Impairment of Ventilatory Efficiency in Heart Failure

To the Editor:

In these days of high-technology cellular biology, it is always a great pleasure to read research relating to whole-body integrated physiology. Kleber and colleagues 1 are to be congratulated on presenting important data relating to the survival of real patients with exercise impairment. There are a number of important issues that I would draw attention to.

The patient group does not represent the usual group of patients with chronic heart failure. They are much younger than those seen in clinical practice (51.6 years), and only 69% of them were taking diuretics.

Most of the authors’ data have been presented previously.2 However, they stopped recruiting in November 1996. Given that follow-up was for a mean of 16 months and that the article was submitted in September 1999, more follow-up data should have been available.

The discussion is out of date as well. Only 4 articles from 1998 are referenced (3 from the authors themselves), and 2 of the references are to old abstracts, at least one of which was published as a full article in 1996. The discussion also mentions the “muscle hypothesis” without referencing the origin of that hypothesis.3

The authors also failed to discuss more relevant recent work, such as the potential role of enhanced chemoreflex activity in driving abnormal ventilatory responses.4 It is particularly disappointing to see the earlier study by Chua et al5 glossed over in a single sentence. Chua et al published their findings in 173 patients aged 60 years nearly 3 years ago, and they found that a high ventilatory response to carbon dioxide production was an important independent prognostic factor.

The accompanying editorial makes interesting reading. In particular, the sentence “Because the high level of ventilatory drive in heart failure can predict survival, it must contain important information on how left ventricular dysfunction affects either the lung or ventilatory control” deserves some comment. Does the fact that “age” can predict survival mean that “age” must contain important information on how left ventricular function affects age?6

The pathophysiology of exercise limitation is complex. In a multisystem disease such as chronic heart failure, changes in different organ systems happen simultaneously. They will necessarily correlate with each other, but this does not imply causation.

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Response

There was a famous Bavarian writer at the turn of the century, Karl Valentin, who, like Andrew Clark, was able to draw odd conclusions by taking words literally and, in fact, he made an art of it. Age affects survival in almost all diseases without being literally affected by the diseases. However, it is unlikely that the derangement of ventilation in congestive heart failure is largely independent of heart failure. Similarly, other changes in this “multi-system disease” are also precipitated by heart failure and its sequela.

Our data were published quite some time after the presentation of the abstract, as Clark readily noticed. We did, however, make a strong effort meanwhile to follow-up on these patients and came to the conclusion that a 100% follow-up was more valuable over the reported time period than a 90% or 95% follow-up over an extended time period. Nevertheless, our group was the first to draw attention to the prognostic importance of ventilatory efficiency in heart failure.

Our patients represented a referred population to a tertiary medical center. This is probably the reason for the rather low mean age. In addition, the ability to perform a treadmill exercise test might have influenced age. However, our normal values were derived within the same age range (16 to 75 years in controls and 21 to 73 years in patients). Therefore, the percentages of predicted normal are appropriate for each individual patient.

Due to the necessity of shortening the manuscript appropriately, we had to abbreviate the discussion. It was not our aim to underestimate the contributions to this important field achieved by other groups and scientists.

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