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Evaluation of Online Videos of Laparoscopic Sleeve Gastrectomy Using the LAP-VEGaS Guidelines

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Abstract

Background Laparoscopic sleeve gastrectomy (LSG) is the most common bariatric surgical procedure worldwide. Educational videos of LSGs are available from online sources with YouTube® being the most popular online video repository. However, due to the unrestricted and uncontrolled nature of YouTube®, anyone can upload videos without peer review or standardization. The LAP-VEGaS guidelines were formed to guide the production of high-quality surgical videos. The aim of this study is to use the LAP-VEGaS guidelines to determine if videos of LSGs available on Youtube® are of an acceptable standard for surgical educational purposes.

Methods A YouTube® search was performed using the term laparoscopic sleeve gastrectomy. Appropriate videos were analysed by two individuals using the sixteen LAP-VEGaS guidelines.

Results A total of 575 videos were found, of which 202 videos were included and analysed using the LAP-VEGaS guidelines. The median video guideline score was 6/16 with 89% of videos meeting less than half of all guidelines. There was no correlation between the LAP-VEGaS score and view count.

Conclusions There is an abundance of laparoscopic sleeve gastrectomy educational videos available on YouTube®; however, when analysed using the LAP-VEGaS guidelines, the majority do not meet acceptable educational standards for surgical training purposes.

Introduction

Bariatric surgery is an established treatment for obesity and its complications. Laparoscopic sleeve gastrectomy (LSG) is a

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What is already known on the subject
• Quality of online surgical educational videos is low.
• There is no established auditing process to assess quality prior to uploading or before publishing online videos.
• LAP-VEGaS is a novel quality assessment tool for online videos.

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first-line surgical procedure in the management of obesity. The first LSG case was described in 1999 as part of a duodenal switch. Following this, the LSG was used as a first-stage procedure for safer Roux-en-Y gastric bypass and subsequently was proven as an effective standalone procedure [1, 2].

The ability to effortlessly record procedures and YouTube's® unregulated uploading policy has led to an abundance of surgical videos available to view, the standard of which is not policed. Indeed, fewer videos are going through the peer-review process prior to uploading [3, 4].

YouTube® is the most frequently used educational video source for medical students, surgical trainees, and surgeons, with up to 90% using it as a resource for surgical preparation. Despite its popularity and widespread use, a standard method of evaluating YouTube® medical videos has not yet been established [5–7].

The LAP-VEGaS (LAParoscopic surgery Video Educational GuidelineS) guidelines were created in 2018 to provide consensus lead advice on how to report a surgical video, in a bid to improve their quality for teaching purposes.

The guidelines were formed by a panel of thirty-three international members from a range of surgical subspecialties. Thirty-seven consensus statements were formed, from which sixteen essential criteria were defined. The LAP-VEGaS guidelines have been validated independently as accurate in identifying overall high-quality videos and those suitable for acceptance for publication or presentation [8–10].

The formation of the guidelines stemmed from surgical trainees spending less time in the operating theatre and the need for supplementary, high-quality teaching methods to make up for the loss in operating time. With the current Coronavirus-2019 pandemic, numerous institutions, including within Australasia, North America, and the UK, have stopped non-critical elective surgical procedure. This will likely have an impact on surgical trainees' exposure in the operating theatre, thereby adding further pressure to develop surgical skills via other means [11–15].

This study aims to assess the quality of educational YouTube® videos of sleeve gastrectomies as determined by their adherence to the essential LAP-VEGaS guidelines.

Method

A YouTube® search was performed on March 15, 2019 using the search term "laparoscopic sleeve gastrectomy" in English, returning 575 videos. Videos were sorted by relevance, as this is the YouTube® default. Inclusion and exclusion criteria are outlined below (Table 1). In total, 202 videos were included in the study, which were further analysed using the sixteen essential LAP-VEGaS guidelines (Table 2).

The sixteen essential criteria cover five domains. The first two criteria relate to the domain of video introduction, specifically identifying essential items such as the title, in which the procedure and pathology being treated are stated. Author information, such as names, institution(s), country, year of surgery and conflict of interest disclosures, should also be present. The case presentation comprises four criteria: operative imaging; baseline characteristics, including age, sex, American Society of Anaesthesiology score (ASA), body mass index (BMI), indication for surgery, prior surgeries and indication for

Table 1 Inclusion/exclusion criteria

Inclusion	Laparoscopic sleeve gastrectomy videos ± cruroplasty
	Gastric stapling dissection must be visualised
Exclusion	Less than 100 views
	Non-English commentary
	Multiple procedures e.g. Lap Chole or Band Removal
	Instrument advertisements

Table 2 Essential LAP-VEGaS essential criteria

Video introduction	1. Title including pathology and procedure
	2. Authors' information and disclosures
Case presentation	3. Patient anonymity
	4. Imaging
	5. Baseline patient characteristics
	6. Pre-operative workup and treatments
Procedures	7. Theatre setup and equipment needed
	8. Patient, surgeon and trocar positions
	9. Anatomic demonstration
	10. Step-by-step approach
Outcomes	11. Time in theatre and in hospital
	12. Morbidity
	13. Pictures of wounds and specimens
	14. Functional outcomes
Educational content	15. Pictures, snapshots, diagrams and tables
	16. Audio/written commentary

surgery; relevant pre-operative workup and treatment. The demonstration of the procedure includes four criteria: position of the patient and theatre staff members, trocar position and variations, stage of the operation with constant reference to the anatomy and in a step-by-step fashion. Outcomes of the procedure should be addressed by means of operating time and time in hospital, photographs of wounds and the specimen and mention of morbidity and functional outcomes. Additional measures to improve the efficacy of the video as a learning resource cover the final two criteria and include the use of diagrams, photos, snapshots and tables to demonstrate anatomical landmarks and relevant or unexpected findings. Audio and/or written commentary in English language must be provided.

The main endpoint of this study was the number of LAP-VEGaS guidelines met for each video, which were assigned scores out of sixteen. For each of the included videos, the upload date, the number of views at the time of analysis, the length of the video and a URL were recorded.

Video analysis was undertaken separately by two of the authors, a surgical registrar and a senior medical student. Each reviewed 101 videos, noting any uncertainties and together forming a consensus.

A power calculation was carried out with 80% power and a moderate correlation (0.5) to achieve a sample size of twenty-nine. Assuming a low correlation of 0.2, a sample size of 193 was required.

The data were analysed using SAS 9.4 statistical software. Statistical significance was determined by Spearman's correlation test between the LAP-VEGaS score and the number of views, length and date for each video. The Wilcoxon two-sample test was used to test for differences in the LAP-VEGaS scores between reinforcement groups. Statistical significance was defined at $p < 0.05$.

Results

A total of 202 videos met the formulated inclusion criteria with a cumulative view count of 2,518,512 views and a mean of 12,511 views. Video length ranged from 0.75 to 84 min with a mean of 8.25 min. The earliest video included was uploaded on March 6, 2007.

According to the analysis, the number of videos uploaded per year showed an upwards trend over 2007–2019 (Fig. 1).

The LAP-VEGaS scores ranged from 2/16 to 15/16. The median was 6/16, and the interquartile range was 3. The LAP-VEGaS score showed a skewed distribution; therefore, median data values were reported.

There was no correlation between LAP-VEGaS score and number of views ($r_s = 0.09$, $p = 0.22$), the length of the video ($r_s = 0.08$, $p = 0.23$) or the date of video upload ($r_s = 0.02$, $p = 0.77$).

Irrespective of the LAP-VEGaS score, we found an association between view count and video length ($r_s = 0.14$, $p = 0.04$) and year of video ($r_s = -0.36$, $p \leq 0.01$), with both newer and longer videos having a higher numbers of views.

Overall, 11% (22/202) of videos met over half the criteria. Over 90% of the videos included the title (96.0%), patient anonymity (97.5%) and a step-by step approach (94.0%). Both the author's information and anatomic demonstration were fulfilled in 82.7% and 89.1% of videos. Fifty per cent of all videos had written or spoken commentary. The other nine criteria were fulfilled in less than 38% of videos. Furthermore, imaging, workup, theatre time, morbidity and outcomes were fulfilled in less than 4% of videos. None of the videos provided disclosure statements. See Table 3.

The highest scoring video URL's are shown in Table 4.

Discussion

The purpose of this study was to determine whether laparoscopic sleeve gastrectomy videos found on YouTube® met the essential LAP-VEGaS guidelines for educational purposes. The results show that overall, videos are of poor to average quality when analysed using the sixteen LAP-VEGaS guidelines with 89% of videos meeting less than half of all guidelines. Reassuringly, some key guidelines were well represented, particularly the demonstration of anatomy and the information being displayed in a step-by-step process. There was no correlation between the number of LAP-VEGaS guidelines met and the view count, length of video or date of upload, similar to other studies [16, 17].

Other papers looking at educational quality of sleeve gastrectomy videos have shown similar results. *Ferhatoglu* et al. evaluated online sleeve gastrectomy videos with a range of assessment tools, such as the Sleeve Gastrectomy Specific tool (SGSS) and other generic assessment tools including Video Power Index (VPI), DISCERN Questionnaire and the Global Quality Score. Videos demonstrating surgical technique had a median SGSS of 5/24 and similarly poor results for the generic assessment tools. Furthermore, the most popular YouTube® videos had a negative correlation with scores across all tools, indicating other factors such as "attractivity" or presentation of the content, rather than educational quality, has a higher impact on viewer rates [16, 18].

Kaijser et al. used the Delphi consensus method to identify 23 key steps to the laparoscopic sleeve gastrectomy. Similarly, *van Rutte* et al. identified 13 key steps as part of an Observational Clinical Human Reliability Assessment (OCHRA) study, identifying technical errors to guide key

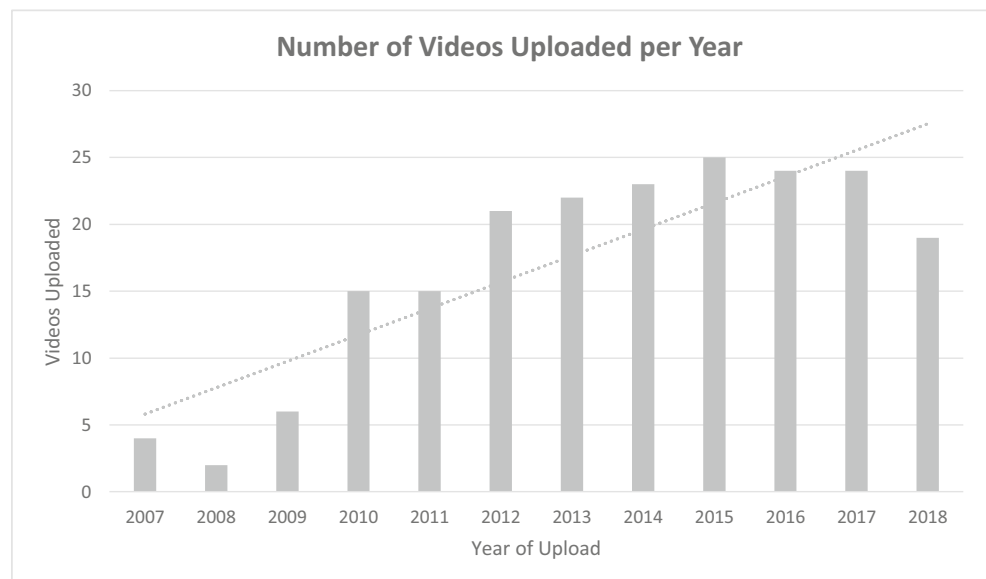**Fig. 1** Number of videos uploaded per year

Table 3 Fulfilled LAP-VEGaS criteria within selected Youtube® videos

LAP-VEGas criteria	Fulfilled criteria	Unfulfilled criteria	Proportion fulfilled
Title	194	8	96%
Authors' info	166	36	82%
Patient anonymity	197	5	98%
Imaging	7	195	3%
Patient characteristics	41	161	20%
Patient workup	7	195	3%
OT setup	27	175	13%
Port placement	75	127	37%
Anatomy	180	22	89%
Step by step approach	190	12	94%
OT time	7	195	3%
Morbidity	3	199	1%
Specimen pic	38	164	19%
Functional outcomes	7	195	3%
Diagrams	29	173	14%
Commentary	101	101	50%

steps. *Toolabi* et al. reviewed 74 YouTube® videos and analysed them using ten of the key operative steps from Kaijser et al. All ten steps were met in 43% of videos. While these tools come with improved applicability to sleeve gastrectomy videos, they lose generalisability and with that, possibly widespread awareness and use [17, 19, 20].

The LAP-VEGaS guidelines were created to help standardise and validate surgical videos. Prior to the establishment of the LAP-VEGaS guidelines, there was no equivalent set of reporting guidelines for surgical video presentation leading to variable quality and reliability of content. The use of these guidelines prior to the publication of videos or peer review could enhance the overall quality of published educational surgical videos. However, it is not without compromise. While the LAP-VEGaS guidelines prescribe a standardised framework for structuring content of uploaded videos, they have no provision for assessment of the content's technical quality. Furthermore, the guidelines have been designed to apply to all online laparoscopic videos, but some of the guidelines may not be relevant to certain procedures. In our study for example, pre-operative imaging would not be considered essential or routine for many bariatric surgeons performing LSG, potentially penalising videos in this study.

Many online videos focus on a specific aspect of a procedure, displaying the technical nuances or variations of established operations. Many of these videos may not meet educational standards when applying the LAP-VEGaS guidelines, as they forego many domains covered in LAP-VEGaS and focus instead on the procedural demonstration. Despite this, they remain popular amongst trained surgeons trying to learn new "tricks" to enhance their skills. We suggest LAP-VeGAS guidelines are equally important in these videos to

ensure the indication and outcomes of said techniques are applicable and safe for use within the viewer's practice. Equally, acknowledgement of common surgical technique variances may be an appropriate criterion in revisions of the LAP-VEGaS guidelines [21].

Another limitation of this study is that each video was analysed only once; each video analyst reviewed half of all videos with no secondary peer review, possibly resulting in variation between the video analyser's reporting and scoring. The use of video analysers who were not trained bariatric surgeons may have affected the quality of the analysis. However, as the study involves assessing adherence to LAP-VEGaS guidelines rather than an analysis of surgical technique, we deemed the expertise level of the video analysers within this study appropriate. Another limitation is that YouTube® searching was performed using the default settings which can vary by geographical location. Finally, the search term may have been too narrow and excluded other relevant videos.

The posting of educational videos to platforms such as YouTube® is encouraging for the future of online learning but is not without cost. The open access nature of these platforms allows for distribution of unregulated and unstandardized methods which do not meet professional learning standards. There are other online video repositories, some of which are dedicated to surgical education. However, their quality has not consistently been shown to be superior to that found on YouTube®. An effective solution could involve surgical resident 'consumers' being educated in using this tool, that dedicated surgical education video sites use this tool, and uploading surgeons recommend only videos that are of high standard. An improvement in the quality of online videos

Table 4 Highest scoring videos (LAP-VEGaS Score ≥ 9, $n = 19$)

URL	Title	Author	Country of origin	Video length	Views	Date of upload	Score
https://youtu.be/aAHe_1YYpe8	Sleeve Gastrectomy in a Patient with Situs Inversus	Moser F, Maldonado P et al	Spain	00:04:24	720	26 Sept. 2013	15
https://youtu.be/w43Xokut_RQ	Laparoscopic Sleeve Gastrectomy	Barker R, Birch D et al	Canada	00:09:16	128	21 Aug. 2013	12
https://youtu.be/J4EJB6u9OUw	Laparoscopic Sleee Gastrectomy & Paraesophageal Hernia Repair	Taller J, Kingdon K et al	USA	00:09:33	8730	8 May 2009	12
https://youtu.be/BSYbMm5tslg	Laparoscopic Vertical Sleeve Gastrectomy	Jossart G and Cirangle P	USA	00:08:55	1399	1 Apr 2015	11
https://youtu.be/NEu8XrYM1Ws	Laparsocopic sleeve gastrectomy for the management of gastric gastrointestinal stromal tumours	Gorecki P and Liu T	USA	00:06:12	155	6 Apr 2017	11
https://youtu.be/bL0bOBBwies	Laparscopic sleeve gastrectomy	Shikora S	USA	00:15:53	24,800	8 Nov 2018	10
https://youtu.be/aN_Oi5hTmVg	Single Incision Sleeve Gastrectomy Using a Completely Intracorporeal Liver Retractor	Choh M, Gorodner M et al	USA	00:07:42	5300	11 Jun 2009	10
https://youtu.be/i-sMkP-yG40	Sleeve Gastrectomy: Tips and Technique	Tanompetsanga R	Thailand	00:07:57	427	26 Feb 2016	10
https://youtu.be/qTPoOXcpdA0	Dr Cottam Performs a Sleeve Gastrectomy	Cottam D, Richards C et al	USA	00:04:58	909	6 Sept 2010	10
https://youtu.be/a2QRs4H1X7w	Live gastroc sleeve surgery - LIMARP/DR. Pompa	Gonzalez L	Mexico	00:04:48	4653	4 Mar 2010	10
https://youtu.be/ubILYLu-smw	Laparoscopic Sleeve Gastrectomy	Abdelbaki T	Egypt	00:07:25	141	3 Aug 2015	10
https://youtu.be/Sqp67gilxME	Laparoscopic sleeve gastrectomy	Grigoryan L and Sedrakyan A		00:17:10	4300	24 Oct 2018	9
https://youtu.be/g3MUrSMR0jM	Laparoscopic Sleeve Gastrectomy	Stamou K	Greece	00:09:40	2500	9 Feb 2015	9
https://youtu.be/kNfzMMsRI2Q	Scarless Sleeve Gastrectomy by Hidden Port Laparoscopy	Naidu KR	India	00:07:24	1680	21 Dec /2015	9
https://youtu.be/Q4O3aJOrCeA	Sleeve Gastrectomy Full Length Step by Step Video	Mishra RK	India	00:24:44	3000	8 May 2018	9
https://youtu.be/chlr570zDi4	Sleeve Gastrectomy Fully Explained by Dr. R K Mishra	Mishra RK	India	00:17:43	1900	23 Dec 2017	9
https://youtu.be/3e55glqlpUg	The Mount Sinai Surgical Film Atlas - Laparoscopic Sleeve Gastrectomy	Marin M	USA	00:10:42	2236	3 Feb 2015	9
https://youtu.be/Ovh92hnoWRM	Laparoscopic sleeve gastrectomy for morbid obesity	Jameel J	India	00:06:30	6667	2 Feb /2015	9
https://youtu.be/ZOIsh7bp5nM	Gastric Sleeve Surgery explained by Dr. Pompa	Gonzalez L	Mexico	00:08:20	36,300	5 Apr 2013	9

could be achieved by creating and reviewing online videos with these guidelines [5, 22].

Conclusion

Laparoscopic sleeve gastrectomy videos available on YouTube® that were analysed in this study did not demonstrate high quality when applying the LAP-VEGaS criteria. Medical professionals should be aware of this when using it as a learning resource to incorporate into their clinical practice.

Compliance with Ethical Standards

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

Human and Animal Rights This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent Informed consent does not apply.

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