Prevalence of Vascular Complications among Type 2 Diabetes Mellitus Outpatients at Teaching Hospital in Malaysia

Salwa Selim Ibrahim Abougalambou1*, Mohamed Azmi Hassali2, Syed Azhar Syed Sulaiman3 and Ayman S. Abougalambou4

1Discipline of Clinical Pharmacy, School of Pharmaceutical Sciences, Universiti Sains Malaysia (USM)
2Discipline of Social and Administrative Pharmacy, School of Pharmaceutical Sciences, USM
3Discipline of Clinical Pharmacy, School of Pharmaceutical Sciences, USM
4Cardiologist, National Heart Institute (IJN), Kuala Lumpur

Introduction

Diabetes mellitus is associated with an increased risk for a number of serious and sometimes life-threatening macro- and microvascular complications. Macrovascular disease, that includes coronary heart disease (CHD), cerebrovascular disease, and peripheral vascular disease, is the leading cause of mortality in people with diabetes. Diabetes mellitus patients carry an increased risk two to four times greater for heart attack, stroke and other complications related to poor circulation [1] and depend on ADA [2] the majority of deaths are due to CHD. In another study by Vijan et al., [3] said that up to 80% of Type 2 diabetic patients will develop or die of macrovascular disease.

Microvascular complications include effects on small vessels, including arterioles, capillaries and venules. The development of these complications starts early in the pathogenesis of Type 2 DM and accounts for morbidity in the form of retinopathy, neuropathy and nephropathy.

In Malaysia, there is a growing public concern due to the escalation with number of people with diabetes while complication rates and associated diseases amongst diabetics are high. In addition high prevalence of complications such as blindness, end stage renal disease, lower extremity amputations as well as premature cardiovascular disease, stroke and premature mortality related to poor control of blood glucose [4].

The present study was to determine prevalence and focused on presence risk factor affecting on diabetic vascular complications among type 2 diabetic outpatients in tertiary center.

Material and Methods

A prospective study was conducted for study period of one year (1st Jan 2008 till 31st Dec 2008) in order to determine the prevalence diabetic vascular complications and risk factors affect on these complications among type 2 diabetes mellitus in outpatient diabetic care at teaching hospital USM which is located in the state of Kelantan, Malaysia.

The research’s protocol was approved by the Human Research and Ethics Committee of the School of Medicine in the Universiti Sains Malaysia. Signed informed consent was obtained from all patients

All patients with type 2 diabetes mellitus, age range 18 to 88 years, were screened for diabetic vascular complications.

The information obtained from the interview included the patient’s identification data such as age, sex, and race, alcohol, smoking history, physical activity and level of education. They were classified smoking history to (never, previous, current), the level of education was classified by the level of completion of their formal education either less than secondary school, secondary and more than secondary school and physical activity was classified into active (if the duration of physical activity was equal or more than 150 min/week), and non active (if physical activity duration was less than 150 min/week). Glycaemic control based on measurement (poor glycaemic control if HbA1c >7%), and blood pressure (BP hypertension if systolic BP> 130 mm Hg or diastolic BP> 80 mm Hg).

Diagnosis of retinopathy is based on finding the diagnostic signs of retinopathy on eye exams by fundoscopy.

Patients were considered to have neuropathy if symptoms of pain anesthesia, paresthesia, muscular weakness, loss of tendon reflexes, and impaired vibration sense.

Patients were considered to have nephropathy if they have microalbuminuria or proteinuria.

Coronary artery disease was diagnosed by documented angina symptoms and confirmed by performed an ECG, or from results of percutaneous transcoronary angiography (PTCA) in patients record.

Cerebrovascular disease was defined by present of transient ischemic attack or stroke in past medical history.

Ethical approval of study

Ethical approval was obtained for this research study from research and ethics committee, USM in January 2008.

Result

A total of 1077 Type 2 diabetic patients were involved in this study. About 476 were males and 601 were females, the mean (± SD) duration of Type 2 DM is 11 (± 6.81) years, ranging from less than one year to forty years. The majority of patients 794 (73.7%) did not achieve target of HbA1c levels ≤ 7.0%. Positive family history of DM was 141 patients while a total of 936 patients had no known family history of diabetes.

Type of vascular complications among type 2 dm patients

Most of the patients, 841 (78%) had microvascular complications alone and 188 (17.5%) had combination of microvascular and macrovascular complications (Figure 1).

Macrovascular complications

In this study most of the diabetic patients 1014 (82.6%) had
no macrovascular complications, 188 (17.5%) had macrovascular complications and out of those 137 (12.8%) had coronary heart disease, only 51 (4.7%) had cerebrovascular disease see (Figure 2).

**Microvascular complications**

Out of 1077 type 2 diabetic patients 1028 (95.5%) had microvascular complications. (Table 1 and Table 2) showed type of microvascular complications.

The major risk factor for the development of diabetic complications were gender, age, BMI, duration of diabetes and hypertension as (Tables 3-8).

**Discussion**

The frequency of microvascular diabetic complications is clearly correlated to the duration of diabetes, quality of metabolic control (HbA1c) and systolic blood pressure [5]. Only a few investigations have focused on the role of obesity in the development or progression of microvascular complications.
Several studies considered that poor glycaemic control, disease duration, hypertension and dyslipidaemia are to be important risk factors for microvascular complications [6-8].

This study has shown a prevalence of macrovascular disease of 17.5% among diabetics and percentage of macrovascular disease lower than in study by Al-Maskari et al. [9] they found prevalence of macrovascular disease in 29.5% of diabetics. The differences in our rates of macrovascular complications among Type 2 DM patients as compared with others could be attributed to differences in study design, and population characteristics of various studies.

Previous studies in Malaysia indicate a high prevalence of suboptimal glycaemic control and that diabetes complications are common [10-12]. Morgan et al. [13] found evidence to show that multiple complications occur in almost one fifth of diabetic patients. In addition, the incidence of individual and multiple complications increases with both age and duration of diabetes.

The present study shows that the prevalence rate of retinopathy were 39.3% alone or in combination with other microvascular complications. The prevalence of retinopathy demonstrates wide variations between countries; in Type 2 DM it ranges from 17% in Switzerland to 52% in the United Kingdom [14].

The results of the present study showed that the overall prevalence of neuropathy was 54.7%, alone or in combination with the other complications. Percentage of neuropathy in this study is higher than in a study by Tesfaye et al. [15] who recruited 3,250 diabetic patients and reported prevalence of neuropathy in 28% of them, but in other studies it counts 25-60% peripheral neuropathy (16-17).

The results of this study also showed that the overall prevalence of nephropathy was 91.7%. It is considered a high percentage in comparison with other studies on diabetic nephropathy which occurs in 40% in diabetic patients [18] and ADA [19] reported that diabetic nephropathy occurs in 20-40% of patients with diabetes and is the single leading cause of end-stage renal disease (ESRD).

Only 24.6 % of patients had optimal controlled, but glycaemic control in the current study insignificant factor affect the development of diabetic complications.

In this study, it did not find any relation between diabetic glycemic control and the presence of macrovascular, similar as in these studies [20-21]. In contrast other study by singer et al. [22] have suggested an association between diabetic glycemic control and the presence of macrovascular complication, or risk of the development of macrovascular complications [23-25].

The major risk factors in this study were gender, age, BMI, duration of diabetes and hypertension. Therefore the rate of diabetic complications may reduce by weight loss and controlled of hypertension.

Conclusion

In conclusion, prevalence of diabetic complications was high. Identifying factors associated with the development of microvascular and macrovascular complications would be to able to prevent the complications. In this study we saw the prevalence of diabetic complications was higher in elder people, longer duration of diabetes associated hypertension and obesity. We recommend screening of high risk type 2 diabetes for diabetic complication and highlight importance of early diagnosis of diabetes and detection diabetic complications so that appropriate treatment initiated at the earliest. It need to focus on the treatment of hypertension and advised the diabetic patients to reduced weight to prevent or decreased the complications of diabetes.

References
