Empyema Guidelines

Reference: 1247
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Purpose
Although the management of empyemas is largely run by the respiratory team, out of hours commitments and the increasing rate of empyemas mean it is important for all staff to have an idea of the general management of empyemas.

These guidelines assume the pneumonia guidelines have been followed.

Intended Audience
This guideline applies to all registered nursing staff and clinicians working within Sheffield Children's Hospital involved in caring for children with empyema.
1. Introduction
Although the management of empyemas is largely run by the respiratory team, out of hours commitments and the increasing rate of empyemas mean it is important for all staff to have an idea of the general management of empyemas.

These guidelines assume the pneumonia guidelines have been followed.

2. Intended Audience
This guideline applies to all registered nursing staff and clinicians working within Sheffield Children's Hospital involved in caring for children with empyema.

3. Guideline Content
A. Diagnosis
If an empyema or complicated effusion is suspected from the X-ray findings, please request a respiratory review. The surgical team should also be consulted early.

B. Management
- First line antibiotic for any community acquired pneumonia with an associated parapneumonic effusion at SC(NHS)FT is intravenous benzylpenicillin. This is because the most likely organism is Strep. pneumoniae, and it is by far the commonest causative organism in our age group, even in vaccinated populations. Other, less common pathogens, include Staphylococcus aureus and Group A streptococcus (GAS).
- Clindamycin is often added if the patient continues to be pyrexial, and can be given orally if tolerated. Clindamycin should not be a substitute for benzylpenicillin, but added in alongside it, especially when there is a clinical suspicion of a staphylococcal or GAS infection. Benzylpenicillin is bactericidal whereas clindamycin is bacteriostatic, slowing the release of toxins from bacteria as they are killed by the benzylpenicillin and immune system. Clindamycin is also effective against Staph.aureus, the second most common cause of empyemas in children, as well as GAS. Clindamycin has excellent bioavailability, and should be prescribed enterally unless there are concerns about absorption.
A chest drain will be needed if there is a significant fluid collection (>1-2 cm depth) and lack of resolution (spiking fever, no clinical improvement) after 24-48 hours of appropriate antibiotics.

More immediate drainage will be needed for a large collection with mediastinal shift, or respiratory distress with oxygen requirement due to the fluid collection.

Check bloods preoperatively if not already checked. These include FBC, electrolytes, albumin and clotting.

**Chest Drains**

- Decisions about chest drains should be taken in conjunction with the Surgical and the respiratory team whenever possible.
- If a chest drain is planned, ultrasound should be requested prior to the procedure including the marking of an optimum site for drainage. More detailed guidelines for chest drain insertion are available.
- A small percutaneous (12 FG) silastic chest drain will be put in by the surgeons. At the same time a long line will kindly be put in. As drain failure may result in further surgical procedures, so the surgeons will be involved in the further management of the patient. However, the respiratory team will have overall responsibility.
- Pleural fluid should always be sent for Culture and cytology. PCR may need to be requested on culture negative pleural fluid if the child does not respond as expected to treatment.
- A chest X-ray should be performed postoperatively to document chest drain position. Imaging for the long line perioperatively may be an acceptable alternative if it confirms the position adequately.

**Post Chest drain management**

There are 4 important aspects to treatment

- Urokinase
- Suction
- Analgesia
- Movement

**Urokinase** It is the medical team’s responsibility to prescribe Urokinase, not the surgeons. Urokinase needs to be commenced shortly after the patient returns from theatre (as chest drains are often put in on the emergency list, this often means overnight), after which the drain should be clamped for 4 hours. It is a twice daily dose and is to be given intra pleural. Please seek senior advice when first giving urokinase. Intrapleural urokinase can also be administered by trained nurses on ward 3. Nursing core plan 90 outlines the procedure for administration of urokinase. Current evidence recommends a **minimum** of 3 days or 6 doses. Further doses may be appropriate if there is continuing copious drainage but should be discussed with a consultant.

The dose is:
Weight | Dose | Sodium Chloride 0.9% volume
---|---|---
<10kg | 10,000 units | 10 ml
>10kg | 40,000 units | 40 ml

**Suction.** Low pressure suction of 2.5 to 5 kPa (using a low pressure suction regulator) is routinely used. *(N.B. An intermediate collection jar should be put into the circuit between the chest drain and the suction regulator, see MDA-2010-040 MHRA).*

Stop suction and review if the patient has an increase in pain when suction is applied. Be careful to turn suction off when giving urokinase. However, it is crucial that the suction is always turned on and at pressure when the drain is connected; otherwise it is effectively clamping the drain.

The routine for urokinase is:
1. Instil urokinase into chest cavity.
2. Lock off drain for 4 hours and encourage mobilisation.
3. Reconnect drain to low pressure suction for 8 hours.

Chest Xrays should be considered and surgical advice taken if the chest drain is leaking or blocked.

If a repeat ultrasound is requested this should not be done with Urokinase still in the pleural cavity.

**Analgesia**

Having a chest drain in situ is painful. Having an empyema is painful. Regular effective analgesia is of paramount importance to allow adequate chest expansion and ventilation, coughing and clearing of secretions and mobilisation, all of which enhance recovery.

A patient with a chest drain should be prescribed:
- Regular Paracetamol 20mg/kg PO 6 hourly
- Regular Ibuprofen 10mg/kg PO 8 hourly
- An alternative to Ibuprofen for patients >1yrs old is regular diclofenac 1mg/kg PO 8 hourly
- PRN Oramorph 0.1 - 0.2mg/kg PO 4 hourly to be given if pain is still present in spite of regular doses of paracetamol and ibuprofen. The dose of Oramorph could be increased to 0.2 – 0.4mg/kg PO 4 hourly with appropriate monitoring.
- An alternative to oramorph for patients >3 yrs old is PRN tramadol 0.5 – 1mg/kg PO 6 hourly

Pain should be assessed at regular intervals, both at rest and on movement, using the SCH pain assessment tool. Scores can be documented on the appropriate observation
chart and any intervention evaluated to check for effectiveness. A score of > 4/10 should prompt an intervention.

If the above measures are not providing adequate pain relief to allow the patient to move and breathe without discomfort then please contact the acute pain service for a review. The acute pain nurse is available on bleep 860 between 8.30am – 5.30pm Monday to Friday and 08.30 to 12.30pm Saturday. The on call anaesthetist bleep 525 is available out of hours and at weekends. The patient will be reviewed and may need Morphine Patient or Nurse Controlled Analgesia interventions setting up, which the pain team will arrange and review daily.

**Mobilisation**

- Patients should be encouraged to move and play while the chest drain is in, although this is not always possible in practice. It is felt that this helps to disperse the urokinase.
- Chest Physiotherapy is not routinely recommended and referral to respiratory physiotherapist should be considered on an individual basis during convalescence.

**C. Discharge and Follow Up**

- Timing of the ICD removal will be decided by the respiratory consultant or on call consultant.(Usually when draining <1-2ml./kg/day)
- A chest X-ray should be done 4-6 hours post drain removal. Although Xrays at this stage may still look very abnormal, the immediate concern is to look for any complications of chest drain removal for e.g pneumothorax.
- Continue the IV antibiotics until the patient has been apyrexial for 24 hours then change to oral antibiotics. The choice of oral antibiotics should be guided by the susceptibility pattern of the organism identified. Prolonged courses of clindamycin are rarely necessary, and prescriptions should be reviewed when clinical improvement has been observed.
- **Amoxicillin** is the antibiotic of choice if a penicillin-susceptible S. pneumoniae or GAS is isolated. If the causative organism is unknown, co-amoxiclav should be used.

The patient should be kept in for 24 hours to ensure patient remains pyrexia free. Then the long line may come out and patient is discharged with 2 weeks of oral antibiotics. If any doubt keep patient in until they can be reviewed by the respiratory team.

A ward follow up should be made for one week after discharge for the patient to be reviewed by the respiratory team. This is to decide on the length of oral antibiotics. The parents should be asked to call the ward if the patient has a temperature and / or becomes unwell in the meantime.

A clinic appointment should be made on discharge for the respiratory consultant’s clinic
in three months time. Ensure that copies of the discharge summary are sent to the surgical consultant involved and to the referring hospital if from out of Sheffield.

4. References


MDA/2010/040 Issued: 13 May 2010