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OPEN PEER REVIEW

Predictors of Post-operative ABG Changes to Pre-operative Levels in Kidney Transplant Patients, a Cross-Sectional Study

Morteza Hashemian, Mohammad Reza Ebadzadeh, Reza Mohammadi, Mahboubeh Mirzaei, Majid Abdoli, Seyed Amir Mohajerani

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About this report

This open peer review (OPR) report shows the public comments made on this article during peer review, by the reviewers, the associate editor and the editor-in-chief, for every revision round, together with the authors' replies. Comments appear only with the consent of the people who wrote them. Reviewers who chose to sign their report are named; the others are shown as "Referee". Comments are edited for language only, and confidential remarks to the editors are not included.

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1 Original submission

1 comment · 22 Apr 2024

Referee 1 Reviewer

MAJOR REVISION 22 Apr 2024

Thank you for submitting your manuscript to the NUM. Overall, the study presents valuable insights; however, there are some areas that require revision to enhance the clarity and scientific rigor of the manuscript. Please consider the following points for improvement:

Abstract

1. Incomplete background information: The background section lacks essential details, such as the significance of ABG changes, the impact of pH changes on transplant outcomes, and the specific gaps in the existing research.
2. Insufficient methodology description: The description of the methods is brief and lacks key details. It does not provide information on data collection methods, inclusion/exclusion criteria, ethical considerations, or statistical analysis methods.
3. Designation Error in Study Design: In the manuscript, the study was mistakenly labeled as a cross-sectional study, whereas the patients were followed, and changes in factors before and after kidney transplantation were evaluated, along with the identification of factors associated with these changes. Consequently, the appropriate study design is a cohort study, specifically a retrospective cohort study since historical data were utilized. This designation should be corrected throughout the entire text.
4. Inadequate results presentation: The results are presented in a narrative form without sufficient numerical data or statistical measures. Key findings are not clearly highlighted, and there is no mention of effect sizes or confidence intervals.
5. Incomplete Conclusion: The conclusion is relatively brief and does not adequately summarize the implications or broader significance of the findings. It does not mention any recommendations for clinical practice or future research directions.

Introduction

6. Incomplete Literature Review: The introduction mentions that numerous studies have been conducted to determine the most effective approach for intraoperative fluid replacement therapy during renal transplantation (lines 49-51). However, it does not provide a summary or synthesis of the existing literature on the topic. A more thorough literature review would strengthen the rationale for the study and help identify the research gap.

Methods

7. Inadequate Description of Sampling Method: The text mentions that 95 patients who had undergone a kidney transplant were enrolled in the study, but it does not provide information about how the participants were selected or recruited. It is important to describe the sampling method (e.g., consecutive sampling, random sampling) to ensure transparency and replicability.
8. Inadequate participant description: The information provided about the study participants (patients) is insufficient. It does not include important demographic details such as age, gender, and relevant medical history.
9. Lack of Information on Data Collection Procedures: The methods section briefly mentions standard monitoring and the insertion of a central venous catheter, but it does not provide specific details about the data collection instruments used, the timing of data collection, or the training of data collectors.
10. Lack of details on post-operative care: The post-operative care and management of patients are not adequately described. Details about the monitoring, interventions, and complications during the post-operative period are missing.

11. Failure to utilize dependent data statistical tests: In the statistical analysis section, only independent data tests were mentioned, and no reference was made to dependent data tests. However, the data in this study involve comparisons between pre- and post-transplant measurements, which necessitate the use of tests such as paired t-tests or Wilcoxon signed-rank tests for comparison.
12. The statistical analysis section should be revised to align with the CHAMP (Checklist for Statistical Assessment and Methodology in Papers) checklist. It should include the following points:
a. Sample size calculation: Provide information on whether a sample size calculation was performed and explain the rationale behind determining the appropriate sample size for the study.
b. Variable selection rationale: Justify the inclusion of specific variables in the analysis and explain their relevance to the research question or hypothesis.
c. Verification of statistical assumptions: Clearly state which assumptions were assessed, such as normality, independence, or homogeneity of variances, and describe the methods used for assessing these assumptions.
d. Choice of statistical tests: Justify the selection of specific statistical tests used for each variable or hypothesis, taking into account the nature of the data and research question. Explain why alternative tests were not chosen, if applicable.
e. Adjustment for confounding variables: Specify whether adjustments were made for potential confounding variables and describe the methods used for controlling confounding in the analysis.
f. Reporting of effect sizes: Include effect sizes or estimates of the magnitude of the observed associations to facilitate the interpretation of the clinical or practical significance of the findings.

Discussion
13. Inconsistent terminology: The use of different terms such as "acidosis," "hyperchloremic acidosis," and "metabolic acidosis" without clear definitions or explanations can lead to confusion. Consistent and precise terminology should be used throughout the discussion.
14. Absence of limitations and future directions: The discussion does not address the limitations of the study or propose future research directions. Including limitations and suggestions for future investigations would enhance the completeness of the discussion section.

Tables
15. Abbreviations should be fully spelled out in all tables.
16. The unit of measurement for variables should be stated in all tables.
17. P-values should be reported as exact values, not less than 0.05 or 0.01.
18. In Tables 2 and 3, it would be beneficial to include a column for mean difference along with its corresponding 95% confidence intervals (CIs).
19. In tables 4-6, the column of 95% CIs can be merged with the OR column.

I appreciate your efforts and look forward to seeing the revised manuscript addressing these points.

2

Revision 1

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Reviewers' Comments:

Reviewer 1:
Thank you for submitting your manuscript to the NUM. Overall, the study presents valuable insights; however, there are some areas that require revision to enhance the clarity and scientific rigor of the manuscript. Please consider the following points for improvement:

Abstract
1. Incomplete background information: The background section lacks essential details, such as the significance of ABG changes, the impact of pH changes on transplant outcomes, and the specific gaps in the existing research.

- Thanks for the comment. ABG changes, particularly alterations in pH, can directly impact transplant outcomes in several ways. pH disturbances can affect graft function directly. Monitoring pH and other ABG parameters can serve as prognostic indicators

2. Insufficient methodology description: The description of the methods is brief and lacks key details. It does not provide information on data collection methods, inclusion/exclusion criteria, ethical considerations, or statistical analysis methods.

- Thanks for the comment. We have provided provide information on data collection methods, inclusion/exclusion criteria, ethical considerations, or statistical analysis methods in revised manuscript.

3. Designation Error in Study Design: In the manuscript, it was mistakenly labeled as a cross-sectional study, whereas the patients were followed, and changes in factors before and after kidney transplantation were evaluated, along with the identification of factors associated with these changes. Consequently, the appropriate study design is a cohort study, specifically a retrospective cohort study since historical data was utilized. This designation should be corrected throughout the entire text.

- Thanks for the comment. This was changed in the manuscript.

4. Inadequate results presentation: The results are presented in a narrative form without sufficient numerical data or statistical measures. Key findings are not clearly highlighted, and there is no mention of effect sizes or confidence intervals.

- Thanks for the comment. The results section is now changed in revised manuscript

5. Incomplete Conclusion: The conclusion is relatively brief and does not adequately summarize the implications or broader significance of the findings. It does not mention any recommendations for clinical practice or future research directions.

- The conclusion part is now revised in the manuscript. Post-operative ABG changes, such as significant decreases in pH and HCO3 compared to pre-operative levels, serve as important indicators of transplant outcomes by reflecting graft function. These changes underscore the importance of prompt recognition and management of ABG abnormalities in optimizing transplant outcomes, reducing complication risk, and

ensuring overall patient stability. Monitoring and managing these changes are essential components of post-transplant care.

Introduction

6. Incomplete Literature Review: The introduction mentions that numerous studies have been conducted to determine the most effective approach for intraoperative fluid replacement therapy during renal transplantation (lines 49-51). However, it does not provide a summary or synthesis of the existing literature on the topic. A more thorough literature review would strengthen the rationale for the study and help identify the research gap.

- Thanks for the comment. We have revised the introduction and added more references.

Methods

7. Inadequate Description of Sampling Method: The text mentions that 95 patients who had undergone kidney transplant were enrolled in the study, but it does not provide information about how the participants were selected or recruited. It is important to describe the sampling method (e.g., consecutive sampling, random sampling) to ensure transparency and replicability.

- Thanks for the comment. The sampling was consecutive based on the inclusion and exclusion criteria. We corrected that in revised manuscript.

8. Inadequate participant description: The information provided about the study participants (patients) is insufficient. It does not include important demographic details such as age, gender, and relevant medical history.

- Thanks for the comment. We included age, gender and relevant medical history in revised manuscript.

9. Lack of Information on Data Collection Procedures: The methods briefly mentions standard monitoring and the insertion of a central venous catheter, but it does not provide specific details about the data collection instruments used, the timing of data collection, or the training of data collectors.

- Thanks for the comment. We included data collection instruments used, the timing of data collection in revised manuscript.

10. Lack of details on post-operative care: The post-operative care and management of patients are not adequately described. Details about the monitoring, interventions, and complications during the post-operative period are missing.

- Thanks for the comment. The details for post operative period are added to revision.

11. Failure to utilize dependent data statistical tests: In the statistical analysis section, only independent data tests were mentioned, and no reference was made to dependent data tests. However, the data in this study involve comparisons between pre- and post-transplant measurements, which necessitate the use of tests such as paired t-tests or Wilcoxon signed-rank tests for comparison.

- Thanks for the comment. The description of statistical analysis for paired
-

12. The statistical analysis section should be revised to align with the CHAMP (Checklist for Statistical Assessment and Methodology in Papers) checklist. It should include the following points:
a. Sample size calculation: Provide information on whether a sample size calculation was performed and explain the rationale behind determining the appropriate sample size for the study.
b. Variable selection rationale: Justify the inclusion of specific variables in the analysis and explain their relevance to the research question or hypothesis.
c. Verification of statistical assumptions: Clearly state which assumptions were assessed, such as normality, independence, or homogeneity of variances, and describe the methods used for assessing these assumptions.
d. Choice of statistical tests: Justify the selection of specific statistical tests used for each variable or hypothesis, taking into account the nature of the data and research question. Explain why alternative tests were not chosen, if applicable.
e. Adjustment for confounding variables: Specify whether adjustments were made for potential confounding variables and describe the methods used for controlling confounding in the analysis.
f. Reporting of effect sizes: Include effect sizes or estimates of the magnitude of the observed associations to facilitate the interpretation of the clinical or practical significance of the findings.

- Thanks for the comment. We have included the details in the revised manuscript.

Discussion
13. Inconsistent terminology: The use of different terms such as "acidosis," "hyperchloremic acidosis," and "metabolic acidosis" without clear definitions or explanations can lead to confusion. Consistent and precise terminology should be used throughout the discussion.
- Thanks for the comment. We have unified all acidosis terminology in the revised manuscript.

14. Absence of limitations and future directions: The discussion does not address the limitations of the study or propose future research directions. Including limitations and suggestions for future investigations would enhance the completeness of the discussion section.

- Thanks for the comment. We have addressed the limitations of the study in revised manuscript.

Tables
15. Abbreviations should be fully spelled out in all tables.
- Thanks for the comment. Abbreviation are spelled out

16. The unit of measurement for variables should be stated in all tables.
- Thanks for the comment. The unit of variables are stated in revised manuscript.

17. P-values should be reported as exact values, not less than 0.05 or 0.01.
- Thanks for the comment. The p-values are corrected

18. In Tables 2 and 3, it would be beneficial to include a column for mean difference along with its corresponding 95% confidence intervals (CIs).

- Thanks for the comment. It is added to the manuscript

19. In tables 4-6, the column of 95% CIs can be merged with the OR column.

- Thanks for the comment. It is corrected in revised manuscript.

2 Revision 1

2 comments · 2 Jul 2024 – 19 Jul 2024

Referee 1 Reviewer

MAJOR REVISION 2 Jul 2024

Dear Authors,
I appreciate your efforts in revising the manuscript. While the revisions made have addressed some of the concerns raised, it is necessary to undertake further corrections to improve the structure of the scientific writing, the English, and the statistical analysis. The specific areas that require attention are as follows:

Abstract
1. Background: The current version was not rewritten appropriately. It can be edited as follows: "Kidney transplant is the treatment of choice for chronic renal failure, significantly improving patient outcomes. Fluid administration during surgery can lead to the accumulation of acid ions and electrolytes, inducing pH changes from the preoperative to postoperative period, which may compromise transplant success. The impact of acid-base balance (ABG) changes on transplant outcomes is crucial, yet research on predictors and ABG changes post-kidney transplant is limited. Understanding ABG changes can enhance perioperative management, early detection of complications, and long-term graft function, thereby optimizing patient care and increasing transplant success rates."
2. Methods: Correct the study design label to "retrospective cohort study" to accurately reflect the methodology and follow-up nature of the study.
3. Methods: Provide a more detailed description of the methodology, including inclusion/exclusion criteria and the specific statistical tests used.
4. The Methods section can be rewritten in this way: "In a retrospective cohort study, we included 95 patients who had undergone kidney transplant. During surgery, patients received crystalloid fluids, with 49 receiving only normal saline and 48 receiving only Ringer's lactate. Data collection involved the insertion of an arterial line after anesthesia induction, and the first arterial blood gas (ABG) sample was obtained as a preoperative measure. A postoperative measure was taken at the end of the surgery. Ethical considerations were followed throughout the study. Statistical analysis included paired t-test or Wilcoxon signed-rank test to compare pre- and post-operative ABG measures, with a significance level set at a p-value less than 0.05."
5. Results: Include specific numerical data, effect sizes, and confidence intervals in the results section. Highlight key findings more clearly to emphasize their significance.

Introduction
6. Lack of Coherent Flow: The introduction jumps between different aspects of ABG and its relevance to kidney transplantation without a smooth, logical progression. Reorganize the introduction to follow a more logical progression, starting with general background information and narrowing down to specific issues and the study's objective.
7. Redundancy and Repetition: There are several points in the introduction that are repeated in different sections, such as the importance of ABG in monitoring acid-base balance and its role in guiding treatment decisions. Avoid repeating the same points in different sections. Instead, consolidate related information to make the text more concise and impactful.
8. Overly Broad Statements: Some statements are too broad and general, such as "several studies have been conducted" without specifying which studies or what their findings were. Include specific examples, data, and references to illustrate key points and strengthen the argument.
9. Lack of Clear Research Gaps: While the introduction touches on the relevance of ABG in kidney transplantation, it does not clearly state the specific gaps in the existing research that this study aims to

address. Clearly state the specific gaps in existing research that this study aims to address, providing a stronger rationale for the study.

Methods

10. Incorrect Study Design Label: The study is labeled as a cross-sectional study, whereas it involves following patients over time, which should be identified as a retrospective cohort study.
11. Detailed Interventions: Interventions and their administration are described, but the methods section lacks a clear timeline and standardized protocols for these interventions, which are necessary for reproducibility.
12. Data Collection: The method of data collection is mentioned, but it does not specify who collected the data, how they were trained, or how data accuracy was ensured, which is vital for ensuring data reliability.
13. Handling of Missing Data: The methods section does not describe how missing data were handled, which is critical for understanding the robustness of the analysis.
14. Statistical Methods: Statistical methods are mentioned, but the section lacks detail on how potential confounders, such as those in Table 1, were addressed and whether any sensitivity analyses were performed.
15. Clarity on the rationale for each statistical test: The statistical analysis section briefly mentions the use of t-tests or Mann-Whitney U tests for parametric variables and paired t-tests or Wilcoxon signed-rank tests for correlated data. However, it should clearly state that independent-samples t-tests or Mann-Whitney U tests were used to compare postoperative ABG values between groups of patients who received Ringer's versus normal saline. Similarly, for paired t-tests or Wilcoxon signed-rank tests, it should be mentioned that they were used to compare ABG measurements before and after surgery. Additionally, the estimation of the odds ratio should be included.

Results

16. Discrepancy in sample size: The results section mentions 97 patients, but the methods section indicates 95 patients were enrolled. The discrepancy in the number of participants should be clarified.
17. Multivariate regression analysis: The results section presents findings from a multivariate regression analysis; however, it does not specify the type of regression analysis conducted or the variables that were adjusted for. Furthermore, in the methods section, there is no reference to the multivariate regression analysis, its covariates, the dependent variable, or the process used for entering variables into the model.

Discussion

18. Insufficient Linking to Hypotheses: The discussion does not explicitly link the study findings back to the initial hypotheses or research questions, which is essential for understanding the context and relevance of the results.
19. Weak Integration of Results: The discussion does not adequately integrate the various results of the study, such as how changes in ABG values, CVP, and fluid types interact and affect each other. This makes it harder to see the bigger picture of the study's findings.
20. Superficial Conclusion: The conclusion is brief and does not fully synthesize the study's findings. It should provide a more comprehensive summary of the results, their clinical implications, and future research directions.

Your attention to these aspects will greatly contribute to the quality and impact of your work. I look forward to receiving your re-edited version of the manuscript for the next round of review.

Associate Editor

MAJOR REVISION 19 Jul 2024

Major Revision

3

Revision 2

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Reviewer 1:
Dear Authors,
I appreciate your efforts in revising the manuscript. While the revisions made have addressed some of the concerns raised, it is necessary to undertake further corrections to enhance the scientific writing structure, English editing, and statistical analysis. The specific areas that require attention are as follows:

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-Thank you for the comment. It has been changed in revised manuscript.

2. Methods: Correct the study design label to "retrospective cohort study" to accurately reflect the methodology and follow-up nature of the study.

-Thank you for the comment. It has been changed in revised manuscript.

3. Methods: Provide a more detailed description of the methodology, including inclusion/exclusion criteria, and the specific statistical analysis tests used.

-Thank you for the comment. It has been changed in revised manuscript.

4. The Methods section can be rewritten in this way: "In a retrospective cohort study, we included 95 patients who had undergone kidney transplant. During surgery, patients received crystalloid fluids, with 49 receiving only normal saline and 48 receiving only Ringer's lactate. Data collection involved the insertion of an arterial line after anesthesia induction, and the first arterial blood gas (ABG) sample was obtained as a preoperative measure. A postoperative measure was taken at the end of the surgery. Ethical considerations were followed throughout the study. Statistical analysis included paired t-test or Wilcoxon signed-rank test to compare pre-and post-operative ABG measures, with a significance level set at a p-value less than 0.05."

-Thank you for the comment. It has been changed in revised manuscript.

5. Results: Include specific numerical data, effect sizes, and confidence intervals in the results section. Highlight key findings more clearly to emphasize their significance.

-Thank you for the comment. It has been changed in revised manuscript.

Introduction
6. Lack of Coherent Flow: The introduction jumps between different aspects of ABG and its relevance to kidney transplantation without a smooth, logical progression. Reorganize the introduction to follow a more logical progression, starting with general background information and narrowing down to specific issues and the study's objective.

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8. Overly Broad Statements: Some statements are too broad and general, such as "several studies have been conducted" without specifying which studies or what their findings were. Include specific examples, data, and references to illustrate key points and strengthen the argument.

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9. Lack of Clear Research Gaps: While the introduction touches on the relevance of ABG in kidney transplantation, it does not clearly state the specific gaps in the existing research that this study aims to address. Clearly state the specific gaps in existing research that this study aims to address, providing a stronger rationale for the study.

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11. Detailed Interventions: Interventions and their administration are described, but the methods section lacks a clear timeline and standardized protocols for these interventions, which are necessary for reproducibility.

-Thank you for the comment. It has been changed in revised manuscript.

12. Data Collection: The method of data collection is mentioned, but it does not specify who collected the data, how they were trained, or how data accuracy was ensured, which is vital for ensuring data reliability.

-Thank you for the comment. It has been changed in revised manuscript.

13. Handling of Missing Data: The methods section does not describe how missing data were handled, which is critical for understanding the robustness of the analysis.

-Thank you for the comment. It has been changed in revised manuscript.

14. Statistical Methods: Statistical methods are mentioned, but the section lacks detail on how potential confounders such as Table 1 were addressed and whether any sensitivity analyses were performed.

-Thank you for the comment. It has been changed in revised manuscript.

15. Clarity on the rationale for each statistical test: The statistical analysis section briefly mentioned the use of t-tests or Mann-Whitney U tests for parametric variables, and paired t-tests or Wilcoxon signed-rank tests for correlated data. However, it should clearly state that independent samples t-tests or Mann-Whitney U tests were used for comparing Post-operative ABG values between groups of patients who received ringer versus normal saline. Similarly, for paired t-test or Wilcoxon signed-rank test, it should be mentioned that they were used to compare ABG variables before and after operative measurement. Additionally, the estimation of the odds ratio should be included.

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to the multivariate regression analysis, its covariates, the dependent variable, or the process used for entering variables into the model.

-Thank you for the comment. It has been changed in revised manuscript.

Discussion
18. Insufficient Linking to Hypotheses: The discussion does not explicitly link the study findings back to the initial hypotheses or research questions, which is essential for understanding the context and relevance of the results.

-Thank you for the comment. It has been changed in revised manuscript.

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-Thank you for the comment. It has been changed in revised manuscript.

20. Superficial Conclusion: The conclusion is brief and does not fully synthesize the study's findings. It should provide a more comprehensive summary of the results, their clinical implications, and future research directions.

-Thank you for the comment. It has been changed in revised manuscript.

Your attention to these aspects will greatly contribute to the quality and impact of your work. I look forward to receiving your re-edited version of the manuscript for the next round of review.

3 Revision 2

2 comments · 24 Sep 2024 – 2 Oct 2024

Referee 1 Reviewer

ACCEPT 24 Sep 2024

Dear Authors,

Thank you for thoroughly revising the manuscript, "Predictors of Post-operative ABG Changes to Pre-operative Levels in Kidney Transplant Patients." I appreciate your time and effort in addressing the feedback provided in the previous review round. Upon reviewing the updated version, I find that most of the previously raised comments have been appropriately and comprehensively addressed.

Specifically:

The abstract is now clearer and more concise, with the background section effectively highlighting the clinical relevance of ABG changes in kidney transplant patients. The methodology has been corrected to accurately reflect the retrospective cohort design, and the statistical analysis is well-described.
The introduction now follows a more logical progression, avoiding redundancy and providing a stronger rationale by emphasizing the gaps in the current research.
In the methods section, the corrections to the study design, description of interventions, and inclusion of the detailed timeline significantly improve the reproducibility of the study. The handling of missing data has also been appropriately addressed, and the rationale for the statistical tests is now clearer.
The results section has resolved the previous discrepancy in sample size, and the inclusion of specific effect sizes and confidence intervals has strengthened the interpretation of the findings.
The discussion is now more cohesive, linking the results back to the research questions and providing a deeper integration of the various study outcomes. The conclusion also provides a more comprehensive synthesis of the clinical implications and offers clear directions for future research.

In light of these improvements, I believe the manuscript is now suitable for publication in NUM. Congratulations on your efforts, and I look forward to seeing your work published.

Best regards,

Associate Editor

ACCEPT 2 Oct 2024

Accept