Author's response to reviews

Title: The occurrence of adverse events in relation to time after registration for coronary artery bypass surgery: a population-based observational study

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Version: 2 Date: 29 January 2013

Author's response to reviews: see over
January 29, 2013

Re: MS: 6955189128524025 - The occurrence of adverse events in relation to time after registration for coronary artery bypass surgery: a population-based observational study

Dear Mr. Zamvar:

Thank you for your letter of January 3, 2013 outlining the revisions required for reconsideration by the Journal of Cardiothoracic Surgery. We are pleased that both reviewers found the manuscript to be well written. We would like to thank the reviewers for their helpful comments and critique.

Enclosed with our revised manuscript, please find a point-by-point response to the comments of the reviewers. Revisions to the manuscript have been highlighted in yellow. In response to the reviewers’ comments, we have improved the manuscript by adding new tables, figures, text, and appendices. We would appreciate it if the additional files containing our new appendices are forwarded to the reviewers. We have also confirmed that the revised manuscript conforms to the journal style.

Along with my co-authors, I hope that, with these revisions, the manuscript may now be suitable for publication in the Journal of Cardiothoracic Surgery.

Sincerely yours,
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Revision report

Editor comments

1. Editor comment:
As your research involves humans please include a statement of ethical approval in the Methods section of the manuscript, including the name of the body which gave approval, with a reference number where appropriate. Any experimental research on humans must be in compliance with the Helsinki Declaration.

Authors’ response:
In the “Methods” section of the manuscript we have included a statement of ethical approval:
“The Behavioural Research Ethics Board of the University of British Columbia approved the study protocol, Certificate of Approval H06-80651.”

Reviewer 1 comments

1. Reviewer comment:
The co-author team of the manuscript, entitled “The occurrence of adverse events in relation to time after registration for coronary artery bypass graft (CABG) surgery: a population-based observational study”, are to be commended for addressing this critically important question. As Canada explicitly coordinates surgical wait lists to most efficiently utilize their limited resources available, the purpose of their study was to examine the impact of delays in cardiac surgery wait times upon adverse events. Specifically, this research team was interested in understanding if longer delays for patients (both urgent and non-urgent) led to increased rates of emergent surgical procedures and/or deaths for patients wait-listed. For British Columbia Cardiac Registry (BCCR) patients’ awaiting a CABG procedure at one of the 4 regional cardiac surgery centers, this well established database included over 12,000 non-emergent patients that had been wait-listed for a primary CABG-only procedure during the 13 year period from 1/1992 to 12/2005. The patients were classified at registration as urgent (i.e., procedure should be performed within 1 week), semi-urgent (i.e., procedure should be performed within 6 weeks), or non-urgent (i.e., procedure should be performed within 12 weeks). All wait listed patients had a catheterization performed to evaluate for the appropriateness of CABG procedure planned. The other study record inclusion/exclusion criteria used were reasonable. As very minor point, the co-authors made the following statement which likely should be removed (as it is
not relevant to the study period previously specified): “We also excluded 1,452 records of patients that were registered in 1991”.

The methods used are appropriate, as well as well described. Additional analytical approaches are suggested, as noted in the questions below, to explore how best to facilitate future health policy recommendations using this study’s database findings.

The BCCR patient data was linked to the Canadian Institute for Health Information (CIHI) discharge database to identify the study endpoints, which included: survival to elective CABG surgery, requirement for an emergent CABG surgery, or death while on the wait-list. Additionally, census data based on patient-specific postal codes were used to identify regional patient characteristics.

For the authors review and consideration, the following questions have been raised:

**Authors’ response:**
Thank you for your valuable comments. We have reviewed and considered the questions raised about the manuscript. Please see our point-by-point response below.

2. **Reviewer comment:**

Registration Status Classification Accuracy: For the sub-group of survivors to elective CABG surgery, was the initial registry “status” classification assigned [that is, their urgent (i.e., procedure should be performed within 1 week), semi-urgent (i.e., procedure should be performed within 6 weeks), or non-urgent (i.e., procedure should be performed within 12 weeks) appear to have been generally achieved? Specifically, the following table would be helpful to add:

<table>
<thead>
<tr>
<th></th>
<th>Urgent</th>
<th>Semi-Urgent</th>
<th>Non-Urgent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Died Prior to Receiving CABG Surgery</td>
<td>Already on table 2.</td>
<td>Already on table 2.</td>
<td>Already on table 2.</td>
<td>#/%</td>
</tr>
<tr>
<td>Received Emergent CABG Surgery</td>
<td>Already on table 2.</td>
<td>Already on table 2.</td>
<td>Already on table 2.</td>
<td>#/%</td>
</tr>
<tr>
<td>Received Elective CABG Surgery</td>
<td>#/%</td>
<td>#/%</td>
<td>#/%</td>
<td>#/%</td>
</tr>
<tr>
<td>For patients surviving to an elective CABG procedure, number of days awaiting surgery</td>
<td>Mean (STD) and Median (IQ range)</td>
<td>Mean (STD) and Median (IQ range)</td>
<td>Mean (STD) and Median (IQ range)</td>
<td>Mean (STD) and Median (IQ range)</td>
</tr>
</tbody>
</table>
Authors’ response:
We agree with the suggestion to describe the sub-group of survivors to planned CABG surgery. We have included the following text and the suggested table in the “Results” section:
“In total, almost 500 (4%) patients had an adverse event while waiting for a planned CABG. Table 2 shows outcomes of registration for CABG across urgency groups.”

Table 2. Outcomes of registration for bypass surgery in British Columbia 1992–2005, by urgency group at registration

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Urgent (n=739)</th>
<th>Semiurgent (n=8,769)</th>
<th>Nonurgent (n=2,304)</th>
<th>All patients (n=12,030*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>death before surgery, no. (%)</td>
<td>4 (0.5)</td>
<td>63 (0.7)</td>
<td>32 (1.4)</td>
<td>104 (0.9)</td>
</tr>
<tr>
<td>unplanned emergency surgery, no. (%)</td>
<td>48 (6.5)</td>
<td>264 (3.0)</td>
<td>65 (2.8)</td>
<td>382 (3.2)</td>
</tr>
<tr>
<td>planned surgery, no. (%)</td>
<td>655 (88.6)</td>
<td>7,512 (85.7)</td>
<td>1,627 (70.6)</td>
<td>9,957 (82.8)</td>
</tr>
<tr>
<td>mean waiting time (STD), weeks</td>
<td>6 (7)</td>
<td>12 (10)</td>
<td>19 (12)</td>
<td>13 (11)</td>
</tr>
<tr>
<td>median waiting time (IQR), weeks</td>
<td>3 (1–7)</td>
<td>10 (5–17)</td>
<td>16 (9–26)</td>
<td>10 (5–18)</td>
</tr>
</tbody>
</table>

Abbreviations: CABG = coronary artery bypass graft; STD = standard deviation; IQR = interquartile range.
*Includes 218 patients for whom urgency was not provided

3. Reviewer comment:
Rationale for 52 Week Follow-up Period: Why did the coauthor team restrict their analysis to the first 52 weeks following registration? Given that censoring might used for records with partial data available, perhaps a life-table approach (e.g., comparing the log-rank tests for Kaplan-Meier curves) be performed to compare the urgent, semi-urgent, and non-urgent patients surviving to an elective CABG procedure?

Authors’ response:
Thank you for the opportunity to state our rationale for the 52 week follow-up period. We have added the following text to the “Outcomes” subsection: “We restricted the analysis to the first 52 weeks following registration because of the lack of information to identify periods when patients were not ready for surgery, which might have contributed to extended waits.”

4. Reviewer comment:
Major Adverse Cardiovascular Events (other than Death): Might it be possible to identify wait listed patients where other major adverse cardiovascular
events (e.g., a non-fatal myocardial infarction or a percutaneous coronary intervention) may have occurred to augment the analysis currently performed and potentially explain findings within the non-urgent patient sub-group?

**Authors’ response:**
Thank you for this suggestion. Unfortunately, we do not have data on other major adverse cardiovascular events.

5. **Reviewer comment:**

**Patient Choice to Delay Surgery:** Might it be possible to identify the sub-group of patients where their own choices (rather than system-based causes for delays and/or resource constraints causing delays) had delayed the timing for their own elective CABG procedure? If so, might the analysis please be re-run without patients that choose a delay (e.g., daughter was in a wedding in the coming month)?

**Authors’ response:**
Thank you for this suggestion. Unfortunately, we do not have data on patient choices that might have delayed surgery. We have improved the following text in the “Conclusions” section:

“Third, the time to surgery may reflect patient and clinician decisions following the registration for surgery, in addition to system and clinical factors. We did not have this information. Therefore, our results can be interpreted only as the net effect of timing of surgery in a possibly self-selected patient population.”

6. **Reviewer comment:**

**Clinician Choice to Delay Surgery:** Potential confounding may be (at least in part) be due to the severity of coronary disease and/or recent coronary events that have occurred. For example, a patient that recently had an acute MI may be purposefully delayed for CABG to “cool off” prior to the surgery. Might it be possible to identify the sub-groups of patients where clinician choices (to purposefully delay the surgery beyond a certain time frame – such as 10 days) might be identified? If so, might the analysis please be re-run without these patients with a purposeful clinical delay (e.g., cool off for an acute MI patient)?

**Authors’ response:**
Thank you for bringing potential confounders to our attention. First, we have improved the text in the “Methods” section as follows:

“...we adjusted for...coronary anatomy at registration as a proxy for severity of coronary disease...”

Second, we do not have data on the clinician choice to delay surgery. We have added the following text to the “Conclusions” section:

“Third, the time to surgery may reflect patient and clinician decisions following the registration for surgery, in addition to system and clinical factors. We did not have this information. Therefore, our results can be interpreted only as
the net effect of timing of surgery in a possibly self-selected patient population.”
Lastly, we agree that patients who were directly admitted to hospital differ from those who were placed on the wait list. We have added a paragraph to the “Conclusions” section, which states that we did not study patients directly admitted to hospital:
“We studied patients who were registered on a wait list for first-time isolated CABG surgery. Patients who underwent the procedure by direct admission to hospital on a non-emergency basis were not included in the analysis. Considering that cardiac surgeons in British Columbia have discretion for direct admission of their patients, these two groups may be incomparable in terms of their clinical presentation and waiting time.”

7. Reviewer comment:
Surgical Center-Based Effects: Might there be center-specific referral effects, that is a center that patients and/or their clinicians would prefer to wait to have their procedure performed at this facility? If so, might center be a potential regression model variable to account for referral variations and/or mix of the different severity of patients that are commonly treated across these four facilities?

Authors’ response:
Thank you for suggesting that institution might be a potential confounder. We entered institution at registration and institution at catheterization into the regression model, as stated in the “Methods” section:
“In these regression models, we adjusted for potential confounders allowing for at least 10 events per variable...we adjusted for sex, age group,..., institution at registration, institution at catheterization,...”
We did not enter institution at surgery into the regression models because this information was not available for patients who did not receive access to surgery.

8. Reviewer comment:
Patient Characteristics Across Status Categories: Were the patient profiles that received emergent surgery across the classifications for urgent, semi-urgent, and non-urgent status similar or different? Of the patients that received emergent surgery, what proportion survived? What was the combined rate for all deaths that occurred – that is those occurring while on wait list and/or related to a surgical procedure performed (i.e., after emergent, urgent, semi-urgent, and/or non-urgent surgery)?

Authors’ response:
We agree with the suggestion to describe those who received unplanned emergency surgery in more detail. We have added the following text to the “Results” section:
“Among patients who underwent surgery after unplanned emergency admission, the distributions of age (p = 0.80), sex (p = 0.46), time between catheterization and registration (p = 0.29), and socioeconomic status (p = 0.28) did not seem to differ across urgency group at registration. Other characteristics differed across groups (p < 0.001).”

We have also added the following clarification statement to the “Conclusions” section:

“Our analysis focused on preoperative events, such as death on wait list. Therefore, we did not report on postoperative events.”

9. Reviewer comment:

Threshold Analysis: Although this study found that the non-urgent and semi-urgent patient sub-groups that waited longer were more likely to die while still on the wait list, was there any wait time threshold (e.g., a number of days that patients waited) that posed an increased risk of death? For example, did the originally proposed status time period (i.e., 1 month, six weeks, or 12 weeks) appear to be actual thresholds that posed any additional threat of death for wait-listed patients? To clarify, can a threshold analysis be used to verify that the time frames identified for the different status groups [that is, for the semi-urgent (i.e., procedure should be performed within 6 weeks), or non-urgent (i.e., procedure should be performed within 12 weeks) patients] appropriately established? As the basis for future health policy discussions, based on this study’s findings might there a point at which the co-author team might recommend that all non-urgent patients should receive a CABG (e.g., not longer than 12 weeks?) to assure that there is no difference with the semi-urgent patient group rates?

Authors’ response:

We have developed the following text in the “Conclusions” section to address this comment:

“...the point at which the wait for CABG becomes too long can be established as the period by the end of which, for a given surgical capacity, the proportion of preoperative deaths exceeds a safety standard accepted in the health system, e.g. postoperative in-hospital mortality in this patient population.”

“In deciding on the duration of time that non-emergency treatment can be delayed safely, policy-makers may find it useful to measure the risk of preoperative death among those who remain untreated by a certain time after registration on a wait list. For example, Figure 6 shows that, conditional on not having undergone CABG by the time recommended by the provincial guidelines, the risk of preoperative death reaches 0.3% for the semiurgent group and 2.1% for the nonurgent group.”

10. Reviewer comment:

Seasonality of Wait Time Delays: Might there be a seasonality effect (e.g., a time of year impact) associated with extended wait time delays? For
example, are delays longer if the patient is placed on the registry in December versus in April?

**Authors’ response:**
We have improved the manuscript by adding a figure to show the wait-list size by a time of year at registration to reveal a possible seasonality effect in the “Results” section:
“There did not appear to be seasonality in the wait-list size in semiurgent and nonurgent groups (Figure 2). As well, there was little variation in wait-list size in the urgent group over calendar months (median wait-list size = 1; interquartile range = 0 to 2.”

11. **Reviewer comment:**
Care Received Outside of Canadian Health Care System: Might potentially patients received a CABG procedure outside of the Canadian health care system (e.g., paying for this separately)? If so, might the out-of-system CABG care be estimated as to the volume as well as impact on the BCCR? Although access to out-of-system care may be related to the socio-economic decile, it was unclear if there may be a mechanism to measure this separately via the registry information currently gathered.

**Authors’ response:**
Thank you for this comment. We have added the following text to the “Conclusions” section:
“Fourth, care received outside of the Canadian health care system (e.g., paid for separately) may impact waiting times and outcomes. In our study, there was no mechanism to ascertain such cases, if any, separately from the registry data.”

12. **Reviewer comment:**
Predictors of Death on Wait Listing: To augment the analyses performed, might the coauthors build a categorical logistic model that predicted the endpoints for 1) survival to elective CABG; 2) survival to emergent CABG; or 3) death on the wait list? If so, then the relative importance of a patient’s initial registration status (urgent, semi-urgent, and non-urgent) could be evaluated in context of their other patient-specific risks (e.g., age) and center-based challenges (e.g., center-specific effects).

**Authors’ response:**
Thank you for the opportunity to report the effect of urgency at registration on access to planned CABG. We have updated the new Table 3 to report the effect of urgency on planned surgery rates and we have updated the new Table 4 to report the effect of urgency on the cumulative incidence of planned surgery.
We have added the following text to the “Results” section:
“Analysis of competing events
In total, 9,957 patients underwent planned surgery over 184,820 patient-weeks: 655 over 4,676 patient-weeks (140.1 per 1000 patient-weeks) in the urgent group, 7,512 over 123,138 patient-weeks (61.0 per 1000 patient-weeks) in the semiurgent group, and 1,627 over 53,232 patient-weeks (30.6 per 1000 patient-weeks) in the nonurgent group (Table 3). After adjustment, the weekly surgery rate was over two times higher in the urgent group (OR = 2.22, 95% CI 2.02–2.45) and 33% lower in the nonurgent group (OR = 0.67, 95% CI 0.63–0.72), compared to the semiurgent group. After additional adjustment for socioeconomic decile, the effects were similar in the urgent group (OR = 2.24, 95% CI 2.03–2.48) and in the nonurgent group (OR = 0.68, 95% CI 0.64–0.72).

Overall, 82.8% (95% CI 82.1–83.4) of patients registered for CABG underwent planned surgery: 88.6% (95% CI 86.3–90.9) in the urgent group, 85.7% (95% CI 84.9%–86.4%) in the semiurgent group, and 70.6% (95% CI 68.8–72.5) in the nonurgent group (Table 4). The urgent group had the highest cumulative incidence of planned surgery for all weeks on the wait list, followed by the semiurgent group and the nonurgent group had the lowest cumulative incidence (Gray’s test statistic = 539.6, df = 2, p < 0.001, Figure 5). After adjustment, the odds of planned surgery were about four times higher in the urgent group (OR = 3.94, 95% CI 3.36–4.62) and 48% lower in the nonurgent group (OR = 0.52, 95% CI 0.48–0.57) as compared to the semiurgent group (Table 3). After additional adjustment for socioeconomic decile, the effect did not change in the urgent group (OR = 3.95, 95% CI 3.35–4.64) and in the nonurgent group (OR = 0.52, 95% CI 0.48–0.57).

To evaluate other patient-specific effects and center-based challenges, we have also added new Tables 5 and 6 in Appendix B:

“Table 5 in Appendix B shows the ORs of the all-cause preoperative death, unplanned emergency surgery, and planned surgery for the potential confounders that include patient- and center-specific factors.”

“Table 6 in Appendix B shows the ORs of all-cause preoperative death, unplanned emergency surgery, and planned surgery for patient- and center-specific factors derived from the regression model for CIF.”

To improve the readability, the former Figure 2 was replaced with three figures. The new Figure 3 shows the “Estimated cumulative incidence of all-cause preoperative death by urgency group.” Figure 4 shows the “Estimated cumulative incidence of unplanned emergency surgery by urgency group.” Figure 5 shows the “Estimated cumulative incidence of planned surgery by urgency group.”

13. Reviewer comment:
As a small point, it is hard to read the figures given the confidence intervals that are plotted. Hence, either color coding or removing the confidence interval curves may be helpful to consider to easily interpret the “take-home” messages for these two figures.
Authors’ response:
As suggested, we have improved the figures by removing the confidence interval curves.

14. Reviewer comment:
In summary, this paper is very well written and addresses an important question raised – that is what is the impact of extended CABG wait times upon patient outcomes. The discussion and conclusion, as well as the limitations identified, are written in a manner to add to the knowledge in this field. The only concern of this reviewer is that the co-author team stopped short of using the data available to identify potential opportunities to improve the system that is in place – by identifying ways to improve the status classification system (e.g., how to set expectations for wait delays for urgent, semi-urgent, and non-urgent patients) as well as to identify if a safety threshold might exist – beyond which no patients should be requested to ever wait.

Authors’ response:
Thank you for your valuable comments which helped to improve our manuscript.

Reviewer 2 comments

1. Reviewer comment:
Well written manuscript that was easy to read and of clinical relevance to health care systems in which wait times are used to manage resources. The major strength of the observation is that it was based on more than 12000 patients stratified for surgery. At the same time its major weakness is the lack of important information on many relevant clinical risk factors that are known to impact on patient outcomes in CABG surgery populations. Furthermore the final conclusions are based on less than 100 events (32 in the proposed higher risk group) making the robustness of the observation subject to skepticism.

Authors’ response:
Thank you for your comments. In the “Results” section, we have improved the text to re-emphasize that this was a population-based study: “Overall, this population-based study included 12,030 patients who were registered on a wait list for first-time isolated CABG surgery from January 1, 1992 to December 31, 2005.” The following text in the “Conclusions” has been developed to address the limited number of studied factors: “Our study had several limitations. First, because of its observational nature, patient and clinical factors that influence the risk of preoperative events might have different distributions across urgency groups. To address this issue, we
used regression adjustment for measured factors. We also attempted to capture unmeasured factors by using calendar period as a proxy for changes in the population of CABG patients. Even so, these techniques may not fully address the issue of potential confounding due to unmeasured factors. The time to surgery may differ between patients treated by surgeons with high volume of CABG procedures and surgeons who perform a diverse range of cardiac procedures."
We have also added text to report the total number of preoperative events in the “Results” section:
“In total, almost 500 (4%) patients had an adverse event while waiting for a planned CABG.”

2. Reviewer comment:
Analysis of the urgent patient may be problematic as presumably many of these patients were admitted to hospital. This would mean that their risk of death or more urgent surgery carefully monitored by clinicians on a daily basis something that was not possible for the other groups of patients. As such estimates of risk while waiting cannot be uniform between groups outside of urgency status. Perhaps the analysis should be done without urgent patients. In fact in figure 2 it appears that urgent patients may be waiting well above their standard of 1 week suggesting that their status may have changed or something about their clinical condition be different.

Authors’ response:
Thank you for raising this important point. In the “Conclusions” section, we have improved the text as follows:
“We studied patients who were registered on a wait list for first-time isolated CABG surgery. Patients who underwent the procedure by direct admission to hospital on a non-emergency basis were not included in the analysis. Considering that cardiac surgeons in British Columbia have discretion for direct admission of their patients, these two groups may be incomparable in terms of their clinical presentation and waiting time.”

3. Reviewer comment:
The major conclusion of the manuscript suggests that non-urgent patients have a greater risk of death while waiting and this is likely related to their longer wait times. This should be explored in more details by the authors to strengthen the position as it has tremendous clinical implications.
a. For example most of the deaths in both groups were observed in the first 25 weeks. Does this suggest that this is a threshold that warrants obligatory re-evaluation?
b. Why is the risk of death over time different between non urgent and semi-urgent in figure 2 (slopes of the curves). Does this suggest that the population of patients is different?
c. In the first 25 weeks the curves do not appear to be statistically different but are still divergent. Again this suggests that there is something inherently differently about the patient not something different about their waiting. Should this be the case it would make the conclusion that non-urgent patients are at greater risk of death correct but not due to their increased waiting as suggested by the authors.

Authors’ response:

a. We have developed the following text in the “Conclusions” section to address this comment:

“...the point at which the wait for CABG becomes too long can be established as the period by the end of which, for a given surgical capacity, the proportion of preoperative deaths exceeds a safety standard accepted in the health system, e.g. postoperative in-hospital mortality in this patient population.”

“In deciding on the duration of time that non-emergency treatment can be delayed safely, policy-makers may find it useful to measure the risk of preoperative death among those who remain untreated by a certain time after registration on a wait list. For example, Figure 6 shows that, conditional on not having undergone CABG by the time recommended by the provincial guidelines, the risk of preoperative death reaches 0.3% for the semiurgent group and 2.1% for the nonurgent group.”

b. We have improved the “Methods” section to explain that the cumulative incidence of death is a function of both the weekly death rate and the probability of remaining on the list (or equivalently, the waiting time):

“The cumulative incidence function (CIF) of an event is the proportion of CABG candidates experiencing the event of interest (e.g. death) instead of competing events (e.g. planned surgery) by a certain time on the wait list. Both the event rate and the probability of remaining on the list influence the CIF. Therefore, if the CIF of an event differs between two groups when the event rates are the same, then it is the probabilities of remaining on the list that contribute to this difference. Using Gray’s test, the CIF was compared across urgency groups.”

c. Thank you for your comment. As stated above, we have improved the “Methods” section to explain that the cumulative incidence of death in the figure is a function of both the weekly death rate and the probability of remaining on the list (or equivalently, the waiting time).

We have also ensured that the “Results” section clearly describes these two components which contribute to the cumulative incidence of preoperative death:
“We attribute the higher cumulative incidence of preoperative deaths in the nonurgent group to the longer waiting times, because the death rates were similar in the semiurgent and nonurgent groups.”

4. **Reviewer comment:**
   Figure 2 the second graph should not include urgent patients as these again should be difficult to compare to the other two groups based on their short time waiting and highly subject to their clinical presentation.

   **Authors’ response:**
   Unplanned emergency surgery is unexpected and therefore not addressed by wait list management routine. Patients who were directly admitted to hospital were not included in this figure.
   In the “Conclusions” section, we have improved the text as follows:
   “We studied patients who were registered on a wait list for first-time isolated CABG surgery. Patients who underwent the procedure by direct admission to hospital on a non-emergency basis were not included in the analysis.
   Considering that cardiac surgeons in British Columbia have discretion for direct admission of their patients, these two groups may be incomparable in terms of their clinical presentation and waiting time.”

5. **Reviewer comment:**
   The statistical analysis appear very well done but given its complexity would require the expertise of an analyst to ensure accuracy of the techniques used and conclusions made. As such some of the methodology is difficult to follow and would benefit from simplification for a non expert reader

   **Authors’ response:**
   We have simplified the description of the methodology in the “Methods” section and we have moved technical details on the “Cumulative incidence of event” and “Regression models” to Appendix A:
   “Further details on the cumulative incidence of event may be found in Appendix A.”
   “Further details on regression of CIF may be found in Appendix A.”

6. **Reviewer comment:**
   It is stated that 104 patients died while waiting but only 99 were used for the analysis (please clarify).

   **Authors’ response:**
   Thank you for this comment. We have added a footnote to the tables to indicate that the regression analyses “Did not include 218 patients for whom urgency was not provided: 5 died, 5 had unplanned emergency surgery, 163 underwent planned surgery, 45 removed for other reasons.”