Objective

To describe the process to enable facilitation of abdominal ANRP (Abdominal Normothermic regional perfusion) in DCD organ donation.

Changes in this version

Addition of SNOD in notification from Hub Ops that NRP is being used
Addition of ensuring availability of cross-matched blood, and use and storage at donor hospital
Clarity on blood culture sampling
Addition of service evaluation for NRP
Clarification on ischaemic times
Clarification on sending ANRP passport if NRP not completed

Roles

- **SNODs** - Facilitate organ donation process and liaise with ODT Hub Operations, NORS team and local hospital team for ANRP organ retrieval.
- **NORS -** Facilitate organ retrieval with ANRP
- **Hub Operations -** to contact the accepting centres to inform them of ANRP retrieval. To co-ordinate mobilisation of the ANRP and NORS team
- **Recipient Centres -** To inform SNOD/SR and ODT Hub Operations of request for ANRP retrieval.
- **APOPS -** To monitor ANRP circuit, test samples/liaise with host hospital for sample testing.

Restrictions

- This SOP is restricted to abdominal NRP only. This SOP is to be followed by a trained SNOD. In the event of a SNOD who is in training, this SOP is to be utilised under supervision.
- This SOP is to be used for Maastricht category III or IV donation after circulatory death organ donors.

Instructions

Organ allocation, acceptance and pre-mobilisation of NORS

RPoC informs Hub Operations of intention for ANRP to be used.

Hub Operations to advise SNOD, abdominal and cardiothoracic organ RC that ANRP is being used. It may be necessary to add an extra 30-minute prep/ theatre setup time to muster time. However, for established ANRP retrieval teams the standard 90 minute set up time is usually sufficient.

Hub Operations notify ANRP group by daily email of all ANRP retrievals - noveltechnologynotification@nhsbt.nhs.uk

ANRP NORS team will arrive 1-2 hours before the proposed withdrawal time. For combined procedures with cardiothoracic teams, the scheduled arrival should be 2 hours ahead of proposed withdrawal time to enable full communication of the steps involved in retrieval to ensure a successful outcome for both teams.

SNOD to put lead ANRP surgeon in contact with cardiothoracic surgeon to discuss ANRP protocol if cardiothoracic organs are also being retrieved.

SNOD will discuss "timings" for organ stand down with lead surgeon and implanting centre. **NB. This can be different to normal DCD protocol.**

SNOD to establish with ANRP team if they have equipment to process blood samples during retrieval (i.e. Piccolo machine), if no machine is available, SNOD to ensure donor hospital labs are aware that blood samples will be taken during procedure and will need to be processed as urgent samples
SNOD to advise local ITU and theatre teams of the potential longer set up time and that the case itself will take 2 hours longer than the standard DCD procedure. SNOD to ensure that the theatre floor space is large enough for DCD/ANRP, and that withdrawal is as close to the theatre as possible.

All ANRP donors will require Diathermy machine and the patch attached as with a standard DBD retrieval.

SNOD to review Donor Hospital Checklist with theatre coordinator, to ensure availability of all additional equipment required by the retrieval team.

Ensure that 4 units of blood is cross matched to the donor and will be available for theatre. Ideally these units of blood will be released from the lab and stored within the theatre complex prior to the start of surgery.

SNOD to identify if any logistical challenges in donor hospital to obtaining and storing blood prior to retrieval and establish alternative plan

SNOD and APOPS to liaise with local theatre team to ensure any unused blood is returned to the blood bank within the specified time frame and return blood traceability forms for any blood used as per local hospital guidance.

For abdominal ANRP where cardiothoracic organs will be retrieved under direct procurement, 8 units of blood will be required.

Theatre preparation

APOPS to inform SNOD if blood sampling for LFTs during retrieval will take place at donor hospital lab or by POCT (portable blood analyser) 'Piccolo'. If required at donor hospital:

- SNOD to advise labs that bloods will be sent
- LFTs X 5, will be sent together to the labs at the end of the 2-hour ANRP procedure
- To be tested as urgent samples.

In the event of a device failure of POCT, 2 LFT samples will be taken (as back-up) at 0hrs and 2hrs to be sent to the donor hospital lab and processed urgently. SNOD to follow up with labs and liaise with NORS team.

Blood cultures may be taken at 0 and 2 hours and processed as per table below.

Centre	Sample Collection	Sample Processing	Sample Result
Edinburgh	Sample obtained by NORS team	Sample processed @ donating hospital.	Sample results obtained by NORS identified individual.
Cardiff	Sample obtained by NORS team	Sample transported with NORS to base hospital and processed at NORS base hospital.	Sample results obtained by NORS identified individual.
Royal Free	Sample obtained by NORS team	Sample transported with NORS to base hospital and processed at NORS base hospital.	Sample results obtained by NORS identified individual.
Addenbrookes	Sample obtained by NORS team	Sample transported with NORS to base hospital and processed at NORS base hospital.	Sample results obtained by NORS identified individual.

The NORS centre will be responsible for notifying NHSBT if there are any positive results and all results will be passed to other accepting centres as per **SOP4938/5** - Sharing Clinical Information and **MPD867** - Findings Requiring Additional Action.

Normal documentation handover and pre-theatre checks will be carried out including handover of agreed stand-down time. Hand over QUOD box (if consent/authorisation) as per protocol, ensuring completion/scanning of QUOD sheet.

Handover and plan for surgical procedure to be discussed and agreed with abdominal and cardiothoracic team together (if applicable) prior to proceeding with withdrawal of life sustaining treatment.

Check that cross matched units of blood are available and agree a plan with APOP and local staff on how and when to collect units from blood bank. Ideally, they need to be in the theatre complex prior to WLST.

One safety brief for all attending teams both abdominal and CT (if applicable).

DCD treatment withdrawal & Retrieval

Withdrawal of life sustaining treatment as per local hospital protocol. Timings communicated to theatre, RPoC and Hub Operations as per normal process.

Death is confirmed and certified by the hospital doctor as per agreed protocol. The donor is then transferred to the operating theatre as per DCD protocol.

ID checks by NORS team/s.

Ensure that a member of the surgical team is allocated to attach Diathermy machine to the donor

Laparotomy, cannulation and connection to the ANRP circuit. ANRP will run for up to 2 hours.

If ANRP is unable to be established, the normal DCD process will be followed with an immediate conversion to standard cold perfusion. SNOD to inform accepting centre (Liver and CT) and Hub Operations that ANRP has been stood down. Hub Operations to inform any other accepting centres. If accepting centre decline, Hub Operations to fast track the liver as per standard practice.

If the NORS team establish NRP and the function of an organ (liver or kidneys) improves and is felt to be transplantable, but has not been accepted, the SNOD should have a conversation with Hub Operations to agree a plan for possible re offer of Liver/Kidney.

QUOD samples (if consent/authorisation) taken and processed as normal, except for liver and kidney biopsies. These are placed in the ANRP box with variances documented in the associated box paperwork. All other biopsies taken (spleen and left ureter) remain stored in QUOD box. This process is carried out by the retrieval team.

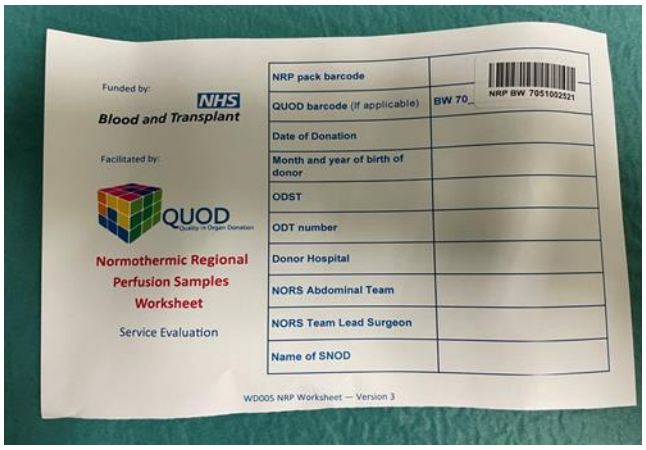
Service Evaluation for NRP – samples taken

For each NRP case the following biopsies and blood samples may be taken by the retrieval team:

- Blood samples at time 0hrs, 1hr and 2hrs
- Liver biopsy at 0hrs and 2hrs
- Kidney biopsy at 2hrs
- Urine at 2hrs

These samples are taken for the purpose of service evaluation to revisit if there are any clinical impacts on recipients. As such, consent/authorisation is implicit in the consent/authorisation for transplantation. These samples are stored in the NRP sampling box and documented on the NRP samples worksheet (sent inside the NRP box).

NB. The NRP sampling box and paperwork is provided by the biobank QUOD and is clearly marked NRP Service Evaluation, this is completely separate to the QUOD boxes for research. See Images below.



After 2hrs, the ANRP process will convert to standard cold perfusion and organ retrieval proceeds in a similar manner to DBD donation. Heparin will be administered via the ANRP pump and the organ preservation practitioner will also add heparin to the perfusion fluid as per standard DCD process.

Please note, for the purposes of Hub ops offering on organs the start of standard cold perfusion is the start of cold ischemic time and this time should be communicated to Hub Ops.

Responsibility remains with retrieval surgeon to document biopsies on HTA A form and surgical team to complete QUOD worksheet.

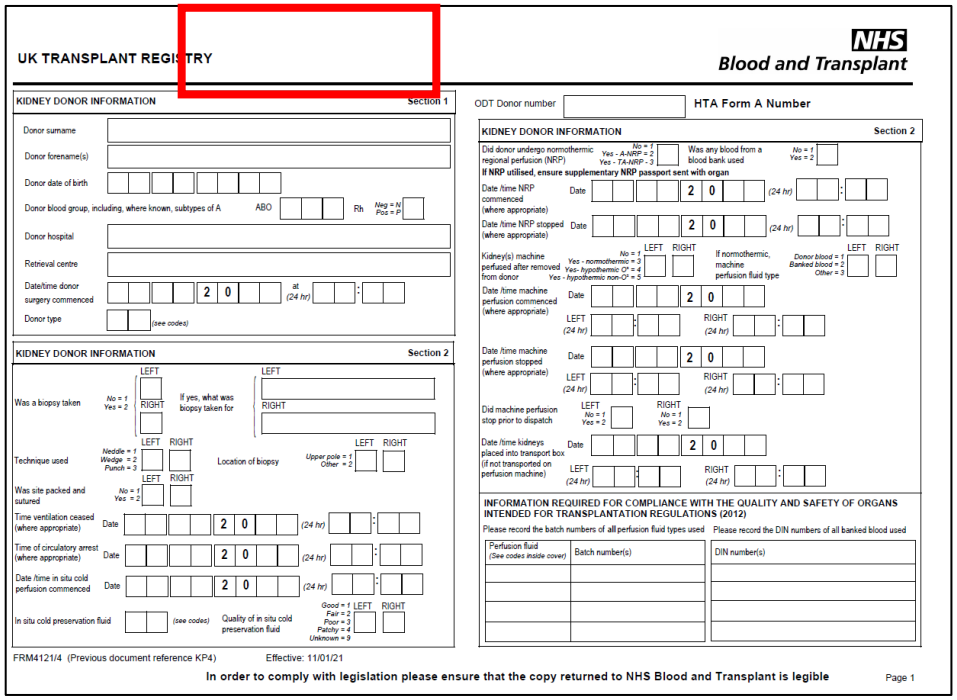
↻ NRP Passport – ANRP retrieval team will completed FRM6725 – NRP Passport

A copy of the completed form **(FRM6725)** will be made available for each retrieved abdominal organ (not required for cardiothoracic organs due to retrieval process and cardiothoracic HTA-A form informing recipient centres of NRP being performed)

The retrieval team will retain the original hardcopy of the completed form. The SNOD will take copy of the form on their iPad via genius scan app and email a copy to ANRP_Passport_Alert@nhsbt.nhs.uk (Please note underscores in the email address). SNOD to ensure a copy of the passport is also sent to the above email if NRP is stopped or not completed for any reason.

The SNOD must attach a pre-printed sticky label (which will be available in each donor pack) to the first page of the **Kidney, Pancreas and Liver** HTA- A form. This will alert the transplanting centre to contact Hub Operations to receive an electronic copy of the NRP Passport.

Sticker to be placed at the in the marked area below – please ensure that this does not cover key donor information


UK TRANSPLANT REGISTRY

NHS Blood and Transplant

KIDNEY DONOR INFORMATION Section 1

Donor surname
Donor forename(s)
Donor date of birth
Donor blood group, including, where known, subtypes of A ABO Rh
Donor hospital
Retrieval centre
Date/time donor surgery commenced
Donor type

KIDNEY DONOR INFORMATION Section 2

Was a biopsy taken
If yes, what was biopsy taken for
Technique used
Location of biopsy
Was site packed and sutured
Time ventilation ceased (where appropriate)
Time of circulatory arrest (where appropriate)
Date /time in situ cold perfusion commenced
In situ cold preservation fluid
Quality of in situ cold preservation fluid

ODT Donor number
HTA Form A Number

KIDNEY DONOR INFORMATION Section 2

Did donor undergo normothermic regional perfusion (NRP)
Was any blood from a blood bank used
If NRP utilised, ensure supplementary NRP passport sent with organ
Date /time NRP commenced (where appropriate)
Date /time NRP stopped (where appropriate)
Kidney(s) machine perfused after removed from donor
If normothermic, machine perfusion fluid type
Date /time machine perfusion commenced (where appropriate)
Date /time machine perfusion stopped (where appropriate)
Did machine perfusion stop prior to dispatch
Date /time kidneys placed into transport box (if not transported on perfusion machine)

INFORMATION REQUIRED FOR COMPLIANCE WITH THE QUALITY AND SAFETY OF ORGANS INTENDED FOR TRANSPLANTATION REGULATIONS (2012)

Please record the batch numbers of all perfusion fluid types used | Please record the DIN numbers of all banked blood used

Perfusion fluid (See codes inside cover)	Batch number(s)	DIN number(s)

FRM4121/4 (Previous document reference KP4) Effective: 11/01/21

In order to comply with legislation please ensure that the copy returned to NHS Blood and Transplant is legible

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Hub Operations will record on NTXD who the Passport has been sent to using the template below

FRM6725 NRP PASSPORT
Centre Sent to:
Organ Accepted:

⊖ End of Procedure

Definitions

- **SNOD** - Specialist Nurse Organ Donation
- **DCD** - Donation after Circulatory Death
- **HTA** - Human Tissue Authority
- **NORS** - National Organ Retrieval Service
- **RC** - Recipient Centre
- **RPoC** - Recipient centre point of contact
- **APOPS** - Advanced perfusion and Organ Preservation Specialist)
- **QUOD -** Quality in Organ Donation Research

Related Documents/References

- **FRM6725** - NRP Passport
- **SOP5499** - Theatre Manual for Deceased Organ Donors
- **SOP4938** - Sharing Clinical information
- **INF1424** - Basic Guidelines for Theatre Staff at Donor Hospital
- **MPD1043** - National Standards for Organ Retrieval for Deceased Donors
- **MPD1086** - Minimum Operating Standards – Patient Identifiable Data – Hub Operations
- **SOP4442** - Allocation of Organs and Tissue for Research & Novel Technologies – Hub Operations
- **MPD867** - Findings Requiring Additional Action
- **FRM4121** - Kidney Donor Information