Diabetes mellitus (DM) is a common endocrine disease. Chronic complications usually occur 10 to 15 years after onset and include microvascular (nephropathy, retinopathy and neuropathy), macrovascular (MVC) (myocardial infarction and stroke), and peripheral vascular (amputation) diseases. Diabetes Mellitus is an established independent risk factor for atherothrombotic brain infarction at all ages and is responsible for 7% of deaths caused by stroke. Patients with type II DM have a 2 to 4 fold increased risk of developing cardiovascular diseases. The incidence of DM is increasing rapidly so, we expect diabetic admissions to increase. The aim of our study is to report on the causes of admissions of diabetic patients to the medical unit of King Abdulaziz University Hospital (KAUH), Jeddah, Kingdom of Saudi Arabia, the mortality and risk factors, associated with high mortality, over a 4 year period and to find out possible ways to reduce the rate, cost and mortality of these admissions.

Method. The medical records of diabetic patients admitted to the medical unit of KAUH, Jeddah, Kingdom of Saudi Arabia, in the period between January 1996 to September 1999 were reviewed. Patients were diagnosed as diabetic according to the World Health Organization (WHO) criteria and classified as type I and II according to WHO criteria. Patients’ age, sex, body mass index (BMI) (defined as weight in kilograms divided by height in square meters) were recorded as well as type of DM (type I, type II, secondary, and discovered on admission), duration and treatment (diet, oral hypoglycemic agents, insulin and combined). Poor glycemic control, long duration of diabetes mellitus and long hospital stay were risk factors associated with high mortality.

Results: A total of 5917 patients were admitted, 17% of them were diabetics. Admissions for blood glucose control and for macrovascular complications were found in 21% and 38%. Mortality rate was 13%. Hypertension, hyperlipidemia, smoking, obesity, infection, poor glycemic control, long duration of diabetes mellitus and long hospital stay were risk factors associated with high mortality.

Conclusion: Macrovascular complications and uncontrolled blood glucose were the most common causes of admissions. Control of hypertension, hyperlipidemia, cessation of smoking and weight reduction will not only decrease the risk of macrovascular complications, but also in addition to patient’s education for tight blood glucose control, will decrease the rate, cost and mortality of diabetic admissions.

Keywords: Diabetes mellitus, macrovascular complications, admissions, mortality.


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glycemic control was defined according to the patients' symptoms and HbA1c > 7%. The presence or absence of hypertension (defined as blood pressure > 140/90) was recorded as well as hyperlipidemia and history of smoking. The reason for admission whether ischemic heart disease (unstable angina and myocardial infarction), heart failure, stroke, (transient ischemic attack and completed stroke), uncontrolled blood glucose (hyperglycemia and diabetic ketoacidosis), infections, nephrotic syndrome or other cause for admission were recorded. Patients mortality and duration of hospital stay were reported.

Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS 7.5). A two-tailed student’s t-test and Chi-square were used as appropriate. Results were considered significant if P value was less than 0.05.

Results. A total of 5917 patients were admitted to the medical unit during the study period, 1006 admissions of 557 patients with diabetes mellitus, which constitutes 17% of the total admissions, around half of them were Saudi. The mean age was 54.3 +/-16.5 years with male:female ratio of (552:454) 1:2.1 and mean BMI of 25 +/-4.5. Eight hundred and fifty four of 1006 (85%) were type II where as 102 of 1006 (10%) were type I, 26 of 1006 (3%) secondary and 24 of 1006 (2%) discovered on admission. The mean duration of DM was 9.8 +/-7.8 years. Most of the patients, 610 of 1006 (61%), were using oral hypoglycemic agents (OHG) for blood sugar control while insulin was used by 298 of 1006 (30%), dietary control only by 64 of 1006 (6%) and 34 of 1006 (3%) used combined insulin and OHG. Poor glycemic control was found in 607 of 1006 (67%). Hypertension was reported in 408 of 1006 (41%) of patients, hyperlipidemia in 216 of 1006 (21.5%) and history of smoking in 398 of 1006 (41%). The most common causes of admission, as shown in Table 1, were MVC, for control of DM, not like type I, is insidious and can be asymptomatic. It is usually recognized 5-12 years after hyperglycemia developed.11 We found 2% of the patients were discovered only on admission. The majority of diabetic admissions were due to conditions related to DM, either MVC, for control of blood sugar or infections. It is well recognized that the most frequent chronic complication of DM is atherosclerotic cardiovascular diseases.12,13 Hyperlipidemia and hypertension are well known risk factors for coronary heart diseases (CHD).

Discussion. Diabetes mellitus is a common endocrine disease with rapidly increasing incidence6 and will probably continue to increase in the future.8,9 We found in our study that 17% of the total admissions to the medical unit were diabetics. Al-Maatouq10 had reported 3% diabetic admissions 10-years ago. It is well known that the onset of type II DM, not like type I, is insidious and can be asymptomatic. It is usually recognized 5-12 years after hyperglycemia developed.11 We found 2% of the patients were discovered only on admission. The majority of diabetic admissions were due to conditions related to DM, either MVC, for control of blood sugar or infections. It is well recognized that the most frequent chronic complication of DM is atherosclerotic cardiovascular diseases.12,13

**Table 1 - Causes of admissions in diabetic patients.**

<table>
<thead>
<tr>
<th>Reason for admission*</th>
<th>No. of admissions (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High blood sugar (DKA, hyperglycemia for control)</td>
<td>212 (21)</td>
</tr>
<tr>
<td>Ischemic heart disease (unstable angina, MI)</td>
<td>210 (21)</td>
</tr>
<tr>
<td>Heart failure</td>
<td>170 (17)</td>
</tr>
<tr>
<td>Infections (urinary, respiratory, foot infections)</td>
<td>160 (16)</td>
</tr>
<tr>
<td>CVA (TIA, complete stroke)</td>
<td>78 (8)</td>
</tr>
<tr>
<td>Nephrotic syndrome</td>
<td>8 (1)</td>
</tr>
<tr>
<td>Others <em>more than one admission in one patient</em></td>
<td>412 (41)</td>
</tr>
</tbody>
</table>

*eg CLD, COAD, malignancy, CT diseases*

**Table 2 - Relation of macrovascular complications to some variables.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>MCV Total no. = 384 N (%)</th>
<th>No MCV Total no. = 622 N (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperlipidemia</td>
<td>114 (30)</td>
<td>102 (16)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hypertension</td>
<td>234 (61)</td>
<td>174 (28)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Smoking</td>
<td>174 (45)</td>
<td>198 (32)</td>
<td>0.002</td>
</tr>
<tr>
<td>Uncontrolled blood sugar</td>
<td>256 (67)</td>
<td>414 (67)</td>
<td>0.8</td>
</tr>
<tr>
<td>Mortality</td>
<td>70 (18)</td>
<td>64 (10)</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Important not only to decrease the rate of admissions due to these complications. Microvascular complications are major causes of morbidity and mortality in patients with diabetes.

The risk of microvascular complications rises with obesity. As these are modifiable risk factors, control of these risk factors will decrease the risk of MVC and mortality in diabetics.

Elevated blood lipids are associated with an increased risk of CHD for patients with diabetes as they are for non-diabetics. Recent studies suggest that cardiovascular complication rates associated with diabetes can be considerably reduced through intensified treatment of CHD risk factors (hypertension and hyperlipidemia) in patients with diabetes.

Macrovascular complications are major causes of morbidity and mortality in patients with diabetes which is in agreement with that reported by others.

Reference