

# Clinical Features of Cardiac Disorders in Diabetes Mellitus

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In diabetes mellitus, the cardiovascular system is affected due to various pathogenetic mechanisms.

- I. Coronary artery disease
- II. Hypertension
- III. Cardiomyopathy
- IV. Autonomic neuropathy
- V. Oral hypoglycaemic drugs causing cardiac features as adverse effects
- VI. Peripheral vascular disease.

## 1. Coronary artery disease

Diabetics have greater prevalence of heart disease such as ischaemic heart disease, hypertensive heart disease, cardiomyopathy and congestive heart failure [1, 2, 3]. The diabetic state shows many metabolic abnormalities which adversely influence atherosclerosis causing coronary artery disease and peripheral vascular disease. The overall prevalence of CAD as assessed by various tests including coronary angiography which is around 55% amongst diabetics compared with 24% in general populations of comparable age. In our study of 200 cases of NIDDM subjected to treadmill exercise test, we found stress test positive for ischaemia in 50% of cases. CAD is not only more prevalent but is more severe in diabetics than in non-diabetics. On coronary angiography, diabetics often have multivessel CAD when compared to age and sex matched non-diabetics [4]. As regards clinical presentation of coronary artery disease in diabetics, it may present as stable angina, unstable angina or acute myocardial infarction. But the clinical features and course of heart disease in diabetes mellitus have some peculiarities. For example, chest pain may be absent or atypical in character and location in a patient presenting with angina or myocardial infarction. Patient may present with breathlessness as angina equivalent or acute dyspnoea due to left ventricular failure in acute myocardial infarction. In other cases of acute myocardial infarction, patient may present with arrhythmias or hypotension without chest pain [5]. Ischaemic heart disease in diabetics occurs at the same age as in non-diabetics. ECG abnormalities are as frequent in diabetic females as in males, unlike in non-diabetics. The occurrence of CAD is not related to the duration and severity of diabetes mellitus. Diabetics have a greater prevalence of painless sudden death particularly during sleep [4, 5, 6].

## Course of acute myocardial infarction in DM

Immediate peri-infarction mortality is high. Diabetic women have increased morbidity and mortality (nearly twice in hospital mortality), when compared to men. Diabetics develop complications of myocardial infarction more often than non-diabetics. These include cardiogenic shock, conduction disturbances and congestive heart failure. Anterior wall infarction is more common in diabetics and that explains the overall bad prognosis [6].

## Silent myocardial ischaemia

Ischemic chest pain is blunted in DM. Myocardial ischaemia or myocardial infarction may be associated with only mild symptoms or may be totally silent. Silent infarctions are more common in diabetics (39%) when compared to non-diabetics (22%) [4].

History is not of much help in the diagnosis of myocardial infarction in diabetics. The patient may present with atypical symptoms like dyspnoea, fatigue, nausea, vomiting or confusion. These may be attributed to metabolic disturbances, leading to delay in diagnosis. Asymptomatic myocardial infarction is associated with increased cardiac morbidity and mortality related to delay in seeking medical opinion. Uretsky et al [7] compared diabetic and non-diabetic patients in whom acute myocardial infarction was associated with atypical symptoms. These patients were older than those with classic symptoms. Cardiogenic shock was noted in 35% patients with atypical presenting symptoms and the hospital mortality was 50%.

## 2. Hypertension

Hypertension is more common in diabetics especially in women than in non-diabetic patients. Diabetic nephropathy is more common in patients having hypertension and DM. Diabetic nephropathy is accompanied by a greater incidence (37%) of cardiovascular mortality as compared to the general population. This is a partly because of associated hypertension [5].

## 3. Cardiomyopathy

It may result from microangiopathy, metabolic changes or possibly both. Patient gets symptoms of left ventricular dysfunction. There are features of left ventricular failure presenting as dyspnoea on exertion or nocturnal dyspnoea. Acute myocardial infarction in presence of pre-existing diabetic CMP will lead to

a morbid course. Clinically, heart is enlarged and usually third and fourth sounds are audible. Basal crepitations may be present [5, 6].

#### 4. Autonomic neuropathy

Owing to autonomic neuropathy, diabetics have sinus tachycardia. However, there is little variation of pulse rate with respiration (absence of sinus arrhythmia), decreased reflex bradycardia after Valsalva manoeuvre, decreased sympathetic response to titling and poor response to carotid pressure. Loss of parasympathetic activity may be more than loss of sympathetic activity. Clinically, this presents as orthostatic hypotension, painless myocardial infarction and cardiorespiratory arrests [7, 8].

Autonomic neuropathy is associated with increased cardiovascular mortality. Upto 33% of deaths are sudden deaths. Since parasympathetic fibres are affected earlier, there is relative increase in sympathetic tone and this results in tachycardia and inappropriate coronary vasoconstriction leading to angina pectoris. Sympathetic fibres get damaged at least 5 years after parasympathetic fibres and this causes postural hypotension. Patients having autonomic neuropathy may have sudden painless death. Some of these may be due to arrhythmias secondary to silent myocardial infarction [8,9].

#### 5. Anti-diabetic therapy and heart disease

Oral hypoglycaemic drugs (both sulphonylureas and biguanides) accelerate CAD, adversely affect myocardial function and facilitate heart disease in diabetics [4].

#### 6. Peripheral vascular disease

The atherosclerosis process in a diabetic is more commonly seen than in a non-diabetic. The risk factors for diabetic vascular disease are severity and duration of diabetes, age, genetic factors, smoking, hypertension, hyperlipidaemia and insulin resistance with compensatory hyperinsulinaemia. Patient suffers from claudication, nocturnal pain, rest pain in limbs, repeated infections of foot, skin atrophy, ulcerations and patchy areas of gangrene. Nocturnal pain is a form of ischaemic neuritis that precedes rest pain [10].

Failure of intervention at the stages of nocturnal and rest pain ultimately result in tissue necrosis and gangrene, necessitating amputation. On examination of an ischaemic limb, the feet are cold with poor or no arterial pulsations. The skin appears shiny with loss of hair and thickened nails.

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