# An audit of complications in central venous access devices (CVADs) in adult Haematology patients

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## Introduction

This audit was undertaken for all CVADs inserted in adult Haematology patients at Chesterfield Royal Hospital over a 2 year period

Aim:
To improve the investigation and management of CVAD-related complications, primarily focusing on infections.

Objectives:
- evaluate compliance with local guidelines and best practice
- identify areas for improvement
- collect data for future comparison

## Method

A retrospective case note audit

Review period: 2 years (1st Oct 16 – 31st Sept 18)

Data reviewed:
- patient diagnosis
- days CVAD in-situ
- fate of each line
- reasons for line removal
- infective or non-infective CVAD complications

Audit standards:
- ✓ samples taken during investigation of possible infection
- ✓ culture of line tip removed for suspected infection
- ✓ CVAD removal for specific organisms/ non-resolving colonisation / tunnel site infection
- ✓ compliance with local guidelines re: use of systemic antibiotics and antibiotic line locks

Following analysis:
- ★ Multidisciplinary discussion re: learning & future actions (Medical + Nursing + Microbiologist)

**Tunnel site infection**
clinical diagnosis (induration/ pain along tunnel site)

**Exit site infection**
clinical diagnosis (erythema, discharge) plus positive site swab

**CLABSI**
**(central line-associated blood stream infection)**
Diagnosed where there is
*systemic infection & positive blood cultures from both PB and CVAD*
**OR**
*positive blood culture from PB ≤ 48 hrs of CVAD removal*
**EXCLUDING**
cases where sepsis is felt to arise from other site

**Possible CVAD colonisation**
pragmatic diagnosis where there is a positive blood culture from one or more lumens of CVAD with concurrent negative PB cultures

***Relevant Guidelines / Policies***
*CRH Neutropenic Sepsis guideline*
*CRH Antibiotic Line Lock policy*
*IDSA 2009 Clinical Practice Guidelines for diagnosis and management of intravascular catheter-related infection*

## Results

28 CVADs were inserted in this 2 year period (17 dual lumen HL, 11 PICC), in a total of 17 patients
9 AML and 3 MDS all for intensive chemotherapy, 5 lymphoma (2 having salvage treatment requiring CVAD ,3 with poor peripheral access).
CVADs were in place for between 10 and 237 days.

Blood cultures were taken on 69 separate occasions. Positive results are shown in the tables below.
16 sets of blood cultures were not identifiable by site due to missing information on the request form and on 12 occasions, all possible sites were not sampled.

There were 13 episodes of CLABSI (9 definite, 4 with incomplete sample sets),. There were 15 episodes of possible line colonisation; antibiotic line locks were used in 7 cases and the CVAD was ultimately removed in 10 cases. Routine re-culture after attempted CVAD salvage was only undertaken in 2 of 6 cases.

| Other infections |
|---|
| 3 tunnel site infections |
| 1 exit site infection (Pseudomonas) |
| VRE from PB only (line cultures negative) |
| Panteo from PB only (line cultures negative) |

| | |
|---|---|
| **CVAD removed** | **7** CLABSI<br>**4** for possible line colonisation<br>**4** tunnel site infections<br>**5** completed treatment<br>**2** damaged CVADs<br>**1** PICC related thrombosis |
| **CVAD retained** | **6** transferred care to other hospital<br>**3** died |

| CLABSI | | Possible line colonisation |
|---|---|---|
| Definite | Vancomycin resistant *Enterococcus* (VRE)<br>*E coli* ( 4 cases)<br>*E faecium*<br>*Stenotrophomonas* spp<br>*Corynebacterium* spp<br>Alpha haemolytic *Streptococcus* | CNS (10 cases)<br>*Stenotrophomonas*<br>VRE<br>*E coli*<br>*Chryseobacterium*<br>*Sphyngomonas* |
| Probable | VRE<br>coagulase negative *Staphylococcus* (CNS)<br>*Enterobacteria cloacae*<br>*Sphyngomonas spp* | |
| CVAD infection rate 7 per 1000 line days | | |

| Audit Point | Details | Evidence | Actual compliance |
|---|---|---|---|
| 1. | All blood culture samples should be identifiable by site | Local practice<br>IDSA Guideline | 130/146<br>89 % |
| 2. | Blood cultures should be taken from all possible sites each time | Local practice | 146/158<br>92 % |
| 3. | If CVAD infection is suspected and removed, the line tip should be sent for culture | Local practice<br>IDSA Guideline | 11/11<br>100% |
| 4. | All blood cultures positive from one or more CVAD lumen should be discussed with a Microbiologist | Local practice | 27/27<br>100% |
| 5. | Line removal is recommended for specified pathogens | Local practice<br>IDSA Guideline | 6/6<br>100% |
| 6. | For proven/ possible line colonisation with attempted salvage, re-culture is undertaken after completion of antibiotics | Local practice<br>IDSA Guideline | 2/6<br>33 % |

## Key findings

Missing samples and samples that were not identifiable by site were a recurrent problem and meant it was impossible to confirm if the infection was CLABSI or definite line colonisation in a significant number of cases.

It was noted that re-culture after completion of antibiotics for possible line colonisation was not embedded in practice, in variance with our local guideline.

## Agreed Action Points

1. Each blood culture request form must state the sample site
2. Reason for not taking any sample must be documented in the notes
3. Where a non-sensitive organism is identified from CVAD lumen(s) only, re-culture all sites prior to switching antibiotics (e.g. CNS and other organisms) should be undertaken
4. Update CRH Antibiotic Line Lock policy to reflect that antibiotic line locks should always to be used with systemic antibiotics, at least initially
5. Re-culture should be routinely undertaken 48-72 hours after stopping antibiotics where CVAD salvage has been attempted

**Reference**
Mermel *et al*. Clinical Infections Disease, Vol 49, 2009 pages 1-45. IDSA 2009 Clinical Practice Guidelines for diagnosis and management of intravascular catheter-related infection

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General Haematology
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PosterSessionOnline.com