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Clinical Value of Glibenclamide Combined with Metformin in the Treatment of Diabetes Mellitus in the Elderly

Jiawei Zhang, Yinyin Chen*
Department of Geratology and Special Hospital Ward, Affiliated Hospital of Hebei University, Baoding 071000, Hebei, China

***Corresponding author:** *Yinyin Chen, Chenyinyin0219@163.com.*

Abstract: This study investigated the clinical efficacy of glimepiride combined with metformin in elderly diabetic patients. A total of 120 elderly diabetic patients admitted to our hospital between March 2023 and June 2025 were enrolled. Using a randomized block design, the patients were divided into two groups for prospective analysis. The control group received metformin monotherapy, while the observation group received glimepiride combined with metformin. Comparative analyses demonstrated that both groups showed lower fasting blood glucose levels ($P<0.05$) and lower 2-hour postprandial glucose levels ($P>0.05$). The combined treatment also showed significantly better glycemic control than metformin monotherapy, with no increased risk of adverse reactions observed. The study concluded that glimepiride combined with metformin effectively managed blood glucose levels in elderly diabetic patients without increasing adverse effects.

Keywords: Glimepiride tablets; Metformin tablets; Elderly diabetes; Clinical effect

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1. Introduction

Metformin serves as the cornerstone medication for type 2 diabetes management. However, clinical studies in elderly patients have shown that its monotherapy often fails to achieve optimal glycemic control due to comorbidities and suboptimal medication adherence [1]. To address this, our study investigated the combined therapeutic effect of glimepiride and metformin on blood glucose levels and renal function parameters in elderly diabetic patients. The findings are presented below.

2. Data and methods

2.1. General information

This study enrolled 120 elderly diabetic patients treated at our hospital, with admission dates ranging from March 2023 to June 2025. Participants were randomly divided into two groups using a randomized number table method, all voluntarily enrolled in the study for prospective analysis. The control group consisted of 60 patients (34 males and 26 females), aged

60-88 years with an average age of (69.42±3.55) years. The comparison group included 60 patients (37 males and 23 females), aged 60-88 years with an average age of (69.48±3.62) years. Baseline data comparison between groups showed no significant difference (P>0.05). The study was approved by the hospital's ethics committee.

Inclusion criteria:(1) the comprehensive clinical diagnosis of hematology and other clinical diagnosis is consistent with the diagnostic criteria of type 2 diabetes mellitus in China's Guidelines for the Prevention and Treatment of Type 2 Diabetes mellitus; (2) the treatment drugs involved in this study are tolerated; (3) complete clinical data.

Exclusion criteria:(1) patients with mental illness; (2) patients with severe valvular heart disease; (3) patients with neuropathy; (4) patients with retinopathy; (5) patients with severe liver impairment.

2.2. Methodology

In the control group, metformin tablets (manufacturer: Shanghai Shangyao Xinyi Pharmaceutical Co., LTD. National Drug Approval No. H31021130, specification: 0.25g) were taken orally with meals once a day in the morning and evening, and each dose was 0.25g.

In the observation group, glibenclamide tablets (manufacturer: Shandong Dainian Marine Biological Pharmaceutical Co., LTD. National Drug Approval No. H20010569, specification: 2mg) were added to the control group treatment once orally half an hour before breakfast every day, and each dose was 2mg.

All patients received one month of treatment, with blood glucose levels monitored during the course of treatment and dosage adjusted as needed based on monitoring results.

2.3. Observation indicators

The improvement of blood glucose (postprandial 2h blood glucose and fasting blood glucose) before and after treatment was compared between the two groups. 3mL venous blood was collected before and after treatment in a fasting state, centrifuged, and the indicators were measured by an automatic biochemical analyzer[2].

The incidence of adverse reactions (headache, gastrointestinal discomfort, rash) during the two groups was compared.

2.4. Statistical processing

Statistical analysis was calculated by SPSS 27.0 software, with n (%) for count data and (mean ± standard deviation) for measurement data. The intergroups were respectively tested by (χ^2 test and t test). P <0.05 was statistically significant.

3. Results

3.1. Comparison of blood glucose level differences between the two groups

Before treatment, the values of fasting blood glucose and 2h postprandial blood glucose in the two groups were compared (P>0.05); after treatment, the values of fasting blood glucose and 2h postprandial blood glucose in the two groups were compared, and the observed group was lower (P<0.05). Details are shown in **Table 1**.

Table 1. Comparison of blood glucose level difference between the two groups(mean ± standard deviation, mmol/L)

group	fasting blood-glucose		H2GPA	
	pretherapy	post-treatment	pretherapy	post-treatment
Control group (n = 60)	7.28±0.45	6.29±0.41	11.09±1.84	9.72±1.32
Observation group (n = 60)	7.31±0.48	5.53±0.37 △	11.13±1.87	8.13±0.65 △
t	0.353	10.660	0.118	8.371
P	0.725	0.000	0.906	0.000

Note: Compared with before treatment, △ P <0.05

3.2. Comparison of the incidence of adverse reactions between the two groups during treatment

After treatment, the total incidence of adverse reactions in the two groups was compared (P> 0.05). See **Table 2** for details.

Table 2. Comparison of incidence of adverse reactions during treatment in the two groups [n(%)]

group	headache	upset	erythra	Overall adverse reaction rate
Control group (n = 60)	1 (1.67)	1 (1.67)	1 (1.67)	3 (5.00)
Observation group (n = 60)	1 (1.67)	2 (3.33)	1 (1.67)	4 (6.67)
χ^2				0.157
P				0.692

4. Discussion

Diabetes is an endocrine disorder caused by impaired glucose metabolism, clinically characterized by persistent hyperglycemia. Among diabetes subtypes, type 2 diabetes has the highest prevalence. Studies[3] indicate that over 50% of patients with type 2 diabetes exhibit significant pancreatic β-cell dysfunction at diagnosis, and this damage progressively worsens despite standardized antidiabetic treatment regimens. Therefore, strict adherence to prescribed medication regimens is crucial for disease management. Clinical evidence[4-5] demonstrates that lifestyle modifications or monotherapy often fail to achieve optimal blood glucose control targets, necessitating combination therapy regimens for most patients.

This study demonstrated that after treatment, the fasting blood glucose and 2-hour postprandial glucose levels in the observation group were significantly lower than those in the control group (P<0.05). The incidence of adverse reactions showed no significant difference between the two groups (P>0.05). These findings indicate that the treatment protocol in the observation group achieved better therapeutic outcomes without increasing treatment risks. Analysis revealed that Glibenclamide selectively acts on sulfonylurea receptor subunits on the β-cell membrane surface of pancreatic islets. By regulating ATP-sensitive potassium channels, it induces cell membrane depolarization and activates voltage-dependent calcium channels, ultimately triggering the exocytosis of insulin granules. This mechanism significantly enhances insulin release capacity and markedly improves blood glucose control[6]. Additionally, the drug demonstrates good tolerability, and combination therapy does not increase treatment risks.

In conclusion, the combination of glimepiride and metformin can effectively control the blood glucose of elderly diabetic patients and has good therapeutic safety.

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Disclosure statement

The author declares no conflict of interest.

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