High blood glucose level and increased risk of mortality in critically ill patients

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ABSTRACT

102 patients, 38 from ICU and 64 from postoperative ward were evaluated. Out of these, 49 of the patients had random blood glucose level <100mg/dl, 46 had in the range 100 to 140mg/dl and 7 had >140mg/dl. The mean random blood glucose level in medical patients was 146mg/dl with a standard deviation of 20 and that in the post operative patients was 94.3mg/dl with a standard deviation of 10.There was an overall mortality of 13.7% (14 patients), of which medical patients were 78.6% (11 patients) and surgical patients were 21.4% (3 patients). Amongst the dead, 81.8% had random blood glucose level >110mg/dl and all were medical patients. However all 3 deaths (18.2%) in surgical patients had their random blood glucose level <110mg/dl. Higher blood glucose level was observed in critically ill medical patients and mortality was higher among patients with random blood glucose level >110mg/dl.

Keywords: random blood glucose, mean, standard deviation, and mortality.

INTRODUCTION

Blood glucose level is often raised in stressful conditions like serious illness and trauma and insulin resistance is also observed in such instances[1] irrespective of the previous blood glucose status. Hyperglycemia can be a marker of severity of illness and it may also worsen outcomes in terms of morbidity (renal and hepatic dysfunction, polyneuropathy, lengthy ventilatory support and ICU stay, increased blood transfusion, increased use of antibiotics) and mortality. Tight blood sugar regulation i.e. random blood glucose level<110mg/dl[2,3] has numerous benefits in the critically ill patients like: prevention of immune dysfunction,[4] reduction of systemic inflammation,[5] protection of endothelium[6,7] and improvement and protection of mitochondrial ultra structure and function.[8]

MATERIALS AND METHODS

We evaluated 102 patients admitted in ICU (38) and post operative ward(64) from December 8, 2006 to March 6, 2007 (2063/8/22 B.S to 2063/11/22 B.S). Patients' age, sex, disease, random blood sugar and disease outcome were thoroughly studied and analyzed.

RESULTS

There were total 102 patients out of whom 50 were male and 52 female. Out of 102, 38 patients were admitted in the ICU and 64 were in the postoperative ward.

Mean random blood glucose level in medical ICU patient's was146mg/dl with a standard deviation of 20 and that of postoperative patients was 94.3mg/dl with a standard deviation of 10. There was an overall mortality of 14 i.e, 13.7%, medical-78.6% and surgical-21.4%. Amongst 11 deaths in medical patients, 9 patients i.e. 81.8%had random blood glucose level >110mg/dl. However all 3 deaths in surgical patients had their random blood glucose level <110mg/dl. Two patients in ICU were known diabetic and were under antidiabetic drugs.

DISCUSSION

In this study we have seen higher random blood glucose level among critically ill patients as stated in literature[1] but post operative patients in our set up had lower random blood glucose level which could be explained by the fact that most surgeries were elective and blood sugar were tested prior to surgery.

Regarding the mortality, 81.8%of those expired had their random blood glucose>110mg/dl, however all 3 deaths in surgical patients random blood glucose level was <110mg/dl. Here also similar argument of fewer study patients, elective surgery and blood sugar test prior to surgical procedure could explain the findings.

Standard medical practice has been to tolerate a moderate degree of hyperglycemia but tight regulation of random blood sugar (80-110mg/dl) in critically ill patients (medical and surgical) with intensive insulin therapy has yielded promising outcome in both morbidity and mortality. The risk of intensive insulin therapy is hypoglycemia. But with standard strict protocol of insulin therapy and well-trained residents and nurses who follow this protocol, risk of hypoglycemia can be avoided.

The awareness of the potential harm from hyperglycemia in critically ill patients must be raised and a systematic approach for lowering blood sugar level effectively and safely must be encouraged.

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Table-1: (Age distribution in patients)

Age group	n.
<20yrs	11
20-40yrs	39
40-60yrs	30
60-80yrs	21
>80yrs	1

Table-2: (Deaths in various departments)

Department	n. of patients	n. of deaths
Medicine	38	11
Surgery	29	3
Gynae	23	0
ENT	6	0
Orthopedics	6	0

Table-3: (Random blood glucose level in studied patients)

Random blood glucose	No. of patients
<100mg/dl	49
100-140mg/dl	46
>140mg/dl	7