Risk factors in young Indian males with myocardial infarction

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Summary

Risk factors were assessed in 108 young Indian males with myocardial infarction. The mean age was 36 years (range 21 - 40 years).

Cigarette smoking was the most common risk factor (79% of patients). Serum cholesterol levels were above 6.5 mmol/l in 50% and serum triglyceride levels were above 2.0 mmol/l in 53% of patients. High-density lipoprotein cholesterol levels below 0.83 mmol/l were found in 52% of patients.

Ninety-six per cent of patients had one or more of the following risk factors: a history of cigarette smoking, hypercholesterolaemia, hypertension, and abnormal glucose tolerance. Thus, in young Indian males with myocardial infarction, one or more risk factors are usually present.

Myocardial infarction is usually considered a disease of middle age, but epidemiological, clinical and pathological data indicate that 3 - 6% of myocardial infarctions occur in people under the age of 40 years. In young Indians and whites in the RSA, ischaemic heart disease is responsible for 59 - 77% of all deaths secondary to disease of the circulatory system. Furthermore, the mortality rates for Indians with ischaemic heart disease increased steadily during the period 1968 - 1977. The reasons for this are not clear.

It seems likely that the incidence of risk factors would be greater in young patients with myocardial infarction. Indeed, most studies on myocardial infarction at young age have shown a high incidence of risk factors. These studies have, however, been confined mainly to whites and are not necessarily applicable to other race groups. Similar studies on young Indians with myocardial infarction have not been reported previously.

This study therefore examines the risk factors in 108 Indian males aged 40 years or less who presented with myocardial infarction.

Patients and methods

During a 36-month period from 1981 to 1983, 1 580 patients were admitted to the coronary care unit at R. K. Khan Hospital, Durban. Myocardial infarction was diagnosed in 982 patients (62%), of whom 153 (16%) were aged 40 years or less. There were 149 men (97%) and 4 women (3%).

The women were excluded from this study because of the small number. Fifteen men died during the acute phase and 26 did not return for risk factor evaluation. The final study group consisted of 108 men between the ages of 21 and 40 years (mean 36 years). All satisfied the diagnostic criteria for acute myocardial infarction as defined by the World Health Organisation (WHO). The cause of myocardial infarction was presumed to be coronary atherosclerosis, since no other cause was found on clinical examination.

Risk factor evaluation was undertaken at least 12 weeks after acute myocardial infarction. The evaluation included a family history, previous history of ischaemic heart disease, diabetes mellitus and hypertension, a smoking history, and a physical examination. Height and weight were measured and relative body weight calculated using Quetelet's formula (weight (kg)/height (cm)^2 x 100). Obesity was defined as a relative body weight of above 0.27.

After a 14-hour fast venous blood was taken for estimation of serum cholesterol, triglyceride, high-density lipoprotein (HDL) cholesterol, uric acid and glucose levels. A 75 g modified oral glucose tolerance test was performed on all patients except those known to have diabetes. The methods used to measure glucose, cholesterol, triglycerides and HDL cholesterol have been described previously. Uric acid levels were measured by an enzyme colorimetric method. The diagnosis of diabetes mellitus and impaired glucose tolerance was based on the 1980 WHO criteria. The upper limit of normal for uric acid was taken as 0.42 mmol/l.

Obesity was defined as a relative body weight of above 0.27.

Results

One hundred and eight men underwent risk factor evaluation. The mean age was 36 years (range 21 - 40 years).

A history of smoking was obtained in 79% of patients (Table I). As can be seen, 74% smoked 10 or more cigarettes per day. The incidence of the other risk factors is summarised in Table II. Abnormal glucose tolerance was found in 40 patients (37%). Of these, 19 (18% of the total sample) were known to have diabetes, a further 13 (12%) were discovered to be diabetic after an oral

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| TABLE I. SMOKING HABITS OF 108 YOUNG INDIAN PATIENTS WITH MYOCARDIAL INFARCTION |
|-----------------|---|---|
| Non-smokers     | 23 | 21 |
| Cigarettes/day  |    |   |
| <10             | 5  | 5  |
| 10 - 19         | 32 | 30 |
| 20 - 30         | 39 | 36 |
| >30             | 9  | 8  |
TABLE II. RISK FACTORS IN 108 YOUNG INDIAN PATIENTS WITH MYOCARDIAL INFARCTION

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypercholesterolemia (&gt; 6.5 mmol/l)</td>
<td>54</td>
<td>50</td>
</tr>
<tr>
<td>Hypertriglyceridaemia (&gt; 2 mmol/l)</td>
<td>57</td>
<td>53</td>
</tr>
<tr>
<td>HDL cholesterol &lt; 0.83 mmol/l</td>
<td>56</td>
<td>52</td>
</tr>
<tr>
<td>Family history of coronary artery disease</td>
<td>51</td>
<td>47</td>
</tr>
<tr>
<td>Hypertension</td>
<td>35</td>
<td>32</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>32</td>
<td>30</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Previous history of MI or angina</td>
<td>34</td>
<td>31</td>
</tr>
<tr>
<td>Obesity</td>
<td>29</td>
<td>27</td>
</tr>
</tbody>
</table>

M.I = myocardial infarction.

glucose tolerance test, and 8 (7%) had impaired glucose tolerance. Thirty-two per cent of patients were hypertensive, and in 10% a combination of hypertension and abnormal glucose tolerance was noted. With cut-off points of 6.5 mmol/l for cholesterol and 2.0 mmol/l for triglycerides, 50% of the patients had hypercholes­
teraemia and 53% hypertriglyceridaemia. Combined hyperlipi-
daemia was present in 32%, HDL cholesterol levels were below 0.83 mmol/l in 56 patients (52%). The serum uric acid level exceeded 0.42 mmol/l in 18% of patients.

The frequency with which a combination of risk factors occurred in individual patients was determined. The following risk factors were assessed: hypercholesterolaemia, hypertension, abnormal gluco-
ses tolerance and cigarette smoking. Only 4% had no risk factors; 24% had one risk factor, 31% had two risk factors, 32% had three risk factors and 9% had four risk factors. Thus, 96% had one or more risk factors (Table II).

Discussion

The present study illustrates that myocardial infarction at a young age is primarily a disease suffered by men. The 3% incidence in women is similar to that of previous studies. However, the overall incidence of 16% in young Indian patients is much higher than that in other reports. The major finding of this study is that myocardial infarction in young Indian males is unusual in the absence of risk factors. Only 4% of patients did not have any risk factors.

Cigarette smoking has been shown to be the major risk factor in all studies of myocardial infarction at young age. The present study confirms these findings. Seventy-nine per cent of the patients were smokers and 74% smoked 10 or more cigarettes per day.

Other risk factors, although frequent, are probably not as important as cigarette smoking in the genesis of myocardial infarction in young Indian males. Of these, lipid aberrations were the second most frequent risk factor, and were encountered in 50% of the patients. Numerous studies have indicated the importance of lipid abnormalities in the genesis of coronary atherosclerosis in young people. Our study fully confirms this association.

Hypertension was present in 32% of patients in this study, which is much higher than the 15% prevalence rate for Indian males of all ages in Durban, and is similar to rates reported by some and considerably higher than those reported by others.

Diabetes mellitus is usually considered to be a minor risk factor and of little importance in the pathogenesis of coronary artery disease in the young. Our results are at variance with this finding. The incidence of diabetes mellitus in this series (30%) is strikingly higher than that reported for other comparable series. This is probably a reflection of the high prevalence of diabetes mellitus in the Indian population.

In conclusion, this study has demonstrated that multiple risk factors are usually present in young Indian men with myocardial infarction and that cigarette smoking is the most common risk factor. A notable difference between this and other studies is the higher incidence of diabetes and hypertension in young Indian men with myocardial infarction. Finally, it is recommended that a screening programme be instituted to identify risk factors such as cigarette smoking, hyperlipidaemia, hypertension and abnormal glucose tolerance in young Indian men, who should then be counselled on appropriate measures to combat these risk factors.

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REFERENCES