

COMPLICATIONS OF INTRA ABDOMINAL DRAINS: A SINGLE CENTER EXPERIENCE

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ABSTRACT

Objective: To compare frequency of intra-abdominal complications in drainage and non-drainage group among patents who underwent intra-abdominal surgeries.

Study Design: Comparative prospective study.

Place and Duration of Study: Department of Surgery, Pakistan Ordinance Factory, Wah Cantt, from Mar 2018 to Jul 2018.

Methodology: There were 32 patients, 16 in each group. Patients were selected through the process of consecutive sampling. Patients were randomly divided into two groups (random number table method); group A patients underwent intra-abdominal drain while group B was non-drainage group. Patients were followed up for 7 days and observed for complications.

Results: Total 32 patients were included in the study. There were 14 (43.8%) males and 18 (56.3%) females. Mean age of patients was 43.2 ± 9.5 years. Drain group showed significantly low anastomosis leakage ($p=0.02$), wound infection ($p=0.05$), mortality ($p=0.04$), pulmonary complications ($p=0.05$) and bleeding ($p=0.03$) as compared to the non-drain group.

Conclusion: Intra-abdominal drains are associated with several complications. Anastomosis leakage is the most common complication following pulmonary complications and bleeding. However, drains help in early detection of complications and timely management of such complications leads to better outcome of a surgical procedure.

Keywords: Anastomosis leakage, Complications, Intra-abdominal drain.

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INTRODUCTION

Abdominal drains are important surgical procedures used since centuries. Several years ago Hippocrates utilized different tubes for ascetic fluid removal from abdominal cavity.¹ Theodore Billroth (19th century) reported that after gastrointestinal surgery, peritoneal cavity drainage was essential for patient's life saving process.² Literature reports that intraperitoneal collections (blood, pancreatic juice, bile, ascities, chyle and intestinal juice) were removed through prophylactic drains. These intraperitoneal collections (without drains) are associated with potential infection of adjacent tissues. Intra-abdominal drains are associated with wide acceptance and prevent gastrointestinal surgery complications.³

Intra-abdominal drains are used in colonic anastomosis, low pelvic anastomosis, and percutaneous drainage as therapy. Anastomotic leakage is the most common complication of intra abdominal drains. Anastomotic leakage is referred as radiological dehiscence present on post-operative enema.⁴ Tsujinaka *et al*, reported that radiological leakage is 3% in drainage group as compared to no drainage group (4%).⁵ Intraabdomi-

nal drainage complications were 7% in drainage group as compared to non-drainage group (4%).⁶

Peritoneal cavity drainage is an effective prophylactic drainage (rectal surgery). Evidence shows that rate of anastomotic leakage is high in pelvic anastomosis as compared to colonic anastomosis.⁷ Eberhardt *et al*, reported that anastomosis leakage is 3.2% patients of drainage group as compared to non drainage group (4%).⁸ However, Law *et al*. reported that wound infection and pulmonary complications are common complication of drains with 1% mortality rate.⁹

American Society of Colon and Rectal Surgeons reported that ideal candidates for percutaneous drainage are patients with abscesses >2 cm.¹⁰ Local data on the complications of intra-abdominal drains is limited to reach any conclusion. Present study was planned to compare frequency of intra-abdominal complications in drainage and non drainage groups among patients who underwent intra-abdominal surgeries.

METHODOLOGY

A comparative prospective study was conducted at the department of Surgery, Pakistan Ordinance Factory (POF) Wah Cantt, from March to July 2018. A sample size of 32 patients (16 patients in each group) was calculated using $p1=50\%$, $p2=10\%$, 80% power of study, 95% confidence interval using WHO calcula-

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tor.¹¹ Selection of patients was done through non-probability consecutive sampling technique. Research approval was taken from research ethical committee (IRB no: RTS6790) of corresponding hospital. Consent forms were signed by all the participating patients.

Inclusion Criteria: Patients of age >20 years, both genders, who underwent abdominal surgeries including liver resection, cholecystectomy, pancreatic resection, esophageal, gastric and duodenal surgery, colorectal surgery and appendectomy were included in the study.

Exclusion Criteria: Patients with benign diseases, low anterior rectal resection emergency procedures, gross fecal peritoneal contamination, hemostatic packing, resection without anastomosis, colostomy closure, abscess, anastomosis above S3 and reversal of Hartman's procedure were excluded.

All the included patients underwent randomization to avoid selection bias using random number table. Group A patients received open or closed suction drains according to demand of surgical procedure while in group B no drain was used. Patients were followed for 7 days and observed for intra abdominal complications.

Data was analyzed by using Statistical Package for Social Sciences (SPSS) version 24. Mean ± SD was calculated for continuous variable. Frequency and percentage was calculated for categorical variables. Chi-square test was used for measuring association between two groups. The *p*-value of ≤0.05 was considered significant.

RESULTS

Total 32 patients were included in the study. There were 14 (43.8%) males and 18 (56.3%) females. Mean age of patients was 43.2 ± 9.5 years. There were 10 (31.3%) patients in age group 21-40 years and 22 (68.8%) in age group 41-65 years. Duration of disease was ≤6 months in 11 (34.4%) and >6 months in 21 (65.5%) patients. There were 12 (37.5%) patients with diabetes mellitus while 20 (62.5%) patients were non diabetic. Out of all, 15 (46.9%) patients were hypertensive while 17 (53.1%) were non hypertensive. Among all the patients, 20 (62.5%) stayed ≤2 weeks in hospital while 12 (37.5%) stayed >2 weeks in hospital. Among all the patients in groups (drain), 3 (9.4%) had anastomosis leakage while 13 (40.6%) did not show leakage. Among all the patients in group B (non-drain), 10 (31.3%) showed anastomosis leakage while 6 (18.8%) did not show any leakage (*p*=0.02). Among all the

patients in group A, 3 (9.4%) showed wound infection, while 13 (40.6%) did not show any infection. Among all the patients in group B, 8 (25%) showed wound infection while 8 (25%) did not show any infection (*p*=0.05). Mortality was found to be significantly low in drainage group as compared to non-drainage group (3.1% vs 12.5%, *p*=0.04) as shown in Table-I.

Among all the patients in drainage group, 2 (6.3%) showed pulmonary complications while 14 (43.8%) did not show pulmonary complications. Similarly, among all those in non-drainage group, 6 (18.8%) showed pulmonary complications while 10 (31.3%) did not show pulmonary complications (*p*=0.05). Among all patients in drain group, 2 (6.3%) showed bleeding while 14 (43.8%) did not show bleeding. Among all the patients in non-drainage group, 9 (28.1%) showed bleeding while 7 (21.9%) did not show bleeding (*p*=0.03). Hospital stay was ≤2 weeks in 13 (40.6%) patients and >2 weeks in 3 (9.4%) patients in group A while in group B, hospital stay was ≤2 weeks in 7 (21.9%) patients and >2 weeks in 9 (28.1%) patients (*p*=0.02) as shown in Table-II.

Table-I: Comparison of complications in drain and non drain groups.

Complications	Interventional Groups, n (%)		p-value
	Group A (Drain)	Group B (Non drain)	
Anastomosis Leakage			
No	13 (40.6)	6 (18.8)	0.02
Yes	3 (9.4)	10 (31.3)	
Wound Infection			
No	13 (40.6)	8 (25)	0.05
Yes	3 (9.4)	8 (25)	
Mortality			
No	15 (46.9)	12 (37.5)	0.04
Yes	1 (3.1)	4 (12.5)	

Table-II: Comparison of complications and hospital stay in drain and non drain group.

Complications	Interventional Groups n (%)		p-value
	Group A (Drain)	Group B (Non drain)	
Pulmonary Complications			
No	14 (43.8)	10 (31.3)	0.05
Yes	2 (6.3)	6 (18.8)	
Bleeding			
No	14 (43.8)	7 (21.9)	0.03
Yes	2 (6.3)	9 (28.1)	
Hospital Stay			
≤2 Weeks	13 (40.6)	7 (21.9)	0.02
>2 Weeks	3 (9.4)	9 (28.1)	

DISCUSSION

Intra-abdominal drains are used for evacuation of contaminated fluid in human body. Several researchers

believe that intra-abdominal drains can be used for tracking anastomosis integrity and help in diagnosis of early anastomotic complications (when excessive fluid or pus comes out through drains).¹² Evidence exists that intra-abdominal and intraperitoneal hemorrhage could be detected through drains in post-operative duration.¹³⁻¹⁵

In the present study, anastomotic leakage was more common in non drainage group as compared to drainage group (31.3% vs 9.4%, $p=0.02$). Bertelsen *et al*, reported that intra abdominal drains act as an eye to anastomosis by surgeons. They reported that out of all drains (20), only 1 contained enteric content and pus at the time of diagnosis with significantly low anastomotic leakage sensitivity (5%).¹⁶ On the contrary, Matthiessen *et al*, reported that pelvic drains had high sensitivity in anastomotic leakage detection.¹⁷ Peeters *et al*, reported that anastomotic leakage was found in 10% drainage and 18% non-drainage groups ($p=0.03$).¹⁸ Tan *et al*, reported that male gender, smoking, lack of stoma, steroid use, preoperative radio or chemotherapy, emergency surgery, intra operative adverse events and severe bleeding are important risk factors for anastomosis leakage in intra-abdominal drains.¹⁹

In the present study, wound infection was significantly low in drainage group as compared to non-drainage group (9.4% vs 25%, $p=0.05$). Galandiuk *et al*. reported that surgical site infections are common in patients undergoing intra-abdominal drains as compared to non drainage after colostomy (10% vs 5%, $p=2.67$).²⁰ Merad *et al*, reported that infection at surgical wound accounts for 2.5% of intra-abdominal drainage complications.²¹ Another similar study reported that pain and drain site wound infections are associated with intra- abdominal drains ($p=0.01$).²²

In the present study, mortality was found to be significantly low in drainage group as compared to non-drainage group (3.1% vs 12.5%, $p=0.04$). Sagar *et al*, reported that patients undergoing colorectal surgeries did not show any significant difference in mortality of drainage and non-drainage groups (1% vs 2%, $p=0.567$).²³

In the present study, pulmonary complications ($p=0.05$) and bleeding ($p=0.03$) were significantly high in non-drainage group as compared to drainage group. Kingham *et al*, reported that pulmonary complications were high in abdominal drainage group (19%) as compared to no drainage (1%) after liver resection. Moreover, bleeding and infected collection was high in abdominal drainage group (14% and 11%).²⁴ Men *et al*,

reported that patients who had intra-abdominal drains suffered bleeding as the 2nd most common complication (32%).²⁵

CONCLUSION

Intra abdominal drains are associated with several complications. Anastomosis leakage is the most common complication following pulmonary complications and bleeding. However, drains help in early detection of complications and timely management of such complication leads better outcome of surgical procedure.

Conflict of Interest: None.

Authors' Contribution

MA: Data collection & analysis, MLM: Write up, NA: Study interpretation, AA: Critical review.

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