ASCO GUIDELINES

Clinical Tools and Resources

Central Venous Catheter (CVC) Care for the Patient with Cancer

Clinical Practice Guideline

Introduction & Context

- Stable venous access is used for a wide range of indications including chemotherapy, blood product and antibiotic administration, fluid resuscitation and access to the bloodstream for clinical monitoring and microbial culturing
- A central venous catheter care clinical bundle is now the standard of care
- The insertion and care for a CVC requires a multidisciplinary approach, involving medical oncologists/hematologists, nurses, interventional radiologists, surgeons, infectious disease specialists, and often a specialized CVC Care Team

Introduction, cont'd

- CVC have a considerable potential for serious complications
- Early complications related to CVC placement include bleeding, cardiac arrhythmia, malposition, air embolism, pneumothorax and rarely injury to vessels or nerves.
- Late complications include infection, thrombosis, and catheter malfunction
- Infection or thrombosis of a CVC can be an indication for removal, which can result in prolonged and costly hospitalizations and significant delays in treatment

Guideline Methodology: Systematic Review

An Expert Panel reviewed relevant medical literature:

- Limited to RCTs focused on adult or pediatric patients with cancer
- Meta-analysis and other Systematic Reviews including patients with cancer

Databases searched:

- MEDLINE
- Cochrane Collaboration Library

Date parameters:

- 1980 - 2012

Clinical Questions

Clinical Question#1: In patients with cancer, does catheter type, insertion site, or placement technique affect complication rates?

Clinical Question #2: What is effective prophylaxis for the prevention of catheter-related infections?

Clinical Question #3: What are effective treatments for the management of catheter-related infections?

Clinical Question #4: What is effective prophylaxis for the prevention of catheter-related thrombosis?

Clinical Question #5: What are effective treatments for the management of catheter-related occlusions?

RECOMMENDATIONS

CVC Type, Insertion Site, Placement

Recommendation #1.1: There is insufficient evidence to recommend one type of CVC routinely for all patients with cancer; the choice of catheter should be influenced by the expected duration of use, chemotherapy regimens, and patient ability to provide care; the minimum number of lumens essential for the management of the patient is recommended; these issues should be discussed with the patient.

CVC Type, Insertion Site, Placement

Recommendation #1.2: There is insufficient evidence to recommend one insertion site or approach (left sided or right sided) for tunneled CVCs for patients with cancer; individual risks and benefits (comfort, security, maintenance of asepsis) of the catheter site should be considered; the Panel recommends that CVC insertion into the femoral vein be avoided because of increased infection risks and concerns about thrombosis, except in certain emergency situations.

CVC Type, Insertion Site, Placement

Recommendation #1.3: Most CVC placement in patients with cancer is performed as an elective procedure; although image-guided insertion (e.g., ultrasound guided, fluoroscopy) of CVCs is recommended, well-trained providers who use the landmark method regularly (e.g., for subclavian or internal jugular) may have a high rate of success and low incidence of acute and/or chronic complications.

Prevention of Infection

Recommendation #2.1: CVC care clinical bundle (including hand hygiene, maximal barrier precautions, chlorhexidine skin antisepsis during catheter insertion, optimal catheter site selection, and assessment of CVC necessity) is recommended for placement and maintenance of all CVCs to prevent infections; there is no evidence that particular dressing types or more frequent IV set and/or dressing changes decrease risk of infection; use of topical antibiotic ointment or cream on insertion sites is not recommended because of potential to promote fungal infections and resistance to antimicrobials; scheduled guidewire exchange of CVC may be associated with greater risk of infection versus catheter replacement at new vascular site; thus, guidewire exchange is not routinely recommended, unless access options are limited.

Prevention of Infection

Recommendation #2.2: Use of antimicrobial/antiseptic-impregnated or -coated CVCs (CH-SS or minocycline/rifampin) and/or heparin-impregnated catheters is recommended to decrease risk of catheter-related infections for short-term CVCs, particularly in high-risk groups such as bone marrow transplantation recipients or patients with leukemia; however, relative benefit and increased cost must be carefully considered before they are routinely used.

Prevention of Infection

Recommendation #2.3: The prophylactic use of systemic antibiotics (IV or oral) before insertion of a long-term CVC is not recommended.

Recommendation #2.4: There are conflicting data about the relative value of prophylactic heparin with saline flushes to prevent catheter-associated bloodstream infections or thrombosis; data are not sufficient to recommend for or against routine use of antibiotic-flush/antibiotic-lock therapy.

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Management of Infection

Recommendation #3.1: Cultures of blood from the catheter and when appropriate of soft tissues at entrance-exit sites or tunnel should be obtained before initiation of antibiotic therapy; most exit- or entrance-site infections can be treated successfully with appropriate antimicrobial therapy without the need for catheter removal, although removal is usually needed for clinically apparent tunnel or port-site infections; antimicrobial agents should be optimized once pathogens are identified and antibiotic susceptibilities defined.

Management of Infection

Recommendation #3.1 Cont'd

Immediate catheter removal is recommended for BSIs caused by fungi and nontuburculous mycobacteria (eg,*Mchelonei*,*Mfortuitum*, *M mucogenicum*, *M abscessus*). BSIs caused by *Bacillus* species, *C jeikeium*, *S aureus*, *P aeruginosa*, *S maltophilis*, and vancomycinresistant enterocci may be difficult to eradicate with antimicrobial therapy alone, and early catheter removal should be considered. Catheter removal is also recommended for patients with an apparent tunnel or port-site infection, persistent bacteremia after 48 to 72 hours of appropriate antimicrobial treatment in the absence of other obvious sites or sources of infection, infective endocarditis or peripheral embolization, presence of local catheter-associated complications not responsive to treatment, or relapse of infection with the same pathogen after the completion of an appropriate course of antibiotics.

Prevention of Thrombosis

Recommendation #4.1: Use of systemic anticoagulation (warfarin, LMWH, UFH) has not been shown to decrease incidence of catheter-associated thrombosis; therefore, routine prophylaxis with anticoagulants is not recommended for patients with cancer with CVCs; routine flushing with saline of the CVC to prevent fibrin buildup is recommended.

Prevention of Thrombosis

Recommendation #4.2: Data are insufficient to recommend routine use of urokinase (not available in the United States) and/or other thrombolytics to prevent catheter occlusion.

Management of Thrombosis

Recommendation #5.1: Instillation of 2-mg t-PA is recommended to restore patency and preserve catheter function.

Management of Thrombosis

Recommendation #5.2: Although it is appropriate to try to clear thrombosis with the CVC in place, if there is radiologically confirmed thrombosis that does not respond to fibrinolytic therapy or if fibrinolytic or anticoagulation therapy is contraindicated, catheter removal is recommended; prolonged retention of unneeded CVCs can lead to significant problems associated with thrombosis and fibrosis; 3 to 6 months of anticoagulant therapy with LMWH or LMWH followed by warfarin (INR, 2.0 to 3.0) is recommended for treatment of symptomatic CVC thrombosis, with duration depending on clinical issues in individual patients.

Patient and Clinician Communication

It is important for the oncologist to discuss CVC options with the patient and to explain that a central line may be inserted for one or more of the following reasons:

- Some chemotherapy drugs are not suitable to be given into small veins in the hand or arm and must be administered in a larger vein for adequate dilution
- To allow some chemotherapy treatments, such as those given by continuous infusion, to be administered at home and not require a lengthy hospital stay
- When extended chemotherapy treatments and frequent needle sticks to obtain blood samples are anticipated
- When a patient is felt to have poor venous access in the hands and arms that are not suitable for treatment infusions
- When a patient verbalizes or displays anxiety regarding needle sticks

More information is available at http://www.cancer.net/patient/All+About+Cancer/Cancer.Net+Feature+Articles/Treatments%2C

Health Disparities

- It is important to note that many patients have limited access to medical care. Racial and ethnic disparities in health care contribute significantly to this problem in the United States.
- Awareness of these disparities in access to care should be considered in the context of this guideline, in particular, the availability of adequate home care for catheter maintenance might vary widely amongst different patient populations and could influence the choice of CVC.
- While in the overall scheme of a patient's care the placement of a central venous access device may seem minor, it can present difficulties that can dramatically impact a patient's ability to receive appropriate treatment.

Central Venous Catheter Clinical Care Bundle

Component	Criteria
Hand hygiene	Every person entering the room during the insertion procedure should perform hand hygiene.
Maximal barrier precautions upon insertion	Sterile drape extends from head to toes; all health care providers participating in the procedure employ mask, cap, sterile gown and sterile gloves.
Chlorhexidine skin antisepsis	The skin at the insertion site should be scrubbed with 2% chlorhexidine for 30 seconds and allowed to dry for at least 30 seconds.
Optimal catheter site selection	The subclavian vein is the preferred site for non-tunneled catheters. Avoid femoral site if possible.
Assessment of Central Line Necessity	Prompt removal of CVC line after completion of therapy unless clinical circumstances suggest that further infusional therapy is likely to be necessary in the future.

Adapted from IHI (http://www.ihi.org/); CDC guidelines (O'Grady NP, Alexander M, Burns LA, et al: Guidelines for the prevention of intravascular catheter-related infections. Clin Infect Dis 52:e162-93, 2011); and Pronovost P, Needham D, Berenholtz S, et al: An intervention to decrease catheter-related bloodstream infections in the ICU. N Engl J Med 355:2725-32, 2006

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Limitations of the literature

RCTs were considered eligible for data extraction if the majority of patients had cancer. It should be noted that many of the trials had small numbers of patients and there was considerable heterogeneity in trial design, types of catheters used, placement techniques and methods of evaluating endpoints, even amongst trials addressing the same "question." In addition, clinical practices have changed over the years and the Panel focused on more recent trials whenever possible. Nonetheless, the overall quality of the evidence was rated as good as evidenced, in part, by the consistency among meta-analyses and guidelines compiled by other groups.

The Bottom Line

Intervention

- Placement of central venous catheters (CVC) in adult and pediatric patients with cancer and the subsequent prevention and management of catheter-related infections and thromboses

Target Audience

- Medical oncologists/hematologists, nurses, interventional radiologists, surgeons, infectious disease specialists, and specialized CVC Care Teams

The Bottom Line, cont'd

Key Recommendations

- There is insufficient evidence to recommend a specific type of CVC or insertion site, but femoral vein insertion should be avoided, except in certain emergency situations
- CVCs should be placed by well-trained health care providers
- Use of a CVC clinical care bundle is recommended
- Use of antimicrobial/antiseptic-coated CVCs and/or heparin-impregnated CVCs has been shown to be beneficial, but the benefits and costs must be carefully considered before they can be routinely used
- Prophylactic use of systemic antibiotics is not recommended before CVC insertion

The Bottom Line, cont'd

Key Recommendations

- Cultures of blood from the CVC and/or tissue at the entrance-exit sites should be obtained before initiation of antibiotic therapy; most clinically apparent exit- or entrance-site infections as well as bloodstream infections can be managed with appropriate microbial therapy, so CVC removal may not be necessary; antimicrobial agents should be optimized once the pathogens are identified; catheter removal should be considered if the infection is caused by an apparent tunnel or port-site infection, fungi, or nontuberculous mycobacteria or if there is persistent bacteremia after 48 to 72 hours of appropriate antimicrobial treatment

The Bottom Line, cont'd

Key Recommendations

- Routine flushing with saline is recommended
- Prophylactic warfarin and low–molecular weight heparin have not been shown to decrease CVC-related thrombosis, so routine use is not recommended
- Tissue plasminogen activator (t-PA) is recommended to restore patency in a nonfunctioning CVC; CVC removal is recommended when the catheter is no longer needed, if there is a radiologically confirmed thrombosis that does not respond to anticoagulation therapy, or if fibrinolytic or anticoagulation therapy is contraindicated

The Bottom Line, cont'd

Methods

- Systematic review and analysis of the medical literature on CVC care for patients with cancer by ASCO CVC Care Expert Panel

Additional Information

- Data Supplements, including evidence tables, and clinical tools and resources can be found at http://www.asco.org/guidelines/cvc.

ASCO believes that cancer clinical trials are vital to inform medical decisions and improve cancer care, and that all patients should have the opportunity to participate

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Guideline Methodology: Panel Members

Panel Members	Affiliation/Institution
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Additional ASCO Resources

- The guideline is available at http://jco.ascopubs.org
- The guideline, data supplements, patient guide, and other resources are available at www.asco.org/guidelines/cvc
- The patient guide is available at http://www.cancer.net
- Venous Thromboembolism Prophylaxis and Treatment in Patients with Cancer: American Society of Clinical Oncology Clinical Practice Guideline Update
- Antimicrobial Prophylaxis and Outpatient Management of Fever and Neutropenia in Adults Treated for Malignancy: American Society of Clinical Oncology Clinical Practice Guideline

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