International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 4, April 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.4.2025.43

Original Research

Role Of Drains In Case Of Duodenal Perforation Operated Within 48hrs; Comparison Between Drains Vs No Drain

[1]Dr. Pabitra Hembram, [2]Dr. Harish Chandra Dhamudia, [3]Dr. Samarendra Satpathy, [4]Dr. Abhijeet Anand, [5]Dr. Subhankar Baidya

[1]Professor, [2]Associate Professor, [3]Assistant Professor, [4]Senior Resident, [5]Junior Resident, Department of General Surgery, VIMSAR, Burla, India

Corresponding Author:
Dr. Samarendra Satpathy,
Assistant Professor, Department of General Surgery, VIMSAR, Burla, India

Received date: 27 February 2025 Acceptance date: 31 March 2025 Published: 05 April, 2025

ABSTRACT

Introduction: The necessity of prophylactic drains in GI surgeries is debated, as recent evidence suggests they may increase infection risk, prolong hospital stays, and exacerbate postoperative pain.This study assesses duodenal perforation repair outcomes with and without prophylactic drains within 48 hours, focusing on operative time, pain duration, hospital stay, wound dehiscence, infection rates, and electrolyte imbalances.

Methodology: A prospective observational study at VIMSAR, Burla (September 2022–August 2024) included 60 patients with anterior D1 duodenal perforation within 48 hours, divided into No Drain (Group 1) and Drain (Group 2). Patients aged 18–65 years, hemodynamically stable, and undergoing Graham's omental patch repair were included, while those with other GI perforations, malignancies, or severe comorbidities were excluded. Outcomes assessed were operative time, pain duration, hospital stay, wound dehiscence, fever, and electrolyte imbalances. Data were analysed using SPSS 26, with $p < 0.05$ as statistically significant.

Results: Operative time was significantly longer in the Drain group (74.80 ± 3.51 min) vs. No Drain group (61.17 ± 4.68 min) ($p < 0.0001$). Hospital stay was also prolonged (7.87 ± 2.34 days vs. 6.37 ± 2.41 days, $p = 0.0175$). Postoperative complications, including wound dehiscence ($p = 0.0467$), fever ($p = 0.0194$), and electrolyte disturbances ($p = 0.0401$), were significantly higher in the Drain group. Pain duration was also longer (7.17 ± 1.09 days vs. 2.57 ± 0.67 days, $p < 0.0001$).

Conclusion: Routine prophylactic drain placement in anterior D1 duodenal perforation repair was associated with longer operative time, extended hospital stay, increased postoperative morbidity, and prolonged pain duration. These findings suggest that drain placement should be selective rather than routine, considering intraoperative findings and patient-specific risk factors.

Keywords: Duodenal perforation, prophylactic drains, gastrointestinal surgery, operative time, postoperative pain, wound dehiscence, electrolyte imbalances, Graham's omental patch repair

INTRODUCTION

The use of intra-abdominal drains following gastrointestinal surgery, particularly after peptic ulcer perforation repair, has been a subject of ongoing debate.[1] While historically, surgeons routinely employed drains based on a principle of caution –an idea that early surgical pioneers, like Hippocrates and Billroth, had adopted.[2,3] However, advances in surgical techniques, infection control, anaesthesia, and the rise of minimally invasive surgery have prompted a critical re-evaluation of this practice. Prophylactic drainage, once considered standard, is now under increased scrutiny, with its necessity and effectiveness being questioned, especially in the context of peptic ulcer perforation repair, a condition requiring prompt medical and surgical intervention.[4,5] The initial rationale for drains involved the removal of fluid, blood, and debris, with the intention of preventing infection and anastomotic leaks.[6,7,8] However, evidence increasingly suggests that routine drainage may not achieve these goals. Studies such as Hoffman et al. (1986) challenged the efficacy of prophylactic drainage in detecting anastomotic leaks.[9,10,11,12] Moreover, concerns have emerged that drains may even increase the risk of infection, and prolonged drain use has also been associated with ascending infections, adhesions, and delayed wound healing. Some surgeons are now advocating for laparoscopic lavage as a preferable alternative to routine drainage in managing intraperitoneal contamination in specific cases of perforated peptic ulcer disease.[13,14,15,16] Randomized controlled trials (RCTs) have further

DOI: 10.69605/ijlbpr_14.4.2025.43

highlighted the limited impact of drains on patient outcomes in many situations. Emerging evidence suggests that drain-free approaches can lead to shorter hospital stays, reduced infection rates, and decreased pain, benefits that are often associated with advances in laparoscopic surgery, enhanced recovery after surgery (ERAS) protocols, and improved perioperative monitoring. Nevertheless, prophylactic drainage may still be warranted in select high-risk cases, such as those involving severe peritoneal contamination, multiple comorbidities, difficult-to-access perforations, or intraoperative evidence of ongoing leakage.[17-23] Conversely, a drain-free approach may be more appropriate for small, contained perforations with minimal contamination and effective lavage. This suggests a need for a selective approach to drain placement, guided by operative findings.[24,25,26]

Therefore, given the ongoing uncertainty regarding the benefits and risks of prophylactic drainage, particularly in anterior D1 duodenal perforation repair, this study aims to compare clinical outcomes between patients undergoing duodenal perforation repair with and without drain placement. The study will evaluate operative time, postoperative pain duration, length of hospital stay, wound dehiscence, infection rates, and electrolyte imbalances to inform future practice.

MATERIALS AND METHOD

From September 2022 to August 2024, a prospective observational study was conducted at VIMSAR, Burla, to evaluate postoperative outcomes following anterior D1 duodenal perforation repair with and without prophylactic drain placement. Sixty patients were enrolled and equally divided into two groups: a no-drain group (Group 1) and a drain group (Group 2). Inclusion criteria consisted of patients aged 18–65 years, presenting within 48 hours of perforation, and being hemodynamically stable. Exclusion criteria included other gastrointestinal perforations, malignancies, significant comorbidities, or late presentation. All patients underwent Graham's omental patch repair; the drain group (Group 2) received prophylactic drain placement. Outcomes assessed were operative time, pain duration, hospital length of stay, wound dehiscence, fever, and electrolyte imbalances. Standard postoperative care was provided, and drains were removed when output fell below 50 mL/day. Follow-up assessments were performed at 2 weeks and 3 months post-surgery. Data were analysed using SPSS version 26, with a significance level of $p < 0.05$. The study was approved by the Institutional Ethics Committee (IEC) at VIMSAR, and all participants provided informed consent. This study aims to inform the necessity of routine prophylactic drain placement in duodenal perforation repair.

RESULT

Sixty patients undergoing anterior D1 duodenal perforation repair were enrolled in the study and separated into two groups: Group 1 (No Drain, n=30) and Group 2 (Drain, n=30). Demographics, operative details, and postoperative results were compared between the groups. The mean age was similar between the No Drain group (46.40 ± 11.87 years) and the Drain group (45.13 ± 10.93 years) (p=0.6778). Gender distribution was also comparable, with approximately 87% male and 13% female patients overall (p=0.4513) (Table 1).

Table 1: Comparison of Gender and Age Distribution Between No Drain and Drain Groups

Parameter	Group - 1 (No Drain)	Percentage	Group - 2 (Drain)	Percentage	P value	Result
Gender						
Male	25	83.33%	27	90%	0.4513	Not Significant
Female	5	16.67%	3	10%		
Age (years)						
< 50 years	16	53.33%	18	60%	0.6054	Not Significant
≥ 50 years	14	46.67%	12	40%		
Mean ± S.D.	46.40 ± 11.87	-	45.13 ± 10.93	-	0.6778	Not Significant

The operative time was significantly higher in the drain group, with a mean duration of 74.80 ± 3.51 minutes compared to 61.17 ± 4.68 minutes in the no-drain group ($p<0.0001$). Similarly, the postoperative hospital stay was significantly longer in patients with drains, with a mean stay of 7.87 ± 2.34 days compared to 6.37 ± 2.41 days in the no-drain group (p=0.0175)(Figure 1).

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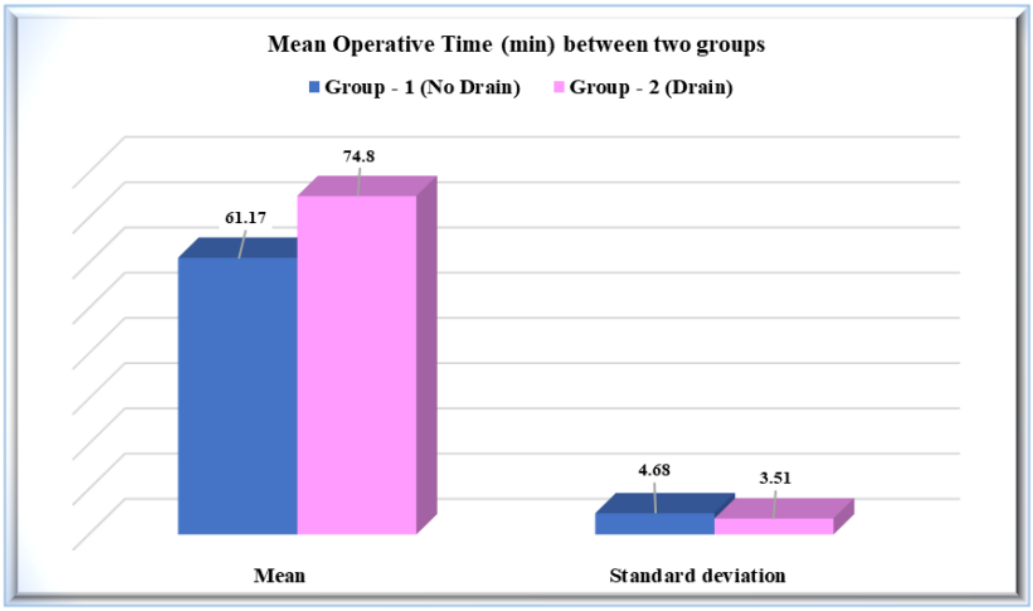

Figure 1: Shows comparison of Mean Operative Time (min) between No Drain and Drain Groups

Patients who received drains after surgery for duodenal perforation experienced a significantly longer hospital stay, with 93.33% staying five days or more, compared to only 76.67% in the group without drains (p = 0.0238). This suggests a potential link between prophylactic drain use and extended hospitalization. Furthermore, wound dehiscence occurred more frequently in the Drain group (40%) than in the No Drain group (16.67%) (p = 0.0467, Table 2), indicating a possible association between drains and increased wound complications. The incidence of postoperative fever was also significantly higher in the Drain group (56.67%) compared to the No Drain group (26.67%) (p = 0.0194), suggesting a greater risk of infection or inflammation. Similarly, electrolyte disturbances were significantly more prevalent in patients with drains (60%) than those without (33.33%) (p = 0.0401). Taken together, these results (Table 2) suggest that routine use of drains in duodenal perforation repair may increase postoperative complications and necessitates careful evaluation of their necessity.

Table 2: Comparison of Postoperative Outcomes (Categorical) Between No Drain and Drain Groups

Outcome	Group - 1 (No Drain)	%	Group - 2 (Drain)	%	P-value	Result
Hospital Stay (<5 days)	7	23.33%	2	6.67%	0.0238	Significant
Hospital Stay (≥5 days)	23	76.67%	28	93.33%		
Wound Dehiscence (Yes)	5	16.67%	12	40%	0.0467	Significant
Wound Dehiscence (No)	25	83.33%	18	60%		
Postoperative Fever (Yes)	8	26.67%	17	56.67%	0.0194	Significant
Postoperative Fever (No)	22	73.33%	13	43.33%		
Electrolyte Disturbance (Yes)	10	33.33%	18	60%	0.0401	Significant
Electrolyte Disturbance (No)	20	66.67%	12	40%		

Furthermore, postoperative pain duration was significantly prolonged in the Drain group, with a mean pain duration of 7.17 ± 1.09 days, compared to 2.57 ± 0.67 days in the No Drain group (p < 0.0001). This highly significant difference suggests that patients with drains experienced more discomfort and delayed pain resolution. The prolonged pain may be due to increased inflammatory response or mechanical irritation caused by the drain(Figure 2).

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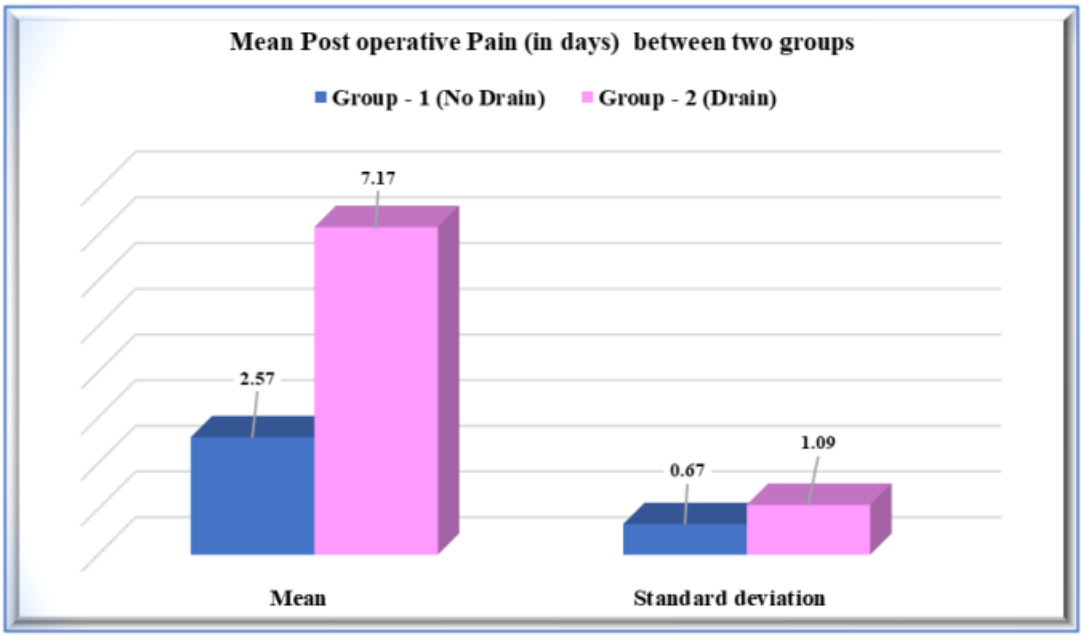

Figure 2 : Shows comparison of mean Post operative Pain (in days) between two groups

Overall, the results indicate that routine prophylactic drain placement in anterior D1 duodenal perforation repair is associated with prolonged operative time, extended hospital stay, higher complication rates, and increased postoperative pain. These findings suggest that drain placement may not be necessary in all cases and should be selectively used based on intraoperative findings and patient risk factors.

DISCUSSION

Traditionally, prophylactic drains have been routinely placed during laparotomy for anterior D1 duodenal perforation repair, specifically after Graham's omental patch repair. The intent was to evacuate intraperitoneal collections like blood, bile, and intestinal contents, thus minimizing the risk of fluid accumulation and subsequent infection. However, contemporary surgical practice, guided by advancements in technique and the adoption of Enhanced Recovery After Surgery (ERAS) protocols, increasingly favours avoiding routine drain placement for many gastrointestinal procedures. This shift is motivated by a lack of definitive evidence demonstrating that prophylactic drains significantly reduce postoperative complications like anastomotic leaks, or improve overall patient recovery. Several studies suggest that drains may act as foreign bodies, paradoxically raising the risk of surgical site infections, adhesions, and delayed wound healing. Furthermore, patients with drains often experience increased postoperative pain, restricted mobility, and electrolyte imbalances. To assess the impact of drain usage, our study compared two patient groups following anterior D1 duodenal perforation repair: Group 1 (No Drain) and Group 2 (Drain Group). We aimed to determine if omitting drains resulted in improved postoperative outcomes, specifically evaluating operative time, length of hospital stay, wound dehiscence, postoperative fever, electrolyte disturbances, and duration of postoperative pain. The mean age was similar between Group 1 (46.40 ± 11.87 years) and Group 2 (45.13 ± 10.93 years) ($p=0.6778$). Gender distribution was also comparable ($p=0.4513$). This demographic consistency suggests that age and gender did not significantly influence postoperative outcomes, strengthening the validity of the comparison between the two groups. These findings align with prior research by Kumar et al. and Arya et al.,[24,25] which reported similar age and gender distributions in drain and no-drain groups.[24, 25]

Our study indicated a significantly longer operative time in the drain group (74.80 ± 3.51 minutes) compared to the no-drain group (61.17 ± 4.68 minutes) ($p<0.0001$). This increased duration likely reflects the time required for drain placement and securement. Comparable findings were reported by Kumar et al,[24] who also noted significantly higher operative times in the drain group. Prolonged surgery increases anaesthesia exposure, delays recovery, and may contribute to postoperative complications, highlighting a potential disadvantage of drain placement. Patients in the drain group experienced a significantly longer hospital stay (7.87 ± 2.34 days) than those in the no-drain group (6.37 ± 2.41 days, $p=0.0175$). This observation is consistent with studies by Arya et al. and Surva et al.,[25,26] which linked drain use to prolonged hospital stays due to delayed mobilization and increased postoperative complication rates. The extended hospitalization in Group 2 may be attributed to increased wound infections, delayed return of bowel function, and prolonged postoperative pain, all factors hindering early discharge. The incidence of postoperative complications, including wound dehiscence, fever,

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and electrolyte disturbances, was significantly higher in the drain group.

Wound Dehiscence: Wound dehiscence occurred in 40% of drain patients compared to 16.67% in the no-drain group (p=0.0467), suggesting that drains may promote infection and hinder wound healing. This aligns with Kumar et al.'s study,[24] which found significantly higher rates of partial dehiscence in the drain group.[24]

Postoperative Fever: Postoperative fever was also significantly more frequent in the drain group (56.67% vs. 26.67%, p=0.0194). This may be attributable to retrograde infections stemming from the drain, which can induce localized peritoneal inflammation. Previous research by Surva et al.[26] also documented higher rates of postoperative fever in drain groups.[26]

Electrolyte Disturbances: Electrolyte imbalances were observed in 60% of drain patients compared to 33.33% in no-drain patients (p=0.0401). Excessive loss of peritoneal fluid through drains may lead to dehydration, hypokalaemia, and hyponatremia, necessitating fluid resuscitation and electrolyte correction.

Postoperative Pain: A significant difference was observed in the duration of postoperative pain. The drain group experienced pain for 7.17 ± 1.09 days, compared to 2.57 ± 0.67 days in the no-drain group ($p<0.0001$). Drains can cause localized peritoneal irritation, leading to ongoing pain stimulation. The discomfort associated with drain removal further exacerbates patient distress. These findings are consistent with previous publications by Arya et al. and Surva et al.,[25,26] which observed prolonged pain and limited mobility in drain groups.[25,26]

Impact on Mobilization: The drain group's restricted early ambulation, stemming from drain-associated discomfort, is another significant drawback. Delayed mobilization increases the risk of deep vein thrombosis (DVT), prolonged ileus, and delayed wound healing. Evidence suggests that patients without drains are often able to mobilize within 24 hours postoperatively, leading to faster recovery and reduced hospital stays.

CONCLUSION

Routine prophylactic drains in anterior D1 duodenal perforation repair are detrimental. This study demonstrates they lengthen operative time, hospital stay, and postoperative pain, while also increasing complications like wound dehiscence, fever, and electrolyte imbalances. The Drain group experienced significantly higher morbidity than the No Drain group. Therefore, selective drain placement based on intraoperative assessment and patient risk factors is recommended over routine use. Individualized, evidence-based management, avoiding unnecessary drains, can improve recovery, reduce infection risk, and shorten hospitalization in duodenal perforation cases.

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