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Research Article,

Complications of Post-Abdominal Surgeries in Diabetic Patients vs. Non-Diabetics in Saudi Arabia between 2016-2021 (2020-2022)

Amar Fathi Mohamed Khalifa[1] , Asmaa Hamzah Al Alwah[2] , Salwa Moetaz Alrouh[2], Lamis Mustafa Jaamour[2], Walid Elsaid Abdelmottaleb[2], Mohammed Nidal Malhis[2], Ghanadeer Abdullah Silsilah[2]

[1]Assistant Professor Community Medicine, Faculty of Medicine, Almaarefa University, Riyadh, Saudi Arabia.
[2]MBBS, Almaarefa University, Riyadh, Saudi Arabia
Email Address: **asmaa.haa96@gmail.com**

Abstract:

Background: Diabetic patients are a subset of emergency and general surgery patients and have a higher risk of postoperative complications including pulmonary and urinary infections, acute cardiac infarction, kidney failure, and death compared to non-diabetic patients.
Objectives: The study assessed the prevalence of postoperative complications in diabetic patients and non-diabetics in Saudi Arabia from 2016 to 2021.
Methodology: This was a community-based observational descriptive cross-sectional study. Sample is 205 diabetic and non-diabetic participants over 18 years underwent abdominal surgery between 2016 and 2021 in Saudi Arabia. A self-administered questionnaire was used to collect data.
Results: Regarding SSI, diabetic patients reported 27% wound erythema, 25% wound pain, and 24% wound pus. It was discovered that 34.1% of patients with poor wound healing,50% of individuals identified with DVT as a postoperative consequence,32.35% with UTI, 54.6% confirmed cases of post-operative incisional hernias, and 42.85% of patients with metabolic acidosis all of them were having diabetes millets. Regarding thrombophlebitis, 28.6% of patients with limb erythema and 21.1 percent of patients with hot and painful limbs were diabetics. Regarding bowel obstruction, only 23.68 percent of patients with acute stomach pain, 28 percent of patients with sudden vomiting, and 22.58 percent of patients with chronic constipation with gas retention had diabetes.
Conclusion: DVT, UTI, and incisional hernia have all been found to be more common post-operative problems among diabetics. There was a modest difference in wound healing, wound infection, intestinal obstruction, thrombophlebitis, and metabolic acidosis between diabetics and non-diabetics.

Key words: Diabetes, Post-op complications, Abdominal surgery, blood sugar, Saudi Arabia.

Introduction:

Postoperative complications are quite common issue in many hospitals in the entire world. It is defined as any change in the normal function of the body after the surgery (1). There is more than 14 million surgical procedure is done annually in the United States, 30% of these patients develop post-operative complications (2), most of them is not significant but still it is a significant issue because it has a mortality rate from 0.79 to 5.7%. Postoperative complications are divided into two types: early complications that happen within 30 days after the surgery and late which happen after 30 days. The most of postoperative complications include fever, surgical site infection and poor wound healing (3)

Over the last 30 years; the global number of diabetic patients has been growing rapidly, (4) so the prevalence of DM in Saudi Arabia is also on the rise (5). Because of high blood glucose,

metabolic disorders, and other factors, diabetic patients are more susceptible to cardiovascular and cerebrovascular diseases, osteoporosis, tumours, and other diseases. (6) Diabetic patients constitute a subcategory of patients who undergo emergency and general surgery procedures (5). As compared to non-diabetic patients, diabetic patients hold a higher risk of postoperative complications including infections as pulmonary and urinary infection, acute cardiac infarct, kidney failure and death. (7) This is a significant concern because it is estimated that over half of worldwide diabetic population would require a minimum of one surgical procedure during their lifetime.(8) Postoperative complications lead to long hospital stay, increase the economic burden, and increase mortality.(9–11) Diabetic patients in Saudi Arabia are always considered a high risk population in surgical departments because they make a challenge to surgeons in different surgery subspecialty, as hyperglycaemia disturbs many body functions such as wound healing and response to surgical trauma.(5)

This study aims to: assess the prevalence of postoperative complications in diabetic patients compared to non-diabetic.

Methodology:

Research Approach:

Study Design: This was an observational descriptive cross-sectional community-based study design (2020-2022)**.**

Study Area and Population: The population of this study was diabetic patients of different ages starting with 18, who did abdominal surgeries between 2016-2021, in the Kingdom of Saudi Arabia.

Sample Size and Technique: The sample consists of 205 diabetic patients with previous abdominal surgery, which were selected using the quota sampling technique.

Data Needs:

Data Collection Tools:

The data was collected by using self -administered questionnaire designed especially for the study. The questionnaire included questions about some post-op complications and their symptoms as surgical site infection, poor wound healing, deep vein thrombosis, metabolic acidosis, urinary tract infection, incisional hernia, thrombophlebitis, and bowel obstruction.

Data Analysis:

The data were coded, entered, and analysed using SPSS. The results were expressed in tables as frequencies and percentages. Suitable statistical tests of significance were used. *P<0.05 was considered statistically significant.*

Ethical Issues:

The consent was taken from the participants verbally .The collected data was only used for research purposes .Confidentiality was committed and ensured.

Tables and Results:

Table (1): Surgical Site Infection

Symptom	Yes	No
Wound Erythema	60 (29.3%)	145 (70.7%)
Wound pain	78 (38.0%)	127 (62.0%)
Wound pus	33 (16.1%)	172 (83.9%)

Table (1) illustrate that 29.3% of the patients had redness over the surgical wound, 38.0% had pain over the surgical wound and 16.1% had experienced pus coming out of there surgical wounds.

Table (2): Diabetes and Surgical Site Infection

Symptom	Diabetic	Non-diabetic
Wound Erythema	13 (21.7%)	47(78.3%)
Wound pain	16 (20.5%)	62 (79.5%)
Wound pus	8 (24.2%)	25 (75.8%)

Table (2) shows that 21.7% of the patient who had wound erythema are diabetics, 20.5% of the patient who had wound pain are diabetics, and 24.2% of the patients had experience pus coming out of there surgical wounds are diabetics. These numbers are considered statistically insignificant.

Table (3): Poor Wound Healing, Deep Vein Thrombosis and Metabolic Acidosis.

Complication	Yes	No
Poor wound healing	47 (22.9%)	158 (77.1%)
DVT	10 (4.9%)	195 (95.1%)
Metabolic acidosis	7 (3.4%)	198 (96.6%)

According to **Table) 3),** 22.9 percent of participants have been told by the physicians that the surgical wounds are complicated as poor healing. Also, this table shows that only 4.9% have been told by their doctors that their surgeries complicated with deep venous thrombosis. In addition, the table shows that 3.4% of patients were complicated with metabolic acidosis.

Table (4): Diabetes with Poor Healing, Deep Venous Thrombosis and Metabolic Acidosis.

Complication	Diabetic	Non-diabetic
Poor healing	14 (34.1%)	33 (20.1%)
DVT	5 (50%)	5 (50%)
Metabolic acidosis	3 (1.5%)	4(2%)

As per **Table (4),** diabetic individuals accounting for 34.1 percentage of patients with poor wound healing. These statistics shows no significant correlation between diabetes and poor wound healing (P = 0.056). In addition, this table shows that 50% of the patients who were diagnosed with DVT are diabetics which is considered statistically significant (p=0.015). Also, this table shows that diabetic patients account 1.5% of patients who were complicated with metabolic acidosis. These proportions were statistically not significant (P=0.125).

Table (5): Urinary Tract Infection

Symptom	Yes	No
Dysuria	36 (17.56%)	169 (82.44%)
Urgency and frequency	39 (19.02%)	166 (80.98%)
Complication	Yes	No
UTI	34 (16.95%)	171 (83.41%)

According to **table (5),** 17.56% of the patients had dysuria, 19.02% had urgency and frequency and 16.95% of the patients had UTI.

Table (6): Diabetes and Urinary Tract Infection

Symptom	Diabetic	Non-diabetic
Dysuria	13(36.11%)	23(63.89%)
Urgency and Frequency	15(38.46%)	24(61.54%)
Complication	Diabetic	Non-Diabetic
UTI	11 (32.35%)	23(67.65%)

Table (6) shows that 36.11% of diabetic patients had dysuria, which showed weak evidence (p=0.008) in comparison of non-diabetic patients. 38.46% of them had urgency and frequency, 32.35% of diabetics had UTI and in which both were evident with P values (= 0.001) and (=0.049) respectively as compared to non-diabetic.

Table (7): Incisional Hernia

Symptoms	Yes	N0
Wound mass	22(10.7%)	183(89.3%)
Increase mass size	18(8.8%)	187(91.2%)
Decrease mass size	19(9.3%)	186(90.7%)
Reversible mass	19(9.3%)	186(90.7%)
Mass pain	18(8.8%)	187(91.2%)
Complication	Yes	No
Incisional hernia	11(5.4%)	194(94.6%)

Table (7) shows that 5.4% of patients were diagnosed with incisional hernia, 10.7% reported a history of a mass at wound site, 8.8% reported a mass that increases with exertion. 9.3% reported a history of mass that decreases when lying down, 9.3% reported a history of a reversible mass, 8.8% reported a history of a painful mass and 10.7% reported a history of a mass at wound site.

Table (8): Diabetes and Incisional Hernia

Symptom	Diabetic	Non- diabetic
Wound mass	10(45.4%)	12(54.5%)
Increase mass size	8(45.5%)	10(55.5%)
Decrease mass size	8(42.1%)	11(57.9%)
Reversible mass	8(42.1%)	11(57.9%)
Mass pain	7(38.9%)	11(61.1%)
Complication	Diabetic	Non-diabetic
Incisional hernia	6(54.6%)	5(45.4%)

Table (8) shows 45.4% of those who reported post-op wound mass were diabetic, 45.5% of those who reported a postoperative wound mass at wound site that increases with movement were diabetic, 38.9% of patients who reported a post-op wound painful mass were diabetics, 54.6% of confirmed cases of post-operative incisional hernias were diabetic. These results are considered statistically significant (P=0.001), (P=0.006), (P = 0.036), (P=0.003) respectively

Table (9): Thrombophlebitis

Symptom	Yes	No
Limb erythema	7 (3.4%)	198 (96.6%)
Limb hotness and pain	19 (9.3%)	186 (90.7%)

This table illustrate that only 7 patients (3.4%) had red strikes on the limbs after their surgeries, and

9.3% had limb hotness and pain after their surgeries

Table (10): Diabetes and Thrombophlebitis

Symptom	Diabetic	Non-diabetic
Limb erythema	2 (28.6%)	5(71.4%)
Limb hotness and pain	4 (21.1%)	15(78.9%)

The table shows that 28.6% of patients who had limb erythema were diabetic which is statistically insignificant (p=0.566). 21.1% who complained of hot and painful limb were diabetic which is statistically insignificant also. (p=0.905).

Table (11): Bowel Obstruction

Symptom	Yes	no
Sudden abdominal pain	38 (18.5%)	167 (81.5%)
Sudden vomiting	39 (19%)	166 (81%)
Chronic constipation and gas retention	62 (30.2%)	143 (69.8%)

Table (11) illustrate that 18.5% of the patients had experienced sudden abdominal pain, 19.0% had sudden vomiting and 30.2% had chronic constipation and gas retention.

Table (12): Diabetes and Bowel Obstruction:

Symptom	Diabetic	Non-Diabetic
Sudden abdominal pain	9 (23.68%)	29 (76.32)
Sudden vomiting	11 (28.21%)	28 (71.79%)
Chronic constipation and gas retention	14 (22.58%)	48 (77.42%)

Table (12) shows the percentage of diabetic to non-diabetic patients who had experienced symptoms of bowel obstruction; 23.68% of patients who had sudden abdominal pain where diabetic, 28.21% of patients who experienced sudden vomiting where diabetic and 22.58% of patients who had chronic constipation and gas retention where diabetic. Accordingly, the correlation between bowel obstruction and diabetes was not significant.

Discussion:

In this research, we did not find any correlation between diabetes and surgical site infection after abdominal surgeries, maybe because patients controlled their blood glucose level before surgery or even took antiseptic shower before the operation. This result is like the result found in study done by Ismat,2016, Pakistan. (12)

This study did not show any association between diabetes and poor wound healing after abdominal surgeries. This finding may be because patients tried hard to avoid local factors that affect wound healing such as trauma and foreign bodies. This finding in our study is like the research in Mangeshkar Hospital in Pune, India,2009. (14)

The study showed an association between diabetes and having post-op DVT, which coincide with the results of a study conducted in China between 2011-2013, that came to conclusion that the incidence of DVT 14 days (about 2 weeks) after total knee arthroplasty was significantly higher in patients with than without diabetes (15), this emphasis the importance of appropriate anti-coagulant therapy and monitoring for diabetic patients during and after surgeries.

The research data did not show a significant effect of diabetic on having post-op metabolic acidosis when it is diagnosed pre-operatively, mostly due to the strict monitoring of blood glucose before, during and after surgery. A case report was published in India 2016 about an undiscovered DM case that was diagnosed for the first time at OR settings after experiencing a DKA directly after surgery, this proves the significance of strict monitoring of BG in surgeries and emphases the importance of measuring HbA1C to protect against life-threatening complications. (23)

Diabetes has an association with post-operative UTI incidence, it may increase the risk of all types of infections as it is proven also in a study conducted in USA 2010, where patients complicated diabetes had a significantly higher rate of postoperative infection. (17)

The proportions of those who showed symptoms of incisional hernia were higher in diabetic patients, the thing that may be explained by a study conducted in India between 2015-2017, that showed that diabetic patients are more likely to become infected with postoperative wounds and both lead to an increased rate of incisional hernia. (21)

The proportion of those who showed symptoms of thrombophlebitis has no significant correlation with being a diabetic patient. The reason might be that patients are aware of the risk factors for thrombophlebitis such as trauma and prolonged inactivity, so they do everything possible to avoid

them. This finding is like the one conducted by Saji in 2005, in Kolenchery. (24)

Bowel obstruction showed no association with having diabetes millets, this is expected if patients have no history of constipation, which is different from the results of a study conducted in Paris in 2006 that aimed to calculate the incidence and risk factors of recurrent adhesive small bowel obstruction after surgical treatment with consideration for ASA status, results showed that patients with high ASA status which includes diabetic patients are at an elevated risk of bowel obstruction. (25)

Conclusion:

DVT was found to be higher in diabetic patients as post-operative complications, mostly because of feeble anticoagulant coverage. This goes the same with UTI and incisional hernia, mainly because diabetic patients are liable to infections and deficiency in caring for such. Difference between diabetic and non-diabetic patients results in poor wound healing, surgical infection, bowel obstruction, thrombophlebitis and metabolic acidosis showed slight variation; however, it did not reach a significant value.

Recommendation

1-Efforts should be made for better care of diabetic patients. It is proposed to control blood sugar levels before, during and after surgery.

2-Doctors should ensure covering patients with anti-coagulant to prevent patients from DVT.

3- To get proper prevention from UTI, doctors should encourage patients to drink fluids, and most important is to take antibiotics as ordered.

4- Managing blood sugar and avoid straining of abdominal muscles too much in the first few months after abdominal surgery could prevent incisional hernia.

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