

# “Line Sepsis” - Patients on Home Parenteral Nutrition - Full Clinical Guideline

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## Management of suspected catheter related blood stream infection in Home Parenteral Nutrition Patients

### 1. Introduction

This is a practical guideline to aid in the management of suspected catheter related blood stream infection (CRBSI), “line infection”, in patients on home parenteral nutrition (HPN), it is not designed for the management of hospital patients on PN via a PICC or multilumen temporary CVC. It is not a replacement for referral to the appropriate teams, e.g Nutrition support team, gastroenterology, microbiology.

Anyone admitted to this hospital on HPN should be referred as soon as possible to the Nutrition Support team.

CRBSI is an important cause for morbidity in patients on HPN. It is a serious and potentially life threatening complication and needs to be recognised and treated promptly and effectively

### 2. Aim and Purpose

To offer guidance for all clinical staff treating adult patients on HPN admitted with suspected CRBSI.

### 3. Definitions, Keywords

ANTT – aseptic no touch technique

CRBSI – catheter related blood stream infection

HPN - Home parenteral nutrition

CVC – central venous catheter

PICC – peripherally inserted central venous catheter

PN – parenteral nutrition

AKI – acute kidney injury

CKD – chronic kidney injury

Na – Sodium

K – Potassium

Mg – magnesium

UC – ulcerative colitis

Suitable for printing to guide individual patient management but not for storage

IBD – inflammatory bowel disease

E Mix – St Mark's Electrolyte Mix

WHO – World Health Organisation

Keywords; line infection, catheter related blood stream infection

#### 4. Guideline

CRBSI should be suspected in any patient on HPN presenting to ED with fever, rigours, abdominal pain, nausea, lethargy or raised inflammatory markers, particularly when the symptoms occur on infusing their parenteral nutrition. It is important to consider other sources of infection.

Local exit site infection in a tunnelled line is rarely associated with systemic infection (O'Grady et al. 2011). More extensive infection including tunnel infection, cuff infection or pocket infection are indications for blood cultures and subsequent line removal.

#### ***Risk factors for line infection***

Opiate use, implanted port, multi lumen catheter, daily infusions, increased frequency of lipid infusions, length of time CVC in place, compliance, CVC used for medication and/or blood drawing and smoking are all risk factors for CRBSI (Richards et al. 1997; Pironi et al. 2012) (Buchman et al. 2014)

#### ***Treatment***

On suspicion of a CRBSI paired blood cultures should be taken peripherally and from all lumens of the CVC using aseptic no touch technique (ANTT) and labelled appropriately with line/peripheral and time taken. This should be done on both the electronic order system AND by labelling the blood culture bottles. This is very important as time to positivity is diagnostic of a CRBSI (Blot et al. 1999; Al Wohoush et al. 2010) (Raad et al. 2004), i.e if the blood culture from the line is positive before the peripheral blood cultures. Once blood cultures have been taken, antibiotics should be started and given through the line and locked in the line, NOT flushed through.

If the patient is displaying signs of septic shock, antibiotics should be given immediately. Line salvage will often be attempted in HPN patients as venous access can be fragile and become challenging. Antibiotic choice is as per central venous catheter infection guidelines – retention of CVC.

Parenteral nutrition should not be given during treatment for CRBSI. The daily requirements for fluid and electrolytes should be given using peripheral intravenous fluids with the addition of magnesium, calcium and phosphate if necessary. 4% dextrose provides 40g glucose per litre and 5% dextrose provides 50g glucose per litre. 50-100g glucose per day is sufficient to prevent starvation ketosis (NICE 2013). Very few people will be unable to continue to eat and drink as they would normally, and will gain some calories from this.

#### **Composition of commonly used intravenous crystalloids (BNF 2017):**

	Na mmol/L	Cl mmol/L	K mmol/L	HCO <sub>3</sub> mmol/L	Ca <sup>2+</sup> mmol/L	Mg <sup>2+</sup> mmol/L	Glucose g	Osm mOsm/L
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0.9% Saline	150	150	0*	0	0	0#	0	300
Hartman's	131	111	5	29	2	0	0	278
0.18% Saline/4% dextrose	30	30	0*	0	0	0#	40	
0.45% Saline/5% dextrose	77	77	0*	0	0	0#	50	

\*20-40 mmol/L as ready prepared bags for ward administration.

#can be added by pharmacy, usually 10-20 mmol/L

### Electrolyte concentration of gastrointestinal secretions(NICE 2013):

	H <sup>+</sup> mmol/L	Na mmol/L	K mmol/L	Cl mmol/L	HCO <sub>3</sub> mmol/L
Gastric	40-60	20-80	5-20	100-150	
Biliary		120-140	5/15	80-120	30-50
Pancreatic		120-140	5/15	40-80	70-110
Jejunum		140	5	135	8
Established ileostomy		50-100	4-5	25-75	0-30
Newly formed stoma, high stoma, high output ileostomy		100-140	4-5	75-125	0-30

### Monitoring

Blood cultures will be incubated for 5 days, with interim negative results being issued at 48hrs. The results should be reviewed at 48 hours, if not previously positive. If blood cultures are negative, parenteral nutrition should be restarted and an alternative diagnosis sort. Many patients on PN may have alternative explanation for a pyrexia e.g. intra-abdominal sepsis/collection.

If blood cultures are positive, treatment should be adjusted if necessary and antibiotics continued. All positive blood cultures should be discussed with a microbiologist to determine the appropriate antibiotic choice and duration, making sure that the microbiologist is aware that this is a HPN patient with a CRBSI and their line is for salvage. Guidelines can be found on central venous catheter guidelines, including line lock advice.

Antibiotics should be continued through the line for at least 7 days (Small 2015) but may require upto 14 days. Duration should be decided in conjunction with a microbiology consultant.

48 hours after completion of antibiotics, repeat paired cultures should be taken from the line and peripherally. If these are negative 48 hours after culture, PN can be restarted via the line.

Once PN has been successfully restarted the patient can be discharged home.

### **Staph Aureus**

If the blood cultures are positive for Staph. Aureus, the line should be removed. Blood cultures should be repeated at 48 hours and advice sought from microbiology regarding the appropriate antibiotic. If cultures remain positive, a deep seated site for infection should be looked for.

### **Indications for line removal**

If the line is infected with Staph aureus, candida or other fungus, the line should be removed. If this is the 3<sup>rd</sup> infection in the same line, removal should be considered. If this is a precious line, and removal would compromise patient care, attempt can be made to salvage the line (Bond et al. 2017). This would need close liaison with the Nutrition consultant, microbiology consultant and the Intestinal Failure unit the patient is under. The line should be removed if there is a failure to clear the infection, with positive blood cultures 48 hours after antibiotic course completion.

If there is a tunnel infection, the line can not be salvaged, equally if there is an implanted port (used very rarely in UK for HPN), the line should be removed.

Any infection in a dual/multilumen catheter is an indication for removal.

If the line is damaged and infected it should be removed.

If the line has displaced and the tip is not in the optimal place, again it should be removed.

### **Further management:**

If the line is infected with *Staphylococcus aureus* ([Sepsis in Immunocompetent Adults \(koha-ptfs.co.uk\)](https://koha-ptfs.co.uk)), or *Candida* ([Invasive Fungal Disease in Adults; Prophylaxis, Investigation, and Treatment - Microbiology Hospital Guideline - Clinical Guidelines > Trust Policies Procedures & Guidelines catalog \(koha-ptfs.co.uk\)](https://koha-ptfs.co.uk)), screening for endocarditis is recommended with echocardiogram. Please follow Trust guidance regarding management.

Watch out for septic emboli in patients who have had a line infection and have a low threshold for investigating particularly for discitis.

In the event of line removal, blood cultures should be taken day one and day 2 after removal. Antibiotic duration should be guided by organism and central venous catheter infection guideline. Once antibiotics have been completed, blood cultures should be taken 48 hours after completion. If these are negative  $\geq$  48 hours then a new permanent tunnelled line can be inserted.

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## 6. Documentation Controls

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