Bleeding Time and Diagnosis of Acute Myocardial Infarction

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Definitive tests in the diagnosis of acute myocardial infarction include serial electrocardiography and measurements of serum cardiac enzyme concentrations. However, neither test is ideal in the first few hours after infarction: cardiac enzymes are not significantly elevated until 10 h after myocardial infarction while only 50% of patients have a diagnostic electrocardiogram at presentation or within 6 h of the start of chest pain [1, 2]. Several studies have found a shortened cutaneous bleeding time in patients with acute myocardial infarction [3–6], an observation that is independent of the elapsed time between the onset of chest pain and measurement of the bleeding time [5,6]. We have investigated, using retrospective and prospective studies, whether the bleeding time may be used in the early diagnosis of myocardial infarction.

The two studies were both undertaken with the permission of the local ethics committees and involved the investigation of consecutive consenting patients admitted to coronary care units with chest pain of less than 20 h duration and with no recent consumption of aspirin or other non-steroidal anti-inflammatory drugs. Fifty-one patients were investigated in the first study and 49 in the second. The cutaneous bleeding time was measured immediately on admission before the diagnosis was known using the Sim-plate II device (General Diagnostics, USA) on the anterolateral aspect of the forearm horizontally and with venous occlusion (40 mm Hg) according to the method of Mielke [7]. Myocardial infarction was diagnosed according to WHO criteria [8], and in the second study unstable angina was defined according to the Veterans Administration study [9].

In the first study a bleeding time of 212 s, chosen retrospectively to maximise the diagnostic accuracy, discriminated well between chest pain secondary to myocardial infarction and that due to other causes (table 1) [5]. In the second study the bleeding time of 212 s was prospectively used to discriminate between chest pain secondary to myocardial infarction and other causes (table 1) [6]. Unlike myocardial infarction, the bleeding time in unstable angina was not significantly different from that in non-coronary chest pain [6]. Since thrombolysis is now widely accepted to be vital in the treatment of myocardial infarction and its effectiveness is dependent on early administration (preferably less than 4 h) [10], any
means of improving the early diagnosis of myocardial infarction must be important. We have demonstrated
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Table 1. Sensitivity, specificity and diagnostic accuracy in the diagnosis of myocardial infarction using a bleeding time of less than 212s, assessed retrospectively in study 1 and prospectively in study 2

<table>
<thead>
<tr>
<th>Study</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Diagnostic accuracy</th>
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<tbody>
<tr>
<td>Study 1 [5]</td>
<td>25/28,89%</td>
<td>18/23,78%</td>
<td>43/51,84%</td>
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<tr>
<td>Study 2 [6]</td>
<td>16/26,62%</td>
<td>20/23,87%</td>
<td>36/49,73%</td>
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that the bleeding time, measured in a standard manner, is accurate in the prediction of myocardial infarction and is more sensitive than the electrocardiogram. Importantly, there appears to be no relationship between the time of onset of chest pain associated with myocardial infarction and the change in bleeding time [5, 6], perhaps explained by an alteration in the ‘megakaryocyte-platelet-haemostatic axis’ prior to infarction [6].

We suggest that the bleeding time may be useful in the early diagnosis of myocardial infarction particularly as a decision aid in whether to give thrombolytic therapy to patients not taking aspirin with chest pain but without diagnostic changes in the electrocardiogram. The test is easily and quickly performed, requires minimal and inexpensive equipment and can be undertaken by medical or paramedical staff both in and out of hospital. Further studies of thrombolysis might benefit from inclusion of bleeding time measurement in the protocol.

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References