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A STUDY ON INSULIN GLARGINE IN THE TREATMENT OF ELDERLY PATIENTS WITH DIABETES

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Abstract:

Introduction: *The prevalence of diabetes is increasing in Taiwan.1, 2 Diabetes is highly prevalent in elderly people. The rate of prevalence is ~20% of the population aged ≥ 65 years in Taiwan, which presents a great burden to individuals, society, and health care services.*

Aims and objectives: *The basic aim of the study is to analyse the role of insulin glargine in the treatment of elderly patients with diabetes.*

Material and methods: *This cross sectional study was conducted in Saidu Medical College, Swat during January 2019 to July 2019. This study was conducted according to the ethical committee of hospital. The data was collected from 100 diabetic patients. We compare this data to the control patients. Both groups received conventional treatment.*

Results: *The data was collected from 100 patients of both genders. We analyzed the factors between the patients with and without hypoglycemic control. It shows that the body mass index (BMI) at baseline was significantly lower in the patients with hypoglycemic episodes than in the patients without hypoglycemic episodes. In addition, the body weight gain after 24 weeks of insulin glargine in the patients with hypoglycemic episodes was significantly higher than that in the patients without hypoglycemic episodes.*

Conclusion: *It is concluded that initiating basal insulin therapy with insulin glargine in elderly patients with OAD may provide effective glycemic control on HbA1c and FPG similar to those in younger patients.*

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INTRODUCTION:

The prevalence of diabetes is increasing in Taiwan.1, 2 Diabetes is highly prevalent in elderly people. The rate of prevalence is ~20% of the population aged ≥ 65 years in Taiwan, which presents a great burden to individuals, society, and health care services. The management of elderly patients with type 2 diabetes mellitus (T2DM) has become more complicated because of age-related physiological changes and the impact of comorbidities, complications and hypoglycaemia [1].

Recently, long-acting insulin analogues were designed to mimic physiological basal insulin secretion. Insulin glargine has been well proven, in addition to oral agents, to control fasting blood glucose with a low risk of hypoglycemia. In clinical practice, basal insulin is a common choice for insulin initiation in patients with T2DM uncontrolled with oral antidiabetic drugs (OAD) [2]. However, there was limited data to compare effectiveness and tolerability of basal insulin therapy in elderly population versus the younger population in clinical practice.

Several studies have shown that high blood sugar (glucose) levels are associated with diseases caused by diabetes [3]. Controlling the glucose may prevent these complications. As people age, their bodies become unable to make enough insulin to control the blood sugars. Pills used to treat diabetes may help for a while, but many times this does not last. When the blood sugar is too high, insulin is frequently recommended and used to treat diabetes. Insulin is often started by adding a long-acting insulin to the medicines a patient already takes. In this study, glargine insulin will be taken together with the diabetes pills currently being used [4]. Glargine is a long-acting insulin which is given under the skin once a day. Glargine is approved for use in the treatment of patients with diabetes by the FDA (Food and Drug Administration) [5].

Currently, insulin delivery is only available as a shot. The purpose of this study is to compare how satisfied patients are when using two different types of insulin shots. Specifically, this study aims to determine if people over 65 years old are more satisfied taking insulin shots by pens or syringes [6]. Everyone who joins in this study will have a chance to use the insulin syringes and the insulin pens.

Aims and objectives

The basic aim of the study is:

- To analyse the role of insulin glargine in the treatment of elderly patients with diabetes.

MATERIAL AND METHODS:

This cross sectional study was conducted in Saidu Medical College, Swat during January 2019 to July 2019. This study was conducted according to the ethical committee of hospital. The data was collected from 100 diabetic patients. We compare this data to the control patients. Both groups received conventional treatment.

Data collection:

On that basis, patients in the control group were subcutaneously injected with insulin glargine 10 U each time, once a day, and the dose was adjusted according to the actual blood glucose level of patients. Patients in the observation group were given insulin glargine combined with acarbose. The dosage of insulin glargine was the same with the control group. Acarbose was orally administrated, 50 mg each time, three times each day. The dose was gradually increased to 100 mg each time. Patients in both groups were treated for three months. The blood glucose control of the two groups before and after treatment was recorded, and the pre-treatment and post-treatment levels of fasting blood glucose (FBG), two hour postprandial blood glucose (PBG) and glycosylated hemoglobin (Hb Alc), the time needed for reaching the standard level of blood glucose and the daily insulin dosage of the two groups were analyzed and compared.

Statistical analysis

The data were processed using SPSS 21.0. Measurement data were expressed by mean±SD and processed by t test. Enumeration data were expressed by n (%) and processed by Chi-square test.

RESULTS:

The data was collected from 100 patients of both genders. We analysed the factors between the patients with and without hypoglycaemic control. It shows that the body mass index (BMI) at baseline was significantly lower in the patients with hypoglycemic episodes than in the patients without hypoglycemic episodes. In addition, the body weight gain after 24 weeks of insulin glargine in the patients with hypoglycemic episodes was significantly higher than that in the patients without hypoglycemic episodes.

Table 01: Comparison of patients with and without hypoglycemic episodes.

Variable	Patients with hypoglycemia	Patients without hypoglycemia	*p*
Age (y)	56.4 ± 14.0	62.1 ± 11.8	0.276
Sex			0.070
Male	88.9 (8)	54.0 (34)	
Female	11.1 (1)	46.0 (29)	
Weight (kg)	60.2 ± 8.1	66.8 ± 14.0	0.059
BMI (kg/m^2)	21.9 ± 2.9	25.7 ± 4.7	0.004
Diabetes duration (y)	12.2 ± 7.6	12.1 ± 5.9	0.954
Diabetic nephropathy at baseline	11.1 (1)	20.6 (13)	0.675
Baseline HbA1c	10.66 ± 1.93	10.02 ± 1.86	0.373
Baseline FPG (mg/dL)	225.1 ± 73.1	238.6 ± 68.0	0.611
OAD types before basal insulin	2.89 ± 0.78	2.87 ± 0.91	0.956
OAD types with basal insulin	2.22 ± 0.83	1.67 ± 0.90	0.091
HbA1c at Week 24 (%)	8.48 ± 2.15	8.78 ± 1.33	0.688
FPG at Week 24 (mg/dL)	144.7 ± 64.0	149.8 ± 57.8	0.824
Daily dose at Week 24 (U)	19.7 ± 8.7	26.1 ± 11.2	0.069
Daily dose at Week 24 (U/kg)	0.30 ± 0.11	0.38 ± 0.14	0.056
Change in HbA1c (%)	−2.18 ± 1.90	−1.23 ± 1.95	0.194
Change in FPG (mg/dL)	−80.4 ± 55.5	−88.8 ± 84.3	0.699
Change in body weight (kg)	+4.7 ± 3.4	+1.2 ± 2.0	0.014

Data are presented as % (*n*) or mean ± SD.

DISCUSSION:

In elderly patients with T2DM, addition of once-daily basal insulin with insulin glargine is a simple regimen to initiate insulin therapy. The results presented here demonstrate that initiation of insulin glargine in patients aged ≥ 65years inadequately controlled on OAD could provide similar effectiveness on glycemic control to younger patients [7]. The HbA1c and the FPG were significantly reduced after a 24-week treatment of insulin glargine in both groups. The rates of hypoglycemia were low and did not differ markedly in the older patients and the younger patients. Only one severe hypoglycemic event occurred in the younger group [8].

Insulin glargine is a long-acting human insulin analogue produced by gene recombination technology and can simulate human basic insulin secretion. Its solubility in neutral solution is low. After subcutaneous injection, insulin glargine can be neutralized to form fine sediments which can steadily release insulin glargine to keep a stable blood concentration. The blood glucose concentration is maintained stable in that period, and there is no peak blood concentration [9]. Numerous clinical studies have shown that insulin glargine therapy could effectively reduce the incidence of hypoglycemic events compared with premixed insulin and intermediate-acting insulin.

Pathogenic factors of diabetes include genetic factors, environmental factors and physiological aging, resulting in insulin secretion or utilization disorders. Diabetes may lead to a variety of cardiovascular diseases due to long-term impairment of glucose metabolism and high blood glucose level [10]. In addition, poor long-term glycemic control often results in peripheral neuropathy. Poor glycemic control can also affect important organs, which will aggravate the deterioration of diabetic patients and even affect life safety.

In the past, insulin therapy was the main therapy to effectively control blood glucose level and reduce complications [11]. Because of the need for long-term use, the application of single drug may weaken the effect of treatment. Elderly patients have weak constitution and poor immunity, and most of them also suffer from chronic diseases such as hypertension or hyperlipidemia. In order to effectively control blood glucose level for a long time and reduce complications as far as possible, two drugs are combined together usually [12].

CONCLUSION:

It is concluded that initiating basal insulin therapy with insulin glargine in elderly patients with OAD may provide effective glycemic control on HbA1c and FPG similar to those in younger patients. The rates of

hypoglycemia and tolerability profiles are comparable in elderly and younger patients.

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