Letter to the Editor

Silent ischaemia and vigorous exercises

T. Hartvig Jensen, S. Christensen, E. Darre, P. Holmich and F. Jahnsen. Copenhagen, 26 January 1989

Sir

Sudden death in highly trained athletes during organized competitive exercise is very infrequent, considering the large number of participants^{1,2}. Sudden death in marathon running has been described³ but few reports have tried to relate sudden death during vigorous exercises to age^{4,5}.

We report a previous healthy 56-year-old man who had a cardiac collapse during the 'Wonderful Copenhagen Marathon' 1987. He was a highly trained athlete who had completed eleven previous marathon races and never been treated for cardiovascular disease.

After 36 km of the race he suddenly collapsed without warning. Resuscitation was initiated at once and the race medical staff reached the patient after three minutes. Ventricular fibrillation was diagnosed and DC defibrillation was successful. On hospital admission ten minutes later he was alert, cardiovascularly stable and denied any chest pain prior to collapse.

Coronary enzymes were slightly elevated (CKMB, LDH) and ECG was compatible with an inferior subendocardial infarction. Echocardiography was normal. The patient was discharged uneventfully after four days. Although cardiac enzymes are increased with physical stress⁶, permanent ECG changes even without chest pain favour the diagnosis of myocardial infarction⁷.

When reviewing the literature and the above mentioned case it is our impression that the cause of sudden death in exercise is mainly due to silent ischaemia among competitors over 35 years old. Maron *et al.* have described causes of sudden death in competitive athletes and concluded that in athletes over 35 years old 75 per cent of sudden deaths were related to arteriosclerotic heart disease. They rarely resulted from the congenital heart conditions more common in younger athletes' deaths. They stressed that about half of older patients with sudden deaths had prodromal cardiovascular symptoms or a known medical history of coronary artery disease and were described as having 'severe' coronary narrowing at autopsy. The other 50 per cent were asymptomatic^{4,5}. Marathon running itself does not provide immunity to atherosclerosis⁸.

Silent ischaemia in the general population is estimated in middle aged men to be approximately five per cent with an annual mortality of between one to three per cent^{9,10}. The rate of asymptomatic atherosclerotic heart disease in highly trained athletes is unknown, but would be expected to be below five

per cent. Droste and Roskamm found that asymptomatic patients had a much higher pain threshold than their symptomatic counterparts¹¹. This is consistent with a high pain threshold in highly trained athletes and, with a well developed coronary collateral system, may explain why 50 per cent of sudden deaths in vigorous exercise occur in runners who are previously asymptomatic.

Sudden death during exercise may be unavoidable, but its incidence can be reduced by giving our proper information, especially to elderly runners. Any discomfort four weeks before a marathon race (or other vigorous programmes) should lead to medical examination. Furthermore, runners with a known family history of arteriosclerotic heart disease should be referred for a medical examination including ECG, treadmill test, and blood lipids.

References

- 1 Tunstall Pedoe, D.S. Sudden death— preventable or inevitable *Brit J Sports Med* 1984, **18**, 293–4
- 2 Vuori, I. Kardiovaskuläre risiker i samband med motion *Nord med* 1984, **99**, 174–6
- 3 Steffny, M. Dritter Marathon—toter in Hamburg *Spiridon* 1987, **4**, 8
- 4 Maron, B.J., Epstein, S.E., Roberts, W.C. Causes of sudden death in competitive athletes *J Am Coll Cardiol* 1986, **7**(1), 204–14
- 5 Maron, B.J., Roberts, W.C., McAllister, Rosing, D.R., Epstein, S.E. Sudden death in young athletes *Circulation* 1980, **62**(2), 218–229
- 6 Sylven, J.C.H., Jansson, E., Brandt, S., Kallner, A. Specificitet of cardiac enzymes in diagnosis of chest pain in marathon runners *Lancet* 1983, **24**(31), 1505
- 7 Smith, W.G., Cullen, K.J., Thorburn, I.O. Electrocardiograms of marathon runners in 1962 Commonwealth Games *Brit Heart J* 1964, **26**, 469–477
- 8 Bassler, T.J. Marathon running an immunity to atherosclerosis *Ann NY Acad Sci* 1977, **301**, 579–92
- 9 Cohn, P.F. Seminar on asymptomatic coronary artery disease *J Am Coll Cardiol* 1983, **1**, 922–3
- 10 Langou, R.A., Huang, E.K., Kelly, E.K., Cohen, L.S. Predictive accuracy of coronary artery calcification and abnormal exercise test for coronary artery disease in asymptomatic men *Circulation* 1980, **62**(1), 196–203
- 11 Droste, C., Roskamm, H. Experimental pain measurements in patients with asymptomatic myocardial ischaemia *J Am Coll Cardiol* 1983, **1**, 940–5

Comment

The above letter was shown to the Medical Director of the London Marathon, 1989. The response is given below:

Sir

I think the 'Wonderful Copenhagen Marathon' medical support team are to be congratulated on successfully resuscitating a runner in ventricular fibrillation