

# SILENT MYOCARDIAL ISCHEMIA AND MICROALBUMINURIA IN ASYMPTOMATIC TYPE 2 DIABETIC PATIENTS

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## Abstract

**Objectives:** To detect silent myocardial ischemia (SMI) in asymptomatic type 2 diabetic patients with or without microalbuminuria, and the importance of microalbuminuria as a predictor for diabetic cardiovascular complications.

**Methods:** Forty asymptomatic patients with type 2 diabetes were included in this study. The patients were divided into two groups as regard the presence of microalbuminuria: group I of twenty patients (12 males, 8 females, with a mean age of  $52 \pm 8.5$  years) with microalbuminuria and group II of twenty patients (14 males and 6 females, with a mean age of  $52 \pm 7.6$  years) without microalbuminuria. A maximum symptom-limited treadmill exercise test was used to detect silent ischemia.

**Results:** In group I, 7 patients (35%) had SMI, with 5 patients showing SMI at higher work load and 2 at low work load. In group II, 2 patients (10%) showed SMI, one at high load and another at low load.

**Conclusions:** The prevalence of SMI in asymptomatic microalbuminuric and normoalbuminuric type 2 diabetic patients were 35% and 10% respectively. Even with a maximum exercise, myocardial ischemia might be completely asymptomatic in type 2 diabetic patients.

**Key words:** type 2 diabetes mellitus, silent myocardial ischemia, treadmill exercise test.

## Introduction

Diabetic nephropathy (DN) is an important cause of morbidity and mortality and is among the most common causes of end stage renal failure (ESRF) in developed countries (1). However, not all patients with diabetes develop serious renal complications.

Microalbuminuria (MA) is defined as urinary albumin excretion rate of 30-300 mg/24 hours (20-200 microgram/minute), and results from glomerular

hyperfiltration and elevated intraglomerular pressure (2). Microalbuminuria in non insulin dependent diabetes mellitus (NIDDM) reflects an underlying predisposition to developing progressive kidney disease as well as serving as a marker of predilection for generalized cardiovascular disease. The progression of the renal complications in NIDDM generally follows the same course as for insulin dependent diabetes mellitus (IDDM) (3).

Two forms of silent myocardial ischemia are recognized. The first and less common form, designated Type-I silent ischemia, occurs in patients with obstructive coronary artery disease (CAD), who do not experience angina at any time.

The second and much more frequent form, designated Type-II silent ischemia, occurs in patients with the usual forms of chronic stable angina, unstable angina, and Prinzmetal's angina. These patients exhibit some episodes of ischemia associated with chest discomfort and others without pain (2).

Irrespective of the mechanism (s) responsible for silent ischemia, it is reasonable to assume that asymptomatic ischemia has a significance similar to symptomatic ischemia and that their diagnosis and management with respect to coronary angiography and revascularization should be similar (4).

The possible explanations for the association of microalbuminuria with (CVD) are more or less related to the following factors, endothelial dysfunction, hypertension, dyslipidemia, insulin resistance, smoking, (5) hyperhomocysteinemia, (6,7) and advanced glycosylated proteins (8). In addition, left ventricular hypertrophy, which occurs early in the course of diabetic nephropathy, is an independent risk factor for myocardial ischemia and sudden death (9).

Cardiovascular disease (CVD) is a leading cause of death among individuals with type 2 diabetes.<sup>10</sup> Coronary artery disease is more common in diabetes and is more extensive and diffuse. Relative risk of acute