



# Analysis of YouTube Videos on Rectal Cancer Surgery as Educational Resources

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## ABSTRACT

**Aim:** Today, the online information-gathering method is widely used by people in the healthcare industry. Currently, there is a lack of data regarding the use of YouTube™ videos as a source of information for rectal cancer surgery. This study aimed to evaluate the content, reliability, and quality of the most-viewed YouTube videos on cancer surgery and determine whether surgeons could benefit from watching these videos.

**Method:** We identified 1,356 videos through a search on <https://www.youtube.com/> using the keywords “rectal cancer surgery” via open internet access on December 4, 2020. All the videos were assessed independently by two physicians. The videos were classified as useful information (group 1) or misleading information (group 2) according to the score of the video and the assessment of the authors.

**Results:** A total of 167 videos qualified for the time period under the study’s protocol. Useful information videos had a significantly higher number of views per day, likes, dislikes, and comments ( $p<0.05$ ). The length of videos uploaded by individual surgeons was statistically significantly longer than those uploaded by organizations ( $p<0.001$ ). Videos uploaded by non-profit organizations had a statistically significantly higher number of views per day.

**Conclusion:** Social media is a frequently-used learning resource for rectal surgery, and its use is expected to become even more widespread. In today’s world, social media should be considered a common learning domain, and videos with a high level of instruction, reliability, and quality should be uploaded to social media platforms by competent people, groups, and institutions.

**Keywords:** Internet, online learning, rectal cancer, social media, YouTube

## Introduction

Rectal cancer is a separate subset of colorectal carcinoma that generally requires a dedicated approach, and surgery plays a dominant role in the treatment of the disease.<sup>1</sup> Rapidly developing and changing strategies for surgical treatment<sup>2</sup> are increasing the need for a global training platform that can easily and quickly reach surgeons everywhere.

Today, online information acquisition is a method frequently used by people in many areas of healthcare. Social media in particular has become a source of public information, a learning and development tool for healthcare professionals, and a communication network that can reach huge numbers of people.<sup>3</sup> Video learning tools have been shown to increase efficiency and confidence in young professionals, leading to improved clinical performance during tasks.<sup>4</sup> YouTube™ is a

platform with over a billion users that is used by both patients and healthcare professionals as an educational tool and a source of medical information.<sup>5</sup> When considering surgical healthcare professionals, surgery is rapidly developing and changing; new and diverse techniques are being introduced regularly, making social media an affordable, easy-to-access continuous platform on which surgeons from different parts of the world can share their techniques and enhance their skills. There are endless educational opportunities on social media, as clinicians around the world can now access expert opinions via telemedicine and distance education.

YouTube is the most commonly used platform for surgical training,<sup>6</sup> and video-based training on minimally invasive surgery is considered a useful teaching tool.<sup>7</sup> Currently, there is a lack of data on the assessment of YouTube videos as a source of information for rectal cancer surgery. The present



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study aimed to assess the content, reliability and quality of the most-viewed YouTube videos teaching rectal cancer surgery techniques and determine whether watching these videos is useful to surgeons.

## Materials and Methods

Our study examined 1,356 videos identified through a search on <https://www.youtube.com/> using the keywords “rectal cancer surgery” via open internet access on December 4, 2020. All videos were assessed independently by two physicians. Because of multiple irrelevant search results depending on different keywords, we restricted keywords to focus specifically on videos containing surgical footage. Those unrelated to rectal cancer surgery were excluded from the study. Among those relevant to rectal cancer, any videos other than those related mainly to surgery, those focused on surgical techniques, and those of an instructive nature were also excluded. Since search results on YouTube can change on a daily basis, the videos were saved in a playlist. For the videos included in the study, characteristics including video length (min), number of views, peer-review status, source of upload (uploader: non-profit organizations/for-profit organizations/individual surgeons), video quality (good/moderate/poor), date of upload, quality score, reliability

score, content (comprehensiveness) score, type of surgical technique (lap/robotic/open), number of likes, number of dislikes, number of comments, and duration on YouTube (days) were recorded. The videos were classified as useful information (group 1) or misleading information (group 2) according to the score of the video (quality, reliability, and comprehensiveness scores) and the assessment of the authors (Table 1). The videos were analyzed with regard to other characteristics, based on the upload source and the usefulness (group 1 or 2) categories.

Ethics committee approval and informed consent were not required in this study, as no human information was used or any animal experimentation was performed.

## Statistical Analysis

The Number Cruncher Statistical System 2007 (Kaysville, Utah, USA) was used for statistical analyses. Descriptive statistics (mean, standard deviation, median, frequency, percentage, minimum, and maximum) were used to assess the study data. The normality of the quantitative data was tested using the Kolmogorov-Smirnov test and graphic assessments. Student's t-tests and Mann-Whitney U tests were used to compare normally and non-normally distributed quantitative variables, respectively, between the two groups, while Pearson's chi-squared test and Fisher's

**Table 1.** Assessment tools for reliability, global quality, and comprehensiveness of YouTube videos on rectal cancer surgery

### Reliability (1 point per question with a “yes” response)

1. Are the explanations presented in the video clear and understandable?
2. Are useful sources cited (publication cited, from valid studies)?
3. Is the information presented in the video balanced and neutral?
4. Are additional sources of information listed for viewer benefit?
5. Does the video mention areas of controversy or uncertainty?

### Global quality scale (scores as much as the item number)

1. Poor quality, poor flow, most information missing, not helpful for clinicians.
2. Generally poor quality, some information given but of limited use to clinicians.
3. Moderate quality, some important information is adequately discussed.
4. Good quality, good flow, most relevant information is covered, useful for clinicians.
5. Excellent quality, excellent flow, very useful for clinicians.

### Comprehensiveness (1 point per each covered in the video except for item 8)

1. Is the abdomen drawn topographically?
2. Are trocar locations shown?
3. Is the clinical summary of the patient provided?
4. Are the radiological characteristics of the patient shown?
5. Is the entire abdominal exploration described or demonstrated?
6. Is autonomic nerve preservation highlighted or demonstrated?
7. Is autonomic nerve preservation highlighted or demonstrated?
8. Are anatomical structures described or demonstrated? [Mesenteric area (1 point), superior pelvis (1 point), inferior pelvis (1 point)].
9. Is splenic flexure mobilization carefully explained or demonstrated?
10. Is the anastomotic technique carefully demonstrated or explained?

exact test were used to compare qualitative variables. The Kruskal-Wallis test was used to compare multiple quantitative variables without a normal distribution. The level of statistical significance was set at  $p < 0.05$ .

## Results

The study included 167 videos. Of these, 64.1% ( $n=107$ ) were uploaded by individual surgeons, 25.7% ( $n=43$ ) by non-profit organizations, and 10.2% ( $n=17$ ) by for-profit organizations. The rate of useful information and misleading information was 52.1% ( $n=87$ ) and 47.9% ( $n=80$ ), respectively. The YouTube duration was significantly longer for misleading videos than for useful information videos. Useful information videos had a significantly higher number of views per day, likes, dislikes, and comments ( $p < 0.05$ ). There was no statistically significant difference in video length and total view rate between groups 1 and 2. There was also no statistically significant difference in upload source (uploader: for-profit, non-profit organizations, and individual surgeons) between groups 1 and 2 (Tables 2, 3). Of the videos, 107 (64.1%) were uploaded by individual surgeons, 17 (10.2%) by for-profit organizations, and 43 (25.7%) by non-profit organizations. According to the source of upload, those videos uploaded by non-profit organizations had significantly higher reliability scores ( $p=0.014$ ). There was no statistically significant difference in the comprehensiveness score and global quality scale score according to the source of upload ( $p > 0.05$ ). Considering the total number of views according to the source of upload, the number of views of the videos uploaded by for-profit

organizations was statistically significantly higher than that of videos uploaded by non-profit organizations and individual surgeons ( $p=0.002$ ). The length of videos uploaded by individual surgeons was statistically significantly longer than that of videos uploaded by for-profit and non-professional organizations ( $p < 0.001$ ). The videos uploaded by non-profit organizations had a statistically significantly higher number of views per day compared with those from other upload sources ( $p=0.02$ ). There was no statistically significant difference in the number of likes, dislikes, and comments according to the source of upload (Tables 2, 3).

Considering pairwise comparisons according to the source of upload, the videos uploaded by non-profit organizations had statistically significant higher reliability and comprehensiveness scores than those uploaded by individual surgeons ( $p=0.002$  and  $p=0.046$ , respectively).

There were no statistical differences in technical approaches in the two groups ( $p=0.336$ ). There were 71 laparoscopic and 16 robotic videos in group 1, while there were two open, 70 laparoscopic videos, and 8 robotic videos in group 2.

## Discussion

Virtual platforms play a huge role in the development of medical education. They enable students to interact with surgeons and learn more about surgical procedures. Also, patients are likely to watch and learn about their treatments. Poll-Franse et al.<sup>8</sup> showed that 71% of patients with cancer search the Internet after receiving a diagnosis. Unfortunately, it has been shown that the quality of the videos uploaded for patient education is low.<sup>9-11</sup> More

**Table 2.** Analysis of video characteristics by usefulness

Characteristics	Group 1 (useful information, $n=87$ ), median (min:max) <sup>a</sup>	Group 2 (misleading information, $n=80$ ), median (min:max) <sup>b</sup>	p-value
Total views	1,805 (12:87,155)	735.5 (8:1,254,989)	0.074
Video length(s)	737 (246:12,540)	728 (47:8,292)	0.352
Duration on YouTube per day (mean $\pm$ SD)	1,463.1 $\pm$ 952	1,822 $\pm$ 1,021	<b>0.02*</b>
Views per day	1.74 (0.02:53.31)	0.61 (0.01:398.5)	<b>0.005*</b>
Likes	9 (0:769)	4 (0:273)	<b>0.001*</b>
Dislikes	1 (0:22)	0 (0:140)	<b>0.033*</b>
Comments	5 (0:119)	0 (0:43)	<b>0.005*</b>
<b>Source of upload, n (%)</b>			
1. Non-profit organizations	26 (60.5%)	17 (39.5%)	0.42
2. For-profit organizations	9 (52.9%)	8 (47.1)	
3. Individual surgeons	52 (48.6%)	55 (51.4%)	

<sup>a</sup>Universities, institutions, organizations, and journals. <sup>b</sup>Corporations, private hospitals, and institutions, \* $p < 0.05$ . min: Minimum, max: Maximum, SD: Standard deviation

**Table 3.** Analysis of video characteristics by source of upload

	Non-profit sources <sup>a</sup> n (%) or median (min:max)	For-profit sources <sup>b</sup> n (%) or median (min:max)	Individual surgeons n (%) or median (min:max)	p-value
Number of videos, n (%)	43 (25.7%)	17 (10.2%)	107 (64.1%)	-
Reliability score	3 (1-5)	3 (1-4)	3 (1-5)	<b>0.014*</b>
Comprehensiveness score	4 (1-9)	4 (1-7)	4 (1-9)	0.129
Global quality score	3 (1-5)	4 (1-4)	3 (1-5)	0.125
Total views	2,625 (8:68,969)	3,468 (213:87,155)	737 (12:1,254,989)	<b>0.002</b>
Video length(s)	583 (77:7,682)	683 (180:12,540)	984 (47:8,752)	<b>&lt;0.001</b>
Duration on YouTube (days)	1,951 (190:4,168)	1,790 (273:4,025)	1,272 (186:3,840)	<b>0.02*</b>
Views per day	1.95 (0.01:51.28)	1.44 (0.09:53.31)	0.74 (0.02:398.5)	<b>0.02*</b>
Likes	9 (0:769)	7 (0:56)	6 (0:273)	0.19
Dislikes	1 (0:22)	0 (0:14)	0 (0:140)	0.073
Comments	0 (0:37)	0 (0:6)	0 (0:119)	0.097
Misleading information	17 (21.3%)	8 (10%)	55 (68.8%)	0.42
Useful information	26 (29.9%)	9 (10.3%)	52 (59.8%)	

<sup>a</sup>Universities, institutions, organizations, and journals. <sup>b</sup>Corporations, private hospitals, and institutions, \*p<0.05. min: Minimum, max: Maximum, SD: Standard deviation

instructional videos are better for patient education, but they may not engage users as well as lower-quality videos. It is unclear that videos created by trusted organizations for patient education purposes on YouTube.<sup>12</sup> Participation is required to direct and educate trainees using quality vetted surgical case preparation resources. This may indicate that surgical societies with video-sharing platforms should prioritize the creation and distribution of quality videos on easily accessible public platforms.<sup>13</sup>

This study's statistical analysis showed that video uploads by individual surgeons were longer, videos by for-profit organizations had more total views, and videos by non-profit organizations had more views per day. It also showed that videos by non-profit organizations had higher reliability and comprehensiveness scores than those uploaded by individual surgeons. However, the most important finding of the present study revealed that there was no significant association between the source of videos (for-profit/non-profit/individual) and those containing useful/misleading information. Another remarkable finding was that almost half (47.9%) of all uploaded videos were evaluated as misleading. Conversely, there are studies on other subjects that have found YouTube videos to be mostly useful.<sup>5</sup>

In today's world, with the levels of knowledge increasing enormously, it is more important to teach the source of information than to teach the information itself.<sup>14</sup> Social media is now being used to help residents in surgical training, and YouTube provides a good source of videos on surgical preparation.<sup>15</sup> YouTube videos demonstrate

multiple surgical techniques, all with the click of a mouse. It is regularly used by surgeons for both educational and refresher purposes.<sup>16</sup> Videos enable the standardization of surgical training among people from different countries, cultures, and practices.<sup>6</sup>

However, there is scant literature on instructional videos. Although there is no definitive video as yet, one on rectal cancer surgery should be made by international authorities. Currently, there are not enough high-quality videos on rectal cancer available on YouTube, which suggests that we are in the early stages of online video education.

Many factors determine the quality of a video and the number of views. A study evaluating videos on breast cancer showed that healthcare professionals usually upload medium-quality videos.<sup>17</sup> Previous studies have shown that usually, short videos are mainly watched compared with long videos.<sup>18,19</sup> Various rating systems are used in the literature to rate the quality and scientific accuracy of videos on the Internet.<sup>20,21</sup>

Regrettably, YouTube lists search results according to an algorithm based on parameters such as total views and comments rather than quality, which is something that may serve commercial interests but not educational ones. Rodriguez et al.<sup>22</sup> reported that only a very few of the most popular videos provide a critical approach to safe surgical practices in cholecystectomy. Some studies also suggested that videos uploaded by medical associations and journals have more reliability,<sup>23</sup> while videos posted

by physicians have higher information quality.<sup>24</sup> De'Angelis et al.<sup>25</sup> reported that laparoscopic videos are a useful and convenient teaching tool but have not been adequately reviewed to achieve standard quality.

We believe that a social media platform should be created for surgical students to upload their videos to, which could be peer reviewed by other surgeons. This platform would allow surgical students to gain a wide reach among their fellow students. Also, we believe that it is necessary for surgeons to create a YouTube channel so that they can share their videos with their peers, similar to what medical journals do.

### Study Limitations

This study has several limitations. In addition to the low number of videos and the relative assessment of those videos, the study only included videos on YouTube in the English language. In the meantime, studies have shown that YouTube is the preferred source for online learning and allows maximum access to professionals who are preparing for surgical cases.<sup>6</sup> However, the videos included in the study had been watched a total of 2,089,868 times, which increases the significance of the videos and the value of the study.

### Conclusion

Social media is a frequently-used learning resource for rectal surgery, and it is expected to become even more commonplace. In today's world, social media should be considered a common learning domain, and videos of high levels of instruction, reliability, and quality should be uploaded to social media platforms by competent people, groups, and institutions.

### Ethics

**Ethics Committee Approval:** Ethics committee approval was not required in this study, as no human information was used or any animal experimentation was performed.

**Informed Consent:** Informed consent approval was not required in this study, as no human information was used or any animal experimentation was performed.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: E.Ç., Concept: N.İ., Design: N.İ., Data Collection or Processing: E.Ç., Analysis or Interpretation: N.İ., Literature Search: E.Ç., Writing: E.Ç.

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