Author’s response to reviews

Title: Effectiveness of accelerated perioperative care and rehabilitation intervention compared to current intervention after hip and knee arthroplasty A before-after trial of 247 patients with a 3-month follow-up

Authors:

   Kristian Larsen (fekl2004@msn.com)
   Karen E Hvass (akeh@ringamt.dk)
   Torben B Hansen (atbh@ringamt.dk)
   Per B Thomsen (apbt@ringamt.dk)
   Kjeld Soballe (kjeld@soballe.com)

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Author’s response to reviews: see over
Reviewer: Henrik Husted.

Thank you for your comments and questions.

I will address your questions below.

1) Before resubmission, the article will be sent for English language review.

2) The $P$ values have been included in Table 2, and we have included results so that we now also present unadjusted and adjusted crude and stratified analyses in Table 2.

3) We agree that inclusion of the unicompartmental knee arthroplasties gives a potential confounding effect and have therefore reanalysed the data. We now present the manuscript without inclusion of the patients receiving unicompartmental knee arthroplasty.

4) The Breakthrough Series Collaborative Model has reference no. 17 in the revised manuscript. We have moved the reference from the middle of the sentence to the end of the sentence. We have also checked that the electronic reference is correct.

5) We believe that the small but significant difference in length of stay between the current intervention group in our RCT, in which the patients and healthcare staff were aware of the ongoing study, which could lead to an increased attention, and the current intervention group in the preimplementation group, in which the healthcare staff and patient were not aware of the ongoing study, was caused by a Hawthorne effect. We have addressed this question, and further clarified it in the manuscript.

6) The discharge criteria were identical in the two groups except for the criterion of knee flexion in knee patients. We found in our RCT on the same topic that the criterion for knee flexion was unnecessary, and we therefore omitted it in the postimplementation period. We have further discussed how omission of this criterion could have affected LOS for knee patients in the postimplementation period. For clarity we also have included the criterion “being able to correctly rise from lying and sitting”, which in the first manuscript we considered to be included in other criteria for activity. We have addressed this in the manuscript.

7) The pain treatment was identical in the two groups, and therefore not part of the clinical trial. The use of Oxycontin® / Oxynorm® was standard treatment at the hospital at that time. We have moved this information in the manuscript to a subheading of information concerning identical interventions in the two groups. We have included information on doses and use of VAS scores under this new subheading.

8) When we calculated LOS we used in hospital LOS from admission to discharge, which is the actual time a patient occupies a bed in the ward. The observed difference in LOS therefore consisted of two elements, which we considered to be equally important parts of our accelerated intervention. This was a reduction in LOS due to introduction of an optimized multi-disciplinary organization that included a changed organization of admission and a reduction in LOS from changed multi-modal intervention. It was not the purpose of this study to distinguish between these
two elements. But in our RCT we observed a reduction in LOS because of changed organization of admission accounting for a mean reduction of 1.5 days, and we believe that this finding will also apply to this study. We have addressed this in the manuscript.

9) The section of the implementation period has been reduced considerably, and we do not believe that it can be further shortened.

10) We tested the patients against the discharge criteria once daily in the morning. We have included this information in the manuscript.

11) In our multivariate analysis the differences in LOS were adjusted for gender, age, diagnosis, implant type, and patient group (THA, TKA), which are considered important patient characteristics to describing case mix. Other relevant patient characteristics are American Society of Anaesthesiology Score (ASA) and blood transfusion. However, we were not able to include ASA scores because of invalid and incomplete data, and we did not include blood transfusion because the operational procedure was not part of the intervention. This has been addressed in the manuscript.

12) The sentence has been rewritten.

13) The sentence has been rewritten.
Reviewer: Liz A. Lingard.

Thank you for your comments and questions.

I will address your questions and comments below.

1) We agree that it is inappropriate to include the unicompartmental knee arthroplasties, and we now present reanalyzed data in the manuscript without inclusion of patients receiving unicompartmental knee arthroplasty.

2) 

a) Five experienced surgeons performed all operations. In the manuscript we have included information on surgeon changes, proportion of operations performed by each surgeon and the ratio of types surgery performed by each surgeon.

b) No changes in anesthetic procedures or use of anesthetists took place during the entire study period. This information has been included in the manuscript.

c) Medication for pain relief was identical in the two groups. We believe your abbreviation PCA stands for patient-controlled analgesia, and we like you to know that we did not use patient-controlled analgesia (PCA) during the study period. This information has been included in the manuscript.

d) There was no difference in use of CPM during the entire study period, which was used in less than 2% of knee patients. This information has been included in the manuscript.

e) We have included information on changes in healthcare staff during the study period, and have discussed the consequences of these changes in the revised manuscript.

f) There were no changes in political or economical pressure on the department during the study period that could cause a change in discharge criteria for arthroplasty patients. This information has been included in the manuscript.

g) There was no change in number of working days. This information has been included in the manuscript.

3) We have deleted the word partial in the text.

4) We have clarified this sentence in the manuscript.

5) Mobilization consisted of all activities out of bed (70% of mobilization time), gait training (15% of mobilization time), and exercises (15% of mobilization time). We have further in more detail described the different part of mobilization in both groups in the manuscript.

6) Identical discharge criteria were the core principle in this study because LOS was related to both intervention and outcome. We did, however, omit the criterion of at least 90° of knee flexion in
knee patients in the postimplementation period. This was done because in the RCT by Larsen et al., we found that this criterion was not a necessary prerequisite for patients to be mobilized and to function well. Omission of this criterion is in accordance with the Danish Health Technology Assessment for THA and TKA. We believe that the omission of this criterion has lead to a reduction in LOS of approximately 1.5 days, because LOS for TKA in our RCT, where the intervention was identical but the criterion was included, had a LOS of 6.1 days, while LOS was 4.7 days in the postimplementation period, where this criterion was omitted. We have included this information in the manuscript.

7) All patients met the discharge criteria before discharge. One of the main purposes of the accelerated intervention is to reduce length of stay by reducing minor or major perioperative and postoperative complications, however, only data on major complication were collected in this study. Only one patient, a hip patient in the postimplementation period, had a major complication related to the implant. This complication, however, did not result in a prolonged length of stay. This information has been included in the manuscript.

8, 9) The purpose of the present study was not to investigate postoperative use of the healthcare system outside the hospital. This area is addressed in cost-efficacy and cost-effectiveness studies which have been conducted, and are currently under review. This information has been included in the manuscript.

10) We have deleted patients receiving unicompartmental knee arthroplasty from Table 1. We have reported information on proportion and ratio of surgery in the text.

11) We agree that it is a limitation of the present study that there is no clinical assessment, and have addressed this in the discussion section.
Reviewer: David C Markel

1) We agree that it is inappropriate to include the unicompartmental knee arthroplasties because of a potential confounding effect, and as it does not affect the power of the study. We now present reanalyzed data in the manuscript without inclusion of patients receiving unicompartmental knee arthroplasty.

2) Data on all patients were collected via unique personal identification numbers, and postoperative potential complications in these patients were sought in all Danish local and central hospital registers, which are available in closed databases. We have included this information in the manuscript.

3) Identical discharge criteria were the core principle in this study. We did, however, omit the criterion of at least 90° of knee flexion in knee patients in the postimplementation period. We believe the omission of this criterion has lead to a reduction in LOS of approximately 1.5 days, because LOS for TKA in our RCT, where the intervention was identical but the criterion was included, had a LOS of 6.1 days, while LOS was 4.7 days in the postimplementation period, where this criterion was omitted. We have included this information in the manuscript.

4) We have included gender, age and specific cause of death in the two patients in the manuscript.

5) The spelling has been corrected in the text.

6) The spelling has been corrected in the text.

7) The spelling has been corrected in the text.

8) The spelling has been corrected in the text.

9) The sentence has been deleted.

10) The spelling has been corrected in Table 1.