



East of England Paediatric Critical Care ODN

(Hosted by Cambridge University Hospitals)



<< BITESIZE >>
PRINCIPLES OF
HEATED HUMIDIFIED HIGH FLOW OXYGEN
THERAPY
IN
PAEDIATRICS



East of England
Paediatric
Critical Care
Operational Delivery Network

Collaborative working to deliver high quality care to our children and their families

BITESIZE

The bitesize learning packages are intended as a refresher or to support learning in the paediatric setting. It is not the intention to give lengthy explanations or critical analysis of practice, rather to be an aide memoire or refresher for the clinical nurse. Links to further information are given where appropriate so the reader is able to delve deeper should this be required.

The learning packages are based on East of England paediatric clinical guidelines and links to these guidelines are provided

Units will differ in the equipment available. Where equipment is identified the reader should refer to manufacturer guidance to ensure safe use.

This should be used in conjunction with the educational resource booklet and competency document, available on the website.

LEARNING OUTCOMES

- Understand the principles of HHHFT in paediatrics
- Be aware of the expectations and limitations of HHHFT
- Know where to find further information

HEATED HUMIDIFIED HIGH FLOW OXYGEN THERAPY

HHHFT is a minimally invasive therapy that delivers warmed and humidified blended air/oxygen via a nasal cannula interface at different flow rates.

HHHFT is a comfortable and effective means of delivering oxygen and humidification to infants and children in respiratory distress

These are 3 of the devices on the market for HHHFT and used in the network



VapoTherm



Optiflow

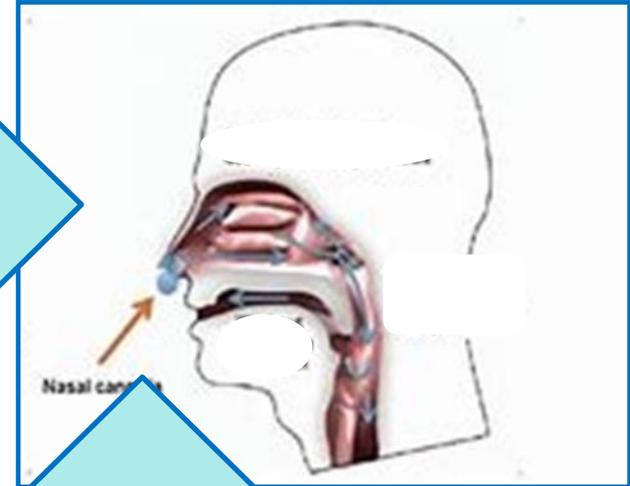


Airvo2

MECHANISM OF ACTION

Washout of nasopharyngeal dead space

improves efficiency of ventilation because the upper airways are bathed in a higher concentration of oxygen, a higher proportion of the respiratory time can engage in gaseous exchange



Continuous high flow oxygen

The higher flow means a reduction in the entrainment of room air (which is at a lower oxygen concentration) and an increase in tidal volumes

MECHANISM OF ACTION

Impact of humidification of gases.

There is a recognised reduction of metabolic cost (energy expenditure) required for gas conditioning and a reduction in the cold air effect which can cause epithelial damage in the airways.



Providing an end distending pressure in the lungs

This is created when a patient's functional residual capacity is increased - additional gas is trapped in the alveoli at the end of expiration which causes them to be 'stented' open and allows for a prolonged opportunity for gaseous exchange to occur.

MECHANISM OF ACTION



Patient comfort

As with any intervention, patient compliance inevitably has an effect on success, HHHFT minimises the dry mouth usually experienced with regular nasal cannula or face mask oxygen and is generally perceived to be more comfortable.

Children may also be able to have drinks, and eat if clinically stable, which improves their experience.

Communication is easier without a mask over the nose and mouth

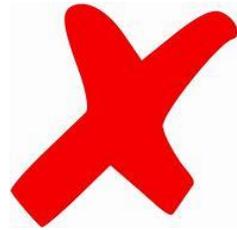
INDICATIONS

Most evidence exists in infants with bronchiolitis but HHHFT is increasingly being used for children presenting with respiratory distress or requiring supplementary oxygen, or a conjunctive therapy alongside other interventions (despite a lack of evidence) for:

- Asthma
- Pneumonia
- Croup
- Sickle cell crisis
- Pre oxygenation (for anaesthetic / intubation)
- Post extubation respiratory support
- For palliative or life limited children experiencing respiratory distress.



CONTRA INDICATIONS



Contraindications include:

- Critically ill infants and children who require a higher level of respiratory support
- Recurrent apnoeas
- Pneumothorax
- Facial trauma
- Nasopharyngeal surgery / trauma
- Suspicion of basal skull fracture
- Upper airway obstruction
- Persistent epistaxis

The decision to start HHHFT should be made by a senior doctor – registrar or consultant level.

IS IT WORKING?

Within 60 -90minutes of starting treatment, children who are responding should demonstrate -

- an improvement in oxygenation
- reduction in respiratory rate
- Reduction in heart rate
- Improvement in work of breathing

As for any intervention it is important to continue close observation of the child, paying close attention to PEWS and parental opinions, and escalate any concerns without delay.

Children who present at a later stage of their illness and / or present with the following are less likely to respond well to HHHFT

- A lack of improvement in oxygenation
- Thoraco-abdominal asynchrony
- Neurological impairment
- Very high respiratory rate, hypercarbia, respiratory acidosis

Do not delay escalation of any concerns to a senior doctor

COMPLICATIONS

Undesired side effects of HHHFT are rare, and therefore it is considered a safe therapy. However, there are some noted complications that bedside nurses should be aware of.

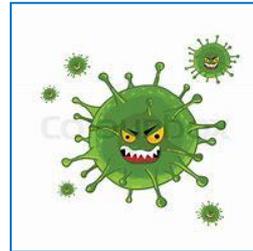
Pneumothorax



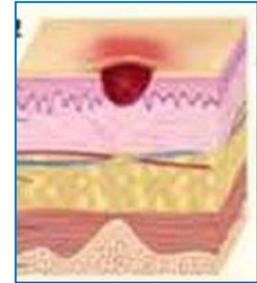
Abdominal distention



Infection



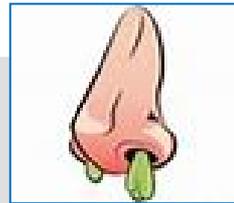
Pressure damage



Nasal irritation



Blocked cannulae



Entanglement



CHECK YOUR UNDERSTANDING

1. What is HHHFT ?
2. What are the 5 principle mechanisms of action?
3. What are the contraindications?
4. How do we know the therapy is being effective?
5. What are the potential complications of HHHFT?

FURTHER LEARNING

For more information please see our website to access-

- >> Bitesize << 'nursing care of the paediatric patient on HHHFT'
- HHHFT educational resource booklet
- HHHFT nursing competency
- HHHFT Clinical guideline

<https://www.networks.nhs.uk/nhs-networks/east-of-england-paediatric-critical-care>