GOLDEN HOURS PROTOCOL

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

This LOP is developed to guide clinical practice at the Newborn Care Centre, Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.

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

2. GENERAL PRINCIPLES
   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 the vascular access including UVC and UAC
   - Confirm all line and tube positions on x-ray.
   - Perform first blood gas
   - Commence blood pressure monitoring. 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.

3. PATIENT
   - Preterm Neonates <32 weeks

4. STAFF
   - Medical Staff
   - Registered Nurses
   - Registered Midwives
   - Student Midwives

5. CLINICAL PRACTICE

| KEY POINT: Gentle Handling of the Infant |

Before Delivery (-30 to 0 minutes of age)
   - Maternal History:
     o 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, Mg SO4, anti-hypertensives, tocolytics, insulin, antipsychotics, antibiotics-type and duration or any other medications.
     o Note down the best estimated gestational age of the infant and determine what method was used to estimate the gestation.

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NICU USE ONLY
- 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.

- Resuscitation Equipment:
  - Gather surfactant vial (1.2 g vial for <27 wk and 2.4 g vial for ≥27 wk) 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.
  - 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 (0-20 minutes of age)
- Personnel:
  - For deliveries 24-25⁰⁶ weeks: Consultant/Fellow+Registrar+NCC RN will attend to delivery
  - 26-31⁰⁶ weeks: Fellow+Registrar+NCC RN will attend to delivery. Notify the consultant of impending delivery

- Cord clamping:
  - If enrolled in the APTS trial, follow the trial arm for the infant.
  - If not enrolled in the APTS trial, timing of the cord clamping is at the discretion of the neonatologist.

- 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 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 T0₂rpido guidelines if baby is enrolled in the study.
  - If not in T0₂rpido 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

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<tr>
<th>Time from birth in minutes</th>
<th>Acceptable right wrist or hand saturation</th>
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<tr>
<td>1</td>
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Respiratory management in the delivery suite/OT:
- 23⁰⁷/7 – 27⁰⁷/7 wks: Infants are to be intubated and prophylactic surfactant given at birth
- 28⁰⁷/7-31⁰⁷/7 wks: Commence non-invasive CPAP (6-7 cm H₂O) at birth

Transport from the delivery suite/OT to NICU:
- 23⁰⁷/7 – 27⁰⁷/7 wks: To remain intubated for the transport to NICU. It is preferable to use auto-breath mode on Drager resuscitation trolley rather than hand ventilate.
- 28⁰⁷/7-31⁰⁷/7 wks: Transport the infant on non-invasive CPAP.

IN NICU (20 minutes – 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 36⁰C in air mode until the temperature is stable.
- Set the humidification at 85% for infants <29⁺⁰ weeks or birthweight <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 (refer to NICU tools link on the NCC website-Clinical Resources and Guidelines Section) and plan the investigations needed in the first 2 hours (e.g. Chest and Abdo X-Ray, FBC, blood culture) and prescribe fluids and medications.
- <27⁰ weeks: No need for ECG leads while they are monitored on pulse oximeter and UAC.

Vascular Access:
- Preferred vascular access:
- <27⁰ weeks or <1000 g - UVC + UAC within the first 2 hours of birth.
- ≥28 weeks – peripheral IV cannula and PICC line or UVC+/UAC.
- NOTE: <27⁰ 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

Intravenous Fluids:
- Commence IV fluids at 60 ml/kg/day with starter TPN and lipids. Aim to start IV fluids within 45 -60 minutes of birth. Fluids,( with the exception of inotropes) can be started through UVC by 45 minutes while waiting for x-ray to confirm the position.

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NICU USE ONLY

- **Antibiotics:**
  - Decide the need for antibiotics and administer the first dose of antibiotics.

- **Caffeine:**
  - Commence loading dose of caffeine in infants on CPAP.

- **CPAP:**
  - If on CPAP: General starting CPAP pressure is 6-7 cmH2O

- **Mechanical ventilation:**
  - If mechanically ventilated– the preferred mode of ventilation is SIPPV (PC +AC) plus volume guarantee (initial setting of 4-6 ml/kg TV, 20/6,IT 0.35 sec, rate 40-50/min)

- **Intubation/Reintubation criteria for infants on CPAP:**
  - FiO2 >0.40 to maintain saturations≥90%
  - PCO2 >60 mmHg with pH<7.20 and
  - Frequent apneas (example: > 1 per hour) or requiring bag and mask ventilation

- **Target Oxygen Saturations:**
  - Target the oxygen saturations to be between 90-95%. Start the Massimo Trends Chart.

4. **DOCUMENTATION**
   - Integrated Clinical Notes
   - Neonatal Medication chart
   - Standard Neonatal Observation Chart.

7. **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 NCPAP 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 air leak 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.\(^3\-^5\)

- 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 NCPAP in preterm infants following extubation. NIPPV is probably more effective than CPAP in reducing the symptoms of extubation failure.\(^6\)

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8. RELATED POLICIES / PROCEDURES / CLINICAL PRACTICE LOP

9. REFERENCES


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APPENDIX. GOLDEN HOUR FLOW CHART

Prior to delivery
-30 to 0 minutes of age

Maternal history
- notes
- MFM Care Plan on Intranet
- ABC (antenatal steroids, MgSO4, cord clamping)
- enrolled in any RCT

Prepare resuscitation equipment
- turn on overhead heater
- check pulse oximeter
- check cylinders
- cut tapes
- warm linen
- plastic bag/hat
- check neopuff / ETT / mask / laryngoscope / line length
- gather surfactant/feeding tube, check dose

Allocation of roles

Organise and prepare equipment in the NICU
- set incubator temperature +/- start humidification
- set up trolley for lines

At delivery
0-20 minutes of age

Personnel
- 24-25+6 wk: Consultant/Fellow + Registrar + NCC RN
- 26-31+6 wk: Fellow + Registrar + NCC RN

Press APGAR timer

Ask for Cord Blood Gas

Apply
- CPAP
- Plastic bag/hat
- pulse oximeter (right wrist)

Respiratory Management
- 23-27+6wk: intubation+surfactant
- 28-31+6 wk: CPAP
- titrate Fio2 to saturation trends

In NICU
20-120 minutes of age

Incubator & humidification
- Weigh the infant
- start humidification at 85%
- keep in plastic bag until insertion of central lines
- attach skin probe
- air mode until temp stable for 1 hour.

Attach to respiratory support

Observations
- length, HC and vital signs

Vascular access
- UVC/UAC (<27+6 wks or < 1000g)
- IVC or PICC or UAC/UVC (≥28 or < 32 wks)

Medications/Fluids
- give Konakion
- Antibiotics if required
- Caffeine if on CPAP
- Starter TPN

Communication
- call the unit (26160)
- Talk to the parents

Documentation
- patient notes
- admission book
- Audit form

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