Letter to the Editor
Received: January 24, 1991
Accepted: March 5, 1991

Haemostasis 1991;21:181-182

Bleeding Time and Diagnosis of Acute Myocardial Infarction

P.M.W.		Bath[a]
S.D.		Kristensen[a]
J.F.		Martin[a]
P.C.		Milner[b]

[a]Department of Medicine, King's College School of Medicine and Dentistry, London; [b]Rotherham Health Authority, Rotherham, UK

P.M.W. Bath, Blood Pressure Unit, St. George's Hospital Medical School, Cranmer Terrace, London SW17 ORE (UK)

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 chain [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

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

	Sensitivity	Specificity	Diagnostic accuracy
Study 1 [5]	25/28,89%	18/23,78%	43/51,84%
Study 2 [6]	16/26,62%	20/23,87%	36/49,73%

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.

Acknowledgements

PMWB was a British Heart Foundation Junior Research Fellow, and SDK was recipient of a Well-come-Carlsberg Research Fellowship. JFM is the British Heart Foundation Professor of Cardiovascular Science.

References

McGuinness JB, Begg TB, Semple T: First electrocardiogram in recent myocardial infarction. Br Med J 1976;2:449–451.

Karlson BW, Herlitz J, Edvardsson N, Emanuels-son H, Sjolin M, Hjalmarson A: Eligibility for intravenous thrombolysis in suspected acute myocardial infarction. Circulation 1990;82:1140–1146.

O'Brien JR, Etherington M, Jamieson S, Klaber MR: Stressed template bleeding-time and other platelet-function tests in myocardial infarction. Lancet 1973;i:694–696.

Cortellaro M, Boschetti C, Fassio G, Baroni L, Polli EE: Haemostatic function changes in a trial on the secondary prevention of myocardial infarction with sulphinpyrazone. Acta Haematol 1981; 65:193–204.

Milner PC, Martin JF: Shortened bleeding time in acute myocardial infarction and its relation to platelet mass. Br Med J 1985;290:1767–1770.

Kristensen SD, Bath PMW, Martin JF: Differences in bleeding time, aspirin sensitivity and adrenaline between acute myocardial infarction and unstable angina. Cardiovasc Res 1989;24:19–23.

Mielke CH: Measurement of the bleeding time. Thromb Haemost 1984;52:210–211.

WHO Euro: Ischaemic heart disease registers, report by a Working Party, No 5010 (1). Copenhagen, WHO, 1968.

Veterans administration cooperative study. Protective effects of aspirin against acute myocardial infarction and death with unstable angina. N Engl JMed 1983;309:396–403.

10 ISIS-2 (Second International study of infarct survival) collaborative group: Randomised trial of intravenous streptokinase, oral aspirin, both, or neither among 17,187 cases of suspected acute myocardial infarction: ISIS-2. Lancet 1988;ii: 349–360.