Author’s Reply

Author’s Reply, “Clinical Significance of Cerebral Oxygenation During Exercise in Patients With Coronary Artery Disease”

In response to the letter from Drs Quaresima and Ferrari, we justify our interpretation on cerebral oxygenation estimated from near-infrared spectroscopy (NIRS) during exercise.

In the investigation by Al-Rawi et al on human subjects undergoing carotid endarterectomy, extracranial contamination seemed to have a stronger influence on oxyhemoglobin ($O_2$Hb) than on the tissue oxygenation index (TOI) when these were measured by NIRS attached to the forehead. Having commenced the present study at the beginning of 2001 before noticing the results from Al-Rawi et al, we reported only the data for $O_2$Hb among the variables obtained from NIRS. Because our study was prospective, all of the parameters for analysis were defined before the study was initiated. The real purpose of the study was not to compare the prognostic power among the indexes obtained from NIRS, but to evaluate the prognostic value of cerebral oxygenation during exercise and determine whether it is independent of cardiopulmonary function. When we initiated the study, the most reliable index of NIRS for estimating cerebral oxygenation had not been established. Therefore, we simply decided to select $O_2$Hb among the variables obtained from NIRS.

In most of our recent reports on cerebral oxygenation during exercise, we demonstrated not only the data for $O_2$Hb but also those for TOI and deoxyhemoglobin. The pattern of change in $O_2$Hb during exercise is basically similar to that of TOI in normal subjects in patients with valvular disease and in those with idiopathic dilated cardiomyopathy. We also noted that patients with reduced consciousness due to ventricular tachycardia exhibited similar changes in $O_2$Hb and TOI. On the other hand, it might be interesting to analyze total Hb in addition to $O_2$Hb and TOI, as Drs Quaresima and Ferrari suggest. We have not carefully conducted such an analysis, though we may in the future.

TOI is now assumed to be a more reliable index than $O_2$Hb for estimating cerebral oxygenation during exercise. If TOI had been used instead of $O_2$Hb in our study, we might have noticed the more powerful prognostic value of cerebral oxygenation. However, we certainly would have reached a similar conclusion (ie, that cerebral oxygenation during exercise is related to future cardiovascular events in patients with coronary artery disease).

References


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