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Research Article

Music Listening Improves Patients' Satisfaction with Colonoscopic Interventions: A Single-Center Randomized Clinical Trial

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Abstract

Objectives: Most patients undergoing colonoscopic interventions experience anxiety. Sedation can alleviate worries, but also increase medical cost and potential complication risk Music listening helps calm mood, and this study aimed to investigate the effects of music listening for colonoscopic interventions.

Methods: Adult inpatients who had indications and underwent therapeutic colonoscopy in a tertiary center were included. A total of 224 patients were enrolled and randomly divided into Group 1 (classic music listening, n=76), Group 2 (popular music listening, n=72) and Group 3 (no music listening, n=76). All patients listened to three songs in turns. Primary and secondary outcomes were satisfaction score immediately and 2 h after procedure.

Results: There were no significantly statistical differences on demographic and clinical features among three groups. The mean satisfaction score in Group 1, Group 2 and Group 3 was 8.3, 8.5 and 6.7 immediately after procedure (p=0.02), which were 9.9, 9.8 and 9.6 2h after procedure (p=0.04), respectively. Abdominal distension and abdominal pain was all reported in three groups immediately after procedure, and no obvious discomfort were reported 2h after procedure.

Conclusion: These results proved that music listening obviously alleviated anxiety during therapeutic colonoscopy regardless of music style (registered at ClinicalTrials.gov, NCT04096508).

Keywords: Endoscopy, therapeutic interventions, music

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Nowadays, endoscopic interventions have been widely applied into the diagnosis and treatment of several gastrointestinal mucosal and submucosal lesions.[1,2] These therapeutic methods have the advantages of minimal trauma, rapid recovery and low medical cost. Additionally, with the rapid development of the technique and the accompanying equipment, the safety and efficacy have been greatly improved and different kinds of endoscopic interventions are available and can be selected based on the specific features of the lesions.[3] Endoscopic mucosal resection (EMR)

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and Endoscopic submucosal dissection (ESD) are commonly used in routine practice.[4] The former is a well-developed endoscopic technique, which can remove the relatively small mucosal lesions. And the latter is able to achieve the en bloc resection of the relatively larger lesions, which is of vital importance for early malignancy in the gastrointestinal tract.

Usually, intravenous sedation will be administrated for patients who undergo esophagogastroduodenoscopic interventions in order to reduce their discomfort and minimize the influence of respiration motion during the procedure. For those with colorectal lesions, they may not experience obvious body discomfort, but a certain proportion of the patients will have mild or moderate anxiety, and some may have even severe worries. Listening to music can bring a fascinating feeling, and the feeling might be lasting and various while hearing different styles like popular and classical music.[5] However, whether the application of music can alleviate the anxious feeling of the patients during colonoscopic interventions remains rarely investigated. Published studies have already investigated the role of music listening for patients who underwent endoscopic examination,[6-9] while its influence on patients with therapeutic endoscopic procedures has been rarely clarified. Thus, in this present study, we aimed to examine the role of music listening and compare the effects of popular and classical music in a single center clinical trial.

Methods

Study Design

The flow chart was presented in Figure 1. This study was registered online at the website ClinicalTrials.gov on September 18, 2019 and the registration number was NCT04096508 (https://clinicaltrials.gov/ct2/show/NCT04096508?term=NCT04096508&draw=2&rank=1). The protocol was approved by the Ethic Committee of Affiliated Hospital to Chinese Academy of Military Medical Sciences (the Fifth Medical Center of Chinese PLA General Hospital) on September 9, 2019 according to the Treaty of Helsinki.

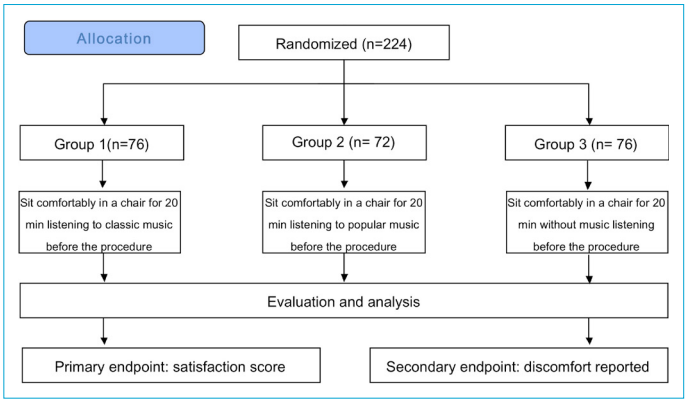

Figure 1. Flow chart of this study.

The sample size was calculated in order to test a difference on pain score among different groups, keeping a power of 0.9 and significance level alpha of 0.05. The sample size was estimated to be 150. All the participants were randomly divided into three groups using a random number method: Group 1 (experimental; patients sit comfortably in a chair for 20 min listening classic music before the procedure), Group 2 (experimental; patients sit comfortably in a chair for 20 min listening popular music before the procedure) and Group 3 (control; patients sit comfortably in a chair for 20 min without music listening before the procedure). We selected three popular songs and three classical songs. The patients can choose to listen to the three songs in turns or only one in repetition.

Patient and Public Involvement

Patients or the public were not involved in the design, conducting, report or plan dissemination of our research.

Patients

Adult inpatients, who had indications and planned to undergo therapeutic colonoscopy in the Endoscopy Center of the Fifth Medical Center of Chinese PLA General Hospital from September 1, 2019 to January 31, 2020, were included. Patients under 18 years old, or with severe uncontrolled coagulopathy, pregnancy, lactation or unwillingness were excluded. All the patients had given their written informed consent.

Therapeutic Colonoscopy

One expert endoscopist, who had an endoscopy experience of over 5 years, performed all the endoscopic therapeutic procedures. EG-L590WR endoscopes (FUJIFILM, Tokyo, Japan) equipped with the newly LASEREO endoscopic system were applied, and propofol sedation was not administrated in any patient. The endoscopist evaluated the patients comprehensively before the procedure and determined the therapeutic strategy after team discussion. EMR and ESD were completed by following the current standard protocols (Figs. 2-3), and the resected specimen was all sent for pathological examination. After the procedure, all the patients were routinely monitored for 1 hour. The endoscopist based on the widely used Ottawa rating scale judged the bowel preparation cleanness.

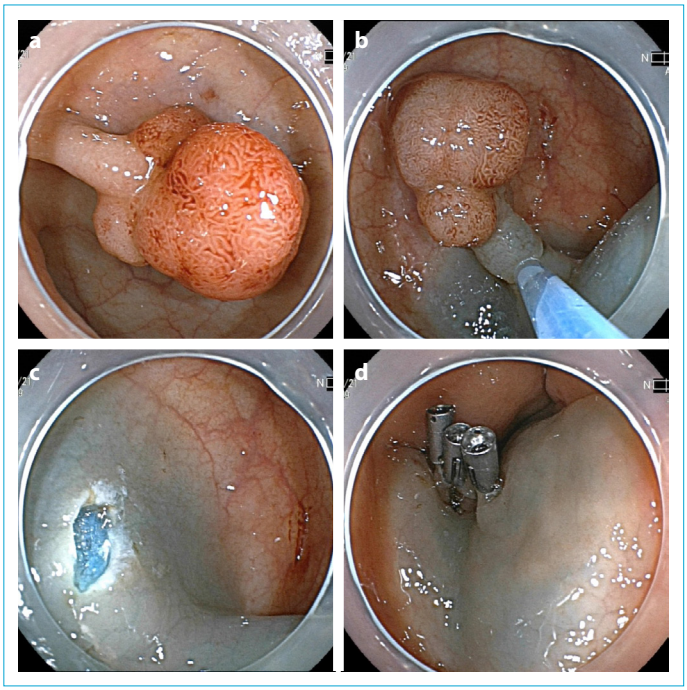

Figure 2. EMR for colonic tubular adenoma (Male; 54 years old; indication for colonoscopy: constipation for 3 years). **(a)** endoscopic image; **(b)** the polyps was ligated; **(c)** EMR; **(d)** the mucosal defect was closed by clips.

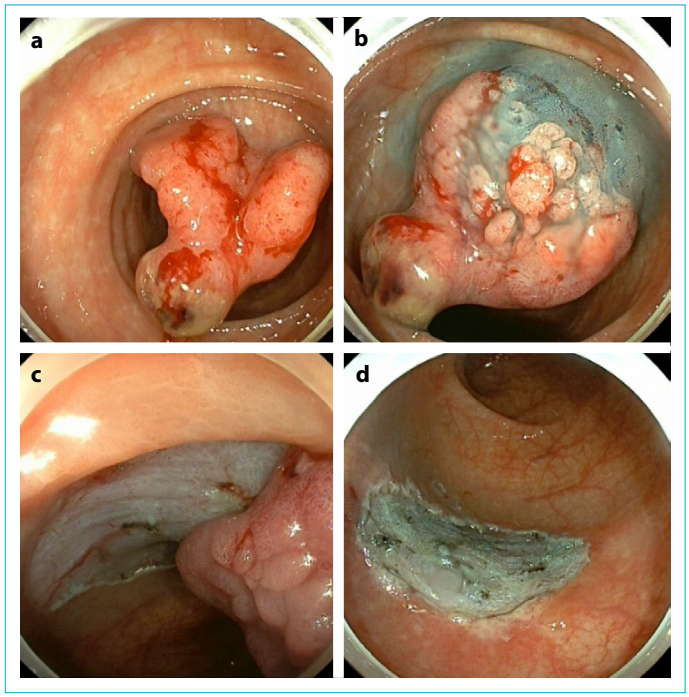

Figure 3. ESD for moderately differentiated adenocarcinoma (Male, 81 years old, indication for colonoscopy: intermittent bloody stool for 1 month). **(a)** endoscopic image; **(b)** the lesions was elevated after submucosal injection; **(c)** ESD; **(d)** the mucosal defect after the removal of the lesion.

Outcomes

Primary and secondary outcomes were the patients' satisfaction score immediately and 2 h after procedure, respectively. The 10-point visual analogue scale (VAS) was introduced to evaluate the patients' satisfaction (0 worst, 10 best) immediately and 2h after the procedure. All the discomforts such as abdominal pain, distension and the like were also recorded.

Statistical Analysis

Using SPSS software finished all the statistical analysis. The continuous and categorical data were presented as mean (range) and percentage (%), respectively, and the differences on the continuous and categorical data among the three groups were tested by one-way analysis of variance (ANOVA) and chi-square when applicable. A two-tailed P value less than 0.05 was considered to be statistically significant.

Results

Demographic and Clinical Characteristics

A total of 224 patients were enrolled. There were 76 patients in Group 1, 72 in Group 2 and 76 in Group 3. All the patients chose to listen to three songs in turns. No significant differences were found on the age, gender, previous history of gastrointestinal endoscopy and the diagnosis among the three groups (all p>0.05, Table 1), respectively. The main indication was colorectal polyps.

Table 1. Demographic and clinical characteristics

	Group 1 (n=76)	Group 2 (n=72)	Group 3 (n=76)	p
Age, mean (range), years	45.7 (18-66)	46.5 (18-62)	47.2 (18-65)	0.11
Male gender, n (%)	52 (68.4)	51 (70.8)	47 (61.8)	0.20
Indications for colonoscopic interventions, n (%)				
Polyps	69 (85.5)	66 (91.3)	70 (94.2)	0.43
Neuroendocrine tumor	4 (5.2)	1 (1.3)	0	
Early cancer	3 (3.9)	3 (4.1)	2 (2.6)	
Signet-ring cell carcinoma	0	1 (1.3)	0	
Moderately differentiated adenocarcinoma	0	1 (1.3)	3 (3.9)	
Leiomyoma	0	0	1 (1.3)	

Therapeutic Colonoscopy

All the patients had only one lesion and underwent one therapeutic procedure, and either EMR or ESD under colonoscopy was performed (Table 2). The bowel preparation cleanness in all the patients was judged to be excellent or good. The lesions were located in ascending, traverse and descending colon, and rectum. The mean examination time in Group 1, 2 and 3 was 8 min, 8 min and 7 min, respectively. No immediate and delayed complications were observed. There were no significant differences on the type of the interventions, locations of the lesions and examination time (all p>0.05, Table 2), respectively.

Satisfaction Evaluation

Patients' satisfaction was evaluated using VAS method (Table 3). The mean satisfaction score in Group 1, Group 2 and Group 3 was 8.3, 8.5 and 6.7 immediately after procedure (p=0.02), which were 9.9, 9.8 and 9.6 2h after the procedure (p=0.04), respectively. Abdominal distension and abdominal pain was all reported in three groups immediately after the procedure (p=0.06; p=0.07; Table 3), respectively, but most of the patients complained no obvious discomfort 2h after the procedure.

Discussion

Colonoscopy has been widely used as an important tool for diagnosing and treating colorectal diseases. However, a majority of patients who undergo colonoscopy will experience anxiety and discomfort.[5] Besides, the intubation of the colonoscopy may irritate the colon motion, which increases the difficulty of the examination. The anxiety during the procedure could also exert an effect on the function of the gastrointestinal tract, especially for therapeutic colonoscopy, which could extend the procedure time.[10] Thus, alleviating the patients' anxiety will help improve the quality of the colonscopic interventions, including EMR and ESD. Our results found that the introduction of music listening before the procedure could greatly decrease the pain score and increase the satisfaction score, indicating that this kind of music behavioral intervention was effective. These findings were consistent with the previous investigations.[11-16]

In this study, only patients who underwent therapeutic colonoscopy were enrolled, because in our endoscopy center all the therapeutic esophagogastroduodenoscopies were performed under sedation. Lee et al., ever reported that music listening could decrease the dosage of sedation

Table 2. Endoscopic interventions.

	Group 1 (n=76)	Group 2 (n=72)	Group 3 (n=76)	p
Endoscopic interventions, n (%)				
EMR	68 (89.5)	66 (91.7)	68 (89.5)	0.55
ESD	8 (10.5)	6 (8.3)	8 (10.5)	
Location, n (%)				
Ascending colon	13 (17.1)	18 (25.0)	25 (32.8)	0.48
Traverse colon	16 (21.0)	19 (26.3)	16 (21.0)	
Descending colon	13 (17.1)	9 (12.5)	11 (14.4)	
Sigmoid colon	12 (15.7)	16 (22.2)	9 (8.25)	
Rectum	21 (27.6)	10 (13.8)	10 (13.1)	
Examination time, mean (range), min	8	8	7	0.67

Table 3. Satisfaction score (0-10) and discomfort after examinations

	Group 1 (n=76)	Group 2 (n=72)	Group 3 (n=76)	p
Satisfaction score, mean				
Immediately after procedure	8.3	8.5	6.7	0.02
2h after procedure	9.9	9.8	9.6	0.04
Discomfort reported immediately, n (%)				
Abdominal distension	14 (18.4)	7 (9.7)	19 (25)	0.06
Nausea	1 (1.3)	4 (5.5)	7 (9.2)	0.07
Discomfort reported 2h later, n (%)				
Abdominal distension	1 (1.3)	0	4 (5.2)	0.12
Nausea	0	1	0	-

during endoscopy,[17] while the ambience may not affect the patients' feeling.[18] Music listening was administrated 20 min before the procedure, and patients did not listen to the music during the procedure. The main reason was that the endoscopist should always ask the patients whether they had any discomfort or to change their positions. The songs were all soft music, which can be most useful in calming down the people's mood. Limitations remained in this study. First, all the patients were from the single endoscopy center, and a multi-center study was highly suggested. Second, all the procedures were performed by on experienced endoscopist, and thereby the effects of music listening on the performance of endoscopists with less or rich experience could not be analyzed and compared.

Based on our data, it indicated that music listening before the procedure could obviously alleviate the pain and improve the satisfaction of the patients who underwent therapeutic colonoscopy. These findings could be further validated in large-scale clinical trial and then recommended as a routine protocol in clinical practice.

Disclosures

Ethics Committee Approval: The protocol was approved by the ethic committee of Affiliated Hospital to Chinese Academy of Military Medical Sciences (the Fifth Medical Center of Chinese PLA General Hospital) on September 9, 2019. All the patients gave their written informed consent.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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Authorship Contributions: Concept – X.S., T.Y.; Design – X.S., T.Y.; Supervision – X.M., L.W.; Materials – Y.L., Z.L.; Data collection &/or processing – X.Z., C.M., H.Y.; Analysis and/or interpretation – X.S., T.Y., C.L., W.Z.; Literature search – Y.W.; Writing – X.S., T.Y.; Critical review – X.S., T.Y.

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