Management of Central Venous Catheter (CVC) Infection in Children Receiving Parenteral Nutrition

(Not for use in oncology children or neutropenic patients)

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Background

CVC infection is a potentially life threatening condition. It is not uncommon in children receiving long term PN.

A logical approach is essential due to the limited sites which are available for CVC insertion and the significant morbidity and mortality associated with CVC infection

The mainstay of management is **prevention**. This means adopting meticulous and excellent CVC care and by adherence to the Trust's "central line care bundle" recommendations

In CVC sepsis, catheter salvage should be the aim of management.

This guideline covers all types of CVC e.g. tunnelled Hickman / Broviac and PICC lines.

Assessment

ANY temperature >38 degrees C in a child with a CVC should be assumed to be CVC sepsis until proven otherwise

The following will raise clinical suspicion of CVC infection:

- Temperature >38 degrees C, or hypothermia
- Tachycardia
- Tachypnoea/grunting
- Low blood pressure
- Poor perfusion
- Irritability/lethargy
- Increase in stool/stoma output
- Vomiting
- Hyperglycaemia /Hypoglycaemia

Other sources of infection e.g. respiratory, abdominal, ENT, UTI, meningitis need to be excluded

The following features should raise concern of severe line sepsis:

- Haemodynamic instability
- Rigor when line flushed/accessed
- Fluid bolus requirement of >20mls/kg
- Falling or low platelets (if acute)

The first temperature requires immediate action – DO NOT WAIT

Immediate Investigations

- Central blood cultures from all lumens of the CVC
- Peripheral blood cultures
- Line exit site swab
- FBC, U& E, CRP, LFTs
- Stool/stoma sample for bacteria and viruses
- SARS-CoV-2 swab

Consider performing other investigations as clinically indicated e.g.

- NPA for respiratory viral infection
- urine M, C& S
- CXR
- Lumbar puncture

Management

- Resuscitation as per APLS guidelines if required
- Full history and examination of the child
- **Stop and take down the PN**
- Investigate as above
- Administer maintenance crystalloid through the CVC line

NB. PN has a high concentration of glucose so this may need to be 10% in the smaller children and children with established liver dysfunction

- Give antipyretics - see BNF for Children for doses
- Administer IV antibiotics – Cefotaxime and Teicoplanin - **THROUGH THE LINE** - see BNF for Children for doses. Give teicoplanin alone if history of IgE mediated penicillin allergy. Add gentamicin if empirical gram negative cover is required.
- If the child has had previous episodes of line sepsis, ask Microbiology for initial antibiotic advice
- Consider HDU care – discuss with HDU Consultant or Registrar
- Consider paediatric review for Surgical patients
- Consider reducing or stopping feeds, if indicated
- Inform Nutrition team

Line removal

Only in an exceptional emergency situation should line removal be considered.
In children receiving PN, any CVC removal requires an MDT decision.

On-going management

- Observe child closely using the PEWS system
- Chase all cultures at 36-48 hours
- If culture positive – give a definitive course of antibiotics with consideration of additional investigations e.g. echo, fundoscopy. This should be done on a MDT basis involving Paediatric Surgery / Gastroenterology / Infectious Diseases / Microbiology
- If the child is well, recommence the PN at 24-48 hours
- If the cultures are all negative, at 48 hours, consider stopping the antibiotics, after discussion with the consultant/nutrition team/ microbiology. (Beware “culture negative” line sepsis episodes)

- If the child continues to be pyrexial, re-culture and discuss with nutrition team/microbiology/consultant.