Transport of infants referred for cooling treatment

Cooling on Retrieval Clinical Guideline

Version 1: 16th October 2009
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INTRODUCTION

With the publication of the NICHD whole body cooling and the CoolCap studies in 2005 and the recent publication of the TOBY Study, mild therapeutic hypothermia has been shown to be a safe and effective treatment for neonatal encephalopathy. Currently in the UK a number of centres are offering therapeutic hypothermia as a treatment for neonatal encephalopathy with data being provided to the UK TOBY Cooling Register of cooled babies (www.npeu.ox.ac.uk/tobyregister).

Current protocols require cooling to begin within 6 hours of birth and suggest that cooling as early as possible is the ideal. To facilitate early cooling in babies born in hospitals without the facilities for therapeutic hypothermia, passive cooling allows safe controlled cooling to begin prior to the arrival of the baby in the cooling centre. To facilitate, and standardise passive cooling we have developed the following clinical guideline which we aim to implement and rigorously audit to help achieve optimal early cooling.

It is anticipated that in the near future further devices will become available to facilitate passive cooling, and it may also be possible to start active cooling during transport from the referring units.
### OVERVIEW OF COOLING ON RETRIEVAL

#### BIRTH
- Care according to NLS & local guidelines
- Assessment for referral
- Transport service
- Referral to Cooling Centre / Normal Thermal Care

#### ASSESSMENT
- Labour Ward
- Referring Unit

#### CONFIRMATION OF COT AT COOLING CENTRE
- Care according to local guidelines
- Document current temp
- Document admission temp
- Turn incubator off
- Follow the Passive Cooling Guideline

#### STABILISATION 1
- Passive Cooling
- Local Team
- Receiving Unit

#### ARRIVAL OF NEONATAL TRANSPORT TEAM
- Care according to transport team guidelines
- Document incubator, rectal, ambient temp and ambient temp
- Commence rectal temp monitoring
- Continue Passive Cooling Guideline
- Follow Passive Cooling on Transport guideline

#### STABILISATION 2
- Passive Cooling
- Local Team
- Receiving Unit

#### DEPARTURE FROM REFERRING UNIT
- Care according to transport team guidelines
- Document incubator, rectal, ambient temp and skin temp
- Every 15 mins
- Transport Team (local support)

#### TRANSFER
- Transport Team
- Ambulance

#### ARRIVAL AT RECEIVING UNIT
ASSESSMENT AND REFERRAL PHASE: NORMAL THERMAL CARE

This phase of care begins at the birth of an asphyxiated baby and ends once the baby has been accepted for therapeutic hypothermia by a cooling centre. Care during this phase will occur in the delivery room and referring neonatal unit, and will be provided by the local team. Babies should be resuscitated at birth according to accepted NLS protocols. As early as possible after resuscitation and stabilisation the baby should be assessed according to TOBY criteria to see if therapeutic hypothermia is appropriate:

(From UK TOBY Cooling Register Clinician’s Handbook, section 2.1)

A. Infants ≥36 completed weeks gestation admitted to the neonatal unit with at least one of the following:
   - Apgar score of ≤5 at 10 minutes after birth
   - Continued need for resuscitation, including endotracheal or mask ventilation, at 10 minutes after birth
   - Acidosis within 60 minutes of birth (defined as any occurrence of umbilical cord, arterial or capillary pH <7.00)
   - Base Deficit ≥ 16 mmol/L in umbilical cord or any blood sample (arterial, venous or capillary) within 60 minutes of birth

Infants that meet criteria A should be assessed for whether they meet the neurological abnormality entry criteria (B):

B. Seizures or moderate to severe encephalopathy, consisting of:
   - Altered state of consciousness (reduced response to stimulation or absent response to stimulation) and
   - Abnormal tone (focal or general hypotonia, or flaccid) and
   - Abnormal primitive reflexes (weak or absent suck or Moro response)

Infants who meet criteria A and B may be considered for treatment with cooling. Babies with evidence of encephalopathy but not fulfilling criteria can be discussed with a cooling centre to establish whether cooling may still be appropriate. As soon as the decision is made to refer for cooling the referring unit should telephone the cooling centre and / or transport service depending on local care pathway. If the referring clinician is unsure if a baby is suitable for cooling this can be discussed with the cooling centre. Throughout this phase the baby should continue to receive standard intensive care and be maintained at normal body temperature.
STABILISATION PHASE 1: PASSIVE COOLING

This phase of care only begins once the baby has been accepted for therapeutic hypothermia by a cooling centre, and a transport team has agreed to transfer the baby. The phase of care ends on the arrival of the neonatal transport team. Care during this phase will continue in the referring neonatal unit and will be provided by the local team, with support and advice from the transport consultant as required.

The local team should be advised to document both the admission and current temperature of the baby. This should be measured by whatever means is routine in the referring unit. Ideally at this stage continuous rectal temperature monitoring should be commenced, if this is not available axilla temperature should be measured every 15 minutes. The incubator should then be turned off (and the portholes opened if in a closed incubator). The baby should be naked apart from a nappy. Staff should aim to document the baby’s temperature every 15 minutes to ensure the baby does not fall below 33ºC. The passive cooling protocol should then be followed under the telephone guidance of the transport consultant (see appendix 2). If despite following the guideline the baby does not cool to target temperature, advice should be sort from the transport consultant or cooling centre. Additional techniques that facilitate cooling are a fan or removing a woollen bonnet used to secure the ET tube. However active cooling techniques such as fans may result in overcooling unless careful core temperature monitoring is in place. Therefore these should not be implemented without rectal temperature monitoring. The remainder of the clinical care should be according to local guidelines with advice, where necessary from the transport consultant.

The neonatal transport team should be dispatched as soon as they are available. Prior to leaving for the referring unit the team should check that all the equipment required is available in the ambulance (see appendix 4). On route the team should turn the transport incubator temperature down to 25ºC, and open the portholes to allow the incubator to cool down.
STABILISATION PHASE 2: PASSIVE COOLING

This phase of care begins on the arrival of the neonatal transport team and ends when the team depart with the baby on route to the cooling centre. Care during this phase will continue in the referring neonatal unit and will be provided by the Transfer Team with support from the local team and advice from the transport consultant.

On arrival, and after the clinical handover, an initial set of temperature readings should be taken and documented. This must include rectal, incubator and ambient temperatures. Ideally the baby should be immediately commenced on continuous rectal temperature monitoring. The rectal temperature probe should be inserted 2-3cm and fixed to the skin using steristrips. If this is not possible e.g. where lack of space prevents the transport incubator being brought alongside the baby’s incubator, a single rectal temperature measurement should be taken. The cooling on transport log (see appendix 3) may be a useful way of documenting temperature and thermal care.

Incubator / ambient / rectal temperature readings should be documented every 15 minutes (e.g. in the cooling log- see appendix 3). If the baby has not commenced continuous rectal temperature monitoring, axilla temperature may be used, however rectal temperature monitoring should be commenced as soon as possible. Whilst the baby is in the hospital incubator the passive cooling protocol should be followed (see appendix 3). Once the baby has been placed in the transport incubator the passive cooling on transport protocol should be followed (See appendix 4). The remainder of the clinical care should be according to local transport guidelines with advice where necessary from the transport consultant / cooling centre.

The Transport Team should commence the Toby Register Paperwork which is available via the Toby Register website: www.npeu.ox.ac.uk/tobyregister
TRANSFER PHASE: PASSIVE COOLING

This phase of care begins when the team depart with the baby from the referral unit and ends on handover of clinical care at the cooling centre. Care during this phase will be provided by the Neonatal Transfer Team with advice from the transport consultant.

Whilst the baby is being transferred, incubator / ambient / rectal temperature readings should continue to be documented every 15 minutes. The passive cooling on transport protocol (appendix 4) should be followed during the transfer. The ambulance temperature should be set at that which is comfortable for the transport team, but should be between 18 and 24°C. The remainder of the clinical care should be according to transport guidelines with advice where necessary from the transport consultant / cooling centre.
Baby born with signs of perinatal asphyxia?

Assess baby

Satisfies eligibility criteria A and B? (see overleaf)

YES

REFER FOR COOLING

NO

COOLING NOT APPROPRIATE

Cot and transport available?

YES

DOCUMENT ADMISSION AND CURRENT TEMPERATURE.
Start passive cooling (see guideline).
Continue clinical care according to local protocols.

NO

Continue with standard intensive care.

Keep parents informed about baby’s condition while waiting for retrieval team.
Provide parents with a copy of leaflet ‘Cooling treatment for babies with perinatal asphyxia’.

TRANSFER TO COOLING CENTRE
Cooling treatment for babies with perinatal asphyxia

Treatment criteria

(From UK TOBY Cooling Register Clinician’s Handbook, section 2.1)

A. Infants ≥ 36 completed weeks gestation admitted to the neonatal unit with at least one of the following:

- Apgar score of ≤5 at 10 minutes after birth
- Continued need for resuscitation, including endotracheal or mask ventilation, at 10 minutes after birth
- Acidosis within 60 minutes of birth (defined as any occurrence of umbilical cord, arterial or capillary pH <7.00)
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Infants that meet criteria A should be assessed for whether they meet the neurological abnormality entry criteria (B):

B. Seizures or moderate to severe encephalopathy, consisting of:

- Altered state of consciousness (reduced response to stimulation or absent response to stimulation) and
- Abnormal tone (focal or general hypotonia, or flaccid) and
- Abnormal primitive reflexes (weak or absent suck or Moro response)

Infants who meet criteria A and B may be considered for treatment with cooling.

For more details please see www.npeu.ox.ac.uk/tobyregister where you may view the UK TOBY Cooling Register Protocol and Clinician’s Handbook.
Commence continuous rectal temperature monitoring
Document initial temperature
(axilla if rectal thermometer not available)

Turn incubator off, open portholes, document rectal/axilla temperature every 15 minutes

Wait 30 minutes

Temperature falling?

YES

Baby temperature > 33°C

NO

Add 1 blanket

Baby temperature > 34°C

YES

Remove any blanket if present.
Consider using a fan, contact transport consultant for advice*

NO

TARGET TEMPERATURE 33.0 - 34.0 °C

*Ice packs should not be used for cooling as these can result in severe hypothermia, active cooling (e.g. fan) should not be used unless rectal temperature is monitored.
PASSIVE COOLING ON TRANSPORT PROTOCOL

Document rectal temperature
Set incubator temperature to 25°C

Document rectal / ambient / incubator temperature every 15 minutes

Rectal temperature < 33°C
add blanket or ↑ incubator temperature 0.5°C

Rectal temperature > 34°C
and not falling

Baby covered with 1 or more blankets?

YES
remove 1 blanket

NO
↓ incubator temperature 0.5°C

Other factors that may improve cooling:
use a fan if safe and available, remove any woollen bonnet used to secure ET tube.
If not achieving adequate hypothermia contact transport consultant / cooling centre.

TARGET TEMPERATURE 33.0 - 34.0°C
Cooling on Retrieval
Cooling Log

Version 2: 16th October 2009

Patient Number ____________________________________________

Patient Name ______________________________________________
### Table of Passive Cooling

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<th>TIME (h)</th>
<th>Location</th>
<th>Ambient</th>
<th>Rectal</th>
<th>Axilla (if no rectal)</th>
<th>Incubator</th>
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**Arrival**

The information recorded on this chart must stay in the baby's notes. It should not be submitted to the Register.
APPENDIX 4: EQUIPMENT CHECKLIST

- Rectal temperature probes and leads to connect to monitor
- Thermometer for ambient temperature readings
- Cooling Log & Thermal Care Protocols documentation
- UK Toby Cooling Register Paperwork: www.npeu.ox.ac.uk/tobyregister
CONTACT DETAILS

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