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Evaluation of Clinical Profile of Patients with Hypoglycemia

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ABSTRACT
To assess clinical profile of hypoglycemic patients. Eighty-six patients with hypoglycemia of both genders were selected for this study. Parameters such as the etiology of hypoglycaemia were recorded. Assessment of blood glucose concentration by Accu-Check Gluco-stix was performed. Out of 86 patients, males were 46 (53.4%) and females were 40 (46.6%). Common clinical features were fever in 72%, LOC in 12%, anorexia in 67%, syncope in 45%, AMS in 26%, FND in 34%, fall in 31% and others in 27% patients. The difference was significant ($p<0.05$). Common causes of hypoglycemia was alcohol in 15%, skipped meal in 10%, insulin in 25%, OHA in 20%, OHA +insulin in 17%, and others in 13% cases. The difference was non-significant ($p>0.05$). Common causes of hypoglycemia were skipped meal, alcohol, OHA, OHA +insulin and insulin. The most common clinical features were AMS, FND, anorexia, fever, LOC and syncope.

INTRODUCTION

Hypoglycemia occurs when the level of glucose in blood drops below normal. Glucose is the primary source of energy for body's cells, especially for the brain[1]. When blood sugar levels become too low, it can lead to a variety of symptoms and if left untreated, can become a medical emergency[2].

Hypoglycemia is classically defined and diagnosed by a combination of symptoms and biochemical criteria known as the Whipple triad, symptoms typical of hypoglycemia are confirmed by low plasma glucose levels and are relieved by carbohydrate intake[3]. The difficulty is in the definition of symptoms as typical. The spectrum of symptoms of hypoglycemia is broad and may vary with time or may fluctuate, often as an alteration in neurohormonal responses after preceding episodes of hypoglycemia[4].

It is imperative to assess the clinical spectrum and burden of hypoglycemia in order to implement appropriate management strategies against this potentially fatal but frequently ignored condition[5]. Choosing treatment regimens with low or no risk of hypoglycemia, self-monitoring blood glucose, early identification of hypoglycemia risk factors and appropriate educational programs for diabetic patients and healthcare professionals are the main ways to maintain good glycemic control, minimize the risk of hypoglycemia and thereby prevent long-term complications[6,7]. The present study was conducted to assess clinical profile of hypoglycemic patients.

MATERIALS AND METHODS

A sum total of eighty-six patients with hypoglycemia of both genders were selected for this study. All patients gave their written consent to participate in the study. Ethical approval was obtained from the institutional ethical review committee.

Demographic characteristics such as name, age, gender etc. was recorded. Hypoglycaemia was defined as a capillary blood glucose of 70 mg dL^{-1} or less. Parameters such as the etiology of hypoglycaemia were recorded. Assessment of blood glucose concentration by Accu-Check Gluco-stix was performed. Data thus obtained were subjected to statistical analysis using Mann- Whitney U-test. $p< 0.05$ was considered significant.

RESULTS

Common clinical features were fever in 72%, LOC in 12%, anorexia in 67%, syncope in 45%, AMS in 26%, FND in 34%, fall in 31% and others in 27% patients. The difference was significant ($p<0.05$) (Table 2, Fig. 1).

Common causes of hypoglycemia was alcohol in 15%, skipped meal in 10%, insulin in 25%, OHA in 20%, OHA+insulin in 17% and others in 13% cases. The difference was non-significant ($p>0.05$) (Table 3, Fig. 2).

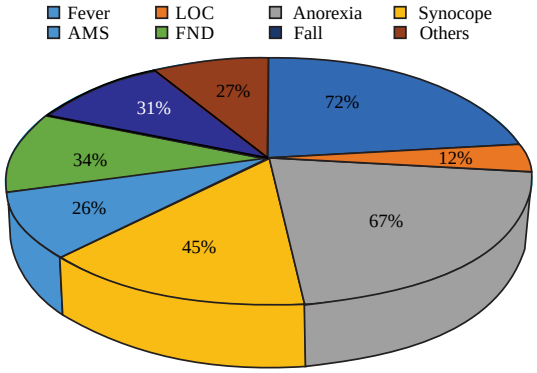

Fig. 1: Assessment of clinical features

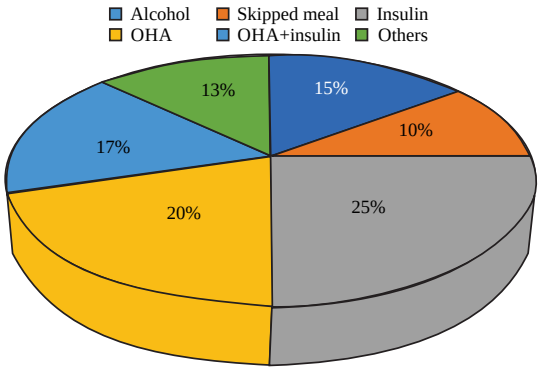

Fig. 2: Assessment of etiology of hypoglycemia

Table 1: Distribution of patients based on gender

Gender	Male	Female
Number	46 (53.4%)	40 (46.6%)

Total respondents: 86

Table 2: Assessment of clinical features

Clinical features	Percentage	p-value
Fever	72	0.15
LOC	12	
Anorexia	67	
Syncope	45	
AMS	26	
FND	34	
Fall	31	
Others	27	

Table 3: Assessment of etiology of hypoglycemia

Etiology	Percentage	p-value
Alcohol	15	0.87
Skipped meal	10	
Insulin	25	
OHA	20	
OHA+insulin	17	
OHA+insulin	13	

DISCUSSIONS

One significant side effect of glucose-lowering medication in individuals with diabetes mellitus is hypoglycemia. Intensive glycemic control attempts always result in an increased risk of hypoglycemia[2,8]. Patients with severe hypoglycemia have been linked to a six-fold increase in diabetes-related fatalities compared to those without the condition. Frequently occurring hypoglycaemic episodes may damage the counter-regulatory mechanism and result in

hypoglycemia unawareness[9]. Acute cerebrovascular disease, myocardial infarction, neurocognitive dysfunction, retinal cell death, and loss of vision are among the short-and long-term complications of diabetes-related hypoglycemia. Other health-related quality-of-life issues include difficulties falling asleep, driving, working, engaging in recreational activities involving exercise and traveling[10].

The most common link between hypoglycemia and diabetes is overuse of insulin or other blood sugar-lowering medications by diabetics. Blood sugar levels can fall if you skip meals for a long time or don't eat enough carbohydrates[11,12]. Blood sugar levels may drop after intense exercise, particularly if proper dietary or insulin adjustments are not made. Hypoglycemia can result from alcohol consumption because it can disrupt the body's ability to control blood sugar, particularly if alcohol is consumed without food. Low blood sugar is a side effect of certain medications, such as those for overactive thyroid or specific bacterial infections[13,14]. The present study was conducted to assess clinical profile of hypoglycaemic patients.

Our results revealed that out of 86 patients, males were 46 (53.4%) and females were 40 (46.6%). Ryan *et al*.[15] selected 100 subjects with type 1 diabetes to serve as a control group and in patients before and after islet transplantation. The mean age of the control diabetic subjects was 38.4±1.3 years (±SE), with a duration of diabetes of 21.5±1.1 years. The median HYPO score in the control subjects was 143. The LI in the diabetic control subjects was 223. The LI correlated much more closely than the MAGE with the clinical assessment of lability. A HYPO score of $\geq$1,047 (90th percentile) or an LI $\geq$433 mmol L^2 h^{-1} · $week^{-1}$ (90th percentile) indicated serious problems with hypoglycemia or glycemic lability, respectively. The islet transplant patients (n = 51) were 42.1±1.4 years old, with a duration of diabetes of 25.7±1.4 years. Islet transplant patients had a mean HYPO score of 1,234±184 pretransplant, which was significantly higher than that of the control subjects (p<0.001), which became negligible post-transplantation with the elimination of hypoglycemia. The median LI pretransplant was 497 mmol L^2 h^{-1} · $week^{-1}$ and fell to 40 within a month after the final transplant. In those who had lost graft function, the LI rose again.

Common clinical features were fever in 72%, LOC in 12%, anorexia in 67%, syncope in 45%, AMS in 26%, FND in 34%, fall in 31% and others in 27% patients. Ashwell *et al*.[16] found that the patients had a median age of 35 years and were 52% women. All patients used multiple daily insulin injections, and none of them used insulin pumps or sensors. Patients with severe hypoglycemia were older, had lower education level and longer diabetes duration and used beta-blockers more often than those without severe hypoglycemia. Patients with severe hypoglycemia (versus those without this complication) also had a higher prevalence of positive screening for common mental disorders (88% vs. 77%, respectively, p = 0.027), as well as more symptoms of depression, anxiety, somatic signs and social withdrawal. Additionally, the median DTSQs score was lower in patients with severe hypoglycemia compared with those without this complication.

Common causes of hypoglycemia was alcohol in 15%, skipped meal in 10%, insulin in 25%, OHA in 20%, OHA +insulin in 17% and others in 13% cases. Su *et al*.[17] found that there were 228 hypoglycemic patients (112 women and 116 men, ranging in age from 22-93 years, mean 69.6 years) identified for the study. These patients had hypoglycemia mainly due to excessive use of sulfonylureas or insulin. There was a diabetic history in 182 patients (79.83%). Other primary etiologies of acute hypoglycemia were sepsis in 13 (5.70%) and extensive liver disease in 13 (5.70%).

Amin *et al*.[17] compared the characteristics of symptoms of hypoglycemia in children and in adults with type 1 diabetes. Sixty-six children (49.2% males, mean age = 12.1±2.4 years, mean age at diagnosis = 7.5±2.9 years) and 53 adults (41.2% males, mean age 38.7±14.5 years, mean age at diagnosis = 17.5±12.9 years) with type 1 diabetes participated. The most common symptoms in adults were hunger, sweating, trembling and weakness. The most common symptoms in children were weakness, trembling and hunger. The 2 most discriminating variables between children and adults were tiredness and sleepiness which were more common in children (p<0.01).

Pratley *et al*.[18] determined whether continuous glucose monitoring is effective in reducing hypoglycemia compared with standard blood glucose monitoring (BGM) in older adults with type 1 diabetes. Of the 203 participants (median age, 68 [interquartile range {IQR}, 65-71] years, median type 1 diabetes duration, 36 [IQR, 25-48] years; 52% female; 53% insulin pump use; mean HbA1c, 7.5% [SD, 0.9%]), 83% used CGM at least 6 days per week during month 6. Median time with glucose levels less than 70 mg dL^{-1} was 5.1% (73 minutes per day) at baseline and 2.7% (39 min per day) during follow-up in the CGM group vs 4.7% (68 min per day) and 4.9% (70 min per day), respectively, in the standard BGM group (adjusted treatment difference, -1.9% (-27 minutes per day), 95% CI, -2.8% to -1.1% [-40 to -16 min per day], p<.001). Of the 31 prespecified secondary end points, there were statistically significant differences for all 9 CGM metrics, 6 of 7 HbA1c outcomes, and none of the 15 cognitive and patient-reported outcomes. Mean HbA1c decreased in the CGM group compared with the standard BGM group (adjusted group difference, -0.3%; 95% CI, -0.4% to -0.1%, p<.001). The most commonly reported adverse events using CGM and standard

BGM, respectively, were severe hypoglycemia (1 and 10), fractures (5 and 1), falls (4 and 3) and emergency department visits (6 and 8).

CONCLUSION

Common causes of hypoglycemia were skipped meal, alcohol, OHA, OHA +insulin and insulin. The most common clinical features were AMS, FND, anorexia, fever, LOC and syncope.

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