

Peer review file

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Reviewer A

Comment 1 - Given all the limitations listed by the authors, the conclusion of the abstract should be less affirmative. Please use the conditional for the last sentence.

Reply 1 – Thank you for your comment. We have changed the last section of the abstract to be less affirmative. “Most of the operative mortalities seemed to be attributable to the index cardiac operation. We believe that the current definition of mortality remains appropriate in the modern era.”

Changes in the text: Page 3, Lines 21-23

Comment 2-The first paragraph of the discussion looks like a second introduction. This paragraph must absolutely be reduced. At this level, the authors should briefly highlight the originality of their study and launch the discussion.

Reply 2 – We have removed a significant portion of the first paragraph of the discussion in order for the discussion to not seem like a second introduction

Changes in the text: Removed Page 10, Lines 10-15

1/

Conclusion: In this study of patients who experienced operative mortalities, the vast majority of deaths were related to the operation itself, indicating that the current definition remains appropriate in the modern era.

2/

Discussion:

Mortality is the most commonly assessed outcome in healthcare. Several distinct definitions of 18 operative death have been proposed for different cardiac surgical quality evaluation and 19 reporting programs. Two of the most common definitions are in-hospital death, which is easily 20 determined from chart review, and mortality within a specific timeframe, specifically 30-days. 21 There are clear advantages and

disadvantages to using either of these definitions and the STS 22 has suggested that to use either in isolation would be insufficient. As such, the STS has defined 23 operative mortality as “(1) all deaths occurring during the acute episode of hospitalization in 24 which the operation was performed (this includes patients transferred to other acute facilities), 10 1 even if after 30-days; and (2) deaths occurring after discharge but within 30-days of the 2 procedures, regardless of cause (3).” While operative mortality is a frequently reported 3 postoperative events in cardiac surgery research and public reporting, the exact composition of 4 the timeframe, location, relatedness to the index operation and causes of operative deaths 5 remain elusive. Many have suggested that a 30-day timeframe may not be sufficient to 6 adequately evaluate mortality; however, prior to instituting a more prolonged interval for 7 operative mortality evaluations, establishing if the current definition of operative mortality is 8 sufficient for patients in the modern era is prudent. The aim of this study was to enhance the 9 understanding of the timing, systems-based cause and association of death with the index 10 operation in patients who experienced operative mortality to determine if operative mortality 11 remains an adequate outcome measure in the modern era.

Reviewer B

In the manuscript “Operative mortality in adult cardiac surgery: is the currently utilized definition justified?” Chan et al aimed to evaluate operative mortality after cardiac surgery to determine if STS definitions remain still appropriate. In 6-year period, a total of 11,190 patients underwent surgery, of whom 62,8% received CABG, 10.6% AVR, 4.6 AVR+ CABG, 3.2 % MVrepair, 1.9% CABG+ MVrepair and 0.84% MVR. Overall mortality was 2.2% (246 patients). According to the date of death, these patients were divided in terciles: death within 3 days, death between 4-18 days and death after 19 days. Of the 246 patients’ deaths, the majority died within 30 days and while still an inpatient (83.7%), whereas 6.7% died within 30 days, but after discharge. The majority of operative deaths were caused by cardiac system failure, other causes of deaths were pulmonary disease, stroke and renal failure. Interestingly authors reported also the causes of deaths according to terciles. Almost all deaths (98.4%) were attributable to the index operation. Authors conclude that the vast

majority of deaths were related to the operation itself indicating that the current definition remains appropriate in the current era.

This is a potential interesting paper based on a large sample size in an American center. Overall mortality is excellent, and authors well describe mortality rate for each index surgery as well as potential causes of death. Despite that this paper presents several limitations, which need to be addressed.

Comment 1. Authors used the STS definitions for baseline characteristics as well as outcomes. Your paper focuses on Observed outcomes; however, nothing has been reported regarding expected outcomes. Please report STS value for each class of surgery and then the E/O ratio.

Reply 1 – Thank you for this comment. We have included further analysis regarding O/E ratio and have included it in the revised manuscript. We included a short statement and a new table.

Changes in text – Page 7, Lines 18-20 with an addition of table 2

Comment 2. Deaths were divided in terciles: which are the criteria?

Reply 2 – We decided to divide the deaths into terciles in order to better understand the temporality of the deaths.

Changes in text - None

Comment 3. You report that 23 patients died after 30days. This is not clear. You should focus only on patients died within 30 days. >30 days is follow-up and I do not think that only 23 died! Please remove them.

Reply 3 – We decided to include the 23 patients who died after 30 days because these patients were included in the definition by STS that is listed in the first paragraph of the discussion. “(1) all deaths occurring during the acute episode of hospitalization in which the operation was performed (this includes patients transferred to other acute facilities), even if after 30-days...” Therefore, we made clear that these deaths were on the index hospitalization.

Changes in text – Page 8, Line6 with an addition of table 2

Comment 4. In the method, outcome section, please be clear with definition. Please

explain difference between index hospitalization and index operation.

Reply 4 – Thank you for the comment. We defined index hospitalization as the same hospitalization of the index operation. Therefore, we have included this definition in order to clarify.

Changes in text – Page 6, Line 7

Comment 5. The advancement of percutaneous treatment had definitively improved outcomes. Might you investigate on mortality in patients undergoing AVR before and after introducing TAVR in your department? Your cut off might be after 2015.

Reply 5 – We have ongoing studies at our institution regarding surgical AVR and TAVR. However, for this particular paper, we did not include any patients who have had a TAVR, only isolated AVR or CABG AVR. We do not believe that TAVR would change the STS PROM of these particular patients.

Changes in text - none

Comment 6. One of major advantage of STS is that compared with Euroscore, it is often updated. This should explain why these definitions are still valid in the current era.

Reply 6 – Thank for this comment. We agree with this statement and have included a statement in the discussion regarding how this is a strength of the STS PROM.

Changes in text – Page 12, Lines 10-12

7. How many low cardiac output syndromes did you have? How many ECMO did you implant?

Reply 7 – Thank you for this comment. We have included further data regarding patients with low cardiac output. We had 62 patients who had an LVEF of less than 30% which represented 23.1% of the operative mortalities. Furthermore, ECMO was required in 31 patients, which represented 11.6% of the operative mortalities. We included both of this information in the data section.

Changes in text – regarding low cardiac output – Page 7. Lines 17-19; regarding ECMO – Page 8, lines 2-3.

Reviewer C

I congratulate the authors for the manuscript, however they should provide a Cox regression considering the following subgroups: man / woman with diabetes and obesity as risk factors. This analysis should be done for CABG, CABG plus AVR, CABG MVr and CABG MVR.

Reply 1 – Thank you for this suggestion. We did further statistical analysis and discovered that with CABG, CABG AVR, CABG MVr, and CABG MVR, there was no significant difference incidence of diabetes and obesity when it comes to men versus women. Therefore, we did not add this analysis to the revision.