

## **NHS FORTH VALLEY**

### **Suspected/Confirmed Central Venous Access Device (CVAD) Infection Protocol - Adults**

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**Consultation and Change Record – for ALL documents**

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# Suspected/Confirmed Central Venous Access Device (CVAD) Infection Protocol - Adults

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## 1. Epidemiology & Risk

Central venous access device (CVAD) infections can result in any person with the following lines in situ: Hickman, PICC, central and midline.

CVADs used for parenteral nutrition (TPN) are at greater risk of candidaemia. [1]

Patients with more than one CVAD are at greater risk of blood stream infection. Only one CVAD should only ever be in use at one time unless there are documented exceptional circumstances and for a limited time. [2]

CVAD infections may appear as a tunnel infection with erythema and/or pus around the exit site or be inside the CVAD in the lumen itself or at the tip. [3]

Strict aseptic technique during CVAD access is a significant factor in preventing CVAD infections. Only staff that have been trained & deemed competent in care and maintenance of CVADs should access CVADs including taking blood cultures. [4-6]

**Note:** Guidance on management on PVC (venflon) site infection under the “Skin and Skin structure” section of antimicrobial guidance. <http://www.antimicrobialcompanion.scot/nhs-forth-valley/hospital-guidance/skin-and-skin-structure/>

## 2. Clinical features of a CVAD infection

Pyrexia or rigors when CVAD is flushed

Discharge from the exit site

Inflammation around the exit site or tunnel

- Note the exit site may not always appear inflamed in a CVAD infection. The infection may be inside the CVAD itself or at the tip.

Sepsis in a patient with a CVAD and no other obvious source [3,7]

### 3. Empirical management

#### In all cases

Take paired blood culture samples from the CVAD & a peripheral site

In multi-lumen devices (e.g. central line) take samples from **each** lumen before starting antibiotics

- Label each sample appropriately

**\* Only staff that have been trained & deemed competent in care and maintenance of CVADs should take blood cultures\***

#### a. Exit site looks clean and no inflammation, pain or pus is present

	Treatment
<b>Stable patient</b>	<ul style="list-style-type: none"> <li>• IV Vancomycin through the CVAD and ensure levels are taken as per protocol.</li> <li>• Add IV Gentamicin if deterioration.</li> </ul>
<b>Unstable patient</b> <b>Severe sepsis or septic shock</b> <ul style="list-style-type: none"> <li>• A-B-C-D assessment &amp; action</li> <li>• Remove CVAD if safe to do so and send tip to microbiology lab in white top universal container</li> <li>• If CVAD cannot be removed then indicate reason(s) in the clinical notes.</li> </ul>	<ul style="list-style-type: none"> <li>• IV Vancomycin &amp; IV Gentamicin through the CVAD (if retained) or peripheral venous cannula (if CVAD removed) and ensure levels are taken as per protocol.</li> <li>• <b>Parenteral nutrition (TPN) patients:</b> Add IV Caspofungin (consult BNF for dosing)               <ol style="list-style-type: none"> <li>1. Review fluid needs in absence of TPN</li> <li>2. Speak to pharmacist <b>and</b> dietician about TPN patients with CVAD infections as soon as possible</li> </ol> </li> </ul>

#### b. Inflamed exit site and/or pus or discharge is present

<b>All Patients</b> <ul style="list-style-type: none"> <li>• Remove CVAD if safe to do so and send tip to microbiology lab in white top universal container</li> <li>• If CVAD cannot be removed then indicate reason(s) in the clinical notes.</li> </ul>	<ul style="list-style-type: none"> <li>• IV Flucloxacillin through a newly inserted peripheral cannula</li> <li>• <b>Penicillin allergy or MRSA:</b> IV Vancomycin through a newly inserted peripheral venous cannula</li> <li>• Add IV Gentamicin if deterioration</li> </ul>
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**\*If the patient is neutropaenic please ensure the neutropaenic sepsis policy is followed in addition to the above**

**Note on prescribing:** Review previous microbiology results and alerts for any resistant organisms (e.g. MRSA, VRE, CPE). If identified then discuss empirical antibiotic cover with microbiology.

**It is the clinical team's responsibility to look over previous results and alerts.**

#### 4. Indications for removal of infected CVAD

- Infection with any of the following isolates: Staphylococcus aureus, Staphylococcus lugdunensis, B-haemolytic streptococci, Gram negative organisms, Mycobacterium species, and all Candida species. See table following page. The microbiologist will advise of any other organism not included in this list. Infectious disease consultants may also give advice on this matter.
- If the resulting cultures are polymicrobial
- Severe exit site or tunnel infection
- Clinical deterioration despite appropriate antibiotics
- Recurrent episodes with the same organism or within two weeks of stopping antimicrobials
- Where there is no further need for the CVAD

#### CVAD salvage may be possible with the following isolates:

- Coagulase negative staphylococci (apart from S lugdunensis)
- Viridans streptococci
- Corynebacterium species

#### 5. Replacing the CVAD

If a CVAD has been removed due infection it is advisable to delay placing a new CVAD until at least 48 hours post removal with antimicrobials given via a peripheral venous cannula. The patient should ideally be afebrile and clinically improving with negative blood cultures. This reduces the likelihood of the new CVAD becoming infected by organisms circulating in the blood stream. [8]

## 6. Duration of therapy

Once confirmed the microbiologist will advise management as per the organism identified.  
For general guidance please refer to the table.

Organism	Infected CVAD removed	Duration of antimicrobial therapy
Culture negative	YES	No further treatment once temperature resolves
	NO	48 hours after normalisation of temperature
Coagulase negative staphylococci	YES	No further treatment once temperature resolves
	NO	7 days total therapy with IV Vancomycin through the CVAD
Viridans streptococci Corynebacterium species	YES	48 hours after normalisation of temperature
	NO	7-14 days IV Vancomycin therapy through the CVAD
Staphylococcus aureus Staphylococcus lugdunensis	MUST REMOVE CVAD*	14 days IV therapy with flucloxacillin or vancomycin for uncomplicated infection counted from day CVAD removed
		4 weeks IV therapy with flucloxacillin or vancomycin for complicated infection counted from day CVAD removed
B-haemolytic streptococci	MUST REMOVE CVAD*	7-14 days total therapy based on sensitivities Gentamicin not required
Gram negative organisms	MUST REMOVE CVAD*	7-14 days total therapy based on sensitivities Vancomycin not required
Candida species	MUST REMOVE CVAD*	IV Caspofungin empirical therapy – minimum 14 days therapy counted from day CVAD removed.
Mycobacterium species	MUST REMOVE CVAD*	Consult microbiologist

\*at the earliest opportunity once clinically safe to do so

## 7. References

1. Peripheral and total parenteral nutrition as the strongest risk factors for nosocomial candidemia in elderly patients: a matched case-control study - *Mycoses*, 56: 664-671. <https://doi.org/10.1111/myc.12090>
2. The effect of multiple concurrent central venous catheters on central line-associated bloodstream infections - *Infect Control Hosp Epidemiol*. 2014 Sep;35(9):1140-6. doi: 10.1086/677634. Epub 2014 Jul 28.
3. Clinical Features of Bloodstream Infections Associated with Peripheral Versus Central Venous Catheters - *Infect Dis Ther*. 2019 Sep;8(3):343-352. doi: 10.1007/s40121-019-00257-6. Epub 2019 Jul 31.
4. Guidelines for the prevention of intravascular catheter-related infections *Am J Infect Control*. 2011 May;39(4 Suppl 1):S1-34.
5. The effect of an education program on the incidence of central venous catheter-associated bloodstream infection in a medical ICU - *Chest*. 2004 Nov;126(5):1612-8. doi: 10.1378/chest.126.5.1612.
6. Prevention of Central Line-Associated Bloodstream Infections Through Educational Interventions in Adult Intensive Care Units: A Systematic Review - *Cureus*. 2021 Aug 18;13(8):e17293. doi: 10.7759/cureus.17293. eCollection 2021 Aug.
7. Prevention and management of catheter-related infection in hemodialysis patients - *Kidney Int*. 2011 Mar;79(6):587-598. doi: 10.1038/ki.2010.471. Epub 2010 Dec 22.
8. Clinical impact of early reinsertion of a central venous catheter after catheter removal in patients with catheter-related bloodstream infection *Infect Control Hosp Epidemiol*. 2021 Feb;42(2):162-168. doi: 10.1017/ice.2020.405. Epub 2020 Sep 9.

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