test ($3, n=74$) = 9.24, $p=0.026$.

The ratio of reliable videos was not significantly different in three search categories. Longer videos were less likely affiliated with institutions. There was no significant difference in other characteristics of videos in three search groups. Table 3 depicts the characteristics of three search groups.



*We stopped viewing videos in each category after reaching 30th video that contained surgical procedure.

Fig. 1 Flow diagram of video selection

Discussion

In order to assess the reliability of videos, we evaluated ten key steps for LSG. LSG is technically demanding and subject to variations and controversies. Standard techniques and guidelines of surgical procedures must be defined by referring

to expert consensus. Kaijser et al. have published a paper on the consensus regarding crucial steps of LSG and LRYGB using Delphi method, an established technique for obtaining consensus between groups of experts [7, 82]. They identified 51 steps in LSG, among which 26 steps were accepted as key steps. Nine key steps were related to operating setup and

Table 1 Key steps of laparoscopic sleeve gastrectomy

- Exposure of gastroesophageal junction and angle of his
- Complete mobilization of the greater curvature up to angle of his
- Detaching posterior attachments of stomach
- Identification of pylorus and starting detachment and subsequent stapling 3 to 5 cm from it.
- Alignment of gastric bougie
- Lateral traction to avoid leaving excessive posterior stomach tissue
- Firing staplers in proper distance and direction alongside bougie
- Using appropriate cartridge size
- Waiting for about 15 s between closing and firing stapler
- Proper position of final stapling, not through the esophagus and not leaving significant dog ear

Taken from “A Delphi consensus of the crucial steps in gastric bypass and sleeve gastrectomy procedures in the Netherlands” by Kaijser et al. [7] with some modification

Table 2 Characteristics of reliable and unreliable videos

	Reliable videos	Unreliable videos	Total	<i>p</i> value
Videos, <i>n</i> (%)	32 (43%)	42 (57%)	74 (100%)	
Videos with voice commentary, <i>n</i> (%)	11 (34%)	14 (33%)	25 (34%)	1 ^a
Videos with HD resolution, <i>n</i> (%)	14 (44%)	15 (36%)	29 (39%)	0.645 ^a
Affiliation, <i>n</i> (%)	Personal 17 (53%) Institutional 15 (47%)	Personal 25 (59%) Institutional 17 (41%)	Personal 42 (57%) Institutional 32 (43%)	0.754 ^a
Buttressing stapler line, <i>n</i> (%)	10 (31%)	13 (31%)	23 (31%)	1 ^a
Showing operation setting and port placement, <i>n</i> (%)	6 (19%)	10 (24%)	16 (22%)	0.811 ^a
Duration (minutes) ^d	22 ± 2 × 19.4	18.5 ± 2 × 11.7	20 ± 2 × 15.5	0.563 ^b
Number of views ^d	22,241 ± 7997	18,730 ± 2242	20,194 ± 2902	0.136 ^{b,c}
Number of views ^d per month	437 ± 526	359 ± 817	391 ± 118	0.110 ^{b,c}
Number of likes ^d	146 ± 2 × 339	62 ± 2 × 218	99 ± 2 × 278	0.168 ^b
Number of dislikes ^d	11.7 ± 2 × 24	5.2 ± 2 × 13	8 ± 2 × 19	0.231 ^b

^a Chi-square test

^b Mann-Whitney *U* test

^c Two outliers removed for statistical analysis

^d Mean ± 2SD

starting laparoscopy. Since most videos included in our study did not contain initial steps, like patient positioning and trocar placement, we assessed only surgical procedures and did not implement those steps in our criteria. Some key steps are not subject to judgment because they are done almost invariably in all surgeries, such as retrieving specimen, removing liver retractor, and removing trocars. Some key steps could also be integrated into one. For instance, we took steps including opening lesser sac at greater curvature, detaching omentum from the stomach at greater curvature’s full length, ligating short gastric vessels, and dissecting angle of his ventral side

into one step, named as complete mobilization of the greater curvature. We defined the waiting between closing and firing stapler as a key step for LSG. This was mentioned in Delphi consensus but did not have the needed confidence interval in order to be identified as a key step. Based on the evidences on the literature and recommendations of manufacturers [83, 84], we expect surgeons to wait for about 15 s between closing and firing stapler. In 9 (12%) videos included in our study, surgeons fired stapler immediately after closing it and 2 videos were declared as unreliable only due to the problem in this step. Therefore, in case of eliminating this step form our

Table 3 Characteristics of videos in three search categories

	Default setting	Sorting according to view	Filtering long videos	<i>p</i> value
Number	30	30	30	
Reliable, <i>n</i> (%)	13 (43%)	17 (57%)	13 (43%)	0.450 ^a
Videos with voice commentary, <i>n</i> (%)	12 (39%)	16 (53%)	7 (23%)	0.06 ^a
Videos with HD resolution, <i>n</i> (%)	14 (45%)	12 (40%)	12 (40%)	0.894 ^a
Affiliation, <i>n</i> (%)	Personal 15 (48%) Institutional 16 (52%)	Personal 11 (37%) Institutional 19 (63%)	Personal 23 (83%) Institutional 7 (17%)	0.006 ^a
Buttressing stapler line	10 (33%)	10 (33%)	11 (37%)	0.931 ^a
Showing operation setting and port placement, <i>n</i> (%)	8 (26%)	8 (26%)	5 (17%)	0.594 ^a
Duration mean (minutes) ^c	15.9 ± 2 × 14.0	14.5 ± 2 × 13.0	34 ± 2 × 15.6	< 0.001 ^b
Number of views ^c	16,894 ± 2 × 57,860	69,806 ± 2 × 105,653	17,862 ± 2 × 78,404	< 0.001 ^b
Number of views per month ^c	422 ± 2 × 1040	1203 ± 2 × 1647	405 ± 2 × 1260	< 0.001 ^b
Number of likes ^c	67.7 ± 2 × 218	229 ± 2 × 405	67.4 ± 2 × 272	< 0.001 ^b
Number of dislikes ^c	5 ± 2 × 15.8	18.7 ± 2 × 26	4.4 ± 2 × 17.8	< 0.001 ^b

^a Chi-square test

^b Kruskal-Wallis test

^c Mean ± 2SD

criteria, the overall result of our study would only change slightly.

We believe that the dichotomous description of techniques as appropriate or inappropriate is more concise and helpful rather than quantitative scoring. Therefore, we preferred to put videos under scrutiny by two experienced surgeons and request them to declare each step as appropriate or inappropriate.

Based on our findings, the overall reliability of LSG videos shared on YouTube was unsatisfactory. This is not surprising since the contents of YouTube are not peer-reviewed and are shared by people with different expertise, experiences, and motivations. Quality and reliability of online videos containing health topics have been addressed in the literature recently. YouTube videos containing education and information on health topics for patients have been evaluated in terms of their quality. A great amount of inaccurate information and low quality videos have been reported [85–88].

Despite the fact that surgery videos on YouTube are not shared necessarily with the intention of surgery education and there are higher quality videos in academic and scientific societies, the availability and popularity of YouTube make many professionals want to watch them as a learning resource. Potential educational value and quality of surgeries on YouTube also have been assessed. Deal et al. [89] reported an incredibly low frequency of critical views in frequently viewed online surgical videos of laparoscopic cholecystectomy. Celentano et al. [90] reviewed right hemicolectomy videos on the World Wide Web and reported that the approach to vascular pedicle and colonic mobilization was considered safe in only 66% and 69% of the cases respectively.

It should be taken into account that strictness of criteria upon which the videos have been evaluated varies in different studies. For instance, Erdem and Sisik [91] have reported that 78% of YouTube videos about bariatric surgeries, mostly lectures and patient experiences, were either useful or very useful. They considered a video as useful if it briefly mentioned at least three of five important facts about bariatric surgery. However, we think that this is a somewhat lenient scoring system.

Applying methods that increase the likeliness of retrieving desirable and reliable information is an important issue in an online search. Therefore, we performed a search with three different settings to investigate whether changing the default setting of the website could help to find more reliable videos. There was no significant difference in the number of reliable videos of three search groups. Investigating factors that determine the order of appearance of YouTube videos is beyond the scope of this paper. We wished to analyze the relationship between the reliability of videos and order in which they had appeared

on YouTube. However, the order of appearance of videos changes rapidly on YouTube and reporting such relation may not be feasible or helpful. We found no difference in reliable and unreliable videos in terms of number of views. It must be noted that in our study, there were two reliable videos whose values of views and views per months were well above the average of all included videos. These outliers could have a significant effect on the average view per month of reliable videos; hence, we removed them for statistical analysis. However, as mentioned earlier, the ratio of reliable videos in the first 30 most viewed videos was not significantly higher than that in other search category groups, even if they had not been removed. We also did not find any relationship between the reliability of videos and likes, dislikes, duration, region, affiliation, and having voice commentary and HD resolution. These findings are in line with most of the studies that have assessed YouTube videos [88, 89, 92]. Only few of them have reported conversely. For instance, Frongia et al. [93] reported that YouTube videos of laparoscopic fundoplication with higher views per days had higher qualities. They also reported that longer videos had higher quality.

It should be noted that a reliable surgical technique alone does not make a perfect educational video. Showing the position of the patient, surgeon, and assistant, and port placement are of great importance in educating laparoscopic surgery. Voice commentary is also invaluable for trainees. These features were often absent in the videos of our study. While a video can be of educational value and reliable because of an appropriate technique, it may not be perfect in the absence of such features. These features are more likely present if surgeons intend to teach trainees or share experience with their peers. If we consider both voice commentary and showing operating setup as mandatory for the educational value of videos, the number of videos with educational value would drop to 5 videos (7%). HD resolution enhances the quality of videos, a feature that was present in only 14 (43%) reliable videos. Interestingly, the number of HD resolution videos has increased year by year, showing a promising advance in image quality of uploaded videos in social media.

The importance of online media in surgery education cannot be overestimated. Watching operations performed by surgical experts from different institutions around the world is an invaluable supplement to traditional methods for educating surgery. However, trainees are advised to search for peer-reviewed contents that are dedicated to education. Examples are websites that are affiliated with scientific societies. Contents of such websites are supervised by well-known authorities, and only surgeries that are performed by surgical experts are shared. Patient positioning and port placement are more likely depicted. Also, videos are meticulously edited and usually include voice commentary.

Compliance with Ethical Standards

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

Ethical Approval Ethical approval does not apply according to nature of study.

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