RESEARCH ARTICLE

EXAMINATION OF THE RECOVERY PROCESS OF CHILDREN AFTER SURGERY

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DOI: *10.5281/zenodo.5651566*

Cite as: DOLGUN,Eda, SAHIN KOZE,Burcak, YAVUZ van GIERSBERGEN,Meryem, POLAT,Meltem, EROĞLU, Birsen, İSLAMOĞLU,Ayşe, & ERGÜN,Mustafa Orkan. (2021). EXAMINATION OF THE RECOVERY PROCESS OF CHILDREN AFTER SURGERY. Perioperative Nursing (GORNA), E-ISSN:2241-3634, 10(2), 168–176. https://doi.org/10.5281/zenodo.5651566

Abstract

Introduction: Surgery is a stressful experience for children and families, but important is the recovery period after the surgery.**Purpose:** This study was conducted to examine the recovery process of children after surgery.**Methods:** This descriptive type study was conducted on 274 pediatric patients who had urgent and planned surgery other than major gastrointestinal surgery and agreed to participate in the study voluntarily. A question form designed by the researchers following the literature was used as a data collection tool. Groups were evaluated using the Kruskal Wallis H test, in variables that did not show normal distribution. **Results:** Of the participants, 46.4% of children's surgeries were outpatient (OP), 36.5% were emergency (E), 17.2% were planned (P) surgeries. Immediately after surgery, the mean pain levels were 2.3 for "OP", 2 for "E", 3.2 for "P", and the next days were below 1 and 1. Among all the participants, 52% of "OPs", 39% of "E", 36.2% of "P"s were mobilized within 3-6 hours after the surgery. At the hospital 94.5%, 89%, 95.7% of the children respectively, there was not any development of complications, while after discharge, 94.5%, 94%, 95.7% did not have any problem at home. **Conclusion:** It was determined that the majority of children did not have any problems in the recovery process and returned to daily life activities a week after the surgery.

Keywords: Pediatric Surgery**,** post-operative care**,** recovery, outpatient surgery, emergency surgery

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INTRODUCTION

About 5% of people have a planned surgery at some point in their lives. Surgeries affect the children and their families physically, psychologically, socially, and economically (1). Surgery is a stressful experience for children and families (1, 2, 3, 4). Surgical nurses are responsible for preventing complications and improving care outcomes by providing adequate support through continuous monitoring and effective interventions in the surgical process of the patients and their families (1). The development of the child and the effects of surgery on the child and his family should be known when planning the care of children in the surgical process (2).

The postoperative period, which begins immediately after surgery, includes a process that continues until the patient has regained normal function or the end of medical care (5, 6, 7). Patient follow-up after surgery includes the evaluation of the vital signs, wound area, and general condition, as well as administration of necessary medications and prevention of possible problems, early recognition, and treatment. The attention and care given to the patient after anesthesia, in the period of hospitalization, and after discharge should be maintained from beginning to end. This process should start at the stage of waking the patient and taking him on a stretcher and moving him to his bed in intensive care or surgical service and continue until the outpatient follow-up in the period after discharge. It is necessary and important to record the patient's findings, laboratory and measurement results, treatment, and applications in detail, to better direct follow-up and treatment, and to evaluate success and errors in the following periods (8, 9, 10). Regular recording and follow-up reduce the duration of hospitalization of patients, reduce the incidence of complications and re-hospitalization, and therefore reduce hospital costs (11). It is thought that this study contributes to the clinical benefit of pediatric patients by following the postoperative recovery process, examining the condition related to this issue, and determining the requirements.

MATERIALS AND METHODS

It was a descriptive study conducted to examine the recovery process of children after surgery. The data of the study were collected in the Department of Pediatric Surgery of a University Hospital between 19 September 2016 and 29 September 2017. All the children who were admitted to the hospital and operated on in the Department of Pediatric Surgery of the university hospital between 19 September 2016 - 29 September 2017 formed the population of the study. The sample of the study consisted of 274 pediatric patients with their families aged 3-16 years, who had an emergency and a planned surgery other than major gastrointestinal surgery and agreed to participate in the study voluntarily. "Data Collection Form", and "Informed Consent Form" in which patients' relatives gave consent to the participation of the patients in the study, was used to collect the data of the study. The Data Collection Form included questions on sociodemographic characteristics of the operated children and their relatives (age, education, occupation, and living place), questions about the patient's illness, pain, mobilization (movement), nausea-vomiting, and duration of the hospital stay. A number scale is used to measure the amount of pain they feel (6 years of age and older). The Pain Scale uses 0 for "no hurt at all" and 10 for "the biggest hurt you could ever have." Children were asked to give their pain a number from 0-10 points. There were also questions about the presence of problems at home when they come for control and their return to daily life activities.

DATA ANALYSIS AND EVALUATION TECHNIQUES

The data obtained from the study were analyzed using the Statistical Package for the Social Sciences (SPSS) for Windows 21.0 (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) package program. Introductory information about the patients was given as a number, percentage, mean and median, and compliance with normal distribution in numerical variables

was investigated using the Shapiro-Wilk Test. The Kruskal Wallis H test was used to examine the relationship between groups for variables that did not show normal distribution. P<0.05 was considered statistically significant for all results.

ETHICAL

Written permission (decision number 16-6/1 with the date of 01.07.2016) was obtained from the Ethics Committee of Clinical Research of the Faculty of Medicine of a University to conduct the study. After all the necessary information was given to the relatives of the patients to be included in the study about the purpose and application of the study, written consent was obtained for the participation of the patients.

RESULTS

Findings on the Introductory Characteristics of Patients

The distribution of socio-demographic data of children is presented in Table 1.

Table 1: Distribution of Children about Socio-Demographic Data

Age:	$\bar{x}$ = 9.09±3.81 (Min:3, Max:16)	
	Number	Percent
Sex:		
Female	80	29.2
Male	194	70.8
Education status:		
Not started yet	41	15.0
Nursery / Kindergarten	28	10.2
Primary	167	60.9
High school	38	13.9
Living place:		
Village	8	2.9
Town	5	1.8
County	123	44.9
City	138	50.4
Total	274	100.0

Accordingly, the mean age of children is $\bar{x}$=9.09±3.81 (Min:3, Max:16). Of the participants, 29.2% (n: 80) of them were girls and 70.8% (n: 194) were boys, 15% (n: 41) did not start the school yet, 10.2% (n: 28) were going to nursery/kindergarten, 60.9% (n: 167) were going to primary school, and 13.9% (n: 38) were going to high school. A total of 2.9% (n:8) children live in the village, 1.8% (n:5) in the town, 44.9% (n: 123) in the county, and 50.4% (n:138) in the city (Table 1).

The mean age of families of children patient included in the study is $\bar{x}$ = 38.13±8.15 (Min:21, Max:66). Of the families 3.3% (n: 9) of them are illiterate, 1.1% (n: 3) literate, 24.8% (n: 68) primary school graduated, 13.9% (n: 38) secondary school graduated, 33.2% of them (n: 91) high school graduated, 23.7% (n: 65) of them university/college graduated. Of the parents being companion to the operated child, 71.2% (n: 195) were mothers, 23.4% (n: 64) were fathers, 1.1% (n: 3) aunts, 2.6% (n: 3) 7) grandparents, 1.8% (n: 5) were older siblings. Of the parents ,11.3% (n: 31) are civil servants, 9.9% (n: 27) are workers, 20.4% (n: 56) are self-employed, 5.5% (n: 15) are healthcare professionals, 43.1% 'i (n: 118) are housewives. Of all the parents, 92% (n: 252) of the families of the children received information about the surgery, 69.3% (n: 190) of which received the information from the doctor and 22.6% (n: 62) from the nurse, while 8% (n: 22) of them did not receive any information at all.

It was seen that 46.4% (n: 127) of the children included in the study had outpatient surgery, 36.5% (n: 100) had emergency surgery, and 17.2% (n: 47) had a planned surgery.

Surgery catergories of the children included in the study as followed; 33.9% (n: 93) appendectomy, 17.2% (n: 47) circumcision, 9.9% (n: 27) ligation,9.1% (n: 25) urotoplasty, 5.1% (n: 14) cyst/mass excision, 4.7% (n: 13) cholecystectomy, 3.6% (n: 10) excision, 3.6% (n: 10) IVRS, 2.6% (n: 7) hernia repair, 1.5% (n: 4) ovarian/testicular torsion, 1.1% (n: 3) orchipexy, 1.1% (n: 3) subureteric injection, 1.1% (n: 3) thyroidectomy, 0.7% (n: 2) circumcision and hydrocelectomy, 0.7% (n:

2) circumcision and orchipexy, 0.7% (n: 2) stenosis dilatation, 0.4% (n: 1) endoscopy, 0.4% (n: 1) mesenteric lymph biopsy, 0.4% (n: 1) nephrectomy, 0.4% (n: 1) esophagomyotomy.

It was determined that 66.4% (n: 182) of the children spent the night before the surgery at home, and 33.6% (n: 92) spent the night in the hospital.

Table 2: Distribution of data on the duration of children's post-operative fasting

	Duration of fasting time after surgery			
	$\bar{x}$	Std.	Min.	Max.
Outpatient	2.31	±2.37	1 hour	18 hour
Emergency	15.27	±13.29	3 hour	72 hour
Planned	8.57	±15.12	1 hour	96 hour

The distribution of data on fasting times after surgery for children included in the study is presented in Table 2. The mean duration of post-operative fasting of children was determined as $\bar{x}$ = 2.31±2.37 (Min:1, Max:18) for outpatient surgeries, $\bar{x}$ = 15.27±13.29 (Min:3, Max:72) for emergency surgeries, and $\bar{x}$ = 8.57±15.12 (Min:1, Max:96) for a planned surgery. There is a significant difference between the type of surgery and the duration of post-operative fasting ($p<0.0001$).

Distributions of the first thing to be given orally, 64.6% of the children (n: 177) had water, 25.9% (n: 71) hadfruit juice, 3.6% (n: 10) had soup, 2.6% (n: 7) had milk, % 1.5 (n: 4) had crackers/biscuits, 1.5% (n: 4) had puding, 0.4% (n: 1) had babyfood. A total of 83.9% (n:230) of the child patients did not experience nausea after surgery, while 16.1% (n:4) experienced nausea. The majority of them, 90.5% of patients (n:248), did not vomit after surgery, while 9.5% (n:26) did.

Table 3: Distribution of Children by Mean Pain evaluations Immediately After Surgery

	Mean pain evaluations immediately after surgery[a]			
	$\bar{x}$	Std.	Min.	Max.
Outpatient	2.32	±2.70	0 point	10 points
Emergency	2.04	±2.51	0 point	8 points
Planned	3.19	±3.16	0 point	10 points

[a] The mean pain in the following days was below 1 and 1.

The children pain evaluations immediately after surgery is presented in Table 3. Immediately after surgery, the mean points of pain was $\bar{x}$ = 2.32±2.70 (min:0, Max:10) for outpatient surgeries, $\bar{x}$= 2.04±2.51 (min:0, Max:8) was for emergency surgeries, and $\bar{x}$ = 3.19±3.16 (min:0, Max:10) was for the planned surgeries. The mean point of pain in the following days was below 1 and 1.

Table 4: Distribution of Children According to the Hours of Mobilization and Duration of Mobilization after the Surgery

	Outpatient		Emergency		Planned	
	Number	Percent	Number	Percent	Number	Percent
Time of mobilization:						
0 to 2 hours	55	43.3	11	11.0	9	19.1
3 to 6 hours	66	52.0	39	39.0	17	36.2
7 to 12 hours	1	0.8	29	29.0	6	12.8
19 to 24 hours	-	-	7	7.0	4	8.5
25 hours and above	2	1.6	8	8.0	7	14.9
	3	2.4	6	6.0	4	8.5

Table 4 shows the distribution of children according to the hours of mobilization and duration of mobilization after the surgery. Accordingly, 52% (n: 66) of the children were mobilized 3-6 hours after outpatient surgery with a mean of $\bar{x}$ = 10.42 ± 8.42 minutes for the mobilization, while 39% (n: 39) of the children were mobilized 3-6 hours after emergency surgery with a mean of $\bar{x}$ = 9.26 ± 5.14 minutes, and 36.2% (n: 17) of the children were mobilized 3-6 hours after a planned surgery with a mean of $\bar{x}$= 9.10 ± 8.99 minutes.

Of all the children, 70.1% (n: 192) of them managed to pass gas after surgery, however 29.9% (n: 82) of them could not. Of all the children, 89.8% (n: 246) of them managed to pass stools after surgery, while 10.2% (n: 28) of them did not. It was determined in the study that, mean gas passing time was $\bar{x}$ = 11.00 ± 11.99 hours, and first stool $\bar{x}$ = 21.59 ± 15.28 hours for children with outpatient surgery, while the mean gas passing time was $\bar{x}$ = 15.85 ± 9.40 hours, and first stool $\bar{x}$ = 31.09 ± 19.10 hours for children with emergency surgery whereas mean gas passing time was $\bar{x}$ = 16.54±10.95hours and first stool $\bar{x}$ = 24.50±14.43 hours for children with the planned surgery. There is a significant difference between the type of surgery and the time to pass gas after surgery and the time to pass a stool after surgery ($p<0.05$) ($p<0.0001$).

Table 5: The distribution of the children according to the time of coming to follow-up, complications, problems at home, and returning to daily life activities after the surgery

	Outpatient		Emergency		Planned	
	Number	Percent	Number	Percent	Number	Percent
Follow-up status:						
Did not come	62	48.8	11	11.0	4	8.5
1 week later	8	6.3	6	6.0	6	12.8
10 days later	36	28.3	71	71.0	19	40.4
1 month later	17	13.4	9	9.0	18	38.3
3 months later	4	3.1	2	2.0	-	-
Development of complication						
Yes						
No	2	1.6	11	11.0	2	4.3
	125	98.4	89	89.0	45	95.7
The presence of complication or a problem:						
Yes	7	5.5	6	6.0	2	4.3
No	120	94.5	94	94.0	45	95.7
Time to return to daily life activity						
Immediately						
Within the week of the surgery	16	12.6	6	6.0	8	17.0
One week after surgery	39	30.7	22	22.0	12	25.5
10 days later						
1 month later	61	48.0	42	42.0	15	31.9
	11	8.7	29	29.0	12	25.5
	-	-	1	1.0	-	-

The distribution of the children according to the time of coming to follow-up, complications, problems at home, and returning to daily life activities after the surgery is presented in Table 5. Accordingly, it was determined that 48.8% of children who had outpatient surgery (n:62) did not come to the follow-up after surgery, while 71% (n:71) of children who had emergency surgery and 40.4% (n:19) of them with a planned surgery came for the follow-up after 10 days. It was determined that 98.4% (n: 125) of children who had outpatient surgery, 89% (n: 89) of those who had emergency surgery, 95.7% (n: 45) of those who had a planned surgery, did not develop any complications after the surgery. In patients who developed complications (n: 14), abdominal pain was observed in 2.6% (n: 7), fever in 1.1% (n: 3), fluid coming from their stitches in 1.1% (n:3), abdominal abscess in 0.4% (n:1). It was determined that 94.5% (n: 120) of children who had outpatient surgery, 94% (n: 94) of those who had emergency surgery, and 95.7% (n: 45) of those who had a planned surgery did not have any problems at home after the operation. Of the patients with problems at home (n: 15), 2.6% (n: 7) had pain, 1.1% (n: 3) was unable to urinate, 0.7% (n: 2) had abdominal pain, 0.4% (n: 1) had constipation, 0.4% (n: 1) had urinary tract infection, 0.4% (n: 1) had infection. It was determined that 48% (n: 61) of children who had daily surgery, 42% (n: 42) of those who had emergency surgery, and 31.9% (n: 15) of those who had a planned surgery returned to daily life activities one week after the operation.

DISCUSSION

The data obtained from this study, conducted to examine the postoperative recovery process of children, were interpreted in line with the literature information and research hypotheses.

In the study, it was observed that 66.4% of the children to be operated on spent the night before the surgery at home. It is thought that this rate is due to factors such as the fact that most of the pediatric patients' elective surgeries were outpatient surgery, their short duration of hospital stay, and prevention of infections. Postoperative early mobilization, less hospital costs, and most importantly, shorter hospital stay lead outpatient surgery to be preferred (12). In 2016, the Academy of Medical Royal Colleges emphasized the importance of outpatient surgery and that 186,000 patients can be treated without much more expense, by performing the most common 20 surgeries with outpatient surgery (13). In the UK's 2011 and 2019 guidelines, the goal of 75% outpatient surgery continues (13). Based on the findings of the study, most of the operations (46.4%) were performed on an outpatient surgery basis, which supports the literature information. Acute appendicitis is the most common condition that requires emergency surgery in childhood and adolescence. Every year, 69 thousand of the 71 thousand pediatric cases accepted with suspected appendicitis require an appendectomy (14). The fact that most of the operations performed (33.9%) were appendectomy in the study findings is in parallel with the literature data. Also, it is thought that the reason why the high percentage of the last food eaten (53.3%) was dinner was that the majority of children spent the night before the surgery at home and families did not want to wake up children who slept early.

In the study, the majority of the children after surgery did not experience nausea (83.9%) and vomiting (90.5%). According to the guidance of the Royal College of Anesthetists 2020 in the literature, it is recommended to have special guidance for the prevention and treatment of postoperative nausea and vomiting in children and young people. In the clinic where the study was conducted, the appropriate anesthesia method is determined for each child after the anesthesiologist evaluates each child before the operation, and the clinical nurse closely monitors them. For this reason, the rates are considered to be low.

Doctor and nurses decided when child may start drinking and eating after surgery. Children started off

slowly, with clear liquids, such as water, fruit juice. If child doesn't vomit; be given a light meal, such as soup or crackers.

In the study, the average duration of post-operative fasting of children was determined as $\bar{x}$=2.31±2.37 (Min:1, Max:18) for outpatient surgeries, while $\bar{x}$=15.27±13.29 (Min:3, Max:72) for emergency ones, and $\bar{x}$ = 8.57±15.12 (Min:1, Max:96) for planned ones. In the guide of the European Society of Clinical Nutrition and Metabolism (ESPEN), it is recommended to start oral nutrition as soon as possible, based on individual tolerance and types of surgery (15). Looking at the literature, in the study of Reismann et al.,(16) the time to start oral feeding was 15 hours. On the other hand, in the study conducted by Rızalar and Özbaş (17) on children with appendectomy, the mean first fluid intake time was 17.86 ± 2.21 hours in the experimental group, 44.30 ± 11.09 hours in the control group, while the mean transition time to soft food was 23.97 ± 3.84 hours in the experimental group, 49.47 ± 37 11.81 hours in the control group, and the mean transition time to solid food including a normal diet was 37.82 ± 5.77 hours in the experimental group and 64.26 ± 12.60 hours in the control group. Immediately after surgery, the mean pain was $\bar{x}$ = 2.32±2.70 (min:0, Max:10) for outpatient surgeries, $\bar{x}$= 2.04±2.51 (min:0, Max:8) was for emergency surgeries, and $\bar{x}$ = 3.19±3.16 (min:0, Max:10) was for a planned surgery.

Every child feels pain and shows that they're feeling pain differently. Children admitted to the pediatric intensive care unit can experience significant morbidity as a consequence of mechanical ventilation and sedative medications.(18,19)

The mean point's pain in the following days was below 1 and 1. In the study of Reismann et al.,(20) the mean pain of children was found to be 4.2 ± 2.9 on the evening of the surgery, 2.2 ± 2.1 on the first postoperative day, and 2.0 ± 2.4 on the second postoperative day. In this study, it was observed that the mean pain levels were less than the literature findings. The reason for the pain levels to be lower is thought to be due to the block anesthesia applied to the operation area in the clinic and the frequent evaluation of the pain of children after the surgery and the interventions.

Early mobilization after surgery is known to positively affect recovery (18). In this study, it was observed that 52% of the children who had outpatient surgery, 39% of those who had emergency surgery, and 36.2% of the children who had a planned surgery were mobilized 3-6 hours after the operation. The study findings were found to be similar to the study findings of Rızalar and Özbaş (17) (the mean duration of first mobilization of the children 9.91 ± 2.48 hours in the experimental group, 11.91 ± 3.08 hours in the control group) and Dolgun et al.,(19) (90.6% (n = 193) of the patients stood up in the first 24 hours and the average time to stand up was 10.38 ± 8.46 minutes).

In the study, mean time to pass gas was $\bar{x}$ = 11.00 ± 11.99 hours, and first stool $\bar{x}$ = 21.59 ± 15.28 hours for children with outpatient surgery, while mean time to pass gas was $\bar{x}$ = 15.85 ± 9.40 hours, and first stool $\bar{x}$ = 31.09 ± 19.10 hours for children with emergency surgery whereas mean time to pass gas was $\bar{x}$ = 16.54±10.95 hours, and first stool $\bar{x}$ = 24.50±14.43 hours for children with the planned surgery. There is a significant difference between the type of operation and time to pass gas after surgery. In a similar study, Rızalar & Özbaş (17) found that the mean time to pass gas was $\bar{x}$ = 19,00 ± 3,75, and first stool $\bar{x}$ = 47,23± 7,40 hours for experimental group, while mean time to pass gas was $\bar{x}$ =28,97±6,65 hours, and first stool $\bar{x}$ = 68,21 ± 11,55 hours for control group. There is a significant difference between the type of surgery and the time to first stool after surgery. In this study, since outpatient surgeries, which do not include any gastrointestinal system surgery, are considered in the smaller surgery group, and these patients are mobilized earlier, gastrointestinal system movements begin earlier. It is thought that there are earlier passing of gas and stool output because of this.

CONCLUSION

The vast majority of children were mobilized within the first two hours after surgery, and they were allowed to move around 10 minutes on average. In the vast majority of children, there was not any development of complications after the surgery, and they did not have any problems at home and returned to daily life activities within the week of surgery.

In line with the study results, it is recommended to emphasize the importance of subjects related to the recovery process after the surgery such as early mobilization, early nutrition, etc... through verbal/written materials as directed by the guidelines to the healthcare professionals, patients, and the relatives. It is also recommended to increase their awareness of these matters and make the necessary arrangements in the clinic in a multidisciplinary manner.

Acknowledgment: Authors would like to thank the patients who contributed to this study for their interest, support and assistance in conducting our study.

"This study is supported by Ege University Scientific Research Projects Coordination Unit. Project Number: 2016-TIP-088".

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