Exercise ventilation after balloon dilatation of the mitral valve

Sir,—We were interested to read the report of Banning et al. of an acute reduction (within 24 hours) of the VE/VCO₂ slope after balloon dilatation of the mitral valve. Banning et al explain this observation by suggesting that the abnormally high VE/VCO₂ slope is the result of ventilation/perfusion mismatching. They argue that with acutely improved haemodynamics this mismatch, and hence the VE/VCO₂ slope, improves. The basis of this assumption is the observation in a subset of 10 patients that the VE/VCO₂ slope is reduced from a mean of 41 to 36 within 24 hours. When concerned, however, with the method used to obtain the VE/VCO₂ slope in these patients. They were exercised to 75% of their pre-procedure maximal workload, and the VE/VCO₂ slope was then calculated from this submaximal test. We have previously demonstrated that the VE/VCO₂ relation is not uniformly linear, at least in chronic heart failure, and that the value obtained for the overall VE/VCO₂ slope is dependent upon the level of exercise completed.1 In our study the VE/VCO₂ slope was at least 10% less if it was calculated from a submaximal (75% maximal) test. The observed reduction in VE/VCO₂ slope at 24 hours could thus largely be explained by this artefact. If the 24 hour VE/VCO₂ slope is spuriously lowered then it is interesting to observe that there would actually be a gradual reduction in VE/VCO₂ slope rather than an acute drop, suggesting a peripheral rather than haemodynamic cause for the high VE/VCO₂ slope in these patients. This hypothesis is also supported by the recently reported dissociation between haemodynamic improvement and exercise tolerance after balloon dilatation of the mitral valve.2

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This letter was shown to the authors, one of whom replies as follows:

Sir,—Further analysis of our data, with direct comparison of equivalent exercise levels, showed a persistence in the difference in the VE/VCO₂ slope before and 24 hours after balloon dilatation of the mitral valve (mean 40 to 36, P<0.05). The relation between ventilation and carbon dioxide is known to vary with the severity of heart failure.3 The finding of a 10% difference in VE/VCO₂ slope calculated from a submaximal test was derived from a group of patients with predominantly mild to moderate heart failure (mean peak Vo₂ 19.4±5.4 m/min (mean VE/VCO₂ 33).3 Our patients had more severe functional limitation (peak Vo₂ 12.7±4.2 m/min, VE/VCO₂ 41) and previous work suggests that in such patients the increase in VE/VCO₂ slope is linear and that it is seen from the outset of the exercise. Data in these severely affected patients are therefore less likely to be affected by reductions in patient motivation and exercise duration during a submaximal test.

We have previously shown that changes in cardiac output can acutely alter the VE/VCO₂ slope in patients with impaired resting left ventricular function.4 Similar changes do not occur in patients with normal ventricles.5 These data, taken with our current data, suggest that in patients with chronic heart failure and increased VE/VCO₂ slope, the VE/VCO₂ slopes and therefore ventilation/perfusion matching can be altered acutely and that these changes are likely to reflect changes in the distribution of pulmonary flow rather than alterations in skeletal muscle metabolism.

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NOTICES

With much sadness the Council and administrative staff of the British Cardiac Society were informed of the death, after a long illness, of Jennie Lodge on 24 January 1996. Jennie had worked tirelessly for the Society for many years, up to and including the 1995 annual meeting in Harrogate, as Senior Administrator. The 1996 Annual Meeting of the British Cardiac Society will take place at the Scottish Exhibition & Conference Centre, Glasgow from 7 to 9 May. The XXth South African Congress of Cardiology will be held at the Wild Coast Sun, South Africa from 6–10 October 1996. The ETRO/ISSFAL meeting on lipids, membranes and thrombosis: fundamental basis of cardiovascular disease and its dietary prevention will be held at the University of Maastricht, The Netherlands from 10–13 July 1996. For further information please contact Mrs Silvia de Bruin, Conference Bureau, Scimex: +31 345 576 34 57 642: fax: +31 345 571 781.