

Frequency of Hypoglycemia in Medical Emergency Department of A Tertiary Care Hospital of Bangladesh

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Abstract

Background: Hypoglycemia is the commonest medical emergency in diabetic patients. It is also the most important limiting factor in intensive control of diabetes. To find out the frequency of hypoglycemia in Medical Emergency of BIRDEM General Hospital.

Materials and methods: This cross sectional observational study was done at the Medical Emergency Department of BIRDEM General Hospital, Dhaka, during the period of March, 2015 to November, 2015. Among the patients attending the emergency department, hypoglycemic patients were identified. Socio-demographic, clinical and biochemical data was collected from these patients. Statistical analysis was done with SPSS version 23.0.

Results: Among the 20564 patients attending the medical emergency department in the specified time period, 577 (2.8%) patients had hypoglycemia. More than half (50.09%) patients were found mild impairment of consciousness (GCS >12).

Conclusion: The present study found that frequency of hypoglycemia in patients attending in Medical Emergency Department of BIRDEM General Hospital was 2.80%.

Key words : Hypoglycemia; Diabetes; Mellitus; BIRDEM.

INTRODUCTION

Diabetes mellitus contributes greatly to the global health burden of this century. The prevalence of Type 2 Diabetes Mellitus (T2DM) has been escalating in the developing countries¹. Hypoglycemia is the most common endocrine emergency faced by physicians. Hypoglycemia is defined as a measurable glucose concentration, 70 mg/dL (3.9 mmol/L)². ADA and European Association for the Study of Diabetes (EASD) guidelines recommend hypoglycemia risk to be considered while treating T2DM patients³. It is established that the primary cause of hypoglycemia among T2DM patients is medications, namely sulfonylureas and insulin in 90% of the diabetic patients⁴⁻⁶. However, hypoglycemia may occur due to other causes apart from medications, which needs to be explored. Patient's well-being can get affected directly due to hypoglycemic symptoms and indirectly due to fear of subsequent hypoglycemic episodes⁷. Even mild symptoms of hypoglycemia can affect the treatment of T2DM if patient's fear of hypoglycemia overtakes the willingness to take medications⁶. Recurrent hypoglycemic episodes can lead to poor quality of life,⁷ increased anxiety, depression, and mood swings^{7,8}.

MATERIALS AND METHODS

Observational Cross-sectional study was carried out in the Medical Emergency Department of BIRDEM General Hospital, Dhaka during March 2015 to November 2015. All Patients attending Medical Emergency Department of BIRDEM General Hospital were included in this study and Diabetic patients who are not willing to participate were excluded in this study. Data were collected from hypoglycemic patient

(After recovery) attendants and previous records. Data were collected with a pre-tested structured questionnaire containing history, clinical examinations and capillary blood glucose test by glucometer. In Emergency Department, a detailed history of the illness was taken from the patients / patients' attendant. The researcher himself carried out through general examinations and recorded the findings. The data was collected and edited manually. Then it was entered into SPSS version 23, computer software program. The tests statistics used to analyze the data were descriptive statistics. The data presented on categorical scale were expressed as frequency and corresponding percentage, while the quantitative data were presented as mean and Standard Deviation (\pm SD). For all analyses level of significance was set at 0.05 and p-value <0.05 was considered significant.

RESULTS

Total number of attended patients in medical emergency department during study period were 20564, among them 577(2.80%) patients had hypoglycemia. Out of 577 hypoglycemic patients 215(37.26%) were admitted and 362(62.74%) were non admitted patients. Frequency of hypoglycemia was 2.80% (Table-I). Mean age was found 56.1 \pm 9.9 years. Maximum (69.15%) hypoglycemic patients belonged to age >50 age, 319(55.28%) were male, 312(40.55%) were unemployed, 160(27.73%) patients completed \geq HSC education and 304(52.69%) were BMI 23.0-24.9 kg/m² (Table-II). More than one third (36.22%) patients were duration of diabetes 11-20 years (Table-III). Majority (85.62%) patients were found HbA1c \geq 7.0 percent (Table-IV). Majority (44.54%) patients had CKD followed by 106(18.37%) had AKI, 98(16.98%) had UTI, 38(6.58%) had CLD, 28(4.85%) had IHD, 25(4.33%) had aspiration pneumonia and 19(3.29%) had electrolyte imbalance (Table-V). Requirement of Intravenous (IV) glucose was found 224(38.82%) and 439(76.08%) patients received oral anti diabetic medication (Table-VI). More than three fourth (36.57%) patients were found CBG >3.0 mmol/L (Table-VII). More than half (50.09%) patients were found mild impairment of consciousness (GCS >12) (Table-VIII).

Table I : Frequency of hypoglycemia among patients attended in Medical Emergency Department of BIRDEM General Hospital (n=20564).

	Frequency	Percentage
Number of patients attending in medical emergency department	20564	100.0
Total number of hypoglycemia	577	2.80
Number of patients requiring admission	215	37.26
Number of patient not requiring admission	362	62.74

Table II : Demographic characteristics of the hypoglycemic patients (n=577)

	Frequency	Percentage
Age (Years)		
30-40	68	11.79
41-50	110	19.06
51-60	241	41.77
61-70	109	18.89
>70	49	8.49
Mean \pm SD	56.1	\pm 9.9
Sex		
Male	319	55.29
Female	258	44.71
Occupational status		
Govt. employee	50	8.67
Non Govt. employee	69	11.96
Self employed	135	23.40
Unemployed	312	54.07
Other	11	1.91
Educational status		
$<$ HSC	417	72.27
\geq HSC	160	27.73
BMI (kg/m ²)		
<18	54	9.36
18.0-22.9	197	34.14
23.0-24.9	304	52.69
≥ 25.0	22	3.81

Table III : Duration of diabetes of the hypoglycemic patients (n=577).

Duration of diabetes (years)	Frequency	Percentage
<5	186	32.24
5-10	158	27.38
11-20	209	36.22
>20	24	4.16

Table IV : Glycemic status of the hypoglycemic patients (n=577).

HbA1c (%)	Frequency	Percentage
<7.0	83	14.38
≥ 7.0	494	85.62

Table V : Associated illness of the hypoglycemic patients (n=577).

	Frequency	Percentage
CKD	257	44.54
AKI	106	18.37
UTI	98	16.98
CLD	38	6.58
IHD	28	4.85
Aspiration pneumonia	25	4.33
Electrolyte imbalance	19	3.29
Acute gastroenteritis	17	2.95
Pneumonia	13	2.25
Arrhythmia	13	2.25
Stroke	10	1.73
Heart failure	10	1.73
Respiratory failure	4	0.69

Table VI : Treatment modalities of the hypoglycemic patients (n=577).

	Frequency	Percentage
Treatment modalities		
IV glucose	224	38.82
Oral glucose	353	61.18
Anti diabetic medication		
Insulin	96	16.64
Oral	439	76.08
Oral + Insulin	42	7.28

Table VII : CBG of the hypoglycemic patients (n=577).

CBG	Frequency	Percentage
1 mmol/L	13	2.25
1.1-2.0 mmol/L	156	27.04
2.1-3.0 mmol/L	197	34.14
>3.0 mmol/L	211	36.57

Table VIII : Glasgow coma scale of the hypoglycemic patients (n=577).

GCS	Frequency	Percentage
Severe (<9)	91	15.77
Moderate (9-12)	197	34.14
Mild (>12)	289	50.09

DISCUSSION

In present study observed that total number of attended patients in medical emergency department during study period were 20564, among them 577(2.80%) patients had hypoglycemia. Out of 577 hypoglycemic patients 215(37.26%) were admitted and 362(62.74%) were non admitted patients. Frequency of hypoglycemia was 2.80%. Many studies were found approximately similar to our study, they showed incidence of hypoglycemia were 5.1%, 6.8%, 9.8%, but different results are found in some western studies like 18.7% and 17%⁹⁻¹³. Jimenez-Montero et al also reported 55620 patients were attended at the Emergency Department. Of them, 4434 had non-communicable conditions including 961 diabetics which was 1.72%¹⁴.

In current study observed that the mean age was found 56.1±9.9 years. Maximum (69.15%) hypoglycemic patients belonged to age >50 age, 319(55.28%) were male, 312(40.55%) were unemployed, 160(27.73%) patients completed HSC education and 304(52.69%) were BMI 23.0-24.9 kg/m². Shih et al observed that mean age of patients was 66.3 years¹⁵. Gautam et al in their study found that majority (87.7%) of the respondents with hypoglycemia were above 40 years of age¹⁶. Hsiao and Chien reported that 50% patients were male another study Shih et al found 47.3% male patients with hypoglycemia^{17,15}. Tsai et al in their study found that the mean BMI of severe hypoglycemic patients was 23.8±4.0 kg/m² with 28.8% in the overweight

category¹⁸. Su and Liao study reported total of 186 cases of hypoglycemia aged from 26 to 98 years old with an average age of 70.5±15.3 years. Kumar et al also observed 751 (62.8%) were males and 445 (37.2%) were females. Mean age distribution was 57 ± 14.7 years; the youngest being 16 years old and the oldest 98 years of age¹⁹⁻²⁰.

In present study observed more than one third (36.22%) patients had duration of diabetes 11-20 years. Lin et al found that patients with non-recurrent hypoglycemia had duration of diabetes 12.41±8.07 years and recurrent hypoglycemia had duration 15.35±8.29 years²¹.

In this study observed that the majority (85.62%) patients were found HbA1c 7.0 percent. Hsiao and Chien found the risk increased as the HbA1c level approached the American Diabetes Association goal of less than 7.0%¹⁷. The patients who have a lower HbA1c level should be encouraged to be more diligent about meal planning, flexible insulin and other drug regimens and frequent self-monitor blood sugar.

In present study showed the majority (44.54%) patients had CKD followed by 106(18.37%) had AKI, 98(16.98%) had UTI, 38(6.58%) had CLD, 28(4.85%) had IHD, 25(4.33%) had aspiration pneumonia and 19(3.29%) had electrolyte imbalance. Su and Liao study reported concomitant infection (55.4%) was more commonly observed than the lack of a recent meal (44.6%). UTI (33.3%) was more commonly observed than pneumonia (23.1%) and BTI (2.7%)¹⁹. Kumar et al also reported similar observation they showed CKD 61 (11.4%), acute/chronic liver dysfunction 13 (2.43%), malignancies 10 (1.87%) drugs/toxins 3 (0.56%), other factors 13 (2.43%) and unknown 7 (1.31%)²⁰.

In this study observed requirement of IV glucose was found 224(38.82%) and 439(76.08%) patients received oral anti diabetic medication. Lin et al in their study found that of the patients of hypoglycemia, Insulin was used by 46(28.9%) patients, Oral anti-diabetic agents by 116(73.0%) Sulfonylurea 51(32.1%) Meglitinide 53(33.3%) Metformin 60(37.7%) Thiazolidinediones 8(5.0%) Polypharmacy 71(44.7%)²¹. Kumar et al reported underlying causes for hypoglycemia in diabetic group included intensive control of blood sugars by oral hypoglycemic agents (OHAs) 204(38.13%), intensive control of blood sugars by insulin 103(19.25%), intensive control of blood sugars by with both insulin and OHAs 13(2.43%)²⁰.

In this study showed more than half (50.09%) patients were found mild impairment of consciousness (GCS >12). Tsai et al which is consistent with our study showed that risk factor responsible for hypoglycemia were meal related (p<0.001), renal impairment (p<0.001), infection (p<0.001)¹⁸.

CONCLUSION

The present study found that frequency of hypoglycemia in patients attending in Medical Emergency Department of BIRD-EM General Hospital was 2.80%. Major factors associated with not requiring hospital admission were younger age, less duration of DM, treatment with OAD, correction of hypoglycemia by oral glucose, high GCS and higher mean blood glucose at presentation than admitted patients.

DISCLOSURE

All the authors declared no competing interest.

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