

■ Research Article

Content and quality analysis of YouTube videos on cytoreductive surgery and HIPEC

Sitoredüktif cerrahi ve HIPEC hakkındaki YouTube videolarının içerik ve kalite analizi

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Abstract

Aim: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are important treatment modalities used in advanced gastrointestinal malignancies. YouTube is among the most frequently consulted sources of information about these procedures by both the public and healthcare professionals. This study aimed to evaluate the content, quality, comprehensibility, and accuracy of CRS and HIPEC videos on YouTube.

Material and Methods: A YouTube search was performed using the keyword "cytoreductive surgery HIPEC," and the first 180 videos were analyzed. Videos were categorized by source (physician, institutional, media, patient). Data on voice narration, subtitles, language, comments, likes, views, and video length were recorded. In addition, each video was assessed for quality, comprehensibility, and accuracy using a 5-point Likert scale.

Results: In total, 52.2% of the analyzed videos were media-based, 28.3% institutional, 17.4% physician, and 2.2% patient-based. While 91.8% had voice narration, only 5.4% included subtitles. The mean video length was 13.3 ± 21.8 minutes, and the mean number of views was $4667 \pm 16,932$. The mean quality score was 2.47 ± 1.08 , comprehensibility score 2.69 ± 1.02 , and accuracy score 2.80 ± 1.04 . Physician and institutional videos had significantly higher quality ($p < 0.001$) and comprehensibility ($p < 0.001$) scores compared with media-based videos.

Conclusion: The majority of CRS and HIPEC videos on YouTube are produced by media sources, with overall low quality and comprehensibility. Although physician- and institution-based videos demonstrate higher scientific quality, they remain less accessible and popular. Increasing the availability of professional, high-quality content is essential to provide accurate and comprehensible information in surgical oncology.

Keywords: cytoreductive surgery, hyperthermic intraperitoneal chemotherapy, HIPEC, YouTube, social media, video analysis, quality assessment

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Öz

Amaç: Sitoredüktif cerrahi (SRC) ve hipertermik intraperitoneal kemoterapi (HIPEC), ileri evre gastrointestinal malignitelerde kullanılan önemli tedavi yöntemleridir. YouTube, hem halk hem de sağlık profesyonelleri tarafından bu prosedürler hakkında en sık başvuru bilgi kaynakları arasındadır. Bu çalışma, YouTube'daki SRC ve HIPEC videolarının içeriğini, kalitesini, anlaşılabilirliğini ve doğruluğunu değerlendirmeyi amaçlamıştır.

Gereç ve Yöntemler: YouTube üzerinde "cytoreductive surgery HIPEC" anahtar kelimesi kullanılarak bir arama yapıldı ve ilk 180 video analiz edildi. Videolar kaynaklarına göre (hekim, kurumsal, medya, hasta) kategorize edildi. Sesli anlatım, altyazı, dil, yorum, beğeni, izlenme sayısı ve video süresine ilişkin veriler kaydedildi. Ayrıca her video; kalite, anlaşılabilirlik ve doğruluk açısından 5'li Likert ölçeği kullanılarak değerlendirildi.

Bulgular: Analiz edilen videoların toplamda %52,2'si medya, %28,3'ü kurumsal, %17,4'ü hekim ve %2,2'si hasta kaynaklıydı. Videoların %91,8'inde sesli anlatım varken, sadece %5,4'ünde altyazı mevcuttu. Ortalama video süresi $13,3 \pm 21,8$ dakika, ortalama izlenme sayısı ise 4667 ± 16.932 olarak saptandı. Ortalama kalite puanı $2,47 \pm 1,08$, anlaşılabilirlik puanı $2,69 \pm 1,02$ ve doğruluk puanı $2,80 \pm 1,04$ idi. Hekim ve kurumsal kaynaklı videoların kalite ($p < 0,001$) ve anlaşılabilirlik ($p < 0,001$) puanları, medya kaynaklı videolara göre anlamlı derecede yüksek bulundu.

Sonuç: YouTube'daki SRC ve HIPEC videolarının çoğunluğu medya kaynaklıdır ve genel kalite ile anlaşılabilirlik düzeyleri düşüktür. Hekim ve kurum temelli videolar daha yüksek bilimsel kaliteye sahip olsalar da, erişilebilirlikleri ve popüleriteleri düşük kalmaktadır. Cerrahi onkoloji alanında doğru ve anlaşılır bilgi sağlamak için profesyonel, yüksek kaliteli içeriklerin erişilebilirliğini artırmak temel bir gerekliliktir.

Anahtar Kelimeler: sitoredüktif cerrahi, hipertermik intraperitoneal kemoterapi, HIPEC, YouTube, sosyal medya, video analizi, kalite değerlendirmesi

Introduction

Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are considered effective treatment options for selected patients with peritoneal metastases secondary to colorectal, ovarian, and gastric cancers, as well as for primary peritoneal malignancies [1]. When performed in appropriately selected patients and in experienced centers, CRS + HIPEC has been shown to provide a survival advantage [2]. Among patients with peritoneal metastases from colorectal cancer, median survival is only 16.3 months with chemotherapy alone, whereas it may extend up to 40 months in those undergoing CRS and HIPEC [3]. Nevertheless, these procedures are technically complex, associated with high morbidity, and should be performed by experienced teams [4]. Even in high-volume centers, perioperative mortality may reach up to 8% [5]. In recent years, interest in these treatments has increased, and patients and their relatives are seeking more information regarding diagnosis and treatment processes. One of the most frequently used digital platforms for health-related information is YouTube [6]. YouTube is the most widely used video-sharing platform worldwide and serves as an easily accessible source

of information for both healthcare professionals and patients [7]. However, unlike peer-reviewed journal articles, its content is not subject to editorial oversight, raising concerns regarding accuracy, reliability, and the risk of misinformation [8]. In a systematic review by Madathil et al., only 32% of health-related content on YouTube was reported to have high accuracy and educational quality, while the remaining videos contained either insufficient information or misinformation [9]. Similarly, Drozd et al. reported that approximately 40% of medical videos on YouTube were of moderate or low quality [10]. Previous studies evaluating YouTube videos on various topics in surgery and oncology have demonstrated variable content quality and highlighted significant information gaps [11]. Nevertheless, there is very limited data in the literature regarding the content and reliability of videos specifically focusing on CRS and HIPEC. Considering that patient education is of critical importance in surgical oncology practice, it is essential to evaluate the quality, comprehensibility, and accuracy of CRS and HIPEC videos available on YouTube. The aim of this study was to systematically analyze the most popular videos retrieved with the keyword "cytoreductive surgery HIPEC" on YouTube in order to shed light on the level of information available in this field.



Material and Methods

This study was designed as a descriptive and cross-sectional content analysis. A YouTube search was performed in March 2025 using the keyword "cytoreductive surgery HIPEC." To avoid bias from previous personal activity, browser history and cookies were cleared before the search. Results were sorted by the "relevance" filter, and the first 180 listed videos were included in the analysis.

Inclusion criteria were: videos directly related to cytoreductive surgery and/or HIPEC, containing comprehensible visual/audio content, and presenting unique, non-duplicated material. Exclusion criteria were: irrelevant videos, those shorter than 1 minute, or videos created for advertising purposes.

For each video, the following variables were recorded: source (physician, institutional, media, patient), presence of voice narration, presence of subtitles, language, availability of comments, availability of likes, video duration, number of views, number of likes, and number of comments. In addition, each video was evaluated according to three parameters defined in the literature: quality score, comprehensibility score, and accuracy score, using a 5-point Likert scale (1 = very poor/completely inaccurate, 5 = excellent/completely accurate) [12]. The evaluation was independently performed by two researchers, and disagreements were resolved by consensus with a third investigator. Since this study was conducted exclusively with publicly available data, ethical committee approval was not required.

Patient records were obtained using the hospital database system, which was approved by the ethics committee of Marmara University Pendik Training and Research Hospital, dated 06.11.2020 and numbered "2020-265". All procedures were performed following the Declaration of Helsinki on human studies.

Statistical Analysis

The collected data were analyzed using SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean \pm standard deviation (minimum–maximum), while categorical variables were presented as frequencies and percentages (%). Comparisons between groups were performed using the Chi-square test or Fisher's exact test when appropriate. The distribution of continuous variables was assessed with the Kolmogorov–Smirnov test,

and for non-normally distributed data, the Kruskal–Wallis test was applied. A p-value of <0.05 was considered statistically significant.

Results

In total, 180 videos were included in the study, of which 52.2% were media-based, 28.3% institutional, 17.4% physician-based, and 2.2% patient-based. The vast majority (91.8%) contained voice narration, whereas only 5.4% included subtitles. While 91.8% of the videos were in English, 8.2% had no narration. The mean video length was 13.34 ± 21.83 minutes (range, 1–110). The mean number of views was $4667 \pm 16,931$ (range, 26–113,000), mean number of likes was 192.8 ± 1138.8 (range, 0–7800), and mean number of comments was 1.13 ± 4.79 (range, 0–31) (Table 1).

When analyzed by source, physician-based videos had a mean duration of 5.75 ± 5.32 minutes, compared with 18.76 ± 26.07 minutes for institutional videos and 13.45 ± 22.40 minutes for media videos ($p = 0.02$). In terms of view counts, media videos had significantly higher numbers ($7643 \pm 23,016$), whereas physician (2505 ± 2863) and institutional videos (815 ± 964) received significantly fewer views ($p < 0.001$). Similarly, the mean number of comments was higher in media videos (1.95 ± 6.51) ($p = 0.048$). The mean number of likes was 359 ± 1561 for media videos, while physician- and institutional-based videos had mean values of 17.9 ± 31.5 and 8.2 ± 10.9 , respectively ($p = 0.481$) (Tables 1, 2).

Significant differences were also observed between groups regarding quality, comprehensibility, and accuracy scores. Institutional videos had the highest quality (3.23 ± 1.13) and comprehensibility scores (3.38 ± 1.01), followed closely by physician-based videos (2.62 ± 1.12 and 3.12 ± 0.94 , respectively). Media videos, on the other hand, demonstrated significantly lower quality (2.04 ± 0.79) and comprehensibility scores (2.20 ± 0.76) ($p < 0.001$). Accuracy scores were highest for physician (3.5 ± 0.80) and institutional videos (3.44 ± 0.95), and lowest for media videos (2.27 ± 0.82) ($p < 0.001$) (Table 2).

Overall, most CRS and HIPEC videos on YouTube were media-based, receiving greater views and user engagement. However, physician- and institution-based videos achieved substantially higher scores in terms of quality, comprehensibility, and accuracy.

Table 1. Baseline characteristics of YouTube videos on cytoreductive surgery and HIPEC.

Variables	
Video Types: n(%)	
Physician videos	32 (17.4%)
Institutional videos	52 (28.3%)
Media videos	96 (52.2%)
Patient videos	4 (2.2%)
Voice Narration: n(%)	
Absent	15 (8.2)
Present	169 (91.8)
Subtitle Narration: n(%)	
Absent	174 (94.6)
Present	10 (5.4)
Video Narration Language: n(%)	
Absent	15 (8.2)
English	169 (91.8)
Comment: n(%)	
Absent	160 (87)
Present	24 (13)
Likes : n(%)	
Absent	48 (26.1)
Present	136 (73.9)
Video length, minute, mean \pm SD, range	13.34 \pm 21.83 (1-110)
Number of Views, mean \pm SD, range	4667.04 \pm 16931.85 (26-113000)
Number of Comments, mean \pm SD, range	1.13 \pm 4.79 (0-31)
Number of Likes, mean \pm SD, range	192.82 \pm 1138.83 (0-7800)
Quality Score, mean \pm SD, range	2.47 \pm 1.08 (1-5)
Comprehensibility Score, mean \pm SD, range	2.69 \pm 1.02 (1-5)
Accuracy Score, mean \pm SD, range	2.80 \pm 1.04 (1-5)

Table 2. Comparison of video features according to the source of YouTube videos on CRS and HIPEC.

Characteristics	Physician videos 32 videos	Institutional videos 52 videos	Media videos 96 videos	p value
Voice Narration: n(%)				0.590
Absent	2 (1.1%)	5 (2.7%)	7 (3.8)	
Present	30 (16.6%)	47 (26.1%)	89 (49.7%)	
Subtitle Narration: n(%)				<0.001
Absent	29 (16.1%)	51 (28.3%)	92 (51.3%)	
Present	3 (1.6%)	1 (0.5%)	4 (2.2%)	
Video Narration Language: n(%)				0.590
Absent	2 (1.1%)	5 (2.7%)	7 (3.8%)	
English	30 (16.6%)	47 (26.1%)	89 (49.7%)	
Comment: n(%)				0.08
Absent	32 (17.7%)	44 (24.4%)	80 (44.8%)	
Present	0 (0)	8 (4.4%)	16 (8.8%)	
Likes : n(%)				<0.001
Absent	4 (2.2%)	8 (4.4%)	32 (17.7%)	
Present	28 (15.5%)	44 (24.4)	64 (35.8%)	
Video length, minute, mean \pm SD, range	5.75 \pm 5.32 (1-18)	18.76 \pm 26.07 (1-100)	13.45 \pm 22.40 (2-110)	0.02
Number of Views, mean \pm SD, range	2505 \pm 2862.93 (430-9300)	814.76 \pm 964.49 (58-2900)	7643.29 \pm 23016.00 (26-113000)	<0.001
Number of Comments, mean \pm SD, range	0	0.38 \pm 0.93 (0-3)	1.95 \pm 6.51 (0-31)	0.048
Number of Likes, mean \pm SD, range	17.87 \pm 31.51 (0-99)	8.15 \pm 10.93 (0-40)	359.20 \pm 1561.86 (0-7800)	0.481
Quality Score, mean \pm SD, range	2.62 \pm 1.12 (2-5)	3.23 \pm 1.13 (2-5)	2.04 \pm 0.79 (1-4)	0.001
Comprehensibility Score, mean \pm SD, range	3.12 \pm 0.94 (2-5)	3.38 \pm 1.01 (2-5)	2.20 \pm 0.76 (1-4)	<0.001
Accuracy Score, mean \pm SD, range	3.5 \pm 0.80 (2-5)	3.44 \pm 0.95 (2-5)	2.27 \pm 0.82 (1-4)	<0.001



Discussion

This study is among the pioneering investigations evaluating the content, quality, comprehensibility, and accuracy of the first 180 YouTube videos retrieved with the keyword “cytoreductive surgery HIPEC.” Our findings revealed that more than half of the videos were media-based, and although these videos ranked higher in terms of views and engagement, their quality and comprehensibility remained low. In contrast, physician- and institution-based videos demonstrated higher scientific quality, yet they were viewed less frequently and received limited engagement.

CRS and HIPEC are technically complex treatment modalities with high morbidity risk, primarily utilized for peritoneal metastases originating from colorectal, gastric, and ovarian cancers, as well as primary peritoneal malignancies [13]. When performed in appropriately selected patients and at experienced centers, CRS + HIPEC can provide a survival advantage [14]. However, due to the complexity of the procedure, the risk of severe complications, and the need for intensive perioperative care, surgical teams must undergo advanced training and maintain extensive experience [15]. In recent years, surgical residents and specialists have increasingly relied on visual materials and online platforms to learn these techniques [16]. In particular, video-sharing sites such as YouTube have become one of the most frequently used resources where surgeons can observe surgical techniques and obtain supplemental training [17]. Indeed, several surgical societies have emphasized that YouTube can serve as a complementary tool for surgical training, especially in the acquisition of laparoscopic and minimally invasive techniques [18]. However, concerns remain regarding the accuracy, educational value, and scientific adequacy of these videos [19].

In our study, physician and institution-based videos achieved the highest scores in terms of quality (2.62 and 3.23, respectively), comprehensibility (3.12 and 3.38), and accuracy (3.5 and 3.44). Joshi et al. reported that videos prepared by medical groups demonstrated statistically superior performance in quality compared with other sources [20]. Similarly, a systematic review by Kim et al. analyzing YouTube videos on women’s health concluded that content produced by healthcare professionals showed significantly higher quality, reliability, and accuracy compared with consumer-generated videos [21]. In contrast, Morkavuk and Badem (2021) reported that although YouTube videos on CRS and HIPEC

may provide potential contributions to surgical training, their number and educational value remain limited [22]. Our results further highlight that physician- and institution-based videos, despite their higher quality, receive limited views and likes, reflecting the difficulty of academic content in reaching larger audiences. Conversely, media-based videos, though more popular and widely viewed, demonstrated low quality and comprehensibility scores. This suggests a tendency among viewers to prefer more superficial and easily consumable content. The relatively low accuracy scores of media videos may also be explained by their reliance on general or simplified information. Such findings underscore the striking imbalance between scientific accuracy and popularity in social media content on surgical oncology.

Standard CRS + HIPEC procedures for colorectal cancer generally last 6-7 hours, depending on the extent of peritonectomy and multi-organ resections [23]. In a series of 370 cases, Polanco et al. reported a mean operative time of 430 minutes [24]. However, such lengthy operations are rarely represented on YouTube. In our study, the mean duration of physician-based videos was 5.75 ± 5.32 minutes (range, 1-18), compared with 18.76 ± 26.07 minutes (range, 1–100) for institutional videos and 13.45 ± 22.40 minutes (range, 2–110) for media videos ($p = 0.02$). The short duration of YouTube videos is likely due to the extensive length of real CRS and HIPEC procedures, which discourages the upload of full-length operative content. Similarly, the literature has emphasized that the most educationally valuable surgical videos are typically full-length and narratively structured, whereas the majority of YouTube content consists of shorter, summarized, or incomplete segments [25]. Thus, YouTube videos on CRS and HIPEC fail to reflect the actual duration of these procedures and are instead presented as shortened versions.

CRS and HIPEC videos on YouTube are heterogeneous in content; high-quality academic materials receive limited views and engagement, while media-based videos, despite their popularity, lack scientific rigor. These findings highlight the need for surgical oncology communities and academic centers to produce more professional, comprehensible, and widely accessible content to ensure accurate and reliable information dissemination.

Limitations of the study

This study has several limitations. First, the analysis was restricted to the first 180 videos retrieved from YouTube

using a single keyword; different search terms or a broader screening strategy might have yielded different results. Second, only videos in English or those with comprehensible visual/audio content were included, and therefore materials in other languages were excluded. Third, the assessments of video quality, comprehensibility, and misinformation were based on subjective evaluations by the researchers; although independent reviewers were employed, a certain degree of bias cannot be completely excluded. In addition, since YouTube's algorithm may vary depending on personal history and time, similar searches performed at different time points could yield different results. Finally, the number of views, likes, and comments are dynamic parameters that change over time; thus, the values obtained in this study reflect only a single point in time.

In conclusion, this study demonstrated that most cytoreductive surgery and HIPEC videos on YouTube are media-based, and although these videos achieve higher viewership and engagement, their overall quality and comprehensibility remain low. Physician- and institution-based videos provide greater scientific quality and reliability, yet they fail to reach broader audiences. Our findings highlight a clear imbalance between popularity and scientific accuracy in social media content. In surgical oncology, patient education must be grounded in accurate and reliable information. Therefore, academic centers and professional societies should strengthen their presence on YouTube by producing more accessible and comprehensible content. Such efforts may reduce the risk of misinformation and improve patient education regarding complex procedures such as cytoreductive surgery and HIPEC.

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Ethics approval

Patient records were obtained using the hospital database system, which was approved by the ethics committee of Marmara University Pendik Training and Research Hospital, dated 06.11.2020 and numbered "2020-265".

Author's contribution

The author is the sole contributor to this work.

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