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**3<sup>rd</sup> year 2017/2018**

**Diabetes and cardiovascular diseases**

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**Date of submission:** 14/4/2018



**Abstract:**

Cardiovascular disease is a complication of Diabetes mellitus. diabetes is considered as a prime risk factor for CVD, also affects the heart muscle, causing both systolic and diastolic heart failure. When you have high blood glucose levels, this can contribute to the formation of fatty deposits in blood vessel walls. Over time, it can restrict blood flow and increase the risk of atherosclerosis, or hardening of the blood vessels

In this report will discuss the relation between diabetes and cardiovascular disease.

**Introduction:**

Cardiovascular disease is a major cause of death in Western countries, and it is becoming a major cause of death in developing countries. This increase may be due to the rising prevalence of many cardiovascular disease risk factors, such as diabetes.<sup>1</sup>

**Discussion:****First study:**

This study shows that in patients with type 2 diabetes mellitus increased concentrations of low density lipoprotein cholesterol, decreased concentrations of high density lipoprotein cholesterol, are risk factors for coronary artery disease. In Previous studies with few patients in 1998, it have shown inconsistent result, that the cholesterol concentration was reported to be a risk factor in some, but not in other. The present study In 2003 shows that patients with type 2 diabetes mellitus have the same risk factors for coronary artery disease as the general population.

An increased concentration of low density lipoprotein cholesterol or total cholesterol at baseline was a major risk factor for coronary artery disease, may be more pathogenic in patients with type 2 diabetes mellitus than in non-diabetic patients because of the presence of small dense low density lipoprotein cholesterol particles and oxidation of glycated low density lipoprotein cholesterol. The retention and accumulation of cholesterol-rich apoB-containing lipoproteins within the arterial intima at sites of predilection for plaque formation, causing Atherosclerotic cardiovascular disease.<sup>2</sup>

**Second study:**

This study reviews the link between diabetes and cardiovascular disease. It is complex and multifactorial.

Cardiovascular morbidity and mortality is not completely clear. Evidence suggests that although hyperglycemia, the hallmark of diabetes, contributes to myocardial damage, it is clearly not the only factor, because both pre-diabetes and the presence of the metabolic syndrome cause a CVD. The circulation is regulated by central and local regulatory mechanisms. The central regulation is via autonomic sympathetic and parasympathetic nerves that reach the vascular smooth muscle local regulation is carried out by substances produced by the endothelial cells and by local products of metabolism. The endothelium produces both vasodilators and vasoconstrictors. Diabetes contributes to defects in the autonomic nervous system, the endothelium, and local metabolism, all of which can result in micro vascular disease. Diabetic autonomic neuropathy (DAN) is one factor associated with impaired auto regulation of blood flow in a variety of vascular beds, including the heart. Patients with DAN have increased rates of sudden cardiac death as well as a higher overall cardiovascular mortality rate.<sup>3</sup>

### **Third study:**

Diabetic patients are at increased risk of developing dyslipidemia. The increase of free fatty-acid release present in insulin-resistant fat cells, the high levels of free-fatty acids promote triglyceride production, which in turn stimulates the secretion of apolipoprotein B (ApoB) and very LDL (VLDL) cholesterol. High levels of ApoB and VLDL have both been tied to increased risk of CVD. In addition to high ApoB and VLDL, hyperinsulinemia is associated with low high-density lipoprotein (HDL) cholesterol levels. Hyperglycemia may also negatively impact lipoproteins (particularly LDL and VLDL) through increased glycosylation and oxidation, decreasing vascular compliance and facilitating the development of aggressive atherosclerosis. High circulating FFA's and triglycerides, increased stimulation of ApoB and VLDL cholesterol, decreased HDL levels and lipoprotein modification have all been appreciated in patients with DM and likely contributes to the high prevalence of CVD in diabetic patients.<sup>4</sup>

### **Conclusion:**

The three studies agreed that the Patients with diabetes (increased concentrations of low density lipoprotein cholesterol, decreased concentrations of high density lipoprotein cholesterol, hyperglycemia, hypertension) have a high risk to get a cardiovascular disease.

### **References:**

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