LOCAL OPERATING PROCEDURE

NEONATAL SERVICES DIVISION

Approved by Quality & Patient Care Committee
20 December 2018

GOLDEN HOURS PROTOCOL - MANAGEMENT OF PRETERM INFANTS <32 WEEKS IN THE FIRST 2 HOURS OF LIFE

This Local Operating Procedure is developed to guide safe clinical practice in Newborn Care Centre (NCC) at The Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this Local Operating Procedure.
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1. AIM

- To optimise the disability-free survival in extreme preterm infants by providing optimal interventions in the first few hours of life

NOTE:

Make every effort to accomplish the following goals by 2 hours of age:

- **Admit to NICU**
- **Place the infant in a humidicrib and commence humidification**
- **Stabilise the infant on CPAP/Mechanical ventilation**
- **Secure vascular access including UVC and UAC (where applicable)**
- **Confirm all line and tube positions on x-ray**
- **Perform first blood gas**
- **Commence blood pressure monitoring (where applicable)**
- **Document vital signs on observation charts**
- **Commence IV fluids and starter TPN**
- **Administer medications including vitamin K, first dose of antibiotics and caffeine (where applicable)**
- **Encourage early expression and administration of breast milk**

KEY POINT: Handle preterm infants gently at all times

2. PATIENT

- Preterm infants <32 weeks

3. STAFF

- Medical, nursing and midwifery staff

4. CLINICAL PRACTICE

Before Delivery (-30 to 0 minutes of age)

- Maternal History:
  - Obtain a detailed maternal history including events leading to current preterm delivery, treatment/interventions such as laser for TTTS, medications during pregnancy including antenatal steroids, MgSO4, anti-hypertensives, tocolytics, insulin, antipsychotics, antibiotics – type and duration or any other medications.
  - Note down the best estimated gestational age of the infant and determine what method was used to estimate the gestation.
  - Check maternal notes for any antenatal care plan for the infant and the neonatologist/fellow involved in the antenatal counselling
  - TIP: If time permits, document maternal history in the progress notes before the delivery of the infant.

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- Resuscitation Equipment:
  - Gather surfactant vial (1.2 g vial for <27 weeks and 2.4 g vial for ≥27 weeks) from the fridge in the NCC treatment room.
  - Check resuscitation equipment is functional and ready for use. Our preference is to use the High Risk Drager Resuscitation Trolley with humidified gases (if available).
  - Determine (a) size of the mask, (b) size and length of oral and nasal ETT, (c) possible length of insertion for UVC and (d) starting ventilator settings.
- NICU Equipment:
  - Nursing/medical staff to prepare and gather all equipment for intubation and vascular access ready on a trolley in the NICU next to the allocated bed. This saves time in the preparation for procedures in the NICU.
- ABC checklist prior to delivery:
  - Antenatal Steroids (first and repeat courses).
  - For infants <30 weeks: Brain Protection (MgSO4 in labour or prior to LSCS).
  - Cord clamping for 45-60 seconds.
- Enrolled in any RCTs?
  - Determine if the infant is enrolled in any randomised controlled trials and any trial interventions required at birth.

At Delivery (0 to 20 minutes of age)

- Personnel:
  - For deliveries 23 – 25+6 weeks: Consultant/Fellow+Registrar+NCC RN will attend to delivery.
  - 26 – 31+6 weeks: Fellow+Registrar+NCC RN will attend to delivery. Notify the consultant of impending delivery.
- Cord clamping:
  - Wait for 45-60 seconds after birth before clamping cord (exact timing at the discretion of the clinician).
- Cord Blood Gas:
  - Ensure O&G staff collect umbilical arterial and venous blood for gas analysis.
- Plastic Bag and Hat:
  - Use a plastic bag to keep the infant warm immediately after birth and place under the radiant warmer. Do not dry the infant. Ensure the opening of the bag is at the neck and folded behind shoulders. Place a hat on the infant's head.
- Oximeter:
  - Attach the pulse oximeter probe to the right wrist for preductal saturation readings. Then, connect the other end of the probe to the pulse oximeter.
- Oxygen for resuscitation:
  - Follow To2rpido guidelines if baby is enrolled in the study.
  - If not in To2rpido trial, it is the clinician's discretion as to what FiO2 (suggested starting FiO2: 0.3 – 0.6) to start resuscitation with.
- Acceptable minimum oxygen saturations in preterm newborn babies:

Time from birth in minutes	Acceptable right wrist or hand saturation
1	60
2	65
3	70
4	75
5	80
10	85

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- Respiratory management in the delivery suite/OT:
  - 23+0 – 27+6 weeks: Infants are to be intubated and prophylactic surfactant given at birth.*

***NOTE: This management strategy is currently under review. The immediate respiratory management of infants in this gestation range is at the discretion of the clinician.**

  - 28+0 – 31+6 weeks: Commence non-invasive CPAP (6-7 cm H2O) at birth.
- Transport from the delivery suite/OT to NICU:
  - 23+0 – 27+6 weeks: To remain intubated for the transport to NICU. It is preferable to use auto-breath mode on Drager resuscitation trolley rather than hand ventilate.*

***NOTE: This management strategy is currently under review. The immediate respiratory management of infants in this gestation range is at the discretion of the clinician.**

  - 28+0 – 31+6 weeks: Transport the infant on non-invasive CPAP.

In NICU (20 minutes to 2 hours of age)

- Weight, length and head circumference:
  - Measure weight and transfer the infant in the plastic wrap into the incubator (GE Omnibed, Drager (HillRom) Airshields C2000).
  - Measure length and head circumference in the incubator.
  - Deduct 25 g from the measured weight to obtain the accurate weight of the infant (Plastic bag and hat weigh 20 g, cord clamp 3 g, oximeter probe 2.5 g, ET tube 3 g, NG tube 3 g).
- Plastic Bag:
  - Keep the plastic bag on until the commencement of central line insertion.
- Incubator Temperature and Humidification:
  - Set the initial ambient temperature at 36 °C in air mode until the temperature is stable.
  - Set the humidification at 85% for infants <29+0 weeks or birth weight <1000 g.
- Ventilator/CPAP support:
  - Connect the infant to ventilator or CPAP as appropriate. Adjust the ventilator settings or CPAP settings as needed (see below).
- Connections:
  - Allow 10 minutes for the nursing staff to settle the baby in the humidicrib, attach all leads, ventilator tubings and gastric tube. While waiting, medical staff to decide on the sizes and lengths of ETT, UVC, UAC and plan the investigations needed in the first 2 hours (e.g. x-rays, blood tests, blood culture) and prescribe fluids and medications.
    NB .Infants monitored with pulse oximetry and UAC do not require ECG leads.
- Vascular Access (preferred):
  - <27+6 weeks or <1000 g – UVC and UAC within the first 2 hours of birth.*
  - ≥28 weeks – peripheral IV cannula +/- PICC line or UVC+/-UAC if required.*

***NOTE: This management strategy is currently under review. The choice of vascular access at this gestation is at the discretion of the clinician.**

  - NOTE: <27+6 weeks or <1000 g – If central venous access is getting difficult, please check blood glucose at 45-60 minutes of age. If BGL<2.6 mmol, try peripheral venous access.

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- Intravenous Fluids:
  - Commence IV fluids at 60 ml/kg/day with starter TPN and lipids. Aim to start IV fluids within 45 to 60 minutes of birth. Fluids (with the exception of inotropes) can be started through a UVC while waiting for x-ray to confirm the position.
- Antibiotics:
  - Decide the need for antibiotics and administer the first dose of antibiotics.
- Caffeine:
  - Commence loading dose of caffeine in infants on CPAP.
- CPAP:
  - General starting CPAP pressure is 6-7 cmH_2O.
- Mechanical ventilation:
  - The preferred mode of ventilation is SIPPV (PC+AC) plus volume guarantee (initial settings of: TV 4-6 ml/kg; Pressure 20/6; IT 0.35 sec; Rate 40-50 /min).
- Intubation/reintubation criteria for infants on CPAP include:
  - FiO2 >0.40 to maintain saturations ≥90%
  - PCO2 >60 mmHg with pH <7.20
  - Frequent apnoeas (eg. >1 per hour) or requiring bag and mask ventilation.
- Target Oxygen Saturations:
  - Target oxygen saturations between 90 and 95%.

5. DOCUMENTATION

- eMR
- Daily Care Plan
- Neonatal Observation Chart
- Medication Chart
- NICUS database

6. EDUCATIONAL NOTES

- Early trials of prophylactic surfactant to preterm infants demonstrated a decreased risk of air leak and mortality in comparison to the rescue surfactant therapy in infants with established RDS, However, recent large trials that reflect current practice (including higher rates of antenatal steroids and routine post-delivery stabilization on CPAP) demonstrate less risk of chronic lung disease or death when using early stabilization on CPAP with selective surfactant administration to infants requiring intubation.[1]
- In preterm infants with signs and symptoms of RDS, early surfactant therapy with extubation to CPAP compared with later selective surfactant replacement and continued mechanical ventilation is associated with lower incidence of BPD and fewer air leak syndromes. A lower treatment threshold (FIO2 < 0.45) confers greater advantage in reducing the incidences of airleak syndromes and BPD in them; moreover a higher treatment threshold (FIO2 at study > 0.45) was associated with increased risk of PDA.[2]
- Support Study involving 1316 infants of 24-27 weeks randomised infants into 2 groups: (1) CPAP Group (Infants were commenced on CPAP in the delivery suite and continued on CPAP in the NICU) and (2) surfactant group (Infants received surfactant and mechanical ventilation in the delivery suite). The rates of the primary outcome of death or BPD at 36 weeks gestation did not differ significantly between the CPAP group and the surfactant group. There were also no significant differences in the composite outcome of death or neurodevelopmental impairment among extremely premature infants randomly assigned to early CPAP or early surfactant administration.[3-5]

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- A lower target range of oxygenation (85 to 89%), as compared with a higher range (91 to 95%), did not significantly decrease the composite outcome of severe retinopathy or death, but it resulted in an increase in mortality and a substantial decrease in severe retinopathy among survivors. The increase in mortality is a major concern, since a lower target range of oxygen saturation is increasingly being advocated to prevent retinopathy of prematurity There was no significant difference in the neurodevelopmental outcomes between lower or higher target range of oxygen saturation.[3-5]
- There is some evidence that NIPPV is a useful method of augmenting the beneficial effects of CPAP in preterm infants following extubation. NIPPV is probably more effective than CPAP in reducing the symptoms of extubation failure.[6]

7. RELATED POLICIES/PROCEDURES/CLINICAL PRACTICE LOP

- Nil

8. RISK RATING

- Medium

9. NATIONAL STANDARD

- Standard 1 Governance for Safety and quality in Health Service Organisation
- Standard 9 Recognising and Responding to Clinical Deterioration in Acute Health Care

10. ABBREVIATIONS AND DEFINITIONS OF TERMS

NCC	Newborn Care Centre	RN	Registered Nurse
NICU	Neonatal Intensive Care Unit	O&G	Obstetrics and Gynaecology
CPAP	Continuous Positive Airway Pressure	OT	Operating Theatre
UVC	Umbilical Venous Catheter	NG	Nasogastric
UAC	Umbilical Arterial Catheter	ECG	Electrocardiogram
TPN	Total Parenteral Nutrition	PICC	Peripherally Inserted Central Catheter
TTTS	Twin-Twin Transfusion Syndrome	BGL	Blood Glucose Level
MgSO4	Magnesium Sulphate	SIPPV	Synchronised Intermittent Positive Pressure Ventilation
ETT	Endotracheal Tube	RDS	Respiratory Distress Syndrome
ABC	Airway Breathing Circulation	BPD	Bronchopulmonary Dysplasia
LSCS	Lower Segment Caesarean Section	NIPPV	Nasal Intermittent Positive Pressure Ventilation
RCT	Randomised Controlled Trial		

11. REFERENCES

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12. AUTHOR

Primary	24/9/2013	S Bolisetty (Staff Specialist), J Sheils (NE), E Jozsa (CNS)

REVISION & APPROVAL HISTORY
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