

GUIDELINE FOR THE DETECTION AND MANAGEMENT OF DESATURATIONS AND APNOEA OF PREMATURITY. INCORPORATING NEONATAL APNOEA AND SATURATION MONITORING PRACTICE

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Key Amendments

Date	Amendments	Approved by

Introduction

Apnoea of prematurity is common. It is seen in 80% of babies born <30 weeks but is rarely a problem for babies born >34 weeks. For a full discussion see Robertson's textbook of neonatology.

Guideline

Apnoea in this document refers to central, obstructive and mixed apnoea.

Central Apnoea is defined as cessation of breathing movements for >20 seconds. Central apnoea will be detected by an apnoea monitor. Any associated desaturation will be detected by a saturation monitor so that babies on a saturation monitor do not usually need an apnoea monitor as well.

Obstructive Apnoea is defined as upper airway collapse leading to cessation of airflow to the lungs. It is recognised clinically as a desaturation with or without associated colour change and bradycardia. Breathing movements will continue during an obstructive apnoea. Obstructive Apnoea will not be detected by an apnoea monitor unless it progresses to a central apnoea.

Mixed Apnoeas are common; they start as obstructive apnoea and progress to central apnoea or vice versa.

A **desaturation** is defined as an episode of oxygen saturation <85%. They occur for a variety of reasons including both central and obstructive apnoea.

A **self limiting desaturation** is an episode of desaturation with or without associated colour change (cyanosis or pallor). There is usually no bradycardia (see below). The baby recovers spontaneously without requiring supplemental oxygen nor tactile stimulation. The need for stimulation and /or oxygen will be a matter of clinical judgement. They are very common in well premature babies- one study of well term infants found desaturations to at

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least 10% below baseline in 59% of babies studied. They have many causes including “short” (ie <20sec) episodes of hypoventilation (central or obstructive).

A **bradycardia** is defined as a fall in heart rate to <100 bpm for >5 seconds.

Monitoring Required

The type and duration of monitoring required is dictated by both the **physiological stability** of the baby and his/her **gestational age**. The terms apnoea, desaturation and self limiting desaturation, as used in this section, are defined above.

Physiologically unstable

- Apnoeas
- Desaturation requiring stimulation or oxygen
- Acute respiratory disease
- Ventilated, NCPAP

SATURATION, ECG and RESPIRATORY RATE MONITORING.

Physiologically stable in air

- No central apnoea
- Self limiting desaturations only
- Not ventilated or on NCPAP

SATURATION MONITOR until self limiting nature of any desaturations has been established, by discussion between medical and nursing staff on ward round, then APNOEA MONITOR plus daily SATURATION CHECK FOR 5 MINUTES until 34 weeks.

Physiologically stable in oxygen

- As above plus stable or decreasing oxygen requirement
- Oxygen via low or high flow nasal cannulae

SATURATION MONITOR unless approaching discharge home in oxygen and a fixed oxygen flow rate has been established, preferably by overnight recording – see home oxygen guideline, when can be changed to an APNOEA MONITOR.

Stopping Continuous Monitoring (= ecg, saturations, apnoea monitor)

Born <34 weeks

Monitor according to physiological stability.

All Continuous Monitoring can be stopped when all of the following criteria are satisfied:

1. CGA 34 weeks.
2. Apnoea free for **8** days*, but if caffeine has been given must be off caffeine for **8** days and apnoea free.
3. Minimum of **5** days off Ventilation/ CPAP if it has been used

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*No monitoring is needed once well baby reaches 34 weeks post menstrual age irrespective of duration of monitoring already performed. For example a baby born at 33+4 can have monitoring removed, provided he is physiologically stable, once he achieves 34 weeks – he does not need 8 days of continuous monitoring provided he has not had caffeine or respiratory support.

Born >33 + 6 weeks

No routine continuous monitoring if physiologically stable.

Response to Apnoea of Prematurity

- Gentle tactile stimulation, oxygen if desaturating and not responding to stimulation, face mask ventilation may be required for severe episodes.
- Examine carefully looking for underlying causes. Consider infection including, viral esp RSV. Also acidosis, hypoxia, hyperthermia and gastrooesophageal reflux (see separate guideline), seizures, anaemia (see transfusion guideline).
- Treat with caffeine if no cause identified other than prematurity.

Caffeine – prescribed as Caffeine Citrate

Usually given to babies \leq 30 weeks if initial respiratory support required.

Not routine > 30 weeks.

Must be prescribed as “caffeine citrate” not simply “caffeine” nor “caffeine base”

See NNU formulary for administration details.

Usu loading dose is 20mg/kg of caffeine citrate (oral or iv)

Use maintenance dose is 5 mg/kg/day of caffeine citrate but can be increased to 10 mg/kg/day (oral or iv)

Can be discontinued at 32 – 34 weeks when baby apnoea free.

Has a long half life, 60 – 140 hrs, in the neonate.

Does not treat bradycardia nor desaturations unless these are secondary to central apnoea.

- For persistent apnoea consider doxapram, NCPAP or ventilation – should all be discussed with Consultant.

Vaccinations

Can cause a recurrence of apnoea. This still seems to be true with acellular pertussis. It is much more likely with the first set of vaccinations. The following risk factors have been identified:

- Birthweight < 1.1 kg.
- Gestation at birth < 29 weeks.
- Chronic lung disease.
- More severe apnoea of prematurity initially.
- < 1.7 kg at time of vaccination.

Consider initial vaccination in hospital with 24hrs of monitoring on an Apnoea monitor. Initial vaccination can be in community – consultant decision. If initial vaccinations do not precipitate apnoea subsequent immunisations can be given in the community.

Apnoea monitors at home

Evidence indicates that apnoea is not predictive of, or a precursor to, Sudden Infant Death Syndrome (Cot Death). An apnoea monitor only needs to be supplied in the following circumstances:

- Discharge home on caffeine - via Neonatal Outreach Team (NOT)
- Previous cot death of a sibling - via CONI (Care of Next Infant)
- Home oxygen therapy - via NOT

Apnoea monitors are not routinely supplied by NNU to any other babies. Parents of babies who do not fulfil the above criteria and who wish to have an apnoea monitor will have to purchase it themselves or obtain one via the CONI Plus scheme. The CONI scheme is organised by the Lullaby Trust <http://www.lullabytrust.org.uk/coni> ,our local contact can be obtained through this website.

References

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Schulzke S et al 2005 Apnoea and bradycardia in preterm infants following immunisation with pentavalent or hexavalent vaccines. Eur J Pediatr 164 (7): 432

Darnall R, Kattwinkel J et al 1997 Margin of safety for discharge after apnea in prterm infants. Pediatrics 100 (5) 795-801

Baird T 2004 Clinical correlates, natural history and outcome of neonatal apnoea Seminars in Neonatology 9, 205-211

Fleming PJ, Blair PS 2003 Sudden unexpected deaths after discharge from the neonatal intensive care unit. Seminars in Neonatology 8 159-167

Slack MH, Schapira D 1999 Severe apnoeas following immunisation in premature infants. Arch Dis Child 81: F67-68

Monitoring Tool

This should include realistic goals, timeframes and measurable outcomes.

How will monitoring be carried out?

Who will monitor compliance with the guideline?

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: <i>(Responsible for also ensuring actions are developed to address any areas of non-compliance)</i>	Frequency of reporting:
	WHAT?	HOW?	WHEN?	WHO?	WHERE?	WHEN?
	Ensure monitoring according to physiological stability	Regular checks on daily Consultant and nursing ward rounds that guidelines are being followed	Ongoing daily consideration on ward rounds	Doctor and nurses completing daily ward round	Senior medical and nursing staff on neonatal units	No formal reporting envisaged. Could be audited if Datix or informal monitoring suggests that there is an issue

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