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Preoperative Diabetes Mellitus in individuals Undergoing Surgery

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ABSTRACT

Objective: Level of glycaemic management is critical in a surgical patient. The current research will manage in the surgical patients the diabetes mellitus.

Study Design: Cross Sectional Study place and duration: The current research was carried out from January 2018 to March 2018 at Outpatient Department of Medicine at Lahore General Hospital, Lahore, Pakistan.

Materials and Methods: There were 200 participants of the study. There were 100 men and 100 women. From all participants the informed consent was obtained, a Proforma questionnaire with previous history, investigation and clinical examination was completed for carrying out the research. The study included all patients who are newly diagnosed with diabetes and those Diabetes Mellitus patient having surgical disease. The study excluded diabetic patients not with surgical disease and patients without diabetes but have surgical disease.

Results: The research was carried out on 200 participants. The age was ranging between 20-60 years of age and the mean age was 34.63 ± 6.3 . All the participants were newly diagnosed patients with diabetes or diabetic patients. HbA1C ranged was from 5.60-10 with mean 8.1 ± 0.45 . The range for Random Blood Sugar was 139-510 mg/dl with mean 281.1 ± 77 . Fasting Blood Sugar was ranging from 121-231 mg/dl with mean 129.12 ± 24 . All the participants were on insulin therapy after the examination and discontinuation of oral hypoglycaemic drug in order to avoid surgery complication.

Conclusion: Pre and Post surgery the main problem is the uncontrolled Diabetes Mellitus, the complications can be lessened with the close communication between surgeon, physician and anaesthetic staff. The controlling of glycaemic before operation and blood glucose after operation are important for lessening the complication. In order to perform a better surgery, electrolyte status and acid base balance must be monitored.

Key Words: anaesthesia, Diabetes Mellitus Surgery, Glycosylated haemoglobin, Insulin, Oral hypoglycaemic agents, Preoperative care.

INTRODUCTION

The definition of Diabetes Mellitus is as characterisation of metabolic disease by hyperglycaemia because of defects in insulin

secretion and insulin action. There is two classification of Diabetes Mellitus as Type-1 and Type-2. There is alteration of normal glucose homeostasis because of metabolic perturbations due to surgical process. The uncontrolled Diabetes Mellitus make the hyperglycaemia a risk element for the post-surgery wound infection, endothelial dysfunction, impaired healing of wound and cerebral ischemia. The stress during and after surgery cause diabetic ketoacidosis or hyperglycaemic hyperosmolar syndrome. The complications can be reduced in the pre and post-surgery by managing the diabetes carefully in the patient undergoing operations. Diabetes management in the patients who need operation is a challenge for clinician.

There is 8% prevalence of diabetes in USA. Normally the patients with diabetes are presented for operation. Orchestration of glucose metabolism by growth hormone, insulin, cortisol, epinephrine and glucagon. The uptake of glucose in adipose, muscles and other tissue is an insulin function. The insulin causes the production rise of glycogen in liver and constrain gluconeogenesis. Diabetes Mellitus dysregulate the glucose metabolism diabetes Mellitus Type-1 is occurring because of destruction of pancreas' beta cells with complete insulin deficiency. The dependence of Diabetes Mellitus Type-1 is on insulin. Insulin deficiency and insulin resistance is causing Diabetes Mellitus Type-2. The treatment of diabetes type-II is exercise, diet, oral or injectable drugs and weight loss. Neuroendocrine hormones release like as catecholamine and cortisol because of stress in relation to anaesthesia and operation result in hyperglycaemia and insulin resistance. The causes of resulting hyperglycaemia are sudden drug discontinuation, reduction of volume and steroids administration contributes hyperglycaemia. Stress is causing the development of hyperglycaemia even in patients without diabetes. There is prevalence of post-surgery diabetic ketoacidosis in 25% patients having operations. Because of the same surgery, the prevalence of diabetic ketoacidosis in diabetes type-II is less. In diabetes type-II the diabetic ketoacidosis is not very common but the common



is hyperosmolar non-ketotic state with intensified dehydration and hyperglycaemia. The interruption in the healing of normal wound is the obstruction of blood flow and tissue oxygenation, endothelial dysfunction and prolonged inflammatory state caused by the increased blood glucose. In hyperglycaemia, the function of neutrophil phagocytic is damaged and rise of infection risk because of bacteria's non-clearance. The mortality and morbidity rate can be minimised by maintaining the level of blood glucose between 80-110mg/dl with therapy of insulin in surgical Intensive Care Unit while comparing with the conventional treatment. The mortality and morbidity have risen 50% in hyperglycaemia or diabetes in operation as compared to patients without diabetes.

MATERIALS AND METHODS

The cross-sectional research was carried out at Outpatient Department of Medicine, Lahore General Hospital, Lahore. There were 200 participants in the current research. The study was carried out with the participants' informed consent and on a questionnaire. The complete previous history was obtained from the participants having clinical examination. All the participants were examined fasting blood sugar, random blood sugar, urea, HbA1C level and level of creatine. In order to exclude cardiac disease, ECG and chest X-ray was advised.

Inclusion criteria: Newly diagnosed patients with diabetes, patients with diabetes and patients with diabetes for surgery.

Exclusion criteria: Patients without diabetes and who are not willing for research.

RESULTS

The research was carried out on 200 participants. The age was ranging between 20-60 years of age and the mean age was 34.63 ± 6.3 . All the participants were newly diagnosed patients with diabetes or diabetic patients. Admission of patients for thyroid surgery was 19, for vesical calculus surgery was 21, for renal calculus was 17, for inguinal hernia surgery was 29, for prostate surgery was 17, for hysterectomy was 19, for incisional hernia was 16, for cataract surgery was 19, for paraumbilical hernia surgery was 11, for cholelithiasis surgery was 23 and for deviated nasal septum was 9.

HbA1C ranged was from 5.60-10 with mean 8.1 ± 0.45 . The range for Random Blood Sugar was 139-510 mg/dl with mean 281.1 ± 77 . Fasting Blood Sugar was ranging from 121-231 mg/dl with mean

129.12 ± 24 . All the participants were on insulin therapy after the examination and discontinuation of oral hypoglycaemic drug in order to avoid surgery complication. Reference to nephrologist was made about 3 participants for further treatment. On the surgery day the insulin morning dose was omitted.

DISCUSSION

In the current research, mostly the participants were the diabetic patients, and some were newly diagnosed patients with diabetes. Pre-surgery management is a complicated procedure which need team work between surgeon, physician and the nursing staff. In order to avoid pre-surgery fluctuation in the level of blood glucose, therefore the level of glucose must be kept at low by this was mortality and morbidity can be decreased. According to American Diabetes Association, the level of blood glucose in hospitalised patients must be less than 180 mg/dl constantly. In several studies it has been found that the pre-surgery increased level of HbA1C is causing increased pre-surgery complications. In recent review, there exist no certain relation between the post-surgery result and HbA1C. Post-surgery complexities can be decreased to get better glycaemic control by surgery delay. According to pre-surgery fasting guidelines by Royal College of Nursing is that in a healthy adult 6 hours fasting for solid and 2 hours fasting for fluid. According to few researches, macrovascular disease is resulting from oxidative stress emerging from changes of acute blood glucose. The benefits of normal level of glucose are decreased endothelial dysfunction and better immune response. Poor post-surgery results are connected with mild hyperglycaemia. Internationally the increase in diabetes type-2 prevalence is that there is likelihood of undergoing the surgery by the diabetic patients than the patients with no diabetes. Post-surgery complexities myocardial ischemia and infection rises in the diabetes mellitus patients while undergoing the operation. In several surgical patients these complexities can be decreased by the good control of glycaemic. According to research carried out by Ven Den Burghe in 2001, the mortality can be decreased by maintaining the level of glycaemic 80-110 mg/dl with non-stop insulin infusion. Before surgical operation the rise of 20 mg/dl of blood glucose increases the complications to 30%. The common problems of before surgical operation are enhanced catabolism because of stress hormones, interruption in food intake, inhibition of insulin secretion, complications emerging because of anaesthesia and reduced consciousness level. The acute complication before



surgery are acidosis, dehydration, loss of weight and fatigue.

CONCLUSION

The close coordination and communication are required among the physical, patients, nursing (anaesthesia) staff, surgeon and OPD providers for managing the pre-surgery diabetes mellitus. Mostly the patients are having uncontrolled level of blood

glucose. The mortality and morbidity can be reduced by providing the patients treatment of insulin checking the level of blood sugar and securing from hyperglycaemia or hypoglycaemia. For having a better surgery, acid base balance and electrolytes must be check. Hypoglycaemia or hyperglycaemia and surgical complications can be decreased with vigilantly checking the level of glucose.

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