

## NEONATAL RESUSCITATION OF COLD BABY

### *EQUIPMENT*

- Clock or watch
- Warm dry towels
- Firm stable surface
- Bag and mask (masks in 3 sizes)
- Suction
- O2
- Cord clamp
- Scissors
- Gloves

### *DRUGS*

Of the babies who will respond to resuscitation, only a very small number (less than 1%) will need drugs in addition to the bag & mask and chest compressions described below. The drugs are sodium bicarbonate, adrenaline and dextrose. If you have them then get them out together with an umbilical catheter through which they are given, but if you do not have the drugs or the catheter remain confident because your resuscitation will be successful without them.

### SCENARIO

Me M arrives at hospital after giving birth at home. She was waiting for the ambulance when she delivered and was assisted by her neighbour. Me M and her baby are brought by the paramedic. Baby is wrapped in a silk scarf. She brought the placenta with in a packet.

What do you do?

### **Mother**

Shake and Shout Alert

Call a CAB

Circulation: Pulse 78bpm, BP 115/80 mmHg

Airway: Talking normally

Breathing: RR 16, does not appear distressed

Secondary survey Big 5, forgotten 4, core 1

CNS alert

CVS Pulse normal and heart sounds normal

Respiratory RR 12 bpm

Gastrointestinal No jaundice, no hepatosplenomegaly

Renal Passes 80ml of urine for urine dipstix analysis which shows leucocytes

Immunological HIV positive and takes one tablet per day for HIV since booking at 20 weeks

Haematological Hb 9,0 g/dL, no bleeding

Endocrine Glucose 4,5 mmol/L. Patient opts for exclusive breast feeding  
Musculoskeletal Calves soft, not swollen or tender  
Core one: Placenta examined and complete  
Uterus well contracted, no vaginal bleeding, no vaginal tears

### **NEONATE**

1. Dry the baby and remove wet towels. The baby is limp and not crying
2. Note the time
3. ABC            Assess ABC
  - Airway: Gently suck the airway
  - Breathing: The baby is not breathing. Give 2 B&M breaths and reassess.  
Still not breathing Give B&M for 30 seconds and reassess
  - Call for help
  - Circulation There is a pulse of >100 palpable at the umbilical cord.
4. You notice the baby is cold and blue
5. Take the baby to a radiant heater and continue bag and mask ventilation with O<sub>2</sub>
6. You take the temperature and it measures 32°C
7. Continue bagging with B&M while ensuring baby is dry. Make sure the head is covered as it represents a significant part of the baby's surface area
8. Measure the glucose 3,4 mmol/L
9. Warm towels and place baby on warm towels
10. Continue B&M ventilation until baby is 36°C before declaring baby as not responding to ventilation.
11. Once baby responds, keep baby warm, ensure breastfeeding is established and perform routine newborn procedures: Vitamin K, Chloromycetin eye ointment, newborn immunizations and Road to Health Card.

### **DISCUSSION POINTS**

1. What are the maternal risks of giving birth before arrival
  - a. Haemorrhage from retained placenta, atonic uterus, genital tract tears
  - b. Infection from lack of aseptic technique
2. What are the neonatal risks of birth before arrival
  - a. Asphyxia
  - b. Birth trauma
  - c. Hypoxia
  - d. Hypothermia
  - e. Hypoglycaemia
  - f. Tetanus and neonatal sepsis from lack of aseptic technique
3. Why is it important and what are different ways to keep a baby warm?
  - a. If the baby does not need active resuscitation, warm the neonate on the mother's chest
  - b. Radiant heater
  - c. Warmed vaculiter – NB must not be more than 37°C
4. How do you manage respectful care of a mother when her baby is being resuscitated?
5. How do we set the incubator for a cold baby?

## ***BACKGROUND INFORMATION***

All babies are at risk of hypothermia due to a large surface area to weight ratio. Some babies are at particular risk for instance preterm infants and babies born before arrival (BBA) to the delivery unit. Hypothermic neonates have increased oxygen consumption and are at higher risk to become hypoglycaemic and acidotic.<sup>1</sup> The EPICure study showed that the temperature of a preterm baby on admission to the neonatal unit was directly related to outcome and that hypothermic babies have a higher mortality.<sup>2</sup> The Advanced Paediatric Life Support guidelines suggest addressing warming at the beginning of resuscitation as it is often forgotten.

Priorities to warming a baby are to dry the baby well as wet babies can cool down despite a radiant heater, and to wrap the baby in a warm towel. The head of a newborn represents a large part of the surface area, thus ensure it is covered at all times. Make sure that the head is covered as it represents a significant part of the baby's surface area<sup>1</sup>

### **Warming a cold neonate**

The following steps can be used to warm a neonate:

- Close windows and doors to minimise draft
- Dry baby with a towel
- Wrap in warm towel
- Place underneath radiant heater
- Place on warm bag
- Place in a plastic packet (ensure head is exposed) if <1000g BEFORE drying and place under a radiant heater

The only Cochrane review comparing warming techniques focuses on neonates born in a delivery room and warming starts within ten minutes of birth. Plastic wraps or bags, plastic caps, skin-to-skin care and transwarmer mattresses all keep preterm infants warmer leading to higher temperatures on admission to neonatal units and less hypothermia. However, the small numbers of infants and studies and the absence of long-term follow-up mean that firm recommendations for clinical practice cannot be given<sup>3</sup>

The infant's temperature must be monitored closely because of the slight, but described risk of hyperthermia when these techniques are used in combination.<sup>4</sup> Infants born to febrile mothers have been reported to have a higher incidence of perinatal respiratory depression, neonatal seizures, and cerebral palsy and an increased risk of mortality.<sup>5</sup> The goal is to achieve normothermia and avoid iatrogenic hyperthermia.<sup>6</sup>

If a neonate is limp and not breathing the aim should be to establish ventilation as recommended by the Working Group on Pediatric Resuscitation (and not to establish cardiac compressions as in adults)<sup>6</sup>

### **Cord clamping and hypothermia**

Delayed cord clamping has been shown to have benefits to both term and preterm infants.<sup>7</sup> Though the evidence does not suggest an increased risk of hypothermia in preterm infants who have undergone delayed cord clamping (30-60 seconds)<sup>8</sup>, there is a potential risk of a drop in core temperature if measures are not taken to prevent heat loss in extreme premature infants during delayed cord clamping especially if the delay exceeds 60-120 seconds. The healthcare providers need to be cognizant of this potential adverse event.

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- <sup>1</sup> Advanced Paediatric Life Support, Fifth Edition. Edited by Martin Samuels, Sue Wieteska. 2011 Blackwell Publishing Ltd. Published 2011
- <sup>2</sup> Costeloe K, Hennessy E, Gibson AT, Marlow N, Wilkinson AR. The EPICure study: outcomes to discharge from hospital for infants born at the threshold of viability. *Paediatrics* 2000; 106(4): 659-71
- <sup>3</sup> McCall EM, Alderdice F, Halliday HL, Jenkins JG, Vohra S. Interventions to prevent hypothermia at birth in preterm and/or low birthweight infants. *Cochrane Database Syst. Rev.* 2010; 3: [CD004210](#)
- <sup>4</sup> Singh A, Duckett J, Newton T, Watkinson M. Improving neonatal unit admission temperatures in preterm babies: exothermic mattresses, polythene bags or a traditional approach? *J Perinatol.* 2010;30:45- 49
- <sup>5</sup> Petrova A, Demissie K, Rhoads GG, Smulian JC, Marcella S, Ananth CV. Association of maternal fever during labor with neonatal and infant morbidity and mortality. *Obstet Gynecol.* 2001;98:20-27
- <sup>6</sup> Kattwinkel J, Perlman JM, Aziz K, Colby C, Fairchild K, Gallagher J, Hazinski MF, Halamek LP, Kumar P, Little G, McGowan JE, Nightengale B, Ramirez MM, Ringer S, Simon WM, Weiner GM, Wyckoff M, Zaichkin J. Part 15: neonatal resuscitation: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation.* 2010;122:S909 –S919.
- <sup>7</sup> Raju TN, Singhal N: Optimal timing for clamping the umbilical cord after birth. *Clin Perinatol* 2012, 39(4):889–900.
- <sup>8</sup> Rabe H, Diaz-Rossello JL, Duley L, Dowswell T: Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at preterm birth on maternal and infant outcomes. *Cochrane Database Syst. Rev* 2012, 8, CD003248.