Evaluation of the quality and reliability of Ahmed glaucoma valve implant surgery videos on YouTube

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ABSTRACT

Purpose: To evaluate the quality and reliability of Ahmed glaucoma valve (AGV) implant surgery videos on YouTube.

Materials and Methods: A search was made on YouTube with the keyword 'Ahmed glaucoma valve' in February 2022. Two hundred and thirteen videos were viewed, and 99 videos were evaluated to determine the DISCERN questionnaire, the American Journal of Medicine Association (JAMA) benchmark criteria, and Global Quality Score (GQS) as well as the video image quality and surgical adequacy.

Results: The DISCERN score was poor (33.64±3.54), the JAMA score was moderate (2.19±0.60), the GQS was fair (3.25±1.00), the surgical score was very good (9.13±1.01), and the image quality of the videos was moderate (3.03±1.32). Video image quality, the DISCERN, and GQS score values were significantly higher in videos that were uploaded by private hospitals or institutions ($p=0.035$, $p=0.031$, $p=0.039$, respectively). The DISCERN and GQS scores were significantly higher in the videos with audio and audio and subtitle together than the videos without audio ($p<0.0001$). There were significantly positive correlations between number of views and likes, view rate and the GQS, DISCERN score, and the video image quality.

Conclusion: Although many YouTube videos show the full stages of the 'Ahmed glaucoma valve' surgery, the quality and reliability of the videos are low. Videos with enhanced video image quality, that are supported with audio and subtitles, and increased reliability by providing surgeons and affiliation information can be a good educational resource for surgical trainees**.**

Keywords: Ahmed glaucoma valve surgery, Global Quality score, JAMA score, video, YouTube.

INTRODUCTION

Glaucoma is an optic neuropathy and is the second cause of blindness in the world.[1] Medical treatment is usually the first step due to low rate of side effects; however, laser and/or surgery should be preferred when the target intraocular pressure cannot be achieved. A trabeculectomy is considered as the gold standard for primary open-angle and primary closed-angle glaucoma.[2] However, aqueous shunt surgery has been successfully applied as the second treatment after an unsuccessful trabeculectomy or as the initial treatment due to secondary glaucoma factors, such as neovascular glaucoma and uveitic glaucoma. The Ahmed glaucoma valve (AGV) implant is a frequently preferred material in aqueous shunt surgery due to its valve structure.[3]

YouTube is the world's largest media-sharing website and the second most frequently used website.[4] The fact that it can reach a large number of viewers in a short time and is free of charge increases its popularity.[5] In the field of health, many videos are shared by physicians and other Youtubers. These videos are watched with great attention by patients and physicians who want to obtain information in the field of health in a short time.[6] Online videos can be a good supplement for education, especially in the fields of surgical medicine; however, inadequate, deficient, and biased surgery videos may mislead users.[7,8]

The quality and reliability of the videos have been investigated in different health fields.[9,10] To the best of our knowledge, no study has reported the quality and reliability of AGV implant surgery videos. In this study, AGV implant surgery videos uploaded to YouTube were examined in terms of surgical competence, quality, and reliability, and whether these videos would be sufficient in the education of surgical trainees was evaluated.

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MATERIALS AND METHODS

This study did not require institutional review board approval. The Declaration of Helsinki was complied with during the study. A search was made on YouTube (http://www.youtube.com) with the keyword 'Ahmed glaucoma valve' between 2 and 7 February, 2022. All uploaded videos were viewed independently by two experienced glaucoma specialists in reverse order of upload (February 2022-December 2007). The results were recorded by taking the average of the evaluations of both physicians.

Videos were evaluated to determine the DISCERN score, the American Journal of Medicine Association (JAMA) questionnaire, and Global Quality Score (GQS) as well as the video image quality and surgical adequacy.

The DISCERN scoring system consists of a total of 16 questions. The first 8 are aimed at evaluating the reliability of the publication, and the next 7 questions are to evaluate the quality of information about treatment options. Question 16 involves scoring the overall quality of the publication based on responses to all other questions. All questions are scored between 1 and 5. The DISCERN scoring system ranges from 15 to 75 points, and the result is evaluated as follows: excellent (63-75 points), good (51-62 points), moderate (39-50 points), poor (27-38 points), or very poor (15–26 points).[11]

JAMA scoring system is another well-known quality assessment tool and is used to evaluate information from health-related websites. It includes four criteria: author, attribution, description, and currency. Each generates one possible score, and a four-point score indicates the highest quality.[12]

GQS is a five-point Likert-type scale for users to rate the overall quality of a video's content. One point indicates the lowest quality, five points excellent quality.[13]

Using the absolute category rating (ACR) method, the video image quality was evaluated based on five levels of ratings: excellent (5), good (4), fair (3), poor (2), and bad (1).[14]

All accepted stages of AGV implant surgery were classified into 10 categories. These stages were scored using the surgical scoring system with 1 point each. These stages were: opening of the conjunctiva; preparation of the implant site; passing fluid through the tube; measuring to locate the implant; suturing the implant; entering the anterior chamber with a 23 gauge cannula; shortening the tube; insertion of the tube into the anterior chamber; covering the tube with a patch or scleral flap or tunnel; and closure of the conjunctiva. Videos that included all these stages received full marks based on surgical scoring.

Videos containing different surgeries, videos of patient education and patient opinions, animated films promoting AGV, animated AGV surgery, conferences, seminars, and AGV implant surgery videos made for veterinary medicine were not included in the study. Videos containing complications of AGV surgery, re-uploaded videos, videos shorter than 60 seconds and longer than 60 minutes, and videos requiring additional procedures, such as vitrectomy, keratoplasty, or complicated cataract surgeries performed simultaneously with AGV, were excluded from the study; on the other hand, AGV surgery with uncomplicated cataract surgery or with intravitreal injection were included. All videos meeting these criteria were included in the study regardless of language. All videos included in the study are titled, and the duration, who uploaded it, the time elapsed since upload date (day), number of views, likes and dislikes, and view rate [number of per month] are specified.

Statistical analysis

Statistical analysis was performed using SPSS Version 22 (IBM® SPSS, Turkey). Descriptive statistics of continuous variables were given as means and standard deviations or median values. Categorical variables are given with frequency and percentages. The suitability of the parameters to the normal distribution was evaluated with the Kolmogorov-Smirnov and Shapiro-Wilk tests. Independent sample *t*-test was used for pairwise comparisons of normally distributed data, and Mann-Whitney *U* test was used for data which are are not normally distributed. Data showing normal distribution in comparisons involving more than two groups were analyzed with One-way ANOVA test, and data not normally distributed were analyzed using Kruskal-Wallis tests. Bonforroni correction was made while applying Kruskal-Wallis tests. Spearman test was used for correlation analysis. Statistical significance was set as $p<0.05$.

RESULTS

In February 2022, 213 videos uploaded with the search keyword "Ahmed glaucoma valve" on YouTube were reviewed retrospectively. The oldest video included in the study was an AGV implant surgery made in 'ORBIS' (Flying Eye Hospital), uploaded in four episodes in December 2007. The most recent video was uploaded in February 2022.

Of the 213 videos, 31 showed surgeries with complications involving AGV implant surgeries, and 22 showed the

AGV implant surgeries combined with other complicated surgeries. These videos were excluded from the study. In addition, duplicate surgical videos, videos showing how the implant functions, videos from the conferences, videos with animations and patient experiences, and AGV implant videos for veterinarians were excluded from the study (n=44). Different implant surgery videos (n=6) and unrelated videos (n=4) were not included in the study. Three videos under 60 seconds and one over 60 minutes were excluded from the study. Four videos showing AGV implant surgery of the same case and divided into sections were included in the study as a single video by taking their averages. A total of 99 videos were included in the study.

The videos included in the study were mostly uploaded in 2020 (n=25, 24.75%). This was followed by the year 2021 with 11 videos (10.89%). In seven videos (6.93%), the surgeons' names and affiliations were not specified. Ninety-two videos (91.08%) provided the name of the surgeon, and only 26 (25.74%) contained information about affiliations. Of the videos with subtitles and/or audio, only four videos were uploaded in a language other than English.

The descriptive statistics of the videos are listed in Table 1. Accordingly, the DISCERN score was poor (33.64±3.54), the JAMA score was moderate (2.19±0.60), the GQS was fair (3.25±1.00), the surgical score was very good (9.13±1.01), and the image quality of the videos was moderate (3.03±1.32).

Sixty-six of the videos were uploaded to YouTube by ophthalmologists (Group 1) and 33 by private hospitals or institutions (Group 2). Video image quality, DISCERN, and GQS score values were significantly higher for Group 2 (p=0.035, p=0.031, p=0.039, respectively) (Table 2).

There was no audio or subtitles in 40 of the videos. There was only audio in 28, only subtitles in 24, and both audio and subtitles in seven. The DISCERN and GQS scores were significantly higher for the videos with audio and with audio and subtitles than for videos without audio (p<0.0001, p<0.0001, recpectively) (Table 3).

Table 1: *Descriptive statistics of Ahmed glaucoma valve implant surgery videos on YouTube*

	Mean±SD	Minimum	Maximum
Duration (minutes)	6.94±5.86	1.20	44.39
Time since upload date (days)	1639.17±1289.04	72	5094
Number of views	2829.25±5964.46	10	29.227
Number of likes	14.29±26.52	0	197
Number of dislikes	0	0	0
Views ratio (number of views per month)	61.17±129.94	0.33	660.69
Video image qualilty	3.03±1.32	1	5
Surgery score	9.13±1.01	6	10
DISCERN score	33.64±3.54	25	40
JAMA score	2.19±0.6	1	4
GQ score	3.25±1.00	1	5

JAMA, Journal of the American Medical Association; GQ, Global Quality; SD, standard deviation.

Table 2: *Comparison of the quality of videos uploaded by ophthalmologists (Group 1) and the private hospitals or institutions (Group 2).*

	Group 1 (n=66)	Group 2 (n= 33)	P
Duration (minutes)	6.38±5.82	8.07±5.87	0.195
Time since upload date (days)	1555.68±1270.38	1806.15±1329.43	0.365
Number of total views	2917.88±6500.88	2652±4801.63	0.11
Number of total likes	14.98±30.03	12.91±17.88	0.69
View ratio (number of views per month)	45.16±94.99	93.19±178.31	0.155
Video image qualilty	2.83±1.28	3.42±1.32	**0.035***
Surgery score	9.07±1.07	9.24±0.90	0.591
DISCERN score	33.10±3.44	34.72±3.56	**0.031***
JAMA score	2.13±0.46	2.30±0.80	0.279
GQ score	3.11±0.97	3.55±1.00	**0.039***

JAMA, Journal of the American Medical Association; GQ, Global Quality; SD, standard deviation; *, p<0.05.

Table 3: *Comparations of qualilty scores of videos with or without audio and subtitles*

	Audio and subtitles (–) **0** n=40	Audio (+) subtitles (-) **1** n=28	Audio (–) Subtitles (+) **2** n= 24	Audio and subtitles (+) **3** n= 7	P
Number of views	2026.88±3919.56	4694.71±8544.55	2166.54±5687.45	2224.57±2487.48	0.283
Number of likes	10.98±16.73	23.68±41.73	8.92±16.13	14.14±15.41	0.163
Views ratio (number of views per month)	30.33±52.93	119.62±197.45	47.24±118.75	51.35±69.99	0.129[a]
Video image quality	2.78±1.31	3.57±1.20	2.79±1.35	3.14±1.34	0.068
Surgery score	9.12±1.11	9.14±0.97	9.04±0.90	9.42±1.13	0.587[a]
DISCERN score	32.00±2.63	35.39±3.78	33.66±3.23	36.00±4.16	<0.0001* **0-1** <0.0001* **0-3** 0.008*
JAMA score	2.07±0.52	2.32±0.66	2.12±0.53	2.57±0.78	0.115
GQ score	2.78±0.73	3.71±1.04	3.29±0.955	4.00±1.15	<0.0001* **0-1** <0.0001* **0-3** 0.018*

JAMA, Journal of the American Medical Association; GQ, Global Quality; SD, standard deviation; [a], Kruskal-Wallis test;* p<0.05.

Table 4 shows correlation analysis between the score of surgery, the DISCERN, JAMA, GQS and the video image quality, view ratio, and the number of views and likes. There was a positive correlation between number of views and GQS, DISCERN, and surgery score with a significance (r= 0.317, p<0.0001; r= 0.346, p<0.0001; r=0.217, p=0.031, with 95% confidence, respectively). There was a positive correlation between number of likes and GQS, DISCERN score, and video image quality with a significance (r= 0.376, p<0.0001; r= 0.378, p<0.0001; r=0.306, p=0.002, with 95% confidence, respectively). There was a positive correlation between view ratio and GQS, DISCERN score and video image quality with a significance (r= 0.411, p<0.0001; r= 0.492, p<0.0001; r=0.402, p<0.0001, with 95% confidence, respectively). There was a positive correlation between video image quality and GQS, DISCERN score with a significance (r= 0.589, p<0.0001; r= 0.550, p<0.0001, with 95% confidence, respectively).

CONCLUSION

In this study, AGV implant surgery videos uploaded to YouTube were examined in terms of surgical competence, quality, and reliability. Overall video image quality was moderate, the surgical score was very good, the DISCERN score was poor, the JAMA score was moderate, and the GQS was fair. Videos uploaded by hospitals or private organizations had better image quality, GQS, and DISCERN scores. Videos with a good video image quality and audio had higher view rates.

Surgical restrictions and disruptions in education during the epidemic made video-sharing sites even more popular all over the world due to the ease of accessing information from the Internet. [15] This was demonstrated by the fact that 36 (35.64%) of the videos included in our study were uploaded in 2020 and 2021, which coincided with the COVID-19 pandemics. In addition, these video

Table 4: *Correlation analysis between the score of surgery, the DISCERN, JAMA, GQ and the video image quality, view ratio, and number of views and likes.*

		DISCERN score	JAMA score	GQ score	Surgery Score	Video image quality
Number of views	R	0.346	0.346	0.317	0.217	0.163
	P	<0.0001*	0.483	<0.0001*	0.031*	0.108
Number of likes	R	0.378	0.001	0.376	0.180	0.306
	p	<0.0001*	0.993	<0.0001*	0.074	0.002*
View ratio (number of views per month)	R	0.492	0.125	0.411	0.196	0.402
	p	<0.0001*	0.217	<0.0001*	0.052	<0.0001*

JAMA, Journal of the American Medical Association; GQ, Global Quality; *, p<0.05.

sharing sites are crucial for surgical trainees in developing countries.[16]

Studies have shown the benefits of multimedia in learning.[17] Various studies in the medical field have reported that YouTube is currently the main platform used by many surgeons to prepare for surgical procedures.[18] Studies on the educational use of videos in surgical fields highlight the importance of visually supported education.[19]

In our study, the videos were at a very good level in terms of surgical proficiency; however, many videos did not include audio and subtitles even though the exact stages of surgery were included. Therefore, they did not include some information, such as the surgical quadrant, the critical stages, such as shortening the tube or entering the anterior chamber with a 23 gauge needles, or suture information and complications. Since they provided this information, audio videos, in particular, had higher scores in our study in terms of the DISCERN and GQS scores. Another remarkable finding was that the rates of watching and liking of videos with audio or a combination of audio and subtitles were higher; however, statistical significance was not reached. Guidelines in other medical fields have also suggested the use of diagrams, photographs, tables, and audio or written content for supplemental educational content.[20]

A poor-quality image may obscure details. Even when the surgical procedure is given in full, the details of the surgery may be lacking if the video is not sufficient in terms of image quality. In our study, the average video image quality was moderate. Thirty videos (29.7%) had a video image quality of 4 and higher. Lucatto et al.[21] evaluated the image quality of vitreoretinal surgery videos at three levels and reported that 63.52% had good quality and 30.37% medium quality. Only 6.11% of the videos contained low video quality images. In our study, video image quality was classified in five stages using the ACR method. Because this method is a subjective method, it can be affected by video content; however, to avoid this, the classification was made within the first 10-15 seconds from the beginning of the video. Although all surgical steps were given, most of the videos included in the study were not adequate in terms of image quality. There were 38 videos (37.62%) with a video image quality of 2 and below. However, the correlation analysis showed that videos with high GQS and DISCERN scores also had good image quality. In addition, the moderate positive correlation between video image quality and view rate and number of likes may indicate the importance of video image quality.

In our study, 66.66% of the surgery videos were uploaded by physicians. The video image quality, DISCERN, and GQS scores of these videos were lower compared to the videos uploaded by institutions. Yıldız et al.[22] reported that the quality of videos uploaded by Universities and institutions was higher. Mangan et al.[6] also reported that the best educational strabismus videos were uploaded by academic institutions; however, the quality values were still poor. Another study involving the examination of refractive surgery videos reported a GQ score of 1.7, a JAMA score of 0.7, and a DISCERN score of 33.2.[23] Our study differed from these studies in that the GQS score was better. This difference may be related to additional over-scoring in the GQS score due to the additional information provided in the audio videos. Unlike these studies in the literature, the videos in our study only focused on AGV implant surgery, and almost all videos were uploaded by professionals. This may have increased our GQS average. Similar to our results, Fan et al.[24] reported that high-quality online surgical videos can be an effective learning tool for surgical trainees. Another study examining vitreoretinal surgery videos reported that videos can be useful, high-quality tools for complementary surgical learning among retinal specialists at any career stage;[21] however, Songur et al.[25] reported the DISCERN score as moderate and the JAMA and GQ scores as poor in retinal detachment surgery videos. Another study examining trabeculectomy surgery videos showed that the video quality was unsatisfactory. In addition, only six of the 97 videos provided the complete surgical steps.[26] The results of these studies are inconsistent with our results.

Most of the surgical videos included in our study had surgical modifications. Some surgeons used suspension sutures or made paracentesis and gave viscoelastic material or fixed the tube separately or performed deep sclerectomy, but some surgeons did not. In fact, after the main surgical information is given, this diversity may be encouraging for other surgeons to improve themselves and to switch to different techniques. It can be an effective learning tool for surgical trainees of all stages.[24] Aykut et al.[27] watched phacoemulsification videos made with small pupils and reported that the fewer complications in these videos were not compatible with the literature. This highlights the importance of an impartial publication. Some surgeons may publish their own disapproved techniques, which can be contradictory and misleading. In our study, the name of the surgeon who published a small number of videos was not mentioned; however, even when surgeons' names were given, many videos did not mention affiliations or disclosures. Therefore, it is debatable whether these

unregulated videos portray safe practices. This may result in the spread of the use of incorrect surgical procedures therefore Ophthalmological societies must provide guidelines and improve the educational quality of such YouTube videos posted.

One limitation of this study, like the similar studies, is that the video evaluations were made subjectively. Although the average of the evaluations of two independent physicians was taken into account, the results cannot be accepted as an objective evaluation. There may also be difficulties in comparisons with other studies in this field.

In conclusion, this study showed that surgical procedure videos can be educational if uploaded by professionals. Videos with high image quality, that are supported with audio and subtitles, and with increased reliability by providing surgeon and affiliation information can be educational for surgical trainees interested in this subject.

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