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Fact Sheet: Bloodstream Infection

This fact sheet was based on a similar sheet developed by the Centre for Healthcare Related Infection Surveillance and Prevention (www.health.qld.gov.au/chrisp/).

Overview

In the majority of cases, bacteria enter the bloodstream from a primary focus of infection in an organ, a wound or an intravascular (IV) device, where they are then easily disseminated through the body (Lee & Bishop, 1997).

Bloodstream infections are associated with high morbidity, mortality and cost. Patients can present to hospital with a bloodstream infection or may develop one as a result of healthcare interventions. Healthcare associated bloodstream infections may or may not always be preventable (Queensland Health, 2001).

Line associated focus

Although intravascular catheters are indispensable in modern-day medical practice, their use puts patients at risk for local and systemic infectious complications. The incidence of intravascular catheter related bloodstream infection varies considerably by type of catheter, frequency of catheter manipulations and other patient related factors (Darouiche, 2003).

Policies, guidelines or procedures should be developed which outline the practices surrounding the use of intravascular devices.

Measures for prevention of infections applicable to all intravascular device types should include:

- Provision of education for personnel required to insert and care for intravascular devices regarding indications for use, choice of device, insertion techniques, care and maintenance.
- Periodic assessment of such knowledge.
- Selection of intravascular device, insertion technique and site with the lowest risk for complications for the anticipated type and duration of therapy.
- Use of appropriate aseptic technique for all aspects of intravascular catheter insertion and care.
- Use of appropriate sterile dressing.
- Prompt removal of any device that is no longer required.

The incidence of bloodstream infection associated with peripheral catheters is usually low. However the potential for these devices to be the focus of a bloodstream infection should be considered because of the frequency with which such catheters are used (O'Grady, Alexander, Dellinger, Gerberding, Heard, Maki *et al*, 2002).

Measures for prevention of infections specific to peripheral intravascular device types should include:

- Daily evaluation of insertion site for tenderness and signs of local infection.
- Defined timeframe for routine replacement of catheters to reduce the risk of phlebitis

Bloodstream infections associated with insertion and maintenance of central venous catheters are among the most dangerous complications that can occur, worsening the severity of the patient's underlying ill health, prolonging the period of hospitalisation and increasing the cost of care (Pratt, Pellowe, Loveday, Robinson &Smith, 2001).

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Organisms causing these types of infections can originate from a number of potential sources including the skin around the site of insertion, contamination of the catheter hub, contaminated infusate or seeding from a distant site of infection (Farr, 1999).

Measures for prevention of infections specific to centrally inserted intravascular device types should include:

- Consider the risk of mechanical complications related to the insertion site against the infection risk.
- For non-tunneled Central Venous Catheters (CVC's) in adults, use of the subclavian site will minimise infection risk.
- Use maximal sterile barrier precautions during catheter insertion.
- Avoid routine guide-wire exchanges particularly if evidence of infection is present.
- Designate one port for parenteral-alimentation.
- Replace dressing if damp, soiled or loosened, or if inspection is necessary.

For further information:

- Centers for Disease Control and Prevention Guidelines for the Prevention of Intravascular Catheter-Related Infection, 2011.
  Available: www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf
- United Kingdom Department of Health Guidelines for preventing infections associated with the insertion and maintenance of central venous catheters 2001.
  Available: www.epic.tvu.ac.uk/Downloads/epic1%20download%20page.html.

Organ site focus

The general principles in prevention of bloodstream infections that are secondary to an organ site infection surround the prevention of infection in the primary site.

Further information on the prevention of infections in various organ sites can be found in the following:

- United Kingdom Department of Health: Guidelines for preventing infections associated with the insertion and maintenance of short-term indwelling urethral catheters in acute care.
  Available: www.epic.tvu.ac.uk/PDFFiles/epic%201/epic%201%20UCs.pdf.
- Centers for Disease Control and Prevention Guideline for Prevention of catheter associated urinary tract infections.
  Available: www.cdc.gov/ncidod/hip/GUIDE/uritract.htm.
- Centers for Disease Control and Prevention Guideline for preventing healthcare associated pneumonia.
  Available: www.cdc.gov/mmwr/preview/mmwrhtml/rr5303a1.htm.
- Centers for Disease Control and Prevention Guideline for prevention of surgical site infection.
  Available: www.cdc.gov/ncidod/hip/SSI/SSI.pdf.

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References

Bishop L, Dougherty L, Bodenham A, Mansi J, Crowe P, Kibbler C, Shannon M, Treleaven J. Guidelines on the insertion and management of central venous access devices in adults. *Int J Lab Hematol*. 2007; 29:261-278.

Darouiche, R.O. (2003). Nosocomial bloodstream infections and second-generation vascular catheters. *Prevention and Control of Nosocomial Infections*, 4th Edition. Philadelphia: Lippincott Williams and Wilkins. Chapter 20, 281-282.

Farr, B.M. (2004). Nosocomial infections related to use of intravascular devices inserted for short term vascular access. *Hospital Epidemiology and Infection Control*, 3rd Edition. Philadelphia: Lippincott Williams and Wilkins. Chapter 17,157-160.

Lee, G. and Bishop, P. (2002) *Microbiology and Infection Control for health professionals.* Pearson Education Australia Pty Limited, Frenchs Forest. Chapter 19, 428.

O'Grady NP, Alexander M, Burns LA, Dellinger EP, Garland J, Heard SO, Lipsett PA, Masur H, Mermel LA, Pearson ML, Raad II, Randolph A, Rupp ME, Saint S (2011). Guidelines for the Prevention of Intravascular Catheter-Related Infections. *Clin Infect Dis*, 52:e162-193.

Pratt, R.J. Pellowe, C. Loveday, H.P. Robinson, N. Smith, G.W. and the *epic* guideline development team. (2001). The *epic* Project: Developing National Evidence-based Guidelines for Preventing Healthcare associated Infections. *Journal of Hospital Infection*, 47(supplement) S3-S4.
Available:http://www.epic.tvu.ac.uk/Downloads/epic1%20download%20page.html [2004,September 13].

Queensland Health (2001). *Infection Control Guidelines*. Queensland Government, Brisbane. Page 42.
Available: www.health.qld.gov.au/infectioncontrol/documents/pdf/QHICP_WEB.pdf [2004, September 13].

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Guide for Investigation: Bloodstream Infection

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Unknown focus

Discuss with relevant persons to decide on most probable source.

Line associated focus

- What type of intravascular device(s) did/does this patient have?
  - Was this device necessary for the patient's treatment?
  - How long did this device remain insitu?
  - Was this appropriate for this device type?
  - Did regular review of its need take place?
  - Was this documented?
- Explore the circumstances surrounding the insertion of this device (i.e., when, where and by whom).
- Do you have a policy/guideline/procedure that guides the choice, duration, insertion site, insertion technique, care and maintenance for each IV device type?
  - Is this document current and based on the latest literature?
  - Are the relevant staff aware of this document or recent changes to this document?
  - Was this policy adhered to in this instance?

Organ site focus

- Had infection at this site been previously identified?
  - Had this infection been treated?
  - Was this treatment appropriate?
- Were patient care activities relevant to prevention of this infection carried out?
- Do you have a policy/guideline/procedure that guides this type of care?
  - Is this document current and based on the latest literature?
  - Are the relevant staff aware of this document or recent changes to this document?
- Was this infection associated with a:
  1. Device (other than IV device)?
     - What was the device?
     - What circumstances surrounding this device may have contributed to infection?
  2. Procedure?
     - What was the procedure?
     - What circumstances surrounding this procedure may have contributed to infection?

Previously identified issues

- Are there similarities between this investigation and previous investigations?
- If there are similarities, are they related to:
  - Human Factors (e.g., training, communications).
  - Environment/Equipment (e.g., adequate equipment).
  - Policy/Procedures (e.g., up to date, relevant and accessible).
- Have recommendations from previous investigations been adopted?