RESEARCH ARTICLE

CYPRUS
JOURNAL OF MEDICAL SCIENCES

DOI: 10.4274/cjms.2021.2021-121
Cyprus J Med Sci 2023;8(6):411-417

Effect of Pre-Postoperative Music Intervention on Anxiety, Pain and Patient Comfort in Patients Undergoing Retrograde Intrarenal Surgery

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Abstract

BACKGROUND/AIMS: The aim of this study was to evaluate the effect of preoperative and postoperative music intervention on anxiety, perceived pain severity and patient comfort in patients undergoing retrograde intrarenal surgery (RIRS).

MATERIALS AND METHODS: This prospective and quasi-experimental study included a total of 58 patients undergoing RIRS between May 14th and December 31st, 2019. The patients were divided into 2 groups. Group 1, the music intervention group, included 30 patients, and group 2, the control group, had 28 patients. The primary outcome of this study was anxiety levels and the secondary outcomes were pain severity and patient comfort. The visual analog scale-anxiety (VAS-A) was used to evaluate the patients' anxiety levels while the VAS was used for the evaluation of pain severity.

RESULTS: A significant difference was found between the groups in terms of VAS-A scores measured in the preoperative and postoperative periods ($p<0.001$, $p=0.024$, respectively). In both measurements, the group 1 VAS-A score was significantly lower than group 2. When the postoperative VAS pain scores of patients were examined; pain severity in group 1 was lower compared to group 2 and significant difference was found between the groups ($p=0.017$). More patients in group 1 were found to feel in comfort than in the control ($p=0.006$).

CONCLUSION: It was observed that music intervention during the preoperative and postoperative periods reduced pain, anxiety, and increased patient comfort in RIRS patients. For this reason, it is thought that it is appropriate to use music intervention in patients undergoing RIRS.

Keywords: Retrograde intrarenal surgery, music intervention, anxiety, pain, patient comfort.

INTRODUCTION

The European Urological Association guidelines recommend Retrograde Intrarenal Surgery (RIRS) as the standard treatment for kidney stones under 2 cm.[1] It is a common endourological procedure with high success rates.[2,3] In addition, it is considered a safe method, as major complications after RIRS rarely occur.[3]

Anxiety might cause the patients to worry that they cannot control their bodies or life, and they may fear organ or tissue loss.[4] Anxiety is one of the most frequent psychological reactions in patients awaiting surgery.[5] This anxiety can be at different levels depending on the nature of the underlying disease, the organ to be operated on, and the meaning and importance of this condition for the person.[4] Increased levels of preoperative anxiety are associated with both psychological

To cite this article: Gazi T, Ciğerci Y, Karalar M. Effect of Pre-Postoperative Music Intervention on Anxiety, Pain and Patient Comfort in Patients Undergoing Retrograde Intrarenal Surgery. Cyprus J Med Sci 2023;8(6):411-417

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Received: 17.05.2021
Accepted: 21.12.2021

and somatic negative outcomes. As a result, anxiety has been proven to be associated with increased autonomic fluctuations, increased anesthetic requirements, and increased postoperative pain.[5-7] As a result of these complications, it has been reported that the healing process and the duration of the hospital stay are prolonged.[6] It is also recognized as a risk factor for mortality.[5] Therefore, it is very important to identify the patient's current anxiety status to be able to help them.[6] There is limited information in the literature regarding anxiety in RIRS patients. Di Mauro et al.[8] examined the quality of life, anxiety, depression, intervention-related satisfaction, and pain in patients undergoing RIRS and mini-percutaneous nephrolithotomy (mPCNL) in their study. As a result of their study, anxiety scores were reported to be higher in the RIRS group [7.00 (4.00-14.00)] compared to the mPCNL group [3.00 (0.00-7.00)].

Postoperative pain, an inevitable experience for most patients who have surgery, is a factor which also affects the recovery process. In Western societies, it has been reported that more than 75% of patients reported having moderate, severe or unbearable levels of pain in the postoperative period, while the incidence of pain in the postoperative period in Türkiye was between 30% and 97%.[9] Inadequate pain control leads to severe pain and may increase the risk of atelectasis, respiratory dysfunction, anxiety, and prolonged stress.[10] Therefore, postoperative pain should be controlled.

In patients undergoing urological procedures, severe postoperative pain which continues despite the use of analgesics is a significant problem.[3] In the literature, it has been shown that one of the main reasons for re-visiting the hospital after urinary system surgery is pain.[11] The quality of life of patients with high levels of pain and anxiety is negatively affected, and the duration of hospitalization is prolonged. For this reason, it is very important to reduce the pain and preoperative anxiety of patients. Currently, in addition to pharmacological methods for pain management, non-pharmacological methods are often used.[12] Music has been considered a non-pharmacological alternative treatment method for many diseases since ancient times. Music intervention has been reported to be beneficial in patients in order to promote relaxation and relieve perceived pain.[13,14]

In the current literature, it has been shown that music reduces pain and anxiety levels in patients undergoing urinary system surgery/intervention, increases procedural satisfaction and also increases patient willingness to undergo the procedure again.[13,15,16] However, there was no study found in the literature investigating the effects of music intervention in patients undergoing RIRS.

Aim

Therefore, with this study, we aimed to investigate the effects of preoperative and postoperative music intervention on anxiety, perceived pain severity, and comfort in patients undergoing RIRS. While the evaluation of the anxiety levels was the primary outcome of this study, the evaluation of pain intensity and patient comfort were the secondary outcomes. The results of this study are expected to be a reference for RIRS practices in order to improve the quality of health care.

MATERIALS AND METHODS

Study Design and Settings

This prospective and quasi-experimental type study was performed in the urology clinic of a university hospital in Türkiye. The study was conducted following the Declaration of Helsinki. Approval of the protocol was obtained from the Afyonkarahisar Health Sciences University Clinical Research Ethics Committee (approval number: 2019/165, date: 03.05.2019). Before the application, all of the participants were informed about this study. They indicated their agreement to participate by signing a written consent form.

Participants

Eligibility Criteria

This study included patients who were 18 years of age or older, had elective RIRS, had no hearing/speech disabilities, had no mental problems, had no diagnosed psychiatric disorders, had no depression, planned surgery under general anesthesia, and who volunteered to participate in this study.

Exclusion Criteria

Those patients who were under the age of 18, had hearing/speech impairments, had mental problems, had a diagnosed psychiatric disorder, were diagnosed with depression, were planned for surgery under spinal anesthesia or those who did not volunteer to participate in this study were not included.

Sample Size and Sampling

Power analysis was performed to calculate the sample size of this study. Accordingly, the effect size of this study was 0.7819; the alpha value was 0.05 and the theoretical power was 0.80, and the minimum sample number was 54 (group 1=27, group 2=27). For the main hypotheses of the research, post-hoc G-power was used. Sufficient power was observed to be reached, and its power was found to be a minimum value of 0.84. After initial assessments, randomization of the participants into two groups was performed via the draw method. The patients were asked to choose a piece of paper from a box with the names of the groups written. Patients who chose group 1 were allocated to the music intervention group (n=27) and patients who chose group 2 were allocated to the control group (n=27). After each draw, the paper with the group number on it was put back into the box. In this way, all patients were randomized.

A total of 92 patients undergoing RIRS were considered for their eligibility. This study was completed with 30 patients in the intervention group and 28 in the control group as 13 patients did not meet the inclusion criteria (four of them did not want to participate, 15 of them with other reasons and 2 patients developed complications during surgery) (Figure 1).

Measurements

The "Personal Information Form", "Visual Analog Scale-Anxiety (VAS-A)", "VAS" and "Patient Comfort" were used in the collection of data. The researcher performed the data collection, which took about 10 minutes, in the patient's room.

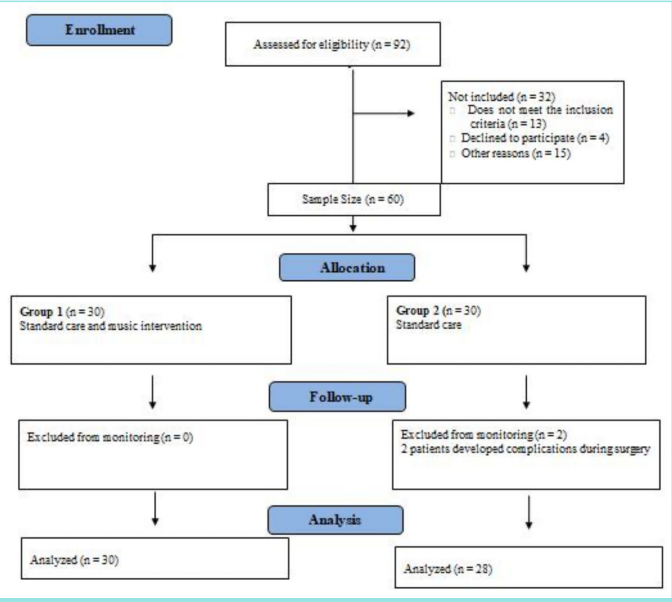

Figure 1. Flow chart of the study participants.

Personal Information Form: This form, which was developed by the researcher, includes 6 closed-ended questions on demographic characteristics (age, gender, marital status, educational level), and also on stone localization and size.

Visual analog scale-anxiety: Determining the anxiety levels of the RIRS patients was the primary outcome of this study. The patients' anxiety levels were measured using VAS-A. The patient's anxiety increases as the anxiety level approaches 10. This scale was developed by Cline et al.[17]. There is a concurrent validity correlation between VAS-A and the Spielberger State-Trait Anxiety Inventory (from r=0.49[16] to r=0.82[19]).[18] This indicates that the VAS-A scale, although brief, is a reliable and accurate measurement tool. Patients were asked to mark with a pen on the 10 cm line, by cutting it, (0=not anxious at all, 10=extremely anxious) to the appropriate place for their anxiety levels (15 minutes after the music intervention which was conducted before surgery and on postoperative 1st day).

Visual Analog Scale: Determining the pain severity of the RIRS patients was the secondary outcome of this study. Pain severity was measured with VAS. The VAS scale is a one-dimensional scale commonly used today in the assessment of pain severity. This scale was developed by Woodforde and Merskey[19] with a scoring range of 0 to 10, with a score of 0 representing "*no pain at all*" and a score of 10 representing "*my pain is as bad as it could possibly be*". The patients were asked to mark with a pen on a 10 cm line by cutting it to the appropriate place for the severity of their pain (15 minutes after the music intervention on postoperative 1st day).

Patient comfort: In this study, based on a review of the literature,[20] patient comfort was evaluated with a single question with 5 possible answers, namely "*No discomfort*", "*Minimal discomfort*", "*Mild discomfort*", "*Moderate discomfort*" and "*Severe discomfort*". Patients rated their comfort status and levels on postoperative day 1.

Data Collection and Interventions

In this study carried out with two groups of patients from May 14th to December 31st, 2019, all patients in both groups included were admitted in single rooms. This was done so that any other patients admitted to the clinic would not be adversely affected. The RIRS of all of the patients were performed by the same surgical team. Admittance of the patients who were scheduled for RIRS was completed on the morning of the surgery due to the protocols of the clinic. The first interview with the patients was made on the morning of the surgery, on the day of their admittance. The patients were visited in their rooms and both verbal and written information was provided to them about this study by the researcher.

Group 1 (music intervention group): The "*Personal Information Form*" was completed by interviewing the patients on the morning of the surgery. Afterwards, the researcher asked the patients about the type of music they would like to listen to.

Through its effect on the limbic system, music creates pleasant psychophysiological reactions and aims to divert attention from harmful stimuli. It is also highlighted that individual preferences should be considered when selecting music for relaxation.[21] The music selection can have different effects on each patient. Only the patients themselves can decide which music will relax or strain them.[22] Therefore, the patients' wishes should be taken into account in order to get the maximum benefit from the music intervention. In this study, a pre-set music selection was not used, taking into account the music preferences of the patients. The music that was listened to included the type of music that the patients wanted to listen to at that moment. After admittance of the patients to the clinic was completed, the type of music they preferred to listen to was determined during the interview with the patients (Turkish folk music, Turkish pop music, arabesque music or religious music). Patients listened to their preferred type of music with headphones, using devices such as smartphones and tablets. Disposable covers, which were changed for each patient, were used for the headphones. The patients listened to the music for 15 minutes one hour before the surgery. The patients' anxiety levels were measured 45 minutes before the surgery. The patients were visited on the 1st postoperative day and they listened to their preferred type of music for 15 minutes. Then, the levels of anxiety, pain, and comfort of the patients were measured.

Group 2 (control group): This group consisted of patients who received standard health care services in the hospital where this study was carried out. These patients did not listen to music. The "*Personal Information Form*" and VAS-A were completed during the interview conducted by the researcher with the patients on the morning of the surgery. The patients were visited on the 1st postoperative day and their levels of anxiety, pain, and comfort were measured.

Statistical Analysis

Data analysis was performed with the SPSS (SPSS Inc., Chicago, IL, USA) for Windows 25.0. Descriptive statistical methods (number, percentage, mean standard deviation, median, minimum, and maximum) were used to evaluate the data. The chi-squared test was used to confirm the homogeneity of the participants in both groups. An independent sample t-test was used to compare the measurement of group 1 and

group 2 in repeated measurements in which the normal distribution assumption was provided in the analysis of the data. In repeated measurements where the normal distribution assumption was not provided, the Wilcoxon signed-rank test, and the Mann-Whitney U test were used to compare the measurement of group 1 and group 2. The existence and the strength of the association between the categorical variables were examined with Cramer's V coefficient. A p-value <0.05 was accepted statistically significant.

RESULTS

Demographic Characteristics

The demographic characteristics of the patients for both groups are shown in Table 1. No statistically significant difference was found between the groups in regards to their demographic characteristics. The mean age of the patients was 47.73±16.80 years in group 1 and 47.00±15.14 years in group 2. More than half of the patients were male (group 1=60.0%, group 2=60.7%) and most of them were married (group 1=73.3%, group 2=85.7%). In both groups, the majority of the participants were primary school graduates (group 1=56.7%, group 2=50.0%). The stone localization of the patients was determined to be mostly the renal pelvis with 46.7% in group 1 and 53.6% in group 2. The stone sizes were determined to be similar in the two groups (group 1=10.33±5.20 mm, group 2=11.36±6.20 mm).

Table 1. Demographic characteristics, stone localization, and size

Feature		Group 1		Group 2		X^2/Z	p
		n	%	n	%		
Age (mean ± SD)		47.73±16.80		47.00±15.14		0.052	0.959**
Gender	Male	18	60.0	17	60.7	0.003	0.956*
	Female	12	40.0	11	39.3		
Marital status	Single	8	26.7	4	14.3	1.353	0.245*
	Married	22	73.3	24	85.7		
Education level	Illiterate	0	0.0	2	7.1	3.000	0.607*
	Primary	17	56.7	14	50.0		
	Secondary	2	6.7	3	10.7		
	High school	8	26.7	5	17.9		
	Graduate	3	10.0	4	14.3		
Location of the stone	Lower calyx	2	6.7	2		0.874	0.928*
	Middle calyx	2	6.7	1	3.6		
	Renal pelvis	14	46.7	15	53.6		
	Ureteropelvic	9	30.0	7	25.0		
	Proximal ureter	3	10.0	3	10.7		
Size of stone (mm) (mean ± SD)		10.33±5.20		11.36±6.20		0.814	0.416**

*Chi-squared test, **Mann-Whitney U test, SD: Standard deviation.

Anxiety

The anxiety levels of patients are presented in Table 2. The anxiety scores of the patients in group 2 were found to be higher in both the preoperative and the postoperative period, and a statistically significant difference was found between group 1 and group 2 in preoperative period (p<0.001). The mean VAS-A scores of the patients in the postoperative period showed a positive change in both groups compared to the preoperative period, and the difference was statistically significant in both groups (p=0.019 for group 1, p=0.009 for group 2).

Pain

When examining the presence of postoperative pain, it was observed that the number of patients who stated that they had pain was similar (group 1 was 43.3% and group 2 was 57.1%) and no statistically significant difference was found between the groups (p>0.05) (Table 3). When examining the pain intensity of the patients with postoperative pain, the pain intensity of the patients in group 1 [1.27; 95% confidence interval (CI): 0.65 to 1.88] was found to be lower than the pain of the patients in group 2 (3.00; 95% CI: 1.71 to 4.29), and this difference was determined to be significant between the groups (p=0.017) (Figure 2).

Patient Comfort

When examining the comfort status of the patients in the postoperative period, more patients in group 1 (93.3%) were found to feel *in comfort* compared to group 2 (64.3%), and this difference between the groups was determined to be statistically significant (p=0.006). The strength of the association was found to be at a moderate level (V=0.358). The comfort levels of the patients who stated that they felt *in comfort* in the postoperative period were found to be higher in group 1, but there was no statistically significant relationship between the groups (p=0.086) (Table 4).

DISCUSSION

This study revealed the positive effects of music intervention in terms of pain, anxiety and patient comfort in RIRS patients.

The preoperative anxiety levels of those patients who will undergo surgery should be determined and necessary measures should be taken to minimize their anxiety. Music intervention, which is applied to reduce the anxiety experienced by the patient, also reduces the level of cortisol which increases in the body as a result of stress. It has been noted that this ensures that vital signs are stable and can speed up the healing process by creating physiological changes in the body.[7] In the literature, music has been reported to have an anxiolytic and analgesic effect.[16]

Table 2. Anxiety parameters of the patients

Measurements	Group 1			Group 2			p*
	Median, (min.-max.)	HR (95% CI)		Median, (min.-max.)	HR (95% CI)		
		Lower bound	Upper bound		Lower bound	Upper bound	
Preoperative VAS-A score	2.00 (0-7)	1.46	3.21	5.00 (0-10)	3.92	5.93	<0.001
Postoperative VAS-A score	0.00 (0-6)	0.48	1.78	3.00 (0-10)	1.89	4.53	0.024
p**	0.019			0.009			

VAS-A: Visual Analog Scale-anxiety, *Mann-Whitney U test, **Wilcoxon signed-rank test, CI: Confidence interval, HR: Hazard ratios, min.: Minimum, max.: Maximum.

In this study, in which the effect of music intervention on anxiety, perceived pain intensity and patient comfort in patients who underwent RIRS was examined, the anxiety levels of patients undergoing RIRS were examined in both the preoperative and postoperative periods. In both periods, the anxiety scores of the patients in the intervention group were significantly lower compared to the control. This indicates that the patients in the music intervention groups had lower anxiety levels than the control group. This result shows that music intervention is effective in reducing patients' anxiety. Our study finding supports the positive effects of music intervention on anxiety, which have also been reported in the literature.[13,15,16,23-27] However, some studies report that music is not effective on anxiety in patients who have undergone a transrectal prostate biopsy.[28,29] This difference may be associated with the differences in the interventions used on the patients as well as the music intervention methods applied.

Pain is one of the major symptoms leading patient to seek help from health professionals. Also, it has been noted that due to untreated pain, the quality of life of patients decreases, while the length of hospital stay and mortality rate increases.[30] For patients undergoing urological intervention, postoperative pain which does not go away despite the use of analgesics may be significantly important.[3] Studies investigating pain in RIRS patients such as by Singh et al.[31] showed that 1st and 2nd day pain scores were significantly higher in those patients undergoing RIRS than in those undergoing Extracorporeal Shock Wave Lithotripsy, while Di Mauro et al.[8] showed that the pain of the mPCNL group was lower compared to the RIRS group. Music, an effective method of reducing pain when used in combination with opioid drugs, is widely used in the treatment of acute and chronic pain.[7] Music intervention is known to reduce pain by activating the cingulo-frontal cortex.[13] In the literature, it has been noted that music is effective against pain in urology patients.[13,15,16,23-27] However, Packiam et al.'s[29] study reported that music did not affect pain in patients undergoing transrectal prostate biopsy. In our study, when patients were asked whether they had pain on the first postoperative day, fewer patients in the music group were found to experience pain when compared to the control group. Additionally, in this study, on the first postoperative day, we investigated the perceived pain severity of the patients. The pain severity of those patients in the intervention group was significantly lower when compared to those in the control. Our study results revealed that musical intervention was effective in reducing postoperative pain severity in RIRS patients.

Table 3. Postoperative pain status of the groups

		Group 1		Group 2		p
		n	%	n	%	
Postoperative pain	Pain	13	43.3	16	57.1	0.293
	No pain	17	56.7	12	42.9	

Chi-squared test.

With the patients entering into the surgical intervention setting, basic stress causes, such as fear of death, the unknown, as well as the perception of pain, reach their highest level.[32] The comfort of the patients who will undergo surgical intervention is very important for both the emotional and physiological status of the patient. Patients who are provided high-level comfort for relief, who are prepared for the procedure in more comfortable and suitable positions and who continue the process in this way experience fewer problems.[33] In this study, more patients in group 1, compared to the other group, were seen to be in more comfort. Öztürk et al.[15], in their study with patients who listened to music during urodynamic interventions, concluded that listening to music increased patients' comfort and satisfaction. Although the patient groups of the studies are different, our results are similar to their study. Therefore, these results suggest that music may be a factor affecting patient comfort positively.

Study Limitations

This study had some limitations. The sample of this study was composed of Turkish patients who underwent RIRS in the urology clinic of a university hospital in western Türkiye. Therefore, the results cannot be generalized to all RIRS patients.

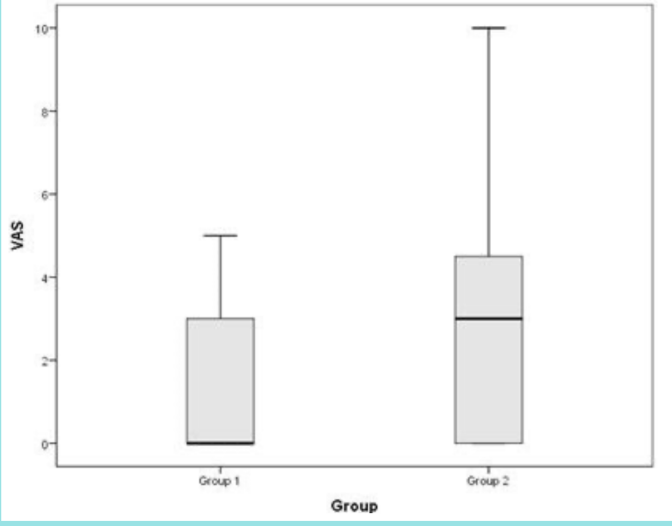

Figure 2. Pain parameters of the patients, (test value: -2.486, p=0.017*).

Table 4. Patients' comfort status and levels

		Group 1		Group 2		p	Cramer's V
		n	%	n	%		
Postoperative patient comfort	Yes, in comfort	28	93.3	18	64.3	**0.006***	0.358
	No, not in comfort	2	6.7	10	35.7		
Postoperative patient comfort level**	Uncomfortable	1	4.0	0	0.0	0.086	
	Unsure	1	4.0	4	22.2		
	Comfortable	16	57.1	12	66.7		
	Very comfortable	10	35.7	2	11.1		

*Chi-squared test, **Only those who answer yes.

CONCLUSION

This study's results revealed that music intervention reduced anxiety, pain and helped in providing better patient comfort in those patients undergoing RIRS. Based on this study's results, music intervention can be considered as an effective and safe method to reduce pain and anxiety in cases where RIRS is performed. Therefore, we recommend the use of music intervention, with the type of music determined by the patients themselves, for those patients who will undergo RIRS.

MAIN POINTS

- In this study, music intervention reduced the anxiety and pain levels of patients who underwent RIRS.
- Music helps to provide better patient comfort in patients undergoing RIRS.
- Music intervention may be considered an effective and safe method to reduce pain and anxiety in those patients undergoing RIRS.

Acknowledgments: The authors thank to all the patients and the medical team of the Urology Clinic of Hospital of Afyonkarahisar Health Sciences University for participating in the study.

ETHICS

Ethics Committee Approval: Approval of the protocol was obtained from the Afyonkarahisar Health Sciences University Clinical Research Ethics Committee (approval number: 2019/165, date: 03.05.2019).

Informed Consent: Before the application, all of the participants were informed about this study. They indicated their agreement to participate by signing a written consent form.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: Y.C., Design: T.G., Y.C., M.K., Supervision: T.G., Y.C., M.K., Materials: T.G., Y.C., Data Collection and/or Processing: T.G., Y.C., Analysis and/or Interpretation: T.G., Y.C., Literature Search: T.G., Y.C., Writing: T.G., Y.C., M.K., Critical Review: T.G., Y.C., M.K.

DISCLOSURES

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: This study was funded by Afyonkarahisar Health Science University Scientific Research Projects Commission (project number: 19.LIS.004).

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