Response to Letter Regarding Article on Index of Microvascular Resistance and Microvascular Obstruction in patients with Acute Myocardial Infarction

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We thank Berry el al(1) for their letter regarding our recent study(2), suggesting we used incomplete data, as we did not include those studies reporting median index microvascular resistance (IMR). However, in our study, we had pre-specified the inclusion of those studies reporting mean and not median IMR. Although different methods are available for converting median values to mean ones, they are based on various assumptions, and each method derives different mean values and standard deviations (SD). The latest study(3) referred to by Berry et al was not identified on Pubmed or Embase at the time our manuscript was being prepared. Even if we were able to access the raw data from that study, their IMR values were non-normally distributed and using mean values instead, would have been statistically flawed, and not reflective of the actual IMR in each group. Besides, the excluded studies also showed a significant difference in IMR values between those with and without MVO and/or intramycardial hemorrhage (IMH), and the overall conclusion of our study would have been similar. To illustrate this, we have now used the formula interquartile range/1.35 as suggested by the Cochrane Handbook(4) to derive the SD of these 3 studies mentioned in their letter(1), and have updated our analysis. The IMR in the MVO/IMH group (n=290) was significantly higher than the no MVO/IMH group (n=297): 41U (99%CI 37-46) versus 22U (99%CI 19-25)(P<0.001), and the heterogeneity among the studies increased from 0% to 28%. We have not provided the SD for each group, as it is highly likely to be inaccurate.

We commend the Berry et al for their tremendous work in this field and we would welcome any future collaborative work to advance the field. Large variability in IMR still exists, and there is a need for standardizing IMR

measurement across centers. Even from a single-center study, the sensitivity and specificity of IMR>27U to detect MVO with IMH was only at 66% and 67%, respectively, and an IMR<27U (rather than >27U as stated in their manuscript(3)) had a negative predictive value of 74%. As it stands, it appears from their data(3), that if a cardioprotective strategy is administered prior to or immediately after reperfusion, then 50% ST-resolution by eletrocardiography at 60 minutes would perform equally well to IMR to track a putative treatment effect, and cardiovascular magnetic resonance remains the gold standard. However, we agree with them that if the aim is to identify high-risk patients immediately post-PPCI and target them with further adjuvant therapies, aiming to restore microvascular perfusion, then IMR would be valuable.

REFERENCES

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