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Superior semicircular canal dehiscence by superior petrosal sinus

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The effect of preoperative training provided to patients undergoing coronary artery bypass graft surgery on postoperative comfort

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Ethics Committee Approval
The study was approved by the Kırklareli University Health Sciences Institute Scientific Research Ethics Committee (November 8, 2019 and 69456409-199-E.19577).
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Abstract

Background/Aim: The most popular surgical procedure for treating coronary artery diseases is coronary artery bypass graft surgery. However, the comfort that patients experience after coronary artery bypass graft surgery varies considerably. The purpose of this study is to ascertain the impact of preoperative training on postoperative comfort in patients undergoing coronary artery bypass graft surgery.
Methods: This study was conducted as a quasi-experimental research investigation the cardiovascular surgery clinic of Edirne Sultan Murat I State Hospital from December 2019 through December 2020. It included 46 patients aged 18–65 who were undergoing their first coronary artery bypass graft surgery and volunteered to participate. The patients in the experimental group (23 individuals), were provided preoperative training; no interventions were made with the patients in the control group. The General Comfort Questionnaire was administered to all of the patients prior to discharge. The necessary ethical and institutional approvals were obtained before the study. Transparent Reporting of Evaluations with Non-randomized Designs was used as the research reporting guideline.
Results: The postoperative General Comfort Questionnaire total score (P<0.001), mean scores of all sub-dimensions (P<0.001) and comfort levels of the experimental group were higher than those of the control group (P<0.001). Preoperative training therefore had a positive impact on postoperative comfort level.
Conclusion: Preoperative training provided to patients improved their postoperative comfort. It is recommended that surgical nurses increase patient comfort by providing patient training before coronary artery bypass graft surgery and that nurses should be supported in administering patient training.

Keywords: cardiac surgery, education, patients, nurses

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Introduction

Coronary artery diseases, which are among the causes of cardiovascular disease, account for 17.9 million deaths annually worldwide [1-3]. The most popular surgical procedure for treating coronary artery diseases, known as coronary artery bypass graft (CABG), restores circulation to the coronary arteries and increases blood flow to the heart muscle layer [4]. The perception of the heart as a functional organ that controls life and death results in cardiac surgery patients facing more intense emotional and psychological reactions to surgery than patients undergoing other surgeries [5]. These issues can negatively affect patient comfort during the perioperative period [6].

Comfort, which is a basic requirement of patients, affects vital signs, recovery time, and daily life activities of patients after surgery [7,8]. Patients who have high comfort levels adapt to treatment more readily, cope better with the stress of a disease, and experience shorter lengths of stay in the hospital [7-11].

The training provided by nurses to patients before surgery is an important stage of surgical preparation, and it is an indispensable part of nursing care [11]. It has been reported in the literature that risk factors for cardiovascular diseases decrease with patient training, patience compliance to treatment increases, anxiety and depression symptoms decrease, and patients undergo positive behavioral changes [12-14]. In CABG surgery, patient training includes information about the hospitalization, preoperative, intraoperative and postoperative periods [15,16]. Preoperative training provided by nurses before CABG surgery reduces patient anxiety and fear, ensures that a patient is supported and strengthened for his/her participation in the care process, eliminates uncomfortable situations and increases comfort level [11].

The study was conducted to determine the effects that preoperative training had on the postoperative comfort of patients undergoing CABG surgery.

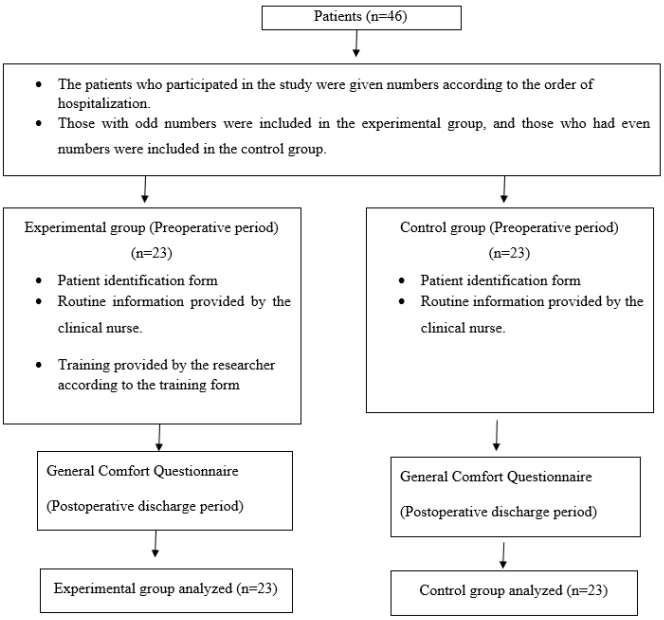
Materials and methods

Study design and sample

This quasi-experimental study was conducted with 46 patients at the cardiovascular surgery clinic of Edirne Sultan Murat I State Hospital between December 2019 and December 2020. The patient cohort included individuals undergoing CABG surgery. The hospital had 22 beds and 9 nurses in its cardiovascular surgery clinic; three nurses work the day shift each day, and two nurses work the night shift. Both elective and urgent surgical procedures are conducted, and the mean number of operations per week is three.

The effect size (d) was found to be 0.999 when calculating an average power of 90.0% at an α=0.05 level of 3.53 (0.24) for the control group and 3.73 (0.15) for the experimental group. When the Type I error rate was set at 0.05 and the power of the test was 0.80 (α=0.05, 1-β=0.80), the minimal sampling size was calculated to be 46 subjects [17]. A simple randomization approach was used to assign numbers to the 46 study participants in the order of their hospitalization; odd-numbered individuals were placed in the experimental group, and even-numbered individuals were placed in the control group. All 46 patients participated in the trial to the end (Figure 1).

Figure 1: Diagram of the study



Every patient had been admitted to the cardiovascular surgery clinic to undergo CABG surgery for the first time; everyone in the cohort volunteered to participate in the study., The patients were all between the ages of 18 and 65, were open to communication and cooperation, were in good mental health, and did not have any vision, hearing, or speech problems. Furthermore, none of the patients had more than two chronic diseases beyond hypertension and diabetes.

The following patients were excluded from the study: individuals who had undergone CABG surgery before, individuals who did not volunteer to participate in the study, individuals who had more than two chronic diseases other than hypertension and/or diabetes, individuals who were not between the ages of 18 and 65, individuals who were not open to communication and cooperation, individuals who were not mentally healthy, and individuals who had vision, hearing, or speech problems.

Ethical considerations

The study adhered to the tenets of the Declaration of Helsinki and the Good Clinical Practice Guidelines. The Kırklareli University Health Sciences Institute Ethics Committee approved the study (November 8, 2019 and 69456409-199-E.19577). Prior to the start of the study, patients were made aware of the investigation and their written, informed consent was obtained.

Data-collection tools

Patient Identification Form

The Patient Identification form, which we prepared based on information from the literature [18,19], was designed to determine the introductory characteristics of the patients who participated in the study. It consisted of 12 demographic questions (age, gender, Body Mass Index (BMI), place of residence, marital status, education level, employment status, health insurance status, chronic disease status, tobacco use, alcohol use, presence of companions), two questions about lengths of stay in the hospital and intensive care unit, and one question about satisfaction with the patient-admission process.

General Comfort Scale

The General Comfort Scale (GCS) was developed by Kolcaba in 1992 [20], and the validity and reliability study of this scale in a Turkish setting was investigated by Kuğuoğlu and

Karabacak [21]. The GCS consists of three levels and four dimensions that constitute the theoretical components of comfort; it is used to determine comfort needs and evaluate expected increases in comfort based on nursing interventions. The scale comprises 48 items and a 4-point Likert design; "1" corresponds to low comfort, and "4" indicates good comfort [20,21]. The scale's sub-dimensions pertain to relief (16 items), relaxation (17 items), and problem-solving (15 items) [20,21]. The scale has a maximum possible total score of 192 and a minimum possible total score of 48. The outcome is parameterized as a mean score between 1 and 4 calculated by dividing the total score by the number of scale items (i.e., 48). Cronbach's α of the scale was determined to be 0.85 [21]. Cronbach's α was calculated to be 0.93 for this study.

Training form

We also prepared a training form based on information from the literature aimed at standardizing the training provided to patients [15,22]. The form included information about coronary artery disease, CABG surgery, the preoperative period (i.e., hospitalization procedures, blood tests necessary for the surgery, anesthesia, what to do the night before the surgery, preparations for the morning of the surgery, transfer conditions to the surgery room), the postoperative intensive care period, procedures to be performed, starting oral intake after surgery, mobilization, admission to the post-intensive care service, and activities to be carried out in the ward, deep breathing and coughing exercises, and exercise with a breathing exercise device (i.e., a spirometer) [15,17].

Control group

Patients in the control group were given the Patient Identification Form to fill out prior to surgery. No further interventions was conducted other than providing routine information (e.g., about checking into the clinic, the doctor's visiting hours, meal hours, the rules of the clinic, medications to be used after the surgery). The GCS was given to patients who were scheduled to be discharged during the postoperative period. For the purpose of the study, patients in the experimental and control groups were kept in separate rooms to prevent them from interacting with one another.

Experimental group

Patients in the experimental group were given the Patient Identification Form to fill out prior to surgery. During the preoperative period, the patients received not only the routine information noted above but also training according to the training form. Training took an average of 30–40 minutes for each patient. The GCS was then given to patients who were scheduled to be discharged during the postoperative period.

Statistical analysis

We used SPSS version 20.0 (IBM, New York, USA) to analyze the data. We assessed the reliability (internal consistency) of the GCS using Cronbach's α. We used the Single Sample Kolmogorov-Smirnov test to evaluate the normality of the data. The study's socio-demographic data were analyzed using numbers, percentages, means, standard deviations, the Student's t-test, the Mann-Whitney U test, Yates chi-squared test, Pearson's chi-squared test and Fisher's exact test. The Mann-Whitney U test was used to determine the total and sub-dimension mean scores and comfort levels of the GCS. The Mann-Whitney U test was used to compare the mean GCS total and sub-dimension scores and comfort levels of the experimental and control groups. A *P*-value of 0.05 was adopted as indicating statistical significance.

Blinding

The researcher was aware of the patients who was provided training. The researcher and the patients who were provided training prior the surgery could not be blinded due to the nature of the study.

Results

The average ages and BMIs of the patients in the experimental and control groups were statistically similar: 57.9 [6.8] years vs. 57.6 [7.1] years; 29.7 [6.2] kg m^{-2} vs. 29.3 [4.1] kg m^{-2}. Furthermore, no significant differences persisted between the groups in terms of hospitalization duration—16.7 [1.9] days vs. 17.5 [1.7] days (*P*=0.177)—or intensive care unit stay duration—2.5 [0.6] days vs. 2.7 [0.6] days (*P*=0.401) (Table 1).

Table 1: Quantitative socio-demographic data of the patients (n=46)

	Experimental (n=23) Mean (SD)	Control (n=23) Mean (SD)	*P*-value
Age	57.9 (6.8)	57.6 (7.1)	0.900[a]
BMI	29.7 (6.2)	29.3 (4.1)	0.791[a]
The length of stay in hospital	16.7 (1.9)	17.5 (1.7)	0.177[b]
The length of stay in intensive care unit	2.5 (0.6)	2.7 (0.6)	0.401[b]

n: Number of patients, SD: standard deviation, [a] Student t Test, [b] Mann Whitney U Test, BMI: Body Mass Index

There were no statistically significant differences in gender (*P*=0.231), place of residence (*P*=1.000), marital status (*P*=1.000), education level (*P*=1.000), employment status (*P*=0.225), health insurance status (*P*=1.000), chronic disease status (*P*=0.757), tobacco use (*P*=0.167), or satisfaction with the patient-admission process (*P*=0.233) between the experimental and control groups. On the other hand, significant differences were detected between the experimental and control groups in terms of alcohol use (*P*=0.038) (Table 2).

Table 2: Categorical socio-demographic data of the patients (n=46)

		Experimental (n=23)		Control (n=23)		*P*-value
		n	%	n	%	
Gender	Woman	12	52.20	7	30.40	0.231[c]
	Man	11	47.80	16	69.60	
Place of residence	Town center	18	78.3	17	73.9	1.000[c]
	Town/village	5	21.7	6	26.1	
Marital status	Married	22	95.70	22	95.70	1.000[d]
	Single	1	4.30	1	4.30	
Education	Elementary and below	20	87.0	20	87.0	1.000[d]
	High school and above	3	13.0	3	13.0	
Employment status	Not working	8	34.8	3	13.0	0.225[e]
	Working	6	26.1	8	34.8	
	Retired	9	39.1	12	52.2	
Health insurance	Yes	22	95.70	22	95.70	1.000[d]
	No	1	4.30	1	4.30	
Chronic disease	Yes	9	39.1	7	30.4	0.757[d]
	No	14	60.9	16	69.6	
Cigarette	No	20	87.0	15	65.2	0.167[d]
	Yes	3	13.0	8	34.8	
Alcohol	No	21	91.3	14	60.9	0.038[d]
	Yes	2	8.7	9	39.1	
Presence of companions	Yes	23	100.00	23	100.00	-
	No	0	0.00	0	0.00	
Satisfaction with the admissions process	Yes	23	100.00	20	87.00	0.233[d]
	No	0	0.00	3	13.00	

n: Number of patients, [c] Yates ki-kare Test, [d] Fisher exact Test, [e] Pearson ki-kare Test

We also found that the total score of the GCS (*P*<0.001), the physical sub-dimension score (*P*<0.001), the psychospiritual sub-dimension score (*P*<0.001), the environmental sub-dimension score (*P*<0.001), and the socio-cultural sub-dimension score were

significantly higher for individuals in the experimental group (P<0.001). The mean scores in terms of the relief, relaxation, and superiority comfort levels of the experimental group were additionally significantly higher than those of the control group (P<0.001) (Table 3).

Table 3: General comfort questionnaire scores and comfort levels of the patients

	Experimental (n=23) Mean (SD)	Control (n=23) Mean (SD)	*P*-value [b]
General Comfort Questionnaire total	3.29 (0.16)	2.65 (0.17)	<0.001
Physically	3.20 (0.26)	2.20 (0.17)	<0.001
Psychospiritual	3.70 (0.21)	2.93 (0.29)	<0.001
Environmental	3.14 (0.20)	2.72 (0.15)	<0.001
Socio-cultural	3.05 (0.23)	2.72 (0.21)	<0.001
Comfort levels			
Refreshment	3.09 (0.20)	2.51 (0.22)	<0.001
Relaxation	3.39 (0.19)	2.68 (0.21)	<0.001
Superiority	3.38 (0.20)	2.76 (0.21)	<0.001

[b] Mann Whitney U Test, SD: standard deviation

Discussion

Patients in the experimental group patients had higher mean scores for all sub-dimensions of the postoperative GCS and higher comfort levels compared with the patients in the control group. Another recent study also found that providing preoperative training to patients undergoing CABG surgery boosted their comfort scores [18]. In their randomized controlled studies, Pazar and Iyigün [22] and Güner and Karakoç Kumsar [19] determined in their study that the comfort level of patients who received training in the preoperative period was higher. Other researchers have determined that providing training to patients scheduled for hip replacement surgery increased their level of postoperative comfort [17]. In a study conducted with patients undergoing day case surgery, researchers found that preoperative training had positive effects on patient comfort levels [23]. Kızıl Toğaç and Yılmaz [24] in their study with laparoscopic cholecystectomy patients and Oshvandi et al. [25] stated in their study with transradial coronary angiography patients that the training provided increased the patients' comfort scores. Yu et al. [26] reported that nursing training provided to cancer patients increased their comfort levels, and Kacaroğlu [27] found that training increased the comfort level of hemodialysis patients.

Limitations

This study had some limitations. First off, our findings cannot be generalized because they are based on data from a single center. In addition, the anxiety level of the patients was not determined—anxiety could have affected the patients' comfort levels. Multicenter studies in which patients' anxiety levels are determined and studies evaluating the effect of preoperative training on postoperative comfort level will be important.

Conclusion

We determined that training administered to patients before CABG surgery positively affected their postoperative comfort. It is critical that surgical nurses effectively use their role as patient educators to boost patient quality of care and facilitate the recovery process. We recommend that research on patient comfort be conducted with larger numbers of patients who are undergoing different surgical interventions; the educational role of surgical nurses should also be supported.

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The effect of postoperative pain on comfort in patients undergoing abdominal surgery

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Ethics Committee Approval
The study was approved by the Bolu Abant Izzet Baysal University Clinical Researches Ethics Committee (No: 2021/247, Date: October 26, 2021).
All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

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

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Abstract

Background/Aim: Postoperative pain management aims to reduce pain intensity and improve patient comfort. This study was conducted to investigate the effects of postoperative pain on the well-being of patients undergoing abdominal surgery.

Methods: This research was designed as a prospective, descriptive study. The study was conducted on 94 patients who underwent abdominal surgery in general surgery. Patients over 18 years of age, who volunteered to participate in the study and who did not need intensive care were included in the research. Postoperative pain and comfort levels of the patients were analyzed. Descriptive information from the patients was used in the first part of the study and the Perianesthesia Comfort Questionnaire (PCQ) was used in the second part. The visual pain scale (VAS) was used to assess pain.

Results: The mean age of the patients was 54.7 (15.7) years; 54.3% of the patients were male; 76.6% were smokers; and the mean body mass index was 29.3 (6.3). Half of the patients underwent open and half underwent laparoscopic surgery, with 90.4% receiving general anesthesia. Patients were hospitalized an average of 3.5 (3.3) days after surgery**.** Patient comfort was at a good level, according to the PCQ. Whether they received local or general anesthesia did not affect their PCQ scores; however, pain was less in patients who received local anesthesia. Fasting time before surgery did not affect mean PCQ scores, but patients who fasted longer before surgery reported less pain. There were no differences in patients' mean scores on the PCQ scale and pain scores. The correlation between the mean PCQ and pain scales showed no significant relationship (r=-0.073, *P*=0.485).

Conclusion: The absence of a significant correlation between the mean PCQ scale and the pain scale indicates no meaningful association between these variables.

Keywords: postoperative pain, patient comfort, surgery, pain management

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Introduction

Pain is commonly described as "an unpleasant sensory and emotional experience associated with or described as actual or potential tissue damage" [1]. Pain is subjective and is characterized by the fact that each individual learns early in life through injury that the experience is unpleasant and, therefore, inherently both emotional and sensory. The process of pain perception involves the detection of stimuli by peripheral sensory nerve endings (nociceptors), primarily the conversion of stimuli into electrical activity, and the transmission of these nociceptive signals to the central nervous system (CNS) via peripheral sensory nerves [2]. Acute pain emerges subsequent to tissue injury related to surgical procedures and is expected to diminish throughout the process of recovery. Typically, this transition spans a duration of approximately three months, after which the pain is categorized as either chronic or enduring. Pain represents a multi-faceted encounter that is individualized for every patient. Variations in the experience of pain are shaped by biological responses, psychological conditions and attributes, as well as social circumstances [3].

Postoperative pain requires a special approach to the procedure and needs adequate analgesia for postoperative rehabilitation and recovery [4]. This recognition has led to the development of initiatives aimed at providing procedure-specific, evidence-based recommendations for the management of pain after a wide range of surgical procedures.

A significant proportion of patients experience unwanted postoperative pain. The prevention and relief of such pain is the primary responsibility of healthcare professionals.

The use of multimodal (or "balanced") analgesia has demonstrated efficacy in postoperative pain control, and its effectiveness has been well established in clinical research.

This concept suggests that combinations of analgesics with different modes or ranges of action may improve analgesia, reduce the need for opioids, and thus reduce the adverse effects of opioids postoperatively [5].

Although objective measures of patient comfort in the perioperative period have not been fully defined in previous studies, pain, mobilization, and sleep quality are known to influence patient comfort [6]. Therefore, an assessment of pain intensity, functional effects, and side effects of treatment should be performed and recorded using consistent, valid, and reliable scales and instruments. In addition to an overall assessment of the effectiveness of acute pain management, there is a need for information on the relationship between postoperative pain management and patient comfort, depending on the surgical site and specific surgical procedures. In this context, our study was conducted to investigate the impact of postoperative pain on the well-being of patients undergoing abdominal surgery.

Materials and methods

This study was conducted as a prospective, descriptive study on patients who underwent abdominal surgery at a university hospital's general surgery department between November 2021 and November 2022.

Sample

The study population consisted of patients undergoing abdominal surgery in the general surgery department of a teaching and research hospital. Patients over 18 years of age, who volunteered to participate in the study and who did not need intensive care were included in the research. When calculated with the G*Power statistical software based on previous studies, the study was designed to include at least 85 patients with an effect size of 0.4, a margin of error of 0.05, and a confidence interval of 0.95. Ninety-four patients were included in the study.

Scales and measures

Postoperative pain and comfort levels of the patients were measured in the study. In the first part of the study, the descriptive information of the patients was used and in the second part, the Perianesthesia Comfort Questionnaire (PCQ), which was adapted into Turkish by Üstündağ and Aslan in 2010, was used [7]. Data for the PCQ were collected by the researcher in the patient's room on the first postoperative day through a personal interview. The visual pain scale (VAS) was used to assess pain.

Perianesthesia Comfort Questionnaire (PCQ)

Kolcaba devised a three-tiered taxonomic structure with four dimensions that encapsulate the fundamental theoretical elements of comfort. This structure serves as a reference to analyze a given scenario for comfort requirements and achieve the desired increase in comfort. The scale comprises 24 questions that investigate an individual's emotions and self-perception, reflecting the overall thought process pertaining to perianesthesia duration. Each statement in the survey is rated on a Likert scale of 1-6, ranging from "strongly disagree" to "strongly agree." The scale consists of positive and negative items presented in a mixed format. Consistent citation and footnote style were followed as per the style guide, and quotes were clearly marked to avoid any ambiguity. Of the 24 items, 12 were positive (1, 5, 6, 11, 14, 16, 18, 19, 20, 21, 23, 24) and 12 were negative (2, 3, 4, 7, 8, 9, 10, 12, 13, 15, 17, 22), with the negative items scored in reverse order. Technical term abbreviations were explained when first used. Accordingly, a high score (6 points) for positive items indicates high comfort, while a low score (1 point) indicates low comfort. Conversely for negative items, a low score (1 point) indicates high comfort, and a high score (6 points) indicates low comfort. When scoring the scale, the negative scores obtained were reverse coded and combined with the positive items. The highest total score possible on the scale was 144 and the lowest total score was 24. The average score was obtained by dividing the total score by the number of scale points and the result was given in a distribution from 1-6. A low score indicates poor comfort, and a high score indicates good comfort. Cronbach's alpha coefficient was found to be 0.83 [7]. In this study, Cronbach's alpha coefficient was 0.77.

Visual analogue scale (VAS)

VAS is a popular method for measuring pain in various clinical contexts [8]. Pain intensity was measured by self-assessment using VAS. During pain assessment, the investigator presents the scale to the patient. One end of the scale corresponds to no pain, while the other end represents the maximum imaginable pain. The patient then reports the intensity of the pain.

Ethical considerations

This study was conducted under an ethical approval (No: 2021/247, Date: October 26, 2021) granted by the Bolu Abant Izzet Baysal University Ethics Committee. The Research Permission Form required for the study was obtained from the institution where the study was conducted. Patients enrolled in the study were informed about the study and completed the voluntary informed consent form.

Statistical analysis

The data were then exported to a computer program. Numerical and percentage analyses were used, and comparisons of parametric data were made using t-test and ANOVA. For non-parametric data, the Mann-Whitney U and Kruskal-Wallis tests were used. *P*-values <0.05 were considered statistically significant.

Results

The study included 94 patients undergoing abdominal surgery at the Department of General Surgery. The mean age of these patients was 54.7 (15.7) years; mean BMI was 29.3 (6.3); mean fasting time (hours) was 18.5 (5.0); and the mean postoperative mobilization time (hours) was 9.6 (7.3). Patients underwent cholecystectomy, appendectomy, gastrectomy, ostomy; and distal pancreatectomy.

A total of 54.3% of the patients were male and 76.6% were smokers. Half of the patients underwent open and half laparoscopic surgery. Overall, 90.4% received general anesthesia and fasted for 18.5 (5.0) hours prior to surgery. Patients were mobilized 9.6 (7.3) hours after surgery (Table 1). Patients stayed in the hospital for a mean of 3.5 (3.3) days after surgery. The mean postoperative discharge rate was 5.4 (2.2). Pharmacological methods were used for postoperative pain management in all patients. Postoperative vital signs and pain were measured every 15 minutes for the first hour, then every half hour for two hours, and subsequently, every four hours for seven hours.

The highest total score that could be obtained on the scale was 144 and the lowest total score was 24. The average score was obtained by dividing the total score by the number of scale points and the result was given in a distribution from 1-6. A low score indicated poor comfort, and a high score indicated good comfort. When the total score was divided by the number of items, the result was 5.2 (0.4), indicating that the patient's comfort was at a good level (Table 2).

There was no significant difference between patients' age, BMI, type of surgery, and PCQ scale and pain. The type of anesthesia (local or general) did not affect mean PCQ scores, but pain was lower in patients who received local anesthesia. Fasting periods of at least seven hours before surgery were observed, and the duration of fasting had no effect on mean PCQ scores, although patients who fasted longer before surgery reported less pain. There were no differences in patients' mean PCQ scale and pain scores during postoperative hospitalization (Table 3).

The correlation between the mean PCQ scale and the pain scale showed that there was no significant relationship between the two variables (r=-0.073, *P*=0.485).

Table 1: Diagnostic information about patients

	n	%
Age		
≤30	8	8.5
31-40	12	12.8
41-50	15	16.0
51-60	20	21.3
>60	39	41.5
Gender		
Female	43	45.7
Male	51	54.3
BMI		
≤18.5	2	2.1
18.5-24.9	20	21.3
25-29.9	40	42.6
≥30	32	34.0
Type of surgery		
Open	47	50.0
Laparoscopy	47	50.0
Type of anesthesia		
General	85	90.4
Local	9	9.6
Fasting time(hour)		
0-12 hour	43	45.7
13-24 hour	41	43.6
≥25	10	10.6
Postoperative mobilization time(hour)		
0-6	28	29.8
7-12	51	54.2
>12	15	16.0
Discharge time(day)		
0-1	37	39.4
2	21	22.3
≥3	36	38.3
Smoking		
Yes	22	23.4
No	72	76.6

n: Number, %: Percentage

Table 2: PCQ scale analysis

	Mean	SD	Min	Max	Mean/24	Cronbach's alpha
PCQ	127.06	10.6	96	142	5.2	0.77

PCQ: Perianesthesia Comfort Questionnaire, SD: Standard deviation, Min: Minimum, Max: Maximum

Table 3: Comparative analysis of PCQ and pain

	PCQ Mean (SD)	Statistical analysis	Pain Mean (SD)	Statistical analysis
Age				
≤30	123.62 (10.8)	F= 1.929	5.8 (2.2)	F= 0.960
31-40	124.50 (11.4)	*P*=0.112	6.0 (1.6)	*P*=0.434
41-50	123.73 (11.9)		5.3 (1.7)	
51-60	125.70 (11.1)		5.8 (2.0)	
>60	130.9.1(9.1)		4.9 (2.6)	
Gender				
Female	124.67(11.9)	t= -2.023	5.6 (2.3)	t= 1.019
Male	129.07(9.1)	*P*=**0.046**	5.1 (2.1)	*P*=0.311
BMI				
≤18.5	114.0 (2.8)	F= 1.811	3.9 (0.1)	F= 0.364
18.5-24.9	130.40 (8.9)	*P*=0.151	5.3 (2.7)	*P*=0.779
25-29.9	126.05 (11.1)		5.3 (2.1)	
≥30	127.06 (10.6)		5.5 (2.0)	
Type of surgery				
Open	129.74 (8.7)	t= 2.499	5.4 (2.2)	t= 0.318
Laparoscopy	124.38 (11.8)	*P*=**0.014**	5.3 (2.2)	*P*=0.752
Type of anesthesia				
General	126.52 (10.7)	t: -1.500	5.5 (2.1)	t: -2.497
Local	132.11 (9.3)	*P*=0.137	3.6 (2.0)	*P*=**0.014**
Fasting time(hour)				
0-12 hour	12.08 (10.4)	F= 1.292	5.7 (2.0)	F= 3.323
13-24 hour	125.1 (11.3)	*P*=0.280	5.4 (2.2)	*P*=**0.040**
≥25	130.3 (8.4)		3.7 (2.2)	
Postoperative mobilization time(hour)				
0-6	127.5 (10.9)	F= 0.946	5.1 (2.5)	F= 0.317
7-12	125.9 (11.5)	*P*=0.392	5.5 (1.8)	*P*=0.729
>12	130.1(5.8)		5.4 (2.9)	
Discharge time(day)				
0-1	126 (12.1)	F= 1.789	5.3 (2.1)	F= 0.849
2	123.6 (10.1)	*P*=0.173	4.9 (2.3)	*P*=0.431
≥3	129.0 (9.0)		5.7 (2.2)	

PCQ: Perianesthesia Comfort Questionnaire, SD: Standard deviation

Discussion

Postoperative pain management remains a challenge. More than 80% of patients undergoing surgery report acute postoperative pain, while less than half report adequate postoperative pain relief [9]**.** It is well known that inadequate

postoperative pain control is associated with higher postoperative pain scores. Postoperative pain management aims not only to reduce pain intensity but also to improve patient comfort [10]. Uncontrolled acute postoperative pain is associated with increased morbidity, poorer quality of life, delayed recovery, longer duration of opioid use, and higher health care costs [11]. Women reported more anxiety than men, both before and after surgery. Studies show that women experience more anxiety than men before and after surgery [12]. It has been suggested that the lower levels of comfort and the increased anxiety in women may be due to the fact that they experience more pain than men.

According to a study by Chae et al [13], immediately after surgery, female patients had more severe pain and used more analgesics than male patients. However, in the recovery room, younger female patients used more analgesics than older patients. A systematic review found that women have a higher risk of developing severe pain after surgery, but gender differences appear to be of little clinical significance [14]. Theodoraki et al. [15] showed that there was no difference in postoperative pain between male and female patients undergoing abdominal surgery. In our study, although pain was higher in women than in men, there was no statistically significant difference between genders.

In a study by Tighe et al. [16], older patients reported lower postoperative pain scores. Van Dijk et al. [17] showed that postoperative pain decreases with age.

The current study found that patients over 60 years old reported the least pain, which supports these studies, but there was no statistically significant difference between age groups. However, there was a negative correlation between pain scores and age. It has been suggested that the cause of these findings may be the effects of pharmacokinetic or pharmacodynamic changes with age.

BMI is an independent risk factor for postoperative pain [18] and it has been reported that high or low BMI has no effect on surgical pain [19]. However, Bolat et al. [20] reported that patients with a low BMI experienced more pain during prostate biopsy. In this study, BMI was not found to influence the postoperative course.

Epidural analgesia provides strong and effective analgesia [10]. Good induction of anesthesia appears to significantly reduce postoperative opioid consumption and improve patient comfort [21].

In open and laparoscopic abdominal surgery, the main cause of postoperative discomfort occurs six hours after surgery [22]. Recent minimally invasive techniques reduce both postoperative pain and patient comfort [23]. Studies show that patients undergoing laparoscopic surgery report less postoperative pain than patients undergoing open surgery [24]. Our study found that patients who underwent laparoscopy had less pain, but this did not affect patient comfort.

In a study by Liang et al [25], patients in the control group fasted for 12 hours and were water deprived for six hours before surgery, while patients in the research group fasted for six hours and were water deprived for two hours. It was found that the patients in the research group had less hunger and thirst and felt more comfortable in the preoperative period, and their postoperative pain was less than that of the control group. In the current study all patients had a fasting time of more than eight hours. There was no difference between fasting time and patient comfort. It was found that the longer the fasting period, the less pain was experienced. Considering the gate control theory, it could be that the state of starvation has an effect on pain, for example, by diverting attention. However, as prolonged fasting delays recovery, it is likely to have a longer-term negative effect on pain and patient well-being.

Restriction of movement during abdominal surgery is also a cause of significant discomfort. In addition, abdominal distension also increases postoperative discomfort [22].

Early mobilization can reduce patient pain, improve comfort, and increase satisfaction [26]. Early mobilization is reported to be necessary to reduce postoperative pain [27]. In our study, mobilization time was found to have no statistical effect on patient pain and comfort, which may be due to patients not having the necessary knowledge for early mobilization.

The correlation between the PCQ and the mean pain score showed that there was no significant relationship between the two variables; however, we cannot take into account the effect of other parameters affecting comfort on this relationship.

Limitations

Since this was a prospective, descriptive study, some parameters such as sleep, which may affect patients' postoperative pain and comfort, could not be determined.

Conclusion

Many patients experience pain after surgical procedures. It is very important to maintain effective pain management of patients and holistic patient care in the perioperative period. Many parameters can affect patient comfort along with pain. According to the findings of this study, postoperative pain levels may vary by gender, with female patients reporting lower levels of comfort than their male counterparts, particularly after abdominal surgery. In addition, patients who received general anesthesia were more prone to experiencing severe postoperative pain compared to those who received local anesthesia. However, no direct relationship was found between pain and patient comfort.

In light of these results, in order for patients to return to their daily activities in a short time, it is recommended to perform comparative clinical studies that may affect patient comfort and postoperative recovery quality, such as advanced analgesic technique, preoperative sleep, etc. Such research will provide a more comprehensive understanding of the complex link between postoperative pain and comfort, which will lead to improved postoperative care.

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Clinico-radiologic discordance: A case of superior semicircular canal dehiscence by superior petrosal sinus

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Abstract

The audio-vestibular symptoms caused by the partial absence of the bony structure surrounding the superior semicircular canal (SCC) are known as superior canal dehiscence syndrome (SCDS). The dehiscence region can be seen in high-resolution computed tomography (HRCT). Dehiscence is often seen at the arcuate eminence level in the apical region of the SCC. The superior petrosal sinus may rarely course in the vicinity of the medial wall of the SCC and can even cause SCDS. The vascular origin of the dehiscence cannot be exactly determined in routine HRCT without contrast agent administration. In the literature, the use of contrast-enhanced magnetic resonance imaging (MRI) has been reported in a small number of cases to demonstrate this pathology. There may be a relationship between the degree of dehiscence demonstrated by MRI and the patient's symptoms. Here, we present a case that is thought to be superior petrosal sinus dehiscence to SCC using HRCT. Contrast-enhanced arterial and venous phase 3D T1-weighted MRI was performed for the confirmation of the diagnosis, but there was no good correlation between the degree of radiological dehiscence and symptoms in contrast to the previous literature.

Keywords: superior semicircular canal, dehiscence, superior petrosal sinus, computed tomography, magnetic resonance imaging

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Informed Consent
The authors stated that the written consent was obtained from the patient presented with images in the study.

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

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Introduction

Hearing loss may occur due to defects in different parts of the bony roof surrounding the inner ear structures in the spectrum of otic capsule dehiscence or in the third window anomaly [1]. Of these, SCC dehiscence has been reported as 2.1%-10.7% in temporal bone CT examinations [2]. A subtype of SCC dehiscence is superior petrosal sinus (SPS) dehiscence reported in 4%-9% of patients with symptomatic SCC dehiscence [3]. The cause of SCC dehiscence is unclear. Dehiscence might occur during fetal development, but trauma, infection, and/or malignancies could also trigger the emergence of clinical findings in some patients [4]. These patients typically have conductive hearing loss, tinnitus, autophony, and pressure-induced vertigo [5]. In audiometric examinations, low-frequency air-bone gap and increased bone conduction can be detected due to decreased air conduction [2]. A few surgical treatments have been reported in cases of dehiscence of SPS to SCC [4,6-7]. Less invasive interventional methods such as endovascular stenting treatment have recently been applied to SPS in these cases [3]. We only notice the groove-shaped impression of the SPS in the adjacent petrosal bone with HRCT, but it is not possible to visualize the SPS itself. A few cases have been reported in the literature in which contrast-enhanced MRI was performed to reveal SPS [3,5]. Here, we present the incidental findings of a patient who had SCC dehiscence of SPS in the HRCT examination but did not have obvious symptoms. We further present the 3D contrast-enhanced T1-weighted (W) MRI findings that were performed to confirm these findings.

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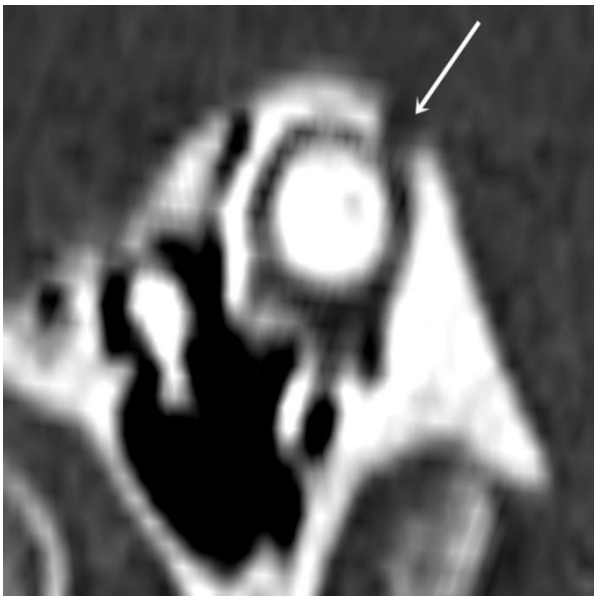
Case presentation

A 38-year-old female patient was admitted to our hospital with complaints of headache, nasal congestion, and decreased sense of smell. No findings were found except postnasal discharge during the physical examination; the patient had no complaints of hearing or balance. In the paranasal sinus HRCT examination, we incidentally evaluated that the left SPS-caused dehiscence in the SCC (Figure 1) in addition to the chronic sinusitis findings. When the patient was questioned again in terms of SHC dehiscence, she reported some symptoms such as mildly feeling her own voice in her ear as well as increased awareness of eye movements and her own steps. However, these symptoms did not affect the patient's quality of life.

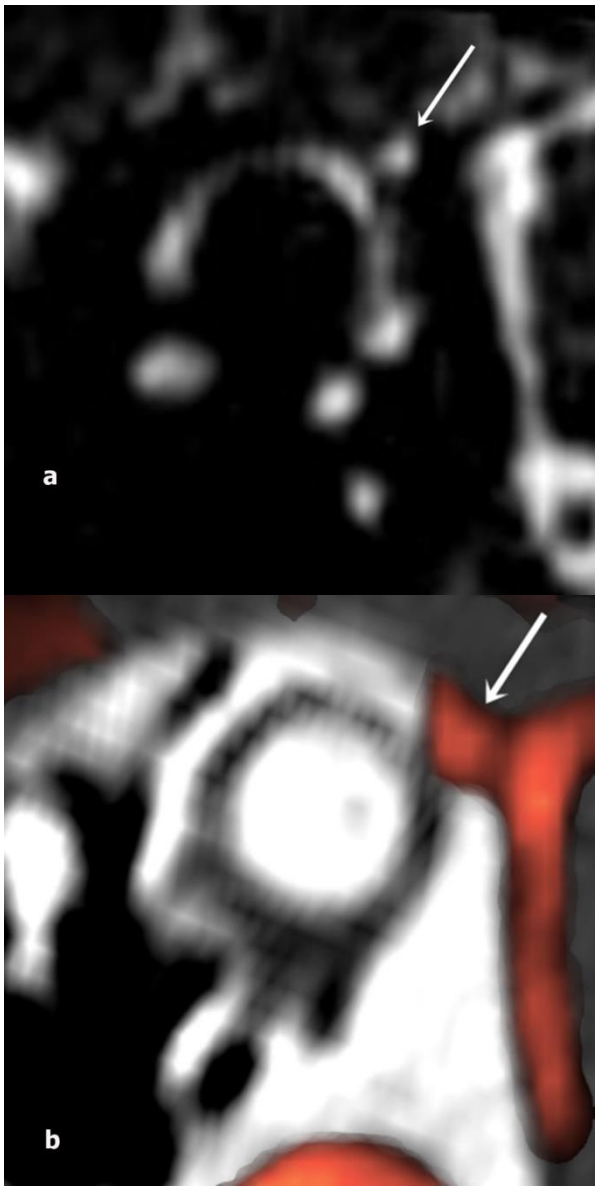
Figure 1: Bony coverage is absent over the superior semicircular canal and “cookie bite” appearance (white arrow) is seen in Pöschl plane high resolution computed tomography (HRCT).



Pure tone audiometry (PTA) showed average thresholds of air conduction at 0.5, 1, 2, and 4 kHz of 7 dB for the right and left ears. The average threshold of bone conduction was 3 dB for the right and left ears. There was no air/bone gap noted for either ear. The function of the bilateral SCC in VHIT was within the normal limits, but there were impaired responses in both lateral semicircular canals (LSC). There was no response in the left ear on cVEMP. These tests could not verify the preliminary diagnosis of SCC dehiscence.

Contrast-enhanced MRI was performed to reveal the dehiscence of SPS to SCC observed on HRCT. The examination was carried out with a 1.5-Tesla MRI scanner (Ingenia, Philips). The scans included axial plane T1, T2 W turbo spin echo, 3 dimensional (D) T2 W gradient echo (GRE), and 3D fat-suppressed T1 W sequences in the arterial and venous phases after contrast agent injection. Contrast enhancement of the SPS was observed in venous phase images. A three-class classification of SCC dehiscence by SPS was described in a recent article [4]. According this report, there was a cookie-bite appearance in the HRCT images and obvious compression of the membranous SCC by SPS on the MRI images, i.e., a ‘Class C’ category. In light of the imaging findings, we suggested Class C dehiscence in our patient (Figure 2). No operation was planned for the dehiscence of SCC because there was no impact on quality of life. Informed consent was obtained from the patient for this case report.

Figure 2: a: In a Pöschl projection, a T2 GRE sequence can image the vascular structure (white arrow). It has a contact with the membranous SSC, b: Class C dehiscence is confirmed with a merged image by HRCT and postcontrast T1W sequence.



Discussion

The rate of diagnosis of SCC dehiscence has increased gradually in the last two decades due to developments in imaging [8]. The vestibular system receives a large number of data inputs from many different systems and the compensatory mechanisms are high. The clinical findings of SCC dehiscence patients may be neglected by the patients as in our case. The patients can continue their lives asymptomatically. In our case, symptoms may differ depending on the variable resistance caused by vascular compression in SCC dehiscence associated with vascular structures such as SPS. Prominent pulsatile tinnitus finding is prominent in patients with SPS-related dehiscence [9]. Dehiscence is usually classified via radiological images, and there are a few articles reporting good correlation between the severity of clinical findings and the degree of radiological dehiscence [5]. In our case, however, a marked dehiscence appearance was observed on HRCT and contrast-enhanced MRI images, but faint patient complaints were described in a way that did not correlate well with these radiological findings.

Diagnosis can be made based on the impression of the SPS on the adjacent bone on CT. Contrast material was needed to

visualize the SPS (a vascular structure) radiologically and to study the relationship with SCC more clearly. A prior report used contrast-enhanced CT examination to reveal SPS involvement [9]. However, this step will increase the patient's radiation exposure because this contrast-enhanced CT examination will be performed in addition to the routine HRCT examination. Therefore, 3D T1 W venous phase images with contrast may be an alternative to reveal SPS involvement.

A few cases have previously been similarly studied using this 3 T MRI scanner [5]: Similar to our work, T2W images were fused with 3D contrast T1W images after the SCC were clearly revealed with 3-dimensional T2 W GRE images in addition to HRCT. Thus, the relationship between the two imaging methods could be seen more clearly. This prior work showed relatively good correlation between the degree of compression by the venous structures on the membranous SCC and the intensity of symptoms (based on their experience with only a few patients). Accordingly, three categories were defined. Asymptomatic patients with "cookie bite" appearance on CT examination but no connection at the labyrinth between SPS and membranous SSC in MR imaging were classified as Class A. Unlike Class A, cases with mild symptoms and limited contact between SPS and membranous SSC on MR imaging were classified into Class B. Cases with severe symptoms with obvious contact between SPS and membranous SSC on MR imaging were categorized as Class C [5].

One of the main problems in MRI is a lack of specific signal intensity for each tissue despite using the same protocol, scanning the same body area, and even imaging the same patient with the same device. Although many efforts have been made to quantitatively measure the tissues' intensity values, no practical method has yet been deployed broadly [10]. Thus, even small deviations in MRI signals could adversely affect clinical and radiological matches in this classification. Moreover, this error source may lead to different MRI signal intensities for each patient even if the same dose of the contrast agent and technical parameters are used [10]. Therefore, inconsistencies may occur in the classification of the degree of dehiscence because this very thin vascular structure cannot be fully reflected on the image in its real size. Our patient was clinically consistent with class A with a "cookie bite" appearance without any bony coverage in the HRCT images. The radiological appearance was different from that seen during Class A. Furthermore, the dehiscence size on MRI resembles Class C more than Class B. Our case had no good correlation between the imaging findings and the symptoms in our case. We could not distinguish between Class B and Class C with this inconsistency. This may be because we performed our examination with a 1.5-T MRI device, which did not have sufficient gradient power. We may not be able to fully distinguish between SPS contacting the endolymphatic canal and that causing compression.

Conclusion

SCC dehiscence of SPS is a rare entity that can be symptomatic with findings such as pulsatile tinnitus. In addition to HRCT, radiological examinations such as contrast- enhanced MRI can reveal the degree of dehiscence of SPS to SCC. Contrast-enhanced MRI can guide endovascular radiological interventional methods for therapy—these have become increasingly important. The classification of dehiscence from fused images created by combining different radiological techniques may vary depending on the differences in technical parameters. As a result, to reach more precise data on this subject, comparative studies with larger series and using different technical parameters and MRI devices with higher gradient power are needed.

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