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Care of Infants Requiring Phototherapy

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Purpose

Ensure a consistent approach to care of infants who require phototherapy.

To ensure the jaundiced infant will have appropriate therapy commenced in a timely manner.

Personnel able to perform procedure

Registered nurses and midwives, Karitane nurses, Clinical Nurse Specialist/Advanced Nurse Practitioner, Neonatal Nurse Practitioner, Medical Practitioner

Equipment

Phototherapy Device – NeoBlue
– Bilisoft
– Giraffe Spot Phototherapy Lite
– Neoblue – Neocosy
– Medella Bilibed
– Drager BiliLux

Incubator

Phototherapy eye shades

Appropriate for gestation SBR chart

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Associated outcome and process standards

Process Steps	Rationale
• Explain need for phototherapy and procedure to parents. Include discussions regarding minimal handling during treatment.	Parents fully informed regarding condition and treatment.
• Medical staff aware infant is commencing treatment.	To ensure all investigations for rising bilirubins have been completed. Infants with blood group incompatibility, sepsis, polycythaemia, acidosis and prematurity may require further bloods and investigations.
• Expose as much of the infants body surface as is possible to maximise phototherapy treatment. This may include removing infant's nappy, reducing the size of the eye protection to expose more of the infants head, not covering bilisoft or bilibed with muslin cloths. Ensure skin is clean, dry and oil free.	Phototherapy only works on exposed skin surface.
• Fasten baby shades, allowing nostrils to remain clear.	Shades protect infant's eyes from the intense lights. Prevents respiratory obstruction.
• Check infant's temperature within 30 mins of placing infant under phototherapy.	Incubator temperature may need to be reduced, therefore reducing the possibility of overheating.
• Observe for signs of dehydration. May need to increase feed volumes or commence intravenous fluids.	
• Full explanation to parents of why it is important to minimise the time the infant is out from under phototherapy. Consider a bilisoft if infant out for breastfeeding and bilirubin levels are not responding to treatment.	The more time exposed to lights maximises the impact of the treatment.
• Turn off phototherapy and remove phototherapy eye shades with cares – at least 6 hourly.	Permits observation of eyes and allows parents to have interaction with their infants.
• Regularly check and chart bilirubin levels on appropriate gestational age phototherapy chart. Completely fill the top box on the phototherapy chart, date and time of birth, maternal blood group, etc. Discontinue phototherapy treatment while	Allows for trend to be established and identifies when treatment can be discontinued. Continuation of phototherapy treatment may lower the blood result minimally.

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Process Steps	Rationale
taking blood samples and recommence once sample has been taken. Regularity of bilirubin levels is a medical decision and is determined on previous levels, gestation and condition of the infant. Record frequency of blood tests on Multidisciplinary Care Pathway.	
• If you do not get a reading on the blood gas analyser consider sending sample to the laboratory. This can occur if a sample is haemolysed or the infant is polycythaemic. Samples sent to the CDHB laboratory for processing do not need to be protected from light.	If you are concerned enough to take a sample you need to persevere to get a result.
• When to discontinue phototherapy is an individual decision based on the clinical scenario, trend of bilirubin levels and amount of phototherapy required. As a general rule wean the amount of phototherapy gradually and discontinue phototherapy from one light when the bilirubin is well below the treatment threshold. Discuss on ward round or with medical staff.	To prevent infants going on and off treatment.
• Infants requiring phototherapy in an incubator require cardio respiratory monitoring if in the neonatal unit or close observation if in postnatal. If in a bilibed no monitoring is required.	Closer monitoring of infants condition while under lights.
• Phototherapy devices are checked regularly to ensure irradiance levels are accurate. If concerns that units are not functioning there is a light metre available in the clinical technicians office. In NICU check with ACNM.	To ensure devices are functioning correctly.

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NeoBlue LED Phototherapy Device

Process Steps	Rationale

- **Level of irradiance (µW/cm^2/nm)**

Distance	High**
15.2 cm (6")	71.9
30.5 cm (12")	54.2
40.6 cm (16")	43.3
45.7 cm (18")	37.8
61.1 cm (24")	27.0

For every 30 cm you move the device from the infant you halve the intensity.

- The neoblue light can be placed on top of the incubator. The closer it is to the infant the more intense the effect of the light.

  The light can be positioned horizontally and vertically.

  See image regarding how to tilt the light.

The rubber feet on the bottom of the light allows for air flow between the light and the top of the incubator.

The light does not emit ultraviolet or infrared radiation so can be placed close to baby.

- Ensure the level control button with 2 lamps is switched to High.
  This equates to '1 light' treatment.

This ensures the correct radiance of light is achieved.

- Use red light to give central positioning of the infant under the lights.

This will maximise skin coverage.

- Place a drape/curtain around the light to decrease the amount of glare from lights.

For parent and staff comfort.

Process Steps	Rationale
• Neoblue lights do not radiate significant amounts of heat but can affect temperature within a closed environment. Check the infant's temperature regularly until stabilised or consider servo control until infants temperature has stabilised.	Prevents over heating infants.
• When using Neoblue device with a radiant warmer care must be taken to angle the light and position to the side of the heat source. The source should not be further than 30 cms from the infant.	Prevents alteration to temperature control.
• Neoblue lights can be used in conjunction with an infant in an open cot. The light should be as close to the baby as possible. Consideration of infant's temperature control is required.	Maintain thermal regulation.
• All general process steps apply as above.	

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BiliSoft LED Phototherapy System

Process Steps	Rationale
• **Level of irradiance (µW/cm^2/nm)** 49 µW·cm^{-2}·nm	
• Ensure the system (grey box) is on flat surface near the infant, preferably on a trolley not inside the incubator/cot. Plug the fibre optic cable into the Bilisoft box.	Ensure patient safety and protection of system.
• Insert bilisoft fiberoptic pad into bilisoft cover. The illuminated side labelled 'this side facing patient' should be against padded side of cover. Place the infant on the padded side of cover ensuring maximum area of illumination is in contact with infant's skin. Infants can be swaddled or positioning aids utilised to enhance skin exposure to light. Bilisoft can be used while infant is breastfeeding. If the infant is wrapped with swaddling blankets in a cot there is no need to apply eye shades.	Ensure maximum irradiance to lower serum bilirubin.
• All general process steps apply as above.	

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Giraffe Spot Light

Process Steps	Rationale
• **Level of irradiance (µW/cm²/nm)** 45 µW/cm²/nm – when 38 cm from infant	
• Position the Blue Spot Phototherapy light as close to the infant as possible – can be as close as 38 cms. This provides the highest level of irradiance. • When moving the lamp close to the infant, • remember that the whole shaft of the lamp is not movable – only the grey areas are bendable.	The closer the head of the lamp is to the infant the higher the irradiance level.
• All general process steps apply.	

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Draeger BiliLux

Process Steps	Rationale
• **INCUBATOR TEMPERATURE MUST BE IMMEDIATELY TURNED DOWN, OR TURNED OFF WHEN USING BiliLux**	The Draeger Bililux can increase the infant's body temperature by more than .5 degrees.
• Check infant's temperature within 30 minutes of placing infant under phototherapy and then monitor regularly until stable.	
• Consider placing servo control temperature probe on the infant.	The incubator temperature will decrease as infant's temperature increases.
• Minimum of 30 cm distance between the BiliLux and the infant. With 100% irradiance, ie. 5 lamps illuminated, the level of irradiance is: at 30 cm from the infant 85.5 (μW/cm^2/nm) 40 cm from the infant 50.1 (μW/cm^2/nm) 50 cm from the infant 33.4 (μW/cm^2/nm) There are 5 increments of intensity or 5 lamps. Each reduction is equivalent to 20% of total irradiation, ie. at 30 cm: 5 lamps highlighted = 85.5 (μW/cm^2/nm) full irradiation 4 lamps – 20% = 68.4 (μW/cm^2/nm) 3 lamps – 20% = 51.3 (μW/cm^2/nm) 2 lamps – 20% = 34.2 (μW/cm^2/nm) 1 lamp – 20% = 17.1 (μW/cm^2/nm)	
IRRADIANCE DOSE: STARTING PHOTOTHERAPY • 5 lamps illuminated (full irradiance) – infants close to exchange level or jaundice before 24 hours or haemolytic jaundice. • 3 lamps of irradiance – for all other infants commencing PT • Chart this on the phototherapy chart along with any reductions as directed by medical staff. NOTE: 5 lamps (equivalent Double Phototherapy), 3 lamps Standard or Single PT	

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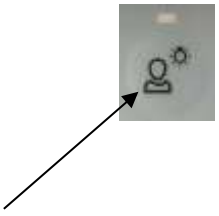
Process Steps	Rationale
• Expose as much of the infants body surface as is possible to maximise phototherapy treatment. This may include removing infant's nappy, reducing the size of the eye protection to expose more of the infant's head. Ensure skin is clean, dry and oil free.	Phototherapy only works on exposed skin surface.
• Place the BiliLux onto incubator over the infant with a minimum distance of 30 cm between the light and the infant.	If less than 30 cm distance between BiliLux and infant then harm may be caused to the infant.
1. Ensure infants eyes are protected by eye shields. 2. Press the start key on the control panel to turn on phototherapy light. 3. Adjust the irradiance to the desired level using the intensity keys on the control panel. Left hand button to decrease and right hand button to increase intensity. The button with the head and light is the observation light, the effect of the phototherapy is not affected when observation light is on.	→

CONSIDERATIONS FOR SAFE USE

- The Bililux unit should always be left uncovered.
- Shade curtain can be used (as long as unit not covered).
- Bililux may be placed directly on top of incubator:
  - Caution as may fall off if incubator moved or if on incubator hood with upward travel (eg. Leo/giraffe).
  - Unplug and remove before moving incubator or moving hood up.
- The observation light can be turned on at the same time the phototherapy light is operating to soften the intensity of the blue light without altering effectiveness of phototherapy unit. Useful when phototherapy light on if finding intensity of light disturbing to eyes of staff or parents.



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NeoBlue – Neocosy

Process Steps	Rationale
• **Level of irradiance (µW/cm²/nm)** > 30 µW/cm²/nm	
• Position the neoBLUE cozy device so that the air vents are not covered by blankets or clothing or positioned against obstructing surfaces. Place the covered neoBLUE cozy mattress into the neoBLUE cozy system so that it lies flat.	Ensures unit does not overheat.
• The infants head should be positioned at the curved end of the device. The infant should be placed with his/her back against the mattress. A blanket may be placed over the infant for added warmth.	Maintain infants temperature.
• The operating temperature for the neoBLUE cozy device is 20-30°C.	Though the device will initially operate in warmer conditions when new, use in warmer environments will shorten the life of the LED panel.
• All general process steps apply.	

References

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Keywords

Phototherapy, Bilibed, Bilisoft, Neoblue, NeoCosy, Giraffe Spot, Draeger BiliLux