NHS Blood and Transplant

DONATION AFTER CIRCULATORY DEATH (DCD)

A guide written for Intensive Care Unit staff in Scotland

Written by NHSBT Scotland Clinical Staff November 2018
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1. Introduction

Deceased donation for organ and tissue transplantation has now become a usual part of end of life care in Critical Care services in the United Kingdom following the recommendations of the 2008 Organ Donation Taskforce. This benefits many patients whose lives are saved or improved after a successful transplant, and respects the decision of those who have put their names on the Organ Donation Register (ODR) and asked to be considered as potential donors after their death.

In the UK about 60% of deceased donation follows a Diagnosis of Death using Neurological Criteria (DNC), known as Donation after Brain Death (DBD). The patient has been declared dead but because of continued mechanical ventilation of the lungs, the heart continues to beat at commencement of the donor operation.

Donation after Circulatory Death (DCD) accounts for the remaining 40% of deceased donation in the UK and is now a well-established practice. DCD is different in that death is diagnosed using circulatory criteria when the heart stops beating, life is pronounced extinct and the donor operation starts shortly afterwards. Successful renal, liver, heart, lung and pancreas transplantation is possible after DCD.

2. Legal Background

DCD has a legal basis and is supported by ethical principles and both medical and nursing professional bodies. Since most potential donors are unconscious, the supporting legislation is the Adults with Incapacity (Scotland) Act 2000, until the point of death when the Human Tissue (Scotland) Act 2006 takes over.

3. Which patients are potential DCD donors?

The definition used in the Potential Donor Audit (PDA) is a patient, not confirmed dead using neurological criteria, receiving assisted ventilation, a clinical decision to withdraw life-sustaining treatment has been made and death is anticipated within 4 hours.

For the purposes of this document it is then assumed that the patient is receiving treatment in an Intensive Care Unit.

4. End of Life Decisions

Guidance on legal issues relevant to donation released by the Chief Medical Officer in 2010 states*:*
Potential DCD donors are people who are likely to have had a catastrophic brain injury and are therefore likely to be unconscious and lack capacity. They will usually (but not always) be in critical care, with relatives close by. A clinician will make treatment decisions following an assessment of the person's best interests, which means considering all aspects of the person's condition, consulting their family and considering the person's previously expressed wishes. At some stage, a clinician may reach the view that there is no prospect of recovery and further active treatment would therefore be futile and not in the person's best interests, in which case a decision may be made to withdraw treatment.

The decision to withdraw life-sustaining treatment should:

- Be made in the usual way by the intensive Care Unit staff looking after the patient, be based on the best interests of that patient and taking into account the likely prognosis of their medical condition.
- Be totally separate from the subject of organ donation and not in any way influenced by it.
- Adhere to any local policy on withdrawal of life-sustaining treatment
- Not involve members of staff involved in transplantation programme.

5. Referral to Organ Donation Service

Early referral to the Specialist Nurse for Organ Donation (SNOD) should be made when the decision to withdraw life sustaining treatment is considered or made, to allow time for the SNOD to reach the donating hospital.

The number to call is the NHS Blood and Transplant (NHSBT) National Referral Line 03000 20 30 40 which operates 24/7. On answering you will be asked for your name, contact number and some patient details.

You should ask for the ODR to be checked and the on call SNOD to be contacted. The on call SNOD will call you back within 20 minutes. All calls to this line are recorded. This is logged as the start of the referral process.

When contacted by the on call SNOD you will be asked for some clinical detail which forms part of the screening process. There are both absolute and relative contra-indications to donation. There is no upper age limit and each case is judged on its merits though donation above the age of 85 is unusual. The list of contra-indications is frequently updated and held centrally by NHSBT. Please refer all patients you are considering withdrawal of life-sustaining treatment and the SNOD will be able to advise on suitability for donation.

For this call you, or the bedside nurse, should have a sufficient knowledge of the patient's current and past medical history to answer brief questions on the following:

- Current diagnosis
- Cause of expected death
- Past or present malignancy
- Previous illnesses and operations
- Past or present infections especially blood borne viruses

- Respiratory support, with FiO2 and mode of ventilation
- Cardiovascular support and any inotropic support
- Renal function and any renal support
- Hepatic function
- Sepsis

After consideration of the above the SNOD will tell you if DCD is a possibility or whether the patient is screened out. The SNOD may need to discuss with transplant surgeons in each centre before coming to a decision. Once we have explored the situation thoroughly we will phone you back. This can take between 30 minutes and 2 hours.

If the patient is screened in, the SNOD will advise on their estimated time of arrival and make a plan with the consultant to attend the Intensive Care Unit.

Please do not mention organ donation to the family at this stage.

If organ donation is raised by the family, please try to park the conversation by saying something along the lines of:

'We're not quite at the stage of discussing donation yet, I'd like you to take some time to think about the sad information you have been given and I will come back in due course. At that time, I will bring a colleague with me and we can discuss next steps'

If the patient is screened out, we will still advise on tissue donation opportunities and refer to SNBTS Tissue Services.

6. Approach for Organ Donation

Best practice guidance on this is available from NHSBT at:

www.odt.nhs.uk/deceased-donation/best-practice-guidance/consent-and-authorisation/

This is available as a training toolkit online and also as booklet and DVD. Full details are beyond the scope of this document and if you are unfamiliar with this process you should use this resource.

There are three key stages:

- Planning the approach
- Confirming understanding and acceptance of loss
- Discussing donation

The SNOD should be involved in all three stages. The final approach should be made by the ICU consultant in conjunction with the SNOD at the same interview.

7. Authorisation for Organ Donation

Once the family have indicated that they are likely to give authorisation for donation then the more detailed process may begin.
When discussing authorisation, the SNOD will ensure the family are aware that:

- The timing of withdrawal will be negotiated between the SNOD, family, ICU team and the organ retrieval team. If the family agree this generally will result in withdrawal some 10-16 hours later.
- The family will be prepared so they know the time available to be spent with the patient following death will be strictly limited, because of the need to go to the operating theatre promptly.
- Donation may not be possible if the time interval between withdrawal and asystole is prolonged, or the Procurator Fiscal refuses permission

In those cases that require referral to the Procurator Fiscal, Written confirmation from Fiscal on the night is not always possible (not all fiscals have secure email out of hours) - verbal confirmation is acceptable with written confirmation at earliest possible time.

permission must be gained from the Fiscal or their deputy as per Crown Office and Procurator Fiscal Guidelines before donation can proceed.

8. What if the patient becomes unstable before withdrawal of treatment?

The SNOD should be informed of any sudden deterioration in the patient's condition. Whether donation may still proceed will depend on the state of readiness of the retrieval team.
If the family have authorised donation and the patient becomes unstable it is reasonable to undertake some measures to maintain stability to assist with donation. Many other patients may benefit from this action. Examples would be switching from spontaneous to a mandatory mode of ventilation, giving vasopressors via a central line. If a central line needs to be inserted to facilitate this, then that should be explained to the family. The routine insertion of central lines prior to this point to facilitate general supportive intensive care would avoid the need for such discussion.

9. Withdrawal of life-sustaining treatment

The patient and family should be afforded as much dignity and privacy as possible at this time. If possible the patient should be nursed in a side room. In some hospitals it may be preferable for withdrawal to occur in an anaesthetic room with the family present. Analgesic or sedative drugs should be administered in the usual way to ensure the comfort of the dying patient. The choice of drugs is at the discretion of the attending consultant / senior member of the medical team who retains a duty of care to the patient.

The focus of care on the dying patient and the family should not differ from normal practice when withdrawal of life-sustaining treatment occurs.

Before withdrawal can take place the following steps will have been completed by the SNOD.

- Family are ready and well informed about the process
- Paperwork complete
- Blood and tissue typing complete
- Organs have been accepted by implantation centres
- Retrieval teams mobilised to your hospital and ready and waiting in the operating room.
- The route from the ICU to operating theatre needs to be checked and clear of any obstructions.

There should be a doctor present to manage the withdrawal process. They should have a full understanding of the process and be confident to declare death by circulatory criteria within the 5 minutes of onset of asystole. With the relative infrequency of DCD in any one hospital it is likely that trainee doctors will have never seen it before. Given that they have duties with other patients it is advisable that a senior doctor is present to manage withdrawal, pronounce life extinct and transfer the donor to the operating theatre. The decision of who does this rests with the ICU consultant in charge.

There is no prescribed method of withdrawal but general consensus is that it should involve extubation or decannulation of trachea and stopping any inotropic support. It is up to the team looking after the patient to make this decision. There is no benefit in administering oxygen. Where there is little or no respiratory effort and lung donation is planned, the

endotracheal tube can be left in place if the team prefer. Oral or nasopharyngeal airways should only be used if considered necessary for patient comfort or where the noise of airway obstruction is upsetting to the family. Sedative drugs such as morphine or midazolam can be administered to ensure comfort if required but there is some evidence that this may actually prolong the dying process.

10. Monitoring and recording after withdrawal

If invasive monitoring is being used at the time of withdrawal, this will be left in situ. If no such monitoring is in use, non-invasive monitoring will be continued. Disconnect all unnecessary monitors and switch off all alarms. If possible, use remote monitoring.

The continued use of some haemodynamic and respiratory monitoring is necessary to assess the perfusion of potentially transplantable organs during the dying process, and to allow the accurate timing of asystole. It will be necessary to monitor and record heart and respiratory rates, blood pressure, and SpO2. These will be recorded every 5 minutes from withdrawal of life-sustaining treatment until asystole.

The SNOD will inform the scrubbed retrieval team every 5 minutes of haemodynamic recordings during the first hour; thereafter every ten minutes.

Once the systolic BP has fallen below 50mmHg (i.e. onset of Functional Warm Ischaemia), the surgical teams will wait 30 minutes before abandoning the liver and pancreas, one hour before abandoning the lungs, and 3 hours before abandoning the kidneys as untransplantable due to excessive warm ischaemia. **If functional warm ischaemia does not occur the process is usually stepped down after 180 minutes**.

11. Diagnosis of Death

When DCD is being carried out, a consultant or senior member of the ICU medical team should pronounce life extinct by using the Academy of Medical Royal Colleges Code of Practice for the Diagnosis and Confirmation of Death (2008) by circulatory criteria (see below).

This should be done by confirming 5 minutes of cardiorespiratory arrest. Any return of cardiac or respiratory activity during this period of observation should prompt a further five minutes of observation after asystole occurs again.
This is best observed by loss of pulsatile pressure waveform on an established and functioning arterial line. It is worth noting that electrical complexes may be seen on an ECG beyond this point, but without pulsatility on an arterial line. This does not constitute return of cardiac output.

The Code of Practice for the Diagnosis and Confirmation of Death, Academy of Medical Royal Colleges 2008 states:

> *The individual should be observed by the person responsible for confirming death for a minimum of five minutes to establish that irreversible cardiorespiratory arrest has occurred. The absence of mechanical cardiac function is normally confirmed using a combination of the following:*
> *— absence of a central pulse on palpation*
> *— absence of heart sounds on auscultation*
> *These criteria will normally suffice in the primary care setting. However, their use can be supplemented in the hospital setting by one or more of the following:*

— asystole on a continuous ECG display
— absence of pulsatile flow using direct intra-arterial pressure monitoring
— absence of contractile activity using echocardiography
• Any spontaneous return of cardiac or respiratory activity during this period of observation should prompt a further five minutes observation from the next point of cardiorespiratory arrest
• After five minutes of continued cardiorespiratory arrest the absence of the pupillary responses to light, of the corneal reflexes, and of any motor response to supra-orbital pressure should be confirmed
• The time of death is recorded as the time at which these criteria are fulfilled.

12. Transfer to the Operating Room:

An ICU nurse should escort the family to an appropriate place away from the now deceased patient while transfer to the operating theatre for retrieval surgery takes place.

Once pronounced dead all monitoring should be removed. An infusion of heparin from a pressurised bag can now commence.

The SNOD, porter and the doctor pronouncing life extinct should transfer the patient by the best route possible as quickly as possible. They should take into account local issues such as lifts and potentially obstructed corridors. Public corridor should be avoided if possible. The ICU nurse caring for the deceased may also wish to be involved in the transfer.

On arrival you will be met by the retrieval team who will be scrubbed and ready to proceed immediately with the retrieval process. You should announce the name of the donor and confirm the time you pronounced life extinct. The donor will be transferred quickly from their bed to the operating table and then skin preparation will begin immediately. At this point, time is of the essence, and the retrieval team will be entirely focussed on the task ahead. They are unlikely to engage in any other discussion with you at this critical point. There is time pressure to isolate and preserve the organs to minimise the warm ischaemic time.

Documentation
Once you have handed the patient over to the retrieval team you should document the patient's death in the case notes in the usual way (paper or electronic). It has been agreed by the National Organ Retrieval Service in Scotland that the documentation of death can happen <u>after</u> the retrieval has begun. On return to the ICU you should complete any other paperwork including the death certificate that will need to be given to family. For cases requiring notification of death to the Procurator Fiscal this should now be done even if they were consulted prior to death.

13. Organ Retrieval and special considerations relevant to ICU staff

Normothermic Regional Perfusion (NRP)

Normothermic regional perfusion (NRP) is a retrieval technique that restores the circulation to the abdominal organs following circulatory arrest for the purpose of transplantation. This involves establishing a localised, abdominal perfusion circuit, perfusing the organs with oxygenated blood at 37°C for a period of 2 hours. NRP is becoming the standard of DCD multi-organ retrieval and will be used in your hospital for most DCD donors. NRP allows for a less hasty retrieval, essentially converting a DCD retrieval to a DBD type one. It also replenishes ATP reserves and allows the assessment of organ function and quality prior to

transplantation. The use of NRP has increased the number of retrieved organs per donor and provides better quality organs for the purpose of transplantation.

The retrieval team will require an additional 30 minutes to setup the NRP machine at the donor hospital. Prior to death, you will be asked to cross match 4 units of blood to facilitate this procedure. If donation proceeds, blood gases and biochemistry will be required at 5 time points during the 2 hour period of NRP, at 30 minute intervals. Whilst the team will be self-sufficient with point of care analysers, on occasions they will require access to a local blood gas machine and local labs. Please note that these results (taken after death) may appear in the donor's lab record, and are likely to be very abnormal.

To facilitate NRP an infusion of heparin (10,000 units of heparin in a 500ml bag of saline) is commenced just after death. This is administered by two pressure bags that are attached to the arterial and venous lines at the time of withdrawal of life sustaining treatment, but with the taps switched off. The taps are opened after confirmation of death and the infusion takes place during transfer to theatre. The infusions are prepared and supplied by the retrieval team and attached by the SNOD. The heparin infusion does not require any involvement of the ICU team, but you may notice its presence.

DCD Lung retrieval and re intubation

You may be asked to re-intubate the donor's lungs after death. This may be performed by the intensive care doctor who certified death or by an anaesthetist who has been suitably briefed as to the purpose of this and has agreed to do it before death occurred. The donor can be intubated soon after death, but the lungs should not be inflated until 10 minutes has elapsed since asystole.
See Lung Donation after Circulatory Death Information document 1425/1.

14. Last Offices

The SNOD team are responsible for the Final Act of Care and will ensure that family follow up is arranged.

The SNOD will offer individual or team debrief if staff have not been involved with DCD before or if there were complexities in the process. We believe that this is important and recommend that a de-briefing meeting be arranged for all staff involved with the case within 2-4 weeks.

Lung Donation after Circulatory Death
Checklist for Lung Optimisation in Theatre

For use in the operating theatre by the anaesthetist / thoracic surgeon / donor care physiologist

Diagnosis of death has been confirmed and recorded in the patients notes.

Secure the patient's airway with a cuffed endotracheal tube once in the operating theatre (if the patient has been extubated).

Ensure that 10 minutes of asystole has occurred before optimising the lungs:

Set the flow to administer 50% Fi02
Under no circumstances should the patient be mechanically ventilated

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Using the anaesthetic circuit, manually carry out one **single recruitment manoeuvre** at 30-40cmH20, for 30 seconds, to reinflate the lungs.

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Following the recruitment manoeuvre, use the APL valve to **maintain CPAP 5cm H_20** using the 15L/min flow set.

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Further single recruitment manoeuvres are often necessary, at a later time, during the lung retrieval process, and are guided by the thoracic team.

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Hand over care of the airway to the thoracic team.