VASCULAR ACCESS

Monitoring and Prevention of CVC Related Infections

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Checklists for CVC complications

Monitoring/Surveillance of CVC Complications

CPG 20.1

At each dialysis session:

- [ ] Perform a basic medical history focused on signs and symptoms of CVC-related complications (e.g., dysfunction, infection)
- [ ] Perform a physical examination or check of the dialysis catheter, exit site, tunnel, and surrounding area at each catheter dressing change or dialysis session.

Checklists for CVC complications – cont.

Catheter Dysfunction

- [ ] Assess for CVC dysfunction at each HD session — CPG 23.1
- [ ] Use standardized definitions for CVC-related infections to allow for comparisons across programs/jurisdictions.
- [ ] Use the KDOQI VA-2019 definitions of CVC-related infections (Tables 23.1 and 23.2), which consider the unique circumstances of a hemodialysis patient. — CPG 23.2
- [ ] Connect the vascular access to circuit properly (see Vascular Access Connection)
- [ ] Monitor and track vascular access related infections in your unit — CPG 24

General Prevention of CVC Infection and Use of Infection Surveillance Programs and Infection Control Teams

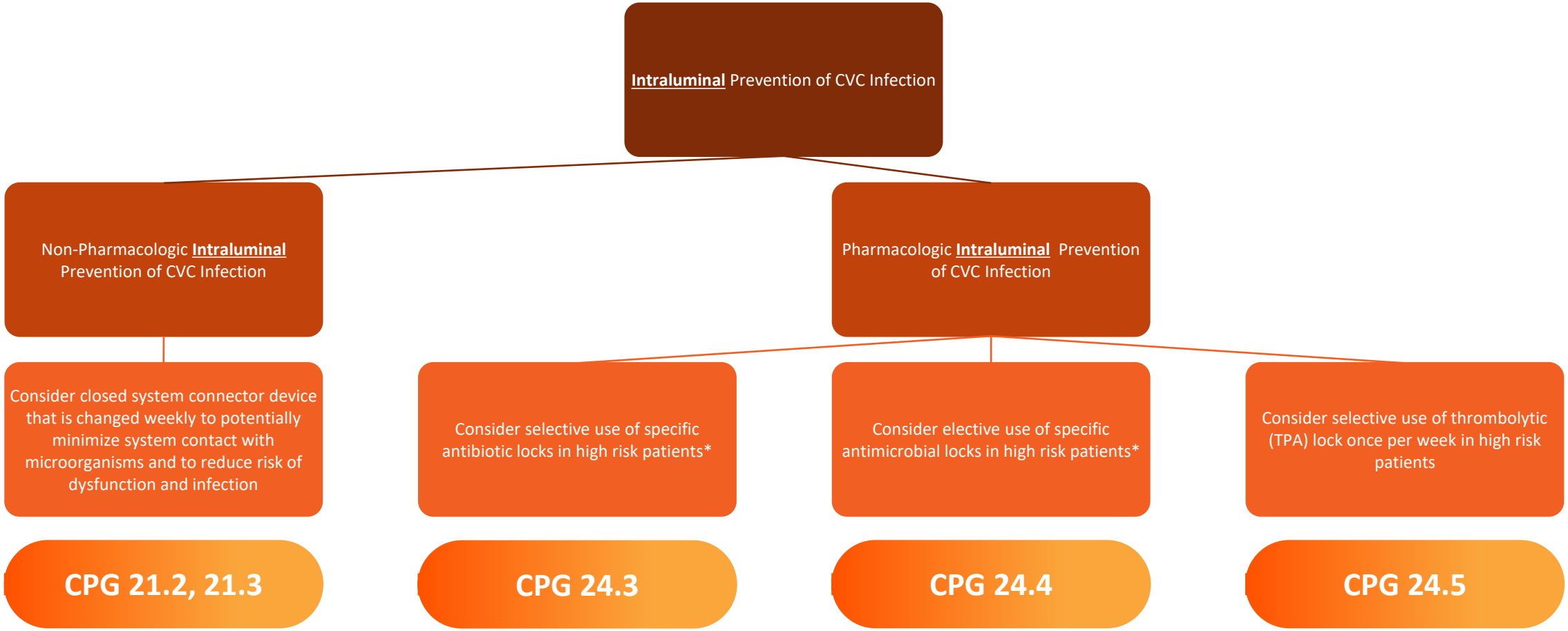
General Checklist:
How to monitor and prevent hemodialysis catheter related infections?

CPG 24.1

- [ ] Educate staff and patients on how to monitor their vascular access (e.g. CVC) for complications
- [ ] Educate staff and patients on how to prevent vascular access (e.g. CVC) infections
- [ ] Incorporate an infection control program
- [ ] Include an infection surveillance team to monitor, track (in an electronic database), help prevent, and evaluate outcomes of vascular access infections and, in particular, CVC related infections

Flow Diagram 24.a.
Prevention of CVC Related Infection

Note: High risk patients include those with multiple prior catheter related bloodstream infections (CRSBI), especially in facilities with high rates of CRBSI e.g., >3.5/1,000 days.



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Flow Diagram 24.b.
Prevention of CVC Related Infection – cont.

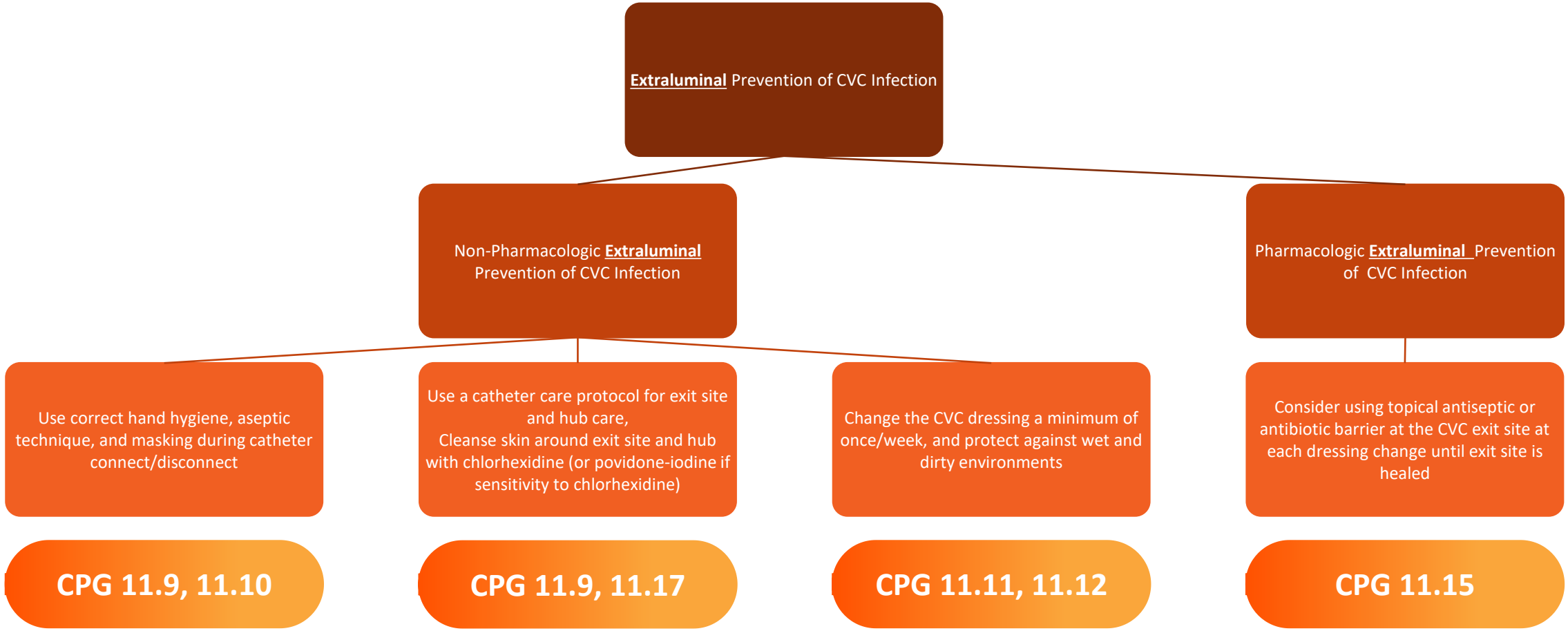

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Table 23.1. Definitions of CVC-Related Blood Stream Infections

KDOQI-2019	KDOQI-2006[13]	CDC[297]	IDSA[319]
Clinical manifestations and at least **1 positive BC** from a peripheral source (**dialysis circuit** or vein) **and** no other apparent source, **with** either positive semiquantitative (>15 CFU/ catheter segment, hub or tip) or quantitative (>10^2 CFU/catheter segment, eg, hub or tip) culture, whereby the same organism (species and antibiogram) is isolated from the catheter segment (eg, hub or tip) and a peripheral source (dialysis circuit or vein) blood sample. If available, the following would be supportive: Simultaneous quantitative cultures of blood samples with a ratio of ≥3:1 (catheter hub/tip vs peripheral [dialysis circuit/vein]); differential period of catheter culture versus peripheral BC positivity of 2 hours.	**Definite:** Same organism from a semiquantitative culture of the catheter tip (>15 CFU/catheter segment) *and* from a BC in a symptomatic patient with no other apparent source of infection. **Probable:** Defervescence of symptoms after antibiotic therapy with or without removal of the catheter, in the setting in which BC confirms infection, but catheter tip does not (or catheter tip does, but blood does not) in a symptomatic patient with no other apparent source of infection. **Possible:** Defervescence of symptoms after antibiotic treatment or after removal of catheter in the absence of laboratory confirmation of BSI in a symptomatic patient with no other apparent source of infection.	Clinical manifestations and at least 1 positive BC from a peripheral vein and no other apparent source, with either positive semiquantitative (>15 CFU/catheter segment) or quantitative (>10^2 CFU/catheter segment) culture, whereby the same organism (species and antibiogram) is isolated from the catheter segment and a peripheral blood sample. Simultaneous quantitative cultures of blood samples with a ratio of ≥3:1 (catheter vs peripheral) Differential period of catheter culture versus peripheral BC positivity of 2 hours **OR** Isolation of the same organism from semiquantitative or quantitative culture segment and from blood (preferably from a peripheral vein) of a patient with accompanying symptoms of BSI and no other apparent source of infection.	Bacteremia/fungemia in a patient with an intravascular catheter with at least 1 positive BC and with clinical manifestations of infections (ie, fever, chills, and/or hypotension) and no apparent source for the BSI except the catheter **AND** One of the following should be present: A positive semiquantitative (>15 CFU/ catheter segment) or quantitative (>10^2 CFU/catheter segment) culture whereby the same organism (species and antibiogram) is isolated from the catheter segment and peripheral blood. Simultaneous quantitative BC with a >5:1 ratio catheter versus peripheral. Differential time period of catheter culture versus peripheral BC positivity of >2 hours.

Abbreviations: BC, blood culture; BSI, bloodstream infection; CDC, Centers for Disease Control and Prevention; CFU, colony-forming unit; KDOQI, Kidney Disease Outcomes Quality Initiative; IDSA, Infectious Diseases Society of America.

Table 23.2. Definitions of CVC Exit Sites and Tunnel Infections

KDOQI 2019	KDOQI 2006[13]	CDC[297]	IDSA[319]
Exit Site Infection			
Hyperemia, induration, and/or tenderness ≤2 cm from catheter exit site. May be associated with drainage from the exit site. It may or may not be associated with bacteremia. If there is exit site drainage, it should be collected and sent for Gram staining, culture, and sensitivities.	Inflammation confined to the area surrounding the catheter exit site, not extending superiorly beyond the cuff if the catheter is tunneled, with exudate culture result confirmed to be positive.	Erythema or induration within 2 cm of the catheter exit site, in the absence of concomitant BSI and without concomitant purulence.	Hyperemia, induration, and/or tenderness ≤2 cm from catheter exit site. May be associated with fever and purulent drainage from the exit site. It may or may not be associated with bacteremia. If there is purulent drainage, it should be collected and sent for Gram staining and culture.

Tunnel Infection			
Tenderness, hyperemia, and/or induration that extends along the subcutaneous tunnel. It may or may not be associated with bacteremia. If there is drainage, it should be collected and sent for Gram staining, culture, and sensitivities.	The catheter tunnel superior to the cuff is inflamed, painful, and may have drainage through the exit site that is culture positive.	Tenderness, erythema, or site induration >2 cm from the catheter site along the subcutaneous tract of a tunneled catheter, in the absence of concomitant BSI.	Tenderness, hyperemia, and/or induration that extends >2 cm from the exit site and along the subcutaneous tunnel. It may or may not be associated with bacteremia. If there is purulent drainage, it should be collected and sent for Gram staining and culture.

Abbreviations: BSI, bloodstream infection; CDC, Centers for Disease Control and Prevention; KDOQI, Kidney Disease Outcomes Quality Initiative; IDSA, Infectious Diseases Society of America.