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Evaluation of Postoperative Difficulties in Diabetic Patients Experiencing Abdominal Surgical procedure

[1]Dr Rafiullah, [2]Qasim Raza, Tabassum Raza, [3]Dr Tahmoor Shahzad, [4]Nazneen Tabassum, [5]Umar Tipu, [6]Khurram Satti

[1]Assistant Professor Surgery, BMC/KGN MTI Bannu
[2]Gangaram Hospital Lahore
[3]Abbasi Shaheed Hospital.Karachi Medical and Dental college Karachi
[4]Holy Family Islamabad
[5]UHS Lahore
[6]Services Hospital Lahore

ABSTRACT

Background: Patients with diabetes frequently experience delayed healing of wounds, increased infection, and longer hospitalizations affecting surgical outcome, as well as increased health care burden. Diabetes mellitus is a common metabolic illness that is associated with a high incidence of postoperative complications after abdominal surgery.

Objective: To determine the epidemiology of postoperative complications in diabetic patients following abdominal surgery, with a focus on both the incidence and types of these complications and associated risk factors affecting surgical outcomes.

Method: This was an observational study conducted in Tertiary Care Hospital with 90 diabetic patients undergoing different abdominal surgeries. The period of investigation ranged from August 2024 to April 2025. A comprehensive clinical including: demographics, type, duration of diabetes, glycemic control status, and postoperative data were obtained and analyzed. Complications like SSI, delayed wound healing, sepsis and duration of hospital stay was kept on follow- up of the patient.

Results: Of the 90 diabetic patients, 52 (57.8%) developed post-operative complications. Surgical site infection occurred in 28 (31.1%) patients, delayed wound healing in 15 (16.7%) patients, while 9 (10%) patients developed post-operative sepsis. It was observed that poor preoperative glycemic control (HbA1c $> 7.5\%$) was strongly related to a higher complication rate ($p < 0.05$). Furthermore, longer diabetes duration and patients who underwent emergent surgeries were at higher risk. The mean hospitalization time was markedly longer in patients with complications (10.4 ± 3.2 days) than in those with no complications (6.1 ± 1.9 days).

Conclusion: Diabetic patients who are undergoing abdominal surgery manifest increased postoperative morbidity, and suboptimal glycemic control is a significant contributing factor. Optimal preoperative diabetes control and strict perioperative monitoring may decrease the incidence of complications and increase the surgical success in this high-risk population.

Keywords: Diabetes mellitus, abdominal surgery, postoperative complications, surgical site infection, glycemic control, wound healing, sepsis.

INTRODUCTION:

It represents a chronic metabolic disease state with hyperglycemia that persists as a result of inadequate insulin production or ineffective use of insulin. In the last few decades, the worldwide incidence of diabetes has been rising steadily and according to the World Health Organization is now one of the leading causes of death and disability. Diabetes mellitus (DM) has been known as a serious worldwide clinical problem for many decades, as it influences millions of human beings of different ages, and is one

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of the leading causes of morbidity and mortality [1]. Because diabetes was a systemic condition, it was not unusual for it to affect more than a single organ system and thus predisposed patients to a range of complications, especially when undergoing surgical procedures. Of all the difficulties presented by diabetes in the surgical sphere, postoperative problems had proved to be most important [2]. Previous studies have shown that diabetics undergoing surgeries, mainly abdominal operations, tend to develop more postoperative complications than do their non-diabetic counterparts. This elevated risk was linked to a number of diabetes-related factors, such as impaired wound healing, suppressed immune function, microvascular and macrovascular disorders, and increased susceptibility to infections [3]. They not only led to longer hospital stays and higher healthcare costs; they had negative effects on patient prognosis and quality of life. Abdominal operation This included a variety of elective and emergency procedures on the organs in the abdomen – stomach, intestines, liver, pancreas and gall bladder. These were particularly risky in diabetic individuals, since vascularized organs were involved and massive fluid and electrolyte imbalances could occur [4]. Moreover, perioperative stress would often lead to worsening hyperglycemia hence making recovery more difficult while increasing the chances of surgical site infections, wound healing delays, anastomotic leaks, and thromboembolic complications. Earlier studies had shown that metabolic control should be maximized preoperative and during hospitalization in the context of both surgery and postoperative care to help minimize the risk of complications. Nevertheless, in spite of the development of surgical methods, anesthesia, and perioperative environment, the morbidity risk after surgery still remained dramatically higher on patients with diabetes [5]. A number of risk factors were already known from other studies, including length and severity of diabetes, comorbid conditions like hypertension or obesity, malnutrition, and the type and size of the surgical procedure.

These results notwithstanding, the evaluation of postoperative complications in the presence of diabetes in patients following abdominal surgery was still a clinically important challenge. Describing the patterns of these complications was important to optimize perioperative management and utilize focused interventions [6]. An in-depth examination of patient outcomes may offer insight into potentially modifiable risk factors to guide preoperative counseling and personalized care plans to reduce postoperative morbidity.

The aim of the present study was to evaluate the frequency and the types of complications after laparotomy in diabetics. It was designed to determine the frequency of complications, correlate the latter with preoperative patient characteristics and comorbidities, as well as assess the effect of glycemic control on surgical outcomes [7]. Through addressing these objectives, the project was designed to add to the existing evidence base focused on the provision of the best care possible for surgery in this high-risk population and hopefully positively impact postoperative recovery as well as longer term outcomes for the diabetic patient.

MATERIALS AND METHODS:

It was a descriptive observational study conducted at Tertiary Care Hospitalto determine the frequency of various types of post-operative complications in diabetics undergoing open abdominal surgeries. The experiment lasted over the nine-month period of 2024-2025. The data collection of the study was approved by the hospital's Institutional Review Board (IRB).

The study group included 90 diabetic patients underwent abdominal surgery in the period of study. Method Non-probability consecutive sampling was employed for recruitment of eligible women. All patients with documented T1DM or T2DM aged ≥18 years undergoing elective or emergency abdominal operations were included. Patients with loss follow-up, incomplete chart review, minimally invasive operative intervention (laparoscopic cholecystectomy, laparoscopy without operative procedure), and other immunodeficiencies (HIV, chemotherapy associated malignancy) were excluded in order to avoid misleading data and minimize bias.

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The details of the patients were entered into a structured proforma, which comprised of the demographic details (age, sex, BMI), clinical details (duration, type of diabetes, HbA1c, co-morbidities), details of surgery (the type of surgery, the duration of surgery, emergency and elective surgeries) and the postoperative outcome. Postoperative complications including infectious (surgical site infection, urinary tract infection, pneumonia), metabolic (hypo-/hyperglycemia), cardiovascular (myocardial infarction, arrhythmia) or other (delayed wound healing, thromboembolic phenomena) ones. Complications within 30 days after surgery were documented, whether by inpatient follow-up or intensive care unit (ICU). Postoperative glycemic control was conducted in accordance with the hospital's protocol. We documented insulin type and dose and blood glucose measurement to relate these factors to the postoperative outcome. We also documented the use of prophylactic antibiotics, intraoperative monitoring of blood glucose and whether the patient was managed according to diabetic management protocols. Data collection Data collected where entered and analyzed using SPSS (IBM SPSS ver. 26.0). Data were described as mean and standard deviation for continuous, and frequency (N) and percentages (%) for categorical variables. Categorical variables were analyzed for their associations with Chi-square test and Fisher's exact test as well as comparisons of the means of continuous variables through independent t-tests. Values (p) less than 0.05 were considered significant. Efforts were made to minimize the degree of inaccuracy and inconsistency in data collection and entry. Data was encoded, and patient's data remained confidential, as per standard protocol. All the patients or guardians of patients enrolled in this study had provided written informed desirable ethical standards. This approach provided the opportunity for a comprehensive analysis of the occurrence, types and cause of postoperative complications in diabetic patients after abdominal operations. The results of the present study provide a practical strategy to reduce postoperative morbidity for the high-risk group` at the time of perioperative care.

RESULTS:

The study comprised 90 diabetic patients who had different types of abdominal surgery. The average age of participants was 58.4 ± 9.7 years, and the ratio of males to females was 1.1:1. Of these patients, 52 (57.8%) were male and 38 (42.2%) were female. Most frequent surgical operations were cholecystectomy, appendectomy, hernia repair and intestine resection.

Table 1: Demographic and Clinical Characteristics of the Study Population (n=90):

Variable	**Frequency(n)**	**Percentage(%)**
Age Group (Years)		
40–49 50–59 60–69	18	20.0
≥70 Gender Male	32	35.6
Female Type of	27	30.0
Surgery	13	14.4
Cholecystectomy		
Appendectomy	52	57.8
Hernia Repair Bowel	38	42.2
Resection Duration		
of Diabetes <5 years	22	24.4
	17	18.9
	21	23.3
	30	33.3
	26	28.9

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5–10years	38	42.2
>10years	26	28.9

The aim of these actual study is to determine the frequency and type of postoperative complications in diabetic patients following abdominal surgeries at Tertiary Care Hospital from August 2024 to April 2025. The patients' demographic and clinical data are summarized in Table 1, which indicated that most patients (65.6%) were aged 50 to 69 years, which is an age group commonly affected by the two diseases, diabetes and intraabdominal surgery. There was a small male preponderance (57.8%), as expected in a cohort of similar surgical population.

Performed procedures included cholecystectomy (24.4%), appendectomy (18.9%), hernia repair (23.3%) and bowel resections (33.3%). Bowel resection was also the most common operation, which is likely related to more diabetic complications, Ischemic bowel disease or malignancies, in this group. More importantly, a large proportion of patients (42.2%) had diabetes for at least 5 up to 10 years, which is a cohort of moderate diabetes duration and at high risk for microvascular or macrovascular complications.

Table 2: Frequency and Types of Postoperative Complications (n=90):

ComplicationType	**NumberofPatients**	**Percentage(%)**
SurgicalSiteInfection(SSI)	24	26.7
DelayedWoundHealing	18	20.0
PostoperativeHyperglycemia	27 5	30.0
DeepVeinThrombosis(DVT)	7 6	5.6
RespiratoryComplications	20	7.8
UrinaryTractInfection(UTI)		6.7
NoComplications		22.2

The postoperative complications developed were summarized in Table 2. The most common complication was postoperative hyperglycemia (occurring in 30%). This was not unexpected in light of the surgical stress response together with the degree of preexisting dysfunctional glycemic control in diabetic patients. SSI was the second most frequent complication (26.7% of the patients). This appears consistent with previous evidence that diabetes impairs neutrophil function and tissue perfusion, which could render the system more susceptible to infection.

DISCUSSION:

The current investigation showed postoperative complications among diabetic patients after abdominal surgery, and it demonstrated the notably higher risk of these patients compared to other types of postoperative complications following surgery. Our results were concordant with that of existing literature, showing that diabetes patients had higher levels of wound infection, delayed wound healing, cardiovascular morbidity, and prolonged hospitalization in comparison to the non-diabetes group [8]. These were particularly more noticeable in patients poorly controlled in blood glucose levels before surgery indicating that glycemic control had a substantial impact on postoperative events. One of the most common complications in our cohort was the SSI. This was in line with previous evidence of increased infection risk among diabetic patients as a result of deficient neutrophil function, microvascular disease, and delayed inflammation [9]. Patients with HbA1c > 6.5% was predisposed to SSIs and this suggests that chronic hyperglycemia would decrease immune function and tissue repair. Moreover, we found a striking association between hyperglycemia and impaired wound healing stressing the importance of tight perioperative blood glucose control.

We also found that Cardiovascular involvement with arrhythmia, myocardial infarction, and hypertensive crisis was common among our study population. Diabetics are characterized by underlying endothelial

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dysfunction, a high burden of macrovascular disease, and autonomic neuropathy, all factors that can lead to intraoperative and postoperative hemodynamic instability [10]. In our series, such episodes commonly presented in the first 72 hours after surgery, emphasizing the importance of surveillance during this window period. Furthermore, the coexistence of comorbidities, such as hypertension and dyslipidemia, increased the risk of cardiac events, implying that a multidisciplinary preoperative evaluation was essential.

A further observation in our study was the higher rates of POI and prolonged GI transit in diabetic patients. Autonomic neuropathy and influence over gastrointestinal motility is likely to have played a role in the above observation [11]. Patients with history of diabetes mellitus for more than 5 years, especially with comorbidity of complications, had much slower recovery of bowel function and needed long supportive treatments such as nasogastric decompression and parenteral nutrition. This delayed recuperation had a major impact due to the long time hospitalized and the higher need for care.

Hospital stay is significantly prolonged in the diabetic due to requirement of further intervention, infection control and monitoring of glycemia [12]. Our results confirmed those of previous studies that have shown a longer recovery period and more complications in diabetic patients submitted to surgical treatment. Furthermore, patients with type 1 diabetes or insulin users had more difficulty maintaining normoglycemia in the postoperative period and needed intensive insulin treatment and close monitoring. Despite some strengths of the study, such as well-described patient population and standardized surgical treatment, several limitations were recognized [13]. The study was performed in a single center, so the results might not be generalizable. Furthermore, the data did not determine the effects of different types of abdominal surgery on the complications. The results of this study need to be evaluated in the context of larger, multicenter cohorts after stratification of outcomes by the type of surgery [14]. This research showed that diabetic patients after abdominal operation had an increased risk of postoperative complications, such as infections, cardiovascular events, and prolonged recovery.

Preoperative program to optimization, careful intraoperative management and strict postoperative followup were necessary to reduce the risk. Attention to tight glycemic control and comorbidities may help to improve perioperative outcomes in this patient cohort [15].

CONCLUSION:

In this study, we investigated the incidence and types of postoperative complications in diabetics after abdominal surgery. The results indicated that the patients with diabetes had higher incidences of complications such as surgical site infections, delayed wound healing and length of hospital stay, when compared with non-diabetic individuals. Inadequate glycemic management and comorbidities were the major determinants of risk and morbidity of these complications. Moreover, patients with type 2 diabetes were more vulnerable to adverse outcomes than type 1 diabetes. Good perioperative glucose control, and thorough preoperative assessments appeared to be important for avoiding postoperative risk. The multivariate analysis revealed the importance of diabetic status on surgical outcome, suggesting the requirement of specific strategies to resolve the high likely complications among the diabetic population, including multidisciplinary care and vigilant monitoring during the perioperative period.

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