Reviewer’s report

Title: Metabolic Syndrome Increases Operative Mortality In Patients With Impaired Left Ventricular Systolic Function Who Undergo Coronary Artery Bypass Grafting: A Retrospective Observational Study

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Reviewer: Karam Sadoon Alzuhairi

Reviewer's report:

The article entitled "Metabolic Syndrome Increases Operative Mortality In Patients With Impaired Left Ventricular Systolic Function Who Undergo Coronary Artery Bypass Grafting: A Retrospective Observational Study" represent a historical cohort of 190 patients with LVEF <50% whom underwent a CABG at one Chinese center. Patients were divided into 2 groups according to the presence of Metabolic Syndrome (MetS).

The main findings of the study: 1- The presence of MetS is associated with higher risk of post-operative mortality. 2- The more individual components present the higher the risk.

General comments:
1- An English proof-reading would be useful.
2- I found it questionable that Urgent/emergency operation and Heart failure which were the factors with the highest association with post-operative mortality on univariate analysis (and the most clinically relevant) to become non-significantly associated with it in multivariate analysis. I recommend the analysis to be run through again to make sure of the results, and to use patients with NYHA class III/IV in these analyses instead of Heart failure.
3- There were more urgent/emergency operation in MetS group (although not statistically significant because of the low numbers), higher intubation time, more frequent use of IABP, and more frequent NYHA III/IV. All these factors pointed at that MetS group contains less haemodynamically stable patients which could have affect the prognosis rather that MetS itself.

Specific comments:

Methods:
1- Line 62: When was the echo done preoperatively because there is a difference if the echo is within 2-4 weeks or one year ago?
2- How many patients were excluded because of lacking LVEF measurements, and what is the
distribution of MetS in this population?

3- In statistical analysis section, you should specify which measure of relative risk you are using, in your case you are using logistic regression test which yield Odds ratio as a measure of the relative risk, this should also be clear in Tables 4 and 5, to write Odds ratio instead of relative risk.

Results:
1- In table 1 there was a significant difference in the no. of patients with Heart failure NYHA III/IV, this was not commented on in the results. This factor is very important for the outcomes.

2- In non-diabetic patients, when comparing the 2 groups, did you insure that the MetS patients do not have DM as part of their MetS criteria, it is not clear form the results?

3- The paragraph from line 136 "Mets was associated …" to the end of the results is very confusing with unnecessary repletion of comparison with the same group of patients (with no MetS and no DM). I would suggest it to be written more clearly and more simple, for example: in patients without DM, MetS was associated with higher risk of mortality whether DM was part of MetS or not (put numbers), while in diabetes patients MetS was not associated with higher risk (put numbers)

Discussion:
1- Line 147-148, you should add references for the studies which studied the prevalence of MetS in CABG patients.

2- Lines 174-175 "Our findings suggested that metabolic abnormalities associated with MetS might be key factors in CAD progression". There is nothing in your results which can support this claim.

3- Line 188, you need a reference to say that patients with MetS are not being treated appropriately.

4- Throughout the discussion, the authors concentrating about the primary prevention/treatment of MetS which is out of the scope of this study. To improve that, the focus should be on the patients with MetS who are referred to CABG.

5- In line 141 it is written that cardiac cause of death was 40%, while in the discussion line 179 it is written that most of deaths were of cardiac cause. What was the definition of cardiac death, and how it was confirmed?

6- From line 186 to 188 not relevant talking about preventive measure for MetS in CAD patients

Table 1:
1- Can you please explain how is that all of the study patients have LVEF<50% and 34.7% of them with NYHA class III/IV yet only 8.9% had heart failure?

Table 3:
1- In the table title it is written "in-hospital outcomes" but in the table is written 30-days mortality,
were all patients admitted for 30 days?

Table 4:
1- Does the heart failure used in this table refer to that patients who were known with heart failure before the CABG or refer to those with NYHA III/IV which are mentioned in table 1. I think it is more relevant to use those with NYHA III/IV, also in multivariate analysis.

2- It is very hard to believe that DM is not associated with increased risk of mortality while hyperglycemia without DM is associated with increased risk.

Table 5:
1- In the method section it is written that factors with p <0.05 on univariate analysis were chosen to enter the multivariate analysis. In univariate analysis: HDL-cholestrol and fasting glycemia had a P<0.05, and it is not clear if they were used in the multivariate analysis. If they were used, this could lead to overfitting the model because they are components of MetS.

3- reference line 147-148

Conclusion:
1- Line 208 I suggest to change "individuals" to "patients" and omit "frequently"

2- Line 210 I suggest to omit "have" so the sentence become " did not increase"

3- Lines 212-214 from "Multifactorial " to "pharmacological intervention" are out of the scope of this study, therefore should not be included in the conclusion.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

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