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RELATIONSHIP BETWEEN HIGH SERUM GLUCOSE LEVEL IN PATIENTS WHO ARE CRITICALLY ILL AND MORTALITY RATE

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Abstract:

Objective: *To analyze the relationship between serum glucose concentration and hospital outcomes for critical patients.*

Study Design: *A retrospective study.*

Place and Duration: *In the Intensive care Unit of Surgery and Medicine Department of Holy family, Hospital Rawalpindi for one year Duration from November 2016 to November 2017.*

Methodology: *Blood sugar fasting, Admission glucose and average glucose levels were measured in every patient. Hyperglycemia was defined as the division of the area under the curve above the normal upper limit into the total duration of the stay.*

Findings: *32 % was the mortality rate of three hundred patients with 16 days mean survival. 121 mg / dl was the average Blood sugar fasting in survivors, and in non-survivors 160 mg / dl was the mean glucose level (P = 0.001). 128 mg / dl was the mean Sugar level in survivors, while survival was 143 mg / dl (0.03). Median hyperglycemia average time in survivors was 5 mg / dl while 18.05 mg / dl in non survivors (P <0.006). The area under the receiver operator (ROC) characteristic curve was 0.60 for mean fasting glucose and mean glucose over time of 0.73.*

Conclusions: *While the mean of hyperglycemia over time is a useful evaluation of glucose control in patients who are critically ill, glucose intake and fasting are not a primary concern for average glucose in order to predict outcomes.*

Key Words: *Critical patients, Glucose, Conclusion.*

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INTRODUCTION:

Hyperglycemia can develop even in a large proportion of the patients suffering from acute stress or not diagnosed as pre-existing diabetes mellitus. Both animal and human studies suppose that this is not a acute event and that hyperglycemia which causes of stress, is linked with a high mortality rate. In the ICU strict glucose control advantage is illustrated by the Louvain study. According to a protocol the patients treated has significant reduction in mortality and morbidity that achieve normoglycemia. intensive care unit patients, HbA1C, which has been shown to be an important determinant of long-term glycemic control, but not proven reliable marker. Monitoring of glucose provides the ability to control metabolic status throughout the day, but activity is observed only in short periods. In studies performed on acute patients, the glucose regulation used is acceptance glucose, morning mean glucose, maximum glucose and average glucose. All these results have certain disadvantages. Maximum glucose, Acceptance glucose and average morning glucose is a single measurement based result. A single mean glucose using all measures may be prejudiced strongly with unequal distribution of time between measurements, as is common in practice. However, hypoglycemia episodes can still reduce this index, suggesting normoglycemia when hyperglycemia actually exists. We assessed the association between time-mediated hyperglycemia and regulation of conventional glucose indices with an intensive care patient group, which we stayed in intensive care unit for a long time.

MATERIALS AND METHODS:

This retrospective study the Intensive care Unit of Surgery and Medicine Department of Holy family, Hospital Rawalpindi for one year Duration from November 2016 to November 2017.

Glucose control has been shown to be important in patients with prolonged UTIs, only those patients who have stayed in the intensive care unit for four days or more.

Exclusion criteria were: Previous diabetes mellitus history and GCS score <5. Sex, Age referral type and from all patients case records GCS score were taken who applied to our hospital. From the central line or arterial Blood samples withdrawn and for glucose measurement sent to the central laboratory. The morning glucose average was recorded as the all measurements arithmetic average taken between 6am and 8 am. For all stays in the ICU Highest glucose was the maximum glucose considered. In NICU patients all sugar levels were checked to determine the mean hyperglycemia over the course of a patient's lifetime. The first step was to correlate all the glucose values. Then, the area between this the upper normal range and glucose curve was recorded. Over time, mean hyperglycemia is defined as the division of the area under the curve into the total length of stay, which means that over time the mean hyperglycemia is independent of the duration of the stay. We chose 125mg / dL as our highest values in all tests. As in other measurements of glucose regulation, the average over time hyperglycemia is expressed in milligrams per deciliter (mg / dl). For this reason, in a patient with all glucose values of 150 mg / dl, there will be an average hyperglycemia over a period of 25 mg / dl. A patient with normoglycemic and all glucose levels measured at 125 mg / dl or less will have an average hyperglycemia over a period of 0.0 mg / dL. As means and medians the data was recorded. Using the Chi2 and Mann-Whitney U test, analysis differences between the groups were evaluated was used for test differences between the ratios. The receiver operator characteristic curve (ROC) analysis was performed using the Medcalc software and the Chi2 test to compare each test validity for estimated deaths in the studied patients. In univariate analysis, the performance of hyperglycemia on average over time and other measurements obtained from glucose with respect to outcome were assessed. Variations were taken significant for a P value of two-tailed <P <0.05. To make statistical analyzes, SPSS version 13.0 was used.

RESULTS:

Admission to intensive care unit was 351 patients and for minimum four days 300 patients (85.5%) stayed and were selected for this study.

Table-I: Characteristics for surviving and non-surviving patients and results of univariate analysis of glucose indices

Characteristics	*Survivors*	*Non-survivors*	*P*
Number of Pt.(n [%])	204(68)	96(32)	
Male (n[%])	155(76)	65(69)	0.25
Age (years; mean ±SD)	40 ± 19	51± 20	0.001
Length of ICU stay(days)	16 (4-48)	16 (5-69)	0.51
Reason for ICU admission(n [%])			0.001
Medical	32 (56)	25 (44)	
Surgery	34 (57)	26 (43)	
Trauma	118 (74)	41 (26)	
Poisoning	20 (83)	4 (17)	
Mean fasting glucose (mg/dl)	121 (108-140)	160 (133-165)	0.001
Mean Admission glucose (mg/dl)	127 (106-159)	142 (118-173)	0.03
Mean Maximum glucose (mg/dl)	163 (138-201)	200 (165-252)	0.001
Mean glucose (mg/dl)	125 (110-156)	170 (149-189)	0.001
Time-averaged hyperglycemia [a] (mg/dl)	4 (2-34)	17.5 (10-50)	0.006

Table I lists the demographic data and measurements related to glucose.
Not the survivors The most common reason for intensive care unit was trauma. Both survivors and civilians escaped intensive care during their 16-day survival period. A total of 96 patients (32%) who applied to the YBU died. In 300 patients 26,268 times sugar level was accessed. The mean glucose concentration was 140 mg / dL (108-165 mg / dL) in all patients, while the mean fasting glucose concentration was 134 mg / dL 1 (106-173 mg / dL) in all patients. dL), mean maximum glucose was 181 mg / dL (138-252 mg / dL) and mean hyperglycemia was 10.7 mg / dL (2-50 mg / dL).

Table-II: the area under each curve of tests

Type of test	*Area under the curve*	*Standard deviation*
Blood sugar on admission	0.57	0.036
Maximum blood sugar	0.68	0.035
Average of fasting blood sugar	0.73	0.033
Time-averaged hyperglycemia	0.59	0.036

The average survival rates of surviving glucose are listed in Table I. All glucose indices were higher significantly in univariate survey in unhealthy individuals. Different tests ROC curves are shown in FIG. Table II shows its standard deviation and area under each curve. Under the curve (0.73) mean fasting glucose had the highest area. Peer comparisons between different tests are shown in Table III.

Table-III: pair wise comparison of different tests

Pair Wise Comparison	*P value*
Blood sugar in admission & Maximum Blood sugar	0.007
Blood sugar in admission & Mean of fasting blood sugars	0.033
Blood sugar in admission & time-averaged hyperglycemia	0.399
Maximum Blood sugar & mean of fasting blood sugars	0.039
Maximum Blood sugar & time-averaged hyperglycemia	0.016
Mean of fasting blood sugars & time-averaged hyperglycemia	0.0001

sex and age, and intensive care, all glucose levels were significant statistically in the dual logistic model.

DISCUSSION:

This study shows that all of the assessed glucose measurements are higher in survivors. Ultimately, this research supports the hypothesis that hyperglycemia is a useful index for measuring glucose control, which is ultimately the best predictor of patient outcome. The fact that the mean fasting blood sugar in our study has the highest area under the curve means that the intensive care unit in these intensive care units has the best indication of mortality. All glucose indices were statistically significant in the dual logistic model for reasons of acceptance in intensive care unit and multivariate analysis by gender and age. High glucose levels are associated with a worse outcome of accepting fasting or glucose; This has been found by many researchers in various categories and has been found in this study. As a result, hyperglycemia is more direct in the indexes than an additional calculation, and it is better to take into account changes in glucose concentrations over time and is better than it prevents the likelihood of higher values. and the average low average produces a normal value. However, with an ROC area of 0.59, mean hyperglycemia over time cannot serve as a useful predictor of mortality. Some features suggest that patients with newly diagnosed hyperglycemia are more severe than those with known diabetes. Although the underlying mechanisms for the development of stress hyperglycemia are not fully understood, various potential mechanisms have been proposed. These hormones have decreased availability, due to increased secretion (catecholamines, glucagon and cortisol) and increased availability of lactate as a substrate, increased gluconeogenesis and increased insulin resistance to glycogenolysis. In these patients, high sickness and death are associated with the causes of the disease they are due to stress but hyperglycemia itself can cause cell morbidity and cell abnormalities and depression, cell dehydration and electrolyte intoxication in a cell-borne cellular environment.

CONCLUSION:

Hyperglycemia is a beneficial judgment for the control of glucose in critically ill patients; The acceptance of glucose, maximum glucose and fasting glucose averages does not have priority for predicting outcomes.

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