ORIGINAL REPORTS

YouTube as a Potential Training Resource for Laparoscopic Fundoplication

Giovanni Frongia, MD,* Arianeb Mehrabi, MD,† Hamidreza Fonouni, MD,† Helga Rennert,* Mohammad Golriz, MD,† and Patrick Günther, MD*

*Division of Pediatric Surgery, Department of General, Visceral and Transplantation Surgery, University Hospital of Heidelberg, Germany; and †Department of General, Visceral and Transplantation Surgery, University Hospital of Heidelberg, Heidelberg, Germany

OBJECTIVE: To analyze the surgical proficiency and educational quality of YouTube videos demonstrating laparoscopic fundoplication (LF).

DESIGN: In this cross-sectional study, a search was performed on YouTube for videos demonstrating the LF procedure. The surgical and educational proficiency was evaluated using the objective component rating scale, the educational quality rating score, and total video quality score. Statistical significance was determined by analysis of variance, receiver operating characteristic curve, and odds ratio analysis.

RESULTS: A total of 71 videos were included in the study; 28 (39.4%) videos were evaluated as good, 23 (32.4%) were moderate, and 20 (28.2%) were poor. Good-rated videos were significantly longer (good, 22.0 ± 5.2 min; moderate, 7.8 ± 0.9 min; poor, 8.5 ± 1.0 min; $p = 0.007$) and video duration was predictive of good quality (AUC, 0.672 ± 0.067; 95% CI: 0.541-0.802; $p = 0.015$). For good quality, the cut-off video duration was 7:42 minute. This cut-off value had a sensitivity of 67.9%, a specificity of 60.5%, and an odds ratio of 3.23 (95% CI: 1.19-8.79; $p = 0.022$) in predicting good quality. Videos uploaded from industrial sources and with a higher views/days online ratio had a higher objective component rating scale and total video quality score. In contrast, the likes/dislikes ratio was not predictive of video quality.

CONCLUSIONS: Many videos showing the LF procedure have been uploaded to YouTube with varying degrees of quality. A process for filtering LF videos with high surgical and educational quality is feasible by evaluating the video duration, uploading source, and the views/days online ratio. However, alternative videos platforms aimed at professionals should also be considered for educational purposes. (J Surg Ed ∎:∎∎∎-∎∎∎. © 2016 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: laparoscopic fundoplication, video, YouTube, educational quality, surgical quality, surgical training

COMPETENCIES: Medical Knowledge, Professionalism, Interpersonal and Communication Skills, Systems-Based Practice

INTRODUCTION

Laparoscopic fundoplication (LF) is an advanced procedure in the field of general, visceral, and pediatric surgery. This operation involves procedure-specific knowledge and technical skills, which are essential for a successful overall outcome. Training for LF involves literature study, operative assistance, and information exchange with experienced surgeons. Educational videos are also appropriate training approaches for LF because of the video-based nature of the procedure. The main advantage of a video as a laparoscopic training aid is that the video shows the surgeon's perspective during the procedure, in contrast to a video of open surgery, where the recorded view may not represent the surgeon's field of vision. YouTube (www.youtube.com) is an online platform for global sharing of videos free of charge. Many LF videos are available on YouTube and represent a potentially important training aid for surgeons preparing to perform a LF. However, the educational quality of the uploaded LF videos has not been assessed so far. The aim of this study was to analyze the educational quality of LF videos accessible on YouTube.

MATERIAL AND METHODS

Study Design

A comprehensive systematic search was performed on www.youtube.com on September 16, 2015 using the keywords

Correspondence: Inquiries to Giovanni Frongia, MD, Division of Pediatric Surgery, Department of General, Visceral and Transplantation Surgery, University Hospital of Heidelberg, Im Neuenheimer Feld 110, 69120 Heidelberg, Germany; fax: (622) 156-5105; e-mail: gio@frongia.net

TABLE 1. Video Stratification According to Score/Ratio Percentiles

	Percentiles		
	>60th	30th-60th	<30th
Total video quality score (TVQS)			
Score points	>44.2	33-44.2	<33 Points
Rating	Good	Moderate	Poor
Views/days online ratio			
Score points	>1.33	0.4-1.33	<0.4
Rating	High	Intermediate	Low
Likes/dislikes ratio			
Score points	>7.5	2.4-7.5	<2.4 Points
Rating	High	Intermediate	Low

"laparoscopic fundoplication" or "laparoscopic Nissen" or "laparoscopic Toupet" or "laparoscopic Thal" or "laparoscopic gastroesophageal anti-reflux surgery." The search settings were as follows: language, English; country, worldwide; restricted mode, off. The eligibility of all retrieved videos for inclusion was analyzed. Additional videos suggested by YouTube were also considered. Surgical videos demonstrating the LF procedure with spoken explanation were included. The following exclusion criteria were applied: nonrelevant content, incomprehensive audio, no spoken explanation, exclusive slide-based presentation, nonsurgical animation or content, commercials, and duplicates. The following information was recorded for each video: duration, total number of views, views per day online, likes, dislikes, and uploading origin.

Evaluation of Surgical and Educational Quality

The surgical and educational quality of each video was evaluated. Surgical quality was assessed by the proficiency and skill of the surgeon performing the LF and was evaluated using the established objective component rating scale (OCRS), as published by Dath et al.[1] The OCRS is an operation-specific rating form that assesses each procedural component of LF (initial operative assessment, retraction of liver lobes and stomach, identification of the esophagus, dissection of the esophagus from the crus, wrap of the fundus posterior to the esophagus, placement of sutures through the stomach and esophagus, and final assessment of the wrap). The technical skill of each procedural component was assessed separately using a 5-point rating scale and an average of all the components was used for the statistical analyses.[1] The minimal possible OCRS was 5 points and the maximum score was 35 points. The educational quality was evaluated by how accurately each procedural component was explained by the surgeon and was assessed using the arbitrary educational quality rating score (EQRS). The EQRS is an operation-specific rating form based on the Guidelines for Surgical Treatment of Gastroesophageal Reflux Disease of the Society of American Gastrointestinal and Endoscopic Surgeons, which represents a consensus of 40 experienced foregut surgeons.[2,3] It evaluates the demonstration and explanation of 12 pivotal surgical steps, including trochar

placement, liver retraction, crural exposure, esophageal mobilization, fundus mobilization, suture choice, knot technique, hiatus narrowing, fundoplication wrapping, anatomic pitfalls, technical pitfalls, and calibration of the gastroesophageal junction. The demonstration and explanation of each individual step was rated as follows: not provided = 0 points, provided = 1 point, and provided in detail = 2 points. The minimal possible EQRS was 0 points and the maximum was 24 points. The EQRS was used to assess the quantity and quality of the information presented in the video and the OCRS was used to rate the surgeon's skills. Using both rating systems, it is possible to assess whether a thorough and descriptive video, presented by a technically poor surgeon, has educational value. Overall, 4 laparoscopy-experienced surgeons (2 consultants for visceral surgery, 1 for pediatric surgery, and 1 final-year surgical trainee) were divided into 2 groups of 2. Each group independently evaluated the OCRS and EQRS and the scores for each video were determined by a consensus between the groups. OCRS and EQRS scores were added to create a total video quality score (TVQS), which evaluated video quality in one single cumulative score. The 30th and 60th percentiles of the scores determined by the collective group the videos were rated as presented in Table 1.

Statistical Analysis

Statistical analysis was performed using SPSS Version 21.0 (SPSS Corp., Chicago, IL). Variables were compared using a one-way analysis of variance with Scheffé test for post hoc comparison. Cut-off values were determined using a receiver operating characteristic curve (ROC) analysis. Odds ratios were calculated using a binary logistic regression. Inter-rater agreement for video score evaluation was assessed by Kappa coefficient. $p < 0.05$ was considered significant. Data are expressed as means ± standard error of the mean.

RESULTS

A total of 673 videos were retrieved by our search and 305 (45.3%) were surgical videos on LF; 234 (76.7%) of these