



Oxidative Stress and HbA1c Levels: Risk Factors in Cardiovascular Complications

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DESCRIPTION

Cardiovascular complications of diabetes are conditions that affect the heart and blood vessels of people with diabetes. These complications include atherosclerosis, coronary artery disease, nephropathy, stroke, thromboembolism, peripheral vascular disease and heart failure. People with diabetes are more likely to develop and die from cardiovascular disease than people without diabetes. Some of the risk factors that contribute to this increased risk are high blood pressure, abnormal cholesterol levels, obesity, and lack of physical activity, poorly controlled blood sugar and smoking. Type 2 diabetes mellitus with cardiac complication is a condition where a person has type 2 diabetes and also has a problem with their heart or blood vessels. Some of the common cardiac complications of type 2 diabetes are coronary artery disease, stroke and heart failure. These complications can be life-threatening and increase the risk of death in people with type 2 diabetes. Some of the symptoms of cardiac complications of type 2 diabetes are chest pain, shortness of breath, weakness, dizziness and irregular heartbeat.

High Hemoglobin A1c (HbA1c) is a cardiovascular risk factor. HbA1c is a measure of blood sugar levels over a period of time. Higher HbA1c levels indicate poor blood sugar control and increased risk of diabetes complications. Research shows that higher HbA1c levels are generally linked with a higher risk of heart disease and death from heart disease in both people with and without diabetes. The most ideal HbA1c level for people without diabetes is 5.0% to 6.0% range and beyond 6.0%, the risk of death from heart disease rises significantly. Interventions for diabetic cardiovascular complications are mainly aimed at preventing or treating the underlying risk factors, such as high blood sugar, high blood pressure, high cholesterol, obesity and smoking. Some of the interventions include:

- Checking of blood glucose regularly and keeping it within recommended ranges
- Eating a healthy, balanced diet
- Participating in regular physical activity
- Make sure that the cholesterol levels are normal
- Maintaining a healthy weight

- Getting regular health checkups
- Take any medications which are prescribed by healthcare
- Not smoking or quitting smoking

Some of the medications that may be used to prevent or treat diabetic cardiovascular complications are statins, aspirin, Angiotensin-Converting-Enzyme inhibitors (ACE), angiotensin receptor blockers, beta blockers and calcium channel blockers. However, the choice of medication depends on the individual patient's condition and preferences. One should consult their healthcare provider before starting or changing any medication. Oxidative stress is a condition where the production of Reactive Oxygen Species (ROS) exceeds the antioxidant capacity of the cells, leading to cell damage and death. ROS are molecules that are generated as a by-product of cellular metabolism or by specific enzymes. They have both beneficial and harmful effects on the cells, depending on their levels and sources. Oxidative stress is highly implicated in various cardiovascular diseases, such as atherosclerosis, hypertension, myocardial infarction, ischemia/reperfusion, and heart failure. Oxidative stress can affect the heart and the vessels by altering their functions, such as cell proliferation, migration, death, calcium handling, and contractility. Antioxidant therapies are potential strategies to prevent or treat oxidative stress-induced cardiovascular diseases. However, their efficacy and safety are still under investigation.

CONCLUSION

A therapeutic target is a molecule or a pathway that can be modulated by a drug or an intervention to achieve a desired clinical outcome. Cardiovascular complications are disorders that affect the heart and the blood vessels, such as atherosclerosis, ischemia, myocardial infarction, heart failure, and stroke. Some examples of therapeutic targets in cardiovascular complications are chemokines, advanced glycation end products, cyclooxygenase, renin-angiotensin system, and oxidative stress. Chemokines are proteins that regulate the recruitment and adhesion of leukocytes to inflamed arteries and myocardium. They are involved in atherosclerosis and ischemic heart disease. Renin-angiotensin system is a hormonal system

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that regulates blood pressure and fluid balance. It is a target of angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, and aldosterone antagonists.