Project: Further Evaluation of Ex Vivo Lung Perfusion to Improve Transplantation Outcomes

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The purpose and location of the project

This study is funded by the National Institute for Health Research (NIHR) Blood and Transplant Research Unit (BTRU). Our project focusses on evaluating normothermic ex vivo lung perfusion (EVLP) as an approach to assessing the potential function of extended criteria donor lungs prior to implantation and as a route to introducing and evaluating novel therapeuties designed to improve donor organ quality. The research team are based at Newcastle University with the perfusion laboratory within the Institute of Transplantation, Freeman Hospital.

The retrieval method and logistics

- As with normal practice, the SNOD will approach the families of potential organ donors and obtain clinical and generic/study-specific research consents.
- If an organ is not accepted by any centres for clinical use, and study specific consent has been obtained, and the donation occurs in a designated study site with an HTA licensed facility; the organ may be procured explicitly for research use in this study.
- The SNOD will inform the on-call cardiothoracic transplant co-ordinator at Freeman Hospital that donor lungs have been authorised for research if not fit for transplant.
- The transplant co-ordinator will communicate this to the CT retrieval team attending that donor.
- Both DCD and DBD lungs will be considered for this study but only if a CT retrieval team has already been mobilised for a potential transplant and that other functions of the team, particularly heart retrieval, are not impeded.
- If lungs have been accepted for clinical transplantation, removal should take place as per normal practice. If lungs are then declined on the back table, they will be offered for research through the NHSBT duty office.
- If the heart is placed clinically and the lungs accepted for research, the heart and other clinical organs will be retrieved according to normal practice, followed by the lungs. In this scenario, the availability of a CT surgeon must be considered. If it is possible, a CT surgeon would wait and retrieve the lungs while the heart is in transit to the transplant centre.
- If there is a prolonged wait of over 2 hrs for a DCD donor, and the donor does not seem on the verge of proceeding, the retrieval team may stand down and return to base.
- In all cases where members of the retrieval team have stayed on to procure research tissue, transport will be arranged by the Research team to transport any retrieval staff back to base.

In all cases, lungs will be retrieved/handled as if they were fit for transplantation and will not compromise the retrieval and integrity of other clinical organs.

- It is at the retrieval team's discretion as to whether they remove the lungs for the purposes of this study, primarily based on whether there is any other clinical transplant activity in their retrieval zone at the time. If the team are not required elsewhere and are able to wait, the team will retrieve the lungs after the abdominal team have completed cold perfusion, as per normal practice.

- If NRP is used in DCD retrieval, the cardiothoracic team will not retrieve the lungs until this process is finished. Clinical organs will not be jeopardised for this research study. The decision to wait until the abdominal team are finished is at the cardiothoracic team's discretion.
- Once tissue has been accepted into the study, suitable licensed transport will be arranged and tissues transported to the designated facility.
- If tissue is removed under specific consent for this study, the retrieval team will fill out the appropriate Notification of Removal of Relevant Material for Research form to the trust from which the tissue is being removed. This form will then be returned to the research team with the tissue for completion and return to the relevant designated individual.
- Please would the following additional paperwork be obtained with recordings of a) time that the removal procedure started b) time that the cold perfusion began and c) time taken to remove lungs, attaching paperwork/recordings to the transport box. This paperwork will be provided to the cardiothoracic team by a member of the SNODs.

Study Details

We are keen to access ALL available lungs unsuitable for transplant that family have consented to and hope to be able to of recruit a total of 40 sets of donor lungs this study. 20 sets of DBD donor lungs deemed unsuitable for transplant and 20 sets of DCD donor lungs that fail current agonal time limits (>2 hours).

Inclusion criteria:

- Identified as a potential organ donor by the NHSBT.
- Patients with appropriate consent reflecting their own and their families' wishes will be considered.
- The tissue in question will have been declined for clinical use by all transplant centres in the UK.
- Age between 18-85 years
- Must fall into one of the following groups:
  - defined brain death
  - individuals who have had a withdrawal of care and a minimum 5-minute observation period to confirm cardiac death.

Exclusion criteria:

- Under the age of 18 or above age 85
- Presentation of blood borne pathogens such as HIV, Hepatitis B, Hepatitis C.
- C. diff
- TB
- MRSA

Any aspects which will change the normal practice for the NORS team

- We would like to minimise any deviation from normal retrieval practice.
- Our research study must not impact the quality or condition of any other viable organ being taken for transplant.
- Therefore, if the heart is being taken we would wish all teams to perform their procedure as normal. We accept that this may leave us without any left atrium and shortened Pulmonary Artery.
- If, however the heart is not being donated the optimal for us would be to have a section of main PA and a left atrial cuff.

We greatly appreciate your help and involvement in our study and hope that this will lead to the overall aim of increasing the number and improving the quality of transplantable lungs in the future.