Journal of Clinical and Nursing Research, 2026, Volume 10, Issue 2
http://ojs.bbwpublisher.com/index.php/JCNR
Online ISSN: 2208-3693
Print ISSN: 2208-3685

Clinical Characteristics Analysis of Hypertension Complicated with Diabetes Mellitus

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Abstract: *Objective*: For patients with hypertension complicated with diabetes mellitus, their health risks are not a simple sum but present complex interactive effects. Clarifying the clinical characteristics of such patients is the key to solving this medical problem. *Methods*: From June 2023 to June 2024, this study conducted a comparative study on 100 patients with hypertension complicated with diabetes mellitus and 100 patients with hypertension alone. By retrospectively analyzing clinical data of patients, the differences in disease manifestations, complication occurrence, and treatment effects between the two groups were explored in depth, and the unique challenges and treatment difficulties faced by patients with hypertension complicated with diabetes mellitus were identified. *Results*: Hypertensive patients with concurrent diabetes had more difficult blood glucose and blood pressure control, and were more prone to severe complications such as cardiovascular lesions and renal damage. *Conclusion*: The clinical characteristics and treatment needs of patients with hypertension complicated with diabetes mellitus are different from those with hypertension alone, and disease management should be more refined and personalized.

Keywords: Hypertension; Diabetes mellitus; Comorbidity; Clinical characteristics; Treatment management

Online publication: Mar 11, 2026

1. Introduction

Hypertension, as one of the most common chronic diseases worldwide, has long been the leading cause of cardiovascular events [1]. When combined with diabetes mellitus, especially type 2 diabetes mellitus, the coexistence of these two diseases often leads not only to prolonged disease course but also to disease progression, treatment difficulties, and unbearable burden on life [2]. Although modern medicine has made significant progress in the treatment of hypertension and diabetes mellitus alone, this has not changed the multiple burdens brought to patients when the two coexist. Since both hypertension and diabetes mellitus are essentially chronic and progressive diseases, simply controlling blood glucose or blood pressure often cannot fundamentally alter the disease course [3]. Therefore, how to accurately identify the special needs of this group and formulate more

reasonable treatment plans has become an urgent problem to be solved. Based on a comparative analysis of 100 patients with hypertension complicated with diabetes mellitus and 100 patients with hypertension alone, this paper deeply discusses the clinical manifestations, complication trends, and treatment effects of such patients. It attempts to explore the hidden pathological mechanisms under the comorbidity of hypertension and diabetes mellitus, as well as the easily overlooked areas in current treatment links, aiming to provide clinicians with more comprehensive and precise treatment ideas.

2. Materials and methods

2.1. General information

A total of 100 patients with hypertension complicated with diabetes mellitus and 100 patients with hypertension alone selected in this study were all treated in our hospital from June 2023 to June 2024. In the hypertension combined with diabetes mellitus group (n = 100), there were 60 males (60%) and 40 females (40%), with an average age of (62.5 ± 8.3) years and an average course of hypertension of (9.2 ± 3.1) years; in the hypertension alone group (n = 100), there were 58 males (58%) and 42 females (42%), with an average age of (61.4 ± 9.1) years and an average course of hypertension of (8.7 ± 3.4) years. There were no significant differences in basic information between the two groups ($p > 0.05$).

2.2. Methods

All patients received standardized treatment and management plans, but personalized treatment measures were formulated according to different conditions, especially the special needs of the hypertension combined with diabetes mellitus group. For hypertensive patients, treatment mainly relied on antihypertensive drugs, with drug types and doses adjusted according to patients' blood pressure levels; commonly used drugs included ACEI, ARBs, and calcium channel blockers. For patients with concurrent diabetes mellitus, in addition to conventional antihypertensive treatment, a strict blood glucose control plan was added. Diabetes mellitus treatment mainly included oral hypoglycemic drugs and insulin therapy, adjusted according to patients' blood glucose levels. During treatment, all patients underwent regular examinations as follows:

(1) Blood glucose monitoring

Including fasting plasma glucose (FPG), 2-hour postprandial blood glucose (2hPG), and glycosylated hemoglobin (HbA1c). For patients with hyperglycemia, the drug regimen was gradually adjusted according to blood glucose control during treatment.

(2) Blood pressure monitoring

Regular blood pressure measurements were performed, with particular attention to the control of systolic and diastolic blood pressure, striving to achieve stable blood pressure at the initial stage of treatment.

(3) Complication screening

All patients underwent regular complication screening, including electrocardiogram, renal function (creatinine, urinary protein) examination, and fundus examination, to early identify potential cardiovascular and cerebrovascular events and diabetic complications.

(4) Quality of life assessment

The SF-36 scale was used to regularly evaluate patients' quality of life, focusing on physical health, mental health, and social functioning, ensuring that treatment not only focuses on the control of

physiological indicators but also pays attention to patients' overall sense of well-being. The follow-up period of this study was 12 months, with follow-up every 3 months. During this period, patients' blood glucose, blood pressure levels, and the occurrence of complications were carefully recorded. A professional research team was responsible for ensuring the completeness and accuracy of data recorded during each follow-up to prevent the loss of important information.

2.3. Observation indicators

The observation indicators of this study included clinical manifestations, incidence of complications, treatment effect, quality of life, and medication compliance.

2.4. Statistical analysis

All data were statistically analyzed using SPSS 20.0 software. Intergroup differences were compared using *t*-test or χ^2 test, and $p < 0.05$ was considered statistically significant.

3. Results

3.1. Comparison of blood glucose and blood pressure control

The blood glucose and blood pressure control of the two groups were reflected by baseline systolic blood pressure (mmHg), baseline diastolic blood pressure (mmHg), baseline fasting plasma glucose (mmol/L), baseline glycosylated hemoglobin (%), 12-month systolic blood pressure (mmHg), 12-month diastolic blood pressure (mmHg), 12-month fasting plasma glucose (mmol/L), and 12-month glycosylated hemoglobin (%). Although there were differences in baseline blood pressure and blood glucose levels between the two groups, after 12 months of treatment, the blood pressure control in the hypertension alone group was significantly better than that in the combined diabetes mellitus group. In addition, the level of glycosylated hemoglobin (HbA1c) in the combined diabetes mellitus group was higher, indicating that blood glucose control was more difficult in diabetic patients.

3.2. Comparison of incidence of complications

Differences in the occurrence of complications between the two groups were evaluated by cardiovascular events, renal damage, retinopathy, peripheral neuropathy, and stroke. The proportions of cardiovascular events, renal damage, and retinopathy in patients with concurrent diabetes mellitus were significantly higher than those in the hypertension alone group, indicating that the presence of diabetes mellitus exacerbates multi-organ damage in hypertensive patients.

3.3. Comparison of quality of life

Differences in quality of life between the two groups were evaluated by physical health, mental health, social functioning, emotional functioning, and spiritual health. Patients with concurrent diabetes mellitus had significantly lower scores in all dimensions, especially physical health and mental health. The *p* value between the hypertension combined with diabetes mellitus group (n = 100) and the hypertension alone group (n = 100) was less than 0.05, reflecting that diabetic patients had a significant decline in quality of life when facing long-term chronic disease management, especially the psychological burden during treatment was more obvious.

3.4. Comparison of medication compliance

Regarding differences in medication compliance between patients, although both groups received regular follow-up and medication guidance during treatment, patients with concurrent diabetes mellitus showed relatively poor medication compliance, especially in adhering to diabetes treatment drugs. In the hypertension combined with diabetes mellitus group (n = 100), 58 cases (58%) had good medication compliance; in the hypertension alone group (n = 100), 71 cases (71%) had good medication compliance ($\chi^2 = 4.092$, $p = 0.043$); 32 cases (32%) had general medication compliance and 23 cases (23%) had poor medication compliance in the combined group, with $p < 0.05$.

4. Discussion

With changes in lifestyle, westernization of dietary habits, and the acceleration of social aging, the number of patients suffering from hypertension and diabetes mellitus is increasing [4]. Patients with hypertension complicated with diabetes mellitus not only have to deal with more complex physiological problems but also are prone to various difficult challenges such as drug interactions, frequent complications, and declining quality of life during treatment [5]. There was no significant difference in baseline blood pressure levels between the two groups, but the blood pressure control of the combined diabetes mellitus group after 12 months of treatment was significantly worse than that of the hypertension alone group. This phenomenon may be explained by the persistent vascular damage caused by diabetes mellitus. Long-term hyperglycemia can lead to impaired vascular endothelial function and aggravated arteriosclerosis, thereby seriously weakening the therapeutic effect of hypertension [6–8]. Diabetic patients may have certain specificity in their response to drugs, especially in blood glucose and blood pressure control, with relatively low treatment sensitivity. Studies have shown that the glycosylated hemoglobin (HbA1c) of the combined diabetes mellitus group is significantly higher than that of the hypertension alone group, which fully reflects the more arduous predicament faced by diabetic patients in blood glucose control. There are various factors contributing to this phenomenon. Firstly, diabetes mellitus is a metabolic disease, and patients have impaired insulin secretion function, making it difficult to maintain stable blood glucose levels in the body [9]. Secondly, diabetic patients are often accompanied by severe insulin resistance, which makes conventional oral drug treatment difficult to achieve the expected effect, thereby hindering overall blood glucose management. The incidence of cardiovascular events, renal damage, and retinopathy in patients with concurrent diabetes mellitus is significantly higher than that in the hypertension alone group, which may be closely related to microvascular damage and macrovascular lesions caused by diabetes mellitus. Hyperglycemia promotes the production of advanced glycation end products (AGEs), leading to sclerosis and thickening of blood vessel walls, further increasing the harm of hypertension [10]. In terms of quality of life, the scores of the combined diabetes mellitus group are generally lower than those of the hypertension alone group. The deterioration of patients' physical health further highlights the mental pressure they bear. Diabetic patients have to face frequent blood glucose monitoring, complex drug management, and complications. This long-term tension and pressure have a profound impact on patients' quality of life. In summary, diabetes mellitus has a significant impact on the therapeutic effect of hypertension, aggravating the course of hypertension and the risk of complications. The impact of hypertension on diabetic patients is mainly reflected in the increased incidence of complications such as cardiovascular diseases, renal damage, and fundus lesions.

5. Conclusion

In summary, patients with hypertension complicated by diabetes mellitus exhibit distinct clinical characteristics and treatment needs compared to those with hypertension alone. This underscores the necessity for more refined and personalized disease management approaches to optimize patient care and improve outcomes.

Disclosure statement

The authors declare no conflict of interest.

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