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Clinical profile of hypoglycemia in emergency department of tertiary care hospital: A single center study

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Abstract

Background: Hypoglycemia is an endocrine emergency which presents with a variety of symptoms ranging from impaired cognitive function to convulsions, coma and death. This study would ascertain the causes, and also the frequency of presentation of hypoglycaemia in subjects presenting to a city accident and emergency department of a tertiary care hospital.

Methodology: A retrospective review of records of case papers of hypoglycemic cases (HGT/RBS <70mg/dl) from January 2015 to December 2015 was conducted to gather data on patient age, gender, HGT (RBS), past history of liver cirrhosis, chronic kidney disease, concomitant infection or other causes of febrile illness, concomitant malignancy, concomitant stroke, lack of recent meal. A total of 91 cases were enrolled in our study. All values were recorded from patients' ED case papers. Patients with RBS levels less than 70mg/dl were included in the study. Elderly age was defined as an age above 65 years old. Neonatal and pediatric patients (age less than 18 years old) were excluded.

Results: Hypoglycemia is related to several co-morbidities. In total, 84 of the patients had Diabetes and 44 were on OHA, 37 on Insulin or both. 2 had liver cirrhosis and 29 had underlying CKD, 23 had fever in past 48 hours 24 had missed recent meal and/or 28 had anorexia secondary to underlying illness, 12 had cerebrovascular event, 11 were concomitant with malignancy, 4 unknown etiology or data missing.

Conclusion: When Hypoglycemic patients present to Emergency department, emergency physicians should pay attention to the presence of infection, malignancy, liver diseases and renal failure. Greater emphasis on intensive glycemic control and Insulin with OHAs has resulted in increased emergency department visit rates for hypoglycemia.

Keywords: Emergency department, hypoglycemia, insulin

Introduction

Hypoglycemia is an endocrine emergency that can alter the patient's mental status, resulting in lethargy, confusion and organ dysfunction^[1]. Common causes are lack of adequate intake of food, chronic alcohol abuse, interactions among medications, increased physical exertion and overdose of medications (insulin/oral hypoglycemic agent)^[2].

Other etiologies of hypoglycemia include old age, infection, chronic renal insufficiency, liver diseases and recurrent hypoglycemic episodes^[3]. It presents with a variety of symptoms ranging from impaired cognitive function to convulsions, coma and death. Whilst the consequences of untreated hypoglycemia are well documented the true frequency of presentation of hypoglycemia for both diabetic and non-diabetic subjects is still unclear^[4]. Reasons for this uncertainty may be due to one of several of the following; the numerous precipitating factors; the protean clinical features and the varied location of presentation and treatment such as hospital, general practice or home. Differences between urban and rural populations may also be a factor^[5].

A six-fold increase in deaths due to diabetes has been attributed to patients experiencing severe hypoglycemia in comparison to those not experiencing severe hypoglycemia. Repeated episodes of hypoglycemia can lead to impairment of the counter-regulatory system with the potential for development of hypoglycemia unawareness^[6]. The short- and long-term complications of diabetes related hypoglycemia include precipitation of acute cerebrovascular disease, myocardial infarction, neurocognitive dysfunction, retinal cell death

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and loss of vision in addition to health-related quality of life issues pertaining to sleep, driving, employment, recreational activities involving exercise and travel [7]. The present study was conducted to determine clinical Profile of hypoglycemic patients in tertiary care hospital.

Materials & Methods

The proposed study was conducted at emergency department of a tertiary care hospital in the city of Mumbai in Patients age more than 18 years with Hgt less than 70mg/dL. Inclusion criteria were patients presenting to emergency with HGT less than 70mg/dL, patient age more than 18 years, with central pulses palpable on arrival. Exclusion criteria were patients younger than 18 years, cardiopulmonary arrest before arrival in the ED, or a do-not resuscitate status.

Age, sex, history of fever in 48 hours, past illness was recorded. Past medical history, and the probable causes of hypoglycaemia which were classified as one or several of the following; missed meal, increase in insulin dose, alcohol or drug ingestion or cause unknown. A blood glucose concentration was determined by Accu-Check Gluco-stix. Hypoglycaemia was defined as a capillary blood glucose of 70mg/dL or less. After appropriate treatment of the hypoglycaemic episode detailing whether the patient was sent home, or was admitted was also noted in case record form. The numeric data was summarized and for statistical significance of numeric data t-test was used. A p value less than 0.05 was considered statistically significant.

Results

Table 1: Patient Characteristics

	Age	HGT/R BS	Pulse	BP-Sys	BP-Dias	GCS
N	91	91	91	91	91	91
Mean	68.13	40.21	88.24	136.70	79.25	10.84
Std. Deviation	13.099	14.571	15.942	24.218	11.653	3.725
Minimum	25	12	48	80	50	3
Maximum	90	68	130	190	100	15
Percentiles	25	61.00	29.00	80.00	120.00	70.00
	50	71.00	37.00	88.00	140.00	80.00
	75	77.00	52.00	100.00	150.00	90.00

Table I shows that mean age was 68.13 years, HGT was 40.21, pulse was 88.2 beats per minute, systolic blood pressure was 136.7 mm Hg, diastolic blood pressure was 79.25 mm Hg and GCS was 10.84.

Table 2: Distribution of Data as per Signs & Symptoms

	Absent		Present	
	Count	Column N %	Count	Column N %
Anorexia	63	69.20%	28	30.80%
Fever	68	74.70%	23	25.30%
LOC	49	53.80%	42	46.20%
Fall	80	87.90%	11	12.10%
AMS	46	50.50%	45	49.50%
FND	47	51.60%	44	48.40%
Syncope	88	96.70%	3	3.30%
Others	59	64.80%	32	35.20%

Table II shows that common symptoms were anorexia, fever, LOC, fall, AMS, FND and syncope.

Table 3: Distribution of as per causes

Likely cause	Absent		Present	
	Count	%	Count	%
OHA	47	51.60%	44	48.40%
OHA+Insullin	58	63.70%	33	36.30%
Insulin	87	95.60%	4	4.40%
Others	87	95.60%	4	4.40%
Skipped Meal	67	73.60%	24	26.40%
Alcohol	90	98.90%	1	1.10%

Table III shows that common causes were OHA in 44, OHA+insulin in 33, insulin in 4, others in 4, skipped meal in 24 and alcohol in 1 case.

Table 4: Past illnesses in Hypoglycemics

	Absent		Present	
	Count	%	Count	%
Hypothyroid	72	79.10%	19	20.90%
DM	7	7.70%	84	92.30%
IHD	32	35.20%	59	64.80%
CKD	62	68.10%	29	31.90%
CLD	89	97.80%	2	2.20%
Malignancy	80	87.90%	11	12.10%
CVA	79	86.80%	12	13.20%
COPD	80	87.90%	11	12.10%
PSY/COG	81	89.00%	10	11.00%

Table IV shows that past illnesses were hypothyroidism in 19, DM in 84, IHD in 59, CKD in 29, CLD in 2, malignancy in 11, CVA in 12, COPD in 11 and PSY/COG in 10 patients.

Table 5: Pearson's correlation for HGT AND GCS

		HGT/RBS	Interpretation
GCS	Pearson Correlation	.687	Good Correlation Indicating Low Sugar Associated With Poor GCS
	Sig. (2-tailed)	<0.001	Statistically Significant
	N	91	

Table V shows that there was positive correlation of HGT and GCS ($P < 0.001$).

Discussion

This study has shown the high frequency of a missed meal and anorexia secondary to other causes as a precipitating cause of hypoglycaemia [8]. This was observed in 26.4% and

30.8% of all cases. It would thus appear obvious that dietary education could potentially ameliorate this situation. 12.1% (11/91) presented to ED with a history of fall or an injury, while 49.5% presented with altered mental status or some neurologic symptoms. Furthermore, while a total of 91 hypoglycaemic episodes over the 12-month period were documented, this accounted for 0.40% (91/22,641) of all new cases presenting to the A&E department, and thus comprised only a small part of the total workload. Previous reports describe greater numbers requiring hospital treatment for hypoglycaemia over a 12-month period^[9].

Both the number of cases and the precipitating factors for hypoglycaemia in this city study may have been influenced by one of several of the following demographic features. The numbers of cases may have been artificially low compared to other studies due to the relative proximity of several Nursing homes, hospitals and private clinics^[10]. In this study hypoglycaemia occurred more frequently in the January & October months. This may be due alterations in insulin absorption due to temperature, or changing seasons, meal patterns may also be a contributing factor. Statistically significant correlation was found between sugar levels and GCS, wherein lower levels of HGT/RBS were associated with poor GCS. While the oldest diabetic subject in this study was 90 years old, it is well established that hypoglycaemia can occur in the elderly and potentially with all forms of insulin therapy^[11].

In this study, insulin and OHA combination therapy was identified as a precipitating factor in 36.3% of subjects whereas 4.4% in patients on insulin alone for management of Diabetes. Renal disease may reduce gluconeogenesis and insulin degradation and thus be associated with hypoglycaemia. 31.9% subjects in this study had renal disease. The hypoglycaemic effect of sulphonylurea therapy is often increased in conjunction with decreased calorie consumption or an increase in dosage or alcohol ingestion. These circumstances were found in 48.4% cases with OHAs^[12]. The general status of a reduced appetite in patients with cancer involving the gastrointestinal system led to hypoglycemia. In 12.1% hypoglycemics there was such an underlying malignancy.

The potential social hazard, as well as the adverse drug interaction for the diabetic when driver or pedestrian, with a history of recent alcohol excess, is well documented (Fisher *et al.*, 1985) but was not seen in our study, reasons for which could be multifactorial. Alcohol alone may acutely promote hypoglycaemia, usually by inhibiting gluconeogenesis. With starvation, the liver is depleted of glycogen, its alternative glucose source. Alcohol may also prime the pancreatic beta cell and exaggerate the pharmacological effect of sulphonylurea agents^[13]. The number of subjects with a loss of consciousness or seizure or coma as the presenting feature were 46.2% of hypoglycaemia indicates the rapid decline of blood glucose occurred without premonitory warning signs. A reduction of counter-regulatory hormone response in insulin-dependent diabetes May 188 M. D. Gitt *et al.*^[14] be observed after 5 years of disease duration. This attenuation of warning symptoms obviously increases the chance of severe neuroglycopenia being the first clinical manifestation of the hypoglycaemic episode.

As major clinical manifestations of hypoglycaemia, namely a LOC, seizure or coma, were seen in 46.2% of cases, we would strongly suggest that in all cases of altered

consciousness presenting to an A&E department, a blood glucose estimation should be performed even in the absence of diabetes. While hypoglycaemia is a readily treatable condition, the inadequately treated patient is at risk of profound long-term sequelae^[15]. In our study dietary factors such as a missed meal and/or anorexia had a greater influence on overall case presentation. All doctors should also be aware of the potential or the patient to plead that hypoglycaemia was the reason for diminished responsibility. The practitioner in accident and emergency is in a position to verify the diagnosis. Greater emphasis is required in education on the regularity of meals and caution with OHAs and Insulin in diabetic population more than 65 years of age.

Conclusion

When Hypoglycemic patients present to Emergency department, emergency physicians should pay attention to the presence of infection, malignancy, liver diseases and renal failure. Greater Emphasis on intensive glycemic control has resulted in increased emergency department visit rates for hypoglycemia. The emergency department provides an important opportunity for study and intervention for severe hypoglycemia. Rates of ED visits for hypoglycemia was more in patients 65 years or older. Hence risks of sequelae in this age group should be considered in decisions to prescribe or intensify OHAs or Insulin therapy. To identify demographic disparities, other significant etiologies it merits further evaluation over longer span of time or prospective study can be proposed. In conclusion, hypoglycemia, both in association with insulin treatment and with non-insulin glucose-lowering drugs, when severe enough to justify attendance to EDs, represents a remarkable burden for individuals with diabetes, increasing the risk of serious events and adverse outcomes, especially in elderly and frail patients, and has a considerable impact on resource utilization and admissions.

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