

MEETING ABSTRACT

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Invasive arterial blood pressure in the neonatal intensive care: a valuable tool to manage very ill preterm and term neonates

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Blood pressure monitoring is essential in managing hemodynamically unstable neonates and preterm infants. Non-invasive blood pressure measurement (NIBP) with oscillometric technique is in widespread use in the Neonatal Intensive Care Units (NICUs). Nonetheless NIBP is not pretty accurate when compared with invasive monitoring since it generally over read mean blood pressure in particular when the infants are hypotensive so it falsely reassures neonatologists [1-4]. Invasive arterial blood pressure (IABP) methods is considered the gold standard for circulatory management of ill neonates [5]. Along with the more accuracy, IABP measurement has a number of advantages over NIBP, namely it allows beat-to-beat pressure measurement to closely monitor patients with very changeable conditions, arterial blood sampling is easily performed as well as cardiac stroke volume can be derived from characteristics of the arterial pressure pulse. The commonly used method is by means of an umbilical artery catheter, wherever possible, or by placing a cannula needle in a different artery, usually radial [5-8]; a column fluid directly connects the arterial system to a pressure transducer where the arterial pulse is converted into an electrical signal that in turn will be processed via a microprocessor, amplified and eventually displayed as the blood pressure waveform against time [5]. In order to ensure a reliable assessment of blood pressure nurses should be wary about one of the commonest sources of error, namely introduction of small air bubble in the system [5]. Thrombo-embolism, vasospasm, thrombosis, haemorrhage and infection are complications of arterial cannulation [9]. Haematoma and peripheral nerve injury may

also occur in case of peripheral cannulation. A close supervision by nurses encompasses observation for adequate patency of artery by monitoring hourly colour, temperature and perfusion of digits and limbs. Blanching, redness, cyanosis and changes in temperature must be quickly reported to the medical staff. Severe bleeding as result of disconnected arterial line required a strict monitoring as well. In addition nursing management consists in performing level and zero arterial line at the beginning of every shift and every time the neonate is turned or moved. The heparinized saline infusion should be changed every 24 hours and the infusion line every third day [10-15].

In conclusion invasive arterial blood pressure technique, if correctly performed by neonatologists and closely monitored by nurses, represents a valuable tool to tailor treatment in very ill preterm neonates.

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References

1. Briassoulis G: Arterial pressure in preterm infants. *Crit Care Med* 1986, **14**:735-738.
2. Gevers M, van Genderingen HR, Lafeber HN, Hack WW: Accuracy of oscillometric blood pressure measurement in critically ill neonates with reference to the arterial pressure wave shape. *Intensive Care Med* 1996, **22**:242-248.
3. Takci S, Yigit S, Korkmaz A, Yurdakök M: Comparison between oscillometric and invasive blood pressure measurements in critically ill premature infants. *Acta Paediatr* 2012, **101**:132-135.
4. Dannevig I, Dale HC, Liestøl k, Lindemann R: Blood pressure in the neonate: three non-invasive oscillometric pressure monitors compared with invasively measured blood pressure. *Acta Paediatr* 2005, **94**:191-196.
5. Weindling AM: Blood pressure monitoring. *Arch Dis Child* 1989, **64**:444-447.
6. Gardner RM, Parker J, Feinauer LR: System for umbilical artery monitoring. *Crit Care Med* 1982, **10**:456-458.
7. Todres ID, Rogers MC, Shannon DC, Moylan FM, Ryan JF: Percutaneous catheterization of the radial artery in the critically ill neonate. *J Pediatr* 1975, **87**:273-275.

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8. Schindler E, Kowald B, Suess H, Niehaus-Borquez B, Tausch B, Brecher A: **Catheterization of the radial or brachial artery in neonates and infants.** *Paediatr Anaesth* 2005, **15**:677-678.
9. Furdon SA, Horgan MJ, Bradshaw WT, Clark DA: **Nurse's guide to early detection of umbelical arterial catheter complications in infant.** *Adv Neonatal Care* 2006, **6**:246-256.
10. Nugent J: **Intra-arterial blood pressure monitoring in the neonate.** *JOGN Nurs* 1982, **11**:281-287.
11. Norfolk, Suffolk & Cambridgeshire Neonatal Network: **Clinical Guideline: Peripheral Arterial Cannulation.** 2007 [<http://www.neonatal.org.uk/documents/3270.pdf>], Downloaded 22/03/2013.
12. Hack WW, Vos A, Okken A: **Incidence of forearm and hand ischaemia related to radial artery cannulation in newborn infants.** *Intensive Care Med* 1990, **16**:50-53.
13. MacDonald MG: **Peripheral Artery Cannulation Chb29.** In *Atlas of Procedures in Neonatology*. 3rd Ed edition. Lippincott Williams & Wilkins, Philadelphia;MacDonald, M.G. & Ramasethu, J 2002.
14. Kaleidoscope The Children's Health Network: **Peripheral Arterial Line in NICU – Insertion, Care and Removal of Guideline / Procedure.**, Accessed 26/03/2013 http://www.kaleidoscope.org.au/docs/gl/pal_nicu.pdf.
15. Newborn Services Clinical Guide: **Intravascular Catheters peripheral Arterial Lines.** 2006, Accessed on 22/03/2013 <http://www.adhb.govt.nz>.

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