Correspondence

Lead specificity of the maximum ST/heart rate slope response

Sir,

We are disturbed that correspondence regarding the maximum ST segment/heart rate slope¹ remains focused on the issue of test perfection² rather than on the potential value and limitations of this method.³ Since no diagnostic test of this type can be wholly accurate, demonstration of test imperfection^{4,5} is predictable. But does this mean that further study of a potentially important contribution to exercise electrocardiography should be abandoned?

Surely a more important question is whether this method can improve the predictive accuracy and clinical usefulness of the exercise electrocardiogram. In patients with stable angina we have found that a modified ST segment/heart rate slope analysis can significantly improve our ability to identify patients with anatomically and functionally severe coronary artery disease.^{6,7} Indeed a similar conclusion regarding identification of three vessel disease might be drawn from the data of Quyyumi *et al.*⁴ The study by Balcon *et al* unfortunately included only two patients with three vessel disease.⁵

The failure of some studies to reproduce the test accuracy reported from Leeds should not stop further study of the method but rather should raise important and answerable questions about the optimal applicability of the ST segment/heart rate slope in different clinical populations. Although the test can be highly accurate for the detection of three vessel disease in patients with stable angina pectoris, the method is inaccurate shortly after transmural infarction and does not predict the severity of coronary disease in patients with aortic regurgitation.³ Test inaccuracy is also likely in the various cardiomyopathies. Heterogeneity of study populations may thus explain some of the controversy surrounding the ST segment/heart rate slope. In addition, selection and referral patterns may also affect test accuracy in patients with angina.⁸ These are interesting and resolvable problems that require investigation. As these data accumulate it is not rea-

sonable to suggest that careful definition of study populations might further clarify the clinical usefulness and limitations of the method?

Paul Kligfield,
Peter M Okin,
Oliver Ameisen,
Jeffrey S Borer,
Division of Cardiology,
The New York Hospital-Cornell Medical Center,
525 East 68 Street,
New York, New York 10021, USA.

References

- 1 Layton C. Lead specificity of the maximum ST/heart rate slope response [Letter]. *Br Heart J* 1985; 54: 554.
- 2 Elamin MS, Boyle R, Kardash MM, *et al.* Accurate detection of coronary heart disease by new exercise test. *Br Heart J* 1982; 48: 311-20.
- 3 Ameisen O, Okin PM, Devereux RB, *et al.* Predictive value and limitations of the ST/HR slope. *Br Heart J* 1985; 53: 547-51.
- 4 Quyyumi AA, Raphael MJ, Wright C, Bealing L, Fox KM. Inability of the ST segment/heart rate slope to predict accurately the severity of coronary artery disease. *Br Heart J* 1984; 51: 395-8.
- 5 Balcon R, Brooks N, Layton C. Correlation of heart rate/ST slope and coronary angiographic findings. *Br Heart J* 1984; 52: 304-7.
- 6 Okin PM, Kligfield P, Ameisen O, Goldberg HL, Borer JS. Improved accuracy of the exercise electrocardiogram: identification of three-vessel coronary disease in stable angina pectoris by analysis of peak rate related changes in ST segments. *Am J Cardiol* 1985; 55: 271-6.
- 7 Kligfield P, Okin PM, Ameisen O, Wallis J, Borer JS. Correlation of the exercise ST/HR slope with anatomic and radionuclide cineangiographic findings in stable angina pectoris. *Am J Cardiol* 1985; 56: 418-21.
- 8 Philbrick JT, Horwitz RI, Feinstein AR, Langou RA, Chandler JP. The limited spectrum of patients studied in exercise test research: analyzing the tip of the iceberg. *JAMA* 1982; 248: 2467-70.