

Percutaneous nephrolithotomy on YouTube: Valuable educational resource for urologists and patients or misleading information?

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Introduction To evaluate the quality, reliability, and educational value of YouTube videos related to percutaneous nephrolithotomy (PCNL), with a specific focus on the content available for urologists and patients seeking information online.

Material and methods A systematic YouTube search using the key words “PCNL” and “percutaneous nephrolithotomy” was conducted. Videos were included if they were in English, had audio, and were relevant to PCNL. Two expert urologists independently evaluated each video. Collected data included upload year, video length, content type, target audience, source, geographic origin, and surgical position. The quality of the videos was assessed using the DISCERN instrument and Global Quality Score (GQS).

Results Of 65 identified videos, 26 met inclusion criteria. Most were aimed at healthcare professionals (84.6%) and were uploaded by physicians (65.4%). Only 15.4% were patient-oriented. The prone position was depicted in 84.6% of videos. The median duration was 7 minutes 58 seconds. The median view ratio was 102.3 views/day. The median DISCERN score was 2 (IQR 1), and the median GQS score was 3 (IQR 1.375), reflecting moderate educational quality.

Conclusions YouTube contains a moderate-quality body of PCNL videos primarily designed for professional audiences. There is a clear shortage of reliable, patient-centered educational content. Healthcare organizations and scientific societies should proactively develop and promote accessible, high-quality educational resources for patients.

Key Words: video-based education ↔ social media ↔ patient education ↔ surgical education ↔ health information

INTRODUCTION

Over the past two decades, the approach to surgery has been evolving on both the physician's and the patient's side. Robotic surgery, advanced devices, and tools such as indocyanine green have significantly increased the need for accessible and accurate information [1–6]. There is therefore

a growing need to provide clear, comprehensive video content tailored to both patients and healthcare professionals. The integration of digital tools such as Apps, telemedicine softwares or video sources or platforms into healthcare communication has transformed how both professionals and patients access medical information [7–9]. Among these platforms, YouTube has become one of the most widely

used resources for video-based education [10–12]. With over 2 billion monthly users and thousands of new videos uploaded daily, YouTube offers an unprecedented opportunity to disseminate healthcare contents and videos to a global audience. In urology, procedural videos are frequently used to enhance surgical training, facilitate peer-to-peer learning and provide patients with a visual understanding of their upcoming interventions [13–15]. Percutaneous nephrolithotomy (PCNL) is usually the minimally invasive approach of choice for the treatment of large renal calculi and staghorn stones, while Retrograde Intra Renal Surgery (RIRS) is reserved for smaller stones [16–21]. PCNL represents a procedure where visual resources may significantly aid comprehension, whether for medical trainees or patients. However, the unregulated nature of YouTube raises important concerns, especially from a medical and educational point of view. Unlike peer-reviewed publications or formal educational platforms, YouTube videos are not subjected to standardized quality checks or accuracy assessments. Previous studies across various surgical disciplines have highlighted the heterogeneity and often suboptimal quality of medical videos available online, with particular concern for those targeting lay audiences [22–24]. Despite the critical role PCNL plays in urologic surgery and its complexity, a systematic analysis of the educational content related to PCNL on YouTube has been lacking. In fact, to the best of our knowledge, no previous study has specifically evaluated PCNL-related YouTube content. The aim of this study is to fill that gap by providing a comprehensive evaluation of PCNL-related videos, focusing on their quality, reliability, and target audience, with special attention to resources intended for patient education.

MATERIAL AND METHODS

A systematic search was performed on YouTube in March 2025 using the keywords “PCNL” and “percutaneous nephrolithotomy”. The search was conducted using a standard web browser in incognito mode without applying additional filters to minimize the influence of personalized search algorithms. Videos were initially screened by title and thumbnail and then assessed based on content after full viewing. Videos were screened independently by two researchers (V.C. and R.M.). In cases of disagreement, a third researcher (F.B.) reviewed the video, and a consensus was reached through discussion. Formal inter-rater reliability statistics were not calculated, which represents a methodological limitation of the present study.

Inclusion criteria were: content explicitly related to PCNL, use of English language, presence of audio narration or voiceover, unique (non-duplicate) upload. We included only videos with a duration between 4 and 20 minutes, as this range is commonly considered appropriate for maintaining viewer attention while providing meaningful educational content, according to previous studies. Nevertheless, this criterion may have excluded shorter or longer videos that could still provide educational value [25].

Exclusion criteria included: non-English language, lack of audio, irrelevance to PCNL (i.e. general urology or unrelated procedures), advertising-only content or promotional material without educational purpose. Videos with fewer than 10,000 views were excluded to focus on content with a minimum level of audience engagement and visibility, as commonly adopted in previous YouTube-based analyses. This approach was intended to prioritize videos with a higher likelihood of influencing viewers. Similarly, videos without audio narration were excluded to ensure comparability across videos and allow consistent application of evaluation tools such as DISCERN and GQS, which partially rely on the clarity and completeness of verbal information. However, we acknowledge that this threshold is arbitrary and does not necessarily reflect educational quality [25].

Extracted data included: year of upload, video duration (in minutes and seconds), content type (surgical footage, patient testimonial, follow-up care, instrumentation), target audience (patients, healthcare professionals, general public), video source (individual physician, hospital/academic institution, medical program, patient, or commercial entity), geographic region of origin, surgical position shown (prone or supine).

Videos were evaluated using the DISCERN instrument, a validated tool for assessing the quality of written consumer health information, adapted for video use and the Global Quality Score (GQS). The DISCERN instrument includes 16 questions: the first 15 evaluate the reliability and quality of the information, while the final question provides an overall quality rating. The items scored from 1 (low quality) to 5 (high quality) [26] while the GQS, is a 5-point Likert scale assessing overall educational value, flow, ease of use, and viewer benefit [27].

Each video was scored independently by the two reviewers, and average scores were used in the final analysis. Additionally, the view ratio (total views divided by days since upload) was calculated to estimate the popularity and audience engagement over time.

Statistical analysis

Quantitative variables were summarized using medians and interquartile ranges (IQRs), reflecting the central tendency and variability of the data. Categorical variables were presented as absolute frequencies and corresponding percentages. All data were analyzed using descriptive statistical methods to provide an overview of the characteristics of the included videos. Given the relatively small sample size, no subgroup comparisons were performed.

Bioethical standards

Due to the nature of the study, bioethics committee approval was not required.

RESULTS

Out of 65 videos initially identified, 39 were excluded (22 for non-English language, 11 without audio, 6 unrelated to PCNL). Thus, 26 videos were included in the final analysis (Figure 1). Most videos (20/26; 76.9%) were uploaded between 2020 and 2024, reflecting recent interest while the median video length was 7 minutes and 58 seconds (IQR: 4:21–12:03). A total of 20 videos (76.9%) were under 10 minutes. Twenty-two videos (84.6%) were aimed at healthcare professionals while only 4 videos (15.4%) were explicitly created for patients. The majority of videos were uploaded by individual physicians (18/26; 69.2%), followed by medical programs (4/26; 15.4%) and hospitals or academic centers (3/26; 11.5%). Only one video each (3.8%) was

uploaded by a patient and a medical device company (Table 1). The majority of content originated from North America (18/26; 69.2%), followed by Europe (5/26; 19.2%) and Asia (3/26; 11.5%). Twenty-two videos (84.6%) displayed the prone position, while only 4 (15.4%) demonstrated the supine position (Table 1). Regarding the quality of the videos, the median DISCERN score was 2 (IQR: 1), indicating overall low reliability and completeness of information. Many videos lacked clear presentation of risks, benefits, and alternatives. The median GQS score was 3 (IQR: 1.375), reflecting moderate educational quality. The median view ratio was 102.3 views/day (IQR: 41.5–217.8), suggesting relatively high interest in this content by the public audience.

DISCUSSION

This study aimed to assess the quality, reliability, and educational value of YouTube content related to Percutaneous Nephrolithotomy (PCNL), with an emphasis on patient-oriented resources. Our findings reveal several important insights into the current landscape of PCNL video content on one YouTube, which is of the world’s most widely used platforms for medical information. First, we observed that the most of PCNL-related video content on YouTube is primarily intended for a professional audience. Over 84% of the analyzed videos targeted healthcare professionals, and only 15.4% were explicitly designed for patients. This aligns with previous findings in urologic and surgical video analyses, where technical demonstrations dominate over simplified, patient-friendly explanations [25, 28–30].

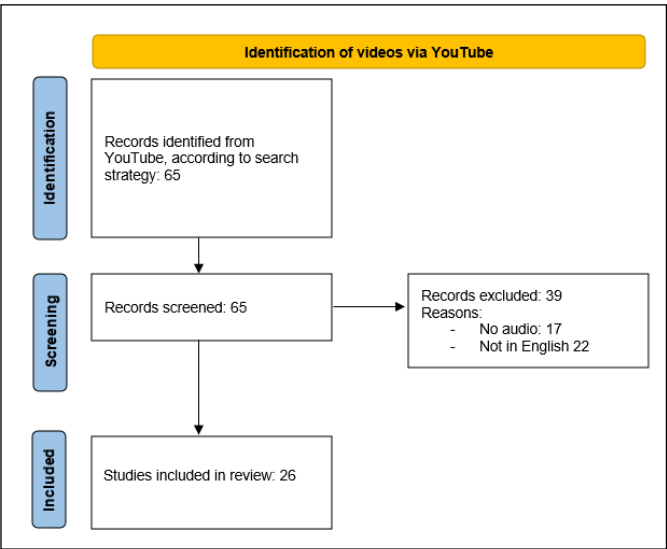


Figure 1. Flowchart of the systematic video search.

Table 1. Summary of the YouTube videos

Number of YouTube videos		26
Duration (median, minutes)	07:58 (IQR: 4:21–12:03)	
Content (surgical procedure, follow-up, personal experience, instruments, other)	Surgical procedure 26; instruments 14; personal experience 13	
Target audience (patients, physicians/nurses or general population)	Physicians 22; patients 4	
Video source (medical center, physician/nurse, patient or television show/program)	Physicians 18; medical programs 4; hospitals 3; patients 1	
Region of origin (Europe, North America, Asia, or Africa)	North America 18, Europe 5, Asia 3	
Position (prone vs supine)	Prone 21, supine 5	
DISCERN	2 (IQR: 1)	
GQS	3 (IQR: 1.375)	

GQS – Global Quality Score

While the predominance of highly technical surgical content reflects the educational needs of urologists and trainees and may represent a valuable training resource, the limited availability of simplified videos tailored to patients suggests that YouTube currently serves professional education more effectively than patient education. Given the growing reliance on online platforms by patients seeking to understand their conditions and treatment options, this gap highlights an urgent need for content that bridges the knowledge divide [31, 32].

Another key finding pertains to the source of the content. Two-thirds of the videos were uploaded by individual physicians, whereas only a minority originated from hospitals, academic institutions, or medical programs. This may be a double-edged weapon: while physician-generated content may offer insights into real-world practice, it often lacks standardization, peer review, or quality control. Moreover, such content may be biased or incomplete, particularly when not guided by formal educational frameworks. Videos from reputable institutions or endorsed by scientific societies are typically more balanced and evidence-based. However, it remain underrepresented on YouTube [33–36].

The geographic distribution of video origins also raises important considerations. Nearly 70% of videos were uploaded from North America, with limited representation from Europe and Asia. No contributions from other continents. This geographical distribution may contribute to a lack of diversity in surgical technique, equipment, and patient populations showcased in the videos, as it happens in scientific literature [37]. Furthermore, cultural and language barriers can limit the global applicability of content, particularly when addressing a lay audience. In terms of technical aspects, the prone position was overwhelmingly dominant, featured in 84.6% of the videos. While prone PCNL remains the traditional and widely used approach, supine PCNL has gained popularity due to advantages in anesthetic management, ease of access, and potential for combined endoscopic procedures [38–41]. The underrepresentation of the supine position may reflect both surgical preferences and potential bias in content creation, reinforcing the need for broader coverage of alternative techniques. Furthermore, prone position is often still the technique of choice in North America, reflecting the origin of the uploaded video.

Perhaps most concerning is the overall low reliability and moderate quality of the videos based on the DISCERN and GQS scores. The median DISCERN score of 2 indicates that critical components of high-quality medical information, such as clar-

ity of treatment risks and benefits, discussion of alternatives, and evidence-based content, were frequently lacking. The GQS score of 3 suggests that, while the videos were somewhat useful, they fell short in terms of educational structure, coherence, and depth. These results mirror those from similar studies in other surgical fields, where YouTube content was found to be heterogeneous and frequently deficient in key informational elements.

Interestingly, the view ratio, that may be used as a proxy for public engagement, was relatively high, with a median of over 100 views per day. This suggests that PCNL-related content attracts substantial attention online, regardless of its intended audience. It underscores the responsibility of healthcare professionals and institutions to ensure that popular content is also accurate, balanced, and understandable, especially for patients who may base medical decisions on such videos.

From a public health perspective, the lack of high-quality, patient-centered educational content on YouTube is problematic. Inadequate or misleading information may contribute to anxiety, poor decision-making, and unrealistic expectations. In contrast, well-designed visual tools can empower patients, enhance informed consent, and improve compliance with pre- and post-operative instructions.

To address these shortcomings, healthcare institutions, academic societies, and public health agencies should take a more active role in producing and promoting reliable, patient-oriented video content. Videos should be designed with clear objectives, using lay-friendly language, structured information, and visual aids. Furthermore, collaboration between clinicians, patients, and digital communication experts can help ensure that such content meets both educational and accessibility standards.

This study has some limitations.. The selection criteria may have introduced selection bias. In particular, restricting inclusion to videos with $\geq 10,000$ views may have excluded less-viewed but potentially high-quality educational content, especially from niche or recently uploaded material. Additionally, excluding videos without audio narration may have led to the omission of visually guided surgical videos that rely on annotations, subtitles, or step-by-step demonstration rather than spoken explanation. The analysis was limited to English-language videos with a duration between 4 and 20 minutes, potentially excluding valuable educational material produced in other languages or videos relying primarily on visual or text-based instruction without narration. Furthermore, although two independent reviewers evaluated each video, formal inter-rater

reliability statistics were not calculated, which may limit the assessment of agreement between evaluators. In addition, while DISCERN and GQS are established tools, they were originally developed for written material and may not fully capture nuances specific to video-based education.

CONCLUSIONS

The educational quality of PCNL-related videos on YouTube is moderate, with most content aimed at healthcare professionals rather than patients. The lack of high-quality, patient-oriented videos highlights an unmet need in digital patient education. To bridge this gap, urological associations, academic institutions, and patient advocacy groups should collaborate to produce and promote trust-

worthy, evidence-based video content. Initiatives such as verified educational channels, standardized patient-oriented videos, and the use of multilingual subtitles could significantly improve accessibility and reliability of online surgical education. Such initiatives could not only empower patients but also foster better outcomes through enhanced understanding and engagement.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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ETHICS APPROVAL STATEMENT

The ethical approval was not required.

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