JACC: CARDIOVASCULAR IMAGING
VOL. 1, NO. 5, 2008

ISSN 1936-878X/08/$34.00
PUBLISHED BY ELSEVIER INC.

iMAIL

LETTERS TO THE EDITOR

Concordance Between Actual and Expected Coronary Artery Distribution

I read with interest the manuscript by Ortiz-Pérez et al. (1) regarding the concordance between the 17-segment American Heart Association model (2) and coronary arterial anatomy using contrast-enhanced cardiac magnetic resonance imaging. In 93 subjects with an acute coronary syndrome, the investigators report a moderately good agreement between the actual and model-predicted coronary artery distribution and suggest that the inferior apical, lateral apical, and mid anterolateral segments are most commonly supplied by the left anterior descending coronary artery (LAD), contrary to what the model predicts.

In a previous study assessing the accuracy of a 17-segment model widely used in the nuclear cardiology literature, we projected the actual coronary artery anatomy of 135 patients undergoing coronary angiography onto the 17-segment model (3). We found that in general the model-predicted coronary anatomy was appropriate. There was only 1 segment (the apical lateral) in which the model-predicted coronary anatomy distribution (left circumflex coronary artery) did not match the actual one (LAD). In our previous report (3), concordance between the adjusted (i.e., apical lateral segment assigned to LAD) model-predicted and actual coronary artery anatomy occurred in at least 14 of 17 segments in 90% of the study population (121 of 135 patients). In our cohort, left dominance, occurring in 8% of study subjects, accounted for the greatest number of "misassignments" by the 17-segment model.

The Ortiz-Pérez et al. (1) findings corroborate our data regarding the apical lateral segment. Furthermore, because the 17-segment model that we examined and the American Heart Association model that Ortiz-Pérez et al. (1) evaluated differ regarding the expected coronary artery distribution at the apical inferior segment, the Ortiz-Pérez et al. (1) findings and our findings are in good agreement regarding the vascular supply of this segment, which in most patients was from the LAD. One segment that Ortiz-Pérez et al. (1) and we did not fully agree on was segment 12, which in our cohort was supplied by the left circumflex coronary artery, as the model predicts, and in the study by Ortiz-Pérez et al. (1), it was more commonly supplied by the LAD. In a smaller study, Pereztol-Valdés et al. (4) reported that segment 12 can be supplied by either the left circumflex coronary artery or the LAD.

The disagreement in the 2 reports regarding blood supply of the mid anterolateral segment (segment 12) may possibly be explained by the following factors: the inherent individual variability of coronary artery anatomy, the smaller number of patients in the study by Ortiz-Pérez et al. (1), the different methodology and different segmentation models in the 2 reports, and the existence of significant coronary atherosclerosis and previous scarring in some patients in the Ortiz-Pérez et al. (1) study. However, the agreement in these two studies (1,3) and other reports (4,5) regarding the inferior apical and lateral apical segments, suggesting that the LAD usually supplies segments 15 and 16, is important and should be taken into consideration for a possible revision of the expected vascular distribution in the 17-segment American Heart Association model.

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doi:10.1016/j.jcmg.2008.06.006

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REPLY

We thank Dr. Danias for his interest in our article (1). Despite the differences in the left ventricular segmentation model applied by Aepfelbacher et al. (2) in their study, we agree that the entire apex more frequently is supplied by the left anterior descending artery (LAD). This finding has also been suggested in other studies in which the authors used nuclear perfusion imaging (3) or coronary computed angiography and magnetic resonance imaging (4). These results reflect the usual distribution of the LAD on angiography which, in most cases, wraps around the apex. Therefore, we agree that these studies should warrant a possible revision of the expected