TO STUDY HYPOGLYCEMIA IN ELDERLY PATIENTS WITH DIABETES MELLITUS VISITING PMCH PATNA

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ABSTRACT:

Background: Diabetes mellitus is the most common metabolic disease in the aging population and is associated with increased morbidity, disability and premature death. As the prevalence of diabetes mellitus increases and as treatment guidelines call for more rigorous glycaemic control, rates of hypoglycaemia are also on the rise.**Objective**: The objectives of the study were to identify the risk factors, symptoms and outcome of hypoglycaemia in elderly diabetics.**Methods**: Patients with diabetes mellitus aged ≥60years with hypoglycaemia, admitted to the medicine wards of Patna Medical College Hospital Patna were studied with the above objectives. Age and sex matched diabetic patients who did not develop hypoglycaemia were taken as controls.**Results**: More than 50% of the patients were asymptomatic during the hypoglycaemic episode. In symptomatic patients, neuroglycopenic symptoms were more common than autonomic symptoms.The

risk factors for the development of hypoglycaemia which were identified in our patients were infection, renal failure, hepatic dysfunction, polypharmacy, recent change in dosage of antidiabetic medication, nutritional discordance, alcohol, drugs, HbA1c<6.5 and recent hospitalization.The study patients were compared with age and sex matched elderly diabetic patients without hypoglycaemia. By univariate analysis poor functional status, infection and renal failure were predictors of hypoglycaemia. Multivariate logistic regression showed that only functional status and infection were associated with a higher risk of hypoglycaemia. The outcome was good and all study patients recovered fully without sequelae.**Conclusions**: This study showed that asymptomatic hypoglycaemia was very common in elderly diabetic patients. The most common risk factors that were identified were polypharmacy, HbA1c<6.5, recent change in dose of hypoglycaemic drugs, infection and nutritional discordance.

INTRODUCTION :

Worldwide ageing' - a global phenomenon. Sir James Sterling Ross said: “You do not heal old age. You protect it; promote it; and extend it”. Therefore ageing is regarded as a normal, inevitable, biological phenomenon. The world's population is ageing. By the year 2025, the world's population will include more than 830 million people above the age of 65 years with the highest percentage of the population in the developed countries, but the absolute number will be higher in developing countries like India. With a comparatively young population, India is going to become home to the second largest number of older persons in the world. According to 1991 census, the population of the elderly in India was 57 million as compared to 324 million which is expected by year 2050.[1]

The prevalence of diabetes is continuously rising. Amongst the elderly age group, type 2 diabetes is a growing problem, and a larger proportion of newly diagnosed diabetics are elderly. Diabetes is a disease of chronicity , which appears to has powerful limiting potential for successful aging. Many ageing changes affect the clinical presentation of diabetes. These changes can make the diagnosis and treatment of diabetes problematic. It is observed that at least 50% of the elderly diabetics are unaware of they have the disease. Managing diabetes in the elderly

population is difficult because of complex comorbidities and the generally lower functional status of elderly[2].

This population is more at risk of developing diabetes-related complications like hypoglycemia ,renal failure and cardiovascular diseases, vision loss than younger people living with diabetes[2].As the prevalence of diabetes mellitus increases and as treatment guidelines call for more rigorous glycaemic control, rates of hypoglcaemia are on the rise.

Hypoglycemia is often a risk of diabetes treatment in the elderly. Hypoglycaemia has serious consequences in terms of mortality and morbidity.

Hypoglycaemia is the most common metabolic complication in elderly diabetics. Physiological changes due to aging itself can contribute to hypoglycaemia in the elderly. Comorbidities, polypharmacy, infections, organ failures, nutritional discordance are all known to contribute to hypoglycaemia in the elderly. Most of these patients do not present with overt symptoms of hypoglycaemia as compared to younger patients. The consequences of hypoglycaemia can be more serious in the elderly. Hence hypoglycaemia becomes a barrier for maintaining strict glycaemia control in these elderly patients.

MATERIALS AND METHODS:

Type of study : Case control study

Place of study : Department of medicine, PMCH, Patna , Bihar

Duration of study : Two year (January 2019- December 2020)

Inclusion criteria :

1. Age ≥60 years
2. Known case of diabetes mellitus
3. Blood sugar of < 60mg/dl. This will include patients who will be admitted with

hypoglycaemia and will develop hypoglycaemia in the hospital.

Exclusion criteria :

1. Non diabetic patients
2. Diabetic patients with age <60 years

3. Patients with malignancy

Controls :

Age and sex matched diabetic patients ≥60 years who will be admitted during the same period.

Number of patients :

No of cases: 50

No of controls: 50

Product/Procedure/Investigations details :

Bloodood sugar random,fasting,post prandial, HbA1c

Statistical analysis:

Statistical analysis was done using SPSS software (Version 23) and the Statistical tools in Microsoft Excel 2010. Continuous data were presented as means and standard deviation (SD) or with 95% confidence intervals (CIs), Differences by groups were analyzed with Student's test for unpaired samples. Correlation has been established by univariate and multivariate analysis and linear regression analysis using Pearson correlation coefficient . p value lower than 0.05 was considered significant.

RESULTS:

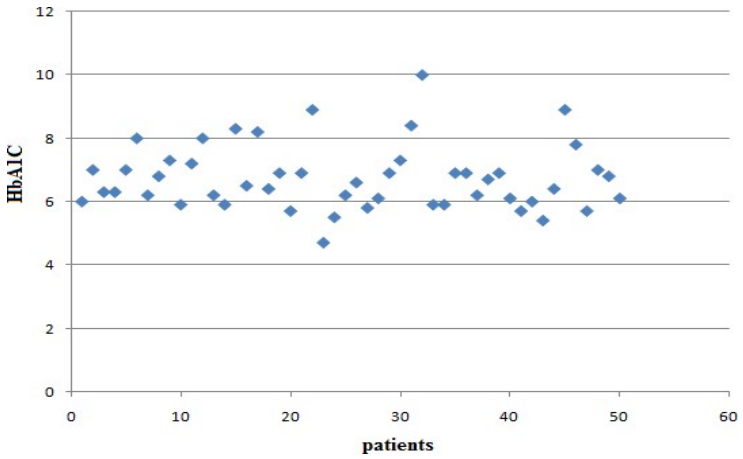
Fifty diabetic patients diagnosed to have hypoglycemia & 50 age & sex matched control diabetic patients without hypoglycemia were studied. Study patients included both patients admitted for a hypoglycemic episode as well as those that developed hypoglycemia after admission for an intercurrent problem.

Table 1: Age of the study patients

	Mean age (in years)	Age range (in years)	S.D
Age	72.98	62-87	6.78

Majority of the patients belonged to the young -old category (the age group of 60 to 75).

Figure 1: HbA1C of study patients



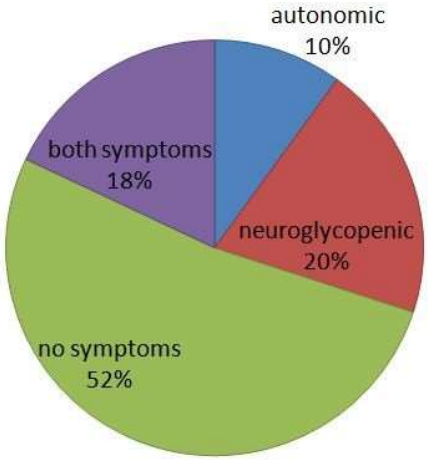
More than 50% of the study patients had an HbA1c < 7

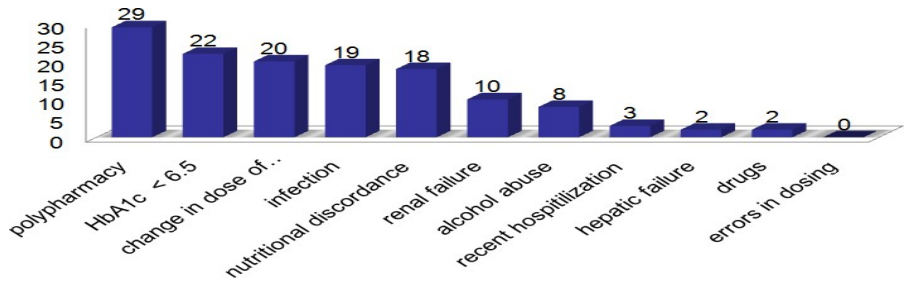
Table 2: Blood sugar levels during hypoglycemia

	Mean	Range(mg/dl)	SD
Blood sugar	40.06	21 - 60	10.698

Figure 2: Symptoms of hypoglycemia in study patients

Figure 3: Frequency of risk factors for hypoglycaemia among study patients:





The risk factors that were present in the study patients were polypharmacy, low HbA1c, change in the dose of insulin, nutritional discordance, renal failure, hepatic failure and drugs.

Table 3: Univariate analysis of precipitating factors among study and control patients:

	Study (no. of patients)	Control (no. of patients)	P value	Odd's ratio	Confidence interval
Infection	19	7	0.006	3.765	1.410-10.051
Hepatic dysfunction	2	0	0.247	-	-
Renal dysfunction	10	2	0.014	6.000	1.242-28.987
nutritional discordance	18	0	-	-	-
Increased dose of insulin	20	0	-	-	-

Infection and renal failure were predictors of hypoglycaemia in this study.

Table 4: Comparison of study & control groups using multiple logistic regression:

Variables		P value	Odd's ratio
Living condition		.999	.000
Medications	Sulphonylureas Metformin Sulphonylureas + metformin Insulin Insulin + metformin Insulin + sulphonylureas	1.000 1.000 1.000 1.000 1.000 1.000	3.0E + 010 3.1E + 010 1.7E + 010 7.1E + 009 1.2E + 010 1.7E + 010
Polypharmacy		.206	.411
Alcohol abuse		.576	.577
Functional status		.020	.074
Precipitating factors infection renal dysfunction hepatic dysfunction		 .007 .999 .589	 .112 .000 .522

By multiple logistic regression, functional status and infection were predictors of hypoglycaemia.

DISCUSSION:

The risk of hypoglycaemia increases exponentially with age.However, this could not be assessed in this study as majority of the patients belonged to the young old group.

HbA1c was significantly lower in the study group (mean HbA1c (6.73%) as compared to the control group (mean HbA1c 7.57%) which is statistically significant (p=0.001). This was similar to other studies in literature[3,4] & it is well documented that stricter the control of sugars greater the risk for hypoglycaemia.

In our study, out of the 50 patients who had hypoglycaemia, fifty two percent were asymptomatic, twenty percent had neuroglycopenic symptoms, ten percent had autonomic symptoms and eighteen percent had both neuroglycopenic and autonomic symptoms. Hence our study showed that more than half of our elderly diabetics were asymptomatic during the hypoglycaemic episodes. Also in our study neuroglycopenic symptoms were more frequent than autonomic symptoms. In a study done in Singapore[5], out of the 45 episodes of hypoglycaemia in elderly diabetics, all of whom were symptomatic, 40 patients presented with neuroglycopenic symptoms and only 5 patients presented with autonomic

symptoms. This is probably due to impaired cognition, reduced autonomic response and reduced adrenergic sensitivity causing hypoglycaemic unawareness.

Patients with a longer duration of diabetes are known to have asymptomatic hypoglycaemic episodes due to defect in counter regulatory hormones. In the UKPDS, almost 50% of patients experiencing hypoglycaemia without warning symptoms had diabetes mellitus for 25 years or more[6]. In our study, the mean duration of diabetes mellitus was 16.58 years in the asymptomatic patients as compared to symptomatic patients who had diabetes for an average of 7.54 years. This was statistically significant ($p = 0.023$). This study supports the hypothesis that a longer duration of diabetes mellitus is more likely to be associated with asymptomatic hypoglycaemia[7]. This is probably due to diminishing counterregulatory responses with increasing duration ofdiabetes.

Risk factors for the development of hypoglycaemia in elderly diabetics are well documented in literature. These risk factors include HbA1c < 6.5, multiple comorbidities, infection, nutritional discordance, hepatic failure, renal failure, polypharmacy, alcohol, drugs such as nonselective beta blockers and poor functional status. All these risk factors were identified in our study patients. The immediate factors that precipitated hypoglycaemia in our study patients were recent increase in insulin dosage, nutritional discordance, infection, renal failure and hepatic failure. Most patients had more than one precipitating factor. This finding is similar to other studies in literature [3,8,9,10].

CONCLUSION:

- Fifty diabetic patients with hypoglycaemia & 50 age & sex matched controls were studied for risk factors for hypoglycaemia, symptoms of hypoglycaemia & the outcome.

- Sixty four percent were in the young old category (60 – 75 years), thirty two percent were in the old old category (75-85) and four percent were in the oldest old category (>85).
- The mean duration of diabetes was longer in the study group than in the control group.

- The commonest risk factors for developing hypoglycemia in our study patients was infection (38%), nutritional discordance (36%), polypharmacy (58%), recent change in the dose of medications (40%) and HbA1c< 6.5(44%).

- BMI were significantly lower in the study group than in the control group (p = 0.035).

- Asymptomatic hypoglycaemia was common in the elderly diabetics. Over half the patients in the study group (52%) had no symptoms. In symptomatic patients, neuroglycopenic symptoms were more commonly encountered than autonomic symptoms.
- All the 50 patients recovered fully without sequel.

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