Original Article

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The Utility of Drain Placement in Stoma Closure Surgeries – A Comparative Study in Children

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Abstract

Background: Cholecystolithiasis is a significant surgical problem. Variation in clinical symptoms of cholecystolithiasis forms the disease more thought-provoking. We aimed to explore demographics, the clinical profile of patients, and treatment outcomes of patients with cholecystolithiasis. **Subjects and Methods:** This is a retrospective study of patients with cholecystolithiasis from January 2018 to June 2021. The patient's demographics, clinical profile, perioperative details, and treatment outcomes were analyzed. **Results:** A total of 304 patients (73 males) with cholecystolithiasis were included in the study. Median ages were 46 years (range: 19-71 years). Most of our patients 290 (95.6%) were symptomatic with the commonest symptom as upper abdominal pain. The conversion rate was 8.6%. Overall postoperative complications were found in 38 patients (12.2%). There was no mortality in this study. In logistic regression analysis, on multivariate analysis, out of the independent variables, sex (male), age (≥ 60 years), presence of comorbidity, and duration of surgery (≥ 2 hours), only the male gender was associated with an increased risk of postoperative complications (OR; 0.046, CI [0.018- 0.112], P < 0.05). **Conclusion:** Cholecystolithiasis is a common and significant surgical problem that usually presents with upper abdominal pain. Laparoscopic cholecystectomy is the standard care of treatment. Male gender is a risk factor for postoperative complications.

Keywords: Cholecystolithiasis, Clinical profile, treatment outcome.

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Introduction

Many congenital anomalies and diseases expose the pediatric population to the need for stoma creation. Fortunately, these stomas are commonly temporary. Some of the causes include anorectal malformation, intestinal malrotation and volvulus. Complex hindgut anomalies, necrotizing enterocolitis, and hirschsprungs disease, and anal and perianal conditions.[1,2,3,4,5,6]

The benefits of stoma closure are also associated with some complications. Commonly in the form of wound infection1 dehiscence and anastomotic ischemia and leak.[4] This will lead to complicated post-operative recovery and extended hospital stay.[2] One of the methods used to lessen the rate of complications is the use of the surgical drain. Commonly used is the subcutaneous layer drain, like the Penrose drain.

The evidence in the paediatric population is limited. Most studies focus on long-term complications such as skin excoriation, stoma prolapse, dysfunction, retraction and stenosis, and parastomal hernia.[3] In a small percentage, adhesive small bowel obstruction was also found.[7] This study aims to compare the outcomes between applying drain versus no drain after stoma closer and study the associated complication between the two groups.

Subjects and Methods

This was a single-centre, retrospective, observational study where the main objective was to compare two groups of subjects (with surgical drain vs no surgical drain) with respect to patient demographics and primary outcomes (wound infection, systemic infection, re-admission and re-surgery) well as secondary outcomes (fever, Hospital length of stay). The research included all pediatric patients who underwent stoma closure at KFSH&RC from 2007-2016. The patient's data were gathered and reviewed using the Operation Room Database from the electronic medical records. The patients were categorized into two groups, those who had stoma closure with a drain and those who had the procedure without a drain. Specific demographic data were collected, including age, primary disease, indication

for surgery, and any associated surgical procedure performed at the time of the stoma closure.

Information regarding the pre-operative preparation, such as prophylactic antibiotics and bowel preparation solution, was also reviewed in addition to the surgical skin incision closure method.

A thorough review of the post-operative complications included fever, systemic infection, wound infection, wound dehiscence, anastomotic leak and any further surgical procedures to manage these complications. Information about the post-operative length of stay was also documented. And any re-admission of a patient within two weeks after discharge.

The collected data were documented using Excel sheet tables. Each patient was given a serial number. And the data were entered into the IBM® SPSS® Statistics (Version 26) for analysis.

There were no direct or indirect expected benefits or risks to the subjects of this study.

Statistical analysis was done using SPSS version 2D. Continuous variables were summarized as means +/- SD, while categorical variables were summarized as percentages. Associations among categorical variables were evaluated using Pearson's Chi-Square Tests. Differences in means of continuous variables were tested using two independent sample t-tests. When the group number exceeded two, we used ANOVA to compare the multiple group means. Duncan's multiple range test was used for the post-HOC analysis. The significant p-value was set at 5%.

Results

Figure 1: Stoma closure with drain in situ

The records of 129 patients who underwent stoma closure were identified and reviewed. 25/129 patients (19.38%) had stoma type I (ileostomy) with a mean age of 38.64 ± 60.445, and 104/129 patients (80.62%) had stoma type II (others/colostomy) with a mean age of 25.91 ± 37.97. There were no significant differences in the mean age (P= 0.187).

3/129 patients (2.34%) had laparoscopic colostomy closure, while 95/129 patients (73.64%) had colostomy closure without laparoscopy. 25/129 patients (19.38%) had ileostomy closure; 4/129 patients (3.10%) had pull through; 1/129 patient (0.78%) had bowel resection; finally, 1/129 patient (0.78%) had colostomy closure with intraoperative radiation treatment delivery (IORT).

Stoma closure with surgical drain (D) [Figure 1] was performed in 53/129 patients (41.09%) with a mean age of 28.41 ± 41.43, and stoma closure with nonsurgical drain (ND) was performed in 76/129 patients (58.91%) with a mean age of 28.35 ± 44.75.

Superficial wound infection after the stoma closure occurred in 8/53 patients (15.09%) from the surgical drain versus 9/76 patients (11.8%) from the group with no surgical drain [Table 1]. Furthermore, wound infection with deep abdominal collection occurred in 1/53 patients (1.89%) from the surgical drain group compared to 2/76 patients (2.63%) from the group with no surgical drain (P = 0.840). Systemic infection was recorded in 1 patient (1.89%) from the surgical drain group; on the other hand, 4/76 patients (5.48%) patients from the group with no surgical drain had a systemic infection (P = 0.314) [Table 2]. As regards re-admission, it was required in 3/53 patients (5.66%) from the group with surgical drain, while 4/76 patients (5.48%) from the group with no surgical drain had re-admission (P = 0.922) [Table 3]. Additionally, no patients in the group with the surgical drain required re-surgery compared with 4/76 patients (5.48%) from the group with no surgical drain (P = 0.90).

Table 1: Wound Infection and Drain

Parameter		Drain	No Drain	P Value
Wound infection	No	44	65	0.840
	Superficial wound infection	8	9	
	Wound infection with deep abdominal collection	1	2	

Table 2: Systemic Infection and Drain

Parameter		Drain	No Drain	P Value
Systemic infection	No	52	72	0.314
	Yes	1	4	

Table 3: Re-admission and Drain

Parameter		Group		P-Value
		No Drain (n=76)	Drain (n=53)	
Re-admission	0 No	72	50	0.922
	1 Yes	4	3	
Re-surgery		72	53	0.90
		4	0	

Discussion

Various pathologic conditions, including congenital anomalies, colon obstruction, inflammatory bowel disease, intestinal trauma, or gastrointestinal malignancy, are considered indications for stoma creation which could be temporarily or permanently. Most cases require a temporary stoma creation; consequently, the stoma eventually needs to be closed. It is common practice to perform stoma closure using a surgical drain to reduce post-operative

complications. Recently, the literature suggested no significant difference in the complications rate between the patients who underwent stoma closure with surgical drain and the groups that did not use the surgical drain.

In our study, 133 patients records, who underwent a stoma closure, were allocated. The primary indication of the stoma varies and includes Hirschsprung's disease, anal anomalies, necrotizing enterocolitis and others. The type of stoma closure included colostomy closure with laparoscopy, colostomy closure without laparoscopy, ileostomy closure, pull through or bowel resection. Regarding wound infection, the overall rate was 15.04 %, similar to the percentage reported in the literature. In both groups – with surgical drain and without surgical drain- there were cases of documented wound infection, but there is no significant difference when comparing the two groups. The statistical analysis when comparing the two groups did not show any correlation between the use of surgical drain and the clinical outcomes, including systemic infection with a P value of 0.314, re-admission with a P value of 0.922, and finally, re-surgery with a P-value of 0.90.

The complications after stoma closure can be attributed to the duration of the operation, the primary indication of the surgery – specifically Hirschsprung disease- and other co-morbidities. The previously stated results indicate that the surgical drain did not have any positive or negative impact on the rate of complications after stoma closure.

Our study had a few limitations, including the different co-morbidities of patients that can influence the outcomes. In addition, this study is single-cantered, so further multi-cantered studies should be performed to support and generalize the results of this study.

Conclusion

The results of this study supported the suggested research hypothesis and proved that the surgical drain did not positively impact the patients' clinical outcomes. When comparing the group with surgical drain and the group without surgical drain, no significant difference was recorded regarding wound infection, systemic infection, re-admission and re-surgery.

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