A comparative study of laparotomy closure in peritonitis with and without intraabdominal drainage

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INTRODUCTION
Peritonitis is a surgical emergency of first magnitude that requires urgent surgical intervention.1-3 The conditions that require urgent laparotomy include peritonitis secondary to perforation of abdominal viscous viz. Stomach, duodenum, appendix, gallbladder, colon etc. or penetrating abdominal injuries. These patients are more prone to develop post-operative complications such as peritoneal abscess or wound infection for which a surgical re-intervention may be required.4-9 Though practiced by many surgeons, the role of the intra-peritoneal drainage to minimize post-operative complications and reducing morbidity and mortality is not clear and remains a much debatable subject.

Unnecessary use of drainage of abdominal cavity is associated with many complications like blockage, adhesions and intestinal obstruction.

Aims and objectives
Therefore, this study was undertaken to investigate whether the use of intra-peritoneal drainage after
laparotomy can prevent or significantly reduce post-operative complications such as intra-peritoneal abscess formation, wound infection and therefore reduce hospital stay and stress and discomfort to the patient. The aim of the study was to determine evidence-based value of prophylactic drainage of abdominal cavity in cases of peritonitis.

**METHODS**

A prospective randomized study was done of one hundred and one (101) cases who underwent emergency laparotomy at General Hospital Palanpur and Sushrut Surgical Hospital, Palanpur, from November 2017- November 2020. The primary cause of peritonitis requiring urgent laparotomy were peptic ulcer perforation, appendicular perforation, traumatic and non-traumatic perforation of small and large bowel. Patients were taken for laparotomy after proper resuscitation and investigations. After completion of operation peritoneal cavity was either drained (Group A) or not drained (Group B), according to operator’s preference. In “Group A” tube drain (28 Fr) was passed through separate stab wound and connected to a sterile bag. Daily drain output and character of fluid were noted in “Group A”. Culture sensitivity of drain fluid was done. All patients with peritonitis included in study except patients with multiple system involvement or with unrelated complications were excluded from study. Surgical outcome and postoperative complications within 30 days of operation were noted and compared between two groups. The study protocol was approved by institutional ethics committee human.

**Statistical analysis**

Data was analyzed manually and using Statistical package for social sciences (SPSS), version 20 (SPSS Inc., Chicago, IL). Chi-square test was used to calculate p-value and for the comparison of categorical variables and presented as percentage.

**RESULTS**

Both the groups were comparable in terms of mean age (35.5 versus 31.5 years). Total number of patients included in “Group A” were 64, while in “Group B” total number of patients were 37. In group ‘A’ there were 43 males and 21 females while in Group ‘B’ there were 25 males and 12 females. Out of 101 patients, 68 (67.33) were male and 33(32.67) are female, thus male high proportion is seen in the present study.

Out of 64 cases of Group ‘A” 25 % had no drainage, 65% had minimal drainage (<50 ml/day). Culture of the drain was positive in 15.6% of Group “A”. However, overall postoperative complications (50 % versus 25.5 %) were higher in “Group A” (p=0.04).

**Table 1: Age wise distribution.**

| Age in years | Drained group A | Non drained group B |
|--------------|------------------|---------------------|
| Up to 12     | 03               | 01                  |
| 12-20        | 09               | 11                  |
| 21-30        | 13               | 08                  |
| 31-40        | 16               | 06                  |
| 41-50        | 15               | 08                  |
| Above 50     | 08               | 03                  |
| Total        | 64               | 37                  |

**Table 2: Gender wise distribution of patients.**

| Gender   | Drained Group A | Non Drained Group B | Total Group A+B % |
|----------|-----------------|---------------------|-------------------|
| Male     | 43              | 25                  | 68                |
| Female   | 21              | 12                  | 33                |
| Total    | 64              | 37                  | 101               |

**Table 3: Primary cause of laparotomy and associated complications.**

| Diagnosis               | Group A Total | W. I. | W.D. | IPA | Other | Group B Total | W. I. | W.D. | IPA | Other |
|-------------------------|---------------|-------|------|-----|-------|---------------|-------|------|-----|-------|
| Peptic perforation      | 24            | 5     | 1    | 0   | 1     | 12            | 2     | 0    | 0   | 0     |
| Enteric perforation     | 19            | 8     | 2    | 0   | 1     | 10            | 3     | 1    | 0   | 0     |
| Appendicular perforation| 5             | 2     | 0    | 0   | 0     | 8             | 1     | 0    | 0   | 0     |
| Traumatic perforation   | 9             | 4     | 0    | 1   | 1 FF  | 0             | 0     | 0    | 0   | 0     |
| Others                  | 7             | 5     | 1    | 1   | 1 BL  | 7             | 3     | 0    | 0   | 1SIO  |
| Total                   | 64            | 24    | 4    | 2   | 2     | 37            | 9     | 1    | 0   | 1     |
Table 4: Complications.

| Complications               | Group A | Group B |
|-----------------------------|---------|---------|
| Wound infection             | 24      | 9       |
| Wound dehiscence            | 4       | 1       |
| Intra-peritoneal abscess    | 2       | 0       |
| Biliary leak                | 1       | 0       |
| Fecal fistula               | 1       | 0       |
| Sub-acute int. obstruction  | 0       | 1       |
| Total                       | 32 (50%)| 11 (30%)|

Table 5: Drainage: amount: culture.

| Drainage Fluid Amount | No. of patients | Drainage fluid culture organisms detected | Drainage fluid culture organisms not detected | Bile pigments |
|-----------------------|-----------------|-------------------------------------------|---------------------------------------------|---------------|
| Nil                   | 16              | -                                         | -                                           | -             |
| Min                   | 41              | 7                                         | 34                                          | -             |
| Significant<50 cc/48 hrs | 7              | 3                                         | 2                                           | 2             |
| Total                 | 64              | 10                                        | 36                                          | 2             |

A significant difference was also observed in length of hospital stay between both the groups. It was higher in “Group A” as compared to “Group B” (13.1 days versus 10.5 days respectively).

**DISCUSSION**

In our study complication rate in the drained group was higher than then in non-drained group, which is comparable to observations made by other workers. In our series, length of hospital stay (13.1 versus 10.5), was higher than the study done by Khan et al (9±4 versus 5±3.4 days) but in both the series length of hospital stay was higher in the drained group. Wound infection rate in our series (37.5% versus 24.3%) was comparable to the study done by Khan et al (40.0% versus 12.5%). Also, the findings were similar in both the series in terms of overall postoperative complications, present series (50 % versus 29.7%), Khan et al (35.85% versus 16.11%). The higher incidence of complications in the drained group seems to be due to the fact that most of the drains get blocked because of clot, thick secretion or omentum, thereby failing the purpose itself of the drain and stop functioning after 72 hours. On the contrary it invites infection from outside. This may delay convalescence and increase the hospital stay. In our series drain was useless in 90% of the cases and resulted in higher incidence of complications and increased hospital stay.

**Limitations of study**

In our study laparotomy closure in peritonitis, after completion of operation peritoneal cavity was either drained or not drained according to operator’s preference which may affect studies outcome. Large number of cases with multi-centric trial needs to further clarify the issue.

**CONCLUSION**

Based on these results, present study suggests that prophylactic drainage of peritoneal cavity after gastrointestinal surgery is not necessary, as it does not offer additional benefits for the patients undergoing laparotomy for peritonitis. Moreover, it increases operative duration, length of hospital stay and surgical site infection. Culture of the drain was positive in 15.6% of Group “A”, but these patients did not develop any major complication later, while one patient whose drain culture did not grow any organism on culture developed major complication like intra-abdominal abscess on 5th post-operative day. Thus, it is difficult to arrive at any conclusion regarding importance of culture and sensitivity of drain fluid in few positive cases only. Intra-abdominal abscess has occurred in spite of drainage in “Group A”. While, in “Group B” (non-drained) patients, if collection occurs later on, Ultrasonography guided percutaneous drainage, culture and sensitivity and appropriate treatment is possible. Alternatively, not draining the peritoneal cavity decreases peritoneal sepsis as it eliminates track infection and increases chances of early ambulation. Drain should be kept when leak from suture line is anticipated or there is lot of necrotic tissue within peritoneal cavity, and kept till it functions otherwise it should be removed at the earliest. Considering all this facts Lawson Taits maxim “when in doubt drain” should be revised when in doubt don’t drain.

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REFERENCES

1. Jang JY. Epidemiology and Microbiology of Secondary Peritonitis Caused by Viscus Perforation: A Single-Center Retrospective Study June 2015 Surgical Infections. 1970;171(5):764-9.
2. Gauzit R, Péan Y, Barth X, Mistretta F, Lalaude O. For top study team Surgical infections, Epidemiology Management and Prognosis of Secondary Non-Postoperative Peritonitis: A French Prospective Observational Multicenter Study. 2009;10(2):119-27.
3. Ghoshe PS. Epidemiology of Secondary Peritonitis: Analysis of 545 Cases International Journal of Scientific Study. 2016;3(12).
4. Baiely & Love Short Practice of Surgery. 26Th edition. 2004;971-8.
5. Maigot: Abdominal Operation. 11th edition. 354,479-515,91.
6. Sabiston D. Text book of Surgery. 2016;1078-80.
7. Paterson S. Core Topics in General and Emergency Surgery. 3rd edition. 96-110.
8. Hall JC, Heel KA, Papadimitriou JM, Platell C. The Pathobiology of Peritonitis. A.G. of Gastroenterology. 1998;114:185-96.
9. Ling. APSIC Guidelines for the Prevention of Surgical Site Infections in 2018. Antimicrobial and Resistance Infection Control. 2019;8:174.
10. Pradeep. Role of abdominal drains in abdominal surgery. I. J. S. 1987;263-8.
11. Robinson J. Surgical drainage: An historical perspective. Br Journal of Surgery. 2001;73:422-6.
12. Agrama. Functional Longevity of intraperitoneal drains A. J. S. 2008;132:418-4211976.
13. Vyas AK. Prophylactic intra-abdominal drains and it’s longevity and role as a source of Infection. I. J. S. 1984;252-8.
14. Stone. Abdominal drainage following appendectomy and cholecystectomy. Ann Surg. 197;187(6):606-10.
15. Yates JL. An experimental study of local effects of drainage Abdominal infectious complications associated with the dislocation of intra-peritoneal part of drainage tube and poor drainage after major surgeries. Int Wound J. 2020;4:21-6.
16. Guo Y. Abdominal infectious complications associated with the dislocation of intra-peritoneal part of drainage tube and poor drainage after major surgeries. Int Wound J. 2020;4:21-6.
17. Cerise EJ, Pierce WA. Diamond Abdominal drains: their role as a source of infection following splenectomy. Ann Surg. 1970;171(5):764-9.
18. Greenall. Should you drain perforated appendix. B. J. S. 1978;880-2.
19. Petrowsky H, Demartines N, Rousson V, Clavien PA. Evidence-based value of prophylactic drainage in gastrointestinal surgery: a systematic review and meta-analyses. Ann Surg. 2004;240:1074-84.
20. Khan S, Rai P, Misra G. Is Prophylactic Drainage of Peritoneal Cavity after Gut Surgery Necessary? A Non-Randomized Comparative Study from a Teaching Hospital October. 2015;02:14-8.
21. Khan S, Rai P, Misra G. Is Prophylactic Drainage of Peritoneal Cavity after Gut Surgery Necessary?: A Non-Randomized Comparative Study from a Teaching Hospital. Journal of clinical and diagnostic research: JCDR. 2015;9(10):PC01-3.
22. Rather SA, Bari SUL, Malik AA, Khan A. Drainage vs no drainage in secondary peritonitis with sepsis following complicated appendicitis in adults in the modern era of antibiotic World J Gastrointest Surg. 2013;5(11):300-5.
23. Hamid AKA, Sarker SJ. Is abdominal drainage after open emergency appendectomy for complicated appendicitis beneficial or waste of money? A single center retrospective cohort study. Annals of medicine and surgery. 2012;36:168-72.

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