

ORIGINAL ARTICLE

INTERMITTENT CLAUDICATION IN TYPE 2
DIABETES MELLITUS PATIENTS

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Background: Intermittent claudication (IC), mainly attributable to peripheral arterial disease (PAD) is the experiencing of pain in legs, especially calf muscles, during walking. Diabetic peripheral neuropathies (DPN) are the commonest sequelae of diabetes mellitus. DPN affect up to 50% of patients with type 1 and type 2 diabetes mellitus. Neuropathies usually represent as numbness, tingling, pain, and weakness etc. The purpose of this study was to see the complications in type 2 diabetics. **Methods:** The study was conducted at Shaikh Zayed Federal Postgraduate Medical Institute, Lahore. A total of 150 patients, (age ≥ 40) with type 2 diabetes mellitus, were selected from the Diabetic Clinic, Cardiology Unit, and Biochemistry Department of the Institute. The subjects were divided into uncomplicated and complicated groups. Blood pressure, Ankle Brachial Index, Body Mass Index and neurological symptoms of each patient were recorded. The 'Edinburgh Claudication Questionnaire' was used to assess intermittent claudication. The urine of each patient was tested for microalbuminuria to label him as complicated type 2 diabetic or otherwise. The data were analysed on SPSS-16. **Results:** In both groups about 8% individuals experienced generalised pain, and 3% felt numbness. Tingling sensations in the uncomplicated group were experienced by none, but 2.7% of the individuals in the complicated group complained about the ailment. No one was suffering from intermittent claudication in the uncomplicated group, but 6.7% of the individuals in the complicated group reported the problem and the differences between the groups were significant statistically ($p < 0.05$). **Conclusion:** The complications in type 2 diabetics are more compared to uncomplicated type 2 diabetics.

Keywords: Intermittent Claudication, Peripheral Neuropathies, Type 2 Diabetes Mellitus, T2DM

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INTRODUCTION

Intermittent claudication (IC) and peripheral neuropathies are the commonest sequelae of diabetes mellitus. IC is the experiencing of pain in legs, especially calf muscles, during walking which is mainly attributable to peripheral arterial disease (PAD), an atherosclerotic condition that can provoke symptoms of leg pain during exercise. PAD results in diminished blood supply to the leg muscles culminating in pain due to lack of oxygen to the area. Peripheral arterial disease is a common manifestation of atherosclerosis, its prevalence increases with age and the presence of cardiovascular risk factors.^{1,2} PAD is common among people with type 2 diabetes in Pakistan.³ Because PAD is often observed with co-morbid conditions such as hypertension, dyslipidemia, diabetes mellitus (DM), smoking, and/or physical inactivity, the pathophysiology of PAD is certainly complex.⁴ Intermittent claudication in diabetes mellitus is commonly associated with arterial disease but may occur without obvious signs of peripheral circulatory impairment. Intermittent claudication in diabetics may be caused by chronic exertional compartment syndrome (CECS) of the legs.⁵ CECS is an underdiagnosed cause of chronic exertional leg pain which is caused by increased intra-compartmental pressure within a fascial space; however, the mechanism why pain occurs is

unknown.⁶ Diabetes is the most common cause of neuropathy in United States, and neuropathies are the most common complication of diabetes mellitus, affecting up to 50% of patients with type 1 and type 2 diabetes mellitus. Symptoms usually include numbness, tingling, pain, and weakness.⁷ The prevalence of painful diabetic peripheral neuropathy (PDN) is about 20% in patients with type 2 diabetes and 5% in those with type 1.⁸ Diabetic neuropathies may be focal or diffuse.⁹ The current study was destined to know about the occurrence of complications in type 2 diabetes mellitus patients in Lahore, Pakistan.

MATERIAL AND METHODS

The study was conducted at the Department of Physiology, Shaikh Zayed Federal Postgraduate Medical Institute, Lahore. A total of 150 subjects with age ≥ 40 years suffering from type 2 diabetes mellitus, were selected from the Diabetic Clinic, Cardiology Unit, and Biochemistry Department of the Institute. The subjects were equally divided into uncomplicated and complicated type 2 diabetes mellitus groups. Patients on insulin therapy, with severe systemic disease or having a major surgery in the past 3 months were not included in the study. After approval from the Ethical Committee, each patient was briefed about the procedure and, after his consent, his blood samples were collected for blood glucose level and lipid profile. Blood pressures, Ankle

Brachial Index (ABI), BMI and neurological symptoms of each patient were recorded. The 'Edinburgh Claudication Questionnaire'¹⁰ was used to assess intermittent claudication. The blood pressure of each patient (arm and ankle) was recorded with the help of a mercury sphygmomanometer and a handheld Doppler to calculate ABI, the weight with a standard weighing scale in light clothes and bare footed, and the height with a standard stadiometer. The urine of each patient was tested for microalbuminuria to label him as complicated type 2 diabetic patient or otherwise. The data was analysed on SPSS-16.

RESULTS

In both groups about 8% individuals experienced generalised pain and 3% felt numbness. The difference in both cases between the groups was not significant statistically ($p>0.05$). Tingling sensations in the uncomplicated group were experienced by none but 2.7% of the individuals in the complicated group complained about the symptom. The differences were not significant ($p>0.05$). Regarding intermittent claudication, in the uncomplicated group, no one was suffering from the trouble but 6.7% of the individuals in the complicated group reported the problem. The differences were significant ($p<0.05$).

Table-1: Comparison of symptoms in the subjects

Symptoms	Uncomplicated Group	Complicated Group	<i>p</i>
Generalised Pain	6 (8%)	6 (8%)	1.000
Numbness	3 (4%)	3 (4%)	1.000
Tingling	0 (0%)	2 (2.7%)	0.155
Intermittent Claudication	0 (0%)	5 (6.7%)	0.028*
Total	9 (12%)	16 (21.3%)	

*significant

DISCUSSION

Diabetes mellitus can be labelled as the mother of many unhealthy conditions including vascular and nervous events. PAD and neuropathies, the leading sequelae of diabetes, engages many of the diabetic patients when the disease progresses. PAD manifests itself mainly as intermittent claudication while neuropathies as pain, numbness, tingling and many others. The existing study encompasses some of these symptoms of diabetes mellitus. A study revealed that the prevalence of IC was nearly four times more common in females and three times more common in males with diabetes compared to non-diabetic participants.¹¹ Though we did not study the occurrence of IC in non-diabetics yet we found that none of the uncomplicated but 6.7% of the individuals in the complicated group developed the symptom. This does not imply that the risk of developing IC in uncomplicated diabetics has been eliminated altogether. The reason may be many folds but one of the possible justifications might be the small size of the sample. Symptoms of sensory neuropathy affect 30–40% of

diabetic patients in the US. Men and women are affected equally.¹²

In our study about 8% of the individuals in both groups reported generalised pain. In spite of the fact that the current study was not aimed at investigation of the cause of pain, yet we can reasonably presume the involvement of pain nerve fibres. In a study it was discovered that the mean tactile threshold of diabetic patients was significantly higher than that of non-diabetic subjects, although the difference between the two groups was small.¹³

In our study about 4% of individuals in both groups developed numbness which roughly coincides with this study. In our study, tingling affected about 2.7% subjects of the complicated group but none of the uncomplicated group. One study demonstrated that despite extremely poor control of their diabetes, up to 50% of all diabetic subjects never developed symptoms of neuropathy, even after >20 years duration of diabetes. Conversely, some unfortunate subjects develop neuropathy soon after the onset of diabetes, even when glycaemic control is relatively good. These well-known observations implicate the involvement of factors other than glycaemia in the aetiology of diabetic neuropathy.¹⁴

The time of onset of diabetic complications cannot be deduced with certainty. While looking at our study, one of the first impressions seem to be the lower percentage of patients suffering from diabetic problems, and that too in the uncomplicated diabetics but the number of victims may be much higher. We studied clinically confirmed DPN patients but countless number of sub-clinical cases may exist. While comparing clinically undetectable and detectable sensorimotor poly-neuropathy in T2DM, the authors of a study suggested that nerve conduction study (NCS) is a more reliable tool for detection of diabetic sensorimotor polyneuropathy especially for the sub-clinical neuropathies. Hence, routine NCS should be done on diabetics at least on yearly basis.¹⁵ Enormous efforts must be spent on the earlier detection and prevention of diabetic complications.

CONCLUSION

Intermittent claudication is more frequent in complicated type 2 diabetes mellitus patients as compared to generalised pain, numbness and tingling.

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