ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-515-x, Impact Factor: 9.23
American Academic publishers, volume 6, issue 02,2026

Journal: https://www.academicpublishers.org/journals/index.php/ijai

CARDIOVASCULAR DISEASE RISK IN PATIENTS WITH DIABETES MELLITUS

Ibrohimjonova Benazir
Faculty of Medicine, General Medicine
1st-year student, Kokand University Andijan Branch
E-mail: Benaziribrohimjanova@gmail.com

Ismoilov Alisher Polatjon ugli
Department of Teaching Languages in Medicine
E-mail: Ismoilovalisherbek9@gmail.com

Abstract

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Over recent decades, the global prevalence of diabetes has increased dramatically, making it a major public health concern. One of the most serious complications associated with diabetes is the heightened risk of cardiovascular diseases, including coronary artery disease, stroke, heart failure, and peripheral vascular disease. Cardiovascular complications remain the leading cause of morbidity and mortality among patients with both type 1 and type 2 diabetes.

The relationship between diabetes and cardiovascular disease is multifactorial and involves complex metabolic and vascular mechanisms. Chronic hyperglycemia promotes endothelial dysfunction, oxidative stress, inflammation, and dyslipidemia, thereby accelerating atherosclerosis. Moreover, diabetes is frequently associated with additional cardiovascular risk factors such as hypertension, obesity, and abnormal lipid profiles, further increasing disease burden.

This article reviews current scientific literature to evaluate cardiovascular disease risk in patients with diabetes mellitus, analyze underlying pathophysiological mechanisms, and summarize recent research findings related to prevention and management strategies. Understanding these mechanisms is essential for reducing complications and improving long-term outcomes in diabetic patients.

Keywords

Diabetes mellitus, cardiovascular disease, atherosclerosis, insulin resistance, hyperglycemia, endothelial dysfunction, hypertension, dyslipidemia.

Introduction

Diabetes mellitus is one of the most prevalent non-communicable diseases worldwide and poses a serious threat to global health systems. It is broadly classified into type 1 diabetes, resulting from autoimmune destruction of pancreatic beta cells, and type 2 diabetes, characterized by insulin resistance and relative insulin deficiency. Both forms of diabetes are associated with significant long-term complications affecting multiple organ systems.

Among these complications, cardiovascular disease represents the most severe and life-threatening outcome. Epidemiological evidence indicates that individuals with diabetes have a

ISSN: 2692-515-x, Impact Factor: 9.23
American Academic publishers, volume 6, issue 02,2026
Journal: https://www.academicpublishers.org/journals/index.php/ijai

two- to four-fold higher risk of developing cardiovascular disease compared to non-diabetic populations [3,4]. Cardiovascular events in diabetic patients tend to occur earlier and are often more severe, accounting for the majority of diabetes-related deaths.

The increased cardiovascular risk is not solely due to hyperglycemia but arises from a combination of metabolic abnormalities, including insulin resistance, chronic inflammation, oxidative stress, and lipid metabolism disorders. These factors collectively contribute to endothelial dysfunction and accelerated atherosclerosis. Given the growing prevalence of diabetes, understanding its relationship with cardiovascular disease is essential for developing effective prevention and treatment strategies.

Main Body

The pathogenesis of cardiovascular disease in diabetes involves a complex interaction of metabolic, inflammatory, and vascular mechanisms. Chronic hyperglycemia leads to the formation of advanced glycation end products, which damage vascular structures and enhance oxidative stress [6]. These changes impair endothelial function and promote vascular stiffness.

Insulin resistance, a hallmark of type 2 diabetes, plays a central role in cardiovascular risk development. It contributes to abnormal lipid metabolism, increased free fatty acid levels, and a pro-inflammatory state. Diabetic dyslipidemia—characterized by elevated triglycerides, reduced high-density lipoprotein cholesterol, and small dense low-density lipoprotein particles—is highly atherogenic [5].

Hypertension and obesity commonly coexist with diabetes and further exacerbate cardiovascular risk. Lifestyle factors such as physical inactivity, unhealthy diet, and smoking also significantly contribute to disease progression. Conversely, lifestyle modification, including regular physical activity and weight control, has been shown to reduce cardiovascular events [11].

Pharmacological interventions remain essential in cardiovascular risk management. Antihypertensive agents, statins, and antiplatelet therapy are widely used. Recent studies demonstrate that novel antidiabetic drugs, such as SGLT2 inhibitors and GLP-1 receptor agonists, provide additional cardiovascular protection beyond glycemic control [7,8].

Conclusion

Diabetes mellitus significantly increases the risk of cardiovascular disease and remains a leading cause of morbidity and mortality worldwide. The relationship between diabetes and cardiovascular disease is complex and involves metabolic, inflammatory, and vascular mechanisms. Evidence from epidemiological studies and clinical trials highlights the necessity of comprehensive cardiovascular risk management in diabetic patients.

Effective prevention requires an integrated approach that includes glycemic control, blood pressure regulation, lipid management, lifestyle modification, and the use of cardioprotective pharmacological agents. Early detection and multidisciplinary care are critical for improving long-term outcomes. Continued research and public health efforts are essential to reduce the global burden of diabetes-related cardiovascular disease.

ISSN: 2692-515-x, Impact Factor: 9.23
American Academic publishers, volume 6, issue 02,2026
Journal: https://www.academicpublishers.org/journals/index.php/ijai

References

1. American Diabetes Association. Standards of Medical Care in Diabetes—2024. *DiabetesCare*. 2024;47(Suppl 1):S1–S350.
2. World Health Organization. *Global Report on Diabetes*. Geneva: WHO; 2016.
3. Haffner S.M., et al. Mortality from coronary heart disease in subjects with type 2 diabetes. *N Engl J Med*. 1998;339(4):229–234.
4. Fox C.S., et al. Increasing cardiovascular disease burden due to diabetes mellitus. *Circulation*. 2004;110(12):1544–1550.
5. Grundy S.M., et al. Diabetes and cardiovascular disease. *Circulation*. 1999;100(10):1134–1146.
6. Emerging Risk Factors Collaboration. Diabetes mellitus and risk of vascular disease. *TheLancet*. 2010;375:2215–2222.
7. Zinman B., et al. Empagliflozin and cardiovascular outcomes in type 2 diabetes. *N Engl J Med*. 2015;373(22):2117–2128.
8. Marso S.P., et al. Liraglutide and cardiovascular outcomes. *N Engl J Med*. 2016;375(4):311–322.
9. Libby P. Inflammation in atherosclerosis. *Nature*. 2002;420:868–874.
10. UKPDS Group. Intensive blood-glucose control and complications. *TheLancet*. 1998;352:837–853.