



Research Article

PROFILE OF HYPOGLYCEMIA PATIENTS ADMITTED IN A GENERAL HOSPITAL WITH THEIR MORBIDITY AND MORTALITY PATTERNS

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ABSTRACT

Objective: The present study was conducted to find the patterns of morbidity & mortality in patients who are admitted with hypoglycaemia in our hospital. It gives us information about the overall profile of such patients in our general hospital. We conducted this study as the trend of hypoglycaemic admissions is not matching the reducing rate of hyperglycaemia admissions.

Methods: In this prospective study, all such patients who were admitted in our medicine ward with hypoglycaemia in Sri Maharaja Hari Singh hospital [SMHS] (associated hospital of Government Medical College, Srinagar) were studied over a period of 10 months. A total of 70 patients were admitted with hypoglycaemia during this time period. These patients were studied for their presenting complaints, residence and gender distribution, diabetes status and complications, comorbidities, diagnoses and length of hospital stay.

Results: A total of 70 patients were admitted with hypoglycaemia during the study period. Out of these, 9 were non diabetic and the rest were diabetic. Among our patients, we had 36 males and 34 females. The most common cause of admission in these patients with hypoglycaemia was infections (pneumonias followed by urinary tract infection), followed by acute on chronic renal failure and seizures. The comorbidity associated with majority of patients was hypertension, chronic kidney disease and anaemia, followed by cardiovascular disease (in the form of old myocardial infarction) and stroke. 10 patients (14.28%) out of 70 died. The most common cause of death was sepsis followed by acute on chronic renal failure and acute exacerbation of COPD (chronic obstructive pulmonary disease).

Conclusion: Admissions due to hypoglycaemia in patients with diabetes in our hospital are mostly because of infections followed by chronic renal failure. We need to lower the hypoglycaemic events by individualising treatment among patients with diabetes.

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INTRODUCTION

Hypoglycemia is an acute complication of diabetes and an endocrine emergency. It is associated with increased morbidity, mortality and duration of stay in hospital [1],[2], so accurate diagnosis and early treatment will improve the prognosis [3]. With increasing focus on reduction of hyperglycaemia, the trend towards developing hypoglycaemia is increasing. The relation between dysglycaemia and mortality has been shown to follow a U-shaped or J-shaped curve with increased risk of death at both extremes [4]. There have been various studies on hospitalization for hypoglycaemia in diabetic patients [5]. The most common symptoms during hypoglycaemia are used in the Edinburgh Hypoglycemia Scale and are divided into autonomic, neuroglycopenic and general symptoms.

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Autonomic symptoms occur due to sympatho-adrenal stimulation, while neuroglycopenic symptoms result from cerebral glucose deprivation [6].

The clinician should be alerted by a value of blood glucose <70 mg/dl (3.9 mmol/l). This level is recommended by the ADA, the American Association of Clinical Endocrinologists, the Endocrine Society, and by the Joint British Diabetes Society and Diabetes UK [7].

Hypoglycaemia most commonly occurs in patients with diabetes commonly due to overdose of anti-diabetic drugs, less calorie intake, malnutrition [8],[9], excessive exercise, prolonged starvation, and development of renal or hepatic failure [10]. Hypoglycemia can result from underlying medical illness, even in the absence of antidiabetic agents. Hypoglycemia in patients without diabetes can occur due to sepsis, liver diseases, malnutrition, alcohol-related diseases, malignancies, postgastrectomy syndrome, and endocrine disorders [11],[12].

Elderly patients are especially at risk for hypoglycemia because of intensive glucose management, presence of hypoglycaemia associated autonomic failure, organ failure (e.g., chronic kidney disease, congestive heart failure and liver failure) and polypharmacy. Hypoglycemia is known to be fatal [13]. Prolonged and severe hypoglycemia can cause brain injury, but most cases of fatal hypoglycemia have been attributed to ventricular arrhythmias, resulting in the 'dead in bed syndrome' [13]. The association between low blood glucose and mortality is reported to be related to 'spontaneous hypoglycemia' rather than iatrogenic one, thus hypoglycemia may be considered as a biomarker of disease severity [4],[14]. All hypoglycaemic events cannot be avoided despite the best efforts of patients and physicians but by identifying the risk factors like age, these events can be reduced. This demands the individualized patient care advocated by the American Diabetes Association (ADA) / European Association for the Study of Diabetes [15].

MATERIAL AND METHODS

In this prospective study, all such patients who were admitted in our medicine ward with hypoglycaemia in Sri Maharaja Hari Singh hospital [SMHS] (associated hospital of Government Medical College, Srinagar) were studied over a period of 10 months. A total of 70 patients were admitted with hypoglycaemia during this time period. These patients were studied for their presenting complaints, diabetes status and complications, comorbidities, diagnoses, duration of hospital stay, residence and gender distribution. Patients who had hypoglycaemic episodes during hospitalisation (in-hospital hypoglycaemia) were not included in the study.

Definitions applied

Glucose levels to describe hypoglycaemia were taken as per

ADA statement

As per ADA, hypoglycemia is taken as a glucose value of less than or equal to 70 mg / dL.

RESULTS

This study gives us information regarding multiple variables including age, sex, blood glucose levels, diagnoses, symptoms, drugs, complications and survival status among patients admitted with hypoglycaemia. A total of 70 patients were admitted with hypoglycaemia during the study period of 10 months duration. Out of these, 9 (12.8%) were non diabetic and rest were diabetic. There were 36 males and 34 females [Table 1].

Table 1 Patient characteristics

	n	%	n	%
Gender (Male / Female)	36	51.4	34	48.6
Residence (Rural / Urban)	45	64.2	25	35.8

25 patients were from urban and 45 from rural areas. The age distribution of our patients is shown in Table 2.

Table 2 Age distribution of patients admitted with hypoglycaemia

Age in years	Male	Female	Total
20 -39	4	4	8
40 -59	12	14	26
60 - 79	20	9	29
> 80	0	7	7

The most common cause of admission (precipitating factor for hypoglycaemia) was infections (pneumonia (9 patients) followed by urinary tract infection (8 patients)), followed by acute on chronic renal failure (6 patients) and seizures (5 patients). The most common symptoms on admission were neuroglycopenic.

The presentation of majority of our patients (39 out of 70) was encephalopathy or alteration in sensorium, followed by seizures (in 6 out of 70) [Table 3].

Table 3 Presentation of patients with primary diagnosis of hypoglycaemia.

Symptoms	n	%
Encephalopathy	39	55.7
Seizures	6	8.5
Other symptoms	25	35.7

The duration of hospital stay among patients is shown in Table 4.

Table 4 Duration of Hospital stay among patients

Duration of stay	No. of patients discharged	No. of patients expired
< 2 days	10	0
2 -5 days	22	7
> 5 days	28	3

The comorbidity associated with majority of patients was hypertension (30 out of 70 patients), chronic kidney disease (16 out of 70) and anaemia (16 patients), followed by cardiovascular disease (in the form of old myocardial infarction) (6 patients) and stroke (4 patients) [Table 5].

Table 5 Comorbidities among patients admitted with hypoglycaemia as primary diagnosis

Comorbidity	n	%
Hypertension	30	42.8
Chronic kidney disease	16	22.8
Anaemia	16	22.8
Old myocardial infarction	6	8.5
Old stroke	4	5.7

4 of our patients had encephalopathy attributed to multiple factors like hypoglycaemia, hypoxia, sepsis and uraemia. 3 patients presented with diabetic foot and 2 had a brittle type of diabetes. 2 patients had post hemodialysis alteration in sensorium attributed to hypoglycemia.

The blood glucose level on admission in our patients was (< 70 mg/ dL) as per the ADA definition for clinically significant hypoglycaemia. HbA1c < 7.0 % was seen in 30 patients (42.8 %) and >7.0% in 40 patients (57.1%) as shown in Figure 1.

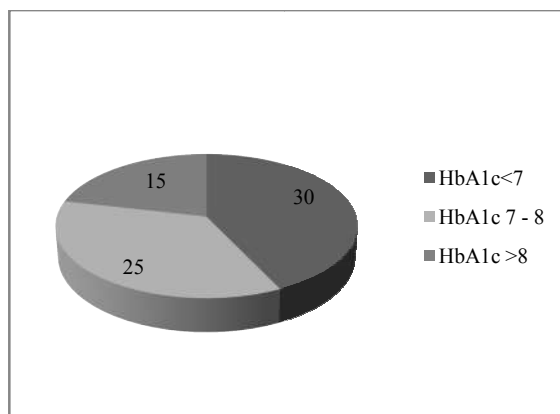


Figure 1 HbA_{1c} of patients admitted with hypoglycaemia as primary diagnosis.

5 out of 70 patients had no proteinuria, 50 had macroalbuminuria and 15 patients had microalbuminuria. 18 out of 70 patients (25.7%) were having tripathy. Retinopathy was documented in 30 patients (42.8%), nephropathy in 58 (82.8%) and neuropathy in 18 (25.7%). 28 out of 70 patients were on insulin whereas 33 out of 70 were on oral hypoglycaemic agents before admission.

Among the non diabetic patients, hypoglycaemia was seen in 1 patient with insulinoma, 1 with rodenticide poisoning and 7 patients with sepsis. 10 patients out of 70 (14.28%) died. The most common cause of death was sepsis (6 out of 10) followed by acute on chronic renal failure (3 out of 10) and acute exacerbation of COPD with type 2 respiratory failure (2 out of 10).

DISCUSSION

Hypoglycemia adversely affects outcomes of patients irrespective of diabetes. This has been shown in many previous studies also [16]. In order to reduce admissions due to hypoglycaemia, healthy and stable diabetic patients should be managed with strict glucose control while as the elderly and severely ill should be managed less aggressively. Prior studies [17],[18] have shown the admission rates for hypoglycaemia to be higher among older patients (≥ 75 years old) compared with younger patients (65–74 years old). However, in our study, we had increasing number of patients with increasing age upto 79 years of age, after which the number decreased.

Nouel *et al* [19] has reported hypoglycaemia in 50% of patients with cirrhosis and sepsis. Fischer *et al* [8] has reported 64 hypoglycaemic episodes due to low calorie intake and inappropriate insulin therapy in 42 diabetic patients. In 20 of these 42, hypoglycaemia was due to chronic renal failure. In our present study, infection had thrown these patients off balance in most cases of both diabetic and non diabetic individuals. Mortality in hypoglycaemia was reported as 4% to 27% in different studies [20]. In our study, the mortality was 14.28% (10 out of 70 patients died). Severe hypoglycemia in diabetic patients is linked to increased cardiovascular events and mortality [21],[22],[23]. As per Lipska *et al* [20], during 1999 to 2011, the rates of hospital admissions for hypoglycemia have risen by 11.7% in US Medicare beneficiaries and there were 40% more admissions for hypoglycemia than for hyperglycemia over the 12-year period. The 1-year mortality rate after an admission for hypoglycemia was higher (22.6%) than that after a hyperglycemia admission (17.6%) in 2010. So, we should avoid struggling for a very low hemoglobin A_{1c} target level and overtreating diabetes as it puts patients at risk for this dangerous adverse effect. A study by Asuncion MM *et al* has also shown an increase in hospitalization due to hypoglycemia in diabetic patients [24].

As per the study carried by Dr Francesco Zaccardi *et al*, [25] hospital admissions in England for hypoglycaemia increased by 39% in absolute terms and by 14% considering the general increase in hospitalisation over a period of 10 years. Due to the rising diabetes prevalence, ageing population, and costs of hypoglycaemia, individual and national initiatives should be implemented to reduce the burden of hospital admissions for hypoglycaemia.

CONCLUSION

Hypoglycemia has a significant negative relation with patient outcomes. Hospital admissions due to hypoglycaemia provide us an indirect comprehensive assessment of overall quality of diabetes management. Overall, in our hospital most of hypoglycaemia admissions are due to infections.

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