

DRAFT

Early care of the newborn infant. Statement on current level of evidence (2005)

Introduction

Within the UK The British Association of Perinatal Medicine (BAPM) is the largest professional body focusing on the field of perinatal medicine. In 1998 the Association produced a UK guideline on the management of respiratory distress syndrome (RDS). This expired in 2002 and initially BAPM declined to revise the guideline given the growing complexity of perinatal care. However members made strong representations that such a document should exist, both to demonstrate where evidence pointed clearly to an optimum approach to practice, and where evidence was simply not sufficient to direct how particular aspects of care should be managed.

The original guidelines covered a broad topic area extending beyond RDS alone. They included much of what can be considered the early care of the newborn, and in particular the preterm, baby. To repeat this exercise in the current era, where “guidelines” are normally produced using a standardised and structured procedure, was felt to be beyond the resources of BAPM. As a compromise, therefore, the Association undertook a review of evidence as it relates to key areas of current practice.

At the start of the process the whole subject was sub divided into a number of topic areas, which relate to the original guidelines, and each of these was reviewed by a small multidisciplinary group comprised of BAPM members and non members as well as individuals from outside the UK (see Appendix for group composition). One member in each group acted as “lead”. The groups were asked to undertake a review of the topic area they had been assigned. The review was to comprise a literature search as well as consultation with experts in the group. Each group was asked to produce a short statement about clinical management in relation to the topic area they had been given, identifying the level of evidence to support any specific recommendations that they made. Level of evidence was graded using the SIGN system (needs ref) of A,B,C,D in which grade A evidence is from at least one high quality meta analysis or randomised controlled trial, whilst grade D is based on case reports and expert opinion alone. Each group was also asked to share their preliminary statement with the whole BAPM membership for wider consultation. These wider comments were also taken into consideration when drawing up the final document

Because of the large variation in the size of the topic areas, and the level of controversy, the output from the groups varied quite markedly. Some produced concise consensus statements whilst others produced more descriptive statements about management and the level of evidence available, but set these in context by including a discussion of the background controversy. For the sake of clarity the output of each group has been reduced to brief statements about particular aspects of management for which there appears to be consensus, either positive or negative. However supporting “discussion papers” are available in the appendix in relation to those groups that produced them.

Where there is strong evidence (grade A and possibly B) then it would be expected that this influence practice. Less convincing evidence (C or D) means that individual units still need to develop their own local consensus view about management.

Where there is only grade C or D evidence, the groups have given their own consensus view. This does not necessarily reflect the view of all the members of BAPM, but is included in this document to assist local discussion.

DRAFT

It is important that these statements are read along with the BAPM Standards for Hospitals Providing Neonatal Intensive and High Dependency Care (2nd edition).

Resuscitation

General

The group is of the opinion that :

- 1) Current evidence does not support routine intubation of “all” preterm infants **(C)**
- 2) An intermediate grade staff and/or a consultant paediatrician, in addition to a junior staff member, should be present for the delivery of an extreme preterm infant ≤ 28 weeks gestation **(C)**.
- 3) Those without training and expertise, who may be faced with an unexpected emergency should have a clear action plan to call for help **(C)**.

Choice of gas for resuscitation

- 1) There is good evidence, from trials in term infants that air should be the first choice **(B)**.
It is the consensus view of the group that resuscitation should be started with air followed by oxygen, in increasing amounts, for newborns who do not respond (by an increase in heart rate) to lung inflation

Thermal care during resuscitation

- 1) The infant's temperature should be maintained above 36°C **(B)**.
- 2) For babies <28 weeks' gestation this can be achieved, through reduction in evaporative heat loss, by placing the baby directly into a plastic bag **(C)**.

Respiratory support during resuscitation

- 1) A T piece device provides more accurate control of inflation pressures than a (self-inflating) bag and mask system and is therefore preferable when resuscitating preterm infants **(B)**.
- 2) Where appropriate equipment is available, there is evidence, from animal studies only, that a PEEP of at least 5 cmH₂O should be used during resuscitation of preterm babies **(B)**.

In the opinion of the group :

- 1) Opening the airway is essential if bag and mask ventilation is to succeed **(C)**.
- 2) Maintenance of an adequate heart rate remains the best guide to correct inflation pressure and adequate ventilation during initial resuscitation **(C)**.
- 3) In the absence of a heart rate response, observation of chest movement is an appropriate secondary guide to effective ventilation **(C)**.

Circulatory support during resuscitation

DRAFT

- 1) Chest compression should be initiated if the heart rate remains less than 60 beats per minute, following 30 seconds of effective positive pressure ventilation **(C)**.
- 2) Heart rate should be determined by auscultation over the precordium **(B)**.
- 3) There is no evidence to support any particular rate of cardiac massage or ratio to breaths and international guidelines should be followed. Two hands encircling the chest with two thumbs applied to the sternum is the most effective way to deliver chest compressions **(B)**.
- 4) There is no evidence to support the routine use of intravascular blood volume expansion during resuscitation. If there is evidence of hypovolaemia due to haemorrhage, blood should be used as first choice **(B)**.

Use of drugs in resuscitation

There is little good evidence for the use of drugs during resuscitation. It is the view of the group that :

- 1) **Adrenaline:**
 - i. In the very preterm infant it may be agreed with parents that the use of adrenaline is inappropriate **(C)**.
 - ii. Where adrenaline is to be considered during resuscitation of a preterm baby it is indicated when the heart rate remains below 60 beats per minute despite 30 seconds of assisted ventilation and another 30 seconds of co-ordinated chest compression and ventilation **(C)**.
 - iii. The dose usually recommended is 10-30 micrograms per kg (0.1-0.3ml/kg of 1:10,000 solution). This can be repeated after 3-5 minutes if needed. The first dose can be given via the trachea **(C)**, but there is no certainty that this route is effective. At least one dose should be given intravenously if the baby remains bradycardic **(C)**.
- 2) **Sodium bicarbonate.** Treatment with sodium bicarbonate is indicated if the heart rate remains less than 60 beats per minute despite adequate ventilation, chest compression and adrenaline **(C)**.
- 3) **Naloxone.** Use of naloxone may be considered in the post resuscitation period in circumstances where the baby still has respiratory depression after positive pressure ventilation has restored a normal heart rate **(C)**.
- 4) **Glucose.** Normoglycaemia should be maintained **(C)**.

Respiratory support

- 1) There is no evidence, from trials done during a period of time when the use of antenatal steroids and surfactant has been at a high level, that early use of CPAP compared to intubation and ventilation is associated with a reduction in the duration of mechanical ventilation.
- 2) Extubation on to nCPAP rather than into ambient oxygen is associated with a decreased incidence of extubation failure and requirement for supplementary oxygen at 28 days **(A)**.
- 3) Current data have not established any alternative mode of ventilation as preferable to time cycled pressure limited ("conventional") ventilation in the management of RDS. This includes comparison with volume controlled ventilation **(B)**, PTV**(B)** HFOV **(A)**.
- 4) In infants born at, or near, term with RDS and with proven pulmonary hypertension nitric oxide should be administered **(A)**.
- 5) There is insufficient evidence to recommend routine use of inhaled nitric oxide in preterm infants with severe respiratory failure **(A)**.

DRAFT

Blood Pressure

- 1) In infants with RDS there remains controversy over the effect on outcome of treating hypotension, however that is defined. However the group considered that it is good clinical practice to measure blood pressure in infants with RDS and to treat hypotension when accompanied by clinical or laboratory evidence of poor tissue perfusion **(D)**.
- 2) In the presence of hypotension, where there is evidence of underlying hypovolaemia, it is the group's view that expansion with normal saline is the first line treatment **(C)**.
- 3) Data on short term outcomes indicate that dopamine is more effective than volume or dobutamine in raising blood pressure **(A)**. In the absence of data confirming long term benefit and safety of dopamine compared to dobutamine, no firm recommendations can be made regarding the choice of drug to treat hypotension **(A)**.
- 4) In preterm babies with refractory hypotension hydrocortisone may increase blood pressure, but the evidence for its effect is weak **(C)**.

Intensive Care Monitoring

The group consider that :

- 1) Oxygen saturation monitoring alone is insufficient to guide oxygen therapy in acute RDS **(C)**.
- 2) It is good practice during the acute phase of RDS to monitor the baby's vital signs, blood biochemistry and haematological profile on a regular basis. **(D)**.

Fluid Balance

- 1) Fluids should be restricted to meet physiological requirements without allowing dehydration **(A)**.
- 2) Additional sodium should only be administered after the natural post-natal diuresis has occurred **(A)**.

Nutrition

- 1) Raw maternal breast milk is the best choice for enteral feeding and should be encouraged **(B)**.
- 2) Use of trophic feeding improves a range of "in hospital outcomes " and should be encouraged **(B)**.

Prevention of Infection

- 1) Differentiation of RDS from early onset infection is difficult. In all babies with early onset respiratory distress (compatible with the respiratory distress syndrome) it is the group's view that blood cultures should be taken and broad spectrum antibiotic cover provided until culture results are available **(C)**.
- 2) Good infection control procedures, in particular hand washing and use of alcohol rub between patients, should be routine **(C)**.
- 3) Sterile technique for invasive procedures is important to prevent infection **(B)**.

DRAFT

- 4) There is no evidence that prophylactic use of immunoglobulin or colony stimulating factors decreases mortality or morbidity **(A)**.

Positioning and Individualised Care in Babies with RDS

It is the view of the group that :

- 1) Proper positioning and handling as a part of an individualised developmental care programme have been shown to have potentially beneficial effects on a number of physiological and neuro-behavioural parameters in the pre-term infant. Units should consider supporting this approach to care **(C)**.
- 2) Prone positioning increases oxygenation, tidal volume and compliance of the lungs when compared to infants in a supine position but is associated with an increased incidence of external rotation of the extremities **(C)**.

Use of Post Natal Corticosteroids

- 1) Corticosteroids should not be used to manage the lung disease caused by respiratory distress syndrome in the first week of life **(A)**.
- 2) There is still a place for corticosteroids in management of preterm infants who are ventilator-dependent after the first week of life to facilitate extubation and to reduce risk / severity of chronic lung disease. Corticosteroids should be reserved for infants who fail to be weaned from assisted ventilation after other potentially less harmful strategies have been tried. The lowest possible dose for the shortest possible duration should be used **(A)**.
- 3) Inhaled corticosteroids are less effective than systemic corticosteroids and their long-term safety has not been established **(B)**.

Management of Persistent Ductus Arteriosus in RDS

- 1) Where clinical considerations indicate early duct closure is a priority use of indomethacin within 24 hours of birth has short term benefits, including a significant decrease in the incidence of symptomatic PDA, the need for duct ligation and in the incidence of Grade 3 and 4 IVH. However these effects are not associated with any change in mortality rates or in rates of long term neurosensory impairment **(A)**.
- 2) Ibuprofen reduces the incidence of PDA and has a similar efficacy to indomethacin. It causes less reduction in blood flow to the brain, gut and kidneys but there are concerns that it may increase respiratory morbidity. Consequently, it is the opinion of the group that ibuprofen does not confer any net benefits over indomethacin.**(C)**.

Endotracheal Tube Management

- 1) Routine suctioning of the endotracheal tube is not necessary **(B)**.
- 2) Suctioning with a “closed system” is associated with reduced hypoxia and a reduced fall in heart rate **(A)**. However the longer term effects of this practice have not been assessed.
- 3) Inspired gases should be warmed and humidified **(C)**.

DRAFT

- 4) Routine chest physiotherapy would result in increased handling of the baby and, in the opinion of the group, is not recommended in neonatal RDS (**D**).

Place of Delivery and Transport

It is the opinion of the group that :

- 1) Maternity units which are not staffed or equipped to provide neonatal intensive care should have arrangements agreed within their Network for the antenatal transfer of women when it is anticipated that a preterm baby might be born and intensive care may be necessary. Because preterm delivery can be unexpected and certain maternal conditions preclude in-utero transfer, every maternity unit must have facilities and trained personnel to initiate effective resuscitation at birth (**D**).
- 2) Each Managed Perinatal Network should establish transport arrangements to provide prompt transfer of a mother or baby without depleting staffing levels at either the place of birth or the receiving NICU (**D**).
- 3) Postnatal transfer of a preterm baby who is receiving artificial ventilation requires staff trained in transport principles and who are familiar with local circumstances (**D**).

Follow up

It is the opinion of the group that :

- 1) Each unit should have a protocol for follow up of children defined as at high risk of adverse neuro developmental outcome, and arrangements for close liaison with child development teams in the locality (**D**). As a minimum these arrangements will include babies born at 30 weeks of gestation or less and babies <1000g birthweight (**D**).
- 2) Standard definitions of severe disability are available for two year old children, including measures of respiratory disability, which can be monitored and reported in annual reports on a local and geographical basis (**D**).
- 3) Babies receiving supplemental oxygen at home should be considered for RSV-specific immuno-globulin (**C**), and routine immunisation with pneumococcal vaccine and seasonal influenza vaccine (**D**).