

Presentation of Preoperative Diabetes Mellitus in Patients Undergoing Surgery

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ABSTRACT

Objective: Managing glycemic level in a surgical patient is critical. In this study we will manage the diabetes mellitus in patients presented for surgical disease.

Study Design: Cross Sectional Study

Place and Duration of Study: This study was conducted at the OPD Department of Medicine at PMCH Nawabshah from June 2016 to November 2017.

Materials and Methods: 115 patients were enrolled for this study. 63 were male and 52 were female. Informed permission was taken from all the patients, study was done using proforma with history, clinical examination and investigations. All diabetic patients newly diagnosed and known case of Diabetes Mellitus with surgical disease were included for this study. Non diabetic with surgical disease and diabetic without surgical disease were excluded from this study.

Results: 115 patients participated for this study, both male and female of all ages. All patients presented with surgical disease for surgery. Age range from 17-70 ys mean age 48.48±10. HbA1C was from 5.60-10 mean 7.5±0.78. Fasting Blood Sugar range 121-231 mg/dl mean 139.38±22. Random Blood Sugar range 139-510 mg/dl mean 272.3±67. All the patients were treated with insulin, on the day of surgery morning dose of insulin was omitted. Statical analysis was done using software SPSS 15 version.

Conclusion: Uncontrolled Diabetes Mellitus is a major problem before Surgery and postoperative, by closed communication between physician, surgeon and anesthetic staff complications can be reduced. Good glycemic control before surgery and postoperative blood glucose control are important in reducing complications. Acid base balance and electrolyte status should be monitored for better surgery.

Key Words: Diabetes Mellitus, Surgery, Preoperative care, Insulin, Oral hypoglycemic agents, Glycosylated hemoglobin, Anesthesia

Citation of articles: Chandio MA, Daidano JK, Yusufani SA. Presentation of Preoperative Diabetes Mellitus in Patients Undergoing Surgery. Med Forum 2018;29(7):54-57.

INTRODUCTION

Diabetes Mellitus defined as metabolic disease characterized by hyperglycemia due to defects in insulin action or insulin secretion. Diabetes Mellitus is classified into type 1 and type 2. Normal glucose homeostasis is altered due to metabolic perturbations caused by surgical procedures. Hyperglycemia due to uncontrolled Diabetes Mellitus is a risk factor for postoperative wound infection, impaired wound healing, endothelial dysfunction and cerebral ischemia.¹ Diabetic ketoacidosis or hyperglycemic hyperosmolar syndrome result due to stress during surgery or postoperatively.² Careful management of diabetes in patients undergoing surgeries preoperative and postoperative complications can be minimized.³ Managing diabetes is challenge for clinician in patients requiring surgery.

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Received: December, 2017;

Accepted: March, 2018

In USA prevalence of diabetes is about 8%.⁴ Commonly diabetic patients present for surgery. Glucose metabolism orchestrated by insulin, growth hormone, glucagon, epinephrine and cortisol. Glucose uptake in muscles, adipose and other tissues is a function of insulin. Insulin increases glycogen production in liver and inhibit gluconeogenesis. Glucose metabolism is dysregulated by diabetes mellitus. Type 1 diabetes mellitus occur due to destruction of beta cells of pancreas with absolute deficiency of insulin. Type 1 diabetes is dependent on insulin. Type 2 diabetes is due to insulin resistance and deficit in insulin secretion. Treatment of Type 2 diabetes is diet, exercise, weight reduction, and oral or inject able drugs. Release of neuroendocrine hormones such as cortisol and catecholamine due to stress related to anesthesia and surgery result in insulin resistance and hyperglycemia. Hyperglycemia resulting due to abrupt discontinuation of drugs, volume depletion and administration of steroids contribute hyperglycemia.⁵ Hyperglycemia develop due to stress even in non diabetic.⁶ Patients with type 1 diabetes are at risk of diabetic ketoacidosis in intercurrent stress even not severe hyperglycemia. There are incidence of postoperative diabetic ketoacidosis in patients undergoing surgery 25%.⁷ Incidence of diabetic

ketoacidosis was less in diabetic type2 0.2% due to same surgery.⁷ Diabetic ketoacidosis is less common in type 2 diabetes but hyperosmolar non ketotic states with severe hyperglycemia and dehydration are common.⁸ Normal wound healing is interrupted due to increased blood glucose impeding tissue oxygenation and blood flow, prolonging inflammatory state and endothelial dysfunction,⁹ Neutrophil phagocytic function is impaired in hyperglycemia, risk of infection increase due to non clearance of bacteria.¹⁰ To maintain blood glucose level between 80-110mg/dl with insulin therapy in surgical ICU morbidity and mortality can be reduced as compared with conventional treatment.¹¹ Morbidity and mortality is increased 50% in diabetes or hyperglycemia in surgery as compared to non diabetic patients.¹² Reason of these outcome is failure to diagnose diabetes and hyperglycemia.¹³

MATERIALS AND METHODS

This cross sectional study was conducted in the OPD department of medicine at PMCH Nawabshah. Total 115 patients were enrolled for this study. Study was done on proforma with questionnaires with informed consent from all the patients. Detailed history was taken from the patients with clinical examination. All patients were investigated for Random blood sugar, Fasting blood sugar, HbA1C level, Urea and creatinine level. X-ray chest and ECG was advised to exclude any cardiac disease.

Inclusion criteria:

Known diabetic
Newly diagnosed diabetic
Diabetic patient for surgery

Exclusion criteria:

Non diabetic
Non diabetic patient for surgery
Diabetic Not willing for study

RESULTS

This study was conducted on 115 patients. Age range from 17-70 yrs mean age 48.48±10. All the patients participated were known diabetic or newly diagnosed diabetic. 9 patients admitted for the surgery of thyroid, 10 patients for the surgery of vesical calculus, 9 patients for hysterectomy, 11 patients for surgery of cataract, 3 patients for the surgery of deviated nasal septum, 28 patients for the surgery of inguinal hernia, 5 patients for surgery of incisional hernia, 7 patients for the surgery of paraumbilical hernia, 17 patients for renal calculus, 15 patients for the surgery of prostate, 10 patients for the surgery of cholelithiasis HbA1C was from 5.60-10 mean 7.5±0.78. Fasting Blood Sugar range 121-231 mg/dl mean 139.38±22. Random Blood Sugar range 139-510 mg/dl mean 272.3±67. After investigations all patients were kept on insulin therapy and oral hypoglycemic drugs discontinued to avoid complications of surgery. Five patients were referred to

nephrologists for further treatment. Morning dose of insulin was omitted on the day of surgery. Statistical analysis was performed by SPSS 15 version. Marking is as under. Sex male=1, female =2, education uneducated =1, primary =2, middle =3 and matriculation =4. Occupation farmers =1, housewife = 2, private job =3 and Govt. job =4.

Table No.1: Sex

Variable	Frequency	Percent	Valid Percent	Cumulative percent
1	63	54.8	54.8	54.8
2	52	45.2	45.2	100
Total	115	100	100	

Table No.2: Education

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
1	58	50.4	50.4	50.4
2	31	27.0	27.0	77.4
3	21	18.3	18.3	95.7
4	5	4.3	4.3	100.0
Total	115	100.0	100.0	

Table No.3: Occupation

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
1	32	27.8	27.8	27.8
2	50	43.5	43.5	71.3
3	29	25.2	25.2	96.5
4	4	3.5	3.5	100.0
Total	100	100.0	100.0	

Table No.4: Descriptive Statics

Variable	N	Min.	Max.	Mean	Std. Deviation
Age	115	17.00	70.00	48.4870	10.23527
Sex	115	1.00	2.00	1.4522	0.49998
Education	115	1.00	4.00	1.7652	0.901556
Occupation	115	1.00	4.00	2.0435	0.82069
HbA1C	115	5.60	10.00	7.5130	0.78187
FBS	115	131.00	231.00	139.3826	22.39736
RBS	115	139.00	510.00	272.3391	67.28688
Urea	115	23.00	101.00	37.2783	11.79247
Creatinine	115	0.60	8.00	1.1800	0.90391
Valid N	115				

Table No.5: Paired Samples Correlations

Variables	N	Correlation	Sig.
Pair 1: Age & Sex	115	0.075	0.426
Pair 2: Education & Occupation	115	0.725	0.000
Pair 3: HbA1C & FBS	115	0.681	0.000
Pair 4: RBS & Urea	115	0.281	0.002
Pair 5: Urea & Creatinine	115	0.544	0.000

DISCUSSION

In this study majority of the patients were known diabetic some of the patients were newly diagnosed diabetic. Preoperative management is a complex process require team work between physician, surgeon and nursing staff. To avoid any fluctuations in blood glucose level preoperatively glucose level should be kept low, morbidity and mortality can be reduced. Blood glucose level should be lower than 180 mg/dl constantly in hospitalized patients according to American Diabetes Association. Postoperative complications are increased by elevated HbA1C level preoperatively in several studies.¹⁴ There is no definite relationship between HbA1C and postoperative outcome in a recent review.⁽¹⁵⁾ HbA1C more than 8% in non cardiac major surgery associated with increased hospital stay time in a retrospective study on 1775 patients.¹⁵ Postoperative complications can be reduced to achieve good glycemic control by delaying surgery. Fasting times of solids for six hours and two hours for fluids in healthy adults are preoperative fasting guidelines by Royals College of Nursing.¹⁶ Acute blood glucose changes leads to oxidative stress resulting macrovascular disease according to some studies.¹⁷ Other benefits of normal glucose level include improved immune response and reduced endothelial dysfunction. Poor postoperative outcomes are associated with mild hyperglycemia. Worldwide increasing prevalence diabetes type 2 fact is that patients with diabetes are more likely to undergo surgery than nondiabetic.¹⁸ Postoperative complications myocardial ischemia and infection increased among patients of diabetes mellitus undergoing surgery.¹⁹ By good glycemic control these complications can be reduced in a variety surgical patients.²⁰ By continuous insulin infusion to maintain glycemic level 80-110 mg/dl benefit of reducing mortality in a study done by ven den burgh in 2001.²⁰ Few episodes of hypoglycemia reported in patient treated with insulin analogues. For the treatment of diabetes mellitus type 1 and type 2 comparison of cost effectiveness of insulin analogues and conventional insulin depends on the type of diabetes and insulin analogue.²¹ Preoperatively increase in blood glucose 20 mg/dl complications are raised 30%.²² Increased catabolism due to stress hormones, inhibition of insulin secretion, interruption in food intake, cardiac complications due to anesthetics and decreased level of consciousness are common problems preoperatively.²³ Dehydration, acidosis, fatigue and loss of weight are acute preoperative complications.²³

CONCLUSION

For the management of preoperative diabetes mellitus communication and close coordination is needed amongst patients, physician, surgeon, anesthesia staff

and outpatient providers. Majority of the patients were with uncontrolled blood glucose level. Treating patients with insulin monitoring of blood sugar level and preventing patient from hypoglycemia or hyperglycemia morbidity and mortality can be decreased. Acid base balance and electrolytes should be monitored for better surgery. Careful monitoring of glucose level surgical complications and hyperglycemia or hypoglycemia can be reduced. Morbidity and mortality can be improved.

Author's Contribution:

Concept & Design of Study: Mujahid Ali Chandio
 Drafting: Jeando Khan Daidano
 Data Analysis: Sikander Azam Yusfani
 Revisiting Critically: Mujahid Ali Chandio, Jeando Khan Daidano
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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