CONVEGNO E VIDEOCONFERENZA

IL NURSING DEI DISPOSITIVI PER ACCESSO VASCOLARE PER EMODIALISI

Polo Didattico Universitario Ospedale Sacco -
Milano e Videoconferenza

5 Ottobre 2024

RESPONSABILE SCIENTIFICO: *Maurizio Gallieni*, Direttore Nefrologia e Dialisi, ASST Fatebenefratelli Sacco, Dipartimento di Scienze Biomediche e Cliniche, UNIMI, Milano

Gemelli

Fondazione Policlinico Universitario A. Gemelli
Università Cattolica del Sacro Cuore

GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

BUNDLES PROCEDURALI PER LA SICUREZZA DEL PAZIENTE

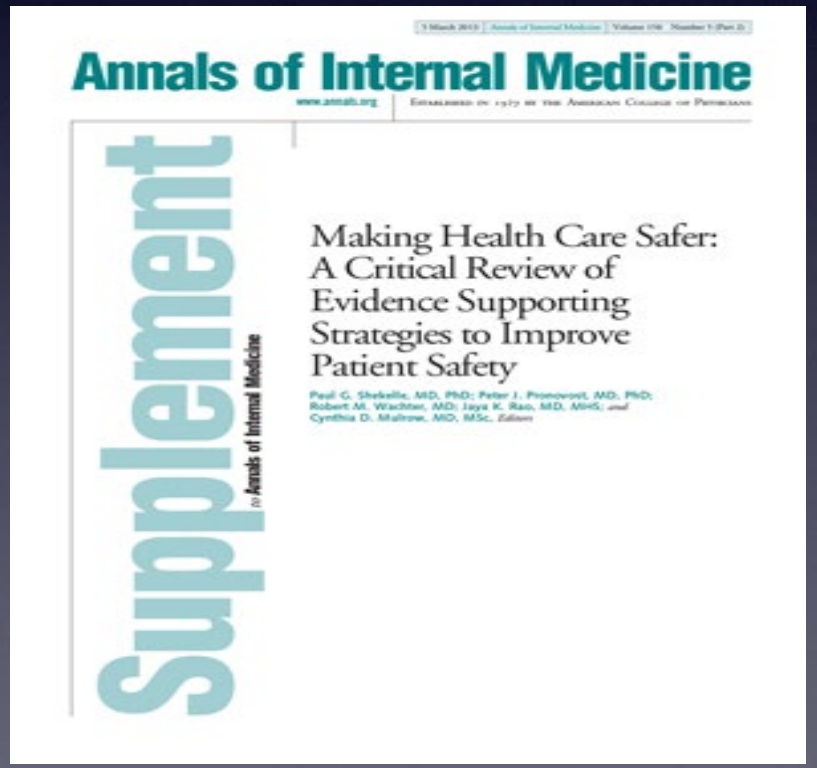
GIANCARLO SCOPPETTUOLO

FONDAZIONE POLICLINICO UNIVERSITARIO "A. GEMELLI"- IRCCS - ROMA

Annals of Internal Medicine | SUPPLEMENT

The Top Patient Safety Strategies That Can Be Encouraged for Adoption Now

Paul G. Shekelle, MD, PhD; Peter J. Pronovost, MD, PhD; Robert M. Wachter, MD; Kathryn M. McDonald, MM; Karen Schoelles, MD, SM; Sydney M. Dy, MD, MSc; Kaveh Shojania, MD; James T. Reston, PhD, MPH; Alyce S. Adams, PhD; Peter B. Angood, MD; David W. Bates, MD, MSc; Leonard Bickman, PhD; Pascale Carayon, PhD; Sir Liam Donaldson, MBChB, MSc, MD; Naihua Duan, PhD; Donna O. Farley, PhD, MPH; Trisha Greenhalgh, BM BCH; John L. Haughom, MD; Eileen Lake, PhD, RN; Richard Lilford, PhD; Kathleen N. Lohr, PhD, MA, MPhil; Gregg S. Meyer, MD, MSc; Marlene R. Miller, MD, MSc; Duncan V. Neuhauser, PhD, MBA, MHA; Gery Ryan, PhD; Sanjay Saint, MD, MPH; Stephen M. Shortell, PhD, MPH, MBA; David P. Stevens, MD; and Kieran Walshe, PhD



2013

Table 2. Patient Safety Strategies Ready for Adoption Now

Strongly encouraged

- Preoperative checklists and anesthesia checklists to prevent operative and postoperative events
- Bundles that include checklists to prevent central line–associated bloodstream infections
- Interventions to reduce urinary catheter use, including catheter reminders, stop orders, or nurse-initiated removal protocols
- Bundles that include head-of-bed elevation, sedation vacations, oral care with chlorhexidine, and subglottic suctioning endotracheal tubes to prevent ventilator-associated pneumonia
- Hand hygiene
- The do-not-use list for hazardous abbreviations
- Multicomponent interventions to reduce pressure ulcers
- Barrier precautions to prevent health care–associated infections
- Use of real-time ultrasonography for central line placement
- Interventions to improve prophylaxis for venous thromboembolisms

1 October 2005
Volume 41
Number 7

Clinical Infectious Diseases

Published by The University of Chicago Press

IDSA
hivma

IDSA
Infectious Diseases Society of America

GUIDELINES

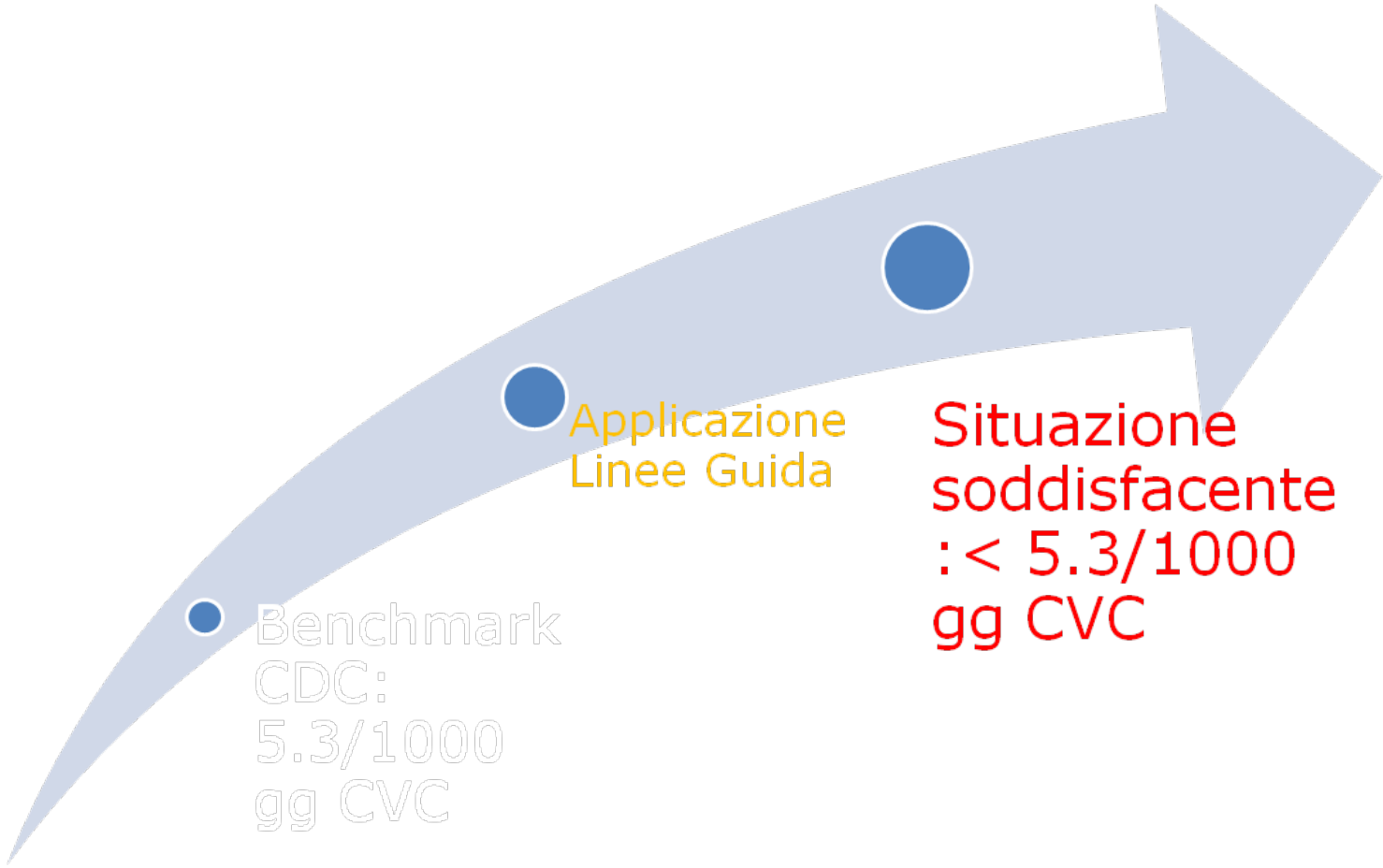
Guidelines for the Prevention of Intravascular Catheter–Related Infections

Naomi P. O'Grady,[1] Mary Alexander,[2] E. Patchen Dellinger,[3] Julie L. Gerberding,[4] Stephen O. Heard,[3] Dennis G. Maki,[5] Henry Masur,[1] Rita D. McCormick,[3] Leonard A. Mermel,[6] Michele L. Pearson,[7] Issam I. Raad,[11] Adrienne Randolph,[4] and Robert A. Weinstein[11]

[1]National Institutes of Health, Bethesda, Maryland; [2]Infusion Nurses Society, Cambridge, and [3]University of Massachusetts Medical School, Worcester, and [4]The Children's Hospital, Boston, Massachusetts; [5]University of Washington, Seattle; [6]Office of the Director, Centers for Disease Control and Prevention (CDC), and [7]Division of Healthcare Quality Promotion, National Center for Infectious Diseases, CDC, Atlanta, Georgia; University of Wisconsin [8]Medical School and [9]Hospital and Clinics, Madison; [10]Rhode Island Hospital and Brown University School of Medicine, Providence, Rhode Island; [11]MD Anderson Cancer Center, Houston, Texas; and [12]Cook County Hospital and Rush Medical College, Chicago, Illinois

Clinical Infectious Diseases 2002; 35:1281–307

1058-4838/2002/3511-0001


Benchmark
CDC:
5.3/1000
gg CVC
Applicazione
Linee Guida
Situazione
soddisfacente
:< 5.3/1000
gg CVC

Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2011

The goal of an effective prevention program should be the elimination of CRBSI from all patient-care areas. Although this is challenging, programs have demonstrated success, but sustained elimination requires continued effort. The goal of the measures discussed in this document is to reduce the rate to as low as feasible given the specific patient population being served, the universal presence of microorganisms in the human environment, and the limitations of current strategies and technologies.

The Risk of Bloodstream Infection in Adults With Different Intravascular Devices: A Systematic Review of 200 Published Prospective Studies

Dennis G. Maki, Dalniel M. Kluger, Christopher J. Crnich

Mayo Clin Proc. September 2006; 81 (9): 1159-1171

TABLE 3. **Rates of Intravascular Device–Related Bloodstream Infection Caused by Various Types of Devices Used for Vascular Access***

Device	No. of studies	No. of catheters	No. of IVD (d)	No. of BSIs	Rates of IVD-related bloodstream infection			
					Per 100 devices		Per 1000 IVD-days	
					Pooled mean	95% CI	Pooled mean	95% CI
Peripheral IV catheters								
Plastic catheters	110	10,910	28,720	13	0.1	0.1-0.2	0.5	0.2-0.7
Steel needles	1	148	350	3	2.0	0.0-4.3	8.6	0.0-18.2
Venous cutdown	1	27	111	1	3.7	0.0-10.8	9.0	0.0-26.6
Midline catheters	3	514	9251	2	0.4	0.0-0.9	0.2	0.0-0.5
Arterial catheters for hemodynamic monitoring	14	4366	21,397	37	0.8	0.6-1.1	1.7	1.2-2.3
Peripherally inserted central catheters								
Inpatient and outpatient	15	3566	105,839	112	3.1	2.6-3.7	1.1	0.9-1.3
Inpatient	6	625	7137	15	2.4	1.2-3.6	2.1	1.0-3.2
Outpatient	9	2813	98,702	97	3.5	2.8-4.1	1.0	0.8-1.2
Short-term noncuffed central venous catheters								
Nonmedicated								
Nontunneled	79	20,226	322,283	883	4.4	4.1-4.6	2.7	2.6-2.9
Tunneled	9	741	20,065	35	4.7	3.2-6.2	1.7	1.2-2.3
Medicated								
Chlorhexidine-silver-sulfadiazine	18	3367	54,054	89	2.6	2.1-3.2	1.6	1.3-2.0
Minocycline-rifampin	3	690	5797	7	1.0	0.3-1.8	1.2	0.3-2.1
Silver impregnated	2	154	1689	8	5.2	1.7-8.7	4.7	1.5-8.0
Silver iontophoretic	2	396	4796	16	4.0	2.1-6.0	3.3	1.7-5.0
Benzalkonium chloride	1	277	2493	12	4.3	1.9-6.7	4.8	2.1-7.5
Pulmonary artery catheters	13	2057	8143	30	1.5	0.9-2.0	3.7	2.4-5.0
Hemodialysis catheters								
Temporary, noncuffed	16	3066	51,840	246	8.0	7.0-9.0	4.8	4.2-5.3
Long-term, cuffed and tunneled	16	2806	373,563	596	21.2	19.7-22.8	1.6	1.5-1.7
Cuffed and tunneled central venous catheters	29	4512	622,535	1013	22.5	21.2-23.7	1.6	1.5-1.7
Subcutaneous venous ports								
Central	14	3007	983,480	81	3.6	2.9-4.3	0.1	0.0-0.1
Peripheral	3	579	162,203	23	4.0	2.4-5.6	0.1	0.1-0.2
Intra-aortic balloon pumps	1	101	414	3	3.0	0.0-6.3	7.3	0.0-15.4
Left ventricular assist devices	3	157	19,653	41	26.1	19.2-33.0	2.1	1.5-2.7

*BSI = bloodstream infection; CI = confidence interval; IV = intravenous; IVD = intravascular device.


LEI HA UN TUMORE.
E SONO IO.
MAURO BIANI 2008

For HAIs, it is widely demonstrated that all are preventable, but some are partly preventable and some others (CLABSI), on the contrary, are completely preventable and avoidable.

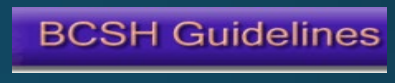
According to IHI's experiences and Campaigns, the best tool to Target Zero Infections is the "Bundle"

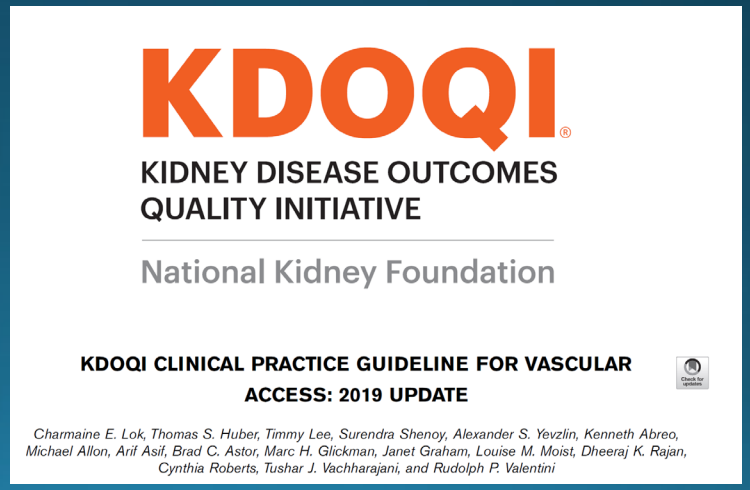
Linee Guida di Riferimento per la prevenzione delle CRBSI

- CDC Atlanta 2002 (Centers for Disease Control, USA)
- RCN 2005 (Royal College of Nurses, UK)
- INS 2006 (Infusion Nursing Society, USA)
- BCSH 2006 (British Committe for Standards in Hematology, UK)
- **EPIC 2007 (Evidence -Based Practice in Infection Control, UK)**
- **SHEA/IDSA 2008**
- **ESPEN 2009**
- **RCN 2010**
- **INS 2011**
- ***CDC 2011***
- ***EPIC 3 2014***
- ***SHEA 2014***
- ***INS 2016***
- ***RCN 2016***
- ***KDOQI 2019***
- ***INS 2021***
- ***SHEA/IDSA 2022***
- ***INS 2024***


epic2: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England

R.J. Pratt[a*], C.M. Pellowe[a], J.A. Wilson[a,b], H.P. Loveday[a], P.J. Harper[a], S.R.L.J. Jones[a], C. McDougall[b], M.H. Wilcox[c]



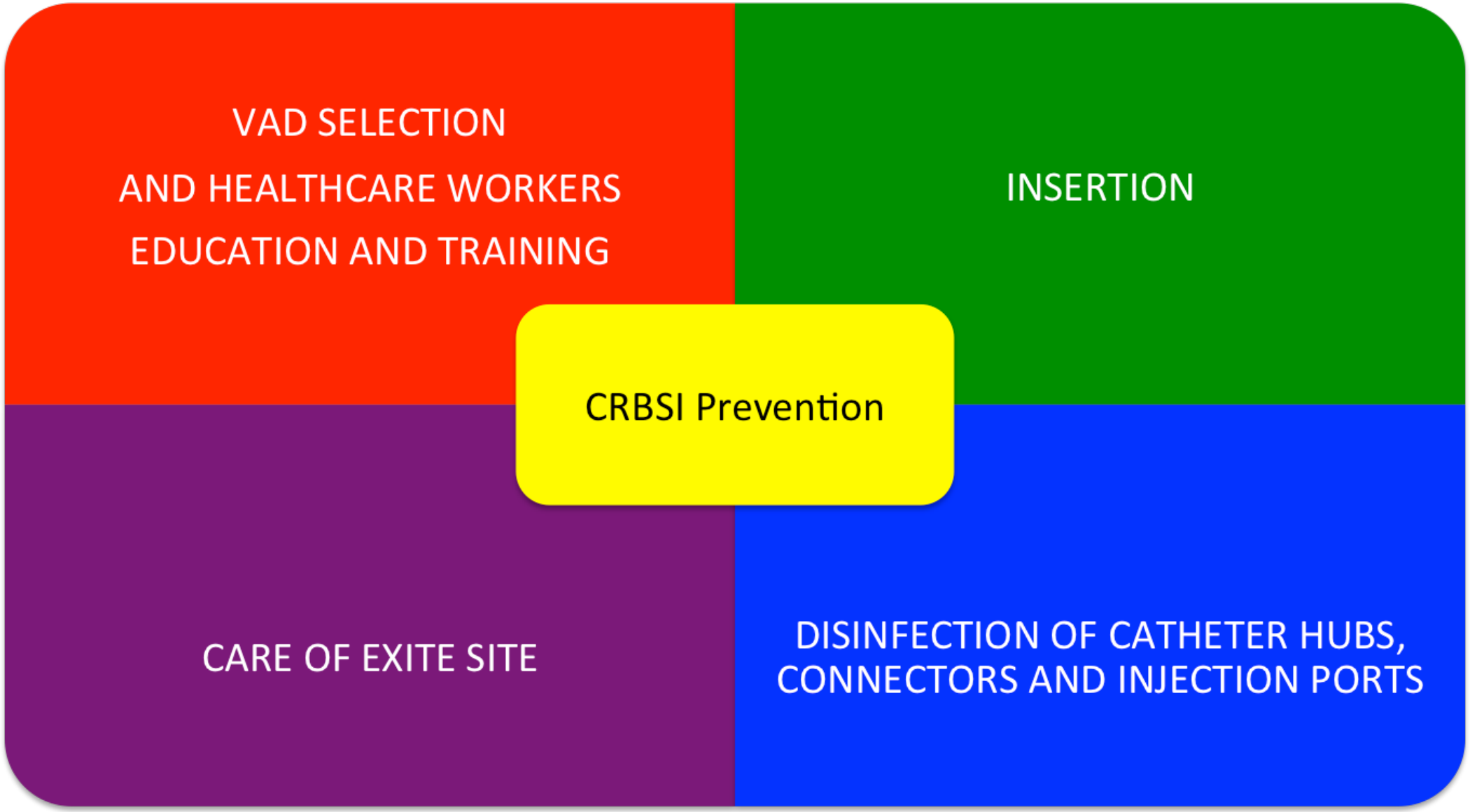

KDOQI

KIDNEY DISEASE OUTCOMES QUALITY INITIATIVE

National Kidney Foundation

KDOQI CLINICAL PRACTICE GUIDELINE FOR VASCULAR ACCESS: 2019 UPDATE

Charmaine E. Lok, Thomas S. Huber, Timmy Lee, Surendra Shenoy, Alexander S. Yevzlin, Kenneth Abreo, Michael Allon, Arif Asif, Brad C. Astor, Marc H. Glickman, Janet Graham, Louise M. Moist, Dheeraj K. Rajan, Cynthia Roberts, Tushar J. Vachharajani, and Rudolph P. Valentini


VAD SELECTION
AND HEALTHCARE WORKERS
EDUCATION AND TRAINING
INSERTION
CRBSI Prevention
CARE OF EXITE SITE
DISINFECTION OF CATHETER HUBS,
CONNECTORS AND INJECTION PORTS

Central Line Bundle

Hand Hygiene

Maximal Barrier Precautions Upon Insertion

Chlorhexidine Skin Antisepsis

Optimal Catheter Site Selection, with Subclavian Vein as the Preferred Site for Non-Tunneled Catheters

Daily Review of Line Necessity with Prompt Removal of Unnecessary Lines

www.ihi.org, 2008

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 DECEMBER 28, 2006 VOL. 355 NO. 26

An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D., Gary Roth, M.D., Joseph Bander, M.D., John Kepros, M.D., and Christine Goeschel, R.N., M.P.A.

Checklist for Prevention of Central Line Associated Blood Stream Infections

Based on 2011 CDC guideline for prevention of intravascular catheter-associated bloodstream infections: http://www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf

For Clinicians:

Promptly remove unnecessary central lines

- ☐ Perform daily audits to assess whether each central line is still needed

Follow proper insertion practices

- ☐ Perform hand hygiene before insertion
- ☐ Adhere to aseptic technique
- ☐ Use maximal sterile barrier precautions (i.e., mask, cap, gown, sterile gloves, and sterile full-body drape)
- ☐ Perform skin antisepsis with >0.5% chlorhexidine with alcohol
- ☐ Choose the best site to minimize infections and mechanical complications
  - o Avoid femoral site in adult patients
- ☐ Cover the site with sterile gauze or sterile, transparent, semipermeable dressings

Handle and maintain central lines appropriately

- ☐ Comply with hand hygiene requirements
- ☐ Scrub the access port or hub immediately prior to each use with an appropriate antiseptic (e.g., chlorhexidine, povidone iodine, an iodophor, or 70% alcohol)
- ☐ Access catheters only with sterile devices
- ☐ Replace dressings that are wet, soiled, or dislodged
- ☐ Perform dressing changes under aseptic technique using clean or sterile gloves

For Facilities:

- ☐ Empower staff to stop non-emergent insertion if proper procedures are not followed
- ☐ "Bundle" supplies (e.g., in a kit) to ensure items are readily available for use
- ☐ Provide the checklist above to clinicians, to ensure all insertion practices are followed
- ☐ Ensure efficient access to hand hygiene
- ☐ Monitor and provide prompt feedback for adherence to hand hygiene
  http://www.cdc.gov/handhygiene/Measurement.html
- ☐ Provide recurring education sessions on central line insertion, handling and maintenance

Supplemental strategies for consideration:

- 2% Chlorhexidine bathing
- Antimicrobial/Antiseptic-impregnated catheters
- Chlorhexidine-impregnated dressings

JOHNS HOPKINS QUALITY AND SAFETY RESEARCH GROUP (QSRG)

ON THE CUSP: STOP BSI

CENTRAL LINE-ASSOCIATED BLOOD STREAM INFECTION TOOLKIT

How to Use This Toolkit

The purpose of this toolkit is to support your efforts to implement evidence-based practices and eliminate Central Line Associated Blood Stream Infections (CLABSIs) in your clinical area. The strategies in this toolkit have nearly eliminated CLABSIs in participating Michigan ICUs (Appendix A). These strategies have been adopted by over 100 ICUs in large and small, academic and community hospitals that we have worked with to date. Most of these ICUs have demonstrated a significant reduction in their CLABSI rates and many have not had a CLABSI in >6 months.

Nevertheless, your leadership is needed to achieve these results in your clinical area. Most of your efforts will be working with staff that insert and assist with the insertion of central lines. We developed a model to help disseminate this, and other, interventions. This model includes 4 stages that answer the following questions:

1. **Engage**: How will this make the world a better place?
2. **Educate**: How will we do this?
3. **Execute**: What do I need to do?
4. **Evaluate**: How will we know we made a difference?

This toolkit provides details of what you should do in each of these stages. In the appendices, we provide all the tools you will need to eliminate CLABSIs in your clinical area; the rest is up to you.

‘BUNDLE’ GAVECELT PER LA PREVENZIONE DELLE INFEZIONI ASSOCIATE A CATETERI VENOSI CENTRALI NON TUNNELLIZZATI A BREVE E MEDIO TERMINE

GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

- Igiene delle mani e Massime precauzioni di barriera durante l’impianto del catetere venoso
- Scelta appropriata del sito di inserzione (in ordine di preferenza: metà braccio, zona sottoclaveare, zona sopraclaveare, collo, inguine)
- Impianto ecoguidato, ovunque possibile, sia per i cateteri a inserzione centrale che per i cateteri a inserzione periferica
- Utilizzo di clorexidina al 2% per la disinfezione cutanea prima dell’inserzione nonché per la disinfezione continua o discontinua dell’exit site
- Impiego di “sutureless devices” per il fissaggio del catetere
- Impiego di medicazioni semipermeabili trasparenti, ovunque possibile
- Rimozione immediata del catetere venoso centrale non più indispensabile

Targeting zero CLABSI in patients with PICC lines: a case-control study

G. Scoppettuolo§, L. Dolcetti§, C. Taraschi§, C. Chiarini§, C. Donato§, S. Lardo§, A. La Greca*, M. Pittiruti*
§ Clinic of Infectious Diseases, * Dpt. of Surgey, Catholic University, Rome

AVA 2011

Pittiruti et al. Critical Care 2012, 16:R21
http://ccforum.com/content/16/1/R21

CRITICAL CARE

RESEARCH Open Access

Clinical experience with power-injectable PICCs in intensive care patients

Mauro Pittiruti[1*], Alberto Brutti[2], Davide Celentano[2], Massimiliano Pomponi[2], Daniele G Biasucci[2], Maria Giuseppina Annetta[2] and Giancarlo Scoppettuolo[3]

See related Letter by Zampieri,

http://ccforum.com/content/16/2/425

Abstract

Introduction: In the ICU, peripherally inserted central catheters (PICCs) may be an alternative option to standard central venous catheters, particularly in patients with coagulation disorders or at high risk for infection. Some limits of PICCs (such as low flow rates) may be overcome with the use of power-injectable catheters.

Methods: We retrospectively reviewed all of the power-injectable PICCs inserted in adult and pediatric patients in the ICU during a 12-month period, focusing on the rate of complications at insertion and during maintenance.

Results: We collected 89 power-injectable PICCs (in adults and in children), both multiple and single lumen. All insertions were successful. There were no major complications at insertion and no episodes of catheter-related bloodstream infection. Non-infective complications during management were not clinically significant. There was one episode of symptomatic thrombosis during the stay in the ICU and one episode after transfer of a patient to a non-intensive ward.

Conclusion: Power-injectable PICCs have many advantages in the ICU: they can be used as multipurpose central lines for any type of infusion including high-flow infusion, for hemodynamic monitoring, and for high-pressure injection of contrast media during radiological procedures. Their insertion is successful in 100% of cases and is not associated with significant risks, even in patients with coagulation disorders. Their maintenance is associated with an extremely low rate of infective and non-infective complications.

Targeting zero catheter-related bloodstream infections in pediatric intensive care unit: a retrospective matched case-control study.

Biasucci DG[1], Pittiruti M[2], Taddei A[3], Picconi E[1], Pizza A[1], Celentano D[1], Piastra M[1], Scoppettuolo G[4], Conti G[1].

Author information

Abstract

INTRODUCTION: The aim of this study was to evaluate the effectiveness and safety of a new three-component 'bundle' for insertion and management of centrally inserted central catheters (CICCs), designed to minimize catheter-related bloodstream infections (CRBSIs) in critically ill children.

METHODS: Our 'bundle' has three components: insertion, management, and education. Insertion and management recommendations include: skin antisepsis with 2% chlorhexidine; maximal barrier precautions; ultrasound-guided venipuncture; tunneling of the catheter when a long indwelling time is expected; glue on the exit site; sutureless securement; use of transparent dressing; chlorhexidine sponge dressing on the 7th day; neutral displacement needle-free connectors. All CICCs were inserted by appropriately trained physicians proficient in a standardized simulation training program.

RESULTS: We compared CRBSI rate per 1000 catheters-days of CICCs inserted before adoption of our new bundle with that of CICCs inserted after implementation of the bundle. CICCs inserted after adoption of the bundle remained in place for a mean of 2.2 days longer than those inserted before. We found a drop in CRBSI rate to 10%, from 15 per 1000 catheters-days to 1.5.

CONCLUSIONS: Our data suggest that a bundle aimed at minimizing CR-BSI in critically ill children should incorporate four practices: (1) ultrasound guidance, which minimizes contamination by reducing the number of attempts and possible break-down of aseptic technique; (2) tunneling the catheter to obtain exit site in the infra-clavicular area with reduced bacterial colonization; (3) glue, which seals and protects the exit site; (4) simulation-based education of the staff.

Vascular Access Team

Antimicrobial Stewardship & Healthcare Epidemiology

The effectiveness of a dedicated central venous access care team to prevent catheter-related bloodstream infections

Published online by Cambridge University Press: **16 May 2022**

Fortune Charles Fil de Lara, Maria Jesusa Mano, Karl Evans Henson, Jia An Bello and Cybele Lara Abad

Article | Metrics

Save PDF | Share | Cite

Abstract

Background: Catheter-related bloodstream infection (CRBSI) rates remain high despite the use of an insertion bundle. We hypothesized that line care and maintenance by a dedicated team would help decrease CRBSI rates. This study was conducted in The Medical City (TMC), is a 526-bed, private, tertiary-care center in Pasig City, Philippines. **Methods:** All adult hospitalized patients from October 1, 2020, to October 31, 2021, with a newly inserted temporary central venous catheter (CVC) were eligible for inclusion. CRBSI rates before the intervention (October 2019 to March 2020) and after the intervention (April to October 2021) were compared. The intervention arm consisted of a dedicated central venous access team (CVAT) who provided

Article contents

Vascular Access Team Policlinico Gemelli

- Multiprofessionale
  - Vascular Access Team Infermieristico (1 Coordinatrice, 5 Infermieri bedside, 6 Infermieri DH)
  - Centro Interdipartimentale Accessi Venosi Centrali (5 Medici)
- Multidisciplinare
  - Infermieri di varie aree (Oncologia, Pediatria, Ginecologia Oncologica, Radioterapia, Ematologia, Malattie Infettive, Urologia, Neurochirurgia)
  - Medici di varie discipline (2 Chirurghi, 1 Anestesista Rianimatore, 1 Infettivologo, 1 Angiologo)
- Setting
  - Tutti i Reparti del Policlinico, ad eccezione delle Terapie Intensive e della Dialisi (ma collaborazione continuativa con il Nefrologo responsabile della Emodialisi per inpatients)
  - Consulenze per scelta accesso venoso, impianto, gestione, gestione delle complicanze

Skills Infermieri Vascular Access Team

COMPETENZE SPECIFICHE	MINIMIDLINE	MIDLINE	PICC	CICC/FICC/PORT/PICC PORT
	GRUPPO A	GRUPPO B	GRUPPO C	GRUPPO D
	21 OPERATORI	16 OPERATORI	15 OPERATORI	6 OPERATORI
Indicazione appropriata al dispositivo	X	X	X	x
Tecnica asettica appropriata	X	X	X	x
Tecnica di anestesia locale	**X**	**X**	**X**	x
puntura ecoguidata vene braccio	**X**	**X**	**X**	X
puntura ecoguidata vene centrali				X
puntura ecoguidata all'inguine				X
tecnica di tunnellizzazione			X	X
tip location con ECG intracavitario			X	X
tip location con bubble test ed ecocardiogramma trans toracico				X
confezione della tasca				X
sutura intradermica				X
uso del cianoacrilato	X	X	X	x
tecniche di fissaggio e medicazione	X	X	X	x

CATHETER STEWARDSHIP

- RIGHT CATHETER
- RIGHT PATIENT
- RIGHT TIME

INFECTION PREVENTION

PROACTIVE VASCULAR ACCESS PLANNING

Reprinted from JOURNAL OF INFUSION NURSING
Vol. 28 No. 3S May/June 2005

Printed in U.S.A.

Kathy Kokotis, RN, BS, MBA

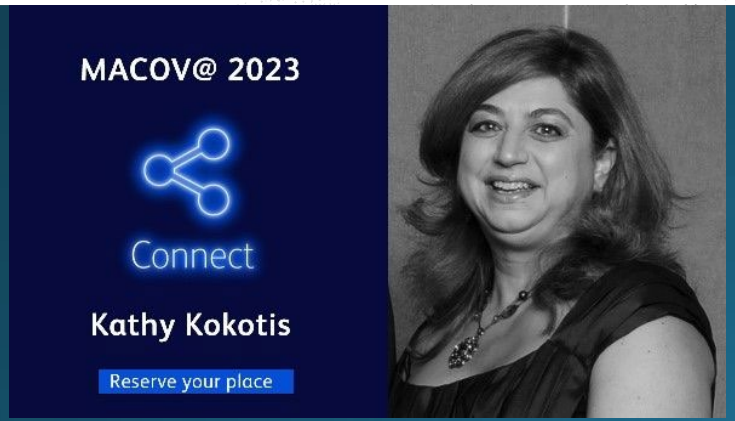
Cost Containment and Infusion Services

Abstract

The implementation of the Medicare Prospective Payment System (MPPS) has placed pressure on healthcare organizations to decrease patient length of stay without adversely affecting outcomes. This article discusses the impact of the MPPS on clinicians who provide infusion therapy, and examines methods for containing costs related to infusion care such as advanced planning and accurate vascular access device selection.

The overall makeup of the healthcare system transitioned after the implementation of the Medicare Prospective Payment System in the 1990s. "Revenue production on a hospital inpatient" became a passé label, and "revenue saving on the DRG [diagnosis-related group]" took its place. The new aim is to decrease hospital length of stay (LOS) without altering patient outcome. What impact does this change have on the skilled infusion professional?

A hospital administrator may envision an infusion team as disposable because it is assumed that any nurse can insert a conventional peripheral catheter. But is it true that all nurses will insert a catheter with the same level of skill? A Press Ganey survey of almost 1.8 million patients in more than 1,000 hospitals shows that this is not true.[1] In fact, 58% of patients are dissatisfied with the venipuncture skill level of their nurse, and 52% are not satisfied with the courtesy of the nurse inserting the catheter.[1] Barton et al[2] and Danek and Kilroy[3] from the University of Florida indicate that a clinician requires 2.18 attempts to achieve a successful catheter insertion. Therefore, it appears that



- Cost reduction with Vascular Access Planning
- Cost reduction with increased proficiency in venipuncture
- Using high-tech tools to improve Picc insertion performance
- Revenue saved by reducing Catheter Related Bloodstream Infections
- Salvage of an occluded catheter

Gemelli

Fondazione Policlinico Universitario Agostino Gemelli IRCCS
Università Cattolica del Sacro Cuore

LINEE GUIDA PARTE PRIMA: RACCOMANDAZIONI PER LA SCELTA CORRETTA DELL'ACCESSO VENOSO	Rev.: 1 LG.029

LINEE GUIDA

Parte prima: Raccomandazioni per la scelta corretta dell'accesso venoso

LG.029

	NOME	FUNZIONE	DATA	FIRMA
Redatto da:	Gruppo di Lavoro			
Verificato da:	Giuseppe Vetrugno	Responsabile Risk Management		
	Maurizio Zega	Responsabile SITRA		
	Alberto Fiore	Responsabile Qualità e Accreditamento		
	Patrizia Laurenti	Responsabile Igiene Ospedaliera	10/3/2021	
	Maria Elena D'Alfonso	Direttore Presidio Gemelli	8/3/21	
	CIO			
Approvato da:	Andrea Cambieri	Direttore Sanitario	8/3/21	
	Rocco Bellantone	Direttore Governo Clinico		

Livello organizzativo di applicazione:

- ☒ **Aziendale**
- ☐ **Dipartimento**
- ☐ **Unità Operativa**

STATO DELLE REVISIONI

Rev. N.	PARAGRAFI REVISIONATI	DESCRIZIONE REVISIONE	DATA
0		Prima Stesura	14/09/2014
1	Intera procedura e allegati	Revisione in coerenza con evidenze scientifiche aggiornate e nuovi processi organizzativi definiti	15/02/2021

Gemelli

Fondazione Policlinico Universitario Agostino Gemelli IRCCS
Università Cattolica del Sacro Cuore

LINEE GUIDA PARTE SECONDA: RACCOMANDAZIONI PER IL CORRETTO IMPIANTO DELL'ACCESSO VENOSO	Rev.: 1 LG.030

LINEE GUIDA

Parte seconda: Raccomandazioni per il corretto impianto dell'accesso venoso

LG.030

	NOME	FUNZIONE	DATA	FIRMA
Redatto da:	Gruppo di Lavoro			
Verificato da:	Giuseppe Vetrugno	Responsabile Risk Management		
	Maurizio Zega	Responsabile SITRA		
	Alberto Fiore	Responsabile Qualità e Accreditamento		
	Patrizia Laurenti	Direttore Igiene Ospedaliera	10/3/2021	
	Maria Elena D'Alfonso	Direttore Presidio Gemelli	8/3/21	
	CIO			
Approvato da:	Andrea Cambieri	Direttore Sanitario	8/3/21	
	Rocco Bellantone	Direttore Governo Clinico		

Livello organizzativo di applicazione:

- ☒ **Aziendale**
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- ☐ **Unità Operativa**

STATO DELLE REVISIONI

Rev. N.	PARAGRAFI REVISIONATI	DESCRIZIONE REVISIONE	DATA
0		Prima Stesura	14/09/2014
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LINEE GUIDA PARTE TERZA: RACCOMANDAZIONI PER LA GESTIONE CORRETTA DELL'ACCESSO VENOSO	Rev.: 1 LG.031

LINEE GUIDA

Parte terza: Raccomandazioni per la gestione corretta dell'accesso venoso

LG.031

	NOME	FUNZIONE	DATA	FIRMA
Redatto da:	Gruppo di Lavoro			
Verificato da:	Giuseppe Vetrugno	Responsabile Risk Management		
	Maurizio Zega	Responsabile SITRA		
	Alberto Fiore	Responsabile Qualità e Accreditamento		
	Patrizia Laurenti	Direttore Igiene Ospedaliera	10/3/21	
	Maria Elena D'Alfonso	Direttore Presidio Gemelli	8/3/21	
	CIO			
Approvato da:	Andrea Cambieri	Direttore Sanitario	8/3/21	
	Rocco Bellantone	Direttore Governo Clinico		

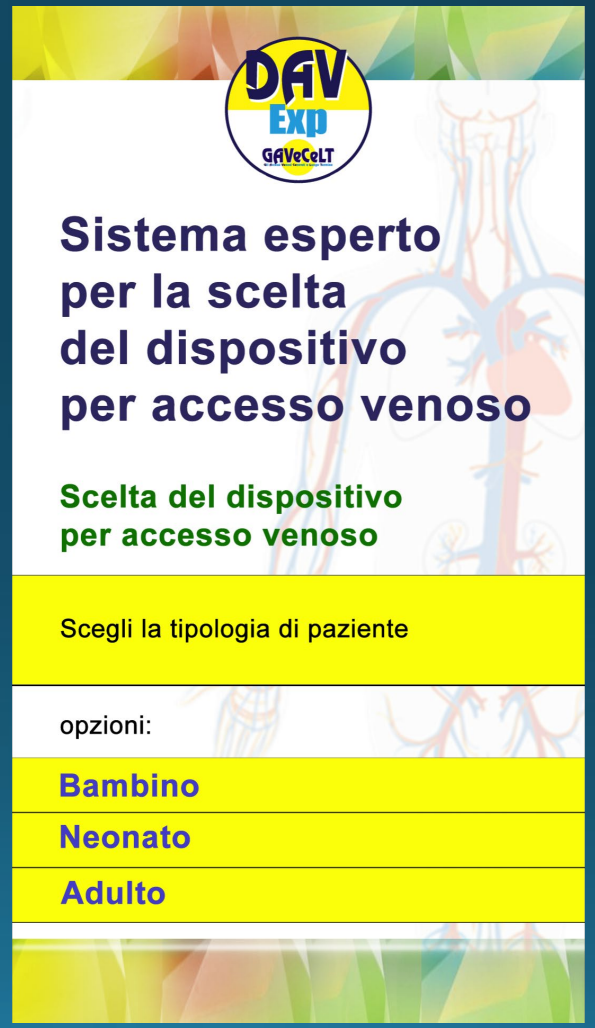
Livello organizzativo di applicazione:

- ☒ **Aziendale**
- ☐ **Dipartimento**
- ☐ **Unità Operativa**

STATO DELLE REVISIONI

Rev. N.	PARAGRAFI REVISIONATI	DESCRIZIONE REVISIONE	DATA
0		Prima Stesura	14/09/2014
1	Intera procedura	Revisione in coerenza con evidenze scientifiche aggiornate e nuovi processi organizzativi definiti	15/02/2021

Un algoritmo GAVeCeLT 2018



Adulto - Emergenza

Non DIVA → cannula periferica corta 'standard'

DIVA

- accesso periferico ecoguidato → Cannula periferica corta Mini-midline
- accesso centrale ecoguidato → CICC non tunnellizzato FICC non tunnellizzato

GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

Adulto- Elezione
Uso intraospedaliero

Sufficiente accesso periferico

- **< 48 ore**
  - Non-DIVA → cannula periferica corta 'standard'
  - DIVA → accesso periferico ecoguidato (mini-midline)
- **2-7 giorni**
  - Non-DIVA → cannula periferica corta a lunga permanenza
  - DIVA → accesso periferico ecoguidato (mini-midline)
- **>7 giorni**
  - accesso periferico ecoguidato (mini-midline)

Necessità accesso centrale

- Vene braccio disponibili (zona verde) → PICC non tunnellizzato
- Vene braccio disponibili (zona gialla) → PICC tunnellizzato
- Vene braccio indisponibili
  - Vena ascellare agibile → CICC sottoclaveare
  - Vena ascellare inagibile → CICC sopraclaveare, tunnellizzato o no
- Ostruzione vena cava superiore → FICC tunnellizzato

Adulto- Elezione
Uso extraospedaliero

<4-6 mesi

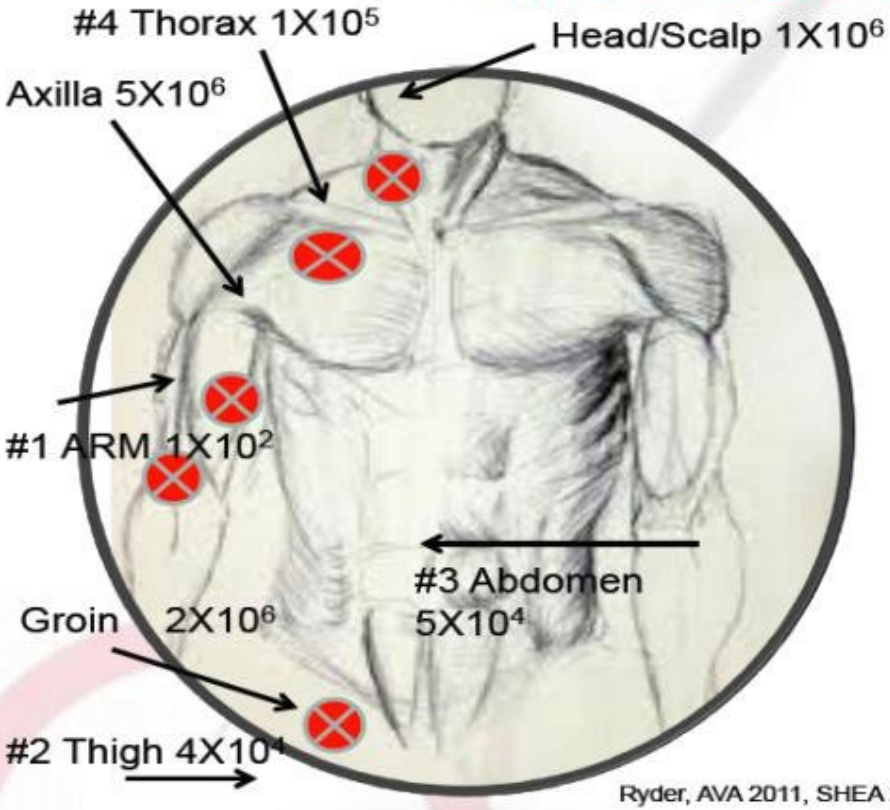
- Sufficiente accesso periferico → < 3-4 sett.: mini-midline; > 3-4 sett.: midline
- Necessità accesso centrale
  - Vene braccio disponibili : PICC non cuffiato, tunnellizzato o no
  - Vene braccio indisponibili: CICC non cuffiato, tunnellizzato
  - Ostruzione vena cava sup.: FICC non cuffiato, tunnellizzato

>4-6 mesi

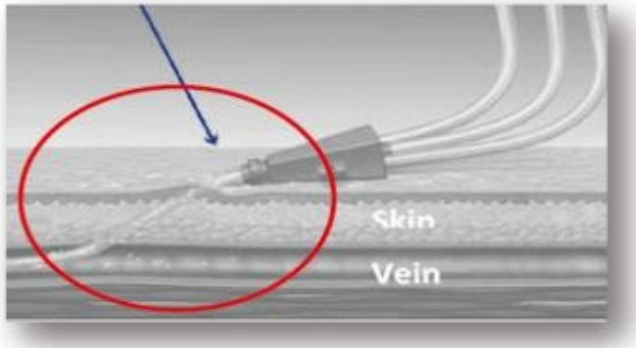
- Uso frequente
  - Vene braccio disponibili : PICC cuffiato opp. tunnellizzato con SAS
  - Vene braccio indisponibili: CICC cuffiato opp. tunnellizzato con SAS
- Uso infrequente
  - Vene braccio disponibili : PICC- port
  - Vene braccio indisponibili: port toracico
  - Ostruzione vena cava sup.: port femorale oppure FICC cuffiato opp. tunnellizzato con SAS

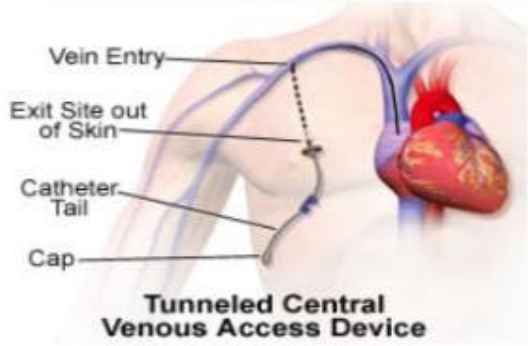
GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

Exit Site Options



Ryder, AVA 2011, SHEA 2011





Tunneled Central Venous Access Device

2011

Protocollo PIDAV

GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

1. CORRETTA INDICAZIONE - Verifica dell'indicazione all'accesso venoso, scelta del dispositivo più appropriato (periferico vs. centrale) e sua rimozione appena non è più indispensabile.

2. CORRETTA ASEPSI - Igiene delle mani con gel idroalcolico, prima dell'impianto e prima e dopo ogni manovra di gestione; massime precauzioni di barriera durante l'inserzione di dispositivi per accesso centrale o accesso periferico di lunga durata; antisepsi cutanea con clorexidina 2% in alcool - in applicatori monodose sterili - prima dell'impianto e al momento del cambio della medicazione.

3. SCELTA CORRETTA DEL SITO DI EMERGENZA – Per gli accessi periferici, evitare le zone di flessione; per gli accessi centrali, preferire (nell'ordine) il terzo medio del braccio, la zona sottoclaveare e la zona sopraclaveare; evitare il sito di emergenza al collo o all'inguine (tranne che in urgenza); tunnellizzare un dispositivo per accesso venoso centrale se ciò è necessario per ottimizzare il sito di emergenza.

4. TECNICA CORRETTA DI IMPIANTO - Utilizzare sempre l'impianto ecoguidato per il posizionamento dei dispositivi centrali e dei dispositivi periferici di lunga durata.

Protocollo PIDAV

GAVeCeLT
Gli Accessi Venosi Centrali a Lungo Termine

5. FISSAGGIO APPROPRIATO: evitare sempre punti di sutura e cerotti; stabilizzare invece il dispositivo con un sistema *sutureless* appropriato (integrato nella medicazione o ad adesività cutanea o ad ancoraggio sottocutaneo).

6. PROTEZIONE DEL SITO DI EMERGENZA - Utilizzare membrane trasparenti semipermeabili ad alta traspirabilità, associate a feltrini a rilascio di clorexidina o a sigillo del sito di emergenza con colla al cianoacrilato.

7. PROTEGGERE LA LINEA INFUSIONALE: - Disinfettare le porte di accesso strofinando con soluzioni alcoliche alla clorexidina 2% oppure applicando *port protectors* (cappucci disinfettanti) sopra ai connettori senz'ago; lavare e chiudere il sistema soltanto con soluzione fisiologica, usando siringhe preriempite.

8. FACILITARE L'ADOZIONE DEL BUNDLE - Utilizzare carrelli dedicati, kit omnicomprensivi e *checklist*, sia per l'impianto che per la gestione.

CHECKLIST IMPIANTO

Bundle per l'inserzione del catetere venoso centrale

Data 20/11/2023 15:41

Percentuale di compliance al bundle

Prima della procedura

Il paziente è stato identificato?	☐ Sì	☐ No	☐ N/A
È stata verificata la corretta indicazione all'accesso venoso centrale e l'assenza di eventuali controindicazioni (allergie, rischio infettivo, stato coagulativo)?	☐ Sì	☐ No	☐ N/A
Il paziente è stato informato sull'indicazione e le complicanze (sottoscrizione consenso informato)?	☐ Sì	☐ No	☐ N/A
È stata verificata la presenza di tutto il materiale necessario per la procedura?	☐ Sì	☐ No	☐ N/A
È stato effettuato lo studio ecografico pre-procedurale delle vene del paziente e contrassegnato il sito di inserzione?	☐ Sì	☐ No	☐ N/A
Il paziente è stato posizionato correttamente?	☐ Sì	☐ No	☐ N/A
È stata eseguita l'igiene delle mani secondo protocollo?	☐ Sì	☐ No	☐ N/A
È stata eseguita antisepsi cutanea con clorexidina 2% in alcool isopropilico al 70% o, in caso di nota intolleranza alla clorexidina, con iodopovidone 10%?	☐ Sì	☐ No	☐ N/A
Sono state messe in atto le massime precauzioni di barriera (mascherina non sterile, cuffia non sterile, guanti sterili, camice sterile, telo sterile "full body", coprisonda sterile)?	☐ Sì	☐ No	☐ N/A

Durante la procedura

L'utilizzo di anestesia locale e/o sedazione è appropriato secondo indicazione?	☐ Sì	☐ No	☐ N/A
La venipuntura è ecoguidata?	☐ Sì	☐ No	☐ N/A
È stata confermata ecograficamente la corretta posizione intravenosa della guida e della sua direzione?	☐ Sì	☐ No	☐ N/A
È stato verificato il posizionamento intravascolare del catetere mediante aspirazione di sangue e lavaggio con soluzione fisiologica?	☐ Sì	☐ No	☐ N/A
È stato eseguito il controllo intra-procedurale della posizione della punta del catetere mediante ECG intracavitario e/o ecocardiogramma?	☐ Sì	☐ No	☐ N/A
È stato eseguito il flush e lock del catetere?	☐ Sì	☐ No	☐ N/A
È stato chiuso il catetere con needlefree connector e applicato il port protector?	☐ Sì	☐ No	☐ N/A
È stato eseguito il fissaggio con sistema sutureless?	☐ Sì	☐ No	☐ N/A
È stata utilizzata la colla istoacrilica per sigillare il sito di emergenza e per la eventuale chiusura di brecce cutanee?	☐ Sì	☐ No	☐ N/A
È stata coperta con medicazione adesiva semipermeabile trasparente e indicata la data?	☐ Sì	☐ No	☐ N/A
Confermato il mantenimento del campo sterile per tutta la durata della procedura?	☐ Sì	☐ No	☐ N/A

Note

CHECKLIST GESTIONE (MEDICAZIONE E LINEA INFUSIONALE)

Procedura di medicazione			
Sono stati utilizzati guanti puliti non sterili?	☐ Sì	☐ No	☐ N/A
È stata eseguita palpazione del sito di emergenza per verificare eventuale dolenzia?	☐ Sì	☐ No	☐ N/A
È stata rimossa la membrana trasparente e il feltrino a rilascio di clorexidina (se presente)?	☐ Sì	☐ No	☐ N/A
È stato ispezionato visivamente il sito di emergenza?	☐ Sì	☐ No	☐ N/A
È stato rimosso il sistema sutureless ad adesività cutanea (se non è presente un sistema ad ancoraggio sottocutaneo)?	☐ Sì	☐ No	☐ N/A
È stata eseguita antisepsi cutanea con clorexidina 2% in alcool isopropilico al 70% o, in caso di nota intolleranza alla clorexidina, con iodopovidone 10%?	☐ Sì	☐ No	☐ N/A
È stato aperto il materiale necessario per la nuova medicazione?	☐ Sì	☐ No	☐ N/A
Sono stati utilizzati guanti sterili, dopo nuova igiene delle mani secondo protocollo?	☐ Sì	☐ No	☐ N/A
È stata applicata nuova medicazione: feltrino a rilascio di clorexidina (se indicato), sistema sutureless ad adesività cutanea (se non è presente un sistema ad ancoraggio sottocutaneo), e membrana adesiva trasparente semipermeabile (con apposizione della data)	☐ Sì	☐ No	☐ N/A
Confermato il mantenimento del campo sterile per tutta la durata della procedura?	☐ Sì	☐ No	☐ N/A
Procedura di lavaggio			
Sono stati utilizzati guanti puliti non sterili?	☐ Sì	☐ No	☐ N/A
È stato effettuato il clampaggio della linea infusionale e la rimozione del needlefree connector	☐ Sì	☐ No	☐ N/A
È stata eseguita la disinfezione del cono di connessione?	☐ Sì	☐ No	☐ N/A
È stata effettuata applicazione di nuovo needlefree connector e declampaggio della linea infusionale	☐ Sì	☐ No	☐ N/A
È stato effettuato il lavaggio pulsante con 10ml di soluzione fisiologica	☐ Sì	☐ No	☐ N/A
È stato applicato il port protector?	☐ Sì	☐ No	☐ N/A

VASCULAR ACCESS TEAM ED EMODIALISI

CDC Approach to BSI Prevention in Dialysis Facilities

(i.e., the Core Interventions for Dialysis Bloodstream Infection (BSI) Prevention)

1. Surveillance and feedback using NHSN
Conduct monthly surveillance for BSIs and other dialysis events using CDC's National Healthcare Safety Network (NHSN). Calculate facility rates and compare to rates in other NHSN facilities. Actively share results with front-line clinical staff.

2. Hand hygiene observations
Perform observations of hand hygiene opportunities monthly and share results with clinical staff.

3. Catheter/vascular access care observations
Perform observations of vascular access care and catheter accessing quarterly. Assess staff adherence to aseptic technique when connecting and disconnecting catheters and during dressing changes. Share results with clinical staff.

4. Staff education and competency
Train staff on infection control topics, including access care and aseptic technique. Perform competency evaluation for skills such as catheter care and accessing every 6-12 months and upon hire.

5. Patient education/engagement
Provide standardized education to all patients on infection prevention topics including vascular access care, hand hygiene, risks related to catheter use, recognizing signs of infection, and instructions for access management when away from the dialysis unit.

6. Catheter reduction
Incorporate efforts (e.g., through patient education, vascular access coordinator) to reduce catheters by identifying and addressing barriers to permanent vascular access placement and catheter removal.

7. Chlorhexidine for skin antisepsis
Use an alcohol-based chlorhexidine (>0.5%) solution as the first line skin antiseptic agent for central line insertion and during dressing changes.*

8. Catheter hub disinfection
Scrub catheter hubs with an appropriate antiseptic after cap is removed and before accessing. Perform every time catheter is accessed or disconnected.**

9. Antimicrobial ointment
Apply antibiotic ointment or povidone-iodine ointment to catheter exit sites during dressing change.***

* Povidone-iodine (preferably with alcohol) or 70% alcohol are alternatives for patients with chlorhexidine intolerance.

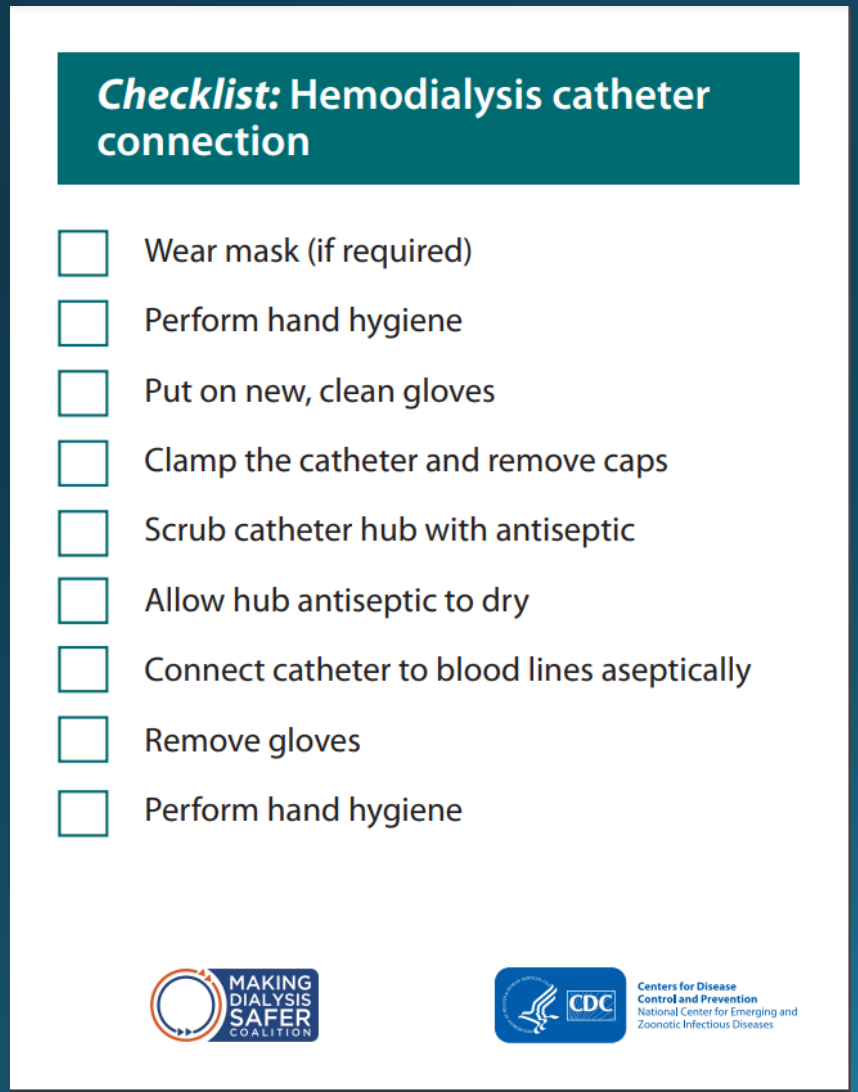
** If closed needleless connector device is used, disinfect device per manufacturer's instructions.

*** See information on selecting an antimicrobial ointment for hemodialysis catheter exit sites on CDC's Dialysis Safety website (http://www.cdc.gov/dialysis/prevention-tools/core-interventions.html#sites). Use of chlorhexidine-impregnated sponge dressing might be an alternative.

For more information about the Core Interventions for Dialysis Bloodstream Infection (BSI) Prevention, please visit http://www.cdc.gov/dialysis

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

Catheter connection and disconnection checklists

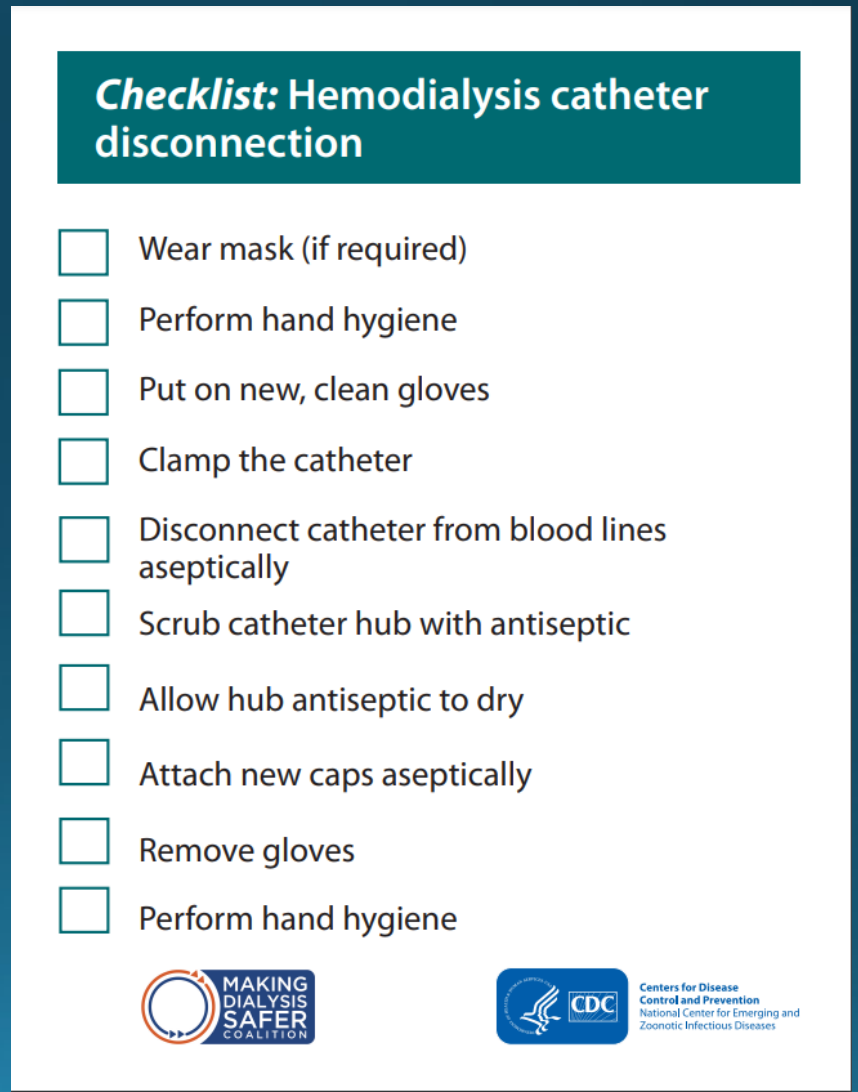


Checklist: Hemodialysis catheter connection

- [ ] Wear mask (if required)
- [ ] Perform hand hygiene
- [ ] Put on new, clean gloves
- [ ] Clamp the catheter and remove caps
- [ ] Scrub catheter hub with antiseptic
- [ ] Allow hub antiseptic to dry
- [ ] Connect catheter to blood lines aseptically
- [ ] Remove gloves
- [ ] Perform hand hygiene

MAKING DIALYSIS SAFER COALITION

CDC Centers for Disease Control and Prevention National Center for Emerging and Zoonotic Infectious Diseases



Checklist: Hemodialysis catheter disconnection

- [ ] Wear mask (if required)
- [ ] Perform hand hygiene
- [ ] Put on new, clean gloves
- [ ] Clamp the catheter
- [ ] Disconnect catheter from blood lines aseptically
- [ ] Scrub catheter hub with antiseptic
- [ ] Allow hub antiseptic to dry
- [ ] Attach new caps aseptically
- [ ] Remove gloves
- [ ] Perform hand hygiene

MAKING DIALYSIS SAFER COALITION

CDC Centers for Disease Control and Prevention National Center for Emerging and Zoonotic Infectious Diseases

Hemodialysis Central Venous Catheter Scrub-the-Hub Protocol

This protocol outlines a suggested approach to preparing catheter hubs prior to accessing the catheter for hemodialysis. It is based on evidence where available and incorporates theoretical rationale when published evidence is unavailable.

Definitions:

Catheter refers to a central venous catheter (CVC) or a central line

Hub refers to the end of the CVC that connects to the blood lines or cap

Cap refers to a device that screws on to and occludes the hub

Limb refers to the catheter portion that extends from the patient's body to the hub

Blood lines refer to the arterial and venous ends of the extracorporeal circuit that connect the patient's catheter to the dialyzer

Catheter Connection and Disconnection Steps:

Connection Steps

1. Perform hand hygiene and don new clean gloves.
2. Clamp the catheter (*Note:* **Always** clamp the catheter before removing the cap. Never leave an uncapped catheter unattended).
3. Disinfect the hub with caps removed using an appropriate antiseptic (*see notes*).
   a. (*Optional*) Prior to cap removal, disinfect the caps and the part of the hub that is accessible and discard the antiseptic pad (i.e., use a separate antiseptic pad for the next step).
   b. Remove the caps and disinfect the hub with a new antiseptic pad for each hub. Scrub the sides (threads) and end of the hub thoroughly with friction, making sure to remove any residue (e.g., blood).
   c. Using the same antiseptic pad, apply antiseptic with friction to the catheter, moving from the hub at least several centimeters towards the body. Hold the limb while allowing the antiseptic to dry.
   d. Use a separate antiseptic pad for each hub/catheter limb. Leave hubs "open" (i.e., uncapped and disconnected) for the shortest time possible.
4. Always handle the catheter hubs aseptically. Once disinfected, do not allow the catheter hubs to touch nonsterile surfaces.
5. Attach sterile syringe, unclamp the catheter, withdraw blood, and flush per facility protocol.
6. Repeat for other limb (this might occur in parallel).
7. Connect the ends of the blood lines to the catheter aseptically.
8. Remove gloves and perform hand hygiene.

Disconnection Steps:

1. Perform hand hygiene and don new clean gloves.
2. Clamp the catheter (*Note:* **Always** clamp the catheter before disconnecting. Never leave an uncapped catheter unattended).
3. Disinfect the catheter hub before applying the new cap using an appropriate antiseptic (*see notes*).
   a. (*Optional*) Disinfect the connection prior to disconnection. If this is done, use a separate antiseptic pad for the subsequent disinfection of the hub.
   b. Disconnect the blood line from the catheter and disinfect the hub with a new antiseptic pad. Scrub the sides (threads) and end of the hub thoroughly with friction, making sure to remove any residue (e.g., blood).
   c. Use a separate antiseptic pad for each hub. Leave hubs "open" (i.e., uncapped and disconnected) for the shortest time possible.
4. Always handle the catheter hubs aseptically. Once disinfected, do not allow the catheter hubs to touch nonsterile surfaces. Hold the catheter until the antiseptic has dried.
5. Attach the new sterile caps to the catheter aseptically. Use caution if tape is used to secure caps to the catheter (*see notes*).
6. Ensure that catheter is still clamped.
7. Remove gloves and perform hand hygiene.

MAKING DIALYSIS SAFER COALITION

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

CDC

Notes/Discussion:

Antiseptic Use and Selection

As described in the 2011 CDC/Healthcare Infection Control Practices Advisory Committee (HICPAC) Guidelines for the Prevention of Intravascular Catheter-Related Infections, prior to accessing the catheter hub it should be disinfected with an appropriate antiseptic (greater than 0.5% chlorhexidine with alcohol, 70% alcohol, or 10% povidone-iodine). There is not enough evidence to recommend one antiseptic over the others. Generally, antiseptics should be allowed to dry for maximal effect.

If using 70% alcohol, sterile antiseptic pads should be used (sterile pads are labeled sterile and packaging for nonsterile pads often does not state whether the pads are sterile or nonsterile). For practical reasons, pads or similar products might be preferred over other forms of antiseptics (e.g., swabsticks) for disinfecting the catheter as they are malleable and allow for vigorous cleaning of small spaces.

If using an antiseptic that leaves a residue (e.g., chlorhexidine), avoid allowing large amounts of antiseptic to enter the lumen of the catheter to avoid potential toxicities to the patient.

If using chlorhexidine, removing all blood residue is particularly important to maximize the effect of the antiseptic.

Soaking Caps

The role of soaking caps in an antiseptic prior to removing them is not clear. It is not a CDC/HICPAC recommendation. This procedure is described in the 2000 National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI) Vascular Access Guidelines but was not included in the 2006 update.

Handling Catheter Hubs

Catheter hubs should always be handled aseptically. Once disinfected, the catheter hubs should not be allowed to touch nonsterile surfaces. This might be best performed by holding them until the antiseptic dries. During this time, the staff member performing the procedure should also ensure that the catheter remains clamped.

When disinfecting catheter hubs, clean, nonsterile gloves can be used if aseptic technique is maintained.

Bloodline Disinfection

When accessing the line, disinfecting the ends of the sterile blood lines is not required if care has been taken not to contaminate the ends of the blood lines (i.e., through careful aseptic technique). Blood lines can become contaminated during connections and disconnections, as well as during the priming process. Contact with contaminated prime waste in prime buckets that have not been properly cleaned and disinfected or through backflow from waste handling ports must be avoided. Disinfecting the bloodlines does not address this issue.

Disconnection and Line Reversals

Catheter hubs should be disinfected again after disconnecting from bloodlines and before replacing a new cap at the end of a treatment. This should be done in a manner similar to that used when disinfecting the hub prior to accessing. Disinfecting the catheter hub and the end of the extracorporeal blood line should also be performed if, during a treatment, a patient must be disconnected and their blood is re-circulated. Anytime a patient's circuit is disconnected this should be done aseptically and the number of times a patient's catheter is disconnected from the blood lines should be minimized to the extent possible.

Securing Caps with Tape

Caution should be used if taping caps on to hubs between treatments. Tape can leave residue on the hubs that might make disinfecting them more difficult.

Use of Masks

Although data supporting the use of masks during catheter accessing/deaccessing to prevent vascular access infections is lacking, this practice is recommended for patients and staff in the 2000 KDOQI guidelines and is included in the Centers for Medicare and Medicaid Services (CMS) End Stage Renal Disease Program Conditions for Coverage Interpretive Guidance.

Personal Protective Equipment (PPE)

Proper PPE should always be worn by staff to avoid exposure to potentially infectious blood and body fluids when connecting/disconnecting catheters.

Aseptic Technique

This includes practices that prevent the contamination of clean/sterile items and surfaces. Once tasks requiring aseptic technique have been started, care must be taken to avoid contamination of gloves and other clean/sterile items that can occur when touching dirty surfaces (e.g., positioning patient, using computer keyboard).

Selected References:

1. National Kidney Foundation. KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for 2006 Updates: Hemodialysis Adequacy, Peritoneal Dialysis Adequacy and Vascular Access. *Am J Kidney Dis* 2006; 48 (suppl 1):S1-S322.
2. National Kidney Foundation. KDOQI Clinical Practice Guidelines for Hemodialysis Adequacy, 2000. *Am J Kidney Dis* 2001; 37 (suppl 1):S7-S64.
3. O'Grady NP, Alexander M, Burns LM, et al. Guideline for the prevention of intravascular catheter-related infections. *Clin Infect Dis* 2011; 52:e162-e193.

KEYPOINTS

- IMPIANTO ECOGUIDATO
- ANTISETTICI (CLOREXIDINA GLUCONATO 2% IN IPA 70%)
- PACK PROCEDURALI
- SISTEMI DI FISSAGGIO
- PORT PROTECTORS
- SIRINGHE PRERIEMPITE STERILI PER FLUSH E LOCK DEL CATETERE
- LOCK PROPHYLAXIS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eal-time ultrasound-guided catheterisation of the internal jugular vein: a prospective comparison with the landmark technique in critical care patients

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Critical Care, 2006

firmed by the present data. We found that the incidence of CVC-BSI in the ultrasound group of patients was significantly lower compared with that documented in the landmark group. The number of CVC-BSIs was significantly correlated to the number of needle passes in the total study population. We could speculate that repeated attempts might lead to a break-down of aseptic technique and more colonisation of skin-related pathogens [17]. The above findings may be of clinical

Table 2

Outcome measures in the ultrasound group versus the landmark group of patients

Outcome measures	Ultrasound group ($n = 450$)	Landmark group ($n = 450$)
Access time (seconds)	17.1 ± 16.5 (11.5 to 41.4)[a]	44 ± 95.4 (33.2 to 77.5)
Success rate	450 (100%)[a]	425 (94.4%)
Carotid puncture	5 (1.1%)[a]	48 (10.6%)
Haematoma	2 (0.4%)[a]	38 (8.4%)
Haemothorax	0 (0%)[a]	8 (1.7%)
Pneumothorax	0 (0%)[a]	11 (2.4%)
Average number of attempts	1.1 ± 0.6 (1.1 to 1.9)[a]	2.6 ± 2.9 (1.5 to 6.3)
CVC-BSI	47 (10.4%)[a]	72 (16%)

[a]Comparison of the outcome measures between the ultrasound group and the landmark group of patients ($p < 0.001$). Access time and average number of attempts are expressed as mean ± standard deviation (95% confidence interval). Success rate, carotid puncture, haematoma, haemothorax, pneumothorax, and CVC-BSI are expressed as the absolute number of patients and percentage of their group. CVC-BSI, central venous catheter-associated blood stream infection.

CDC 2011

7. Usare la guida ecografica per posizionare i cateteri venosi centrali (ovunque questa tecnologia sia disponibile) così da ridurre il numero di tentativi di incannulamento e le complicanze meccaniche da venipuntura. La guida ecografica dovrebbe essere utilizzata da personale pienamente addestrato nell'utilizzo di questa tecnica. [60–64]. Categoria 1B

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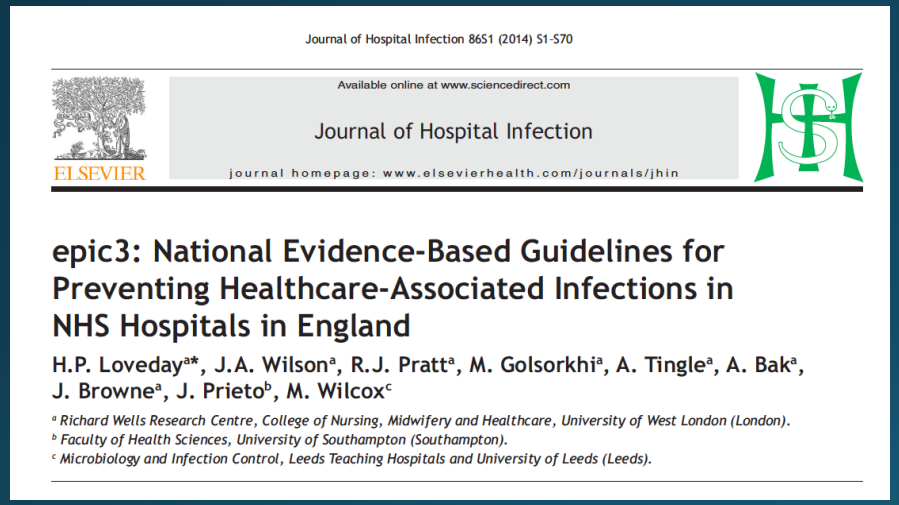

Journal of Hospital Infection 86S1 (2014) S1-S70

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Journal of Hospital Infection

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epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England

H.P. Loveday[a]*, J.A. Wilson[a], R.J. Pratt[a], M. Golsorkhi[a], A. Tingle[a], A. Bak[a], J. Browne[a], J. Prieto[b], M. Wilcox[c]

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- "… L'uso dell'ecografia può indirettamente ridurre il rischio di infezione facilitando il posizionamento del catetere venoso centrale…"

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY JULY 2014, VOL. 35, NO. 7

SHEA/IDSA PRACTICE RECOMMENDATION

Strategies to Prevent Central Line–Associated Bloodstream Infections in Acute Care Hospitals: 2014 Update

Jonas Marschall, MD;[1,2,a] Leonard A. Mermel, DO, ScM;[3,a] Mohamad Fakih, MD, MPH;[4] Lynn Hadaway, MEd, RN, BC, CRNI;[5] Alexander Kallen, MD, MPH;[6] Naomi P. O'Grady, MD;[7] Ann Marie Pettis, RN, BSN, CIC;[8] Mark E. Rupp, MD;[9] Thomas Sandora, MD, MPH;[10] Lisa L. Maragakis, MD, MPH;[11] Deborah S. Yokoe, MD, MPH[12]

5. Use ultrasound guidance for internal jugular catheter insertion (quality of evidence: II).[99]
   a. Ultrasound-guided internal jugular vein catheterization reduces the risk of CLABSI and of non-infectious complications of CVC placement.[100]

Consensus 2012

Intensive Care Med
DOI 10.1007/s00134-012-2597-x

CONFERENCE REPORTS AND EXPERT PANEL

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Susan T. Verghese

International evidence-based recommendations on ultrasound-guided vascular access

Table 6 Recommendations regarding sterility using ultrasound guidance and prevention of infectious and mechanical complications using ultrasound-guided cannulation

Domain code	Suggested definition	Level of evidence	Degree of consensus	Strength of recommendation
Sterility during ultrasound vascular procedures				
D8.S1	Sterile techniques should always be used during the placement of a vascular access device, including hand washing; sterile full body drapes; wearing of sterile gowns, gloves, caps and masks covering both the mouth and nose. Probe and cable sterility have to be maintained using sterile gel and appropriate probe and cable shields	A	Very good	Strong
Prevention of infectious and mechanical complications with ultrasound-guided cannulation				
D8.S2	Ultrasound guidance should be used in order to decrease the rate of CRBSI in adults and children	C	Very good	Strong
D8.S3–4	A multi-faceted strategy, including the use of ultrasound guidance with specific preventive and educational measures and the promotion of good practices applied by both medical and nursing staff, is suggested in order to reduce the incidence of CRBSI	B	Good	Strong
D8.S5	Ultrasound guidance should be used to avoid cannulation of thrombotic sites	A	Very good	Strong
D8.S6	Ultrasound guidance, by reducing puncture attempts, technical failure rates and mechanical complications, has to be preferred because of a reduced incidence of catheter-related thrombosis	A	Very good	Strong

INS 2024

22. VASCULAR VISUALIZATION

Standard

22.1 To ensure patient safety, the clinician is competent in the use of vascular visualization technology for vascular access device (VAD) insertion. This knowledge includes, but is not limited to, appropriate vessels, size, depth, location, and potential complications.

22.2 Vascular visualization technology is used in patients with difficult venous access and/or after failed venipuncture attempts.

22.3 Vascular visualization technology is employed to increase the success with peripheral cannulation and decrease the need for central vascular access device (CVAD) insertion, when other factors do not require a CVAD.

KEYPOINTS

- IMPIANTO ECOGUIDATO
- ANTISETTICI (CLOREXIDINA GLUCONATO 2% IN IPA 70%)
- PACK PROCEDURALI
- SISTEMI DI FISSAGGIO
- PORT PROTECTORS
- SIRINGHE PRERIEMPITE STERILI PER FLUSH E LOCK DEL CATETERE
- LOCK PROPHYLAXIS

HEALTHCARE EPIDEMIOLOGY INVITED ARTICLE

Robert A. Weinstein, Section Editor

Chlorhexidine: Expanding the Armamentarium for Infection Control and Prevention

Aaron M. Milstone,[1,3] Catherine L. Passaretti,[2,3] and Trish M. Perl[2,3]

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Health care–associated infections (HAIs) result in increased patient morbidity and utilization of health care resources. Rates of HAI are increasing despite advances in health care technology. Limited antimicrobial agents and a dry drug pipeline make novel prevention efforts critical. Chlorhexidine, an antiseptic solution that has been used worldwide since the 1950s, is a safe and effective product with broad antiseptic activity. Novel uses of chlorhexidine-containing products are being implemented to promote antisepsis and prevent bacterial colonization and infection. We review some of the many infection control applications of chlorhexidine in the battle against HAI, such as general skin cleansing, skin decolonization, preoperative showering and bathing, vascular catheter site preparation, impregnated catheter site dressings, impregnated catheters, and oral decontamination. As mandatory public reporting and pay for performance force infection control issues to the forefront, chlorhexidine-containing products may provide a vast armamentarium for the control and prevention of HAI.

IVAD14 Decontaminate the skin at the insertion site with a single-use application of 2% chlorhexidine gluconate in 70% isopropyl alcohol (or povidone iodine in alcohol for patients with sensitivity to chlorhexidine) and allow to dry prior to the insertion of a central venous access device.

Class A

IVAD15 Decontaminate the skin at the insertion site with a single-use application of 2% chlorhexidine gluconate in 70% isopropyl alcohol (or povidone iodine in alcohol for patients with sensitivity to chlorhexidine) and allow to dry before inserting a peripheral vascular access device.

New recommendation *Class D/GPP*

Journal of Hospital Infection 86S1 (2014) S1-S70

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevierhealth.com/journals/jhin

epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England

H.P. Loveday[a*], J.A. Wilson[a], R.J. Pratt[a], M. Golsorkhi[a], A. Tingle[a], A. Bak[a], J. Browne[a], J. Prieto[b], M. Wilcox[c]

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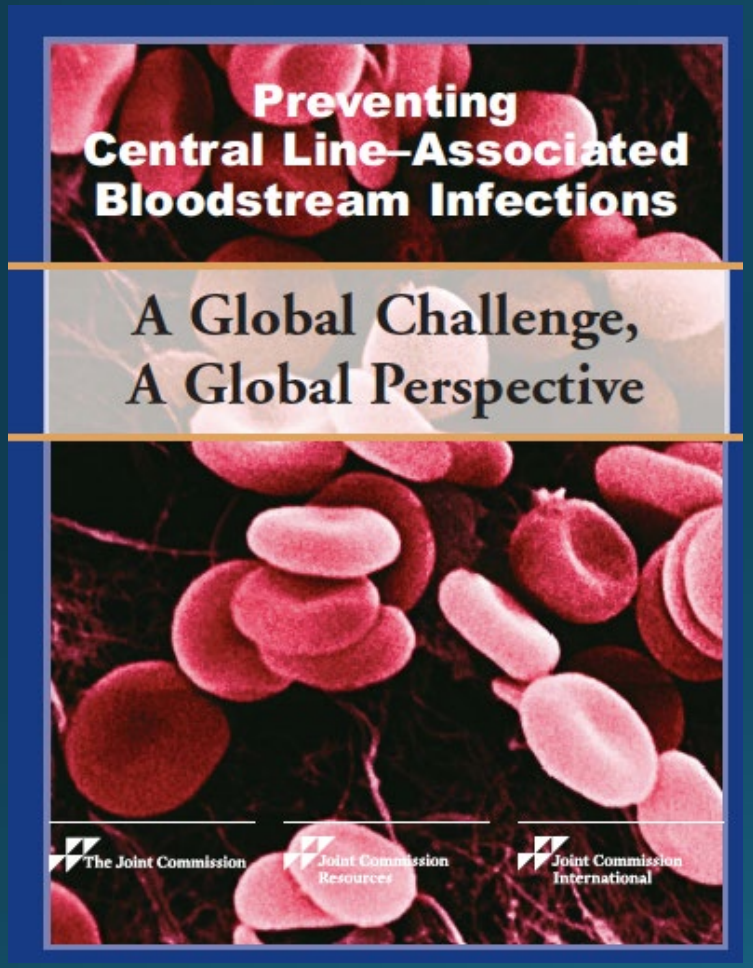

The following summarizes current recommendations for skin antisepsis prior to CVC insertion and during dressing changes[13,14,18,19,36]:

- Apply antiseptics to clean skin.
- Apply chlorhexidine/alcohol in a concentration greater than 0.5% in alcohol.
- If there is a contraindication to chlorhexidine, apply tincture of iodine, an iodophor, or alcohol as an alternative.
- Allow the antiseptic solution to dry before placing the catheter.

Infusion Therapy Standards of Practice

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Mary Alexander, MA, RN, CRNI®, CAE, FAAN

8TH EDITION
REVISED 2021

33. VASCULAR ACCESS SITE PREPARATION AND SKIN ANTISEPSIS

Standard

33.1 Skin antisepsis is performed prior to VAD placement.

33.2 The intended VAD insertion site is visibly clean prior to application of an antiseptic solution; if visibly soiled, cleanse the intended site with soap and water prior to application of antiseptic solution(s).

Practice Recommendations

A. Remove excess hair at the insertion site if needed to facilitate application of VAD dressings; use single-patient-use scissors or disposable-head surgical clippers; do not shave as this may increase the risk for infection.[1,2] (I)

B. Evaluate patient history of any allergy or sensitivity to skin antiseptics (see Standard 55, *Catheter-Associated Skin Injury*).[3,4] (V)

C. Perform skin antisepsis using the preferred skin antiseptic agent of alcohol-based chlorhexidine solution.[5-10] (I)
   1. If there is a contraindication to chlorhexidine solution, an iodophor (eg, povidone-iodine) or 70% alcohol may also be used.[5,6,10] (IV)
   2. Aqueous chlorhexidine may be considered if there is a contraindication to alcohol-based chlorhexidine.[3] (IV)
   3. For preterm neonates, low-birth-weight infants, and within the first 14 days of life:
      a. Use povidone-iodine, alcohol-based or aqueous chlorhexidine solution.[4,11-17] (I)
      b. Use both aqueous and alcohol-based chlorhexidine with caution due to risks of chemical burns to the skin. Systemic absorption has been reported due to skin immaturity; however, systemic effects are not documented. Studies have not established one antiseptic solution as superior for safety or efficacy in neonates.[11-17] (IV)
      c. Avoid the use of tincture of iodine due to the potential deleterious effect on the neonatal thyroid gland.[18-20] (II)
      d. Remove antiseptics after the procedure is complete using sterile water or saline.[11,16] (IV)

D. Use a single-use sterile applicator containing sterile solution, not a multiple use product (eg, bottle of antiseptic solution).[3,5] (IV)
   1. Follow manufacturers' directions for use to determine appropriate product application and dry times; always allow product to naturally dry without wiping, fanning, or blowing on skin.[3] (V)

Infection Control & Hospital Epidemiology (2022), 1–17
doi:10.1017/ice.2022.87

SHEA

SHEA/IDSA/APIC Practice Recommendation

Strategies to prevent central line-associated bloodstream infections in acute-care hospitals: 2022 Update

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7. **Use an alcoholic chlorhexidine antiseptic for skin preparation** (Quality of Evidence: HIGH)[42,129–134]
   a. Before catheter insertion, apply an alcoholic chlorhexidine solution containing at least 2% chlorhexidine gluconate to the insertion site.
      i. The antiseptic solution must be allowed to dry before making the skin puncture.
      ii. Alcoholic chlorhexidine for skin antisepsis to prevent CLABSI in NICU patients should be used when the benefits are judged to outweigh potential risk.


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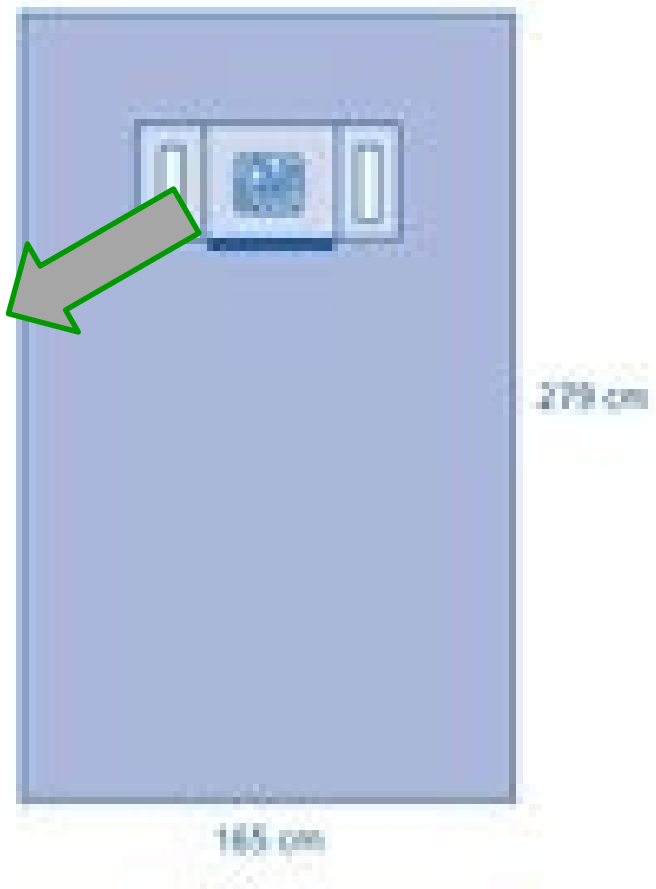


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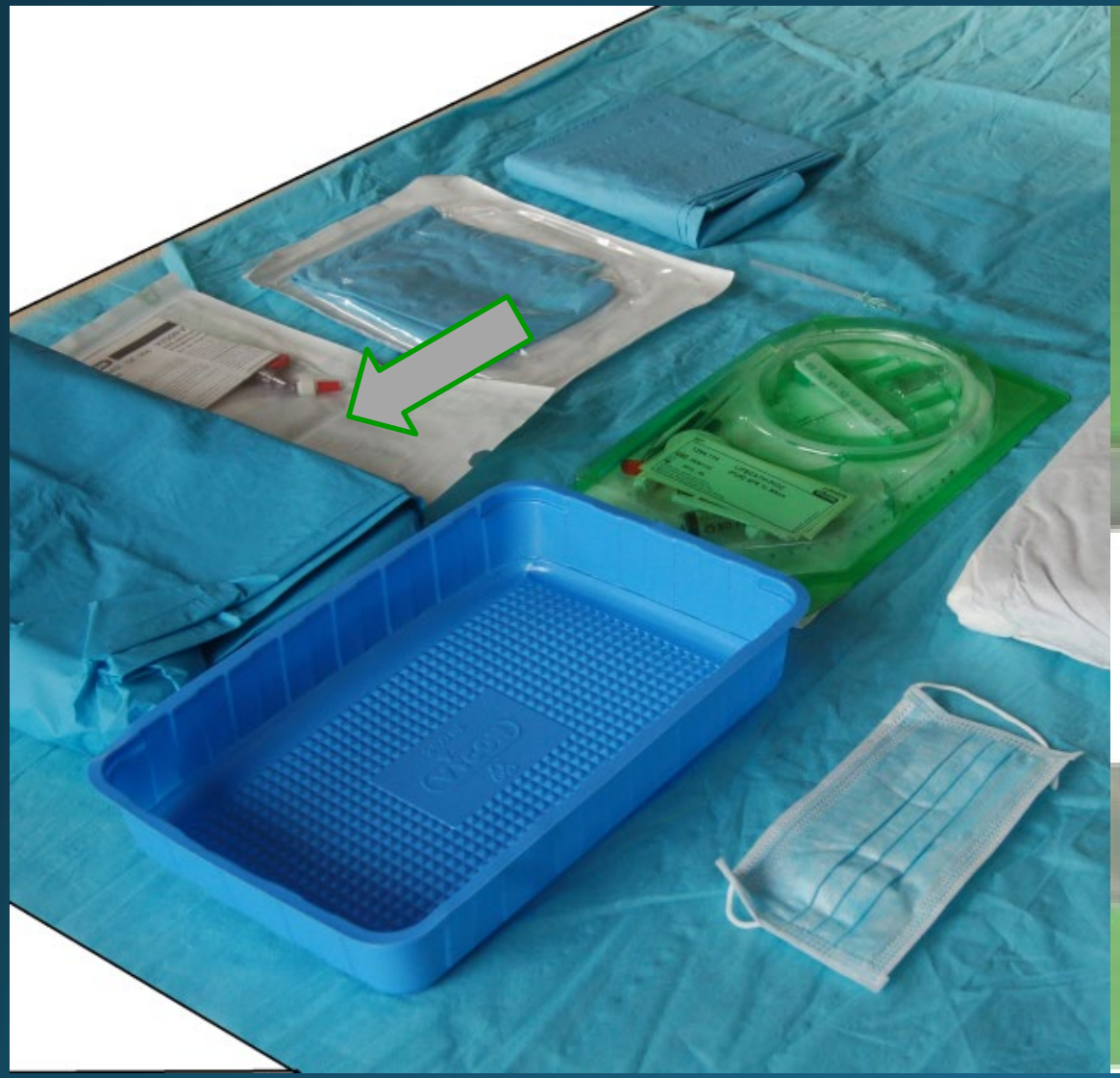

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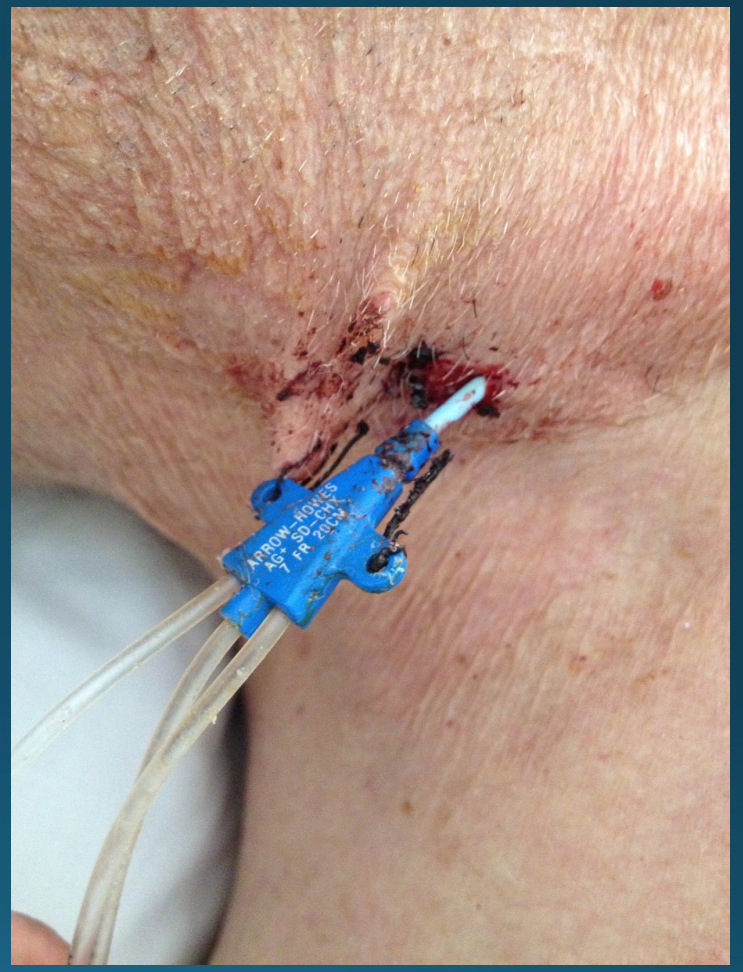
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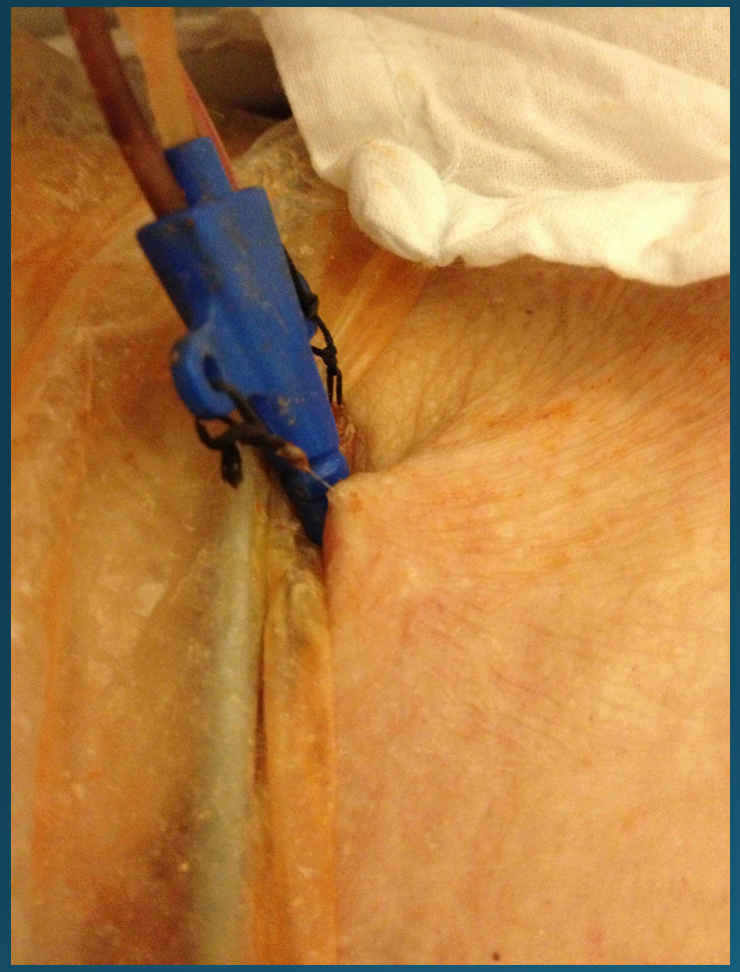


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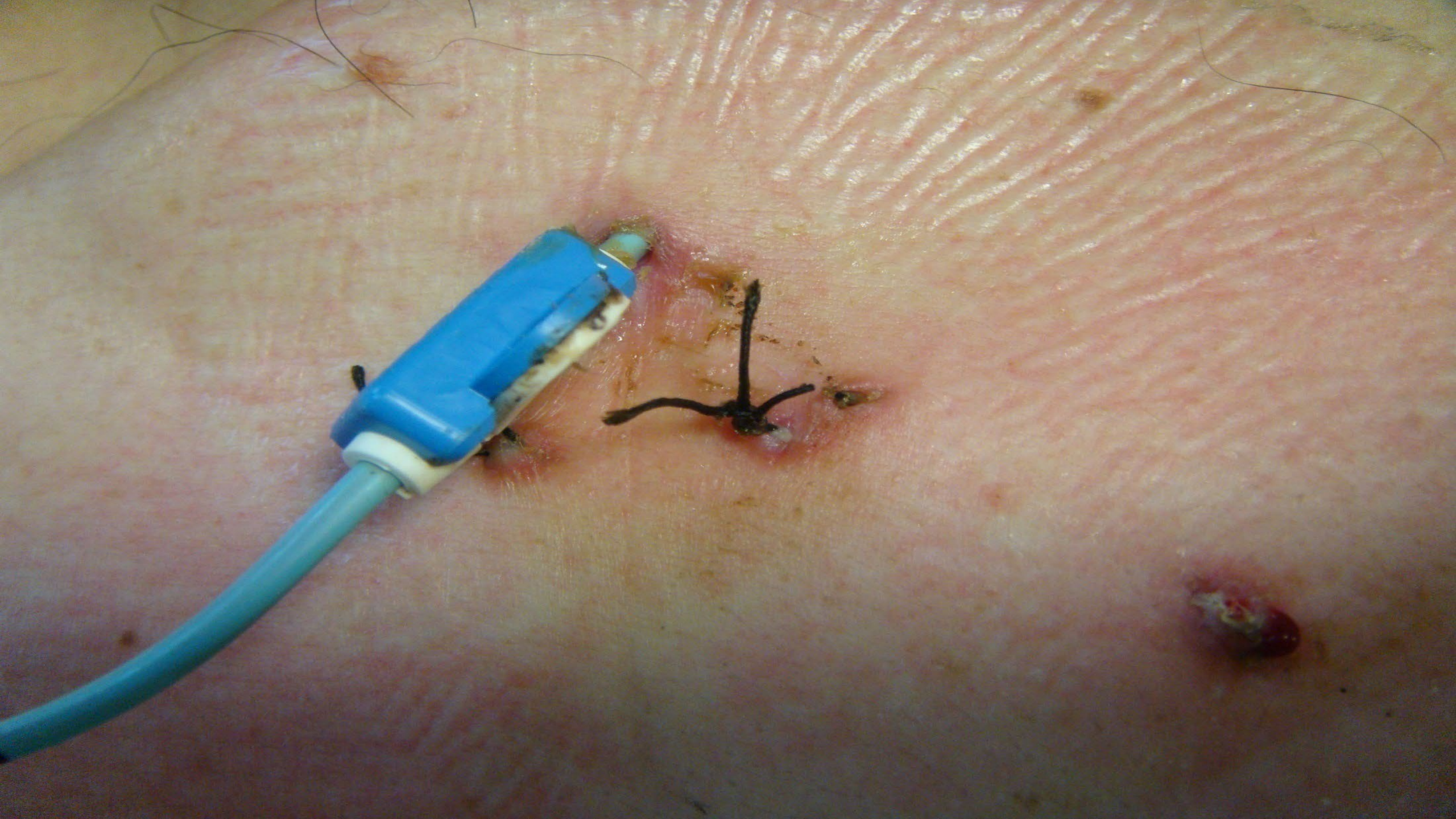


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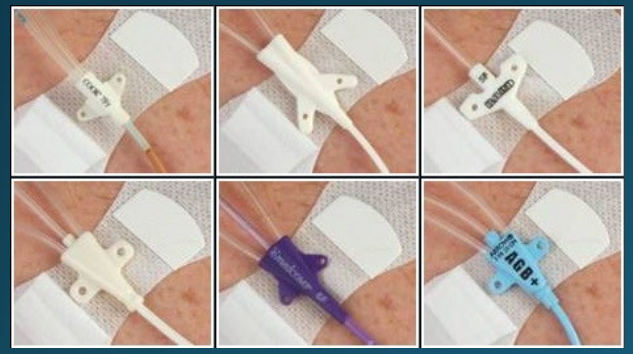
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Dispositivi per il Fissaggio del Catetere

Raccomandazioni

Usare un dispositivo di fissaggio *sutureless* al fine di ridurre il rischio di infezione per i cateteri intravascolari [105]. Categoria II

CDC

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547 **Catheter Securement Devices**

548 **Recommendation**

549 Use a sutureless securement device to reduce the risk of infection for PICCs [163].

550 Category II

Avoid use of tape or sutures, as they are not effective alternatives to an ESD. Rolls of nonsterile tape can become contaminated with pathogenic bacteria, although its contribution to VAD infection has not been quantified. Sutures are associated with needle-stick injury, in addition to supporting the growth of biofilm and increasing the risk of catheter-related bloodstream infection.[7-10] (II, Regulatory)

INS 2024

F. Subcutaneous ESDs have been successful in stabilizing PICCs and CVADs inserted through the internal jugular vein of adults. Patient outcomes and patient and inserter satisfaction have been favorable; however, additional studies with other CVADs are needed.[21-23] (V)

INS 2024

Clinical experience of a subcutaneously anchored sutureless system for securing central venous catheters

Mauro Pittiruti, Giancarlo Scoppettuolo, Laura Dolcetti, Davide Celentano, Alessandro Emoli, Bruno Marche and Andrea Musarò

ABSTRACT

This article reports the results of three prospective clinical studies conducted in a university hospital regarding the efficacy, safety and cost effectiveness of a subcutaneously anchored sutureless system for securing central venous catheters. The results were favourable to the adoption of such a device, and the analysis of the data allowed the authors to define those categories of patients where the device should have the most benefit: neonates, children, non-compliant older patients with cognitive difficulties, patients with skin abnormalities that may reduce the effectiveness of a skin-adhesive sutureless securement system, patients who are candidates for having a peripherally inserted central catheter (PICC) in place for more than 8 weeks, and any other category of patients with a recognised high risk of catheter dislodgement.

Key words: Sutureless securement ■ Central venous catheters ■ Peripherally inserted central catheter ■ Subcutaneously anchored securement ■ Stabilisation device

the use of such a device for the purpose of reducing or eliminating the clinical occurrence of catheter dislodgement, an often-neglected complication. In the authors' experience, CVC dislodgement is only partially prevented by current securement strategies: adoption of semipermeable transparent dressings (Tegaderm, 3M; IV 3000, Smith & Nephew); application of cyanoacrylate glue (Hystoacryl, BBraun) on the exit site; consistent use of sutureless devices, either adhesive to the skin (StatLock, BD; Grip-Lok, Zefon International; WingGuard, Centurion Medical Products) or integrated in the transparent dressing (SorbaShield, Centurion). In some patient populations within the authors' hospital (such as in children), partial or total dislodgement of the catheter is the most frequent reason for losing venous access (far more frequent than infection or venous thrombosis or lumen occlusion).

Before introducing this new device into clinical practice, the authors have considered several aspects: its applicability, its

Original research article

JVA The Journal of Vascular Access

The Journal of Vascular Access
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GAVeCeLT-WoCoVA Consensus on subcutaneously anchored securement devices for the securement of venous catheters: Current evidence and recommendations for future research

Fulvio Pinelli[1], Mauro Pittiruti[2], Ton Van Boxtel[3], Giovanni Barone[4], Roberto Biffi[5], Giuseppe Capozzoli[6], Alessandro Crocoli[7], Stefano Elli[8], Daniele Elisei[9], Adam Fabiani[10], Cristina Garrino[11], Ugo Graziano[12], Luca Montagnani[13], Alessio Pini Prato[14], Giancarlo Scoppettuolo[15], Nicola Zadra[16], Clelia Zanaboni[17], Pietro Zerla[18], Evangelos Konstantinou[19], Matt Jones[20], Hervé Rosay[21], Liz Simcock[22], Marguerite Stas[23] and Gilda Pepe[15]

Abstract

Background: Subcutaneously anchored securement devices (or subcutaneous engineered securement devices) have been introduced recently into the clinical practice, but the number of published studies is still scarce. The Italian Group of Long-Term Central Venous Access Devices (GAVeCeLT)—in collaboration with WoCoVA (World Congress on Vascular Access)—has developed a Consensus about the effectiveness, safety, and cost-effectiveness of such devices.

Methods: After the definition of a panel of experts, a systematic collection and review of the literature on subcutaneously anchored securement devices was performed. The panel has been divided in two working groups, one focusing on adult patients and the other on children and neonates.

Results: Although the quality of evidence is generally poor, since it is based mainly on non-controlled prospective studies, the panel has concluded that subcutaneously anchored securement devices are overall effective in reducing the risk of dislodgment and they appear to be safe in all categories of patients, being associated only with rare and negligible local adverse effects; cost-effectiveness is demonstrated—or highly likely—in specific populations of patients with long-term venous access and/or at high risk of dislodgment.

Conclusion: Subcutaneously anchored securement is a very promising strategy for avoiding dislodgment. Further studies are warranted, in particular for the purpose of defining (a) the best management of the anchoring device so to avoid local

KEYPOINTS

- IMPIANTO ECOGUIDATO
- ANTISETTICI (CLOREXIDINA GLUCONATO 2% IN IPA 70%)
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- PORT PROTECTORS
- SIRINGHE PRERIEMPITE STERILI PER FLUSH E LOCK DEL CATETERE
- LOCK PROPHYLAXIS

DISINFEZIONE DEI PUNTI DI ACCESSO (HUB O NEEDLEFREE CONNECTORS)
DI UN CVC MEDIANTE SCRUBBING CON SOLUZIONI ALCOLICHE (PREFERIBILMENTE
CLOREXIDINA 2% IN SOLUZIONE ALCOLICA) OPPURE DISINFEZIONE PASSIVA
DEI NFC MEDIANTE PORT PROTECTORS.

F. Perform a vigorous mechanical scrub for manual disinfection of the needleless connector prior to each VAD access and allow it to dry.
   1. Acceptable disinfecting agents include 70% isopropyl alcohol, iodophors (ie, povidone-iodine), or >0.5% chlorhexidine in alcohol solution.[7,16] (II)

G. Use of passive disinfection caps containing disinfecting agents (eg, isopropyl alcohol) has been shown to reduce intraluminal microbial contamination and reduce the rates of central line-associated bloodstream infection (CLABSI). Use of disinfection caps on peripheral catheters has limited evidence but should be considered.

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BMC Infectious Diseases

RESEARCH ARTICLE Open Access

Educational interventions alone and combined with port protector reduce the rate of central venous catheter infection and colonization in respiratory semi-intensive care unit

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INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY JULY 2014, VOL. 35, NO. 7

SHEA/IDSA PRACTICE RECOMMENDATION

Strategies to Prevent Central Line–Associated Bloodstream Infections in Acute Care Hospitals: 2014 Update

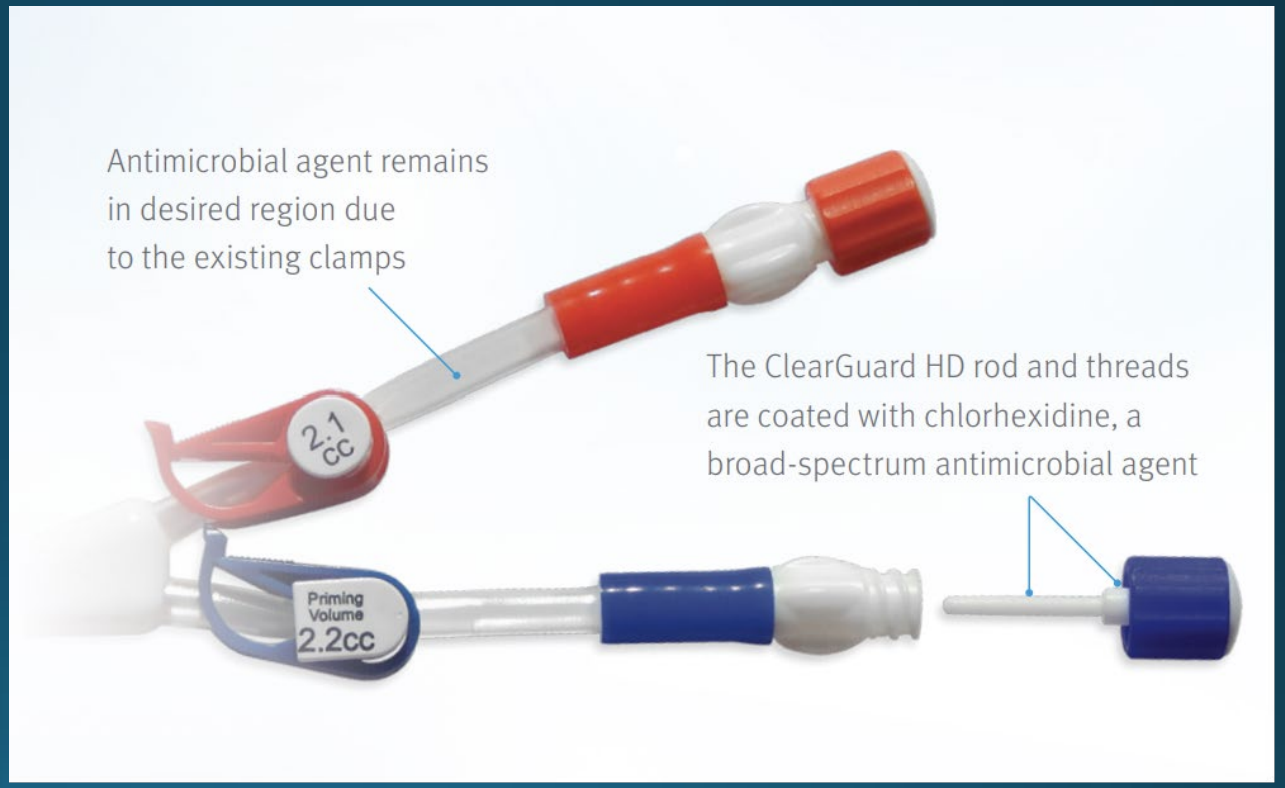
Jonas Marschall, MD;[1,2,a] Leonard A. Mermel, DO, ScM;[3,a] Mohamad Fakih, MD, MPH;[4] Lynn Hadaway, MEd, RN, BC, CRNI;[5] Alexander Kallen, MD, MPH;[6] Naomi P. O'Grady, MD;[7] Ann Marie Pettis, RN, BSN, CIC;[8] Mark E. Rupp, MD;[9] Thomas Sandora, MD, MPH;[10] Lisa L. Maragakis, MD, MPH;[11] Deborah S. Yokoe, MD, MPH[12]

3. Use an antiseptic-containing hub/connector cap/port protector to cover connectors (quality of evidence: I).[161-165]

INS 2021 : port protectors

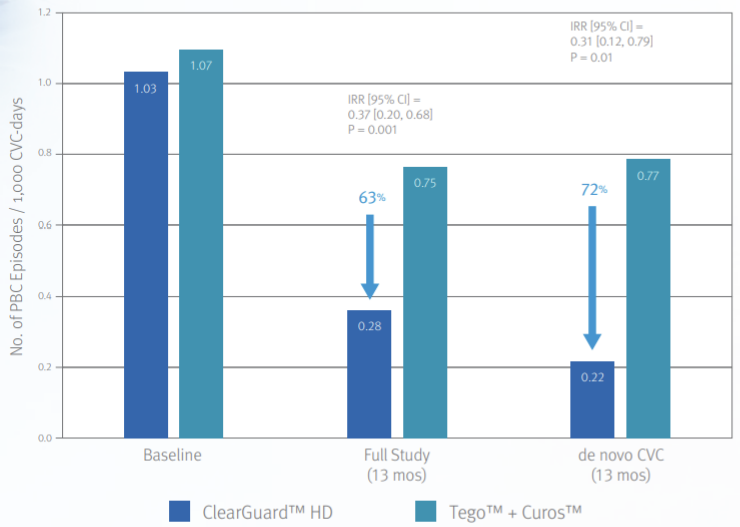
G. Use of passive disinfection caps containing disinfecting agents (eg, isopropyl alcohol) has been shown to reduce intraluminal microbial contamination and reduce the rates of central line-associated bloodstream infection (CLABSI). Use of disinfection caps on peripheral catheters has limited evidence but should be considered.

HD ANTIMICROBIAL BARRIER CAPS



JASN Journal of the American Society of Nephrology

Cluster-Randomized Trial of Devices to Prevent Catheter-Related Bloodstream Infections



ClearGuard HD Caps vs. Tego™+ Curos™

Brunelli, SM et al. Cluster-randomized trial of devices to prevent catheter-related bloodstream infection. J Am Soc Nephrol 2018 Apr; 29(4):1336-1343.

- 13-month prospective, cluster-randomized multicenter open-label trial
- 1,671 patients (826 treatment, 845 control) accruing ~183,000 CVC days
- 40 centers across the US
- Primary endpoint was PBC rate as an indicator of BSI rate

Results: Use of the ClearGuard HD caps for 13 months was associated with a 63% lower BSI rate vs. use of Tego + Curos.

Recommended in the UKs NICE Medical Technologies Guidance [MTG62]

Recommended in the UKs NICE National Guidance for hemodialysis catheter-related bloodstream infections: 2021**

https://www.nice.org.uk/guidance/mtg62/

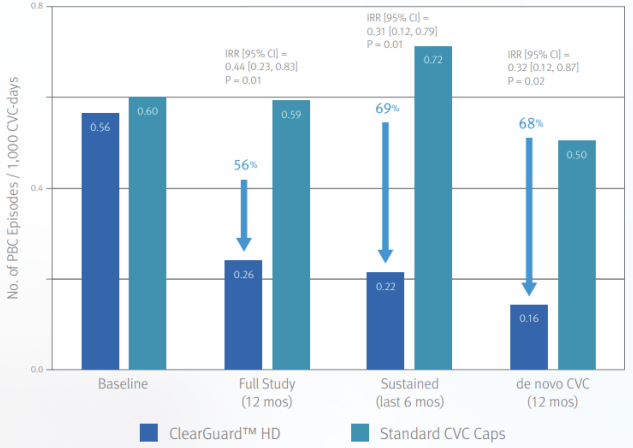
National Kidney Foundation® | KDOQI® Kidney Disease Outcomes Quality Initiative

ClearGuard HD caps recommended in NKF's KDOQI Clinical Practice Guideline for Vascular Access: 2019[6]

21.3 KDOQI considers it reasonable to use an antimicrobial barrier cap to help reduce CRBSI in high-risk patients or facilities; the choice of connector should be based on clinician's discretion and best clinical judgment. (Expert Opinion)

AJKD American Journal of Kidney Diseases

Dialysis Catheter-Related Bloodstream Infections: A Cluster-Randomized Trial of the ClearGuard HD Antimicrobial Barrier Cap



ClearGuard HD Caps vs. Standard Dialysis Caps

Hymes, JL et al. Dialysis catheter-related bloodstream infections: A cluster-randomized trial of the ClearGuard HD antimicrobial barrier cap. Am J Kidney Dis. 2017; 69(2):220-227.

- 12-month prospective, cluster-randomized, multicenter, open-label comparative effectiveness trial in hemodialysis patients with central venous catheters
- 2,470 patients (1,245 treatment, 1,225 control) accruing ~350,000 CVC days
- 40 centers across the US
- Primary endpoint was PBC rate as an indicator of BSI rate

Results: Use of the ClearGuard HD caps for 12 months was associated with a 56% lower BSI rate vs. use of standard caps. When considering sustained use (defined as 6 months of the study), the intervention vs. control was associated with a 69% lower BSI rate.

KEYPOINTS

- IMPIANTO ECOGUIDATO
- ANTISETTICI (CLOREXIDINA GLUCONATO 2% IN IPA 70%)
- PACK PROCEDURALI
- SISTEMI DI FISSAGGIO
- PORT PROTECTORS
- SIRINGHE PRERIEMPITE STERILI PER FLUSH E LOCK DEL CATETERE
- LOCK PROPHYLAXIS

A. Use single-dose systems (eg, single-dose vials or prefilled labeled syringes) for all VAD flushing and locking.
   1. Commercially available prefilled syringes may reduce the risk of CR-BSI and save staff time for syringe preparation.[1-3] (IV)
   2. If multiple-dose vials must be used, dedicate a vial to a single patient (see Standard 49, *Infection*).[4] (V)
   3. Do not use intravenous (IV) solution containers (eg, bags or bottles) as a source for obtaining flush solutions.[3-6] (IV)

Infusion Therapy Standards of Practice

UTILIZZO DI SIRINGHE PRERIEMPITE STERILI PER IL FLUSH E IL LOCK DEI CVC

SwabFlush™

SwabFlush™

Offers clinicians the convenience of having SwabCap **there when they need it,** after the final flush!

When to use SwabFlush

- When a saline flush/lock is required to finish a patient's IV therapy
- Use SwabFlush to administer the final saline:
  - After catheter insertion
  - After medication delivery
  - After blood is withdrawn or delivered through the catheter

SwabCap™

NON-VENTING
DISINFECTION CAP
CONTAINS 70% IPA

Single Use Only
Sterile Packaging
Luer Lock Design

KEYPOINTS

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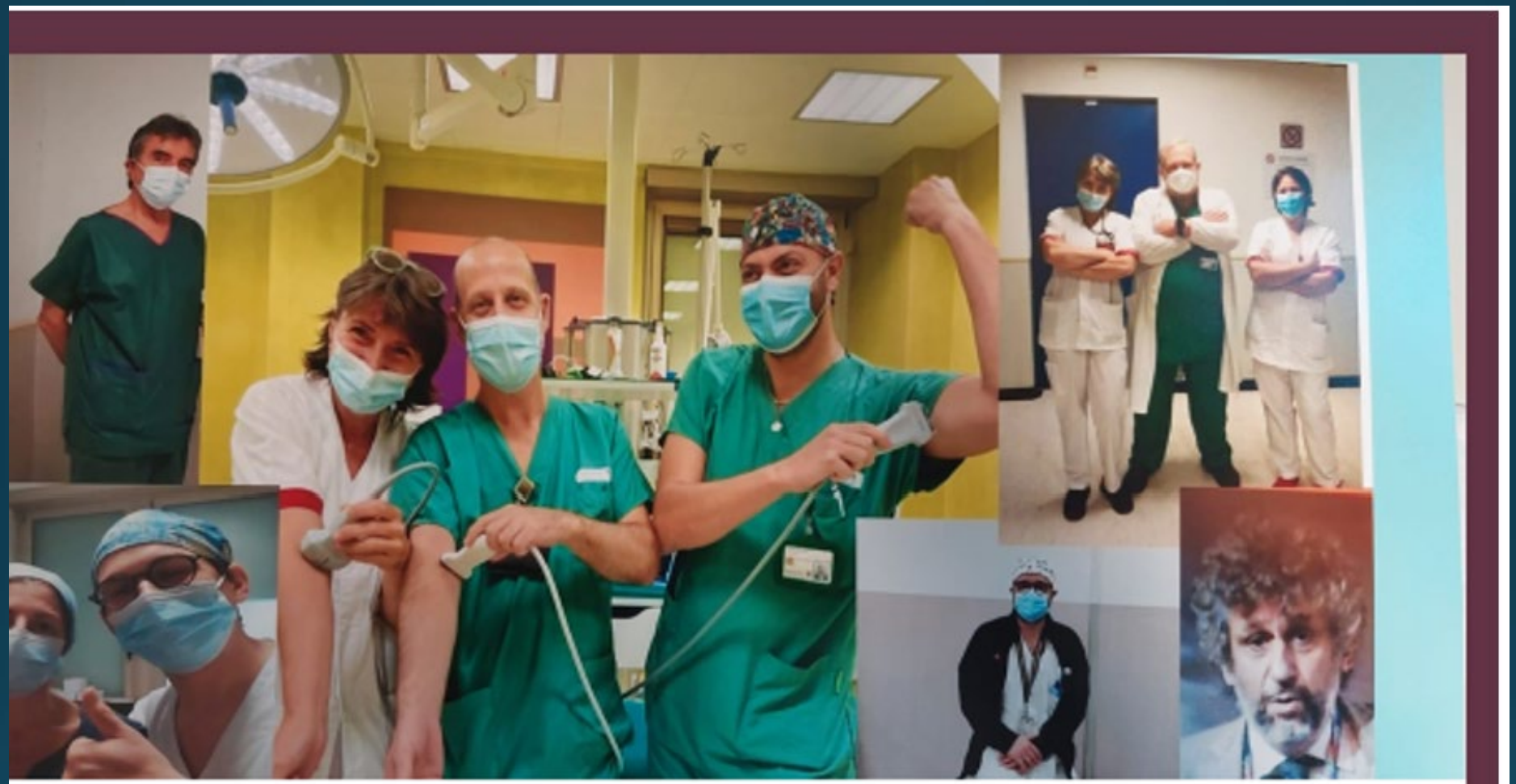
IDEAL LOCK SOLUTION

- Spectrum of activity should include common or targeted pathogens
- Ability to penetrate o disrupt a biofilm
- Compatibility with anticoagulants
- Prolonged stability
- Low risk of toxicity and adverse events
- Low potential for resistance
- Cost effectiveness

SOSTANZE AD ATTIVITA' ANTIMICROBICA (NON ANTIBIOTICI)

- ETANOLO
- **TAUROLIDINA (anche coniugata con eparina o citrato 4% oppure urokinasi + citrato 4%)**
- CITRATO
- EDTA



Grazie per l'attenzione!

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