East of England Neonatal ODN

(Hosted by Cambridge University Hospitals)

IVH Care Bundle

Background:

Intraventricular Haemorrhage is a significant complication of preterm birth associated with adverse neurodevelopmental outcomes. Although survival rates have improved in the preterm population, IVH is still a significant cause of mortality and morbidity. Premature babies are at the highest risk to develop intraventricular haemorrhage within the first 72 hours of life.

The care bundle was developed to be implemented for all babies **30 weeks gestation or below** during their **first 72 hours of life.**

Purpose

To provide recommendations for both nursing and medical staff in the support of preterm babies' **post-natally.** It sets out the expectations for the standard of care required to reduce harm. It will not include antenatal interventions already included in maternity recommendations.

❖ Content:

- Rationale and Interventions
- Bedside Checklist
- Poster card for Incubator

RECOMMENDATION	INTERVENTION	RATIONALE
Undertake an SBAR prior to delivery.	Obtain a handover between the obstetric and neonatal team using SBAR or similar.	An SBAR tool provides a communication method between teams to reduce the risk of missed information. Supporting the decision making process during stabilisation /resuscitation. Preventing avoidable errors through poor communication.
Assign roles, to cover checking of equipment and responsibilities during stabilisation, depending on the agreed level of intervention.	A member of the team is identified to lead. Other team members present are assigned roles during stabilization/ resuscitation of the baby including checking any equipment potentially required e.g. Lifestart;	With the lead having oversight of the overall situation and all members of the team being aware of their responsibilities. This helps to ensure everyone knows what they need to be doing, reducing the likelihood of missed or repeated tasks. Ensuring all equipment is checked and present,

	resuscitaire, etc to ensure it is working and ready for use.	provides reassurance that the equipment is working and available, reducing the likelihood of an adverse outcome.
Delay cord clamping for a minimum of 60 seconds or longer, if not contraindicated	As part of Initial handover, check there are no contraindications for delayed cord clamping due to a maternal or foetal condition. Agree, with the obstetric team, to delay umbilical cord clamping for at least 60-120 seconds after birth and how this will be managed. With the final decision made to delay cord clamping, based on the clinical picture of the baby once delivered.	Optimal cord clamping at preterm deliveries improves neonatal outcome: • Reduced rates of mortality • Reduced rates of necrotising enterocolitis • Reduced rates of intraventricular haemorrhage (all grades) • Reduced need for packed cell transfusions • Reduced need for blood pressure support. Ensuring all teams are aware of the plan to delay cord clamping, and how this will be managed will enable a smoother transition from the obstetric to neonatal team. Occasionally factors such as the length or condition of the cord, or baby's condition may prevent delayed cord clamping. This decision will be made by the leads present at the delivery.
Cord milking should be avoided in this group of babies.		The practice of Umbilical Cord Milking has been associated with an increased risk of severe IVH in the preterm population (<28weeks) and should not be encouraged. Extreme caution should also be advocated for those babies born between 28 to 30 weeks gestation
Provide an optimum environment to maintain normothermia	Check and ensure Delivery room is free from draughts and the room temperature is at least 25^0c or greater.	Hypo/hyperthermia increases the risk of mortality and reduces the likelihood of a successful resuscitation.
	Use a Neohelp^{RM} bag or equivalent is available to place baby directly into. Place a hat on the baby's head.	Use of a hat, Neohelp^{RM} bag or equivalent reduces heat loss from the baby
	Check temperature at least at birth, before moving the baby after resuscitation and on arrival to unit.	Careful monitoring of the baby's temperature allows interventions to be implemented to avoid hypo/hyperthermia.

Implement minimal intervention strategies during stabilisation/ resuscitation	Prior to delivery, the on call neonatal consultant should be informed and be present where possible. The least invasive airway support should be used to stabilise the baby, whilst always being prepared to escalate airway management. Management of airway should be performed by the most procedurally skilled member of the team.	To ensure the best possible outcome, a neonatal consultant would ideally be present to support the team, in their absence, the most experienced member of the team should lead. Intensive levels of resuscitation have been associated with a poor outcome. To minimise potential trauma to the baby and avoid excessive intubation attempts.
Facilitate a Delivery room cuddle, if the baby is stable enough.	Parents should be given the opportunity to hold their baby before transfer to NICU, even if they are intubated as long as they are clinically stable. Ideally the baby should be placed side lying onto the parents' chest.	Having the opportunity to touch and hold their baby is essential for improved bonding and mental health and can be performed safely with care.
Babies who are intubated as part of their stabilisation process or a very preterm baby who is not steroid mature should receive early surfactant.	Preterm babies with RDS on CPAP with FiO2 > .30 and/or increased work of breathing with respiratory and/or mixed acidosis and/or radiographic evidence of neonatal RDS should receive Surfactant using non-invasive techniques.	Recent studies comparing rescue therapy to prophylactic therapy favoured rescue therapy for safety and efficacy of treatment, along with the recommendation to use the least invasive method for administration of surfactant.
Use volume guarantee ventilation in preference to pressure ventilation	For preterm baby's requiring invasive ventilation within the first 72hours of life, volume-targeted or volume-guarantee (VG) ventilation should be the primary mode of respiratory support when used in combination with synchronised ventilation. Clear documentation of rationale if volume guarantee ventilation is not used.	Baby's ventilated with VG ventilation had significantly shorter duration of ventilation and need of supplemental oxygen. Volume guarantee ventilation has been associated with lower odds of severe IVH (grade 3 &4), compared with pressure limited ventilation. Reducing the chance of death or bronchopulmonary dysplasia compared with pressure-limited ventilation modes
	Monitoring of PCO2 levels via blood gases, transcutaneous monitoring or end-tidal CO2 is	It is important to avoid hypercapnia or hypocapnia as both are independently associated with acute brain injury.

	recommended. CO2 levels should be maintained at 4.5-8.5kPa.	
	Use Closed suction for ventilated babies	To maintain physiological stability and reduce incidence of hypoxia and hypercapnia.
	(NB: Early use of rescue ventilation via high-frequency oscillatory ventilation HFOV may increase the risk of IVH).	
Maintain Head Elevation for 72 hours	Bed tilt of 12^0 maximum 30^0 degrees. Bed should only be lowered when absolutely necessary. E.g x-rays, weights and should be for the least time as possible. Raising or lowering of the bed should be done in a slow and controlled manner.	Maintaining the head of the incubator in a raised position has been associated with reduced pressure on the baby's cerebral blood flow.
Keep head, neck and body in midline.	Head and torso should be kept in midline positioning, either in a supine or side lying position. Any deviation on medical grounds should be documented in the notes.	Keeping the bay's head as close to the midline as possible reduces likelihood of constricting the cerebral blood flow. A left or right deviation of the head from the midline may affect venous drainage by partial occlusion of the jugular vein. This can induce a temporary increase in intracranial pressure and may contribute to the occurrence of IVH
	No prone positioning unless agreed by senior clinician where clinical need outweighs the care bundle recommendations.	To avoid fluctuations in blood pressure and cerebral blood flow created through the need to turn the head left or right in prone positioning.
Aim for minimal Handling and 2 person cares	Timings of procedures should be discussed and agreed within the team depending on clinical need.	To minimise fluctuations in blood pressure and cerebral blood flow.
	In line with family integrated care, parents should actively be involved in all aspects of care for their baby.	The ethos of family integrated care is to promote a partnership between parents, carers and health professionals. FiCare has shown to improve outcomes for babies, improves mental health for parents and reduces their anxiety.

	Aim for two person handling for all interventions; cares, position changes, weighing and sheet changes.	Additional help with cares reduces handling time, provides assistance to comfort the baby and monitor their tolerance to the intervention. Ideally' this support can be given by the parents or professional staff in their absence.
	With the exception of emergency events, handling must be slow, paced and contained for the baby.	Life threatening situations must take precedence over care bundle recommendations.
	Observing and adjusting exposure to handling according to their tolerance of the procedure. Allow sufficient time for recovery and rest.	Avoid stress and exposure to pain, from excessive handling, poor positioning or nursing/medical interventions.
	Use of incubator covers to minimise exposure to light and noise.	Ensure adequate periods of uninterrupted sleep to promote growth and repair promotes brain maturation.
	Avoid lifting legs above head height to change nappy. Activities such as mouth care, nappy changes, bedlinen changes, etc, should be assessed for necessity and not on timing	To prevent increased cerebral blood flow associated with upward bending of the legs used in traditional style nappy care.
Encourage Skin-to-skin once baby is clinically stable.	Skin to Skin can be performed, on the neonatal unit, if the baby is deemed clinically stable after medical review.	Active parental involvement is an essential part of neonatal care. Skin to skin is integral to the physiological and psychological health of the parents and babies Kangaroo Care (skin-to-skin), offers benefits including decreased mortality, an improvement in physiological parameters, pain-relief, and improved long-term developmental outcomes. It is not proven to increase the risk of IVH if babies are stable.
	Parents should be informed that skin to skin or comfort holding should take place for a minimum of 1 hour and for as long as possible. Termination of skin to skin should be at parental request, or if the baby exhibits any of the following: ● Repeated or profound desaturations ● Repeated or	To optimise the benefits of skin to skin. This ensures cardiovascular stability and minimises stress and discomfort to the baby, providing the baby remains stable or if the baby is deeply asleep. Assessing and reducing the risk of an adverse event occurring whilst skin to skin is in progress promotes this sense of well-being. Improves bonding and increases breast-milk supply

	profound bradycardia. ● Repeated or profound apnoea. ● Dislodgement or concern about dislodgement of ET tube. ● Dislodgement or concern about dislodgement of venous access. ● Unrelenting irritability AND attempts to make the baby more comfortable have failed.	
	When Skin to skin is not deemed possible, it is important to show parents how to minimise separation by encouraging gentle comfort touch, talking, reading, singing soothing lullabies and olfaction simulation.	Family involvement is essential for the bonding and emotional well-being of the baby and parents/ significant carers
	Check the baby's temperature at least hourly whilst having side lying skin to skin.	Side lying skin to skin is not as effective when compared to prone skin to skin for maintaining normothermia.
	Method for transferring skin to skin. 1. If the baby is ventilated with central access, 2 nurses should be present to monitor, support and secure the lines, avoiding accidental removal. 2. Ideally the person/ parent performing the skin to skin should be the one to remove the baby from the incubator. 3. Ensure the incubator and baby is in a position to allow the holder to lean in as far as possible to minimise the distance required for the baby to move from the bed to the chest. 4. Once a secure hold has been obtained, gently manoeuvre the baby onto	If the preference of the parent is for the nurse to transfer the baby whilst they are already seated. The nurse should try to follow the principals of maintaining head elevation and midline position, when undertaking the transfer, reducing the distance between nurse and parent as much as possible. Maintaining Side lying during Skin to skin avoids inhibiting the venous return of the

	the chest, maintaining the principles of midline positioning with head slightly higher than the body. (The baby will not be fully upright sat this point). Settle the holder into the chair in a comfortable position. 5. Slowly manoeuvre the baby into the upright position, maintaining the side lying position to keep the head, neck and body in a straight line. Ensure any tubing is secure and safe from accidental removal. 6. Secure a blanket around both baby and holder to provide additional warmth and security to assist with position	blood flow in the brain, which has been strongly associated with Significant IHV. The baby should be kept in a side-lying position, ensuring the baby's head is kept in the midline during skin-to-skin for the first 72 hours. Careful handling of the baby aids the development of vestibular, proprioceptive and tactile sensory systems.
Give early Caffeine	Ensure caffeine loading dose is given within the first hour after birth. Followed by a daily maintenance dose commenced after 24hours after loading.	Caffeine is associated with improved neurodevelopmental outcomes, reduced IVH, reduced rates of bronchopulmonary dysplasia and patent ductus arteriosus, both of which cause cardiovascular instability.
Give prophylactic Vitamin K	Ensure vitamin k is given as part of the first hour of care.	Prophylactic administration of IM vitamin K is standard practice on all neonatal units to prevent vitamin K deficient bleeding, otherwise known as haemorrhagic disease of the newborn (HDN). If the intravenous route is used in preterm neonates, it may not provide the same protection as the intramuscular injection; further doses of Vitamin K may be required
Minimise blood sampling. Avoid rapid flushes or withdrawal of blood.	Minimise heel pricks / venepunctures. Ensure flushes are given slowly over 30 seconds. Avoid rapid withdrawal of blood from any venous or arterial access device.	To minimise fluctuations in blood pressure and cerebral blood flow from the pain and stress caused by the procedure. Or from the effects of rapid withdrawal or flushes.

Cautious use of Inotropes	Adopt a cautious approach to the use of inotropes to treat hypotension, unless other clinical signs are present (e.g. elevated lactate, prolonged capillary refill time, decreased urine output or low cardiac output. Fluid boluses should only be given if there is evidence of hypovolaemia increased capillary leak or blood loss.	The potential effects of treating low blood pressure with inotropes was found to be associated with an increase incidence of IVH in preterm babies. Careful consideration of inotropes ensures their use is appropriate and necessary for the clinical condition.
Use Central Line access if required clinically.	Insertion of Central access should be performed the most procedurally experienced team member within first hour of life. Junior/less experienced team members can assist as the second person. The bed should remain in the tilted position during the procedure. Careful monitoring of the baby should take place to ensure the baby is kept in the midline position during procedures.	Cuff blood pressure can be taken as part of the 1st baseline blood pressure until central access has been obtained. Caution should be advised regarding accuracy of cuff blood pressures and used only if central access is not available. Unstable babies should have umbilical lines in situ to minimise unnecessary handling, ensure accurate blood pressure monitoring and reducing the need for heel prick sampling.
Cautious use of Sodium Bicarbonate	Consider effects of using sodium bicarbonate. To be used with caution and upon medical decision. Consider low dose continuous infusion via UAC.	Sodium bicarbonate administration has been associated with increased IVH severity and mortality rates, as well as decreased cardiac output. The practice of giving continuous low dose Sodium Bicarb to prevent metabolic acidosis via central access is being used successfully, although strong evidence to support this is still minimal.
Consider treatment of PDA if clinically significant	Consideration of risks of treating compared to not treating should be assessed when determining treatment. If a Patent Ductus Arteriosus is considered clinically significant, affecting oxygen saturations and blood pressure, and respiratory support.	A symptomatic PDA increases the risk of a preterm baby developing an IVH. There has been some research looking into the use of prophylactic or early pharmacological treatment to prevent PDA, Although treatments for PDA closures were effective, the evidence did not show any benefit to prophylactic or early treatment.
After the initial day 1 Head ultrasound, further scans performed within the 72hour window should be based on clinical need.	After the initial Cranial ultrasound, further routine Cranial ultrasounds should ideally be after completion of the 72-hour bundle. Unless the clinical picture suggests a bleed has occurred or transfer to another unit is required.	As there is no evidence directly relating to the adverse effects of performing an ultrasound within the 72-hour window, we are following the expert opinion of the neurocritical care community. The D1 scan should be performed as soon as possible after birth to detect any lesions that may be antenatal in origin. However, this should be

		deferred if there is any concern that a CrUSS could destabilise the patient. Although 90% of Intraventricular bleeds occur within the first 72hours. Unless the bleed is significant, resulting in dilated ventricles, requiring medical intervention to reduce pressure, there is currently no treatment other than regular monitoring to assess and monitor extent of the bleed. Cystic changes take several weeks to develop and if present on day 4 can still be attributed to an antenatal event. Unless there is a clinical event or significant instability in the baby's condition that warrants assessment of a potential bleed, to determine ongoing management of the baby. Further routine scans should wait until the completion of the 72 hour bundle.
Monitor, implement, and evaluate intervention to reduce Pain and stress, and optimise comfort	Every effort should be made to monitor and mitigate the adverse effects of pain. Regular assessment of pain should be undertaken, with a step wise approach to pain management depending on the level of optimal pain relief needed.	Studies have identified how the effects of pain and stress can adversely impact on the maturation of the preterm brain and subsequent neurodevelopment of the preterm baby.
	Non-pharmacological approaches for reducing pain for minor procedures should be employed consistently, avoiding long periods of distress or crying. Comfort tool Pharmacological treatments should be considered and utilised depending on the gestation and tolerance of the baby for any procedure that is known to be painful.	All medications have potential adverse side effects and should be used with care. Using a step wise approach to pain relief allows the least intervention to be used which offers an effective level of pain relief.
	The effectiveness of any interventions should be evaluated, acted upon and documented.	All care provided needs to be evaluated for effectiveness to ensure the intervention is effective and beneficial to the baby.
Optimisation Nutrition	It is recommended that parenteral nutrition is commenced as soon as Intravenous access is available and enteral feeds started within the first 24 hours if possible. Breast milk is considered gold standard for all babies regardless of gestational age for optimal growth and development	Optimisation of nutrition and growth is associated with improved neurodevelopmental outcomes in preterm and very low birth weight babies.

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IVH Care Bundle Checklist

IVH Care Bundle Started - date of birth:_____

Started - time of birth:_____

Daily Tasks		AGE					
Document Assessment 12 hourly		0-12H	12-24H	24-36H	36-48H	48-60H	60-72H
Time of Assessment:							
	1. Minimal handling, baby cues followed						
	2. Environmental noise reduced. Phones /alarms set at minimum noise levels, alarms answered promptly.						
	3. Light reduced by dimming overhead lighting and use of incubator covers						
	4. Head kept in midline position						
	5. Bed tilted to 12 degrees maximum 30 degrees						
	6. Side lying nappy change (two person technique and legs below head level)						
	7. Temperature maintained between 36.5-37.5 using servo mode						
	8. Humidity as per policy						
	Signature:						

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Daily Tasks		AGE					
Document Assessment 12 hourly		0-12H	12-24H	24-36H	36-48H	48-60H	60-72H
Time of Assessment:							
Cardiovascular	1. Central Lines access present						
	2. Monitoring: Invasive blood pressure monitoring (if central access present)						
	3. Slow IV flushes over 30 seconds						
	3. Capillary puncture/heel puncture avoided						
	5. Slow Arterial sampling						
	6. Preterm saturations 91-95% maintained						
	Signature:						

Daily Tasks		AGE					
Document Assessment 12 hourly		0-12H	12-24H	24-36H	36-48H	48-60H	60-72H
Time of Assessment:							
Respiratory	1. Volume guarantee ventilation						
	2. Closed suction used with ventilation (if available on unit) or						
	3. Avoid prolonged Suction <15secs						
	3. CO_2 clearance between 4.5-8.5 kPa						
Pain and stress and comfort.	1. Hourly pain assessment has been recorded and actioned where necessary.						
	2. Hourly assessment of comfort score and actioned where necessary.						
Signature:							

*Due to the wide range of gestational ages covered by this SOP not all interventions may be needed, mark as N/A if not applicable or not available on your unit.

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IVH Care Bundle
Start date and time :

_____

IVH Care Bundle
End date and time
(72 hours from birth):

_____

Add Unit Logo