Ambulatory ST segment monitoring after myocardial infarction

The significance of transient myocardial ischaemia in patients with chronic angina, is now reasonably well established, and ambulatory ST segment monitoring probably adds little to the information available from exercise stress testing. There is much less information available on transient ischaemia in acute coronary syndromes but recent work suggests that ambulatory monitoring may have prognostic significance in patients with unstable angina.15

Prevalence and characteristics of transient myocardial ischaemia after myocardial infarction

Transient myocardial ischaemia seems to be less common in survivors of myocardial infarction than in other subgroups with coronary artery disease. Ischaemic episodes were detected in 14–34% of patients in studies using only one 24 hour recording period.6-13 There are several explanations for this relatively low prevalence of transient ischaemia. Firstly, shortly after infarction patients generally have a low activity level and thus a reduction in myocardial oxygen demand. Secondly, in the early post-infarction period unresolved baseline ST segment depression may mask further significant ST segment depression, and later the presence of abnormal Q waves makes it increasingly difficult to distinguish ischaemic episodes.14 Thirdly, an association between left ventricular dysfunction and a low prevalence of transient ST segment depression has recently been reported.15 This observation accords with the detection of more transient ischaemia after non-Q wave than after Q wave infarction.7-9 14 In the early in-hospital post-infarction period transient ischaemia may be related more to supply than to demand, unlike the pathophysiological mechanism later on.10

Eighty one per cent to 100% of ischaemic episodes seem to be symptomless.9,11-15 16 17 Thus a greater proportion of ischaemic episodes are silent in patients early after myocardial infarction than in other subgroups with coronary artery disease. In patients who are able to perform predischarge exercise stress testing, ambulatory monitoring is considerably less sensitive in detecting patients with ST segment depression.9,18 These results suggest that ambulatory ST segment monitoring should not be used as a routine screening test for continuing ischaemia in the early post-infarction period. Ambulatory monitoring, however, seems to identify patients with a poor exercise test result. This is apparent both in terms of more severe ischaemic electrocardiographic changes and a reduced haemodynamic response during post-infarction stress testing.11 18

Prognostic significance of transient myocardial ischaemia after myocardial infarction

Transient myocardial ischaemia detected within one week after hospital admission seems to be predictive of early recurrent cardiac events. The available evidence, however, is limited by small numbers of patients and the choice of soft clinical end points.6 16 17

In another series of prognostic studies ambulatory monitoring was performed 1–3 weeks after myocardial infarction.7-9 14 16 At this time many recurrent events already have occurred, a fact that will always affect the prognostic value of transient ischaemia. The available data suggest that ambulatory ST segment monitoring can be used to identify those survivors of myocardial infarction who are at an increased risk of recurrent cardiac events during 1–2.5 years of follow up. The severity of key end points in different studies ranges from mortality7 through combined hard events9 mainly to angina pectoris.14 18 This difference probably indicates that most studies were of too few patients and that there was a considerable variation in terms of patient selection between studies. The relative value of ambulatory ST segment monitoring in the low risk group of patients who are able to perform a predischarge exercise stress test remains unclear.6 9 14 18

One common finding in the post-infarction studies is the poor association between transient myocardial ischaemia and recurrent non-fatal infarction. This may be explained in part by the fact that myocardial infarction can often result from acute plaque rupture of what were only mild coronary artery lesions. Thus in 48–66% of patients with mild to moderate coronary artery disease myocardial infarction was shown to occur because of the occlusion of a coronary artery that did not contain an obstructive (<50%) stenosis on an earlier coronary angiogram.19 20 Coronary artery lesions of this severity are generally not flow limiting and will probably not result in myocardial ischaemia—silent or symptomatic—during ordinary daily living. It should be emphasised that the applicability of the data on post-infarction ambulatory monitoring is limited because most of the studies either predate the thrombolytic era or include only a small proportion of patients who have received reperfusion therapy.

Summary and conclusions

The prevalence of transient myocardial ischaemia after myocardial infarction seems to be lower than in other subgroups with coronary artery disease. In post-infarction patients, however, a greater proportion of
ischaemic episodes are silent. At present there is substantial evidence that transient ischaemia provides prognostic information in different subsets of patients with previous myocardial infarction, but there is considerable disagreement about how this is expressed in terms of cardiac events. Small patient numbers, patient selection, and different timing of ambulatory monitoring are proposed as important reasons for the inconsistent findings.

The precise role of ambulatory ST segment monitoring in clinical practice has yet to be established. Direct comparisons with exercise stress testing may not be appropriate for two reasons. Firstly, the main advantage of ambulatory monitoring may be that it can be performed early after infarction at the time of maximum risk. Secondly, it can be performed in most patients after infarction, including those recognised as being at high risk who are unable to perform an exercise stress test.

Department of Cardiology, Odense University Hospital, 5000 Odense C, Denmark

18 Mickley H, Pless P, Nielsen JR, Berning J, Møller M. Transient myocardial ischemia after a first acute myocardial infarction and its relation to clinical characteristics, predischarge exercise testing and cardiac events at one-year follow-up. Am J Cardiol 1993;71:139-44.