

# The Correlation Between Age of Operation and Postoperative Early Complication in Hirschsprung Patients Operated Using the Swenson Pull-Through Technique

# Putu Yudis Pramana<sup>1\*</sup>, Kadek Deddy Ariyanta<sup>2</sup>, I Wayan Niryana<sup>3</sup>, I Wayan Sudarsa<sup>4</sup>, IGAB Krisna Wibawa<sup>5</sup>, and I Made Mulyawan<sup>6</sup>

<sup>1</sup>Department of General Surgery, Faculty of Medicine, Udayana University, Prof. Dr. IGNG Ngoerah General Hospital, Denpasar, Indonesia (80113)

<sup>2</sup>Division of Pediatric Surgery, Department of Surgery, Faculty of Medicine, Udayana University, Prof. Dr. IGNG Ngoerah General Hospital, Denpasar, Indonesia (80113)

<sup>3</sup>Division of Neurosurgery, Department of Surgery, Faculty of Medicine, Udayana University, Prof. Dr. IGNG Ngoerah General Hospital, Denpasar, Indonesia (80113)

<sup>4</sup>Division of Surgical Oncologist, Department of Surgery, Faculty of Medicine, Udayana University, Prof. Dr. IGNG Ngoerah General Hospital, Denpasar, Indonesia (80113)

<sup>5</sup>Division of Vascular and Endovascular Surgery, Department of Surgery, Faculty of Medicine, Udayana University, Prof. Dr. IGNG Ngoerah General Hospital, Denpasar, Indonesia (80113)

<sup>6</sup>Division of Digestive Surgery, Department of Surgery, Faculty of Medicine, Udayana University, Prof. Dr. IGNG Ngoerah General Hospital, Denpasar, Indonesia (80113)

E-mail: yudisprmna@gmail.com ; deddyariyanta@yahoo.com; niryanawayan@gmail.com; sudarsa1510@yahoo.com; krisnawibawa64@gmail.com; mulyawanm@yahoo.com

\*Corresponding author: Putu Yudis Pramana; yudisprmna@gmail.com

# ABSTRACT

**Background:** Hirschsprung is a disease characterized by the absence of ganglion cells in the myenteric glands and submucosal plexus of the intestine. The principle of operation for Hirschsprung patients is to remove the aganglionic part, followed by anastomosis of the proximal and distal ganglionic parts. However, postoperative complications that occur less than 30 days after definitive surgery can still occur. **Method:** Analytical observational research with a retrospective cohort design using the Windows Statistical Package for the Social Sciences (SPSS) version 24 program. **Results:** 40 research subjects were divided into 20 subjects in the operating age group > 28 days and  $\leq$  28 days. It was found that there were 12 subjects with complications in the  $\leq$ 28 days group and 9 subjects in the > 28 days group (RR 1.333 95%CI: 0.730 – 2.435). Three patients had low body weight, and two of them had complications with statistical insignificance (p 0.100). The relationship between gender, duration of surgery, amount of bleeding, and length of the aganglion segment was not statistically significant (p>0.05). There were 10 subjects with complications in the group with assistance with laparotomy or laparoscopy. The analysis showed a statistically significant (p=0.032) relative risk value of 1.888 (95%CI: 1.096 – 3.252). **Conclusion:** The risk of early complications in Hirschsprung neonate patients aged before 28 days is not significantly different compared to patients aged after 28 days - 1 year.

Keywords: complications; postoperative; Hirschsprung; neonate

# INTRODUCTION

Harold Hirschsprung first discovered Hirschsprung's disease in 1888. It is characterized by the absence of ganglion cells in the intestine's myenteric glands and submucosal plexus [1].

Hirschsprung's disease is found more often in men than women, with a ratio of 4:1 [2]. In the United States, the incidence rate is 1 case in every 5,400-7,200 live births each year. In Asian populations, it is reported that the incidence of Hirschsprung's disease is 1:3571 live births [3]. Meanwhile, no epidemiological data in Indonesia shows the incidence of Hirschsprung's disease. At Prof. Dr. IGNG Ngoerah Denpasar Bali General Hospital, Denpasar, 135 Hirschsprung patients had a pull-through procedure at Prof. Dr. IGNG Ngoerah Denpasar Bali General Hospital's Central Surgical Installation from 2015 to 2019 [4].

The average age at which definitive surgery was performed was 17.6 months, with a median of 6 months, and there were more females than males.

Management of Hirschsprung's disease is divided into two, namely initial management and definitive management. Initial management focuses on revitalizing the patient's condition [3]. Definitive management is to remove the aganglionic portion of the colon. Classical management of neonates who have been diagnosed with Hirschsprung's disease is to perform a leveling colostomy and wait 6 – 12 months for definitive pull-through surgery [5]. The principle of surgery in Hirschsprung's disease is to remove the aganglionic part, followed by anastomosis of the proximal and distal ganglionic parts, and maintain the function of the canal and sphincter anal [6].

In the last three decades, the development of definitive surgical techniques for Hirschsprung's disease has occurred rapidly, and surgical procedures have transitioned to the primary pull-through method, which can also be performed using laparoscopy. The age at which definitive surgery for Hirschsprung's disease can be performed can be done during the neonate's age (before 28 days) and carried out in 1 stage, thereby reducing morbidity, mortality, and postoperative complications as well as long-term complications from Hirschsprung. Long-term complications significantly affect the patient's quality of life [7].

The Swenson pull-through surgical technique is one of Hirschsprung's few definitive surgical techniques [8]. This technique was first used in 1948 and has been developing. Many surgeons do not use this technique because the level of dissection is complex, and there is a higher risk of damage to the genitourinary system than other surgical techniques. However, if performed by an experienced surgeon, this technique has a minimal recurrence rate [9].

The risk of contamination during surgery should be minimal in patients who have undergone definitive surgery because this type of surgery is a clean, contaminated operation. However, postoperative complications that occur less than 30 days after definitive surgery can still occur. Surgical wound infections and wound dehiscence can still happen due to poor bowel preparation before surgery, inadequate antibiotic prophylaxis, preoperative nutrition, poor patient hemostasis, long operation time, and the sterilization process during surgery. Large amounts of bleeding after definitive surgery are rare. However, the main factors are patients with a history of blood clotting disorders or coagulopathy. Complications of anastomosis can include leakage from the anastomosis and abscesses in the pelvis. Injuries to surrounding organs such as the vagina or urethra are found in postoperative patients using the Swenson pull-through technique. Mechanical obstruction can also be caused by anastomotic strictures and twisted pull-through segments [10].

Gao et al. conducted a study in China 2017 to compare the Swenson and Soave surgical techniques

for Hirchsprung complications [11]. Of the 148 patients who had definitive surgery under the age of 1 year, it was found that the Swenson pull-through surgical technique had a lower incidence of complications compared to the group that underwent surgery using the Soave technique. In patients who underwent Swenson pull-through, the rate was 15.18% compared to patients who underwent Soave pull-through, 30.43% [7]

Because of this condition, researchers are interested in knowing the rate of early complications in patients who underwent definitive Hirschsprung surgery using the Swenson pull-through technique during neonatal age. Limited data in Indonesia is also the reason researchers want to conduct this research. Several things that will be studied include the patient's demographic condition (age, gender, and birth weight), the duration of the operation (duration of surgery, bleeding, surgery with the help of laparotomy or laparoscopy, length of the aganglionic segment), the postoperative condition (complaints that arise related to with postoperative complications).

#### **METHODS**

This research is an analytical observational study with a retrospective cohort design. The consideration for choosing a retrospective cohort was because the research looked backward using data from medical records with measurements of factors or exposures consisting of age, gender, birth weight, duration of surgery, amount of bleeding, and length of the aganglionic segment found, and then assessing the incidence of early complications in each -each age group.

The research was conducted at the Department of Pediatric Surgery, University of Udayana/Prof. Dr. IGNG Ngoerah Denpasar Bali Hospital. This research was conducted from December 2019 to March 2022. The target population was all patients who underwent surgery using the Swenson pull-through technique. Inclusion criteria: Patients under 1 year and undergoing surgery using the Swenson pullthrough technique at Prof. Dr. IGNG Ngoerah Denpasar Bali Hospital from December 2019 to March 2022. Exclusion criteria: patients aged over 1 year, patients with a history of colostomy, patients with Down Syndrome, patients with a history of congenital heart disease, and patients with total colon ganglion

Data analysis in this study consisted of univariate analysis (descriptive statistics), bivariate analysis, and multivariate analysis. Univariate analysis takes the form of descriptive statistics displayed as a single distribution table. Bivariable analysis was carried out by making a 2x2 cross-tabulation and calculating the size of the association in the form of relative risk. The statistical test used is the Chi-Square Test at the limit  $\alpha$ <0.05. Multivariate analysis with adjusted relative risk, namely relative risk that has been considered or controlled for confounding effects. Statistical significance was assessed using 95% CI (confidence interval). The entire data analysis process above uses SPSS 24.0 statistical software.

#### RESULTS

A total of 40 research subjects were divided into 20 subjects in the operating age group > 28 days and  $\leq$  28 days. Most subjects were male, with 3 subjects recorded as having low birth weight. Overall, 9 (45%) early complications occurred in the > 28 days group and 12 (60%) in the  $\leq$  28 days group.

There were 6 (30%) postoperative excoriations in the > 28 days group and 12 (60%) excoriations in the  $\leq$  28 days group. In addition, fistula formation was recorded in 2 (10%) patients in the > 28 days group and 3 (15%) in the  $\leq$  28 days group. For the incidence of bleeding, obstruction, and wound dehiscent, 1 case was recorded in each group, while there were no cases of anastomotic complications and twisted segments (Table 1).

Variable	Group			
variable	> 28 Days	≤ 28 Days		
Gender				
Woman	6 (30%)	8 (40%)		
Man	14 (70)	12 (60%)		
Birth Weight				
Normal	19 (95%)	18 (90%)		
Low	1 (5%)	2 (10%)		
Laparoscopy/Laparotomy				
Yes	16 (80%)	11 (55%)		
No	4 (20%)	9 (45%)		
Early Complications				
Excoriation				
Yes	6(30%)	12 (60%)		
No	14(70%)	8 (40%)		
Wound Dehiscent				
Yes	2 (10%)	1 (5%)		
No	18 (90%)	19 (95%)		
Postoperative bleeding				
Yes	1 (5%)	1 (5%)		
No	19 (95%)	19 (95%)		
Twisted Segment				
Yes	0	0		
No	20 (100%)	20 (100%)		
Rectourethral/Rectovaginal Fistula				
Yes	2 (10%)	3 (15%)		
No	18 (90%)	17 (85%)		
Anastomosis Complications				
Yes	0	0		
No	20 (100%)	20 (100%)		
Obstruction	· ·	· · ·		
Yes	1 (5%)	1 (5%)		
No	19 (95%)	19 (19%)		
Early Complications				
There is	9 (45%)	12 (60%)		
No	11 (55%)	8 (40%)		

Analysis of the relationship between the age of the neonate (< 28 days and  $\ge$  28 days) and the incidence of early complications in patients who underwent the Swenson pull-through procedure. The chi-square analysis found 12 subjects with complications in the

 $\leq$ 28 days group and 9 subjects in the > 28 days group. The statistical analysis showed that this difference was insignificant even though the relative risk value was 1.333 (95%CI: 0.730 – 2.435) (Table 2).

**TABLE 2:** The relationship between neonatal age (≤28 days and >28 days) and the incidence of early complications in patients undergoing Swenson pull-through procedures.

Variable	Early Complications			n valua
Age	There is	No	- KK (95%CI)	p-value
≤ 28 Days	12	8		0.242
> 28 Days	9	11	— 1.333 (0.730 <b>-</b> 2.435)	0.342

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Then, an analysis of the relationship between them is carried out on gender and the incidence of early complications in patients undergoing Swenson pullthrough procedures. From the results of the chi-square analysis, it was found that there were 6 subjects with complications in the female group and 15 subjects in the male group. The results of statistical analysis show that this difference is not significant (p>0.05) (Table 3).

**TABLE 3:** The relationship between gender and the incidence of early complications in patients undergoing Swenson pull-through procedures.

Variable	Early Com	plications		n valua
Gender	Yes	No	- KK (95%CI)	p-value
Woman	6	8	0 742 (0 272 1 470)	0.270
Man	15	11	- 0.743 (0.373 - 1.479)	0.370

Analysis of the relationship between birth weight category and the incidence of early complications in patients undergoing Swenson pull-through procedures. The chi-square analysis found that 19 subjects with complications were in the normal birth weight group, and 2 were in the low birth weight group. The statistical analysis shows that this difference is not significant (p>0.05) (Table 4).

**TABLE 4:** Relationship between weight category with the incidence of early complications in patients undergoing Swenson pull-through procedures.

Variable	Early Complications		DD	n valua
<b>Birth Weight Category</b>	Yes	No	ĸĸ	p-value
Normal	19	18	0 770 (0 226 1 010)	0 1 0 0 0
Low	2	1	0.770 (0.326 - 1.819)	0.1000

Analysis of the relationship between duration of surgery and the incidence of early complications in patients undergoing Swenson pull-through procedures. This analysis used a comparative study of unrelated t-test means (independent sample ttest). The results of the t-test analysis found that the average duration of surgery in the group with complications was  $113.09 \pm 34.29$  minutes. In contrast, the average surgery duration in the group without complications was  $95.05 \pm 25.25$  minutes. The results of the statistical analysis showed that the mean difference between the two groups was 17.04 minutes and that it was not statistically significant (p>0.05) (Table 5).

**TABLE 5:** The relationship between the duration of surgery and the incidence of early complications inpatients undergoing Swenson pull-through procedures.

Variabla	Early Compli	Mean	n voluo		
variable -	Yes	No	Difference	p-value	
Average Operation Duration (Minutes)	113.09 ± 34.29	95.05±25.25	17.04	0.084	

Analysis of the relationship between the number of postoperative bleeding and the incidence of early complications in patients undergoing Swenson pullthrough procedures. This analysis used a comparative study of unrelated t-test means (independent sample t-test). The results of the t-test analysis found that the mean amount of postoperative bleeding in the group with complications was  $9.28 \pm 5.97$  mL minutes. In contrast, the average postoperative bleeding was recorded at  $6.52 \pm 2.77$  mL in the group without complications. The results of the statistical analysis showed that the mean difference between the two groups was 2.75 minutes and that it was not statistically significant (p>0.05) (Table 6).

**TABLE 6:** The relationship between the amount of postoperative bleeding and the incidence of early complications in patients undergoing Swenson pull-through procedures.

Variable	Early Com	plications	Mean		
variable	Yes	No	Difference	p-value	
Average Postoperative Bleeding Amount (mL)	9.28±5.97	6.52 ± 2.77	2.75	0.074	

Analysis of the relationship between the number of aganglionic segment lengths and the incidence of early complications in patients undergoing Swenson pull-through procedures. This analysis used a comparative study of unrelated t-test means (independent sample t-test). The results of the t-test analysis found that the average length of the aganglionic segment in the group with complications was  $10.14 \pm 4.25$  cm minutes. In contrast, the average postoperative bleeding was recorded at 9.21  $\pm$  3.04 cm in the group without complications. The results of statistical analysis show that the mean difference between the two groups is 0.932 minutes and is not statistically significant (p>0.05) (Table 7).

**TABLE 7:** The relationship between the length of the aganglionic segment and the incidence of early complications in patients undergoing Swenson pull-through procedures.

Variable	Early Complications		Mean	n velve
variable	Yes	No	Difference	p-value
A ganglion Segment Length (cm)	10.14 ± 4.25	9.21 ± 3.04	0.932	0.435

Analysis of the relationship between assistance with laparotomy or laparoscopy and early complications in patients undergoing the Swenson pull-through procedure. The chi-square analysis found that there were 10 subjects with complications in the group with laparotomy or laparoscopy assistance and 11 subjects without laparotomy or laparoscopy assistance. The results of statistical analysis show that this difference is significant (p<0.05) with a relative risk value of 1.888 (95%CI: 1.096 - 3.252) (Table 8).

TABLE 8: The relationship between laparotomy or laparoscopic assistance and the incidence of early
complications in patients undergoing Swenson pull-through procedures.

Variable	Early Complications			
Laparotomy/Laparoscopy Assistance	Yes	No	RR (95%CI)	p-value
Yes	10	3	1 000 (1 006 2 252)	0.022
No	11	16	- 1,888 (1,090 - 3,252)	0.032

#### DISCUSSION

The risk of early complications in Hirscsprung patients depends on various factors, one of which is age. The age of diagnosis can determine the prognosis and risk of complications in Hirscsprung patients. Delays in diagnosis in patients can also be caused by clinical symptoms such as malnutrition, failure to thrive, recurring fecal obstructions, and chronic progressive constipation. In particular, patients who experience delays in treatment are characterized by an average age of over 1 month to teenagers, namely 13 years. The definitive management of Hirscsprung cases is an operative procedure [12].

Early diagnosis in Hirscsprung patients can be a direct indication for surgery using the Swenson pull-through technique. In some cases, such as megacolon and enterocolitis in Hirscsprung patients who experience delays in diagnosis, a two-stage surgical technique is used. There are several advantages of early diagnosis in patients with Hirscsprung cases, namely the length of stay, hospital costs, and the risk of early complications in patients undergoing Swenson pullthrough procedures at neonatal age (before 28 days) is lower than in patients aged after 28 days - 1 year. Not only that, but this is also supported by metaanalysis data, which states that the Swenson pullthrough means shorter hospitalization. The risk of postoperative complications, especially conditions such as enterocolitis, is lower [13].

This is proven by research conducted by Mahanta et al., which stated that in the research sample of 63 patients, including 31 neonates (before 28 days), initially, the patients complained of constipation (93.65%) cases, and all samples received treatment. The definitive surgical procedure, namely the Swenson pull-through, has a good prognosis and minimal postoperative complications. The mortality rate obtained was 12.69%. Later, during the postprocedure follow-up process, Swenson was found to be in good condition [14]

The incidence of early complications in male and female patients with Hirschsprung who underwent the Swenson pull-through procedure was found to significantly different. Previous research be evaluated Hirschsprung's incidence as more common in boys, but several studies showed that the percentage of complications in boys was smaller compared to the total cases. These results are from previous research conducted by Gao et al., which evaluated Hirschsprung's postoperative complications, reporting that 24 of 98 male patients experienced HAEC complications. In comparison, 9 of 21 female patients experienced HAEC complications (p=0.109). It was also reported that 6 male patients and 2 female patients experienced postoperative constipation (p=0.630), and 20 male patients and 2 female patients experienced fecal incontinence (p=0.357) [11].

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Another study by Beltman et al. evaluating 102 male and 30 female patients showed that 18 male and 4 female patients experienced complications with an odds ratio for male patients 1.393 (KI 95% 0.433-4.485; p = 0.579.[15]A gender predisposition to postoperative postoperative complications of Hirschsprung's disease has not been well described. However, men were found to have a higher risk of experiencing Hirschsprung's disease, one of which is due to a genetic predisposition that changes the susceptibility of the RET+3 allele involved in coding for receptor tyrosine kinase. Mutations in this allele occur on the X chromosome. This makes men have a four times higher risk of experiencing Hirschsprung's disease [16].

Body weight is one of the factors that can influence the occurrence of early complications in Hirschsprung's patients. Body weight in patients can be divided into patients with low birth weight and patients with non-low birth weight (Moore, 2016). A study by Min et al. found that more significant complications occurred in patients with low birth weight. This is thought to be related to the patient's nutritional status. Poor nutritional status in children before surgery will likely result in a reduced ability to tolerate and recover from surgery. In addition, although the surgical method for this disease is suitable, the operation and postoperative fasting time are relatively long. Therefore, children with insufficient protein and fat content are more susceptible to intestinal infections and serious complications [17].

Based on research by Al-Baghdady et al., in 48 patients with Hirschsprung's rectosigmoid disease, the average patient's weight during surgery was 5.125 kg, ranging between 3.5 and 12 kg. The results of this study showed that there was no intestinal obstruction after surgery. The Swenson procedure can reduce the risk of bleeding, cuff abscess, and postoperative postoperative constipation where these complications can occur in patients who have undergone a transanal endorectal pull-through procedure due to the presence of a muscle cuff of the distal aganglionic segment [18].

Mohamed et al. also found similar results. In this study, 23 neonates who underwent the Swenson procedure had an average body weight of 2.7-4 kg and an average operation duration of 106±15 minutes. The research results showed no significant blood loss or pelvic organ injury in the patient. The study concluded that the Swenson procedure is feasible and can be performed safely in neonates with Hirschsprung's disease with promising results [19].

Transanal Swenson and soave pull-through procedures are the most common surgical procedures to treat Hirschsprung's disease. However, a consensus has yet to be reached regarding the best surgical method for treating Hirschsprung's disease. These two techniques are used to treat Hirschsprung's disease [20], The Swenson approach has several advantages in treating the affected rectal wall, reducing the risk of anastomotic stricture, and reducing postoperative obstructive symptoms. Based on a study by Bing et al. found that this procedure was correlated with less blood during surgery, lower duration of surgery, and a lower risk of suffering from constipation over a long period and minimal trauma, resulting in a faster recovery [7].

A study by Bing et al. supports the results that the duration of surgery for Hirschsprung patients was shorter in patients who underwent Swenson pull-through. The average duration of surgery for the soave procedure was  $180.41\pm30.12$ , while in Swenson, it is  $153.96\pm27.27$  with a p-value <0.05. The study also found that the difference in postoperative complications in the Swenson and Soave treatment groups showed significant results, namely 15.2% in the Swenson group and 30.3% in the Soave group (p = 0.001). In addition, the level of perianal excoriation in the Swenson group was much lower than in the SOAV group, namely 17.4% and 26.5% (p = 0.005) [7].

The amount of bleeding experienced bv Hirschsprung patients after surgery can be related to the occurrence of early complications. Based on a study by Bing et al., it was found that the average number of postoperative bleeding in patients with the Soave procedure was 51.24, while in patients with the Swenson procedure, it was 45.22 with a pvalue <0.05, and there were complications with the Swenson procedure. Lower with p=0.005. This study showed significant bleeding results in Hirschsprung patients who underwent the Swenson pull-through procedure [7]. In addition, research by Zhang et al. showed that there was a significant difference between the duration of surgery and the amount of postoperative bleeding in Swenson patients compared to Soave with p<0.05 [21]

Based on several studies, it was found that the success of the Swenson pull-trough is closely related to the details of the operating process.[22]When inserting the forceps into the rectum, it is done at the level of the pubic symphysis so that the anterior rectal wall can be pulled down below the anus correctly. If it is difficult to pull out the anteriorrectal wall, the rectum can be cut at the level of the peritoneal reflection. After rectal excision, the proximal portion of the colon is closed and pushed upward into the abdominal cavity to provide space for distal rectal dissection. When dissecting the proximal colon, the mesenteric vessels are appropriately ligated, preventing uncontrolled bleeding. Coagulation hemostasis can be used in the distal colon because petrolatum gauze compression can effectively control postoperative bleeding [7].

The length of the aganglionic segment influences the incidence of early complications in Hirscsprung patients undergoing the Swenson pull-through procedure.

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This is proven based on research conducted by Gunadi et al., with the characteristics of the short aganglion segment research sample of as many as 66 samples or 98.5% and the long aganglion segment as 1 sample or 1.5%. No research samples with a total of colonic ganglion found that complications in enterocolitis occurred in 15% of patients. Also, the frequency of constipation was 15% of the total research sample after undergoing definitive surgery [23].

Then, based on research conducted by Ademuyiwa et al., with a total of 14 research samples, it was found that all patients came in with complaints of constipation and abdominal distension. A total of 13 research samples experienced short-segment aganglionics, and also one research sample experienced long-segment aganglionics. Ten patients (71.4%) in the study underwent a colostomy before undergoing definitive Swenson pull-through surgery, and four samples immediately received definitive Swenson pull-through surgery. There were three cases of postoperative constipation and one case of mortality in patients who experienced long-segment aganglionic disease due to sepsis following peritonitis from posterior colonic perforation proximal to the area of anastomotic stenosis. Thus, the length of the aganglionic segment was found to increase the risk of early complications in Hirscsprung patients [24].

Another study conducted by Andi Waradeni, through a retrospective cohort study, analyzed complicating factors in the form of anastomotic leakage, anastomotic stricture, and also perianal excoriates in 62 cases of hirscsprung; it was found that short segment aganglionics were 75.8%, then long segment aganglionics were 19.4% and Total colonic aganglionic disease occurred in 4.8% of the research sample. Fourteen patients experienced complications after definitive surgery, and 48 research samples did not experience postoperative postoperative complications. The most common complications were perianal excoriation at 42.8%, anastomotic leak at 28.6%, and anastomotic stricture at 28.6% [25].

The length of the aganglionic intestinal segment has a significant role in early complications in Hirscsprung patients. Even though surgical therapy is effective in patients, as many as 32% of patients experience complications after the surgical procedure. Especially in patients who experience total aganglionic, the risk of experiencing early complications increases by 63% after definitive surgery; in patients who experience rectosigmoid aganglionic, as many as 17% of patients can experience complications after definitive surgery [25]. A long aganglionic segment is the leading risk factor that triggers postoperative emergencies and also causes a poor prognosis in hirscsprung patients [26].

This research shows a significant effect of laparotomy or laparoscopy assistance on the incidence of early complications in Hirschsprung patients who have undergone the Swenson pullthrough procedure. This is based on previous research by Curran & Raffensperger, which compared complications in Hirschsprung patients who underwent laparoscopic Swenson pull-through (LSP) with open Swenson pull-through (OSP). The study showed that patients with laparoscopy had a shorter hospital stay (5.25 v 8.8 days; p < 0.05) and had a shorter period of initiation of oral food intake (2.75 v 5 days; p < 0.05) with operating time not much different (4 hours 42 minutes v 4 hours 37 minutes: p= TS). Another important thing was that it was also reported that no complications were found in the laparoscopy group. Meanwhile, in the open surgery group without laparoscopy, complications were found in the form of 3 wound infections, 1 prolonged illus, and 1 patient with anastomotic leak [27].

Previous research by Georgeson et al. also demonstrated a reduction in perioperative and postoperative postoperative complications from laparoscopic-assisted pull-through procedures compared to open pull-through procedures. This is reflected in the decrease in postoperative postoperative recovery time. Most patients can eat on the first day after surgery and then go home on the second or third day after surgery. 10 (12.5%) of the 80 patients had to be readmitted to the hospital for 3 days, and 6 of these 10 patients did not require additional hospitalization or surgical procedures. Meanwhile, 4 out of 80 patients required a secondary ostomy. Of the 4 patients, 2 patients experienced anastomotic leakage, and one patient experienced congenital abnormalities [28]. This is supported by other research by Langer et al. showing the effect of laparoscopic assistance in reducing atypical complications from Hirschsprung's definitive procedures, including obstruction due to colonic adhesions, wound healing, and injury to the pelvic nerves. At the same time, 81% of patients experienced an improvement in canal function. Digestion was normal at 20-month follow-up [29].

Using laparoscopy or laparostomy assistance in this procedure can reduce complications with several advantages compared to conventional techniques with open pull-through. The colonic pedicle can be mobilized with the help of laparoscopy, thus minimizing trauma to the peritoneum, which has an impact on the intra-abdominal condition of the colon, which remains intact, thereby avoiding bacterial contamination of the peritoneal cavity [28,29]. In addition, laparoscopy can verify the location of ganglion cells in the proximal colonic seromuscular biopsy pedicle with before irreversible resection. Laparoscopic assistance can maximize devascularization and mobilization of a ganglionic segment, facilitating the mobilization of the rectum and end point of endorectal dissection. It can also allow the completion of a pull-through on a more extended aganglionic segment, thereby improving the patient's gastrointestinal function [28,30].

The laparoscopic Swenson technique (LapSwen) has also been found to reduce the risk of enterocolitis as one of the dangerous complications of Hirschsprung's. Traumatic involvement involving the pelvis and surrounding nerves can also be minimized by using laparoscopy, which directs images more clearly and accurately into the pelvic cavity. This allows concerns about diathermy-related trauma to be reduced to the pelvic innervation. On the other hand, complete transanal pull-through (without laparoscopy or laparostomy) can only be performed in classic rectosigmoid disease [30–32]

#### CONCLUSION

The results of the study and discussion can conclude that the risk of early complications in Hirschsprung neonate patients aged before 28 days is not significantly different compared to patients aged after 28 days. To 1 year, and assistance with laparotomy or laparoscopy has a significant effect on the incidence of early complications in Hirschsprung patients who had a Swenson pull-through procedure had a relative risk of 1.888, which indicated an increased risk of 1.888 times higher in neonates who were assisted by laparotomy or laparoscopy compared to neonates who were not assisted or did not require assistance from laparotomy or laparoscopy.

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