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Effects of an Internet-based informational video on preoperative anxiety in patients with colorectal cancer

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Purpose: Surgery is the primary curative treatment for colorectal cancer; however, it remains a frightening procedure that can cause stress and pain in affected patients. Therefore, patients typically experience significant anxiety during the preoperative period, which has been associated with poorer outcome after surgery. This study aimed to evaluate the effect of an Internet-based informational video on preoperative anxiety level in patients with colorectal cancer.
Methods: This prospective, single-arm, observational study included patients scheduled to undergo elective colorectal cancer surgery, who did not have a history of previous surgery or major cognitive impairment. The primary outcome measure was the change in Amsterdam Preoperative Anxiety and Information Scale - Anxiety (APAIS-A) before and after watching a 5-min informational video (https://youtu.be/VzhtOMPUe4Q) during the preoperative period. Secondary outcome measures were the change in Hospital Anxiety and Depression Scale (HADS), length of postoperative hospital day, and postoperative morbidity.
Results: Thirty-two patients were enrolled. Anxiety was significantly decreased after watching the video (APAIS-A score: from 10.8 ± 3.7 to 8.2 ± 3.2, $P < 0.001$, mean reduction: 22.2%). HADS score was also significantly decreased (from 5.8 ± 4.4 to 4.0 ± 3.3, $P = 0.001$, mean reduction: 26.5%). All preoperative anxiety level did not significantly differ between patients who developed postoperative complication and those who did not.
Conclusion: The informational video was an effective tool to reduce preoperative anxiety. Viewing this video may confer a higher level of confidence and realistic expectations, as well as reducing patients' preoperative anxiety.
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Key Words: Internet, Social media, Anxiety, Surgery

INTRODUCTION

Colorectal cancer (CRC) is a major cause of morbidity and mortality worldwide [1]. In Korea, it is the third most common cancer, and its incidence has gradually increased since 2010 [2]. The standard curative treatment for CRC is surgery; however it is an invasive procedure that can cause stress and pain in affected patients.

Anxiety is common in patients with CRC [3], particularly regarding what will happen during the hospitalization period and the potential complications and outcomes of surgery [4,5]. Some 60% to 80% of surgical patients experience preoperative

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anxiety [6-8]. Increased preoperative anxiety is associated with pathophysiological responses [9], increased requirement for anesthetic drugs [10], and increased requirement for postoperative analgesia [11]. Therefore, reducing preoperative anxiety may help to improve surgical outcome [12].

The provision of preoperative information is essential to reducing patients' anxiety. The most commonly used format for preoperative information is written consent. However, not all patients have sufficient knowledge to understand this information, and their retention of the information varies [6]. In order to overcome the limitations of written information, multimedia methods such as video have been adopted more recently. Video information is advantageous in that it can provide basic information of equal quality to all patients [13]. Several randomized controlled studies demonstrated that video information decreased preoperative anxiety [6,14,15] although another study did not support those effects [16].

This preliminary study aimed to investigate the effect of an Internet-based informative video on preoperative anxiety in patients with colon cancer, with the aim of providing scientific evidence to support the theoretical basis for preventing preoperative anxiety and consequently improving postoperative outcomes.

METHODS

Study design

This single-arm, prospective, pragmatic observational study included patients who were scheduled to undergo elective surgery for CRC with curative intent at a single center, between 20 to 75 years of age, and able to understand the questionnaire and provide informed consent. Patients who had a previous history of surgery, major cognitive impairment or psychological disease that could influence the outcomes or who required emergent surgery were excluded (Fig. 1). All participants were educated by the study coordinator how to watch the video and complete questionnaires on the one day before surgery, after bowel preparation. Each questionnaire was collected by the study coordinator when the patient completed it before and after watching the video, and the interval was at least 2 hours. This study was approved by the Ethics Review Board at Seoul National University Bundang Hospital (approval number: B-1608-359-302) and was registered with the Clinical Trials Registry (NCT02873455).

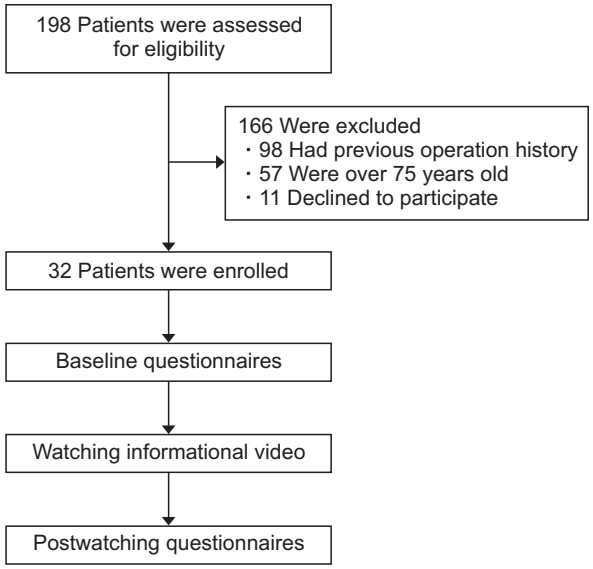


Fig. 1. Flow diagram of the study.

Video

A 5-minute video in the Korean language was produced in collaboration with Talent Management Division in Seoul National University Bundang Hospital that provided various multimedia services to our institute. The video described the course of the operation day, conditions of the operating theater, operational

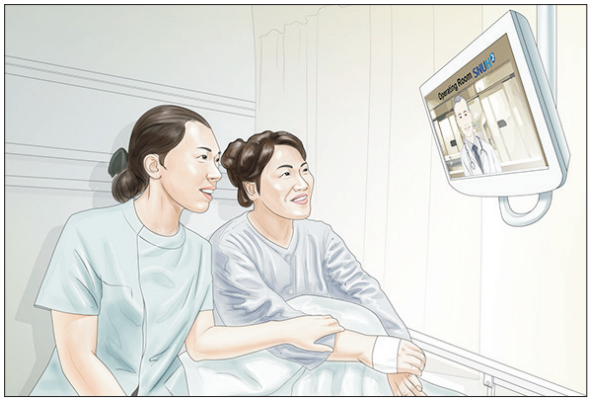
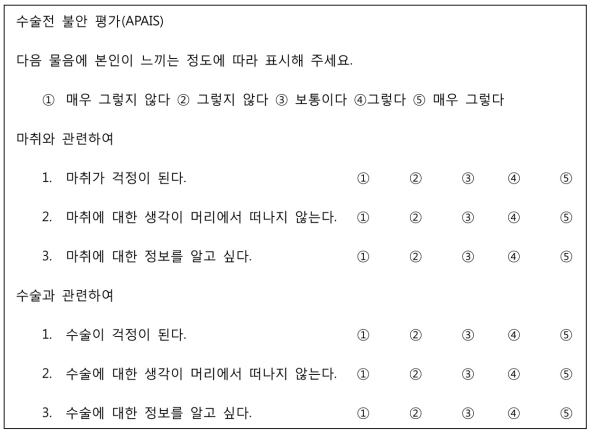


Fig. 2. The patient watches informational video about colorectal surgery using digital monitor device connected to the smart bed system.



수술전 불안 평가(APAIS)

다음 물음에 본인이 느끼는 정도에 따라 표시해 주세요.

① 매우 그렇지 않다 ② 그렇지 않다 ③ 보통이다 ④그렇다 ⑤ 매우 그렇다

마취와 관련하여

1. 마취가 걱정이 된다. ① ② ③ ④ ⑤
2. 마취에 대한 생각이 머리에서 떠나지 않는다. ① ② ③ ④ ⑤
3. 마취에 대한 정보를 알고 싶다. ① ② ③ ④ ⑤

수술과 관련하여

1. 수술이 걱정이 된다. ① ② ③ ④ ⑤
2. 수술에 대한 생각이 머리에서 떠나지 않는다. ① ② ③ ④ ⑤
3. 수술에 대한 정보를 알고 싶다. ① ② ③ ④ ⑤

Fig. 3. Amsterdam Preoperative Anxiety and Information Scale questionnaire, translated into Korean.

procedure, and encouraging messages from the anesthesiologist and attending surgeons. In this video, 3 attending surgeons appear and explain to each other in a lighthearted and friendly—although technically correct—manner what an operation room is like, and the various objects and procedures involved. The video was watched using a variety of tools: digital monitor device connected to the smart bed system in our hospital (Fig. 2) [17], any device with internet access to enter the URL address of the video (https://youtu.be/VzhtOMPUe4Q) directly, or mobile device with QR code scanning.

Questionnaire

Two questionnaires that have been translated and validated in Korean were used to evaluate preoperative anxiety level: the Amsterdam Preoperative Anxiety and Information Scale (APAIS) and the Hospital Anxiety and Depression Scale (HADS) [18].

The APAIS is a self-reporting questionnaire consisting of 6 items (Fig. 3). Two items are dedicated to the assessment of anesthesia-related anxiety, 2 items assess surgery-related anxiety, and 2 items evaluate the desire for information. Thus, the APAIS assesses anxiety about anesthesia, anxiety about

병원 불안-우울 척도(Hospital Anxiety-Depression scale: HADS)

다음 글을 읽고 지난 주 동안 당신의 상태를 가장 잘 나타낸다고 생각되는 문항에 동그라미 표시를 하십시오.

1. 나는 긴장감 또는 '정신적 고통'을 느낀다.
① 전혀 아니다.
② 가끔 그렇다.
③ 자주 그렇다.
④ 거의 그렇다.

2. 나는 즐겨오던 것들을 현재도 즐기고 있다.
① 똑같이 즐긴다.
② 많이 즐기지는 못한다.
③ 단지 조금만 즐긴다
④ 거의 즐기지 못한다.

3. 나는 무언가 무서운 일이 일어날 것 같은 느낌이 든다.
① 전혀 아니다.
② 조금 있지만 걱정하지 않는다.
③ 있지만 그렇게 나쁘지 않다.
④ 매우 분명하고 기분이 나쁘다.

4. 나는 사물을 긍정적으로 보고 잘 웃는다.
① 나는 항상 그렇다.
② 현재는 그다지 그렇지 않다.
③ 거의 그렇지 않다.
④ 전혀 아니다.

5. 마음속에 걱정스러운 생각이 든다.
① 거의 그렇지 않다.
② 가끔 그렇다.
③ 자주 그렇다.
④ 항상 그렇다.

6. 나는 기분이 좋다.
① 항상 그렇다.
② 자주 그렇다.
③ 가끔 그렇다.
④ 전혀 그렇지 않다.

7. 나는 편하게 긴장을 풀 수 있다.
① 항상 그렇다.
② 대부분 그렇다.
③ 대부분 그렇지 않다.
④ 전혀 그렇지 않다.

8. 나는 기억력이 떨어진 것 같다.
① 전혀 아니다.
② 가끔 그렇다.
③ 자주 그렇다.
④ 거의 항상 그렇다.

9. 나는 초조하고 두렵다.
① 전혀 아니다.
② 가끔 그렇다.
③ 자주 그렇다.
④ 매우 자주 그렇다.

10. 나는 나의 외모에 관심을 잃었다.
① 여전히 관심이 있다.
② 전과 같지는 않다.
③ 이전보다 확실히 관심이 적다.
④ 확실히 잃었다.

11. 나는 가만히 있지 못하고 안절부절 못한다.
① 전혀 그렇지 않다.
② 가끔 그렇다.
③ 자주 그렇다.
④ 매우 그렇다.

12. 나는 일들을 즐거운 마음으로 기대한다.
① 내가 전에 그랬던 것처럼 그렇다.
② 전보다 조금 덜 그렇다.
③ 전보다 확실히 덜 그렇다.
④ 전혀 그렇지 않다.

13. 나는 갑자기 당황스럽고 두려움을 느낀다.
① 전혀 그렇지 않다.
② 가끔 그렇다.
③ 꽤 자주 그렇다.
④ 거의 항상 그렇다.

14. 나는 좋은 책 또는 라디오, 텔레비전을 즐길 수 있다.
① 자주 즐긴다.
② 가끔 즐긴다.
③ 거의 못 즐긴다.
④ 전혀 못 즐긴다.

Fig. 4. Hospital Anxiety and Depression Scale questionnaire, translated into Korean.

surgery (with the sum of both serving as the global anxiety index), and the desire for information. We divided these items into 2 groups, all anxiety items for APAIS - Anxiety (APAIS-A) and all information items for APAIS - Information. The items were answered using a 5-point Likert scale ranging from 1 ("not at all") to 5 ("extremely") [19].

The HADS is designed specifically to detect symptoms of anxiety and depression in medically compromised patients. This is divided into 2 sections: anxiety and depression. Each section has 7 items and the answer was graded from 0 to 3 (Fig. 4) [20].

Primary outcome was the difference in APAIS-A, which was more useful method to evaluate the preoperative anxiety [18]. Secondary outcome was the difference in HADS, length of postoperative hospital day, and postoperative morbidity.

Sample size and statistical analysis

Before starting this study, a pilot study was performed on 10 patients. Based on APAIS-A score, the mean preoperative anxiety level was 10.8. A power analysis assuming a 20% decrease of anxiety level and 5% drop-out rate, with a power of 90% at a 5% level of significance using 2-sided paired t-test, a mean of paired differences of 2.2, and an estimated standard deviation (SD) of differences of 3.5 indicated that a total sample size of 32 patients would be sufficient. Data were analyzed using STATA 14 (StataCorp LP, College Station, TX, USA) and IBM SPSS Statistics ver. 22.0 (IBM Co., Armonk, NY, USA). Continuous variables were reported as means (SD), and the paired t-test was used to assess the difference in anxiety level before and after watching the video. The Wilcoxon signed-rank test for paired abnormally distributed data was used to assess statistical significance between groups. A P-value less than 0.05 was considered statistically significant.

Table 1. Patients' demographic characteristics

Variable	Patients (n = 32)
Age (yr)	57.9 ± 10.3
≤60	17
>60	15
Sex	
Male	24 (75.0)
Female	8 (25.0)
Education	
Elementary	2 (6.3)
Middle school	5 (15.6)
High school	13 (40.6)
University	12 (37.5)
ASA PS classification	
I	13 (40.6)
II	19 (59.4)
Surgeon[a]	
1	20 (62.5)
2	9 (28.1)
3	3 (9.4)

Values are presented as mean ± standard deviation or number (%).
ASA PS, American Society of Anesthesiologists physical status.
[a]A total of 3 surgeons participated in the surgery and were represented only by numbers.

RESULTS

We calculated the APAIS-A score as the sum of 2 categories concerning anxiety about surgery and anesthesia. The demographic characteristics of enrolled patients are shown in Table 1. Thirty-two patients were included. Their mean age was 57.9 ± 10.3 years, 75% were men, and 78% had more than a high school education.

Patients' initial preoperative anxiety score was 10.8 ± 3.8, which was reduced significantly after watching the video (2.6 ± 2.6, 22.2%; P < 0.001). The APAIS score for desire for

Table 2. Mean scores of anxiety scales in each group, with the difference between before and after watching the video

Group	Video (before)	Video (after)	Difference[a]	P-value
APAIS-A	10.8 ± 3.8	8.2 ± 3.2	2.6 ± 2.6	<0.001
APAIS-I	6.4 ± 2.0	5.1 ± 1.9	1.3 ± 1.8	<0.001
HADS-A	5.8 ± 4.4	4.0 ± 3.3	1.8 ± 2.8	0.001
HADS-D	6.4 ± 3.9	5.2 ± 3.9	1.2 ± 2.5	0.01

Values are presented as mean ± standard deviation.
APAIS-A, Amsterdam Preoperative Anxiety and Information Scale - Anxiety; APAIS-I, Amsterdam Preoperative Anxiety and Information Scale - Information; HADS-A, Hospital Anxiety and Depression Scale - Anxiety; HADS-D, Hospital Anxiety and Depression Scale - Depression.
[a]Difference was calculated as video (before) – video (after).

Table 3. Comparison of preoperative anxiety scales according to the postoperative complication

Variable	No complication (n = 27)	Complication (n = 5)
APAIS-A (before)	10.7 ± 3.5	11.0 ± 5.7
APAIS-I (before)	6.4 ± 2.0	6.2 ± 2.4
HADS-A (before)	5.6 ± 4.1	6.8 ± 6.1
HADS-D (before)	6.2 ± 4.1	7.4 ± 2.1
APAIS-A (after)	8.2 ± 3.2	8.4 ± 3.6
APAIS-I (after)	5.2 ± 2.1	4.8 ± 0.8
HADS-A (after)	4.1 ± 3.5	3.6 ± 1.8
HADS-D (after)	5.0 ± 4.0	6.0 ± 3.7

Values are presented as mean ± standard deviation.
APAIS-A, Amsterdam Preoperative Anxiety and Information Scale - Anxiety; APAIS-I, Amsterdam Preoperative Anxiety and Information Scale - Information; HADS-A, Hospital Anxiety and Depression Scale - Anxiety; HADS-D, Hospital Anxiety and Depression Scale - Depression.

information and the HADS score were also significantly reduced after patients watched the video (both $P < 0.001$) (Table 2). There were 2 patients who demonstrated an increased anxiety score. The postoperative complication rate was 15% (5 of 32). Three patients had a prolonged ileus for more than 5 days after surgery, one patient had voiding difficulty, and one had diarrhea. All preoperative anxiety level also did not significantly differ between patients who developed postoperative complications and those who did not ($P > 0.05$) (Table 3).

DISCUSSION

Many patients who have no experience of surgery report preoperative anxiety and this anxiety can affect a patient's outcome after surgery. Most information aimed at reducing preoperative anxiety is given to the patient verbally or in writing, but it is not always easy for the patient to understand. Recent research has demonstrated that even when giving information to healthy, educated young volunteers in an ideal environment, their recall is low [21]. To overcome these limitations, previous studies have attempted to reduce patient anxiety using a variety of information tools with mixed results [14]. The most effective means of reducing preoperative anxiety is to provide patients with hospital experience.

Video is one of the best tools for providing information. Patients can understand medical information with easy-to-comprehend terms and visual descriptions. In addition, if produced by the medical institution itself, video can be expected to provide accurate and appropriate information to the patient. For example, while children may have greater difficulty understanding routine or medical terms than adults, a recent report found that watching a video or 2-dimensional animation before surgery could reduce their anxiety [22]. In the present study, video was also found to effectively reduce preoperative anxiety in patients with no surgical experience.

The Internet is widely used to disseminate health information. About 70% of people in their fifties and over are comfortable using the Internet, and even over the age of 65, 41% of people use the Internet to find health information. However, the quality of information on the Internet is not always guaranteed. The fact that content has been accessed by many viewers does not indicate the quality of its information, which is often poor [23]. Nevertheless, the Internet has the advantage of being easily accessible; therefore, combining it with other media can have a synergistic positive effect. In terms of ease of use, feasibility, and availability of information, Internet-based multimedia leads to higher patient satisfaction [24].

Patient outcome can be difficult to measure. Previous studies have shown mixed results for postoperative outcomes. In orthopedic surgery, improved preoperative anxiety led to better postoperative recovery, higher patient satisfaction, and reduced pain level [14]. However in children, there were no differences in postoperative behavioral change [25]. In our study, 5 patients had postoperative complications, and there was no significant difference in all preoperative anxiety score between patients who did and did not experience complications.

This study showed that watching preoperative explaining video clip improves comfort to the patient entirely without the costly intervention of drug or test in clinical aspects. However, there have been several limitations in this study. The sample size was too small to demonstrate the efficacy of this video. There was also a selection bias, because only patients who had not undergone surgery were included. Despite the positive results, it is difficult to expect reliability because the study was designed with a single arm. Studies involving larger sample sizes, such as randomized controlled trials, as well as those including patients who have experienced other types of surgery, are needed to confirm and extend the present results.

In conclusion, the informational Internet-based video evaluated in the present study was an effective tool to reduce preoperative anxiety. This video can provide realistic experience and accurate information to patients with CRC and is easily accessible to patients. Further evaluation will be needed, including patients who have experienced different types of surgery in this setting.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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