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PROFILE OF POST LAPAROTOMIC SURGERY IN PATIENTS 1 – 12 MONTHS OF AGE AT DR. SOETOMO GENERAL HOSPITAL

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Abstract: Background: Intestinal obstruction is mostly manifested in the pediatric 1 – 12 months age group. The ideal hospital length of stay is 6 – 9 days. Management of intestinal obstruction by surgical approach leads to 3 – 4 times longer length of stay compared to a conservative approach. Objective. To find out the associated factors of hospital length of stay post laparotomy. **Methods:** Research data were obtained from medical records of 1 – 12 months old infants who underwent laparotomy in Dr. Soetomo General Hospital from January to December 2018. Data analysis was performed by Fisher's Exact test. **Result:** The total subject of 24 patients had a mean 13,4 days length of stay. There were 8 (33,3%) patients with $\leq$ 6 days length of stay and 16 (67,7%) with > 6 days length of stay. Nutritional status (p=0,022), diagnosis (p=0,009), and the type of laparotomy (p=0,009) are correlated with length of stay. **Conclusion:** Subjects have a longer length of stay than the recommendation. There is a correlation between nutritional status, diagnosis, and the type of laparotomy with the length of stay.

Key words: open surgery, laparotomy, infant, length of stay

Introduction

Bowel obstruction in infants is almost always the result of congenital abnormalities, such as atresia, stenosis, or malrotation. This case is still a challenge in pediatric surgical emergencies and needs immediate treatment.[1] Research in Riau, Indonesia, stated that intestinal obstruction cases in children are most manifested in the 28 days - 12 months age group compared to other age groups, with the main causes including Hirschsprung Disease, adhesions, and intussusception.[2] Management of intestinal obstruction can be done through (1) conservative therapy with a barium enema, or (2) surgical therapy with invasive or minimally invasive methods.[3,4] Studies by Kaiser et al.[5] showed that surgery is still needed in cases of failed therapy or barium enema contraindications.

Laparotomy is an invasive surgical procedure on the abdominal wall to gain access to the peritoneal cavity and better visualise the abdominal organs compared to laparoscopy.[6] In the laparotomy procedure, both manual reduction and anastomosis resection can be performed.3 The consequences of laparotomy surgery are the presence of postoperative cosmetic wounds, high rates of postoperative complications, and length of recovery period that may prevent patients from being discharged. Children with surgical therapy undergo hospitalization 3-4 times longer than children with conservative therapy.[5] According to the Indonesian Ministry of Health, the ideal length of stay is 6 - 9 days. In addition to providing an overview of the level of efficiency, length of stay can also provide an overview of service quality.[7] The application of the ideal length of stay aims to reduce the risk of nosocomial infections. WHO reported that 5% - 34% of total nosocomial infections are surgical wound infections.[8] The success of recent intussusception surgical therapy showed that the average hospitalization of patients with manual reduction was 3.9 days and patients with bowel resection were 6.1 days.[5]

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Table 1 Subjects' Characteristics (N=24).

Characteristics	n (%)
Gender	
Male	15 (62,5)
Female	9 (37,5)
Nutritional Status	
Severely underweight	8 (33,3)
Normal	16 (66,7)
Diagnosis	
Intussusception	15 (62,4)
Pancreatic annulare	2 (8,3)
Adhesion with obstruction	2 (8,3)
Esophageal diverticle	1 (4,2)
Anal and rectal fistule	1 (4,2)
Volvulus	1 (4,2)
Wound dehiscence	1 (4,2)
Anal and rectal stenosis	1 (4,2)
ASA Score	
II	4 (16,7)
III	18 (75)
IV	2 (8,3)
Preoperative Antibiotics	
Prophylaxis	22 (91,7)
Therapeutic	2 (8,3)
Type of Surgery	
Cito	21 (87,5)
Elective	3 (12,5)
Wound Classification	
Clean	6 (25)
Clean-contaminated	12 (50)
Contaminated	3 (12,5)
Infection	3 (12,5)

Type of Laparotomy	
Minor	15 (62,5)
Major	9 (37,5)
Stoma Formation	
Ileostomy double barrel	4 (16,7)
Loop sigmoidostomy	2 (8,3)
Without stoma	18 (75)
Oral feeding	
Early	14 (58,3)
Late	10 (41,7)
Length of Stay	
$\leq$ 6 days	8 (33,3)
$>$ 6 days	16 (66,7)

Methods

This research is a descriptive-analytic type using a cross-sectional approach. The research subjects were obtained from the medical record data of patients in the Inpatient Room for Functional Medical Staff (SMF) Children's Health Sciences Dr. Soetomo Surabaya from January 2018 to December 2018. Subjects were infants aged 1-12 months after laparotomy surgery at Dr. Soetomo, who met the inclusion and exclusion criteria with the total sampling method. The inclusion criteria in this study were the medical records of patients aged 1-12 months with code ICD-9-CM 54.1, namely laparotomy surgical procedures during the study period. Exclusion criteria were patients with incomplete medical records. Data were collected from medical records, which included (1) independent variables, namely gender, body weight, primary diagnosis, ASA score, preoperative antibiotics, type of surgery, category of surgical wounds, type of laparotomy, stoma making, and oral feeding, and (2)) the dependent variable, namely the length of stay.

The operational limitations are as follows, the classification of nutritional status uses 2006 WHO chart, namely body weight based on age for children aged <2 years. The categories of nutritional status were divided into malnutrition (<-3 SD), undernutrition (-3 SD to <-2 SD), good nutrition (-2 SD to 2 SD), and overnutrition (> 2 SD). Types of surgery are divided into cito and elective surgery. Surgical wound categories are divided into clean, clean, contaminated, and dirty wounds. There are two types of laparotomy, namely minor laparotomy and major laparotomy. It is called minor laparotomy if there is no bowel resection during the surgical procedure. Major laparotomy is if there is bowel resection with stoma creation or end-to-end anastomosis. Postoperative oral nutrition is said to be early oral feeding if given $\leq$ 24 hours and late oral feeding if given> 24 hours. Length of stay is the number of days the patient is admitted from hospital admission to discharge.

The research analysis used SPSS. The relationship between the independent variables and the dependent variable was tested using Fisher's exact method. There is a significant relationship if the p-value is <0.05. This study was approved by the Health Research Ethics Committee of Dr. Soetomo Surabaya with ethical clearance no. 1483 / KEPK / Ix / 2019.

Results

The research subjects were 24 patients who were in the age range of 1-12 months. The mean length of stay in the subjects was 13.4 days. A total of 8 (33.3%) subjects underwent hospitalization $\leq$ 6 days and 16 (66.7%) subjects underwent hospitalization> 6 days. The proportion of male to female is 1.7:1. There were 8 (33.3%) malnourished subjects and 16 (66.7%) well-nourished subjects. There were no subjects with less or more nutritional status. The most common diagnosis was intussusception in 15 (62.4%) subjects. A total of 4 subjects with a diagnosis of adhesions (2 subjects), wound dehiscence (1 subject), and intussusception (1 subject) had a history of the previous laparotomy.

Two of the 3 subjects who underwent elective surgery were given therapeutic antibiotics. Antibiotic use regimens obtained in this study included cefazoline (15 subjects), ampicillin (6 subjects), ceftriaxone (2 subjects), and cefuroxime (1 subject). Nine subjects who underwent bowel resection were included in the category of major laparotomy. In 6 subjects who had a stoma made, 4 subjects had a double-barrel ileostomy, and 2 subjects had loop sigmoidostomy. The distribution of the characteristics of the research subjects is shown in Table 1.

In the results of the bivariate analysis, there was a significant relationship ($p < 0.05$) between the variables of nutritional status, diagnosis, and type of laparotomy with the variable length of stay (Table 2). All subjects with poor nutritional status (8 subjects), a diagnosis other than intussusception (9 subjects), and those undergoing major laparotomy (9 subjects) underwent hospitalization > 6 days.

Discussion

Subjects in this study had a longer average hospitalization (13.4 days) than the ideal standard of hospitalization (6 - 9 days), but shorter than the study by Lakhoo et al.[9] (134 days). The difference in length of stay was due to differences in the diagnosis underlying the laparotomy. There is a relationship between diagnosis and length of stay ($p = 0.009$). Subjects with a diagnosis other than intussusception had a longer hospital stay than a diagnosis of intussusception. The difference in pathophysiology of intussusception with other diseases underlies the difference in length of stay. Intussusception is the entry of the ileum into

Table 2 Results of Bivariate Analysis.

Variable	Length of stay				P-value
	≤6 days		>6 days		
	n	%	n	%	
Gender					
Male	6	75	9	56,2	0,657
Female	2	25	7	43,8	
Nutritional Status					
Severely underweight	0	0	8	50	0,022
Normal	8	100	8	50	
Diagnosis					
Intussusception	8	100	7	43,8	0,009
Other than intususepsi	0	0	9	56,2	
ASA Score					
II	1	12,5	3	18,8	1,000
III and IV	7	87,5	13	81,2	
Preoperative Antibiotics					
Prophylaxis	8	100	14	87,5	0,536
Therapeutic	0	0	2	12,5	
Type of Surgery					
Cito	8	100	13	81,2	0,526
Elective	0	0	3	18,8	
Wound Classification					
Clean and clean-contaminated	6	75	12	75	1,000
Contaminated and infection	2	25	4	25	
Type of Laparotomy					
Minor	8	100	7	43,8	0,009
Major	0	0	9	56,2	
Stoma Formation					
Yes	0	0	6	37,5	0,066
No	8	100	10	62,5	
Oral feeding					
Early	7	87,5	7	43,8	0,079
Late	1	12,5	9	56,2	

p-value <0,05 is considered significant

the cecum so that the intestinal segment is trapped, and the degree of severity is local, such as the presence or absence of ischemia, bacterial build-up, or tissue necrosis.[10] Diagnosis of adhesions and wound dehiscence results from complications from previous surgical history so that it can be distinguished by diagnosis intussusception.

Meanwhile, in the partial or total imperforate anus, 50% of cases are strongly associated with Down syndrome.[11] In addition, multiple anomalies with a combination of duodenal atresia, intestinal malrotation, and Down syndrome can also be found in 10-20%. cases of annular pancreas.[12] The presence of other comorbid diseases can prolong the length of stay.

There is no relationship between gender and length of stay. The study by Foulds et al.[13] stated that gender had little or no effect on length of stay. Nutritional status had a significant relationship with length of stay ($p = 0.022$). This is due to the significant influence of nutritional status on physiological changes, micronutrient imbalance, and gastrointestinal dysfunction.[14] In patients with poor nutrition, the need for protein, fat, and carbohydrates to maintain tissue structure is not fulfilled.[15] The degree of disease can exacerbate the state of preexisting malnutrition and can be a predisposing factor for complications and prolonged duration of treatment.[16]

ASA scores, preoperative antibiotics, and type of surgery did not have a significant relationship in this study. The three variables were more directly related to the presence or absence of surgical wound infection (ILO), then the length of stay was associated. Studies by Adamou et al.[17] and Lina et al.[18] stated that ASA IV score and cito surgery have a significant relationship with the incidence of ILO, where ILO can increase mortality, affect wound healing, and prolong postoperative hospitalization. In addition, wound contamination is a factor that increases the risk of the ILO, which is then associated with prolonged hospitalization due to increased morbidity and mortality.[19] However, there was no evidence of a significant relationship between surgical wound category and length of stay in this study.

There was a significant relationship between the type of laparotomy and length of stay ($p = 0.009$). Intestinal resection disrupts the motor activity of the intestine and causes it to become paralyzed, thus extending the time to return to bowel function. This is what causes the length of stay in major laparotomy is longer than minor laparotomy without bowel resection. Six out of 9 subjects with bowel resection underwent stoma creation, while the rest performed end-to-end anastomosis. Post-resection of bowel stoma did not have a significant relationship with length of stay. According to Hignet et al.[20], apart from not prolonging hospitalization, stoma making also did not affect the incidence of complications, readmissions, and anastomotic leak.

Early oral feeding was not proven to shorten the length of stay because patients with late oral feeding still received nutrition from the nasogastric tube in this study. This study's result differs from the results of the study by Mamatha et al.[21], which stated that early oral feeding $\leq$ 24 hours postoperatively without waiting for the return of bowel activity can be carried out safely and can reduce the length of stay. The Early Recovery After Surgery (ERAS) guidelines do not recommend that nasogastric tubes remain in place postoperatively as a routine procedure and suggest a gradual increase in feeding at early oral feeding as a stimulant for bowel mobility.[22]

Conclusion

Subjects have a longer length of stay than the recommendation. There is a correlation between nutritional status, diagnosis, and the type of laparotomy with hospital length of stay, respectively.

Ethics Committee

This study was approved by the Health Research Ethics Committee of Dr. Soetomo Surabaya with ethical clearance no. 1483 / KEPK / Ix / 2019

Conflict of interest

Authors declare no conflict of interest.

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