LOCAL OPERATING PROCEDURE

NEONATAL SERVICES DIVISION

Approved by Neonatal Services Quality Committee
April 2018

BLOOD PRESSURE MONITORING IN NEWBORN CARE CENTRE

This LOP 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 Operations Procedure (LOP). Using this document outside the Royal Hospital for Women or its reproduction in whole or part, is subject to acknowledgement that it is the property of NCC and is valid and applicable for use at the time of publication. NCC is not responsible for consequences that may develop from the use of this document outside NCC.

INTRODUCTION

Blood pressure (BP) measurement is an important vital sign to monitor in infants admitted to a neonatal intensive care unit (NICU).

1. AIM

- To provide guidance on timing and frequency of blood pressure monitoring for infants admitted to the NCC

2. PATIENT

- Newborns

3. STAFF

- Medical and nursing staff

4. EQUIPMENT

- Drager Monitor in Level 3 for continuous intra-arterial measurement in infants with indwelling arterial catheters via transducer
- SpaceLab Monitor in other clinical areas
- Non-invasive blood pressure devices

CLINICAL PRACTICE

Blood pressure measurement and monitoring should be performed in the following circumstances:

- All neonates on admission to NCC
- Infants with an intra-arterial line in situ need BP monitored by continuous intra-arterial blood pressure monitoring and hourly documentation of BP in the Neonatal Observation Chart
- Infants admitted to Level 3 should initially have 1-4 hourly non-invasive BP measurements according to their clinical needs, with less frequent monitoring 4-12 hourly when their condition is stable
- Infants who are unwell or unstable for any reason (signs of clinical changes eg. lethargy, poor perfusion, unstable respiratory status) need regular BP monitoring at least every 4 hours until their condition stabilises
- Infants on inotropic or vasoactive medications with no indwelling intra-arterial catheters need non-invasive BP monitoring at least every hour
- Post-operative or post-anaesthetic babies
    - Initial post-operative infants returning to NCC from theatres every 30 minutes for 2 hours
    - Increase the frequency or duration of observations if clinically stable after first 2 hours
    - For stable infants, monitor BP every 4 hours for the first 24 hours as a minimum
- Infants with renal conditions: initially monitor BP 4-6 hourly or as prescribed by the medical team
- Infants with cardiac conditions: initially monitor BP 4-6 hourly or as prescribed by the medical team

BLOOD PRESSURE MONITORING IN NEWBORN CARE CENTRE cont'd

Measuring blood pressure invasively:

- See the following NCC LOPs:
    - Arterial Line - Blood Sampling
    - SAFESET Intra-Arterial Line Set – Set up and priming

Measuring blood pressure non-invasively (Oscillometric method):

- Choose appropriate size blood pressure cuff that covers at least 2/3 of length of upper arm or lower leg/calf.
- Apply inflatable cuff to infant's limb
- Connect inflatable cuff hose to the BP monitor hose
- Press "start" button

NB. Limitation with this method is that values tend to be too high for smaller infants and may be too low for larger infants

5. DOCUMENTATION

- eMR nursing notes
- Daily Care Plan
- Neonatal Observation Chart

6. EDUCATIONAL NOTES

- There are only a few small studies on the practical and predictive applicability of BP measurements in preterm infants.[1-9]
- BP monitoring is only part of the assessment of adequate circulation and tissue perfusion in the newborn. There is often a poor relationship between BP and either cardiac output or blood volume in preterm infants.[10]
- BP increases steadily in the first week of life in very premature neonates. Preterm infants generally stabilize their BP after 14 days of life and at this time they have a BP similar to that of term infants.[1,9]

<u>Normal BP range</u>

- The normal physiologic BP range ensuring appropriate organ perfusion in the neonate is unknown.[11]
- Hegyi et al[9] reported that the maximum and minimum systolic and diastolic BP during the first 7 days of life in premature infants with birthweight less than 2000 grams increased daily for the first 7 days of life. They derived the following formula for normal BP range during the first week of life:
    - Minimum Systolic (mmHg) = 1.8(DAY)+43
    - Maximum Systolic (mmHg) = 2.6(DAY)+57
    - Minimum Diastolic (mmHg) = 1.3(DAY)+24
    - Maximum Diastolic (mmHg) = 2.0(DAY)+36

<u>Hypotension</u>

- Agreement on the definition of hypotension in preterm infants is still lacking.
- For very low birth weight (VLBW) infants, a good rule of thumb is to aim for the baby's gestational age in weeks as the desired minimum mean BP.[12,13] For example, for a 24 weeks gestation infant, aim for a mean arterial pressure of 24 in the first few days of life.
- A postal questionnaire sent to all 120 NICUs in Canada, which had a 79% return rate (95 replies), found that 25.8% relied on BP values as the sole criteria for intervention. A BP less than gestational age in weeks was the most common trigger for treatment.[14]
- There is controversy over how active to be in treating a low BP in an otherwise stable premature infant. Decision to treat hypotension should be based on the general condition of the infant, not on the mean arterial BP alone.

BLOOD PRESSURE MONITORING IN NEWBORN CARE CENTRE cont'd

Hypertension

- Hypertension in the term infant has been defined as a systolic BP > 90mmHg or a diastolic > 60mmHg. In preterm infants a systolic pressure > 80mmHg or a diastolic BP > 50mmHg has been used.[15,16]

7. RELATED POLICIES/PROCEDURES/CLINICAL PRACTICE LOP

- Arterial Line - Blood Sampling
- SAFESET Intra-Arterial Line Set – Set up and priming

8. RISK RATING

- Medium

9. NATIONAL STANDARD

- Standard 1 Governance for Safety and quality in Health Service Organisation
- Standard 11 Service Delivery
- Standard 12 Provision of Care

10. ABBREVIATIONS AND DEFINITIONS OF TERMS

NCC	Newborn Care Centre	BP	Blood pressure
LOP	Local Operations Procedure	NICU	Neonatal Intensive Care Unit

11. REFERENCES

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BLOOD PRESSURE MONITORING IN NEWBORN CARE CENTRE cont'd

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12. AUTHOR:

Primary	10/8/2011	Newborn Care LOPS Group
Revised	5/4/2018	Newborn Care LOPS Committee

REVISION & APPROVAL HISTORY
Moved from RHW LOPs into Neonatal Services Division April 2018
Reviewed and approved Neonatal LOPs April 2018
Approved Quality & Patient Safety Committee 18/8/11
Newborn Care LOPs Group 10/8/11

FOR REVIEW :