

An overview of common complications of intra-abdominal drains

Kamran Ahmad, Mudassar Shehzad, Kamran Hakeem Khan, Fazal Ghani

Received:
7th October, 2018

Accepted:
13th August, 2019

Abstract:

Objective: Study aims to determine frequency of complications due to intra abdominal surgery

Study design: Descriptive cross sectional study

Study duration and place: Study was conducted at department of surgery, Qazi Hussain Ahmed Medical Complex, Nowshera, KPK. This study was carried out from March 2018- August 2018.

Material and methods: Sample size of 82 patients was calculated using WHO calculator. Non probability consecutive sampling technique was used. Ethical approval and consent forms were taken. Patients were undergone intra-abdominal drainage surgical procedure and followed after 2 weeks for complications. SPSS software was used for data analysis purpose. Chi-square test was applied. P value ≤ 0.05 was considered significant.

Results: Present study includes 82 patients. Mean age of patients was $42.7\text{years} \pm 7.9\text{SD}$. There were 48(58.5%) male and 34(41.5%) female. Success rate was $\leq 50\%$ in 28(34.1%) patients and $>50\%$ in 54(65.9%) patients. most common complication of intra-abdominal drainage is re-hospitalization 30(36.6%), followed by fistula formation 18(22%), obstruction of drainage tube falling out 16(19.5%), bleeding and damage 14(17.1%). Manipulation and repositioning required 12(14.6%). Success rate was significantly associated with drain related falling out ($p=0.01$), manipulation/repositioning required ($p=0.00$), damage ($p=0.02$), obstructed ($p=0.04$), fistula formation ($p=0.00$) and bleeding ($p=0.00$).

Conclusion: Intra-abdominal drains has been evolved in last few decades in Pakistan. However, re-hospitalization and fistula formation are most common complications in current data.

Keywords: Intra abdominal drain, fistula, success rate

Qazi Hussain Ahmed
Medical Complex,
Nowshera
K Ahmad
M Shehzad
KH Khan
F Ghani

Correspondence:
Dr. Kamran Hakeem Khan
Senior Registrar,
Department of General
Surgery, Qazi Hussain
Ahmed Medical Complex,
Nowshera.
Cell: 0333-9012394
Email:
kamranhakeemkhan@
yahoo.com

Introduction:

Concept of intra abdominal drains is a subject of debate for centuries. Hippocrates explained used of tubes for ascetic fluid removal from abdominal cavity in early nineties.¹ Billroth reported that peritoneal cavity drainage is essential after gastrointestinal surgery for life saving purpose, in 19th century.² Intra-abdominal drainage is curative in 80-90% cases.³ However, in 10% cases intra abdominal drainage allow surgical post-pontment in critically ill subjects leading towards clear operative area.⁴ Recurrence rate in

intra abdominal drainage is 5-10%.⁵ Drains are divided in to three major categories drains in colonic anastomosis, drain after low pelvic anastomosis and used of percutaneous drainage.⁶

Abdominal drainage use in colonic anastomosis is very common. Jesus et al conducted colorectal anastomosis in 148 patients. They reported 11% anastomotic leak (drain), 6% anastomotic leak (no drain) 6%, wound infection 15% and 16% in drain and no drain group.⁷ Cochrane collaboration reported that colorectal surgery with

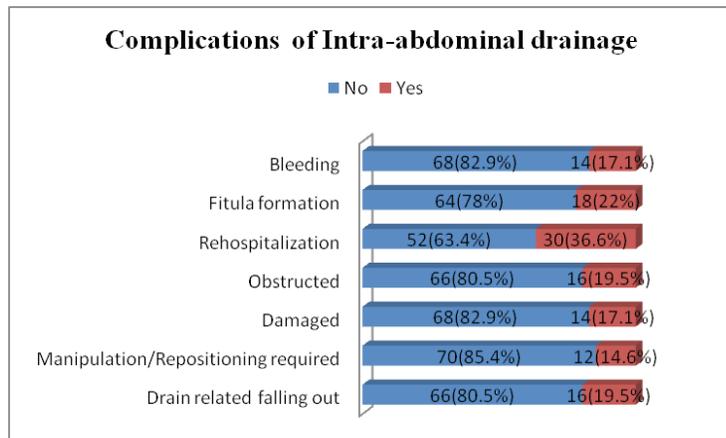


Fig. 1: Complications of intra abdominal drainage

prophylactic use of drains is effective in 23% patients.⁸ Yeh et al. explained anastomotic leak as existence of radiological dehiscence on enema after surgery.⁹

Rectal surgery use drains after low pelvic anastomosis. Evidence exist that pelvic anastomosis contain high anastomotic leakage rate as compare to colonic anastomosis. Large raw surface area after meso-rectal resection secretes high concentration of hemorrhagic fluid.¹⁰ However, use of drain leads to prevent seroma or abscess formation after low pelvic anastomosis. Merad et al. conducted a study on pelvic anastomosis. Total 60 patients were randomly divided into two group; drain and non drain group. There was no significant difference in complications association with drainage. However, overall leakage rate was 7% and no significant difference in wound infection and pulmonary complications of both groups.¹¹

Percutaneous drainage helps is several situation to avoid emergency surgery. Percutaneous drainage has 70% role in non-operative management. Patients with acute diverticulitis are significantly associated with an abscess in 15% of patients.¹² Moreover, literature reported that antibiotics alone have same outcomes as compare to percutaneous drainage and antibiotics. Complications of abdominal drains include mortality, morbidity, anastomotic leak, surgical site infection.¹³ There is no enough data available on intra-abdominal drainage in Pakistan. Present study aims to determine frequency of complications due to intra abdominal surgery.

Material and Methods:

A descriptive cross sectional study was conducted at department of surgery, Qazi Hussain Ahmed Medical Complex, Nowshera, KPK. Study duration was 6 months (March 2018-August 2018). A sample size of 82 patients was calculated using prevalence 12%,¹⁴ absolute precision 7% and 95% confidence interval through WHO calculator. Non probability consecutive sampling was used. Ethical approval was taken from ethical review board. Consent forms were taken from all participants. Patients with age >18 years, both genders and patients underwent intra abdominal drainage surgery were included in study. Patients with metabolic disorders, pulmonary infection, immuno-deficiency syndromes were excluded from study. All patients were undergone intra-abdominal drainage with help of qualified surgeon and radiologist. Immediate imaging after drainage procedure leads to catheter placement confirmation in all patients. Clinical parameters includes monitoring of fever, level of leukocytosis and overall patients well being. At an output diminishing level (<10-20 mL/day) catheters were removed. Patients were followed after 2 weeks for frequency of complication measurement. SPSS software was used for data analysis. Mean±standard deviation and frequency, percentages were calculated for continues and categorical variables respectively. Chi-square test was applied. P value ≤0.05 was found significant.

Results:

Present study includes 82 patients. Mean age of patients was 42.7years±7.9SD. There were 48(58.5%) male and 34(41.5%) female. There were 28(34.1%) patients in 19-40 years and 54(65.9%) in age group >40 years. In current data, 27(32.9%) patients had public jobs and 55(67.1%) had private jobs. Duration of disease was ≤ 3 months in 26(31.7%) patients and 56(68.3%) had >3 months. Duration of hospital stay was ≤ 1 week in 49(59.8%) and >1 week in 33(40.2%). Success rate was ≤50% in 28(34.1%) patients and >50% in 54(65.9%) patients. Complications of intra-abdominal drainage are given in figure 1.

Table-1: Association between complications and success rate

| Complications | Success rate | | Total | P value |
|---|--------------|-----------|-----------|---------|
| | ≤50% | >50% | | |
| Drain related falling out | | | | |
| No | 18(22%) | 48(58.5%) | 66(80.5%) | 0.01 |
| Yes | 10(12.2%) | 6(7.3%) | 16(19.5%) | |
| Manipulation/ Repositioning required | | | | |
| No | 28(34.1%) | 42(51.2%) | 70(85.4%) | 0.00 |
| Yes | 0(0%) | 12(14.6%) | 12(14.6%) | |
| Damage | | | | |
| No | 28(34.1%) | 40(48.8%) | 68(82.9%) | 0.02 |
| Yes | 0(0%) | 14(17.1%) | 4(17.1%) | |
| Total | 8(34.1%) | 54(65.9%) | 82(100%) | |

Table-2: Association between success rate and complications

| Complications | Success rate | | Total | P value |
|---------------------------|--------------|-----------|-----------|---------|
| | ≤50% | >50% | | |
| Re-hospitalization | | | | |
| No | 21(25.6%) | 31(37.8%) | 52(63.4%) | 0.09 |
| Yes | 7(8.5%) | 23(28%) | 30(36.6%) | |
| Obstructed | | | | |
| No | 19(23.2%) | 47(57.3%) | 66(80.5%) | 0.04 |
| Yes | 9(11%) | 7(8.5%) | 16(19.5%) | |
| Fistula formation | | | | |
| No | 27(32.9%) | 37(45.1%) | 64(78%) | 0.00 |
| Yes | 1(1.2%) | 17(20.7%) | 18(22%) | |
| Bleeding | | | | |
| No | 28(34.1%) | 40(48.8%) | 68(82.9%) | 0.00 |
| Yes | 0(0%) | 14(17.1%) | 14(17.1%) | |
| Total | 28(34.1%) | 54(65.9%) | 82(100%) | |

Patients with intra abdominal drain success rate >50%, 6(7.3%) had low drain related falling as compare to patients with success rate ≤50% 10(12.2%) (p=0.01). Patients with success rate >50% had high manipulation or repositioning as compare to patients with success rate ≤50% (p=0.00). Patients with success rate >50% showed 17.1% damage of drain as compare to patients with success rate ≤50% (p=0.02) as shown in table 1. Patients with success rate >50% had low obstruction of drainage 8.5% as compare to patients with success rate ≤50% (p=0.04). Success rate is significantly associated with fistula formation and bleeding (p=0.00) as shown in table 2. However, success rate is insignificantly associated with age, gender, duration

of diseases and re-hospitalization (p>0.05).

Discussion:

Intra-abdominal drainage is common surgical procedure, world-wide. Present study includes 82 patients. Mean age of patients was 42.7years±7.9SD. Success rate of intra abdominal drainage was ≤50% in 28(34.1%) patients and >50% in 54(65.9%) patients. Durmishi et al reported that success rate of intra-abdominal drainage in men is 65% while in women 34%.¹⁵ Brandt et al reported that recurrence rate and success rate of intra-abdominal drainage is 4% and 67% respectively in Saudi-Arabia.¹⁶

In present study, most common complication of intra-abdominal drainage is re-hospitalization 30(36.6%), following fistula formation 18(22%), obstructed drainage and falling out 16(19.5%), bleeding and damage 14(17.1%), manipulation and repositioning required 12(14.6%). Bafford et al reported that most common complication of low pelvic anastomosis is bleeding and fistula formation (65% and 22%).¹⁷ Another similar study reported that complications of drains in colonic anastomosis include falling out (7%), damage 2% and surgical site infection in 23% cases (p=0.00) as compare to non drain group.¹⁸ Feagins et al reported that percutaneous drainage has most common complication of surgical site infection (15%).¹⁹

In present study, patients with intra abdominal drain success rate >50%, 6(7.3%) had low drain related falling as compare to patients with success rate ≤50% 10(12.2%) (p=0.01). Moreria et al reported that low recurrence rate is significantly associated with low complication after intra abdominal drainage (p=0.001).²⁰ Karliczek et al reported that drain related falling out was 2nd common complication of intra-abdominal drain surgery.²¹

In present study, patients with success rate >50% had high manipulation or re-positioning as compare to patients with success rate ≤50% (p=0.00). Baig et al reported that repositioning of drain is significantly higher in age group >50 years with success rate <30% (p=0.04).²²

In present study, patients with success rate >50% showed 17.1% damage of drain as compare to patients with success rate ≤50% (p=0.02). Tang et al reported that complication associated with damaging intra-abdominal drain are associated with low success rate (p=0.03).²³

In present study, success rate is significantly associated with fistula formation and bleeding (p=0.00). Tokunaga et al reported that patients undergone pelvic anastomosis were more prone to develop fistula and destruction of drainage as compare to patients undergone colonic anastomosis (RR: 1.4, 95% C.I, p=0.00).²⁴

Limitation: Due to short duration of study and small sample size, generalizability of study was limited.

Conclusion:

Use of intra-abdominal drains has been evolved in last few decades in Pakistan. However, re-hospitalization and fistula formation are most common complications in current data. We recommend that use of intra-abdominal drainage as surgical management in several diseases depend upon surgeon choice and patients risk factors.

Conflict of interest: None

Funding source: None

Role and contribution of authors:

Dr. Kamran Ahmad, study designing and acquisition

Dr Mudassar Shehzad, data collection

Dr. Kamran Hakeem Khan, data collection and analysis

Dr. Fazal Ghani, write ups, interpretation and final approval

References:

- Petrowsky H, Demartines N, Rousson V, Clavien P A. Evidence-based value of prophylactic drainage in gastrointestinal surgery: a systematic review and meta-analysis. *Ann Surg*. 2014;2(1) 1084-1085.
- Sagar P M, Couse N, Kerin M, May J, MacFie J. Randomized trial of drainage of colorectal anastomosis. *Br J Surg*. 2015;80(6):769-771.
- Berliner S D, Burson L C, Lear P E. Use and abuse of intraperitoneal drain in colon surgery. *Arch Surg*. 2018;89(1):686-689.
- Hoffmann J, Shokouh-Amiri M H, Damm P, Jensen R. A prospective, controlled study of prophylactic drainage after colonic anastomoses. *Dis Colon Rectum*. 2015;30(6):449-452.
- Urbach D R, Kennedy E D, Cohen M M. Colon and rectal anastomoses do not require routine drainage: a systematic review and meta-analysis. *Ann Surg*. 2015;229(2):174-180.
- Tsujinaka S, Konishi F. Drain vs no drain after colorectal surgery. *Indian J Surg Oncol*. 2011;2(1):3-8.
- Jesus E C, Karliczek A, Matos D, Castro A A, Atallah ÁN. Prophylactic anastomotic drainage for colorectal surgery. *Cochrane Database Syst Rev*. 2004;(4):21-24.
- Brown S R, Seow-Choen F, Eu K W, Heah S M, Tang C L. A prospective randomised study of drains in infra-peritoneal rectal anastomoses. *Tech Coloproctol*. 2014;5(2):89-92.
- Yeh C Y, Changchien C R, Wang J Y. et al. Pelvic drainage and other risk factors for leakage after elective anterior resection in rectal cancer patients: a prospective study of 978 patients. *Ann Surg*. 2015;241(1):9-13.
- Khan A A, Wheeler J MD, Cunningham C, George B, Kettlewell M, Mortensen N J. The management and outcome of anastomotic leaks in colorectal surgery. *Colorectal Dis*. 2018;10(6):587-592.
- Merad F, Hay J M, Fingerhut A. et al. French Association for Surgical Research . Is prophylactic pelvic drainage useful after elective rectal or anal anastomosis? A multicenter controlled randomized trial. *Surgery*. 2015;125(5):529-535.
- Peeters K C, Tollenaar R A, Marijnen C A. et al. Dutch Colorectal Cancer Group . Risk factors for anastomotic failure after total mesorectal excision of rectal cancer. *Br J Surg*. 2015;92(2):211-216.
- Tsujinaka S, Kawamura Y J, Konishi F, Maeda T, Mizokami K. Pelvic drainage for anterior resection revisited: use of drains in anastomotic leaks. *ANZ J Surg*. 2016;78(6):461-465.
- Rafferty J, Shellito P, Hyman N H, Buie W D. Standards Committee of American Society of Colon and Rectal Surgeons . Practice parameters for sigmoid diverticulitis. *Dis Colon Rectum*. 2016;49(7):939-944.
- Durmishi Y, Gervaz P, Brandt D. et al. Results from percutaneous drainage of Hinchey stage II diverticulitis guided by computed tomography scan. *Surg Endosc*. 2015;20(7):1129-1133.
- Brandt D, Gervaz P, Durmishi Y, Platon A, Morel P, Poletti P A. Percutaneous CT scan-guided drainage vs. antibiotherapy alone for Hinchey II diverticulitis: a case-control study. *Dis Colon Rectum*. 2016;49(10):1533-1538.
- Bafford A C, Coakley B, Powers S. et al. The clinical impact of preoperative percutaneous drainage of abdominopelvic abscesses in patients with Crohn's disease. *Int J Colorectal Dis*. 2015;27(7):953-958.
- Poritz L S, Koltun W A. Percutaneous drainage and ileocolicotomy for spontaneous intraabdominal abscess in Crohn's disease. *J Gastrointest Surg*. 2016;11(2):204-208.
- Feagins L A, Holubar S D, Kane S V, Spechler S J. Current strategies in the management of intra-abdominal abscesses in Crohn's disease. *Clin Gastroenterol Hepatol*. 2015;9(10):842-850.
- da Luz Moreira A, Stocchi L, Tan E, Tekkis P P, Fazio V W. Outcomes of Crohn's disease presenting with abdominopelvic abscess. *Dis Colon Rectum*. 2017;52(5):906-912.
- Karliczek A, Jesus E C, Matos D, Castro A A, Atallah A N, Wiggers T. Drainage or nondrainage in elective colorectal anastomosis: a systematic review and meta-analysis. *Colorectal Dis*. 2016;8(4):259-265.
- Khurram Baig M, Hua Zhao R, Batista O. et al. Percutaneous postoperative intra-abdominal abscess drainage after elective colorectal surgery. *Tech Coloproctol*. 2012;6(3):159-164.
- Tang R, Chen H H, Wang Y L. et al. Risk factors for surgical site

- infection after elective resection of the colon and rectum: a single-center prospective study of 2,809 consecutive patients. *Ann Surg.* 2015;234(2):181–189.
24. Tokunaga Y, Nakayama N, Nishitai R, Hata K, Kaganoi J, Ohsumi K. Effects of closed-system drain in surgery: focus on methicillin-resistant *Staphylococcus aureus*. *Dig Surg.* 2014;15(4):352–356.