Paediatric Intensive Care Unit

Nebulisers-Hypertonic Saline & DNase

Staff relevant to:	Medical, Nursing and Physiotherapy staff caring for ventilated children requiring nebulisation to help clear respiratory secretions.
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1. Introduction and Who Guideline applies to

The indication for using nebulisers to aid secretion clearance is based on clinical grounds as excessively viscous bronchial mucous can lead to respiratory difficulties secondary to sputum retention.

The evidence for using different nebulisers is based around data gathered from trials in the self-ventilating Cystic Fibrosis patients and more recently in infants with bronchiolitis. There is no clear evidence as yet to suggest which nebuliser is better, Hypertonic Saline or DNase. However there is evidence to show that hypertonic saline increases the volume of sputum cleared and ease of clearance. This effect is immediate and thus is best used immediately prior to physiotherapy. On this

basis the guideline suggests the use of hypertonic saline prior to consideration of DNase.

This is a guideline to give some structure to the treatment of ventilated children requiring nebulisation to help clear respiratory secretions. As there is no evidence yet for the use of DNase nor Hypertonic saline variations from the guideline are likely.

2. Guideline Standards and Procedures

Hypertonic Saline should be our first line of treatment until trials are conducted to demonstrate efficacy.

Indications for Hypertonic Saline or DNase

- lobar collapse and /or atelectasis (uni or bilateral)
- Abnormal radiological changes on CXR suspected to be caused by mucous plugs.
- Inexorable secretions thought to be contributing to the limitation of gas exchange.
- High Fi02 requirements, worsening ventilation or inability to wean conventional ventilation

The decision to use Hypertonic Saline / DNase should be made between the Consultant Intensivist and the PICU Physiotherapist: Indications for use must be fully and clearly documented in the medical notes.

Hypertonic Saline

2 to 4 mls of Hypertonic Saline depending on patient weight and tolerance. Immediately prior to physiotherapy
(NB 3, 3.5% or 7% are available from pharmacy)

TEST DOSE

Monitor for signs of hyperactive airways including

- Wheeze
- Decreased tidal volumes

Both of these may be due to loosening of secretions

Monitor Serum Na via arterial blood gases and if above 150 or increased by >5 mmol Na post nebulisation stop therapy

FURTHER DOSES

- If test dose tolerated then use prior to physiotherapy - up to 4 times in 24 hours.
- The use of hypertonic saline can result in generalised wheeze. This is often related to secretions and not bronchospasm.
- If wheeze is thought to be due to bronchospasm and not secretions a trial of a salbutamol nebuliser can be used.
- Continue therapy for 48 hrs and review.
- If no improvement consider DNase

DNase Guidelines Preparation and Administration

Direct Instillation

- Target segmental /lobar changes
- Inability to tolerate disconnection for nebulisation

Draw up 2.5mg of DNase into a syringe for children Weighing above 10kg and 1.25mg for children below10kg.

Ensure patient is sedated and optimally oxygenated.

Use modified inverse postural drainage position to target affected lobe/segment.

Instill DNase via the ETT. **This should only be performed by a PICU registrar or consultant**. The patient should be left in this position for a minimum of 30 minutes without suctioning to allow time for the DNase to work in the affected area.

Nebulised

- Widespread atelectasis/collapse
- Patients unable to/cannot have position change i.e. chest open, immobilised post-surgery.
- Patient with poor tolerance to direct instillation of solution i.e. poor response to saline
- Patient likely to cough on direct instillation where temporary increase in sedation is inappropriate.

Draw up 2.5mg DNase into nebuliser pot
Bag the nebuliser into patient using ventilator settings

The patient should be left for a minimum of one hour without suctioning to allow time for the DNase to work in the affected area/s.

DNase cannot be placed in Servo 1 circuit for nebulisation as not compatible with the type of nebulisation delivery

Post Procedure

- A temporary increase in oxygen/ventilator settings might be required post instillation.
- Document pre and post ventilator settings/Fi02requirements and blood gases on patient monitoring chart.
- Physiotherapy should be performed between 1-2hours following instillation or nebulisation

Repetition of Procedure

The procedure may be repeated after 6 – 8 hrs, but a maximum of twice within a 24 hour period. The indication for repeating the procedure is clinical improvement without complete resolution.

- Ventilatory requirements have improved.
- Auscultation has improved but with limited carryover between physiotherapy treatments.
- Large quantities of sputum have been obtained but significant sputum retention remains, which is difficult to clear.
- CXR changes show partial improvement.

Treatment with DNase should be reviewed on a daily basis, and only continued after discussion with the Consultant Intensivist and the Physiotherapist in PICU.
If there is no response to treatment after 3 days the DNase should be discontinued.

Indications to Stop Therapy

Therapy trialled for 3 days with no improvement/ ineffective i.e.

- No change in ventilation parameters/chest x-ray/oxygen requirements etc
- Resolution of problem/reason started.
- Adverse side effect
- Reduction in secretions/tenaciousness.

3. Education and Training

No training is required to implement this guideline

4. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Minimise complication rate	Incident forms	Consultant	3 Yearly	Local clinical practice meeting

5. Supporting References

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6. Key Words

Nebulisers, Hypertonic saline, DNase

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

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Details of Changes made during review: **No changes**	