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Determining the Factors Affecting the Satisfaction of Patient in Sedoanalgesia Due to Distal Radius Fracture in Emergency Department

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ABSTRACT

Introduction: Patients with distal radius fractures (DRF) are frequently admitted to the emergency departments (EDs). Reduction with procedural sedation and analgesia (PSA) and followed by plaster/splint are the treatment of choice. We aimed to determine the factors affecting the satisfaction in patients with DRF undergoing PSA.

Methods: This prospective, observational, cross-sectional study included 70 patients with DRF. The socio-demographic features, comorbidities, level of satisfaction with PSA procedure, physical factors of the environment, physician and patient satisfaction were evaluated. PSA satisfaction scores "1, 2 and, 3" were grouped as "dissatisfied group" and "4-5" points as "satisfied group" with the Likert scale. Patient satisfaction was compared between the groups according to the satisfaction levels.

Results: The median satisfaction level was found 4 (interquartile range 4-5). Their satisfaction with the given information about the PSA procedure and the cleanliness of the area where the procedure was performed was higher in the satisfied group than the dissatisfied group (p=0.014 and p=0.007, respectively). Also, as the level of residents of emergency physicians, the satisfaction of the patients increased (p=0.025). There was no significant difference between the groups in terms of age, gender, educational status, comorbidities, fracture type, additional injury, selected sedo-analgesic drugs, Richmond Agitation Sedation Scale and, complications (p>0.05). Satisfaction was high in all physicians.

Conclusion: PSA procedure was satisfactory by a majority and can be performed safely in the ED. The residency period of the physician who performed the PSA, satisfaction with the given information about PSA and the cleanliness of the area were affecting the patient satisfaction.

Keywords: Conscious sedation, radius fracture, patient satisfaction, patient preference, emergency medicine

Introduction

Diagnosis and treatment of fractures are mostly performed in emergency departments (ED). Distal radius fractures account for 20% of all fractures seen in the ED (1). Procedural sedation and analgesia (PSA) is frequently used in the ED to reduce pain and anxiety related to reduction procedures (2).

Although there are numerous studies investigating the success of PSA, those examining patient satisfaction from the patients' perspective are limited (3,4). Patient satisfaction with PSA may vary depending on patient-related or environment-related factors, in addition to the drug choices and administration doses. The aim of our study is to investigate the factors affecting patient satisfaction with PSA during fracture reduction in patients presenting to the ED with a distal radius fracture.

Methods

Our study is an observational, prospective study. Patients over the age of 18 who were admitted to the ED due to distal radius fractures between 1 August 2019 and 1 January 2020 and underwent PSA were included in the study. The study was conducted with the approval of the Ethics Committee of Dokuz Eylül University (approval number: 2019/18-36, date: 17.07.2019). Informed consent was obtained from the patients, and from the physician who performed the interventional procedure, before the study. Patients were excluded from the study for reasons such as refusal to participate, limited communication, unconsciousness,

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additional distracting injuries such as multiple trauma, and the absence of a study team.

Factors that may affect satisfaction with the procedural sedation and analgesia procedure were examined in two groups:

Patient-related factors: Socio-demographic data, comorbidities (hypertension, diabetes mellitus, chronic obstructive pulmonary disease, chronic kidney failure, psychiatric disease, congestive heart failure, active malignancy, liver disease), fracture type, sedation level achieved in the Richmond Agitation-Sedation Scale (RASS), pain levels before and during the procedure, complications, if any, and interventions made, satisfaction levels about PSA, satisfaction to be informed about the PSA.

Factors related to the physical environment and physician: Characteristics of the area where PSA applied, the patient's perception of the cleanliness of the environment, patients' perception of crowding, duration of physician's experience about the procedure performing reduction and PSA.

Patient satisfaction was evaluated with a 5-point Likert scale when fully awakened after sedation. Patients who scored "1-2-3" on PSA satisfaction were categorized as the "dissatisfied group," and those who scored "4-5" were classified as the "satisfied group."

Fractures were classified as uncomplicated (undisplaced or extra-articular displaced) and complicated (intra-articular displaced or involving fracture of the distal ulna).

All patients were monitored before PSA. There was no intervention in the diagnosis and treatment process (the choice of sedatives and analgesics) of the patients. Sedation levels were evaluated by the study team with the RASS scale. Proper sedation levels for PSA include minimal sedation and moderate sedation [RASS (-3) and RASS (-2)]. Other levels of RASS were considered inappropriate for sedation. In addition, RASS < (-3) values were categorized "excessive sedation" and RASS> (-2) values were "insufficient sedation" in inappropriate sedation group. Respiratory depression (hypoventilation, need for auxiliary respiratory support or airway maneuver), cardiac side effects (arrhythmias, hypo/hypertension), hallucinations, headache, nausea and vomiting, agitation, and epileptic seizure were recorded as complications.

Statistical Analysis

Data were evaluated in SPSS 24.0 package. Descriptive information was summarized by percentage distribution, mean and standard deviation, median minimum-maximum interquartile range (IQR). Variables indicated by counting were compared with the chi-square test and Fisher's exact test, while variables specified by measurement were compared with the Mann-Whitney U test based on their suitability for normal distribution. The Bonferroni test was used for multiple-comparison correction. Independent variables included sedation level, pain scores, crowding perception, cleanliness perception, and physician experience. The statistical significance level was accepted as $p<0.05$.

Results

Seventy of 108 patients with distal radius fractures who received sedation analgesia in the ED were included in the study. Thirty-eight patients were excluded from the study (Figure 1). Fifty-two of the participants (74%) were female, and the median age was 58.5 (IQR: 49.5-67). The median satisfaction level of the patients was found to be 4 (IQR 4-5). Fifty-nine of the patients (84%) were in the satisfied group and 11 of the patients (16%) were in the dissatisfied group (Figure 1). Factors that can affect the satisfaction of the PSA procedure, such as those belonging to the patient, the physical environment, and the physician, are shown in Table 1.

Patient-related factors: Age, gender, education level, comorbidity, type of fracture, and complication rates were similar between the satisfied and dissatisfied patient groups (Table 1).

The median of the RASS scores of the patients during the reduction procedure was: (-2) [IQR: (-3)-(0)].

The median satisfaction score regarding the pre-procedural information about PSA was 5 (IQR 4-5) on a five-point Likert scale. Overall satisfaction with the PSA procedure was higher among those who were satisfied with the information about it ($p=0.014$).

Factors related to the physical environment and physician: No significant difference was found between satisfied and dissatisfied groups regarding the ED area where PSA was applied, and patients' perception of crowding in the ED (Table 2). The median value of the patients' perception of the cleanliness of the environment was 4 (IQR 3-4.3). Satisfied patients had a higher perception of the cleanliness of the environment than the dissatisfied patients.

The median duration of PSA administration was higher in patients satisfied with PSA (12 months) than in patients who were dissatisfied (8 months). There was no difference in patient satisfaction based on the duration of the physician's experience in applying the reduction procedure.

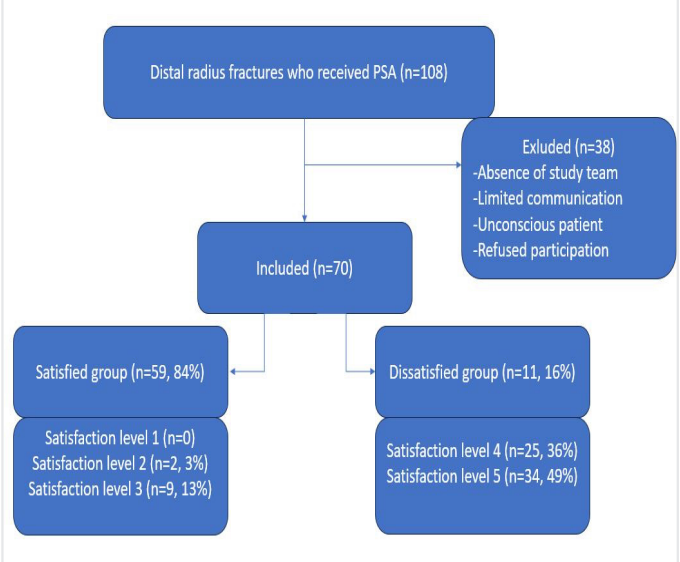

Figure 1. Patient distribution chart
PSA: Procedural sedation and analgesia

Table 1. Patient related factors affecting satifaction

		Patients with dissatisfaction n=11 (%)	Patients with satisfaction n=59 (%)	p
Sex, n (%)	Male	3 (16.7%)	15 (83.3%)	1.000
	Female	8 (15.4%)	44 (84.6%)	
Age (age), median (IQR)		56 (47-67)	59 (50-67)	0.686
Patients education level; n (%)	Graduate	2 (15.4%)	11 (84.6%)	0.922
	Undergraduate	9 (15.8%)	48 (84.2%)	
Comorbidity	At least one	5 (7.1%)	27 (38.5%)	0.985
	None	6 (8.5%)	32 (45.7%)	
Fracture type	Complicated	8 (18.2%)	36 (81.8%)	0.521
	Uncomplicated	3 (11.5%)	23 (88.5%)	
Sedation level	Proper sedation	6 (22.2%)	21 (77.8%)	0.236
	Inappropriate sedation	5 (11.6%)	38 (88.4%)	
Complication	Patients with complication	0 (0%)	6 (100%)	0.542
	Patients without complication	11 (17.2%)	53 (82.8%)	
Pain score before the PSA; median (IQR)		8 (7.25-9.75)	7 (5-9)	0.214
The median of the waiting time before the PSA procedure; minute median (IQR)		30 (15-60)	30 (15-60)	0.915

IQR: Interquartile range, PSA: Procedural sedation and analgesia

Discussion

In our study, it was observed that the majority of patients who underwent PSA in the ED due to distal radius fractures were satisfied with the PSA procedure. In other studies, satisfaction regarding PSA application, in a study using ISAS with a median value of 2.7 (between -3 and +3) a study reporting satisfaction rates of 72-81%, were similarly evaluated to be high (3,5). PSA application in a painful procedure such as bone reduction reduces the pain and anxiety of patients. Therefore, patient satisfaction is also high. Achieving a high satisfaction rate of 84.3% in our study demonstrates effectively that we perform PSA effectively and that the patients are satisfied.

In our study, the application of PSA did not result in any life-threatening complications. The rate of other non-life-threatening complications was 8.6%. In a study conducted in the Netherlands with 1711 patients, the rate of complications associated with PSA application was shown as 10.6 %(5). The PSA complication rates (hypoxia 4.02%, vomiting 1.64%) in the systematic review by Bellolio et al. (6), were similar to those found in our study. The total complication rate in that study was 10.75%. In our study, only four patients developed respiratory depression, which was mitigated with nasal oxygen support, and two patients developed nausea and vomiting. The fact that our complication rate is lower than that reported in other studies shows that we can safely apply PSA in our ED. This may be one of the factors contributing to our high satisfaction rate with PSA. Although the success of the procedure was not evaluated in our study, none of the patients needed to undergo surgery or re-reduction because of unsuccessful reduction. This can be regarded as an indicator of success. With the widespread use of PSA in the ED, satisfaction in painful and difficult procedures is expected to increase. The fact that the majority of our patients (81.4%) stated that they would undergo PSA again if needed supports the confidence and comfort of the patients in PSA application.

Studies in the literature show a relationship between sedation depth and patient satisfaction. In our study, no significant relationship was found between the depth of sedation and patient satisfaction. In an ED study where sedation was followed using the “observers assessment of anaesthesia/Sedation Scale” and the satisfaction was measured with the Iowa satisfaction scale, it was shown that there was a significant relationship between the depth of sedation and patient satisfaction (3). In the referenced study, the number of patients achieving ideal sedation was higher than in our study. In our study, the targeted sedation depth was achieved in 27 patients, less sedation was achieved in 29 patients, and more sedation was achieved in 14 patients. The reason we could not find a relationship between the depth of sedation and satisfaction may be that the effective sedation depth was not sufficiently reached.

Table 2. Factors affecting the satisfaction related to the physical environment and physician				
Factors related to the physical environment				
		Patients with dissatisfaction n=11 (%)	**Patients with satisfaction n=59 (%)**	
ED area where PSA applied	Trauma room	6 (15.8%)	32 (84.2%)	0.542
	Critical care area	2 (8.3%)	22 (91.7%)	
	Observation room	3 (37.5%)	5 (62.5%)	
Patients' perception of crowding in ED	Very calm	0	9	0.205
	Calm	3	20	
	Moderate intensity	4	20	
	Crowded	4	7	
	Very crowded	0	3	
The patient's perception of the cleanliness of the area; median (IQR)		3 (3-3)	4 (3-5)	0.007
Factors related to the physician				
Physicians experience for PSA; month, median (IQR)		8 (2-12)	12 (7-28)	0.025
Physicians experience for reduction; month, median (IQR)		14 (8-18)	15 (10-18)	0.418
IQR: Interquartile range, PSA: Procedural sedation and analgesia, ED: Emergency department				

The median value of the pain level felt by the patients before the procedure is 8 (IQR 6-9), which indicates that patients experience severe pain in distal radius fractures; therefore, the importance of PSA application is emphasized.

In our study, to examine the effect on satisfaction of the properties of the physical area where the PSA procedure is performed, factors such as the specific area in the ED of performance, the density of the environment and the cleanliness of the environment were evaluated. No relationship was found between density and satisfaction, or between the area of the ED where the procedure was performed and satisfaction. On the other hand, the opinions about the cleaning of the area where the PSA was performed were more positive among patients satisfied with the PSA procedure than among those who were not satisfied. We did not find any other data on the cleanliness of the area and on satisfaction in the literature. More studies and evaluations are needed regarding this surprising result.

The median residency (12 months), of the physicians who were satisfied with the PSA procedure was significantly longer than for those whose patients were not satisfied (8 months). The increase in clinical experience is expected to increase the success of the procedure.

Study Limitations

Our study is a single-centered, PSA satisfaction study conducted only in a patient population with distal radius fracture. It cannot be generalized to patients who underwent PSA for other reasons. More comprehensive studies are needed to investigate other parameters that affect PSA satisfaction. In our study, we planned to evaluate the factors affecting physician satisfaction, but we could not make a comparison because all physicians were satisfied with the PSA. The number of patients excluded from the study due to the absence of the study team was high, which we could not have predicted.

Conclusion

In our study, in patients who underwent procedural sedoanalgesia due to distal radius fracture in the ED, we determined that the duration of the residency of the physician who performed the PSA procedure, the physician informing the patient before the PSA, and the cleanliness of the area where the PSA procedure was performed affected patient satisfaction. In our study, patient and physician satisfaction regarding the PSA procedure was also found to be high.

Ethics

Ethics Committee Approval: The study was conducted with the approval of the Ethics Committee of Dokuz Eylül University (approval number: 2019/18-36, date: 17.07.2019).

Informed Consent: Informed consent was obtained from the patients, and from the physician who performed the interventional procedure, before the study.

Footnotes

Authorship Contributions: Surgical and Medical Practices: S.Ö., N.Ç., E.A., M.C.G., Concept - S.Ö., N.Ç., E.A., M.C.G., H.E.; Design - S.Ö., N.Ç., E.A., M.C.G., H.E.; Data Collection or Processing - S.Ö., N.Ç., E.A., M.C.G., H.E.; Analysis or Interpretation - S.Ö., N.Ç., E.A., M.C.G., H.E.; Literature Search - S.Ö., N.Ç., E.A., M.C.G., H.E.; Writing - S.Ö., N.Ç., E.A., M.C.G.

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