



Complete Summary

GUIDELINE TITLE

Guidelines on the insertion and management of central venous access devices in adults.

BIBLIOGRAPHIC SOURCE(S)

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 Aug;29(4):261-78. [95 references] [PubMed](#)

GUIDELINE STATUS

This is the current release of the guideline.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- [August 16, 2007, Coumadin \(Warfarin\)](#): Updates to the labeling for Coumadin to include pharmacogenomics information to explain that people's genetic makeup may influence how they respond to the drug.

COMPLETE SUMMARY CONTENT

** REGULATORY ALERT **

SCOPE

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INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT

CATEGORIES

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SCOPE

DISEASE/CONDITION(S)

- Diseases or conditions requiring placement of a central venous access device
- Complications related to insertion of a central venous access device, including infection, misplacement, and thrombosis

GUIDELINE CATEGORY

Management
Prevention
Technology Assessment

CLINICAL SPECIALTY

Anesthesiology
Critical Care
Geriatrics
Hematology
Infectious Diseases
Internal Medicine
Nephrology
Nursing
Oncology
Radiation Oncology
Radiology

INTENDED USERS

Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

- To review the types of central venous access devices (CVADs) available and their respective advantages and disadvantages in various clinical settings
- To recommend patient care prior to, and immediately following insertion of CAVDs in the context of possible complications and how these are best avoided
- To recommend long-term care of in-dwelling CAVDs
- To recommend techniques of insertion, removal and management of the problems which are most likely to occur following insertion of CAVDs including infection, misplacement and thrombosis
- To recommend care of patients with coagulopathies and catheter-related problems

TARGET POPULATION

Adults in the United Kingdom requiring central venous access devices

INTERVENTIONS AND PRACTICES CONSIDERED

1. Choice of catheter
 - Nontunnelled central venous catheters
 - Tunnelled catheters with anchoring cuff
 - Implanted ports
 - Apheresis/dialysis catheters (tunnelled and nontunnelled)
 - Peripherally inserted central catheters (PICC)
2. Patient care prior to catheter insertion
 - Explanation of risks/benefits of procedure
 - Physical assessment
 - Vein assessment and history of previous central venous catheterization
 - Platelet count
3. Antibiotic prophylaxis (not recommended routinely)
4. Catheter insertion
 - Use of experienced personnel
 - Skin cleansing with chlorhexidine solution
 - Use of clean environment for insertion
 - Ultrasound-guided insertion
 - Availability of imaging facilities (fluoroscopy, intravenous contrast studies and standard radiography)
 - Use of antibiotic/antimicrobial impregnated catheters
5. Care after catheter insertion
 - Flushing catheters with heparin vs. normal saline
 - Routine replacement (e.g., weekly change) (not recommended)
 - Guidewire-assisted catheter exchange to replace a malfunctioning catheter
 - Frequency of dressing change
 - Use of securing devices (e.g., Stalok™)
 - Use of needle-free connectors
6. Providing patient with information (guides, leaflets)
7. Management of problem patients, such as those with thrombocytopenia, disseminated intravascular coagulation, hemophilia, infection
8. Prevention and management of catheter complications (infection, malfunction, thrombosis)
9. Technique of catheter removal
10. Auditing of complications

MAJOR OUTCOMES CONSIDERED

- Incidence of catheter-related infections
- Incidence of antibiotic resistance (from antimicrobial/antiseptic impregnated catheters)
- Catheter flow rate and longevity
- Rates of thrombosis and stenosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Recommendations are based on database searches using appropriate keywords, and a review of the existing published guidelines written by experts.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Not stated

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review
Review of Published Meta-Analyses

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Not stated

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not applicable

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

- Patients should receive clear and comprehensive verbal and written information explaining the risks, benefits and care of the catheter. Signed consent should be obtained prior to catheter insertion.
- Nontunnelled catheters are indicated for short-term use when peripheral venous access is impractical.
- Tunnelled central venous catheters are indicated for the repeated administration of chemotherapy, antibiotics, parenteral feeding and blood products, and for frequent blood sampling. They are recommended for patients in whom long-term (>30 days) central venous access is anticipated.
- Fully implanted catheters (ports) are more suitable for children and for less frequent accessing but long-term use, whereas skin-tunnelled catheters are recommended for intensive access.
- Peripherally inserted central catheters should be avoided for inpatient therapy because of limited catheter longevity and increased incidence of thrombosis. They are more suited to ambulatory or outpatient-based therapy.
- Polyurethane peripherally inserted central catheters (PICC) allow easier infusion of blood products as greater flow rates are achieved because the thinner walls provide a larger internal diameter of the catheter. The decision to use polyurethane catheters should be balanced against the higher risk of thrombosis with these catheters compared with silicone catheters.
- The number of lumina and diameter of catheters should be kept to the minimum.
- Experienced operators, regardless of specialty, should perform catheter insertion with training, supervision and competence assessment programmes in place. Paediatric specialists should insert catheters in children.
- Ultrasound guided insertion is recommended for all routes of central venous catheterization. The use of ultrasound is also recommended for the insertion of PICC when the peripheral veins are not visible or palpable.
- Imaging facilities (fluoroscopy, intravenous contrast studies and standard radiography) should be available for the insertion of skin-tunnelled central venous catheters (CVCs) and ports.
- Catheter insertion should take place in an operating theatre or similar clean environment. Bedside placement should not be performed except in an emergency, apart from PICC placement.
- Rigorous skin cleansing with a chlorhexidine gluconate 2% in alcohol or aqueous solution is recommended prior to catheter insertion.
- Antibiotic/antimicrobial impregnated catheters, for example, chlorhexidine and silver sulfadiazine impregnated catheters should be considered for appropriate risk groups of patients to minimize infection risk. These are becoming available for tunnelled devices.
- Routine antibiotic prophylaxis is not recommended.
- Flushing with heparin vs. normal saline remains controversial.
- Routine replacement, for example, weekly change, of short-term catheters as a means to reduce infection rates is not recommended.
- Guidewire-assisted catheter exchange to replace a malfunctioning catheter is acceptable if there is no evidence of infection. However, if infection is

suspected the existing catheter should be removed and a new catheter inserted at a different site. This technique is generally impractical for cuffed tunneled catheters or ports when it may be technically easier and safer to insert a new catheter into a clean site.

- Dressings should be changed 24 hours after catheter insertion and weekly thereafter.
- Securing devices, for example, Statlok™ are preferable to stitches, and lines should not be sewn into or around the vein.
- Needle-free connectors should be used to reduce risk of infection to patients and needle stick injury to staff.
- A positive pressure method of flushing (by protocol, according to the type of catheter) is essential to maintain catheter patency.
- Intravenous (IV) therapy giving sets should be changed every 24 to 48 hours if used for transfusing blood products, and every 72 to 96 hours otherwise.
- Pre-existing haemorrhagic, thrombotic, or infective problems must be effectively managed before catheter insertion.
- Blood products may be administered concurrently with another drug/infusion through a dual bore catheter.
- Low-dose warfarin prophylaxis is not recommended, but therapeutic dosing may be required in selected patients at risk of developing a thrombosis.
- Thrombosis and infection must be promptly diagnosed and vigorously treated. Both complications may require removal of the catheter.
- Tunneled catheters can be pulled out if the cuff has not anchored in the tissues. Otherwise, a cut-down procedure is needed to free the cuff. Ports require surgical removal. All procedures should be undertaken by experienced personnel.
- Units should audit complications associated with central venous catheterization and use the data to develop preventative measures. Close liaison with the local microbiology department is essential to monitor trends in infection.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate insertion and management of central venous access devices

POTENTIAL HARMS

- The use of antimicrobial/antiseptic impregnated catheters is recommended for adults who require short-term (<10 days) central venous catheterization and who are at high risk of infection. The debate continues about such catheters and their propensity for inducing antibiotic resistance, and occasional severe allergic reactions have been reported.
- If the catheter tip is sheared off during removal, it is likely to embolize into the right heart or pulmonary artery and will require urgent retrieval by vascular radiologists using a snare, under fluoroscopic guidance.

CONTRAINDICATIONS

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Infection at the time of catheter insertion represents a relative contraindication to proceeding, and consideration should be given to temporary, nontunneled catheter placement or temporary use of peripheral cannulae, but the risks and benefits should be considered for each patient on an individual basis. If the patient has a unilateral skin infection on the anterior upper chest wall, the unaffected side should be used for catheter placement. Targeted antibiotic prophylaxis may be warranted in these cases.

QUALIFYING STATEMENTS

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- The guidelines are not intended as a substitute for local policies and protocols but should provide a useful source of reference for those writing such documents.
- While the advice and information in these guidelines is believed to be true and accurate at the time of going to press, neither the authors, the British Society for Haematology nor the publishers accept any legal responsibility for the content of these guidelines.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

A locally based audit should include patient identification data, diagnosis, date of catheter insertion, number of previous catheters, operator and department where the catheter was inserted, complications associated with the catheter, date of and reason for removal. Each unit should monitor their infection rates/1000 catheter days to observe any changes or trends in infection rates and be mindful of the emergence of resistant bacteria.

IMPLEMENTATION TOOLS

Audit Criteria/Indicators

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness
Safety
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

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ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2007 Aug

GUIDELINE DEVELOPER(S)

British Committee for Standards in Haematology - Professional Association

SOURCE(S) OF FUNDING

British Committee for Standards in Haematology

GUIDELINE COMMITTEE

Not stated

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available from the [British Committee for Standards in Haematology Web site](#).

Print copies: Available from the British Committee for Standards in Haematology; Email: bcsh@b-s-h.org.uk.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on March 17, 2008. The information was verified by the guideline developer on April 1, 2008.

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