Biological and Clinical Sciences Research Journal
eISSN: 2708-2261; pISSN: 2958-4728
www.bcsrj.com
DOI: https://doi.org/10.54112/bcsrj.v6i4.2309
*Biol. Clin. Sci. Res. J., Volume 6(4), **2025**: 2309*
Original Research Article

Frequency of Complications Due to Intra-Abdominal Surgeries

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(Received, 08th January 2025, Accepted 5th April 2025, Published 30th April 2025)

Abstract: *Intra-abdominal procedures are associated with a broad spectrum of postoperative complications that vary widely in incidence depending on underlying pathology, surgical approach and patient comorbidities. Despite the abundance of literature, population characteristics and outcome definitions can obscure the true burden of postoperative events, necessitating continued investigation.* ***Objective:*** *To determine the complications due to intra-abdominal surgeries in patients presenting at Lady Reading Hospital, Peshawar.* ***Methods:*** *This descriptive study was conducted at the Department of General Surgery, Lady Reading Hospital, Peshawar, from 04-07-2024 to 04-01-2025, involving 213 patients aged 18 to 70 years who underwent intra-abdominal surgery. We monitored the patients for 30 days for complications such as re-hospitalisation, drain-related fall out, fistula formation and bleeding. Data were analysed using SPSS version 23, and chi-square tests for stratification were used P values < 0.05 were considered significant.* ***Results:*** *The mean age was 43.27±14.91 years, with 58.7% male and 41.3% female patients. The complications were fistula formation (14.6%), re-hospitalisation (13.1%), bleeding (7.5%) and drain fallout (7.0%). No noteworthy associations between the complications and the patients' age and gender were observed.* ***Conclusion:*** *Complications due to intra-abdominal surgeries in our study were fistula (14.6%), re-hospitalisation (13.1%), bleeding (7.5%) and drain-related fallout (7%).*

Keywords: Intra-abdominal surgery, postoperative complications, re-hospitalization, drain fall out, fistula.

[***How to Cite:*** Ahmed M, Gul A. Frequency of complications due to intra-abdominal surgeries. *Biol. Clin. Sci. Res. J.*, **2025;** 6(4): 294-297. doi: https://doi.org/10.54112/bcsrj.v6i4.2309

Introduction

Intra-abdominal procedures are an essential part of modern medicine, dealing with acute emergencies to chronic diseases. Interventions performed within the intricate abdominal cavity can decrease pain along with improving well-being (1, 2). The journey to recovery can frequently be challenging, as intra-abdominal interventions carry an inherent danger of complications that may significantly affect patient results and quality of life (3, 4).

Postoperative complications constitute an important cause of morbidity as well as mortality (5). The growing importance of health care costs has been acknowledged globally. Complications resulting from surgery significantly affect hospital costs. Postoperative complications substantially elevate total hospital costs, constitute a financial burden on both government as well as individuals, and increase amount of work for medical personnel, even when considering the type as well as urgency of surgery (6-9). Patients receiving care for complications following surgery are relatively common, and majority presented with early complications. According to a study, the recorded complications due to intra-abdominal surgeries are drain related falling out 19.5%, re-hospitalization 16.6%, bleeding 17.1%, and fistula formation 22% (10).

The likelihood of complications after surgery is directly related to the patient's preoperative condition as well as magnitude of surgery itself, while being inversely related to the extent of preoperative planning as well as care (11, 12). A midline incision remains preferred choice for circumstances necessitating rapid intra-abdominal access or when initial diagnosis is ambiguous, due to its swiftness and simplicity of extension (13). To minimize the risk of wound-related complications, it is critical to implement preventive strategies, and optimized wound care protocols (14, 15).

Intra-abdominal surgeries are among the most common and complex procedures performed worldwide, addressing a wide range of medical conditions. But due to the paucity of literature on this subject locally. The goal of this study is to determine the frequency of complications due to intra-abdominal surgeries at our hospital setup. The findings of this study will be helpful in exploring complications due to intra-abdominal surgeries, which is of paramount importance from clinical, patient safety, and quality improvement.

Methodology

This descriptive study was conducted in the Department of General Surgery at Lady Reading Hospital, Peshawar, from 04-07-2024 to 04-01-2025 after receiving ethical approval. The sample of 213 patients was calculated using the World Health Organization's sample size calculator, based previous frequency of re-hospitalization rate of 16.6%(10) among patients who had undergone intra-abdominal surgeries, with 5% margin of error and 95% confidence interval. Consecutive non-probability sampling was employed.

Eligible patients included both males and females aged 18 to 70 years who had undergone intra-abdominal surgery, defined by interventions involving access to and operations within the abdominal cavity for various medical conditions, anatomical abnormalities and pathological processes. Those with pre-existing metabolic disorders, pulmonary infections or immunodeficiency syndromes were not included. Each patient gave their consent. Demographic information such as age, body mass index, gender, educational status, employment status, socioeconomic level and residence was recorded. Patients were then monitored for specific postoperative complications including re-hospitalization (unplanned admission of a patient to a hospital occurring within a 30-day period after discharge from a previous hospitalization or healthcare encounter), unintended drain dislodgement (unintended removal or displacement of a surgical drain from its designated position within 30 days post-procedure, generally arising after initial insertion and throughout the postoperative care phase), fistula development (emergence of an abnormal communication channel or tract between neighboring structures in the abdominal cavity, resulting in the leakage of fluid and pus, identified within 30 days of the procedure via physical examination)

and bleeding (blood loss originating from the surgical site within 30 days following the procedure, confirmed through physical examination), all evaluations were overseen by a surgeon possessing at least five years of experience following fellowship completion. Data were captured using a structured proforma.

For analysis, the collected information was processed with SPSS 23. Categorical demographics and complications were presented as frequencies and percentages while age and BMI were presented as mean and standard deviation. Complications were stratified with age and gender using Chi Square test, keeping P value statistically notable at ≤ 0.05.

Results

The mean age of 213 patients was 43.27 ± 14.91 years. The body mass index (BMI) of participants was 24.79 ± 1.44. The study population was diverse containing 125 males (58.7%) and 88 females (41.3%). Rest of the demographic information about the patients in given in table no 1.

The study assessed several complications post-surgery. Re-hospitalization occurred in 28 (13.1%) cases while 185 (86.9%) did not require re-hospitalization. Drain-related issues specifically drains falling out were observed in 15 (7.0%) cases with 198 (93.0%) experiencing no such issue. Fistula formation was noted in 31 (14.6%) cases while 182 (85.4%) did not develop fistulas. Bleeding was reported in 16 (7.5%) cases with 197 (92.5%) free from this complication (Table 2).

When examining complications across age groups the analysis found that patients in the age groups of 36 to 50 and > 50 years had higher frequency of complications, but the associations weres not statistically notable (Table 3). Similarly the gender wise association with complications revealed that majority of the complications were found in the male gender, but the associations were not significant (Table 4).

Table 1: Demographics of the patients

Demographics		n	%
Gender	Male	125	58.7%
	Female	88	41.3%
Education	Literate	83	39.0%
	Illiterate	130	61.0%
Occupation status	Employed	94	44.1%
	Unemployed	119	55.9%
Residence	Urban	111	52.1%
	Rural	102	47.9%
Socioeconomic status	Lower class	48	22.5%
	Middle class	115	54.0%
	Upper class	50	23.5%

Table 2: Complications of intra-abdominal surgeries

Complications		n	%
Re-hospitalization	Yes	28	13.1%
	No	185	86.9%
Drain related falling out	Yes	15	7.0%
	No	198	93.0%
Fistula formation	Yes	31	14.6%
	No	182	85.4%
Bleeding	Yes	16	7.5%
	No	197	92.5%

Table 3: Stratification of complications of intra-abdominal surgeries with age

Complications		Age groups (Years)						*P value
		18 to 35		36 to 50		> 50		
		n	%	n	%	n	%	
Re-hospitalization	Yes	5	17.9%	12	42.9%	11	39.3%	0.09
	No	68	36.8%	50	27.0%	67	36.2%	
Drain related falling out	Yes	6	40.0%	4	26.7%	5	33.3%	0.88
	No	67	33.8%	58	29.3%	73	36.9%	
Fistula formation	Yes	9	29.0%	13	41.9%	9	29.0%	0.23
	No	64	35.2%	49	26.9%	69	37.9%	
Bleeding	Yes	7	43.8%	5	31.2%	4	25%	0.57
	No	66	33.5%	57	28.9%	74	37.6%	

**Chi Square test was applied*

Table 4: Stratification of complications of intra-abdominal surgeries with gender

Complications		Gender				*P value
		Male		Female		
		n	%	n	%	
Re-hospitalization	Yes	15	53.6%	13	46.4%	0.55
	No	110	59.5%	75	40.5%	
Drain related falling out	Yes	10	66.7%	5	33.3%	0.51
	No	115	58.1%	83	41.9%	

Fistula formation	Yes	16	51.6%	15	48.4%	0.38
	No	109	59.9%	73	40.1%	
Bleeding	Yes	9	56.2%	7	43.8%	0.83
	No	116	58.9%	81	41.1%	

**Chi Square test was applied.*

Discussion

The findings of our study indicate notable rates of re-hospitalization, drain dislodgement, fistula formation, and bleeding yet showed no significant association with age or gender. The mean age of our cohort was 43.27 years which presents an interesting midpoint when contrasted with other studies. It is younger than the population studied by Lim et al. (62.2 years) in their research on total gastrectomy for gastric carcinoma, a demographic typically associated with oncological resections. (16) Conversely, it is notably older than the median age of 33.5 years reported by Sincavage et al. in their prospective study of emergent laparotomies, which reflects a population burdened by acute surgical conditions like perforations and volvulus. (17)
Our cohort's age profile suggests a mix of elective and emergent procedures for conditions that are not exclusively cancer-related, we included a broader spectrum of pathological conditions and anatomical abnormalities. The lack of a significant association between age and complications in our study aligns with the subgroup analysis performed by Lim et al., who found that the omission of drains did not increase complications across different age brackets. (16) However, it contrasts with the findings of Sincavage et al., where older age was a significant independent predictor of mortality. (17) This inconsistency can be attributed to the different outcome measures as our study focused on specific morbidities, while the aforementioned study measured mortality, which is often the result of severe complications and comorbid conditions more common in older patients.
The gender distribution in our study (58.7% male) is consistent with a common trend in abdominal surgical procedures where males often constitute a majority of patients undergoing such procedures particularly for conditions like perforated peptic ulcers and trauma. This aligns with the male predominance (82.5%) reported by Sincavage et al. and the 71.4% reported by Mukakala et al.(17,18) Our finding that gender was not a notable factor for any of the complications studied, has also been reported by Lim et al. who did not find gender to be a significant determinant of postoperative morbidity.(16)
The rate of fistula formation in our study (14.6%) is a significant finding. It is lower than the 19.5% reported by Mukakala et al. but remains a substantial cause of morbidity.(18) Fistulae often arise from anastomotic leaks or infected peritoneal cavities, and their high incidence in certain settings, as noted by Mbuya et al., is frequently linked to septic procedures for conditions like typhoid perforation.(19) The fact that we did not find age or gender to be risk factors for fistula formation suggests that its etiology may be more closely tied to technical aspects of the surgery, the nature of the primary disease (e.g., inflammation, infection) and perhaps nutritional status of the patient, rather than demographic variables.
The re-hospitalization rate of 13.1% serves as a crucial indicator of significant postoperative morbidity. This figure finds some context in the work of Lim et al., who reported a 30-day readmission rate of 2.6% to 3.6% after total gastrectomy, which is considerably lower than our findings. (16) Soylu et al. documented that around 50% of their patients who had abdominal surgeries were presented for readmission within one hundred and eighty days after discharge. (20) Since we noted readmissions within 30 days, this could explain the higher percentages for readmission by Soylu et al.
The complication of drain fall-out, observed in 7.0% of our patients, is a practical and often underdiscussed issue in surgical care. Surgical drain fall out or dislocation from the intended position is a commonly occurring problem in patients undergoing abdominal surgeries. A study reported 28% incidence of drain dislocation in patients undergoing abdominal surgeries. (21)
The occurrence of postoperative bleeding in 7.5% of our patients is a serious concern. This rate is substantially higher than the 1.0% reported in the drainage group by Lim et al. and similar to 6.3% in the drain group reported by Azhar et al. (22)
This study observed an increased incidence of fistula formation, which can be attributed to several factors, including the skills of the surgeons, underlying diseases and the complexity of the procedure.
The high incidence of postoperative complications observed in this study is a complex issue, which is deeply rooted in patient-specific factors, intraoperative decisions, and postoperative care quality. A significant reason of morbidity, especially surgical site infections (SSI) and intra-abdominal abscesses is intraoperative contamination, which is prevalent in procedures for perforated appendicitis or in contaminated fields. (23) This risk is exacerbated in resource-constrained settings where following strict aseptic protocols can be challenging for the OT staff. Furthermore, patient comorbidities and procedural complexity can elevate the risk of severe complications. The complications in abdominal surgeries can increase the treatment cost due to longer hospital stays. (24) While surgeons continuously refine their technical expertise, complications can still arise from a combination of factors directly related to their skills. These include not only manual technical errors but also critical gaps in non-technical skills like situational awareness, decision-making, communication, and leadership. Majority of surgical adverse events are connected to technical errors, which can occur even during routine procedures performed by experienced surgeons. Another reason for complications occurrence can be due to the miscommunication or negligence in following surgical protocols by the OT staff. Often overburdened nursing or OT staff can resist following the surgical protocols. (25)
The limitations of this study are the single-center design and the use of consecutive sampling, which are practical but may limit the generalizability of the results to other surgical settings with different patient populations and clinical practices. Patients with pre-existing metabolic and immunodeficient conditions were excluded from the study, making the study population relatively healthier than the population typically seen in surgical wards. Also the study did not include confounding variables like the type of surgery, the duration of the surgery, the skill level of the surgeon, and the nutritional status of the patients.

Conclusion

In conclusion, our study confirms a notable frequency of complications following intra-abdominal surgeries, with fistula formation being the most prevalent (14.6%), followed by reshospitalization (13.1%), bleeding (7.5%) and drain related fallout (7%), while revealing no significant link between these complications and the age or gender of the patients.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned. (162/LRH/ MTI))
Consent for publication
Approved
Funding
Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

MA (Postgraduate Resident)
Manuscript drafting, Study Design,
AG (Associate Professor)
Review of Literature, Data entry, Data analysis, and drafting articles.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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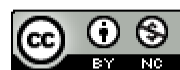

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