Reviewer’s report

Title: Impact of completeness of revascularization by coronary intervention on exercise capacity early after acute ST-elevation myocardial infarction

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Reviewer: Francesco Saia

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The study by Dr. Zhao and colleagues pertains a very interesting and controversial topic in interventional cardiology: the impact of complete vs. incomplete revascularization in patients with multivessel coronary disease (MVD) presenting with ST-elevation myocardial infarction (STEMI) who underwent primary PCI.

The Authors enrolled all patients who underwent cardiopulmonary exercise testing 7-30 days after STEMI and they found no advantage of complete revascularization (CR) over incomplete revascularization (IR) on short-term exercise tolerance, quantified by peak oxygen uptake (VO2peak), oxygen uptake at anaerobic threshold (VO2AT) and peak oxygen pulse.

The manuscript is well written, the methodology is clear and discussion and conclusions are balanced enough and adequately supported by the data.

The main limitation is the retrospective nature of the study. In the medical literature there are many similar retrospective studies, but all of them are flawed by a strong - though inevitable- selection bias: patients that received a “staged procedure” in order to complete revascularization were most likely those perceived at higher risk by the physicians, either for clinical or for anatomical characteristics. This limitation has been acknowledged by the Authors. Nevertheless, this and other studies may still carry interesting information.

Major Compulsory Revisions

1) The conclusion that CR is of no benefit in my opinion should be toned down. There are several limitations suggesting to be more cautious when interpreting these data:

a) The previously mentioned selection bias between the 2 groups of patients with MVD, potentially encouraging revascularization when more feasible or when perceived more clinically-relevant

b) 97% of the patients had a Killip class I, meaning that this is a very low risk population. The benefit of complete revascularization is mainly expected in high-risk and hemodynamically unstable patients. Showing a benefit of CR in low risk population would require much larger studies and longer follow-up.

c) The complete revascularization group received a staged PCI procedure within the same hospitalization with an apparently angio-guided strategy. In the
absence of a clear evidence of ischemia, some procedures may carry only increased risk of events.

d) Data from other similar studies provided opposite results, using clinical endpoints

e) In parallel with the “ischemia-driven “ vs . the “angio-guided” strategy issue, it could be hypothesized that a strategy of “delayed” complete revascularization (i.e. performed a few weeks after the episode of STEMI) may hold different results as compared to a strategy of “early” complete revascularization.

2) In the “catheterization protocol” paragraph the Authors should clarify how decision to perform complete revascularization with staged PCI was made. Was there any ischemia-driven decision or angio-guided decision. Alternatively, it should be simply stated that there was not a clear strategy for CR and every physician and center made the decision based on different protocols.

3) The authors state that a limitation of the study design was that there were no exercise performance data obtained prior to acute MI (Limitations paragraph). This would be rather unusual (we cannot predict a MI), so this in my mind is not at all a limitation and I suggest to remove these sentences.

Discretionary revisions

5) Catheterization protocol: the Authors state that clopidogrel was prescribed indefinitely. This is rather unusual and deserve a comment.

6) Table 2 basically duplicates data described in the text and there are also some unclear data. For example, it is not clear if the number of stents implanted refers only to the first procedure or, for the CR group, it also includes the second PCI. Please specify. In general, I suggest either to remove the table or to fill the table with more data. For example: non-IRA lesion vessel, lesion type (ACC/AHA), CTO, bifurcation, ostial lesion, target-lesion average lesion length, average stent length

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

'I declare that I have no competing interests'