Perfusion renal protection strategies during open thoracoabdominal aortic aneurysm repair: a systematic review

1. *PICOS:*

P – Patients undergoing open thoracoabdominal aortic aneurysm repair utilising either cardiopulmonary bypass or partial left heart bypass.

I – Renal protective strategies including but not limited to delivery of renal protective solutions such as HTK or blood performed intraoperatively.

C – The comparators will be the various strategies identified within the literature search. To date the authors do not believe there is currently enough equipoise to determine a standard care method.

O – Outcomes will include markers of post-operative acute renal injury including clinical markers such as need for post-operative dialysis and biochemical markers such as creatinine levels and eGFR depending upon reporting.

S – Due to the suspected paucity of evidence any primary research will be included such as randomised controlled trials, prospective observational studies and retrospective studies.

2. *Primary Research Question*

What strategies are available to protect the kidneys and reduce the incidence of acute kidney injury during open thoracoabdominal aortic repair utilising cardiopulmonary bypass or partial left heart bypass?

3. *Secondary Research Questions*

How effective are these strategies?

Can one strategy be recommended ahead of the others available?

4. *Search Parameters*

1. Dates: 1995 to present
2. Language: English language only
3. Key Words:

    Text Word: Kidney or Renal
    AND Text Word: Thoracoabdominal or TAAA
    AND Text Word: Aneurysm
    AND Text Word: Surgery

    NOT Title: Endovascular
    NOT Title: TEVAR
    NOT Title: EVAR
    NOT Title: Endograft(s)
    NOT Title: Stent(s)
    NOT Title: Hybrid
    NOT Title: Endografting
    NOT Title: Arch

NOT Title: Elephant
NOT Title: Ascending
NOT Publication Type: Review

4. Databases searched: Pubmed's Medline

5. Methodology:

1. Searches with the above methodology will be performed in February 2020.
2. Duplicates will be removed.
3. Abstracts will be screened by two authors separately utilising an abbreviated version of the Cochrane Consumers and Communications Review Group's data extraction template shown in Appendix 1 with the following inclusion/exclusion criteria

Inclusion	**Exclusion**
All patients undergoing open thoracoabdominal aortic repair utilising some form of cardiopulmonary bypass or partial left heart bypass	All patients undergoing endovascular thoracoabdominal aortic repair or open thoracoabdominal aortic repair without the use of either cardiopulmonary bypass or partial left heart bypass
Primary research including randomised controlled trials, retrospective and prospective observational studies, case reports	Reviews, qualitative studies

4. Any conflicts in the screening decisions of the two authors will be discussed and if necessary, a third individual will adjudicate.
5. Full text articles will be divided between the two authors and will be assessed for eligibility using a modified version of the Cochrane Consumers and Communications Review Group's data extraction template. This will be pilot tested by both investigators on five randomly selected included studies and refined if necessary.
6. Each author will review and extract the data for half the articles. These will then be checked by the second author. Any disagreements will be referred to a third investigator if necessary.

6. Risk of Bias Assessment

Risk of bias will be performed at study level. The Cochrane Collaboration's tool for assessing risk of bias will be used.

The following biases will be assessed: selection (patient selection, baseline conditions and random intervention allocation), performance (blinding of clinicians), detection (blinding of clinicians during outcome assessments), attrition (completeness of data included in results), and reporting (the potential existence of selective outcomes). Other biases may be analysed if apparent.

Studies will be categorised as 'low risk', 'high risk' or 'unclear risk' based on the evidence found within studies. The results of which will be used to determine and describe the reliability of data in text.

Two reviewers will take part in quality assessment. Disagreements that cannot be reached by consensus may lead to a study being classified as 'unclear' for risk assessment. A third party may be involved (collaborator) to resolve any further disagreement if necessary.

7. Time Frame

Search and screening completion: End of February 2020

Data Extraction completion: End of May 2020

Manuscript completion: End of December 2020