The application and fitting of an Antiviral Filter for chest drains with under water seals.

1. Purpose
The Standard Operating Procedure (SOP) has been written to:

Describe the procedure to fit an antiviral filter to a pleural chest drain bottle in order to prevent aerosol contamination with SARS-CoV-2 virus.

This procedure specifically applies to all chest drains, regardless of patient SARS-CoV-2 status which:
- have an underwater seal and are also bubbling.
- Including drainage of a pneumothorax via an underwater seal drain or
- Any other drainage likely to bubble for example haemo/hydropneumothorax.

A filter is not needed when an uncomplicated pleural effusion is being drained unless bubbling is seen. Where unexpected bubbling is seen, a filter should be put in place however the drain should also be reviewed by a medical practitioner competent in chest drainage in case of unexpected complications from drainage such as tube displacement.

A filter is not needed when thoracic suction is applied as this is a closed circuit. If a filter is in place it should be removed, using PPE as below prior to attaching suction.

Why is a filter needed?
When an antiviral filter is attached to the venting port of an underwater seal drain bottle the risk of aerosol transmission is reduced. A recent study (Akhtar, rickets and Fotheringham 2020) performed a fluorescein dye experiment to demonstrate the reduction in aerosol emission from a chest drain bottle with a described technique, allowing an antiviral filter to be attached to an underwater seal drainage bottle for added protection of patients and staff in the local environment. The study identified that pleural drainage tubes attached to an underwater seal drain may allow the expulsion of aerosol and larger droplets via the bottle in the surrounding environment and this should be considered to be an AGP.

2. Scope
This standard operating procedure (SOP) relates to the following staff groups who may be involved in the assessment and delivery of care for underwater chest drainage for pneumothorax in adults and children.
- Medical Staff
- Registered Nurses.
3. Location.

This standard operating procedure can be implemented across NMCO in all clinical areas that care for underwater seals for chest drains which are bubbling.

Adults who require chest drainage must be cared for in an area where the staff are adequately trained and have competence in the management of chest drains as per trust policy. The placement of children requiring chest drain management should refer to the paediatric policy.

4. Equipment required

**Equipment** (in order from left to right)

- Cable ties (optional)  
  NHS Supply Chain Code WAC1201 (pack of 100)
- Bacterial/ viral filter  
  NHS Supply Chain Code FTC 500 (pack of 50)
- Oxygen stem connector  
  NHS Supply Chain Code FDC 597 (pack of 40)
- Small piece of oxygen tubing
(Filter placed on a Rocket chest drain bottle)
Filter placed on a Redax chest drain bottle.

5. Indications

- Pneumothorax requiring chest drainage connected to an underwater seal drain that is bubbling or not.
- Hydro/haemopneumothorax.

6. PPE required
Prior to chest drain insertion, where bubbling is expected, a filter can be placed as shown on the venting port of a chest drain bottle. In these circumstances, PPE should be worn as per trust policy for placing a chest drain.

The time and date of initial placement must be noted as the filter must be replaced every 24 hours.

When changing the filter, there is a possibility that an aerosol will be generated, thus FULL PPE with FFP3 mask, Visor, gowns and gloves must be worn. Donning and doffing should be done as per hospital policy for all patients regardless of SARS-COV-2 status.

7. Frequency of vial filter change

All viral filters must be changed every 24 hours as a minimum and all changes should be logged on the trusts chest drain monitoring chart (see chest drain policy).

In addition viral filters must be changed if they become wet (for example when a bottle if knocked over).

PPE should be worn as above during changes

8. Risks of filter use

Should a filter become wet it may prevent air escaping from the bottle and thus cause positive pressure in the drain circuit. Clinically this may manifest in failure of a pneumothorax to resolve, increasing size of pneumothorax or increasing surgical emphysema.

In all cases where there are suspected clinical problems with chest drainage the viral filter should be immediately removed and replaced. A clinical incident form should be submitted in the circumstance where a blocked filter was suspected. The filter should be placed in a sealed plastic bag for further inspection and sent to the chest ward marked for attention of Dr Hoyle.

References