

**Name of Journal: *World Journal of Cardiology***

**Manuscript Type: RETROSPECTIVE STUDY**

**Risk Score for Predicting Abdominal Complications After Coronary Artery Bypass Grafting**

**Answering reviewers**

**Reviewer 04159375. Comments to the authors:** The authors partly responded to the concerns of this reviewer. However, there are problems yet.

1. The authors defined "early" abdominal complications as prior to discharge. The predictive variables they suggested include also treatments and events during the admission after surgery. Thus, there is a possibility that this risk score cannot substantially predict the complications prospectively. I think that the variable should be limited to ones just after the surgery

2. One table should be added which shows fundamental clinical data of the 6590 patients including the factors shown in the table 1 (mean±SD, range, incidence etc. in all variables) to reflect the patient characteristics.

3. The criteria (method of diagnosis) of the diseases such as DM, HT, CKD are not shown.

4. This reviewer requires the validation of this risk score by evaluating another patient group as already suggested in the previous review. This should be considered before going to the prospective study.

5. What is the target journal ? World journal of cardiology or world journal of gastroenterology? In the final manuscript journal name is WJE and WJC in answers to the reviewers.

**Answer:**

1. We removed the variables 'Superficial wound complications' and 'Resternotomy due to the deep wound complications' from the study since they occurred more than one week after CABG with CPB. Other risk factors except the anamnestic ones occurred within two days after surgery. This information was added at page 6, 'Assessment of risk factors' section.

2. Mean, 95% CI, and  $n$  (%) were added in Table 1.
3. Diagnostic criteria were added at pages 5-6.
4. We prospectively evaluated our scale in 2018. This information was added at page 8.
5. The target journal is World Journal of Cardiology.

**Reviewer 1:** the paper is good and well written

**Answer:** Thank you for the evaluation of our article.

**Reviewer 2:** Thank you for submitting this retrospective paper that targets a novel concept of scoring abdominal complications post CAVBG. The article is well structured and answers the questions it raised. More details: **FIRST:** This article identifies novel risk for abdominal complications. The hypothesis are briefly discussed but not as relevant as this work is not aimed at causation. However by providing associations we can plan postoperative care. **SECOND:** The quality is good in regards to numbers. However the retrospective nature suggests there are gaps in the knowledge which needs addressing. **THIRD:** lacks details in many areas **SPECIFIC QUESTIONS:** 1 Title. Does the title reflect the main subject/hypothesis of the manuscript? **GOOD** 2 Abstract. Does the abstract summarise and reflect the work described in the manuscript? **OK** 3 Key words. Do the key words reflect the focus of the manuscript? **OK** 4 Background. Does the manuscript adequately describe the background, present status and significance of the study? **INADEQUATE** 5 Methods. Does the manuscript describe methods (e.g., experiments, data analysis, surveys, and clinical trials, etc.) in adequate detail? **LACKS STRUCTURE** - Look at a methods paper for headings 6 Results. Are the research objectives achieved by the experiments used in this study? What are the contributions that the study has made for research progress in this field? **OK** 7 Discussion. Does the manuscript interpret the findings adequately and appropriately, highlighting the key points concisely, clearly and logically? Are the findings and their applicability/relevance to the literature stated in a clear and definite manner? Is the discussion accurate and does it discuss the paper's scientific significance and/or relevance to clinical practice sufficiently? Needs more interrogation 8 Illustrations and tables. Are the figures, diagrams and tables sufficient, good quality and appropriately illustrative of the paper contents? Do figures require

labeling with arrows, asterisks etc., better legends? OK 9 Biostatistics. Does the manuscript meet the requirements of biostatistics? Needs stats review 10 Units. Does the manuscript meet the requirements of use of SI units? Not sure 11 References. Does the manuscript cite appropriately the latest, important and authoritative references in the introduction and discussion sections? Does the author self-cite, omit, incorrectly cite and/or over-cite references? OK 12 Quality of manuscript organization and presentation. Is the manuscript well, concisely and coherently organized and presented? Is the style, language and grammar accurate and appropriate? OK 13 Research methods and reporting. Authors should have prepared their manuscripts according to manuscript type and the appropriate categories, as follows: (1) CARE Checklist (2013) - Case report; (2) CONSORT 2010 Statement - Clinical Trials study, Prospective study, Randomized Controlled trial, Randomized Clinical trial; (3) PRISMA 2009 Checklist - Evidence-Based Medicine, Systematic review, Meta-Analysis; (4) STROBE Statement - Case Control study, Observational study, Retrospective Cohort study; and (5) The ARRIVE Guidelines - Basic study. Did the author prepare the manuscript according to the appropriate research methods and reporting? Not sure 14 Ethics statements. For all manuscripts involving human studies and/or animal experiments, author(s) must submit the related formal ethics documents that were reviewed and approved by their local ethical review committee. Did the manuscript meet the requirements of ethics? NA

**Answer:** Thank you for the thorough analysis of our article.

*Question 4 (Does the manuscript adequately describe the background, present status and significance of the study?):* The relevance of the problem is confirmed in the studies of several authors, links to which are presented in the list of references.

*Question 9 (Does the manuscript meet the requirements of biostatistics?):* Statistical methods were reviewed by the Department of Biostatistics of South Ural State Medical University. Statistical data processing was performed using Statistica 10.0 (Statsoft, OK, United States) and SPSS Statistica 23.0 (IBM Corp., NY, United States). In order to describe the risks, contingency tables were used to calculate the relative risk and the odds ratio. An integrated scale for assessing the risk of early abdominal complications was created on the basis of the above-mentioned factors by using a multivariate logistic regression analysis. The presence or absence of complications was a dependent variable, while the above-mentioned factors were independent variables. Then the obtained risk

scale was evaluated by using a receiver operating characteristic (ROC) curve analysis.

*Question 10 (Units. Does the manuscript meet the requirements of use of SI units?):* The manuscript meets the requirements of use of SI units.

*Question 14 (For all manuscripts involving human studies and/or animal experiments, author(s) must submit the related formal ethics documents that were reviewed and approved by their local ethical review committee. Did the manuscript meet the requirements of ethics?):* All the necessary ethic statements are present on the title page of the manuscript according to the requirements.

### **Reviewer 3:**

1. In the manuscript the Authors talks about early abdominal complications after cardiopulmonary by-pass but they do not specify to which kind of complication they refer! 2. In the text the Authors do not show data about clinical characteristics at baseline (before cardiac surgery). Thus we cannot exclude that those patients with abdominal complications had already a worse clinical situation. For example, atrial fibrillation was a new onset AF or not? Moreover, which was the ejection fraction at baseline? We cannot exclude that patients who were treated with ECMO or IABP had a higher risk of developing abdominal complications. 3. In the conclusions, the Authors state that their risk score, by stratifying patients, will be important for treatment an diagnosis in order to reduce perioperative mortality. The question is HOW they believe that this risk score might change the clinical and therapeutic approach for these patients. Once identified them, which is the next step?

**Answer:** Thank you for the detailed analysis of our manuscript.

1. The complications described are associated with hemodynamic disorders in the internal organs, which lead to the development of ischemia.

2. The study included patients who underwent elective coronary artery bypass grafting. The study excluded patients who underwent emergency surgery, as well as those who underwent ECMO and intra-aortic balloon counterpulsation before surgery. In contrast, the study included patients with a normal or moderately reduced left ventricular ejection fraction before surgery (55.69%; 95% CI 47.74–61%). Atrial fibrillation was considered as a risk factor if it appeared after coronary artery bypass grafting.

3. One of the goals of this study was to identify the leading risk factors for

abdominal complications and to develop a prediction score based on perioperative predictors to reveal patients at a high risk of abdominal complications. The identification of such patients will make it possible to perform early screening and to develop an algorithm of therapeutic and diagnostic measures for the prevention, early diagnosis, and treatment of this pathology. This is the subject of our further prospective study.

**Reviewer 4:**

This study was performed to develop a risk score for the prediction of early abdominal complications after coronary artery bypass grafting with cardiopulmonary bypass retrospectively data of 6586 patients in a single center. The leading risk factors for early abdominal complications after CABG with CPB included multifocal atherosclerosis, extracorporeal membrane oxygenation, intra-aortic balloon pump, atrial fibrillation, acute perioperative myocardial infarction, and the need for performing postoperative re-sternotomy. This reviewer has several concerns about this article. Major: 1. Although the authors found that the risk scores to predict the early abdominal complications retrospectively, they are recommended to verify the reliability and usefulness of this risk scores in another patients group (for example patients between 2017- 2020 etc.). 2. The authors are requested to describe the importance of early abdominal complications in the introduction, because the potential authors of this journal are not specialists in cardiology neither cardiac surgery. 3. Please define the “early” and “abdominal complications” in early abdominal complications in detail. Which symptoms/signs and clinical problems are included? 4. Please define the multifocal atherosclerosis, diabetes, the intra- and post-operative myocardial infarction and cerebrovascular accident. 5. What do you mean by 6. the use of “extracorporeal membrane oxygenation”? Was it used as PCPS/ECMO for cardiogenic shock/acute respiratory failure or just used during emergent on pump CABG? Minor: 1. The following is not necessary in the main manuscript. The statistical methods of this study were reviewed by Yu. V. Naymushina from the Department of Medical Statistics, South Ural State Medical University, Chelyabinsk, Russia.

**Answer:** Thank you for the detailed analysis of our article.

Major concerns.

1. The verification of reliability and usefulness of the developed risk score is the topic of our further prospective study.

2. Indeed, early abdominal complications are an important problem of surgery. Despite their rarity (1.1%), they are accompanied by high mortality rates reaching 90%. Information about this was provided in the Introduction section.

3. Cases of acute cholecystitis, acute pancreatitis, acute mesenteric ischemia, intestinal necrosis, and acute intestinal obstruction that developed prior to discharge of the patient were referred to as early abdominal complications. Information about this was added to the text (page 5, the Materials and methods section).

4. Definitions were added to the text (page 6, the Results section).

5. ECMO was considered as a risk factor when applied in the postoperative period in the case of cardiogenic shock and acute heart failure.

Minor concerns.

1. We deleted the sentence from the text.