REPLY

We read with interest the data submitted by Batalla et al. concerning plasma Lp(a) concentrations in 132 men aged less than 50-years old admitted to hospital with acute coronary syndromes. They report a multiple group comparison (Kruskal Wallis test) indicating a significant difference ($p = 0.003$) between Lp(a) concentrations in four subgroups divided according to the number of vessels with greater than 50% angiographic stenoses (i.e., 0, 1, 2 and 3 vessel disease). Their data suggest that the patients with higher vessel scores had higher plasma Lp(a) concentrations. Our previous report (1) described plasma Lp(a) concentrations in 129 patients (mean age 60 ± 11 years; 43 women) with chronic stable angina who we assessed using a validated angiographic scoring method (2) to take account of both mild and severe angiographic stenoses. Analysis of our data indicated that Lp(a) concentrations were significantly higher in patients with significant angiographic disease compared with those without such disease. Having demonstrated a significant difference in Lp(a) concentration between those with a vessel score of 0 and those with a vessel score greater than 0, it is not surprising that a multiple group analysis of Lp(a) concentrations between subgroups of our patients divided according to vessel score (as performed by Batalla et al.) also indicated a statistically significant difference. However, we wished to investigate the relationship between Lp(a) concentration and vessel score within the patients with angiographic disease and, therefore, we excluded those with a vessel score of zero from this analysis. Our data indicated that the difference in Lp(a) concentration between patients with 1, 2 and 3 vessel disease was not significant ($p = 0.3$). The distribution of the data in Batalla et al.'s study is presented as the 5th to 95th percentiles rather than the more conventional interquartile range (25th to 75th percentiles) and consequently, it is difficult to compare the extent of overlap between the subgroups in the two studies. Nevertheless, it would be interesting to know whether a similar three-way analysis of their data would provide a statistically significant result.

Subgroup analysis of our data according to gender indicated that the difference in Lp(a) concentration between those with and those without angiographic disease only achieved statistical significance in women. Our failure to demonstrate a significant difference in men is consistent with the findings of other investigators (3) and is intriguing in light of the fact that androgenic steroids are known to significantly reduce Lp(a) concentrations (4). The discrepancy with the findings of Batalla et al. may be related to the difference in clinical presentation and, in particular, it is important to consider the possibility that Lp(a) may act as an acute phase reactant in patients with acute coronary syndromes (5). Therefore, we believe that the data provided by Batalla et al. are complementary to our own findings. Their data also confirm and extend the results of other authors (6) who have previously shown that plasma Lp(a) concentrations are significantly raised in patients with unstable angina and correlate with plasma Troponin-T levels. These findings suggest that Lp(a) may have an important role in the pathophysiology of plaque instability in acute coronary syndromes.

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REFERENCES

1. Schwartzman RA, Cox ID, Poloniecki J, Crook R, Seymour CA, Kaski JC. Elevated plasma lipoprotein(a) is associated with coronary artery disease in patients with chronic stable angina pectoris. J Am Coll Cardiol 1998;31:1260–6.
2. Sullivan DR, Marwick TH, Freedman SB. A new method of scoring coronary angiograms to reflect extent of coronary atherosclerosis and improve correlation with major risk factors. Am Heart J 1990;119;1262–7.
3. Stiel GM, Reblin T, Buhrlen M, Lattermann A, Nienaber CA. Differences in lipoprotein (a) and apolipoprotein (a) levels in men and women with advanced coronary atherosclerosis. Coron Artery Dis 1995;6:347–50.
4. Crook D, Sidhu M, Seed M, O'Donnell M, Stevenson JC. Lipoprotein (a) levels are reduced by danazol, an anabolic steroid. Atherosclerosis 1992;92:41–7.
5. Utermann G. The mysteries of lipoprotein (a). Science 1989; 246:904–10.
6. Stubbs P, Seed M, Moseley D, O'Connor B. Collinson P, Noble M. A prospective study of the role of Lp(a) in the pathogenesis of unstable angina. Eur Heart J 1997;18:603–7.

Peak VO_2 et al. For Prognosis In Heart Failure?

Osada et al. (1) recently reported interesting data on the 3-year prognosis of 154 patients with a peak VO_2 ≤14 ml/kg/min. It was found that amongst the variables studied peak exercise systolic blood pressure and % predicted peak VO_2 were the two most important prognostic markers. We would like to ask the authors whether they have included in their statistical analyses the VE/VCO_2-slope and the presence of very low body weight or weight loss, i.e., cardiac cachexia?

In the methodology section, the authors stated that the VE/VCO_2-slope has been assessed. Nowhere in the paper did the authors subsequently report these data, which is unfortunate, particularly because a report published previously in the *Journal of the American College of Cardiology* reported the very strong prognostic predictive power of the VE/VCO_2-slope, which was significantly independent of peak VO_2 (2). This finding has recently been confirmed by others (3,4). Part of the quality of VE/VCO_2-slope data arises from its excellent reproducibility. The SD for re-

peated measures is approximately 3 to 6% (that for peak VO_2 is 8 to 12%). This is particularly important, if no familiarization exercise test is performed (not reported in the paper). If the VE/VCO_2-slope, nevertheless, is not of prognostic importance in the patients studied by Osada et al. this would also be important information.

It is intriguing that in the study of Osada et al. the peak VO_2 was similar in survivors and nonsurvivors, but that the percentage of predicted peak VO_2 was significantly different ($p = 0.04$). It has previously been shown that the skeletal muscle mass correlates linearly with peak VO_2 ($r = 0.68$, $p < 0.01$) in 100 patients (5). It has been suggested that obesity is bound to underestimate "true" peak VO_2 (6), whereas in the presence of muscle wasting the peak VO_2 rather overestimates "true" exercise capacity (7). When the survivors and nonsurvivors are not significantly different for age and sex the main determinant predicting low percentage predicted peak VO_2 is most likely the patients' low body weight in relation to ideal body weight. In accordance with this concept, we have previously shown that the presence of cardiac cachexia (>7.5% weight loss) or of low ideal body weight (<85% of ideal) is predictive of mortality in patients with a peak $VO_2 \leq 14$ ml/kg/min (8).

The VE/VCO_2-slope and the presence of cardiac cachexia (or low ideal weight) are simple and useful measurements well recognized in the literature, but unfortunately have not been discussed by Osada et al. We believe that without discussion of these available data, Osada et al.'s important paper is not complete, although, one could argue, this should have been picked up in the review process.

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REFERENCES

1. Osada N, Chaitman BR, Miller LW, et al. Cardiopulmonary exercise testing identifies low risk patients with heart failure and severely impaired exercise capacity considered for heart transplantation. J Am Coll Cardiol 1998;31:577–82.
2. Chua TP, Ponikowski P, Harrington D, et al. Clinical correlates and prognostic significance of the ventilatory response to exercise in chronic heart failure. J Am Coll Cardiol 1997;29:1585–90.
3. Kleber FX, Vietzke G, Bauer U, Opitz C, Reindl I, Köhler F. Impairement of ventilatory efficiency predicts prognosis in patients with chronic heart failure [abstract]. Circulation 1996;94 Suppl I:I–374.
4. Gitt AK, Speck T, Schwarz A, et al. Exercise ventilation in chronic heart failure: prognostic importance of the ventilatory response to exercise [abstract]. Eur Heart J 1997;18 Suppl:575.
5. Lang CC, Chomsky DB, Rayos G, Yeoh TK, Wilson JR. Skeletal muscle mass and exercise performance in stable ambulatory patients with heart failure. J Appl Physiol 1997;82:257–261.
6. Wilson JR, Rayos G, Smith J, Gothard P, Yeoh TK. Effect of body composition on exercise performance in patients with heart failure [abstract]. J Am Coll Cardiol 1995; Suppl A25:339A.
7. Anker SD, Swan JW, Volterrani M, et al. The influence of muscle mass, strength, fatiguability and blood flow on exercise capacity in cachectic and non-cachectic patients with chronic heart failure. Eur Heart J 1997;18:259–69.
8. Anker SD, Ponikowski P, Varney S, et al. Wasting as independent risk factor of survival in chronic heart failure. Lancet 1997;349:1050–53.

REPLY

We thank Dr. Anker and Dr. Coats for pointing out the merits of using VE/VCO_2-slope as a prognostic predictor of mortality independent of peak VO_2. We did not test VE/VCO_2-slope in relation to peak VO_2 as a prognostic predictor in our report.

There was no significant relationship between body weight and prognosis. The body weight in the 154 patients with a peak VO_2 <14 ml/min/kg was 74.2 ± 10.7% of ideal weight. Mortality in patients with <70% of ideal body weight was 15% (7/46), 70–85% of ideal weight was 26% (25/93), and >85% was 20% (3/15) in the 154 patients with a peak VO_2 <14 ml/min/kg; the differences were not statistically significant ($p = 0.29$).

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