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Assessment of quality and accuracy of YouTube videos on percutaneous transthoracic biopsy

Transtorasik akciğer biyopsisi hakkındaki YouTube videolarının kalite ve doğruluğunun değerlendirilmesi

Okan Gürkan [1], Canan Gündüz [2]

[1] Gaziosmanpaşa Taksim Training and Research Hospital, Department of Radiology, Istanbul, Turkey
[2] Istanbul Sureyyapasa Chest Diseases and Thoracic Surgery Training and Research Hospital, Department of Pulmonary Diseases, Istanbul, Turkey

ORCID ID of the author(s)

OG: 0000-0002-7934-9154
CG: 0000-0002-4746-529X

Abstract

Aim: YouTube is an essential source of medical information for patients, but may also be misleading, depending on the kind of content quality. The aim of this study is to evaluate the quality of YouTube videos on percutaneous transthoracic lung biopsy.

Methods: A search on YouTube was performed with the terms 'Lung Biopsy,' 'CT-Guided Lung Biopsy,' 'US-Guided Lung Biopsy,' and 'Percutaneous Transthoracic Biopsy.' Relevant English videos were examined and scored by two reviewers. Video characteristics, uploaded sources, and content quality were assessed using different indices. Correlation analysis was conducted to investigate the possible correlation for global quality score.

Results: Fifteen videos (47%) were uploaded by a healthcare professional, nine videos (28%) by a product company, six videos (19%) by an individual user, and 2 (6%) by an academic institution. The videos had a median (IQR) quality score of 2 (range 1-5), and a median (IQR) length of 235 (46-751) seconds. The quality of the videos varied, depending on the uploaded sources as well as whether they were uploaded by academic institutions, which had the highest quality. Some important components regarding the biopsy procedure, such as complications, were not evaluated in most videos.

Conclusion: YouTube videos on percutaneous transthoracic lung biopsy (PTLB) had a low median content quality score, while some important points were grossly overlooked. Thus, YouTube videos may be a misleading source of patient information. Academic institutions and healthcare professionals should be creating accurate multimedia content for patients seeking informative medical information.

Keywords: YouTube, Social media, Biopsy, Patient education

Öz

Amaç: YouTube, hastalar için önemli bir tıbbi bilgi kaynağıdır. Ancak içerik kalitesine bağlı olarak yanıltıcı bilgiler de verebilmektedir. Bu çalışmanın amacı, perkütan transtorasik akciğer biyopsisi ile ilgili YouTube videolarının kalitesini değerlendirmektir.

Yöntemler: YouTube'da 'Lung Biopsy', 'CT-Guided Lung Biopsy' 'US-Guided Lung Biopsy' ve 'percutaneous Transthoracic Biopsy' terimleri ile arama yapıldı. İlintili İngilizce videolar iki kişi tarafından incelendi. Video karakteristikleri, yüklendiği kaynak ve içerik kalitesi değerlendirildi. Global kalite skorunu değerlendirmek için korelasyon analizi yapıldı.

Bulgular: On beş video (%47) profesyonel sağlık çalışanları, 9 video (%28) firmalar, 6 video (%19) kişisel hesaplar ve 2 (%6) video ise akademik kurum tarafından yüklenmişti. Videoların ortanca (IQR) kalite skoru 2 (aralık 1-5), ortanca uzunluğu ise 235 (46-751) saniye olarak hesaplandı. Videoların kalitesi, yüklendiği kaynağa göre değişiklik göstermekte olup, akademik kurumlar tarafından yüklenen videolar en yüksek kaliteye sahipti. Komplikasyonlar gibi önemli biyopsi prosedürü komponentleri, çoğu videoda değerlendirilmemişti.

Sonuç: Perkütan transtorasik akciğer biyopsisi (PTLB) ile ilgili YouTube videolarında bazı önemli noktalar göz ardı edildiğinden dolayı, düşük bir ortanca içerik kalite puanına sahip oldukları gözlendi. Bu nedenle, YouTube videoları yanıltıcı bir hasta bilgisi kaynağı olabilir. Akademik kurumlar ve sağlık uzmanları, bilgilendirici tıbbi bilgi arayan hastalar için doğru multimedya içeriği oluşturmalıdır.

Anahtar kelimeler: YouTube, Sosyal medya, Biyopsi, Hasta eğitimi

Corresponding author/Sorumlu yazar:
Okan Gürkan
Address/Adres: Karayolları Mahallesi, Osmanbey Caddesi 621 sokak, Gaziosmanpaşa, İstanbul, Türkiye
E-mail: drokan@gmail.com

Introduction

YouTube is the second most popular website, which serves 95% of web surfers in 80 different languages [1,2]. Entertainment and educational sources, including medical videos, are also commonly used with YouTube. Explanatory videos about medical procedures and operations are often appreciated by medical students, as well as patients.

Lung cancer is the 3rd most frequent malignancy in both genders, and the most frequent malignancy in males. Approximately 2 million new patients were diagnosed with lung cancer in 2018. Although lung cancer mortality rates tend to decrease in the male population, as a function of decreased smoking prevalence, overall rates in women continue to increase. Lung cancer accounts for the highest mortality rate in the overall population [3,4]. Its presentation for most patients in the advanced stages emphasizes the importance of early diagnosis and treatment.

Lung biopsy procedures, as part of the diagnosis for lung cancer, are either performed by bronchoscopy, percutaneous interventions, or open surgery. Percutaneous transthoracic lung biopsy (PTLB) is an image-guided radiological biopsy method used in the diagnosis of lung cancer for patients with peripheral masses. Fluoroscopy, computed tomography (CT) and ultrasound (US) are often selected for imaging during the PTLB procedure [5]. Occasionally, patients find the information from their primary physicians about the PTLB procedure insufficient, since it is usually performed by radiologists. As patients try to overcome the lack of information from website sources, YouTube videos serve as a substantial resource. Even if most videos enlighten the patients and answer their questions accurately, there is a risk of misinformation, which cannot be underestimated. Misleading video content may have negative consequences, such as avoidance of the procedure. The quality of information received by patients via medical YouTube videos has immense value.

The primary aim of this study was to evaluate the quality of YouTube videos on PTLB. As such, video characteristics via the upload source, reliability scores, and popularity indices were assessed.

Materials and methods

A search was performed on YouTube with the search terms 'Lung Biopsy,' 'CT-Guided Lung Biopsy,' 'US-Guided Lung Biopsy,' and 'Percutaneous Transthoracic Biopsy.' The study was performed on 6.6.2019. The videos were sorted by relevance as well as other default filter settings. The first 60 videos for each search term were analyzed and viewed, since internet search engine studies show that users primarily view the first three pages [6]. Non-English videos are irrelevant, while nonverbal and duplicate videos were excluded. Number of likes/dislikes, total number of views, video length, uploading date, and number of comments and likes per 1000 views were recorded for the enrolled videos. They were analyzed and scored independently by two investigators. One was a radiologist, experienced with lung biopsies, the other was an experienced pulmonary physician.

The videos were categorized according to four uploading sources: Academic institutions, healthcare professionals (physician and non-physician), product companies, and individual users. Four questions adapted from the DISCERN tool [7] were used for determining reliability of YouTube videos (ROV): (1) Are the aims clearly stated? (2) Is the source of information informative and reliable? (3) Is the presented information objective and unbiased? (4) Are uncertain elements noted? 'Yes' answers scored 1 point and 'no' answers, 0 points. A lung biopsy scoring tool (LBST) was created for evaluating the accuracy of the videos, which were adjusted from previous studies [8,9] (Table 1). Each item scored 1 point, with a maximum of 12 points. The educational content value of the videos was evaluated by Global Quality Score (GQS), which was adapted from a previous study [10], using a scale of 1 to 5: (1) Poor quality, not useful for patients; (2) Poor quality and flow, but partially useful; (3) Moderate quality, useful with some important details missing; (4) Generally good flow and quality; and (5) Excellent quality and flow, including very useful information. Video power index (VPI) could evaluate popularity of the videos, described by the formula: ratio*view ratio/100 [11].

Table 1: Lung biopsy scoring tool for accuracy of the videos (scored from 0 to 12)

Topic	Content	Maximum points available
Purpose of the procedure	To determine if the lesion is benign or malignant and to analyze the tumor stage, for evaluating diffuse lung disease	3
Alternative to percutaneous transthoracic lung biopsy	Follow-up, excisional biopsy	2
Preparation	Stop antiaggregant 5-7 days, oral anticoagulants 3-5 days before the procedure. No intake of solid foods before procedure for 6 hours and water for 2 hours	2
Method	The entry localization should be sterilized and then local anesthetic is injected. Position depends on depth and size of the lesion. Biopsy needle should be inserted while patient holds inspiration. Duration is 20 to 120 minutes.	2
Side effects	Px, pulmonary hemorrhage, hemothorax, tumor seeding cardiac tamponade, chest infection.	2
After procedure	Chest radiograph should be performed 0.5-1 hour later than the procedure.	1
Results	2-10 days after the procedure	1
Further information	Further information sources	1

Px: pneumothorax

Statistical analysis

The statistical analysis was performed with IBM SPSS Statistics 22.0 (Armonk, NY, USA: IBM Corp.). Shapiro-Wilk test was used to assess the normality of variable distributions, which were also included. A Spearman correlation analysis was conducted to examine associations between GQS and VPI, and ROV and ICGIP. For all analyses, a P-value < 0.05 was considered significant.

Results

Among 240 screened videos, 32 fulfilled inclusion criteria and were analyzed for the study (Excluded videos (n=208): Non-English (61), Irrelevant (95), Non-verbal (22), Duplicate videos (31)). Fifteen videos (47%) were uploaded by a healthcare professional, 9 videos (28%) by a product company, 6 videos (19%) by an individual user, and 2 (6%) by an academic institution. Median (IQR) length of the videos was 235 (46-751) seconds, while median (IQR) number of views was 6385 (57-63128). There was a significant correlation between duration of

the video and number of views (*P*=0.04) (Table 2). Based on reviewers' GQSs, 12 videos were rated 1 point (poor quality, not useful for patients), and only 1 was rated as 5 points (excellent quality and flow, includes very useful information), out of a total of 32 videos. Median quality score was 2.00. The highest median quality score (3) belonged to videos uploaded by academic institutions and the lowest median score (1) belonged to videos uploaded by healthcare professionals (Table 3). The median ROV was 2 out of 4. Academic institutions had the highest ROV median score (2.5). The median number of likes from product companies and individual user videos were 28 and 26, respectively, which were higher than other uploaded sources. The video with the highest number of dislikes was uploaded by a product company with the longest duration (751 seconds). Video content was not assessed for all components of LBST. The highest score was 11 out of 12, uploaded by individual users. Thirteen videos (40%) mentioned side effects, which was shown in 5 videos (33%) uploaded by healthcare providers. The purpose of the procedure was noted in most (81%) videos. Those that focused on methods had higher dislike counts (*P*=0.02). The videos with the highest and lowest median VPI scores were from academic institutions and healthcare workers, respectively (38.83 and 1.64, respectively). GQS demonstrated a significant correlation with ROV and ICIGP, but not with VPI (*P*<0.001, *P*<0.001, *P*=0.067, respectively) (Table 4). GQS did not show a significant correlation between number of views and video length (*P*=0.31, *P*=0.62, respectively). Videos clarifying the purpose of the procedure showed a significant correlation with GQS (*P*<0.001 in both). Interclass correlation coefficients ranged between 0.911 and 0.984 for intra-rater reliability, and between 0.925 and 0.941 for interrater reliability. Ethical committee approval was not required for the present study, since open access data were used.

Table 2: Characteristics of the evaluated videos

	Mean	SD	Median	Minimum	Maximum
Video length (seconds)	259	161	235	46	751
Number of likes	58	123	17	1	676
Number of dislikes	5	5	1	1	26
Total number of views	16079	19778	6385	57	63128
Total number of comments	9	29	1	0	162
Days since upload	1333	961	1165	28	3547
View ratio	19.68	40.48	19.68	0.07	209.43
Like ratio	80.61	17.04	87.30	50.00	98.67
VPI	17.66	38.33	5.78	0.04	205.75
ROV (0-4)	1.94	1.22	2.00	0.00	4.00
LBST (0-12)	3.44	2.82	3.00	1.00	11.00
GQS (1-5)	2.16	1.14	2.00	1.00	5.00

LBST: lung biopsy scoring tool, VPI: video power index, ROV: reliability of YouTube videos, GQS: global quality score

Table 3: Characteristics of the YouTube videos by source

Source		VPI	ROV (0-4)	ICIGP (0-12)	GQS (1-5)
Academic institutions	Mean	38.83	2.50	5.50	3.00
	Median	38.83	2.50	5.50	3.00
	SD	44.15	2.12	6.36	2.83
Healthcare professionals(physician and non-physician)	Mean	7.83	1.73	2.40	1.80
	Median	1.64	1.00	2.00	1.00
	SD	10.71	1.10	2.10	1.01
Product companies	Mean	29.28	2.22	3.22	2.44
	Median	5.97	2.00	3.00	2.00
	SD	66.40	1.09	1.99	0.88
Individual users	Mean	17.77	1.83	5.67	2.33
	Median	11.71	1.00	5.00	2.50
	SD	25.07	1.60	3.39	1.21

Abbreviations: LBST, lung biopsy scoring tool; VPI, video power index; ROV, reliability of YouTube videos; GQS, global quality score

Table 4: Correlation of GQS

	Correlation coefficient	*P*-value
Number of likes	0.050	0.976
ROV	0.813	<0.001
ICIGP	0.799	<0.001
VPI	0.078	0.673

LBST: lung biopsy scoring tool, VPI: video power index, ROV: reliability of YouTube videos, GQS: global quality score

Discussion

While there is a large number of medical studies on YouTube related to patient education, over the last 10 years, these studies have generally focused on diseases and treatments, the use of medical materials, and operations. In our literature review, we found only one study about image-guided biopsy. For lung biopsy, no such studies were conducted so far.

Patients receiving detailed information from their physicians before the biopsy and operation becomes more difficult as the number of patients increase, as the time allocated for each patient shortens. Healthcare associations provide information to patients and their families in numerous ways for educational purposes. However, special procedures such as a biopsy become more understandable when supported by visual content, such as videos. Although pulmonary and oncology clinicians examine the patient with malignant diseases of the lung and refer them for biopsy, the procedures are often performed by radiologists. Disorderly information regarding the procedure cause confusion. Lung cancer has the highest mortality rate and early diagnosis is crucial for quality medicine. To increase patient compliance prior to the biopsy, which is necessary for an early diagnosis, online information is especially helpful [12].

In this study, the median values of GQS, ROV, and LBST of the videos were extremely low. These results show that the quality, reliability, and accuracy of the videos on transthoracic lung biopsy were also low. In terms of upload source, the highest median ROV, LBST, and GQS scores were affiliated with academic institutions. The lowest median of all groups belonged to healthcare professionals. In terms of VPI, the videos uploaded had the lowest average. It was also found that these videos included little explanation, often containing biopsy patient images in the CT unit with poor informative content and quality. The popularity scores for these videos were also low, due to lack of satisfactory information for the audience. For example, one of the most important subjects for a patient is the complication rate that may occur after the procedure. The most common is pneumothorax, which can be seen in a wide range of patients, from 0 to 61%. Moreover, 3.3% to 15% of patients may also need a chest tube [13,14]. When patients and their relatives do not receive enough information about these issues, they can be troubled by hearsay information, and sometimes refuse the procedure due to misleading information. Videos uploaded by healthcare groups stated that this was rare. This shows that videos displaying the process content, with too much visual detail for patients (and not acknowledging focus topics, such as side effects), receive negative reactions.

LBST was a tool that was adapted by us from two separate studies, to evaluate videos about lung biopsy in terms of accuracy. LBST being significantly correlated with GQS suggested that this tool was useful. It also allowed us to make unique inferences about the videos during a subgroup evaluation.

For example, the dislike ratio of videos that discussed the method was high. The most mentioned topic was the purpose of the procedure. In general, this was noted in all videos uploaded by individual users, focusing on their biopsy stories from subjective experiences. We find that the mean LBST score of individual users, being higher than other groups, needs further consideration.

As stated, the highest VPI scores belonged to academic institutions and product companies, respectively. We attributed this to the fact that both groups create their videos with higher quality and offer their content in a more organized manner. Since it may be possible to get higher search rankings on YouTube with Search Engine Optimization (SEO) [15], increasing the number of views via various advertising routes by the product companies may have positively contributed to the VPI scores. To keep up with changing YouTube search algorithms, appropriate optimization of title, description, and keywords must also be performed for videos uploaded by healthcare professionals.

The lack of correlation between GQS and VPI revealed that video uploaders neglected factors that created quality content, while tending to increase video popularity for users. ROV developed from the DISCERN tool, which was created about 10 years before the first YouTube video was made, was also correlated with GQS. This indicates that the tool was up-to-date and could evaluate educational videos.

Limitations

The fact that only videos in English were examined was one of the limitations of our study. Like previous studies, two reviewers were included, which may also be considered a potential limitation. Furthermore, new content could be available in YouTube, while old content may have been removed. This is also a limitation for our study.

Conclusion

In this study where we examined the contents of the educational videos on YouTube for transthoracic lung biopsy procedure, we found that the quality of the videos was low. Moreover, we observed that the subjects about which the patients were often curious, such as complications that may occur after the procedure, were not adequately addressed. Professional associations and academic institutions need to keep up with changes in ways of learning, provide online healthcare information more accurately and address a broader audience to minimize patients' anxiety about the procedure and any refusal of procedure.

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