BEST PRACTICE GUIDANCE FOR INFANT CPAP

A South London and South East of England approach

Introduction:

This guideline has been created to support clinical colleagues in South Thames Paediatric Network (STPN) with the use of Non-invasive Continuous Positive Airway Pressure (CPAP) for Children under 1 year within acute paediatric admissions. This excludes the use of CPAP within Neonatal units who will use equipment and approaches familiar and appropriate to their clinical environment and practice.

The guideline is designed to allow for rapid recognition of a child that would benefit from CPAP and provide succinct information as to the best practice for commencing therapy in a child experiencing acute respiratory distress. It does not replace the clinical knowledge, expertise and judgement of clinicians at the bedside. The guideline does not describe the use of Non-invasive ventilation (NIV) beyond CPAP although clinical units with the skills and ability to provide care beyond CPAP should use local guidance.

The contents for the Guideline are as follows:

Main document: Best Practice guidance for Infant CPAP

References and Team credits

All appendices can be accessed on this link: [CPAP | South Thames Paediatric Network (stpn.uk)]

Appendix A: Team Screen

Appendix B: Set up guides and resources

Appendix C: Patient transfer

Appendix D: Adaptable Interface selection material for infants and toddlers only

Appendix E: Adaptable Interface selection material for all ages

Change History:

Date	Change details, since approval:	Approved by:	Document Version:
21/10/2021		Clinical Director STPN Marilyn McDougall	1.0

South Thames Paediatric Network

Non-invasive CPAP in children under 1 year – South Thames Paediatric Network

Patient and therapy selection

Choosing CPAP or HHHFT- CPAP delivers better PEEP but high-flow is often better tolerated. This decision should hence be made by senior clinical team with consideration of underlying condition, time to set up therapy, equipment availability, skill availability and patient tolerance to therapy.

Indications

- Moderate to severe respiratory distress despite first line respiratory support methods (Oxygen, positioning, suction and ECCs)
- Unresponsive to HHHFT
- Hypoxia (Sats < 90%) despite oxygen therapy (Type 1 respiratory failure)
- Respiratory acidosis (Type 2 respiratory failure), although repeated blood gases not advised.

NB: CPAP can be commenced for respiratory acidosis at pH < 7.3 if parallel clinical assessment signifies a need. Favourable outcomes have been seen if CPAP is commenced at pH 7.25, although clinicians should be aware of potentially higher rates of CPAP failure if intervention is delayed.

Contra-indications

- Recurrent or prolonged apnoea
- Respiratory arrest or peri-arrest state
- Severe cardiovascular instability
- Upper airway obstruction
- Inability to protect the airway
- Undrained pneumothorax/pneumomediastinum
- Craniofacial abnormalities
- Trauma/Surgery to nasopharynx
- Continuous vomiting

Cautions

- Abdominal distention
- Recent abdominal surgery
- Previous Vomiting

Patient and equipment management

Essential Care considerations (ECCs) – ECC's should be reviewed prior to and during therapy.

- Optimised positioning (e.g. head elevation)
- Optimise comfort (swaddling, dummy if used, nappy cares, parental contact/skin to skin)
- Consider referral for physiotherapy assessment
- Secretion clearance if indicated and safe to do so
- Consider feeding regime alteration according to risk and underlying disease:

Severe respiratory distress- NBM with IV fluids

Moderate respiratory distress- assess prior to feeding and proceed with caution

- Psychosocial support for family
- Minimal handling/cluster cares
- Blood gas analysis not essential and acidosis a late sign of failure.
- Chest x-ray for all children starting CPAP
- Onsite anaesthetic to be aware of patient in case of need for step up intervention (unless local policy does not indicate)
- Essential to support breastfeeding mothers

Monitoring and Nursing care

- Nurse on 1:2 ratio (1:3 with 2 ward level patients)
- Presence of red flags will require Nursing ratio of 1:1 until resolved
- Continuous oxygen saturations
- Observation frequency and escalation according to PEWS
- Min hourly observations and escalation according to PEWS
- Continuous ECG initially until clinical improvement
- 2 hourly mouth and nose care including pressure area check if clinically tolerated
- Hourly documentation of FiO_2, PEEP and humidification temperature checks
- Equipment specific checks

Equipment

- Paediatric arrest trolley easily accessible
- Bag Valve Mask at bedside
- Piped Medical Gases and suction
- Ideally Centrally monitored if possible

Patient transfer

Intra- Hospital Transfers - avoid where possible until a period of stability maintained without CPAP- **Appendix C**

Inter-Hospital transfer Should be discussed with STRS.

Sedation use: The use of sedation for patients on CPAP should not be routine or considered prior to all comfort measures. Consultant with experience in the use of low dose sedation for CPAP should do so only with consideration of the patient risks. Clinicians without experience should proceed only with advice from STRS.

Commencing CPAP

1. Select interface, CPAP device, humidification and settings

PEEP 5-7cmH_20 (commence at 4-5 if tolerance poor)
FiO_2 at maximum setting (unless contraindicated).

2. Nasogastric tube

Aspirate stomach contents including air.
Leave NG on free drainage and regularly aspirate to alleviate pressure from air in stomach until patient considered ready to re-establish feeding.

3. Patient preparation

Assess need for suction
Nappy cares and other comfort measures
Place headgear at the back of the head
Other comfort measures and skin preparation

4. Commence CPAP using 2 person technique

1st person - turn on device and apply interface

2nd person- apply flow by oxygen until interface applied and secure headgear once therapy tolerance and clinical condition established

Please note: If secured too tight this will increase risk of intolerance, vagal stimulation and pressure damage.

5. Close observation for tolerance and stability in 1st 10-15 mins

6a. If patient tolerates CPAP, review at regular intervals (Minimum hourly)

- Titration of FiO2 to oxygen saturations of 90% (or alternative patient range)
- Need to escalate treatment
- Readiness to feed
- Readiness to wean PEEP (When FiO_2 < 0.40)

6b. If patient FAILS to tolerate CPAP

- Senior review
- Consider switching to high-flow or low-flow
- Consider escalation to intubation, see red-flags below

Red flags for immediate escalation	Immediate escalation
• Apnoeic/bradycardic episodes • Increasing respiratory distress after CPAP commenced • Clinical exhaustion (as evidenced by respiratory insufficiency) • FiO2 >0.60 PEWS indicates immediate escalation to 2222	• Increase FiO2 to max • Call 2222 • Prepare for intubation • Liaise with retrieval team or on site L3 PCC Communicate with family

NOTE: Children with underlying neuro-muscular weakness may not be able to increase respiratory effort – escalate treatment according to effect (hypoxia, hypercapnia, bradycardia, prolonged CRT, reduced consciousness)

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References and Team credits

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Clinical Director review and Endorsement of South Thames Paediatric Network Infant CPAP guideline		
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References

James et al (2011) Predicting the success of non-invasive ventilation in preventing intubation and re-intubation in the paediatric intensive care unit. Intensive Care Med (2011) 37:1994–2001

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Pons-Òdenaa et al (2019) What are the most reliable predictive factors of non-invasive ventilation failure in paediatric intensive care units? *An Pediatr (Barc)*;91:307–316.

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