ΚΛΙΝΙΚΟ ΦΡΟΝΤΙΣΤΗΡΙΟ
Κεντρικές Γραμμές

Λαζαρίδης Γεώργιος ΝΕΛ ΠΓΝΑ
Λεμονάκης Νικόλαος ΝΕΛ ΠΓΝΑ

Κεντρικές (Φλεβικές) Γραμμές

ΑΠΟΚΛΕΙΣΤΙΚΟΣ ΔΩΡΗΤΗΣ

ΙΣΝ/SNF
ΙΔΡΥΜΑ ΣΤΑΥΡΟΣ ΝΙΑΡΧΟΣ
STAVROS NIARCHOS FOUNDATION

ΠΡΩΤΟΒΟΥΛΙΑ ΓΙΑ ΤΗΝ ΥΓΕΙΑ
HEALTH INITIATIVE

ΥΛΟΠΟΙΗΣΗ ΕΡΓΟΥ
ΕΠΙΒΛΕΠΟΥΣΑ ΑΡΧΗ

ΟΔΙΠΥ
ΟΡΓΑΝΙΣΜΟΣ ΔΙΑΣΦΑΛΙΣΗΣ ΤΗΣ ΠΟΙΟΤΗΤΑΣ ΣΤΗΝ ΥΓΕΙΑ

ΔΙΑΧΕΙΡΙΣΤΗΣ ΕΡΓΟΥ

CLEO
CENTER FOR CLINICAL EPIDEMIOLOGY AND OUTCOMES RESEARCH

ΣΥΝΕΡΓΑΖΟΜΕΝΟΙ ΦΟΡΕΙΣ

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Εθνικόν και Καποδιστριακόν Πανεπιστήμιον Αθηνών
ΙΔΡΥΘΕΝ ΤΟ 1837

Institute for Healthcare Improvement

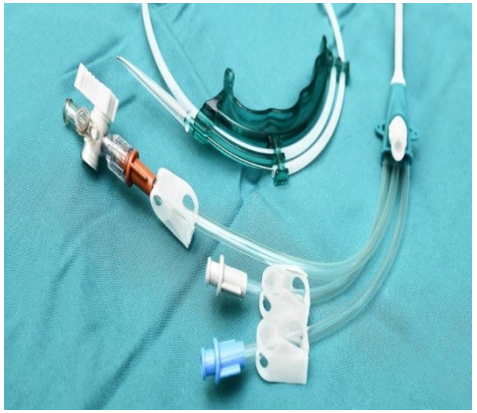
ΕΘΝΙΚΟΣ ΟΡΓΑΝΙΣΜΟΣ ΔΗΜΟΣΙΑΣ ΥΓΕΙΑΣ

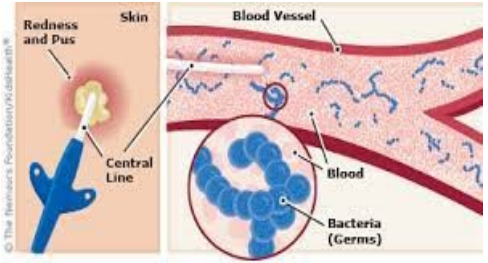
ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Υπουργείο Υγείας

GRIPP
Greek Infection Prevention Program

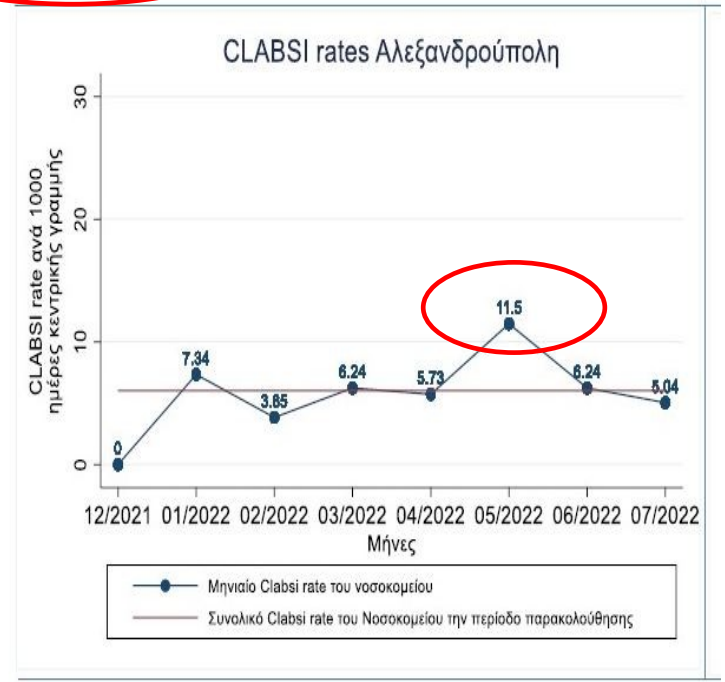
ΕΠΙΤΡΟΠΗ ΝΟΣΟΚΟΜΕΙΑΚΩΝ ΛΟΙΜΩΞΕΩΝ ΠΓΝΑ

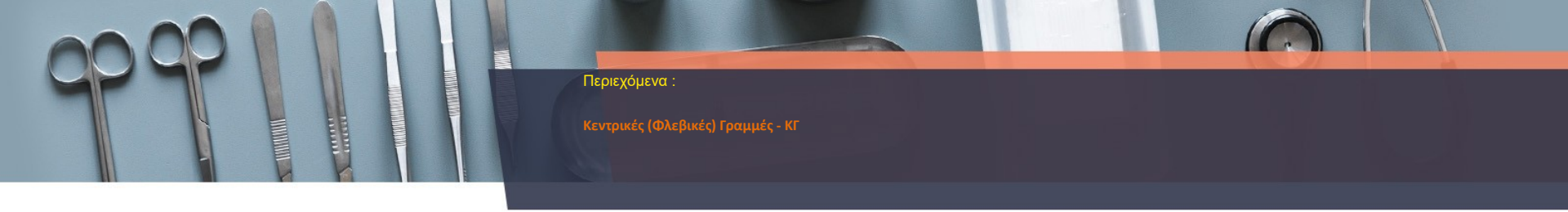
Δείκτης	Ιούλιος 2022
CLABSI ρυθμός	5,04 / 1000 CL days





A central line infection can occur where the line enters the body (left), and/or in the blood (right).

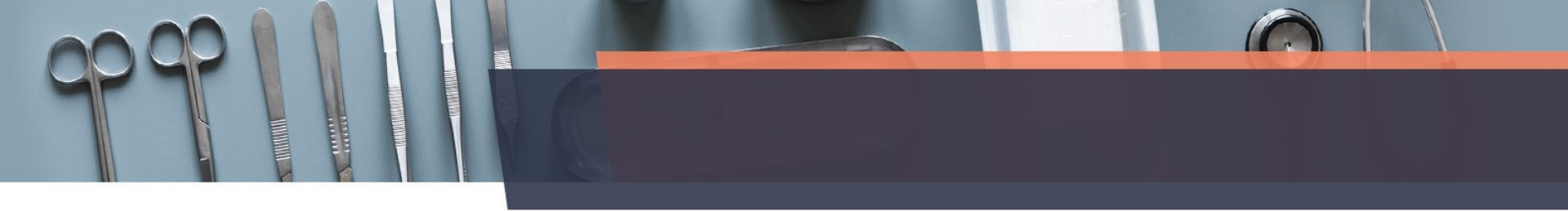




Περιεχόμενα :

Κεντρικές (Φλεβικές) Γραμμές - ΚΓ

Τι είναι;
Πότε τις χρησιμοποιούμε;
Πως τις τοποθετούμε;
Έχουν επιπλοκές;
Πως προλαμβάνουμε τις επιπλοκές;
Πως φροντίζουμε τις ΚΓ (ΚΦΚ);

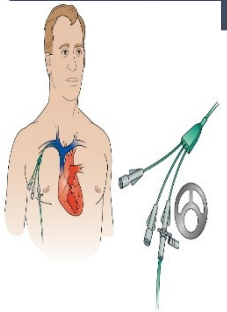


- Καθετήρες που καταλήγουν σε μεγάλο αγγείο (άνω και κάτω κοίλη φλέβα, βραχιοκεφαλικές φλέβες, έσω σφαγίτιδες, υποκλείδιες, έξω λαγόνιες και κοινές μηριαίες φλέβες)
  - Χωρίς υποδόριο κανάλι (προσωρινοί ΚΦΚ)
  - Με υποδόριο κανάλι (π.χ καθετήρας τύπου Hickman)
  - Πλήρως εμφυτευμένοι καθετήρες (Port-a-cath)
  - Περιφερικά εισερχόμενοι κεντρικοί καθετήρες (PICC)
  - Καθετήρες αιμοκάθαρσης
- Χρήσεις: χορήγηση υγρών, φαρμάκων, παρεντερικής διατροφής, παραγώγων αίματος, αιμοκάθαρση, αιμοδυναμική παρακολούθηση

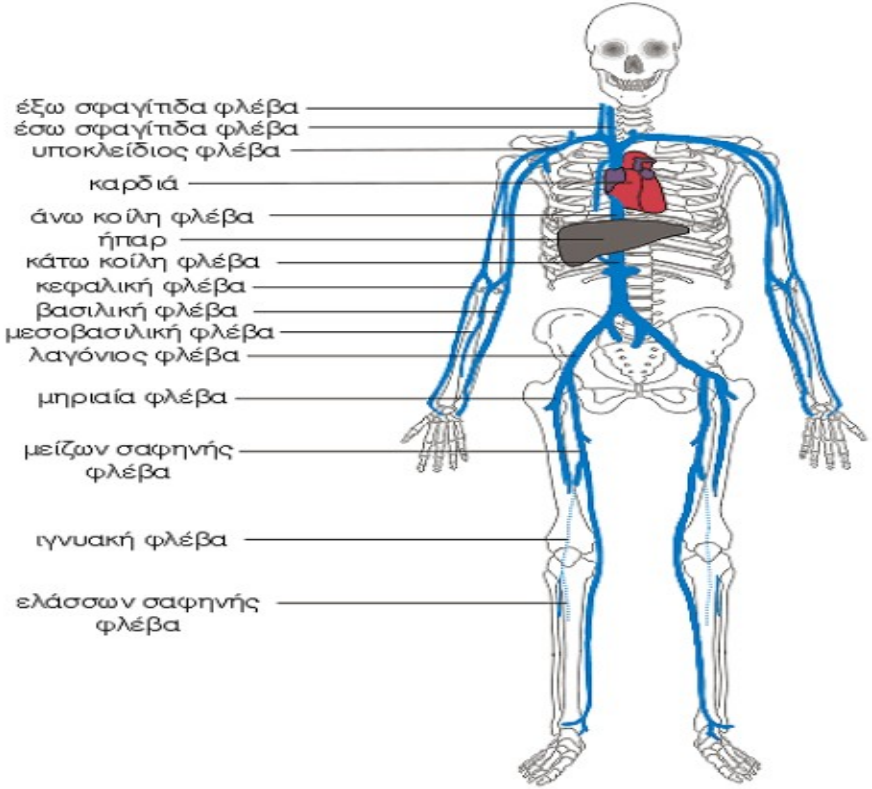
Αγγειακή Προσπέλαση
μεγέθη - διάμετρός & αιματική ροή

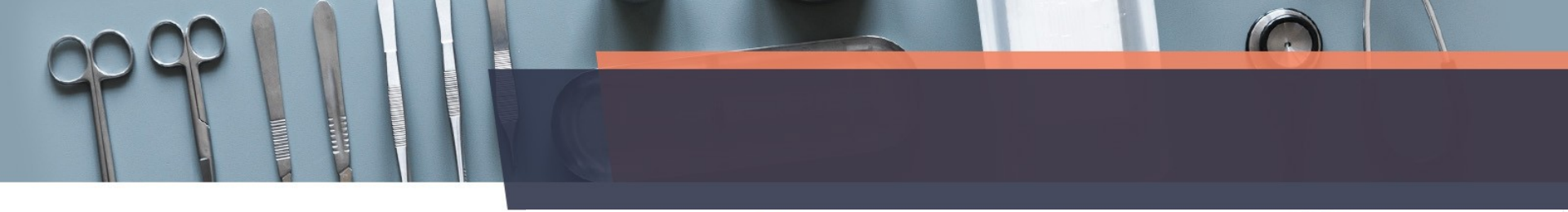
ΚΕΦΑΛΙΚΗ	6mm	40-90ml/min
ΒΑΣΙΛΙΚΗ	8mm	90-150ml/min
ΜΑΣΧΑΛΙΑΙΑ	16mm	150-350ml/min
ΥΠΟΚΛΕΙΔΙΟΣ	19mm	350-800ml/min
ΑΝΩΝΥΜΟΣ	19mm	800 - 1500ml/min
ΚΑΤΩ ΚΟΙΛΗ	20mm	2000ml/min

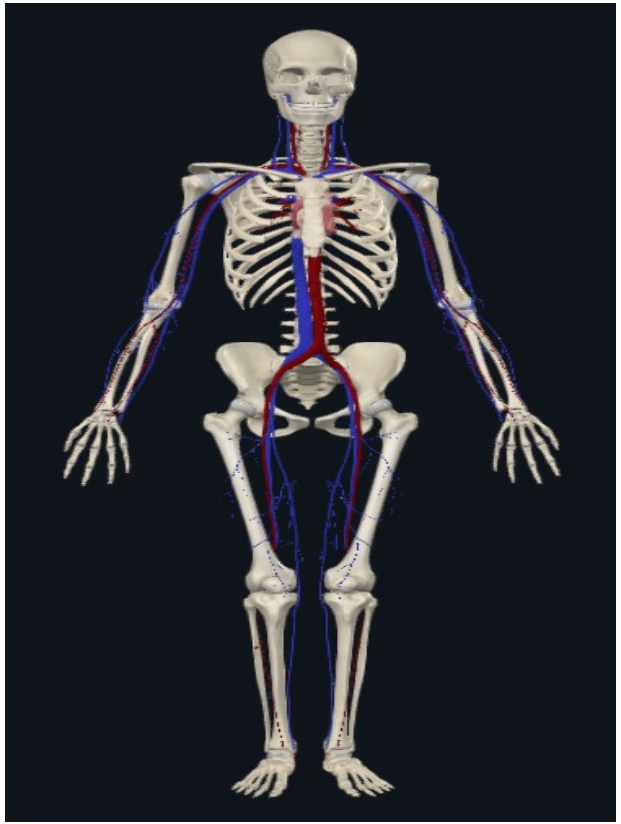
Μεγάλα Αγγεία (φλέβες)

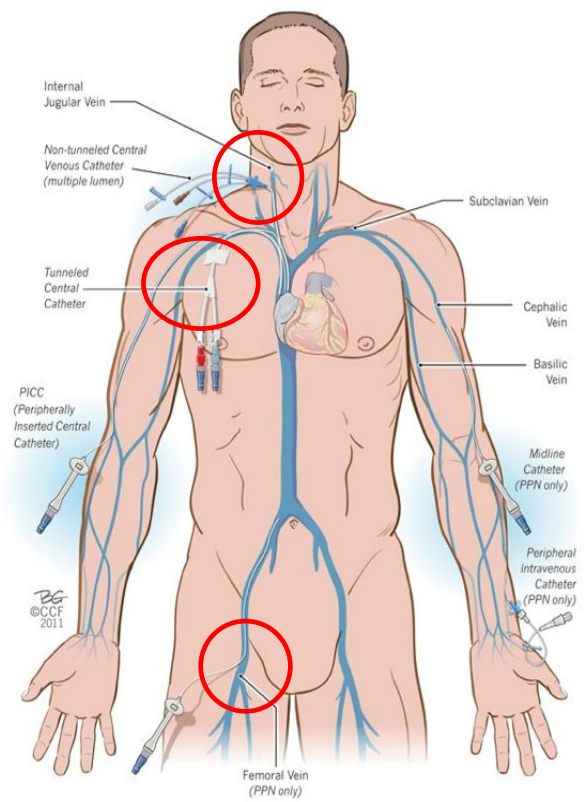


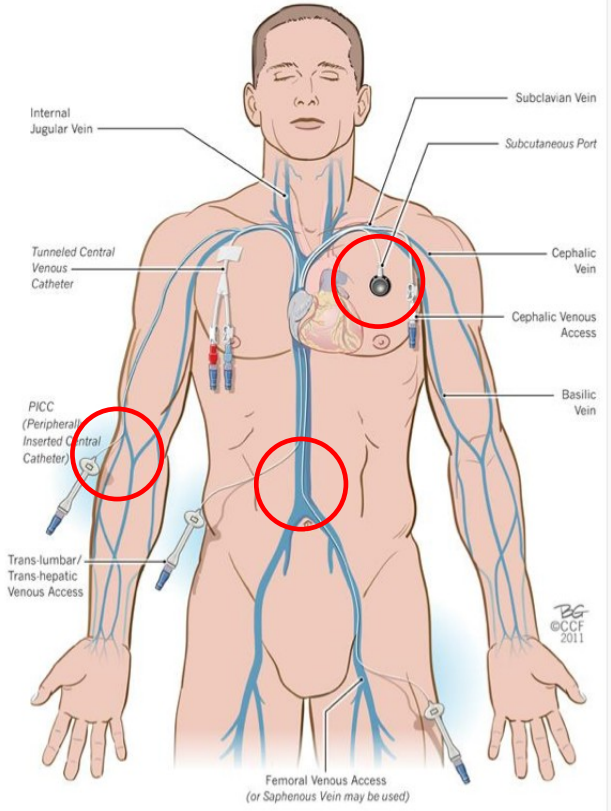
- Άνω κοίλη φλέβα
- Κάτω κοίλη φλέβα
- Μεσοβασιλική φλέβα
- Έσω σφαγίτιδα φλέβα
- Υποκλείδιος φλέβα
- Έξω λαγόνια φλέβα
- Μηριαία φλέβα





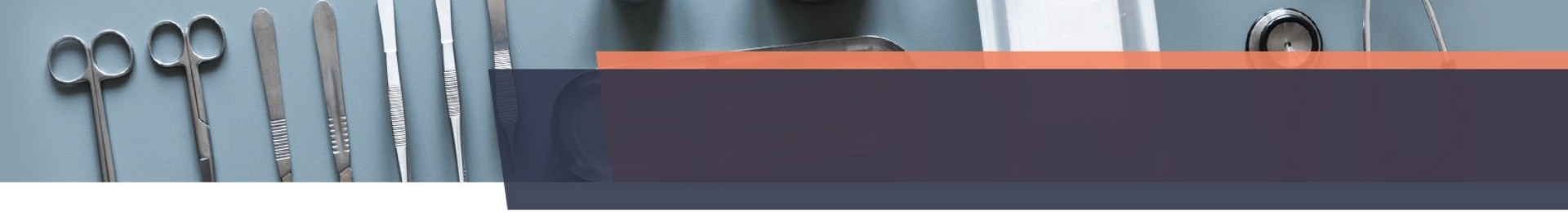



Internal Jugular Vein
Non-tunneled Central Venous Catheter (multiple lumen)
Subclavian Vein
Tunneled Central Catheter
Cephalic Vein
Basilic Vein
PICC (Peripherally Inserted Central Catheter)
Midline Catheter (PPN only)
Peripheral Intravenous Catheter (PPN only)
BG ©CCF 2011
Femoral Vein (PPN only)

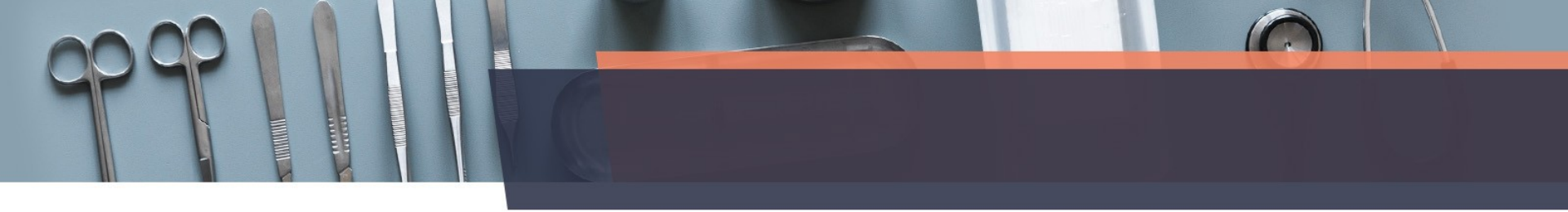

Internal Jugular Vein
Subclavian Vein
Subcutaneous Port
Tunneled Central Venous Catheter
Cephalic Vein
Cephalic Venous Access
Basilic Vein
PICC (Peripherally Inserted Central Catheter)
Trans-lumbar/ Trans-hepatic Venous Access
BG ©CCF 2011
Femoral Venous Access (or Saphenous Vein may be used)

Τοποθέτηση: Τεχνική Seldiger

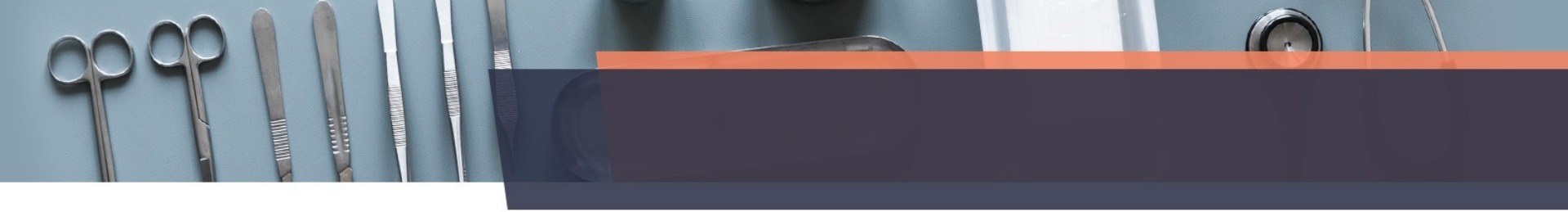
- Είναι σαφώς η πλέον ατραυματική.
- Μετά την παρακέντηση της φλέβας με λεπτή βελόνη προωθείται στον αυλό της ατραυματικό υδρόφιλο σύρμα και με οδηγό το τελευταίο γίνεται τοποθέτηση τελικώς του καθετήρα.

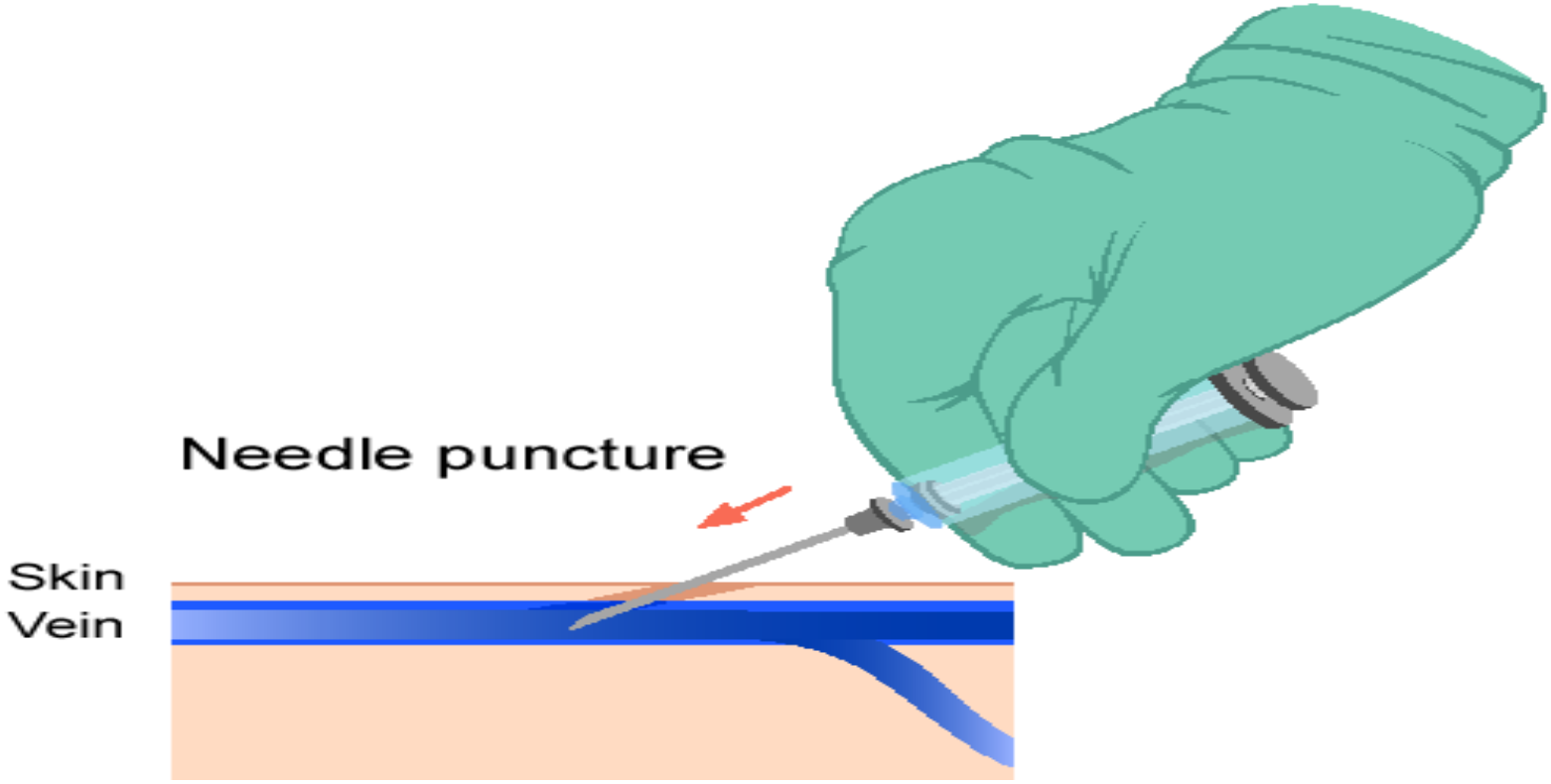


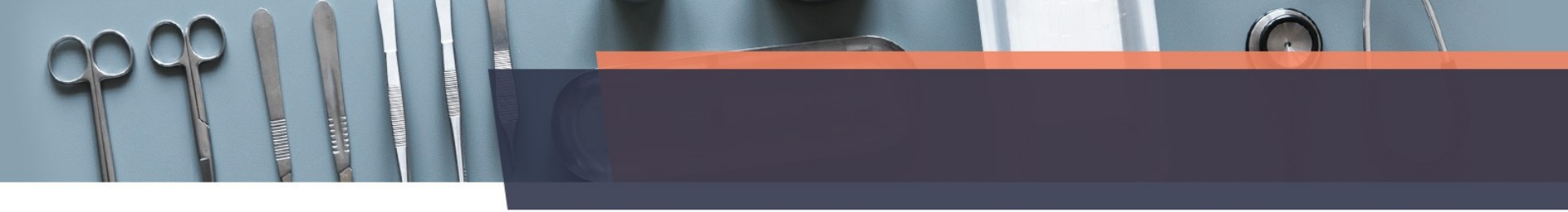
- Τοπική αναισθησία (αν ο ασθενής έχει επίπεδο συνείδησης)
- Παρακέντηση σύμφωνα με τα οδηγά σημεία
- Προώθηση της βελόνης, ασκώντας αρνητική πίεση στο έμβολο της σύριγγας
- Μόλις εισέλθει αίμα στη σύριγγα σταματάμε την ώθησή της και αφαιρούμε τη σύριγγα κρατώντας τη βελόνη σταθερή
- Προωθούμε μέσα από τη βελόνη το σύρμα οδηγό

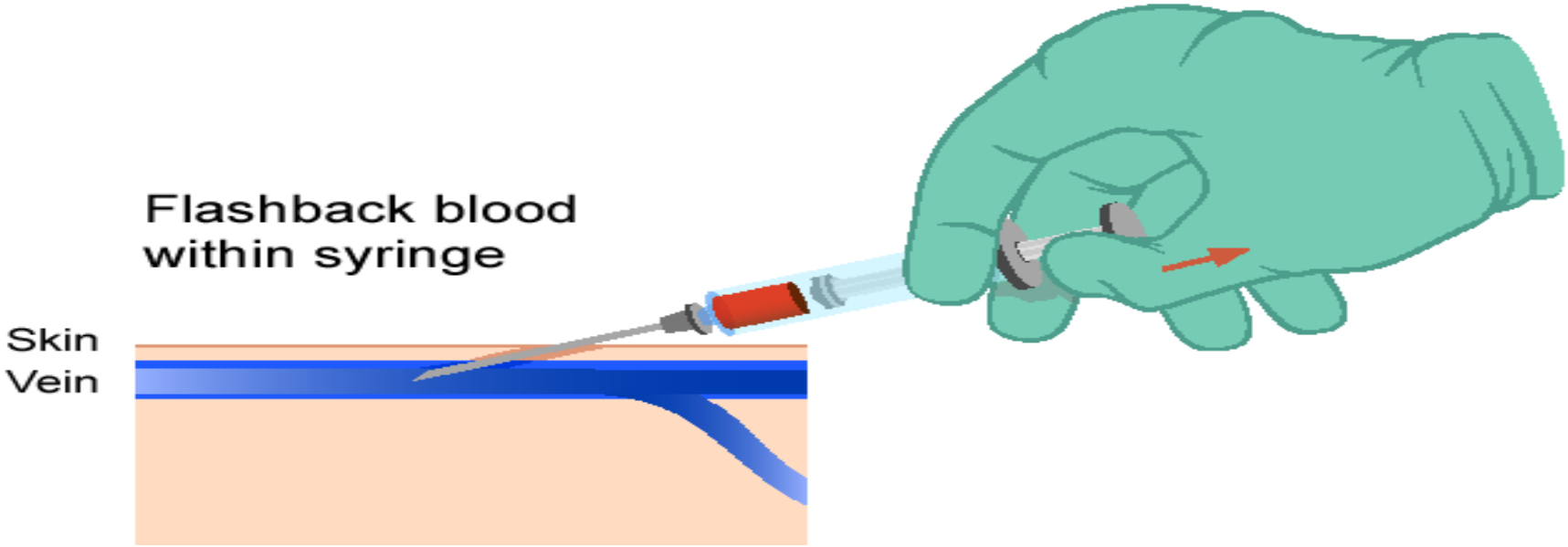


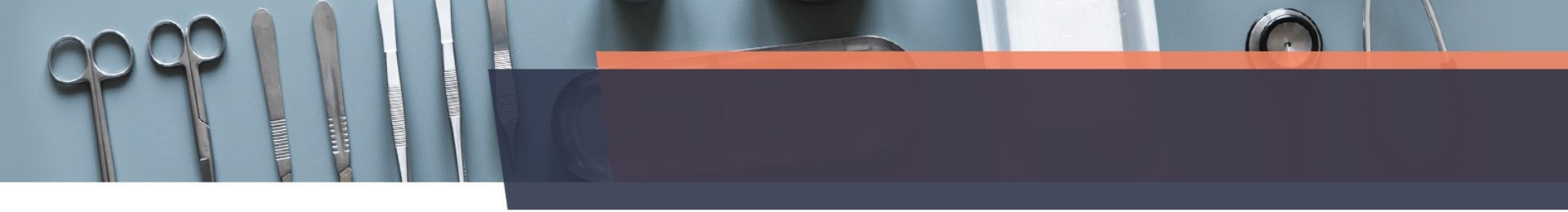
- Μετά από μία μικρή τομή του δέρματος με μαχαιρίδιο στο σημείο εισόδου, προωθούμε τον ειδικό διαστολέα με οδηγό το σύρμα. Προσέχουμε να μην τον ωθήσουμε παραπάνω από το μήκος εκείνο που χρειαστήκαμε για να εισέλθουμε στο αγγείο με τη βελόνη
- Μετά την αφαίρεση του διαστολέα, με οδηγό και πάλι το σύρμα, προωθείται ο καθετήρας
- Η πράξη της τοποθέτησης τελειώνει με τη σταθεροποίηση (δια συρραφής) του καθετήρα

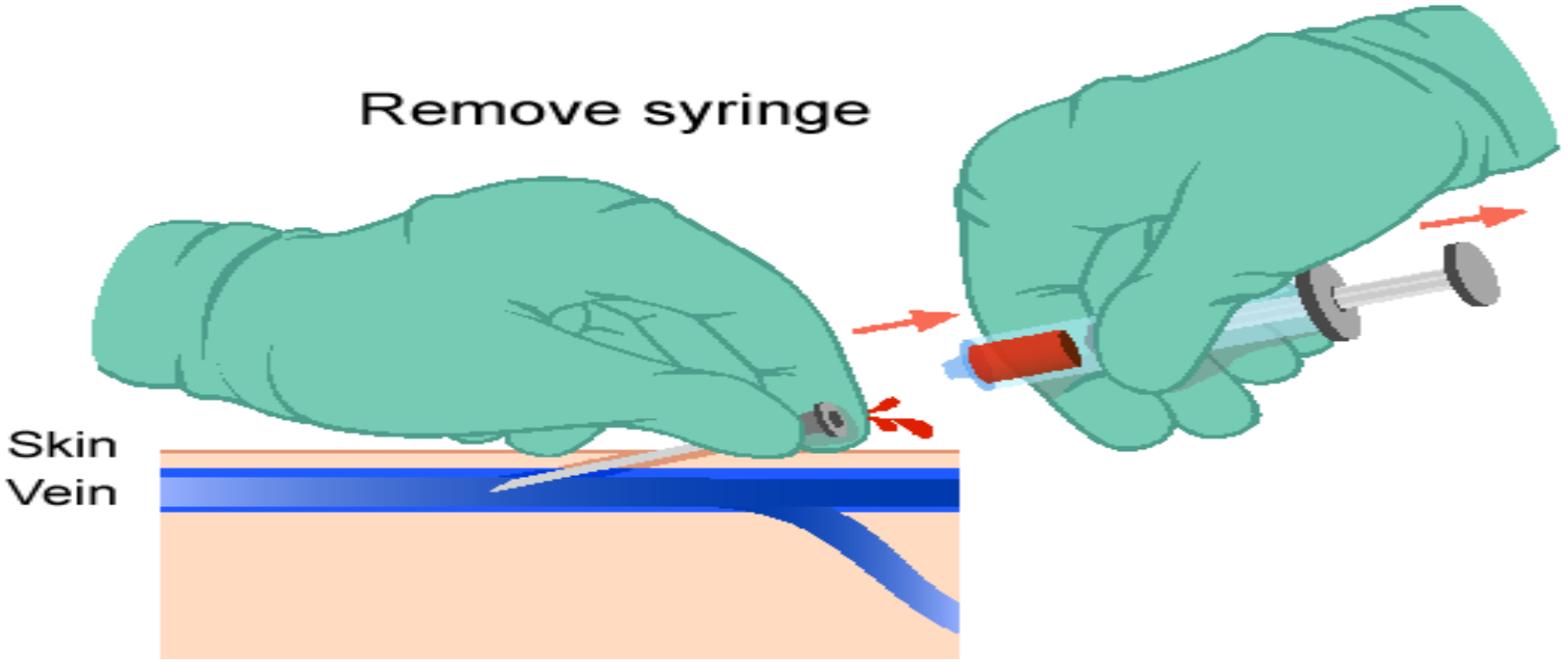


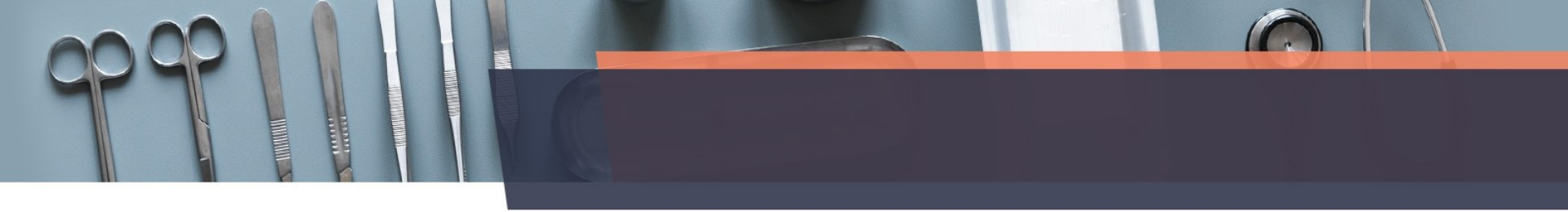

Needle puncture
Skin
Vein

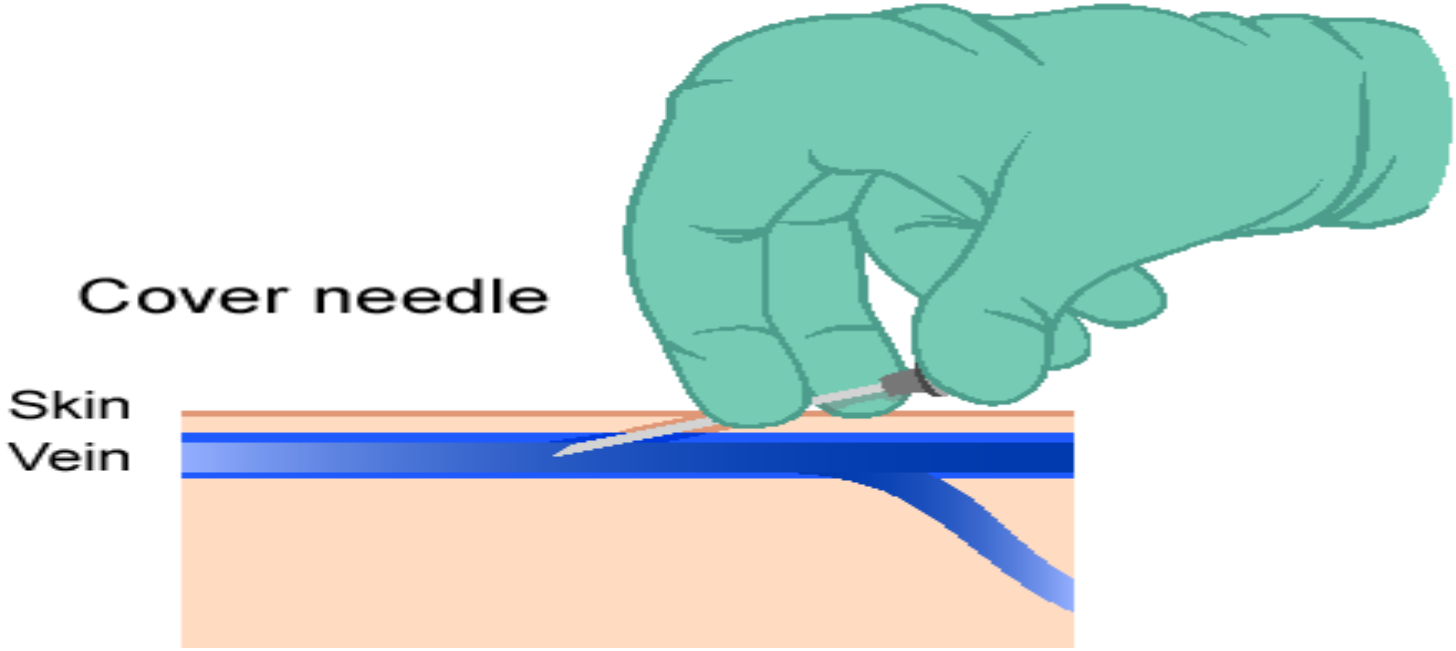


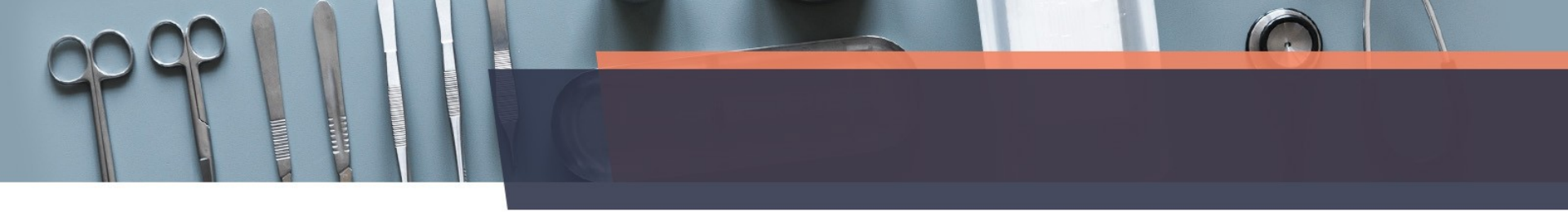

Flashback blood
within syringe
Skin
Vein

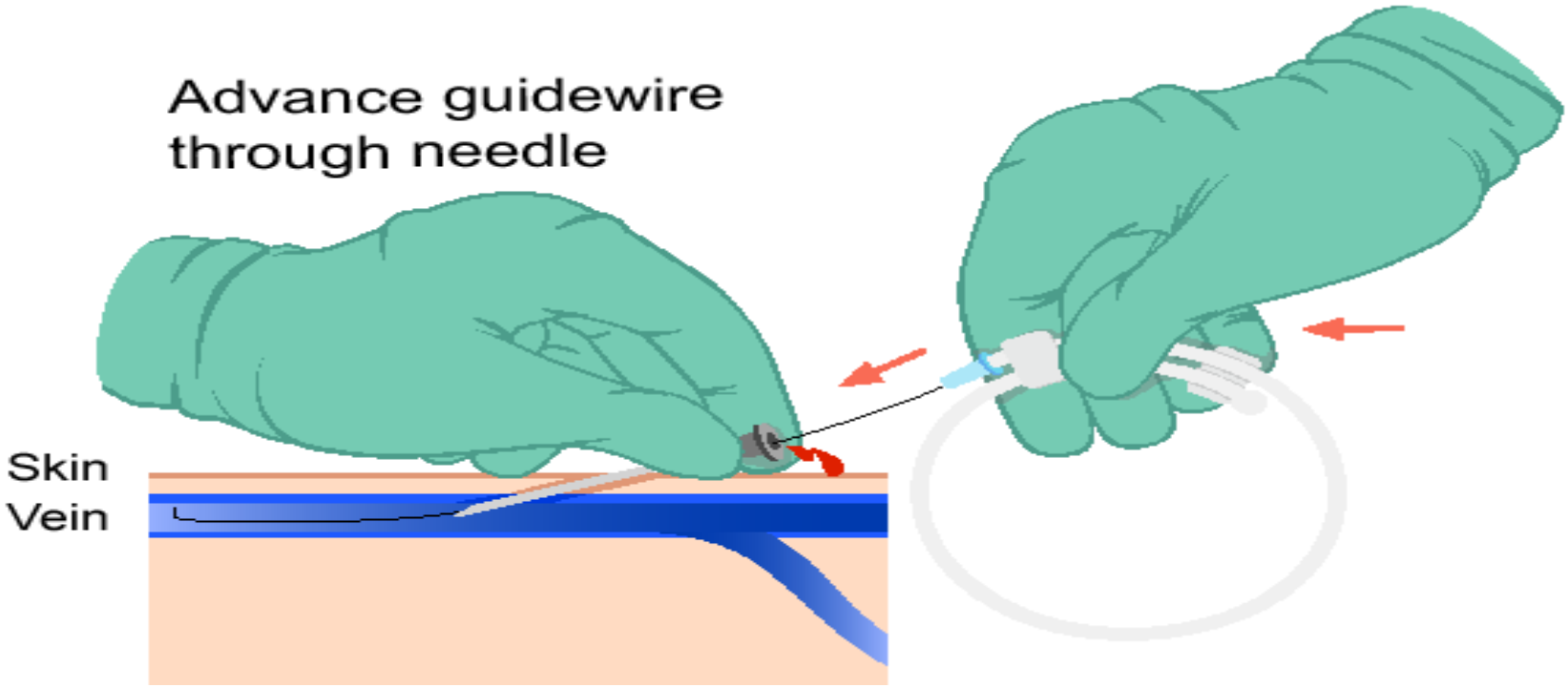


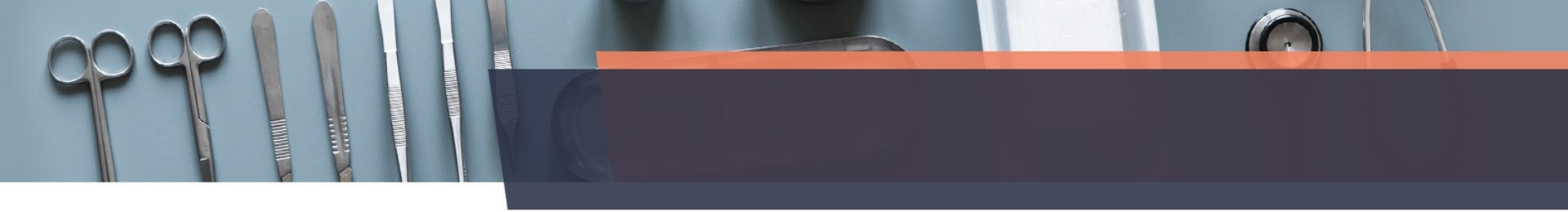

Remove syringe
Skin
Vein

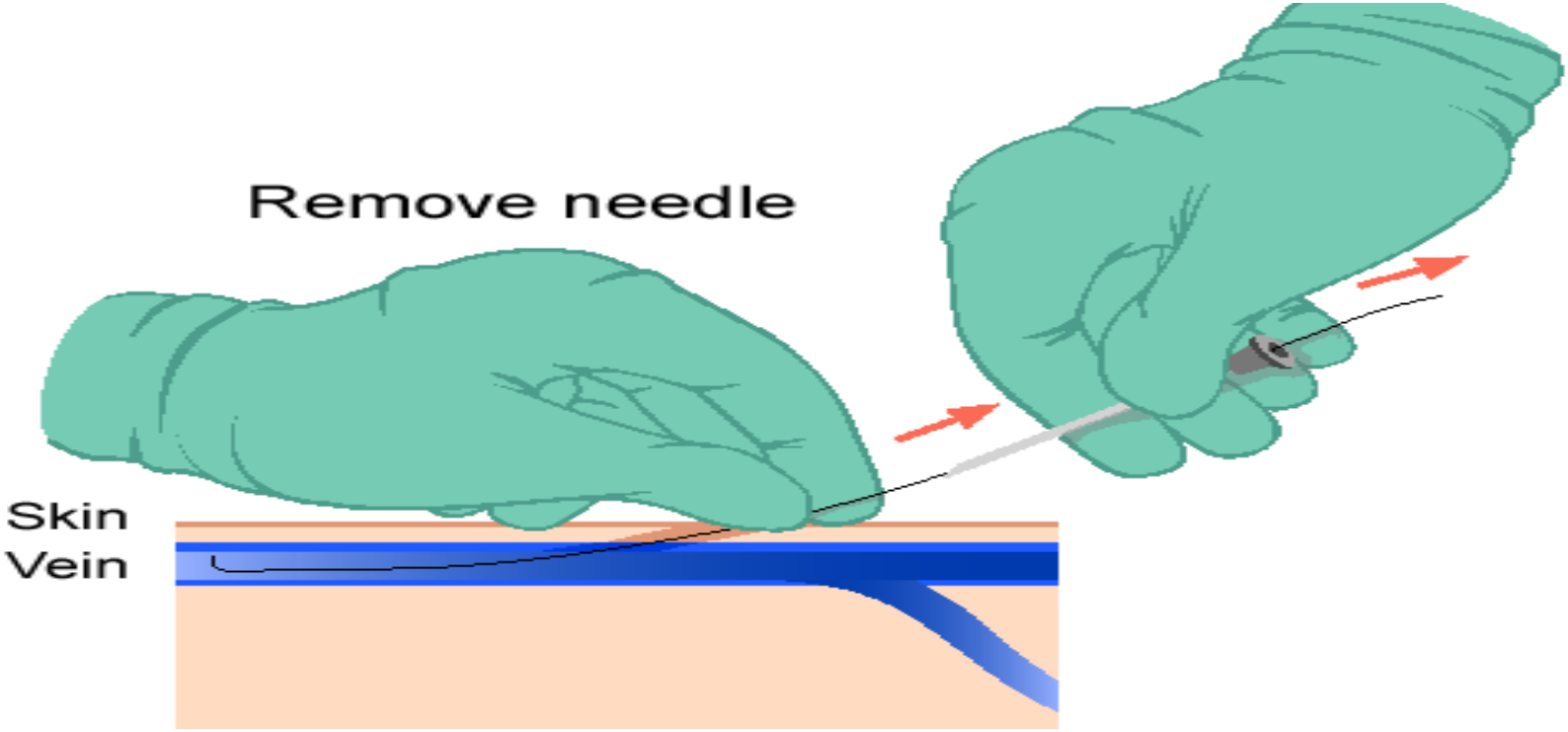


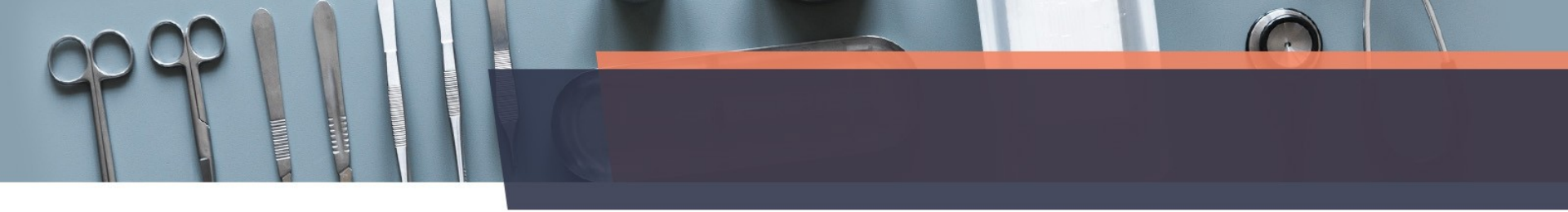

Cover needle
Skin
Vein

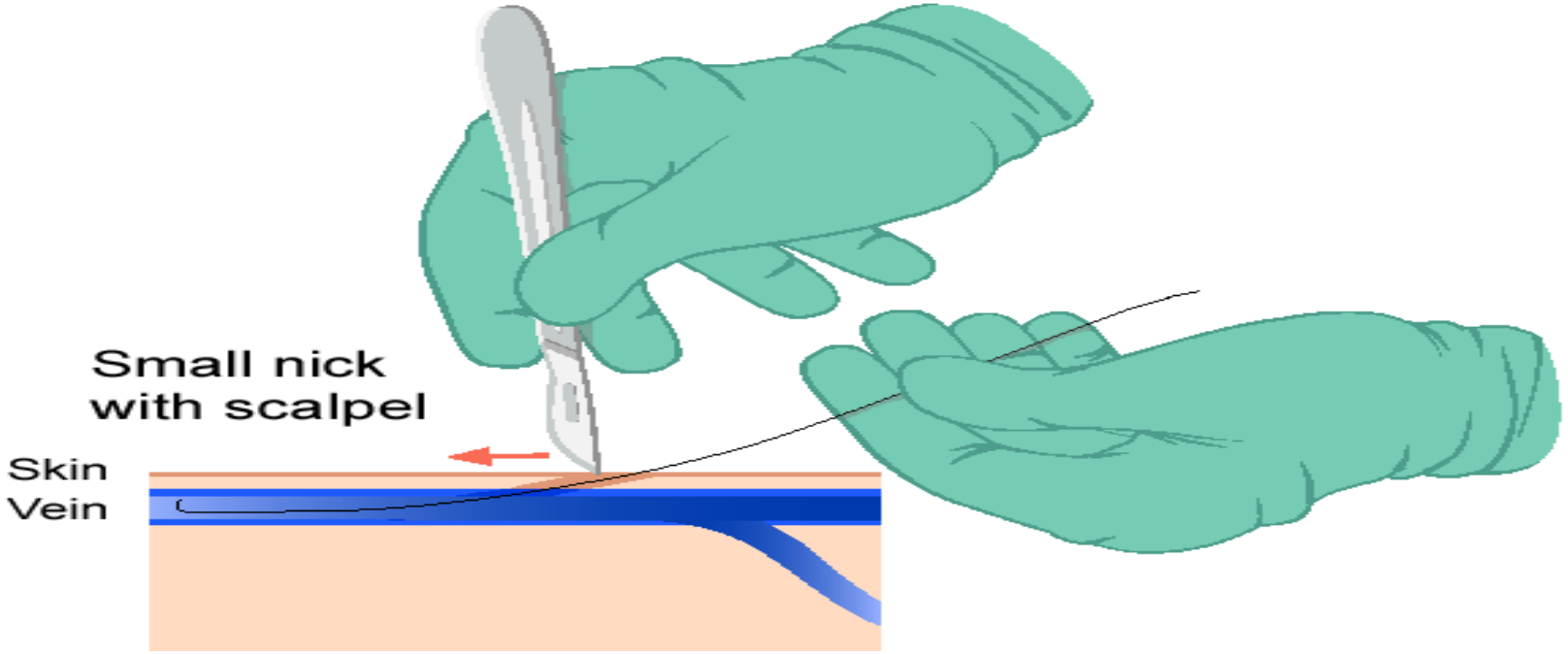


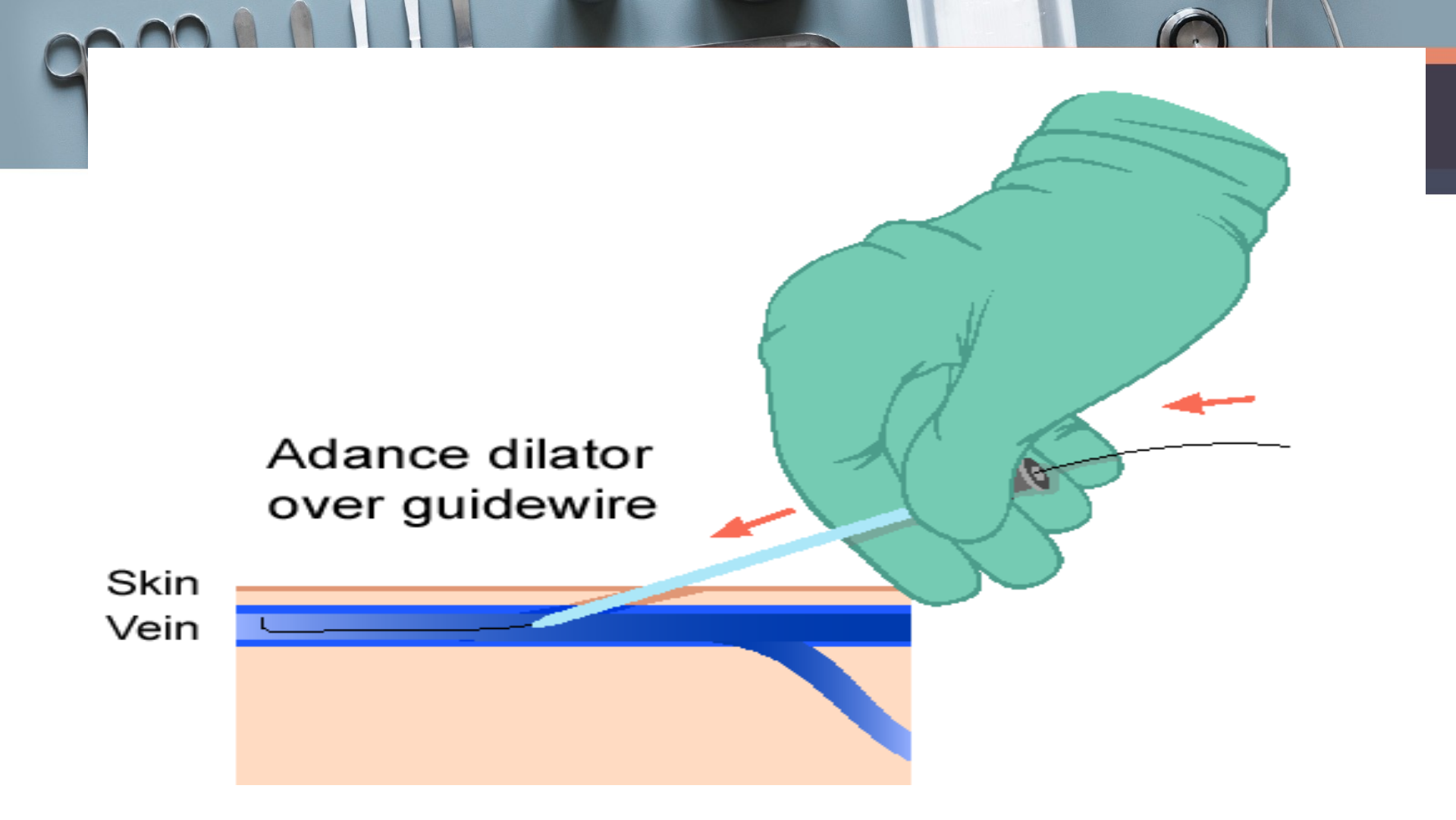

Advance guidewire
through needle
Skin
Vein

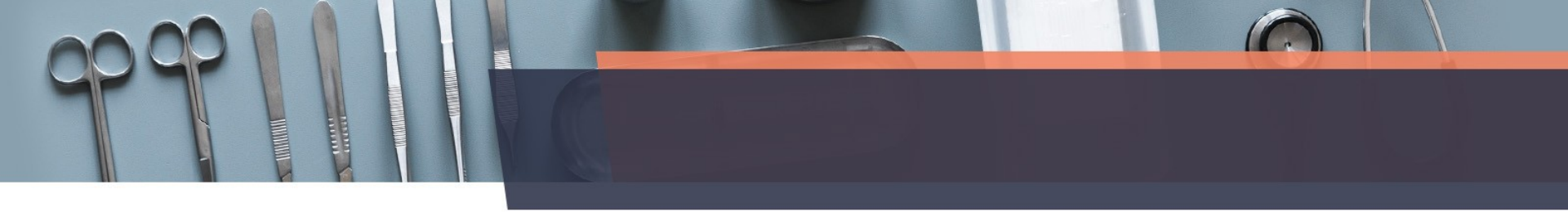


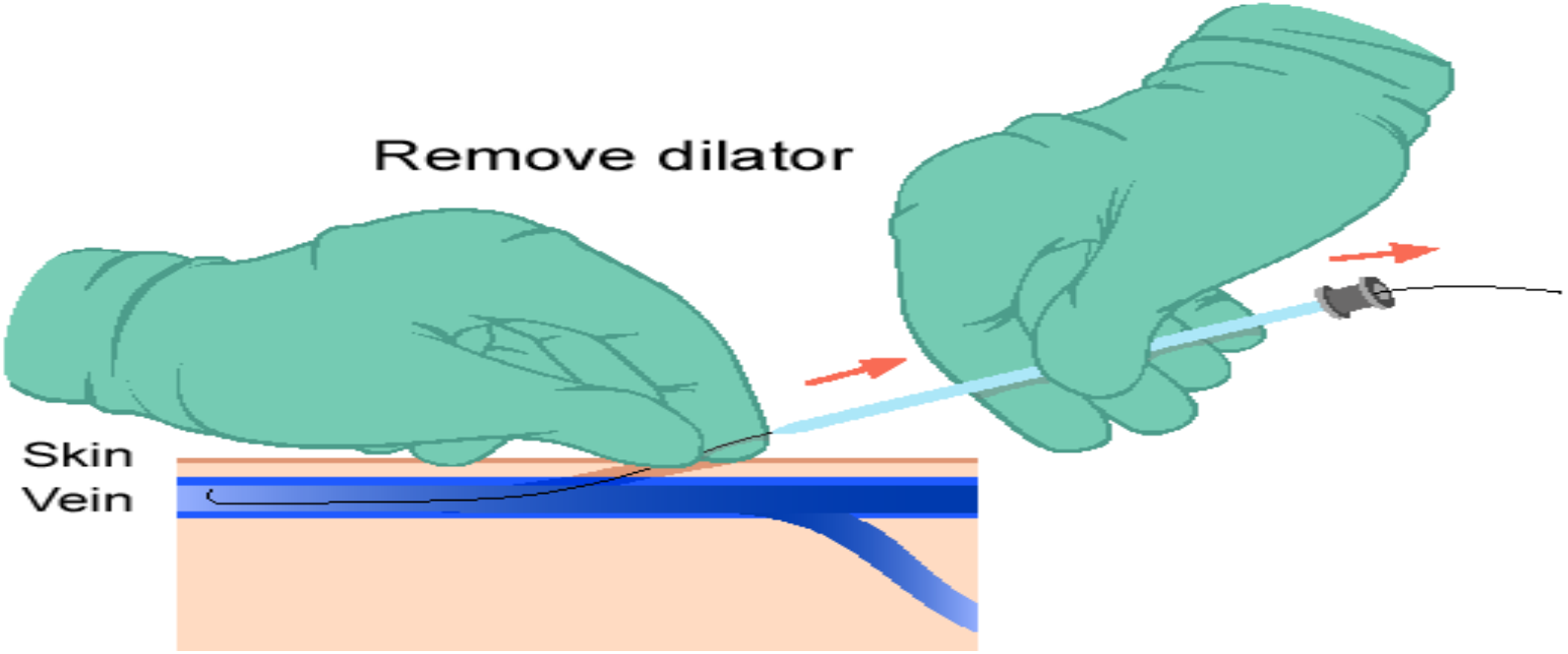

Remove needle
Skin
Vein

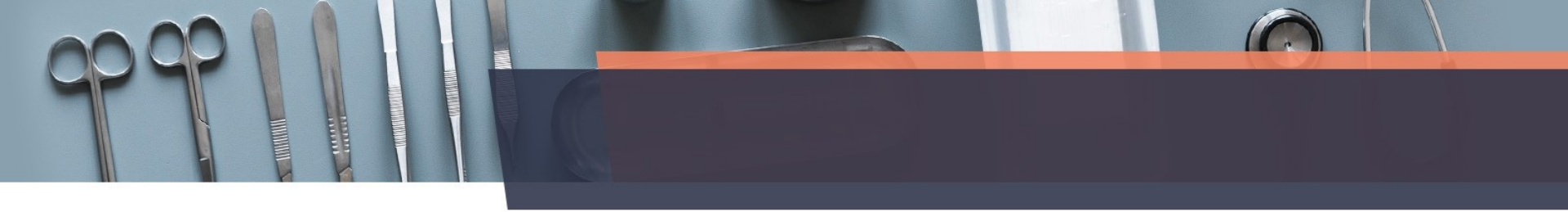


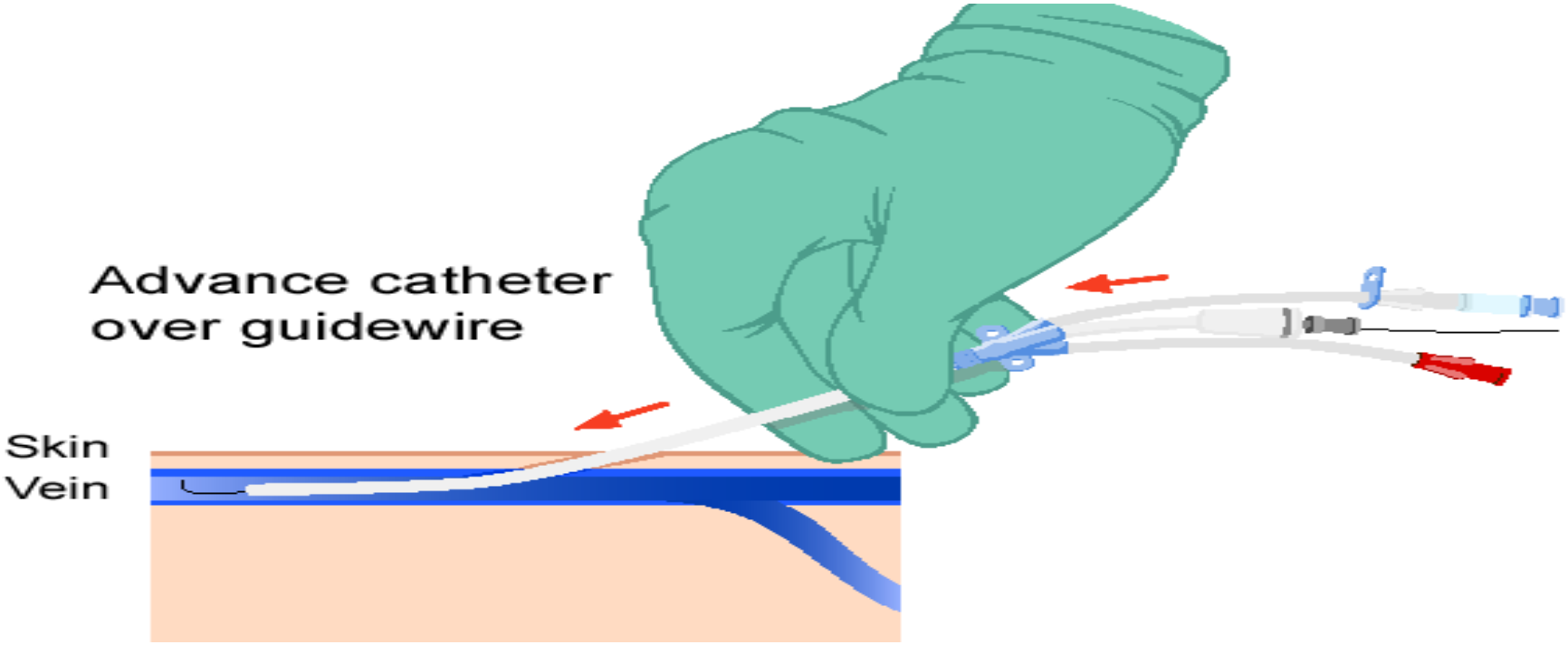

Small nick
with scalpel
Skin
Vein

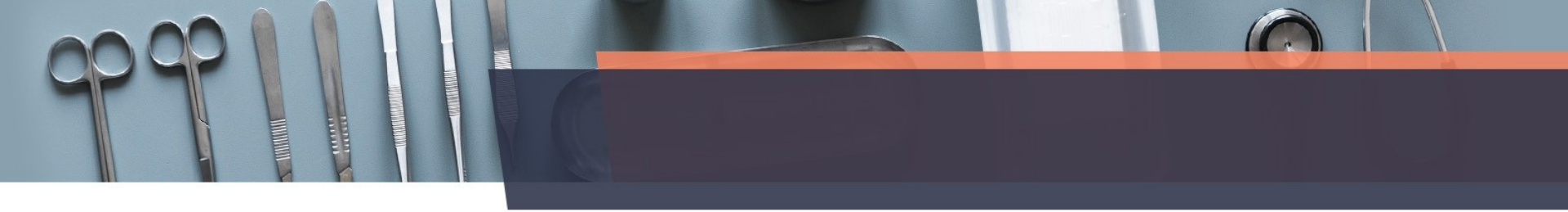

Adance dilator
over guidewire
Skin
Vein

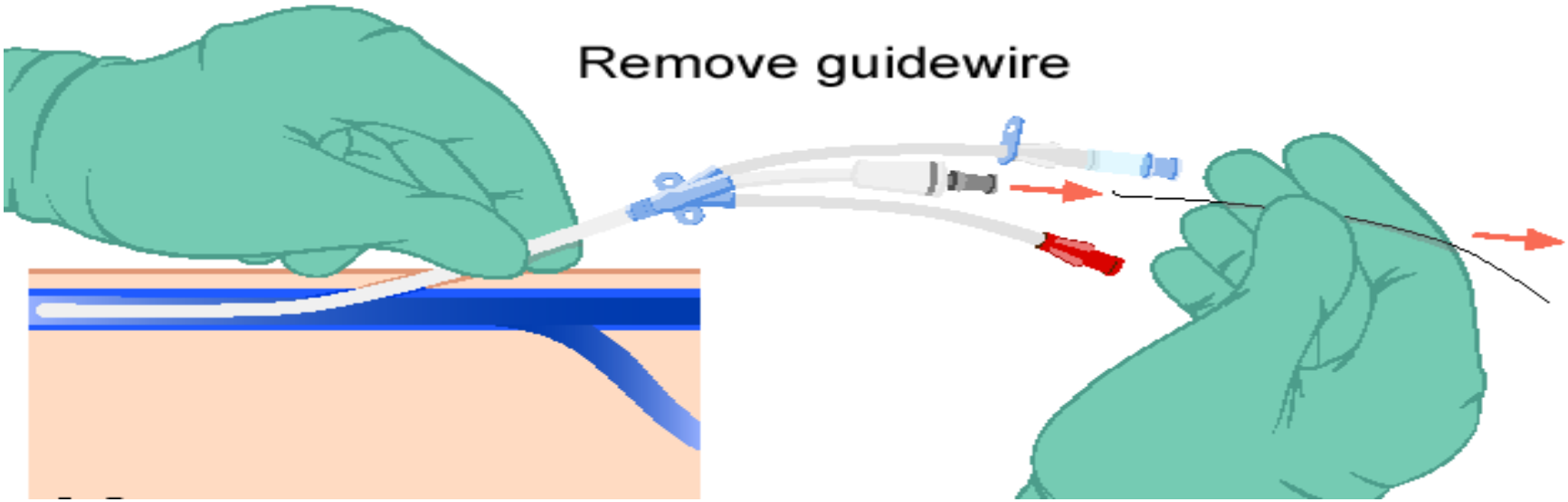



Remove dilator
Skin
Vein



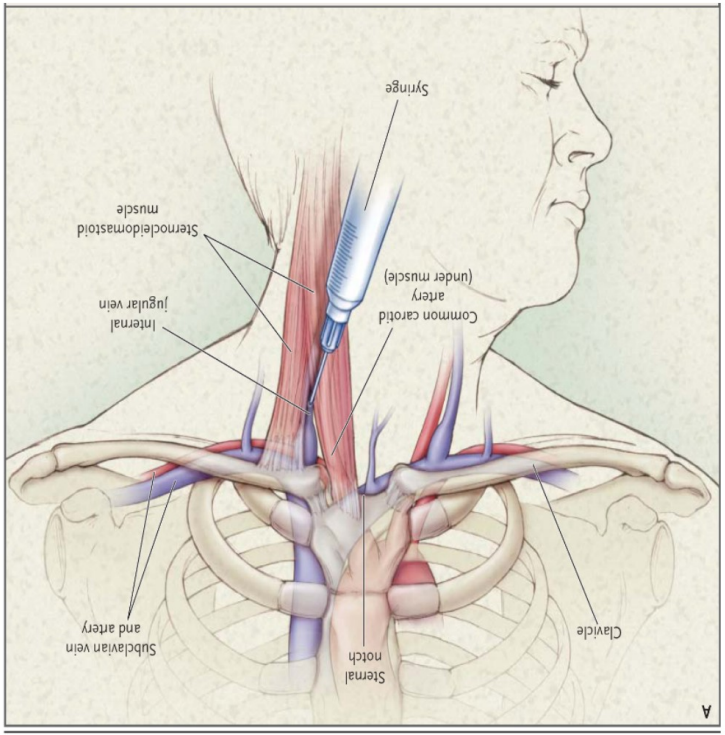

Advance catheter
over guidewire
Skin
Vein



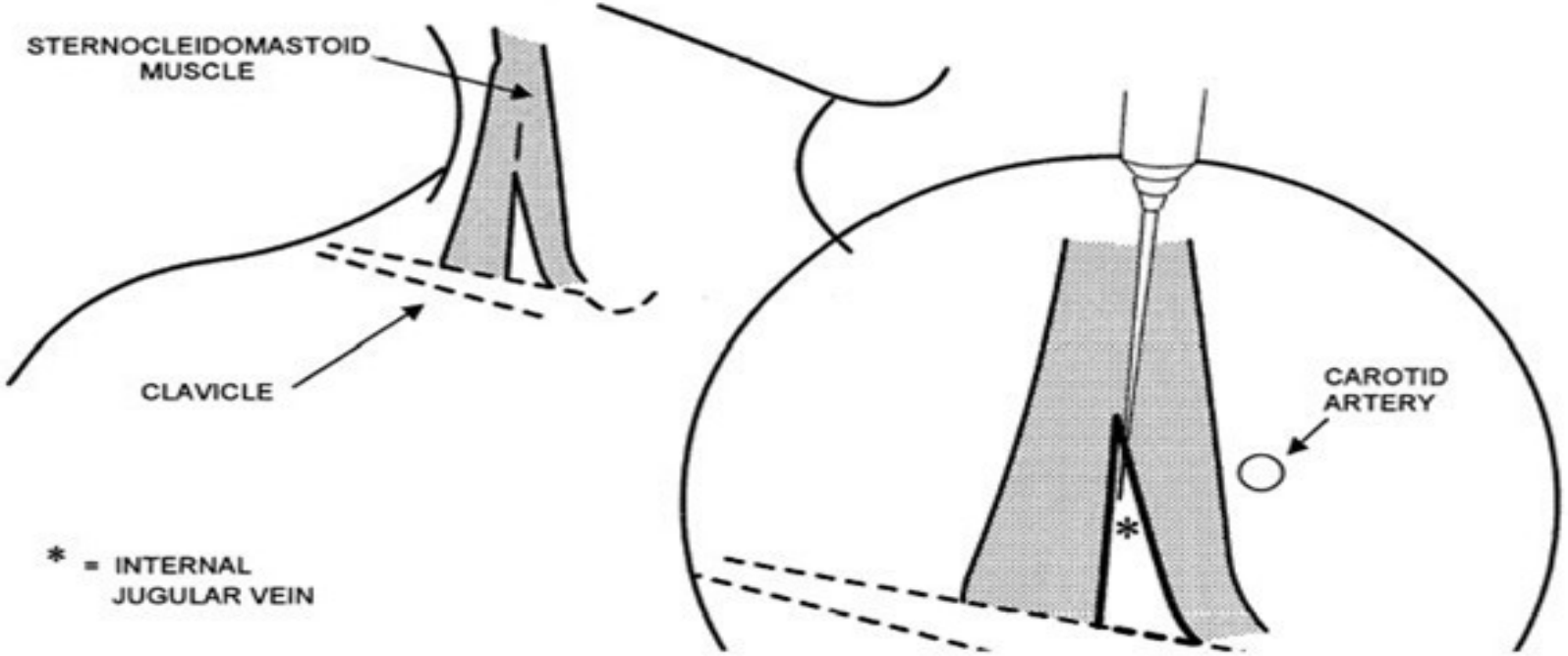

Remove guidewire

Έσω Σφαγίτιδα

- **Ενδείξεις:** Αποτελεί την πρώτη επιλογή λόγω της εύκολης προσπέλασης του αγγείου.
- **Αντενδείξεις:** Προηγούμενη χειρουργική επέμβαση ή ιστορικό θρόμβωσης του φλεβικού δικτύου στο σημείο προσπέλασης και ιδιαιτερότητες στην ανατομία του τραχήλου.
- **Πλεονεκτήματα:** Μικρός κίνδυνος για πνευμοθώρακα
- **Μειονεκτήματα:** Δεν υπάρχουν
- **Επιπλοκές:** Εμβολή αέρα, τρώση καρωτίδας, πνευμοθώρακας, αρρυθμίες

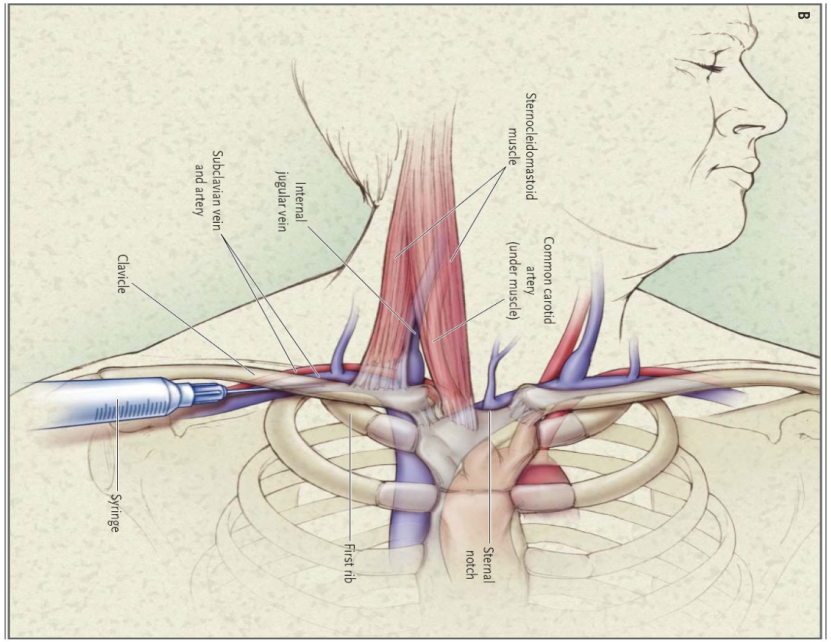


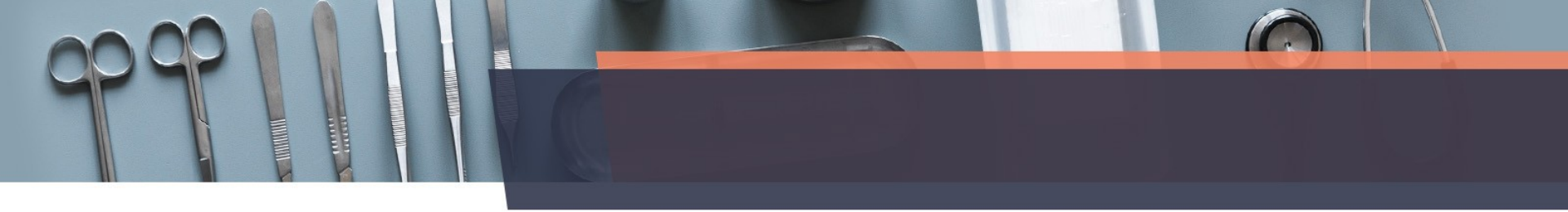
Τοποθέτηση ΚΓ στην έσω σφαγίτιδα



Υποκλείδιος Φλέβα

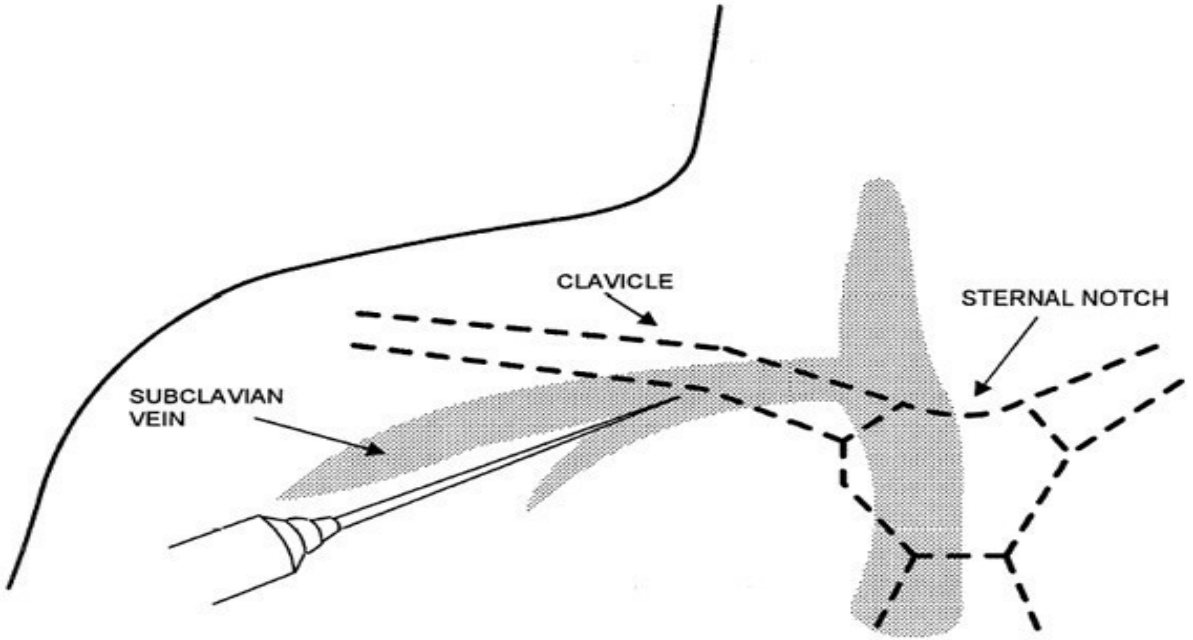
- **Ενδείξεις**: Θεωρείται ιδανική για καθετηριασμό, επειδή είναι μεγάλο αγγείο.
- **Αντενδείξεις:** Θρομβώσεις, πολυτραυματίας με τραύματα στον θώρακα.
- **Πλεονεκτήματα:** Οδηγά ανατομικά στοιχεία
- **Μειονεκτήματα:** Δυσκολία πίεσης σε περίπτωση αιμορραγίας
- **Επιπλοκές:** Πνευμοθώρακας, τρώση υποκλειδίου αρτηρίας, αρρυθμίες

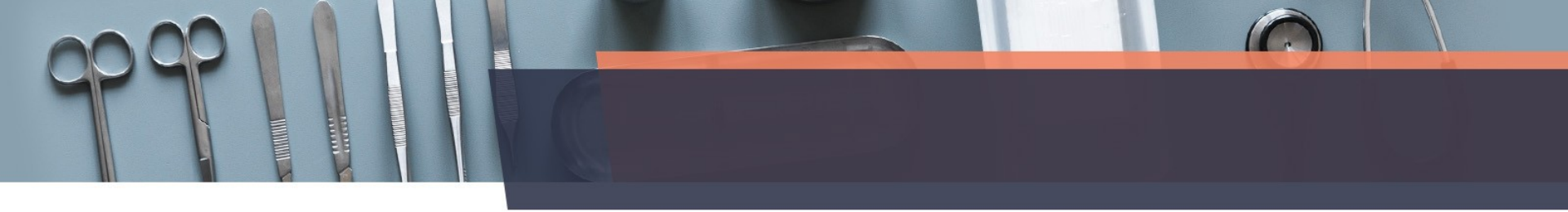


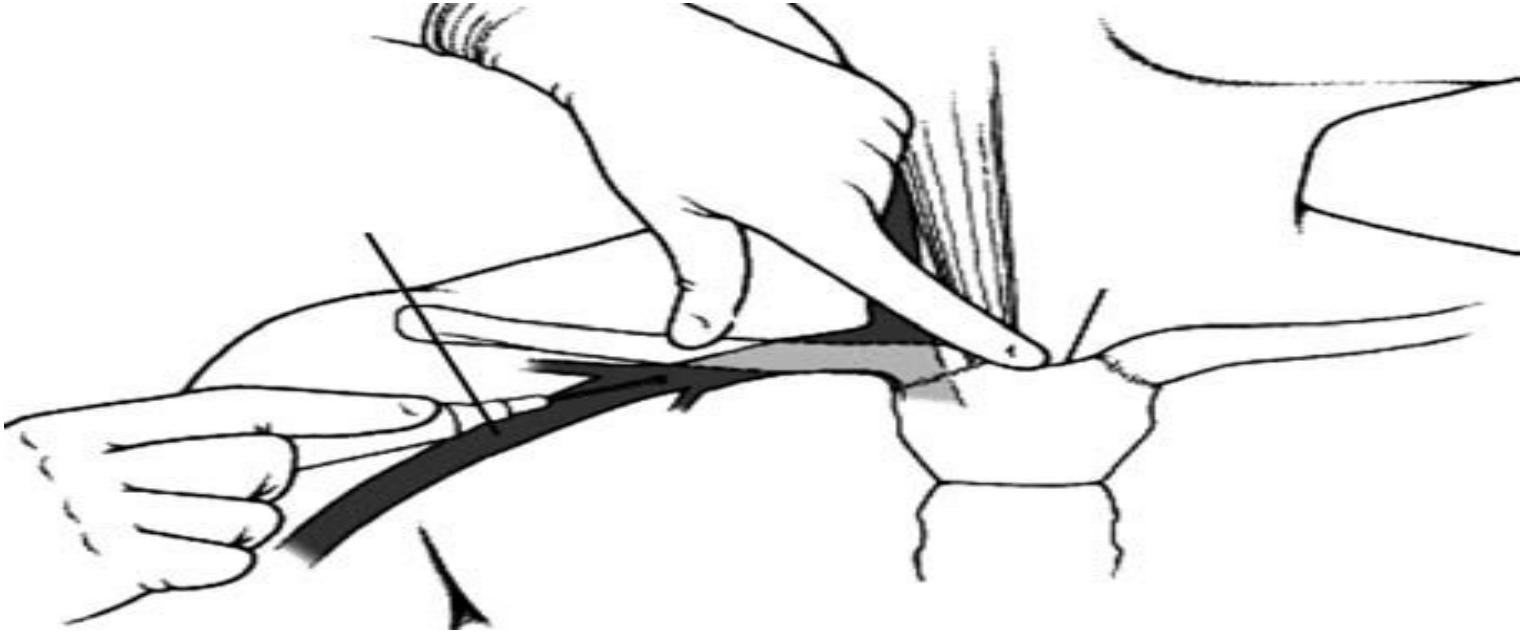


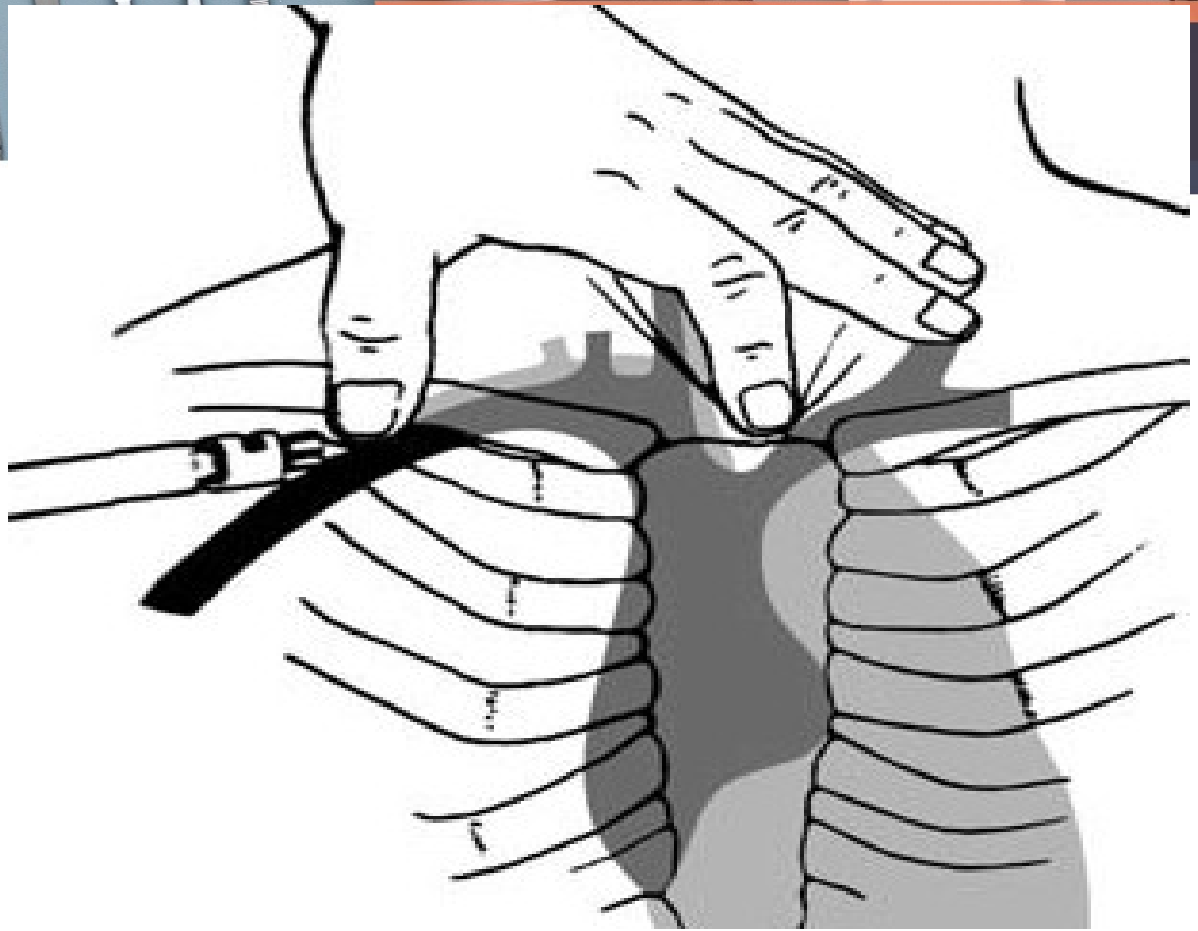
Θέση	Πλεονεκτήματα	Μειονεκτήματα
Έσω σφαγίτιδα φλέβα	Μεγάλο αγγείο Εύκολη εντόπιση Εύκολη προσπέλαση Σύντομη ευθεία πρόσβαση στην άνω κοίλη φλέβα Ελατ. Κίνδυνος πνευμοθώρακα Βέλτιστη επιλογή σε διαταραχές πήξης	Τρώση καρωτίδας Αποφυγή σε παχυσαρκία με όχι σαφή ανατομικά όρια Δυσανεξία για τον ασθενή Δύσκολη η επικάλυψη Εύκολη η λοίμωξη Δυσκολία επί τραχειοτομής ή τραύματος στο λαιμό

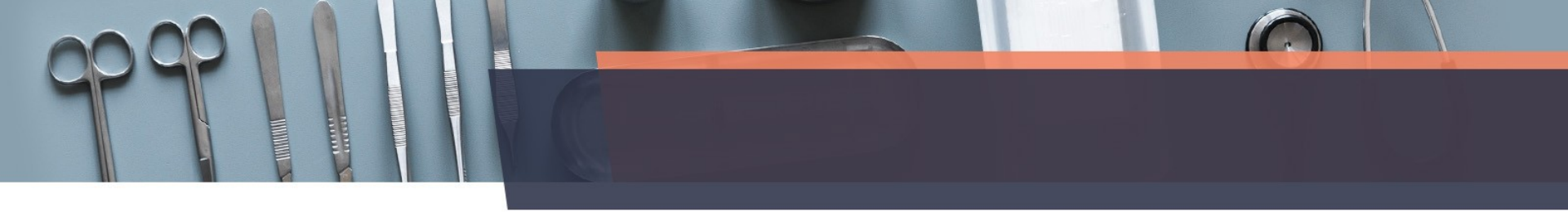
Τοποθέτηση ΚΓ στην Υποκλείδιο





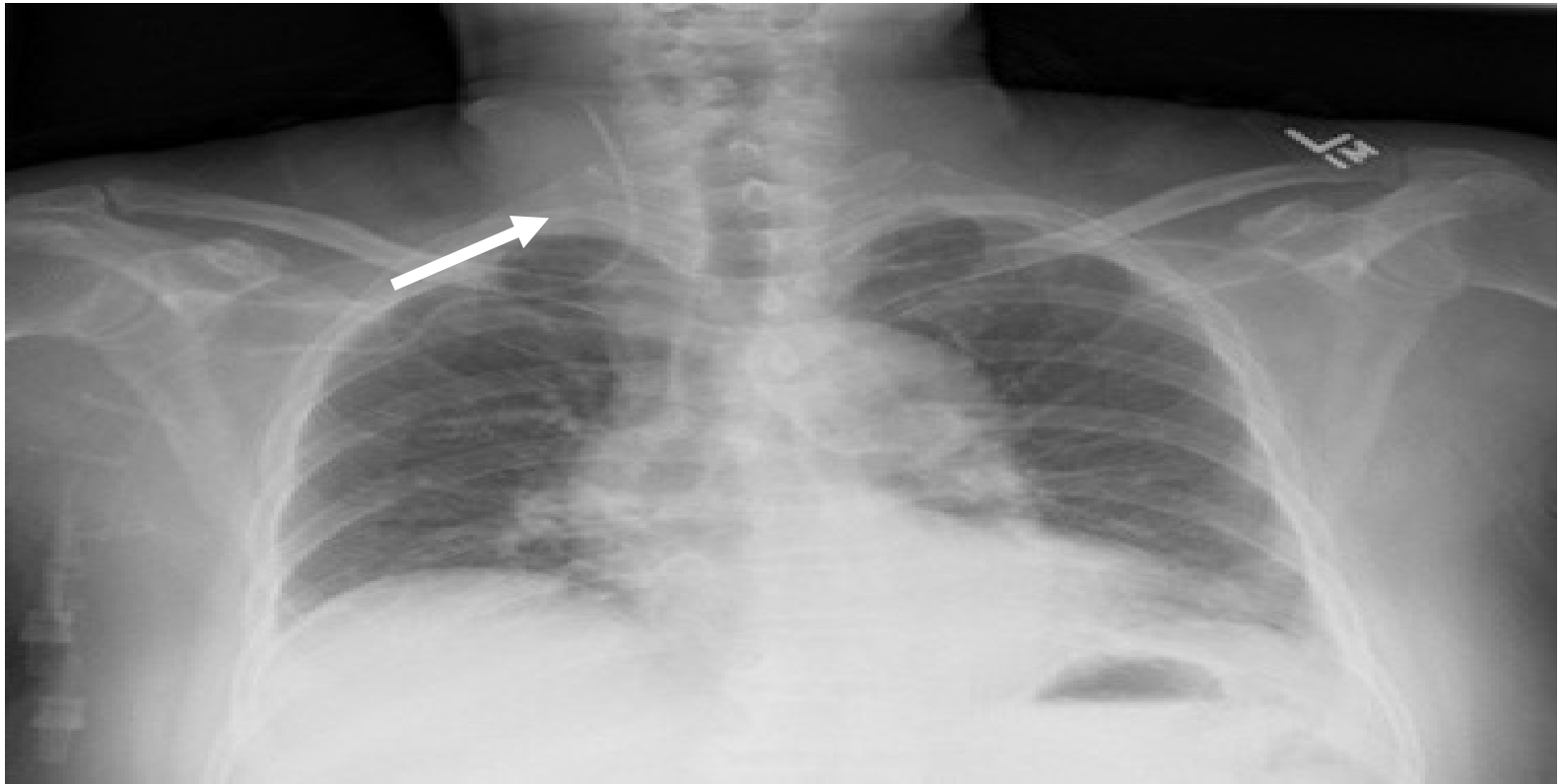






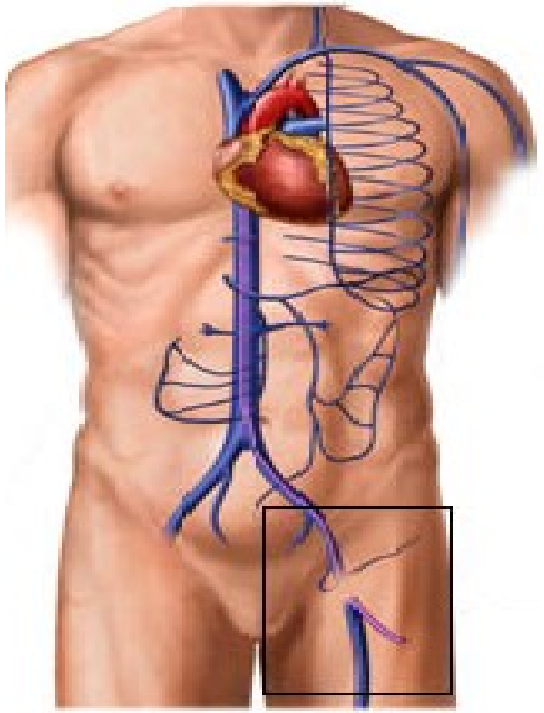
Θέση	Πλεονεκτήματα	Μειονεκτήματα
Υποκλείδιος φλέβα	Μεγάλο αγγείο Υψηλές ροές υγρών Ελατ. συχνότητα επιπλοκών Διατήρηση επικάλυψης Λιγότερο περιοριστική για τον ασθενή Ελάχιστη συχν. λοίμωξης Βέλτιστη επιλογή σε υπογκαιμική καταπληξία	Γειτνίαση με κορυφή πνεύμονα – πνευμοθώρακας Τρώση υποκλείδιας αρτηρίας Δύσκολος ο έλεγχος αιμορραγίας Αποφυγή σε υποξαιμία

ΚΓ στην καρωτίδα μετά από καθετηριασμό της υποκλειδίου



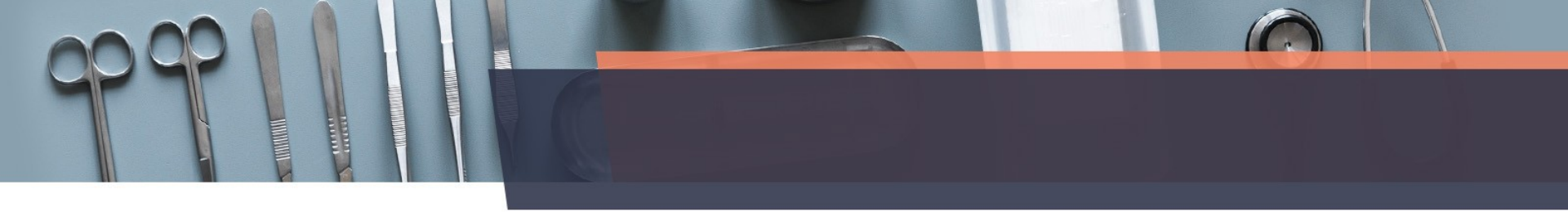
Μηριαία Φλέβα

- **Ενδείξεις:** Αδυναμία προσπέλασης των δύο ανωτέρω οδών, αιμορραγική διάθεση.
- **Αντενδείξεις:** Θρόμβωση της μηριαίας φλέβας, ακράτεια ούρων, προηγούμενη χειρουργική επέμβαση στο σημείο προσπέλασης.
- **Πλεονεκτήματα:** Εύκολη προσπέλαση
- **Μειονεκτήματα:** Φλεβική θρόμβωση, αδυναμία κάμψης του ποδιού (πού μπορεί να είναι ενοχλητικό για του αρρώστους που έχουν επαφή με το περιβάλλον).
- **Επιπλοκές:** Τρώση νεύρου ή μηριαίας αρτηρίας, αιμάτωμα και κίνδυνος για λοίμωξη.

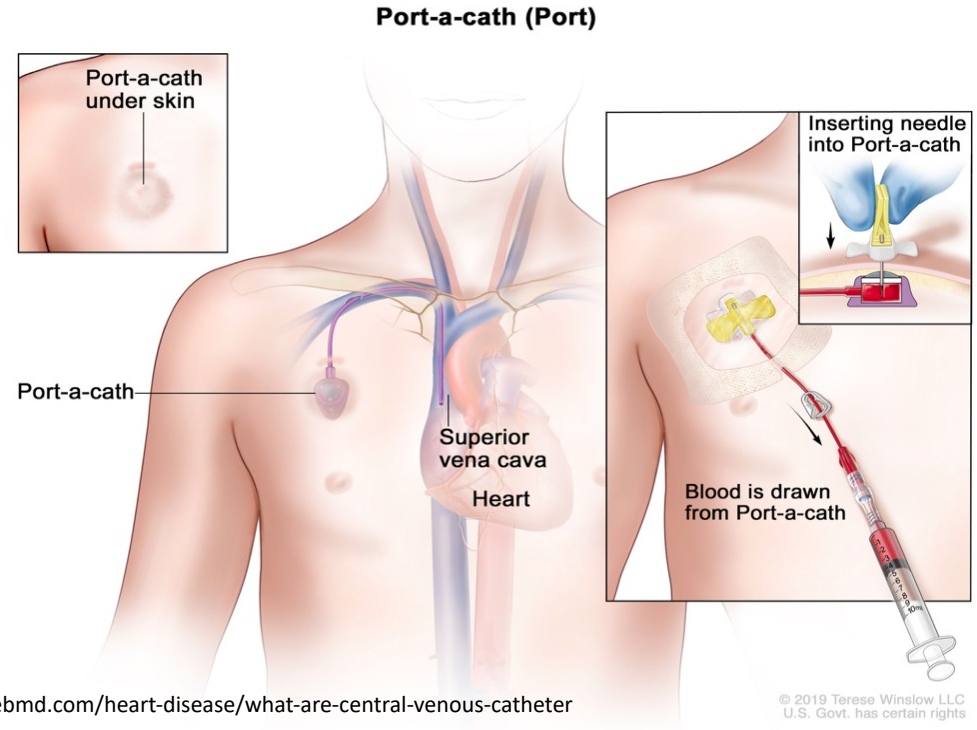


Μηριαία φλέβα

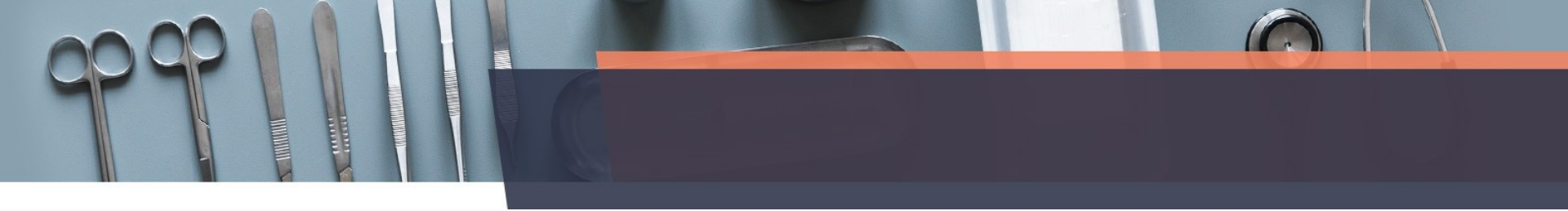
Θέση	Πλεονεκτήματα	Μειονεκτήματα
Μηριαία φλέβα	Βέλτιστη επιλογή σε υποογκαιμική καταπληξία Εύκολη πρόσβαση Μεγάλο αγγείο Καλή επιλογή σε ανάνηψη	Ελατ. Κινητικότητα Αυξημ. Θρόμβωση Αυξημ. λοίμωξη Εύκολη μόλυνση Γειτνίαση με μηριαία αρτηρία Δύσκολη η επικάλυψη



A device used to draw blood and give treatments, including intravenous fluids, blood transfusions, or drugs such as chemotherapy and antibiotics. The port is placed under the skin, usually in the right side of the chest. It is attached to a catheter (a thin, flexible tube) that is guided (threaded) into a large vein above the right side of the heart called the superior vena cava. A needle is inserted through the skin into the port to draw blood or give fluids and other treatments. A port-a-cath may stay in place for many weeks, months, or years. Also called port.



ПНГН: https://www.webmd.com/heart-disease/what-are-central-venous-catheter



Device Type	Proposed Duration of Infusion			
	≤5 d	6–14 d	15–30 d	≥31 d
Peripheral IV catheter	No preference between peripheral IV and US-guided peripheral IV catheters for use ≤5 d		Inappropriate	Inappropriate
US-guided peripheral IV catheter	US-guided peripheral IV catheter preferred to peripheral IV catheter if proposed duration is 6–14 d		Inappropriate	Inappropriate
Nontunneled/acute central venous catheter	Central venous catheter preferred in critically ill patients or if hemodynamic monitoring is needed for 6–14 d		Inappropriate	Inappropriate
Midline catheter	Midline catheter preferred to PICC if proposed duration is ≤14 d		Inappropriate	Inappropriate
PICC	Inappropriate	PICC preferred to midline catheter if proposed duration of infusion is ≥15 d		
Tunneled catheter	Inappropriate	Inappropriate	Inappropriate	PICC preferred to tunneled catheter and ports for infusion 15–30 d
Port	Inappropriate	Inappropriate	Inappropriate	

Appropriate | Neutral | Inappropriate | Disagreement

Figure 3. Venous access device recommendations for infusion of peripherally compatible infusate.

Ann Intern Med. 2015;163:S1-S39

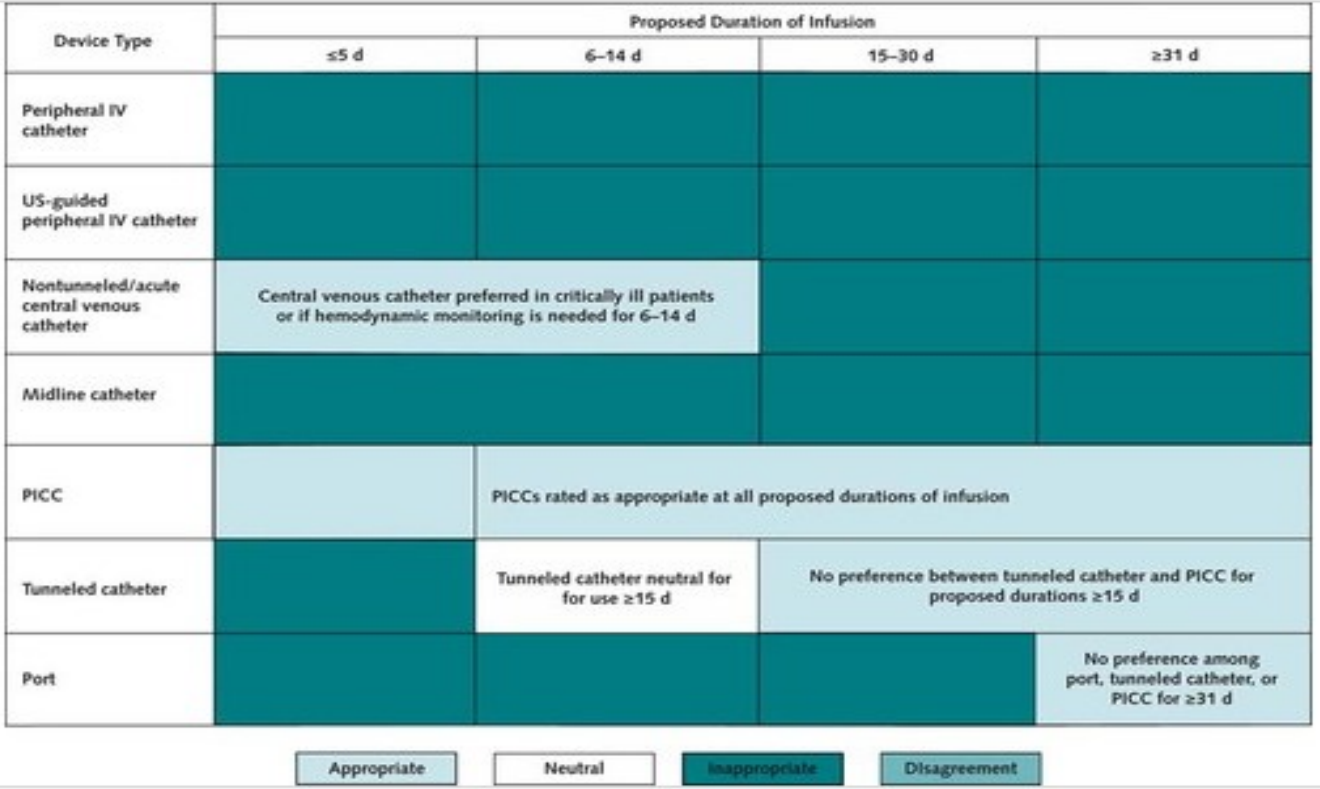
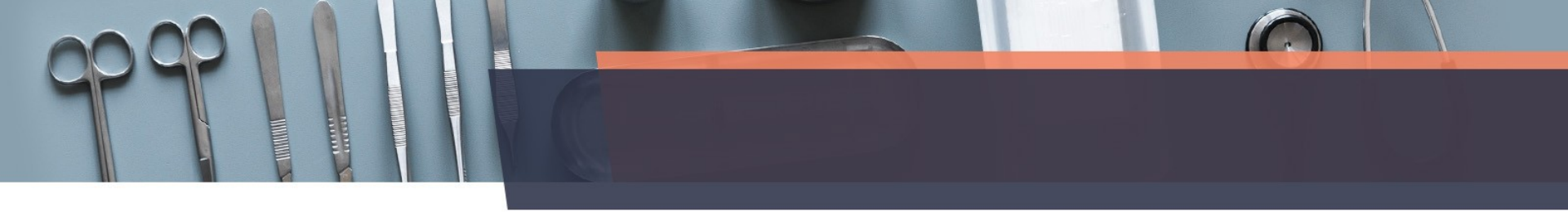


Figure 4. Venous access device recommendations for infusion of non–peripherally compatible infusates.

ΠΗΓΗ:Ann Intern Med. 2015;163:S1-S39

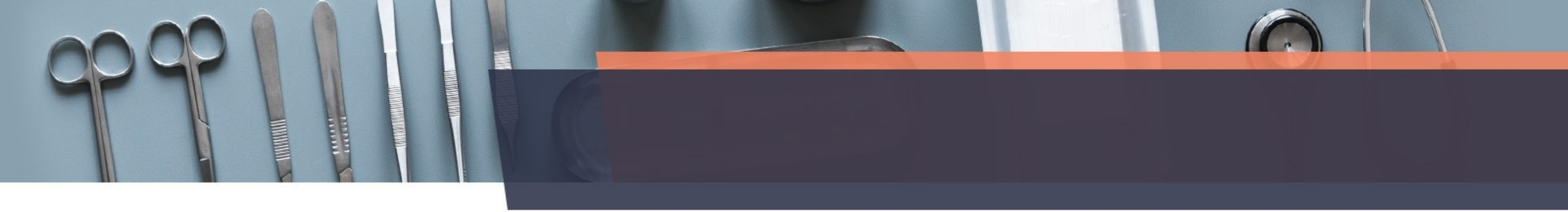


Device Type	Proposed Duration of Infusion			
	≤5 d	6–14 d	15–30 d	≥31 d
Peripheral IV catheter	No preference between peripheral IV and US-guided peripheral IV catheters for use ≤5 d			
US-guided peripheral IV catheter	US-guided peripheral IV catheters preferred to peripheral IV catheters if proposed duration is 6–14 d			
Midline catheter	Midline catheters preferred to PICC if proposed duration is ≤14 d			
Nontunneled/acute central venous catheter	Central venous catheter preferred to PICC for use ≤14 d in critically ill patients			
PICC	Disagreement on appropriateness of PICC for durations <5 d	PICC use appropriate if proposed duration is ≥6 d; PICCs preferred to tunneled catheters for durations of 15–30 d		
Tunneled catheter			Tunneled catheter neutral for difficult IV access for use ≥15 d	No preference between tunneled catheter or port for use ≥31 d
Port				

Appropriate | Neutral | Inappropriate | Disagreement

Figure 5. Venous access device recommendations for patients with difficult venous access.

Ann Intern Med. 2021;174:1513–20.



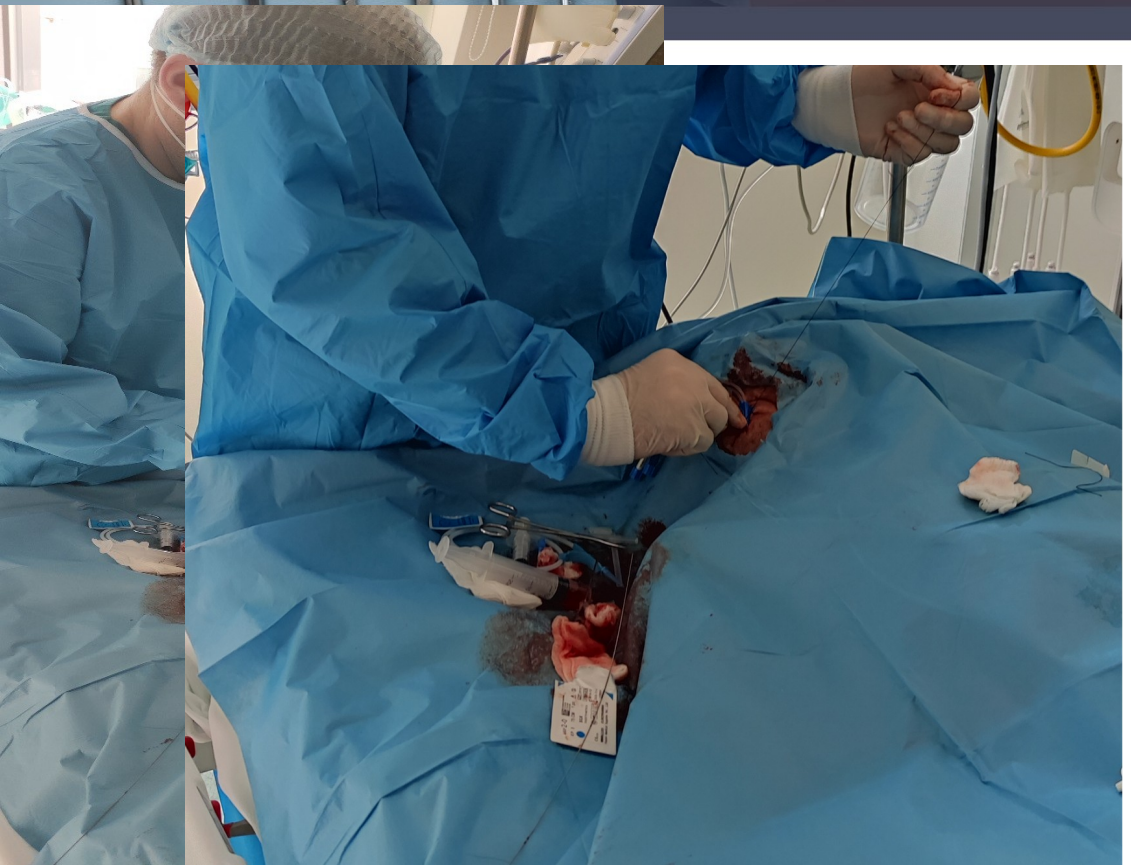
Device Type	Proposed Duration of Infusion			
	≤5 d	6–14 d	15–30 d	≥31 d
Peripheral IV catheter	No preference between peripheral IV and US-guided peripheral IV catheter for use ≤5 d			
US-guided peripheral IV catheter	US-guided peripheral IV catheter preferred if venous access difficult			
Midline catheter	Midline catheter preferred to PICCs if proposed duration is ≤14 d		Midline catheter neutral for frequent phlebotomy at this duration	
Nontunneled/acute central venous catheter	Central venous catheter preferred to PICC for use ≤14 d in critically ill patients			
PICC	Disagreement on appropriateness of PICC for durations <5 d	PICC use appropriate if proposed duration ≥6 d; PICC preferred to tunneled catheter for durations of 15–30 d		
Tunneled catheter			Tunneled catheter neutral for difficult intravenous access for use ≥15 d	
Port	Ports inappropriate for frequent phlebotomy, regardless of proposed duration of use			

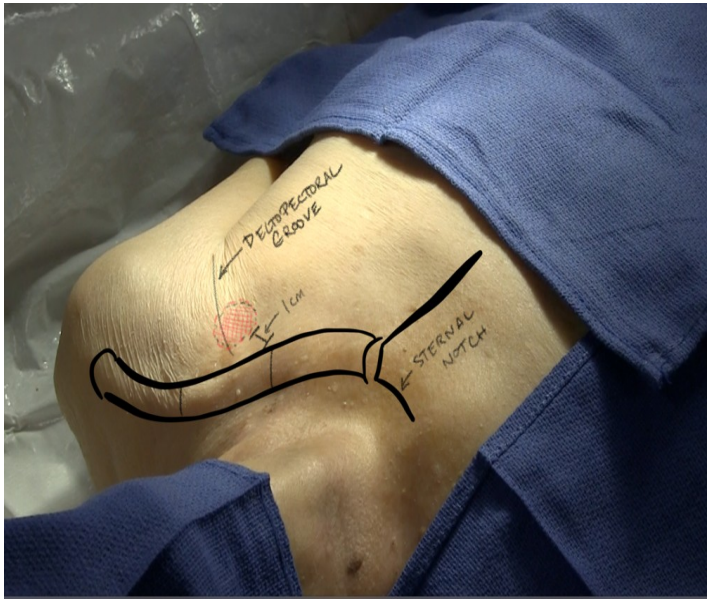
Appropriate | Neutral | Inappropriate | Disagreement

Figure 6. Venous access device recommendations for patients who require frequent phlebotomy.

Ann Intern Med 2015;163:S1-S39

Δεν είναι απλή διεργασία





Ομάδα τοποθέτησης Κεντρικών ΓΡΑΜΜΩΝ (Κ.Γ.)

- Αποτελείται από Ιατρούς, Νοσηλευτές εκπαιδευμένους στην διαδικασία τοποθέτησης Κ.Γ.
- Που έχουν τα κατάλληλα εργαλεία τοποθέτησης Κ.Γ.
- Ακολουθούν τις ενδεικνυόμενες τεχνικές τοποθέτησης Κ.Γ.
- Ακολουθούν τα ενδεικνυόμενα μέτρα αντισηψίας τοποθέτησης Κ.Γ.

Πηγή: https://www.vascularwellness.com/central-venous-catheter-lines/

Common risk of all Central lines

Central line-associated bloodstream infections at the multidisciplinary intensive care unit of Universitas Academic Hospital, Bloemfontein, South Africa

E Glover,[1] MB ChB, FCP (SA), MMed (Int), Dip (HIV); **A Abrahamson,**[2] **J Adams,**[2] **S R Poken,**[2] **S-L Hainsworth,**[2] **A Lamprecht,**[2] **T Delport,**[2] **T Keulder,**[2] **T Olivier,**[2] **S D Maasdorp,**[3] MB ChB, FCP(SA), MMed (Int), Cert Pulm (SA) Phys

[1] *Division of Infectious Diseases, Department of Internal Medicine, Faculty of Health Sciences, University of the Free State, Bloemfontein, South Africa*
[2] *Medical students, Department of Internal Medicine, Faculty of Health Sciences, University of the Free State, Bloemfontein, South Africa*
[3] *Division of Pulmonology and Critical Care, Department of Internal Medicine, Faculty of Health Sciences, University of the Free State, Bloemfontein, South Africa*

Corresponding author: *S Maasdorp (maasdorpsd1@ufs.ac.za)*

Background. Central line-associated bloodstream infections (CLABSIs) are frequently encountered device-related healthcare-associated infections in critically ill patients, causing substantial morbidity, mortality and prolonged hospitalisation.

International Journal of *Environmental Research and Public Health*

MDPI

Μικροβιαιμίες

HHS Public Access
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Published in final edited form as:
Infect Dis Clin North Am. 2017 September ; 31(3): 551–559. doi:10.1016/j.idc.2017.05.007.

Prevention of Central Line-Associated Bloodstream Infections

Taison Bell and **Naomi O'Grady**
Critical Care Medicine Department, National Institutes of Health

Abstract

Central venous catheters (CVC) are commonly used in critically ill patients and offer several advantages to peripheral intravenous access. However, indwelling CVCs have the potential to lead to blood stream infections, with the risk increasing with an array of characteristics such as catheter choice, catheter location, insertion technique and catheter maintenance. Evidence-based guidelines have led to a significant reduction in the incidence of blood stream infections associated with CVCs. The combination of guideline implementation combined with newer technologies has the potential to further reduce morbidity and mortality from infections related to CVCs.

American Journal of Infection Control 50 (2022) 440–445

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ELSEVIER

AJIC American Journal of Infection Control

Major Article

Early prediction of central line associated bloodstream infection using machine learning

Keyvan Rahmani PhD, Anurag Garikipati BS, Gina Barnes MPH *, Jana Hoffman PhD, Jacob Calvert MSc, Qingqing Mao PhD, Ritankar Das MSc

Department of Research and Writing, Dascena, Inc., Houston, TX

Key Words:
Machine learning
Algorithm
Prediction
Central line-associated bloodstream infection (CLABSI)

Background: Central line-associated bloodstream infections (CLABSIs) are associated with significant morbidity, mortality, and increased healthcare costs. Despite the high prevalence of CLABSIs in the U.S., there are currently no tools to stratify a patient's risk of developing an infection as the result of central line placement. To this end, we have developed and validated a machine learning algorithm (MLA) that can predict a patient's likelihood of developing CLABSI using only electronic health record data in order to provide clinical decision support.

Assessment of Knowledge on the Prevention of Central-Line-Associated Bloodstream Infections among Intensive Care Nurses in Poland—A Prospective Multicentre Study

Danuta Dyk [1], **Agata Matusiak** [1], **Edyta Cudak** [1], **Aleksandra Gutysz-Wojnicka** [2] and **Wioletta Mędrzycka-Dąbrowska** [3,*]

[1] Department of Anaesthesiology and Intensive Care Nursing, Medical University in Poznan, 60-179 Poznan, Poland; dyk@ump.edu.pl (D.D.); matusiak.agata25@gmail.com (A.M.); edytacud@ump.edu.pl (E.C.)
[2] School of Public Health, Collegium Medicum, University of Warmia and Mazury in Olsztyn, 10-561 Olsztyn, Poland; a.gut.wojnicka@uwm.edu.pl
[3] Department of Anesthesiology Nursing & Intensive Care, Faculty of Health Sciences, Medical University of Gdansk, 80-211 Gdańsk, Poland
* Correspondence: wioletta.medrzycka@gumed.edu.pl

Abstract: The presence of a central venous catheter (CVC) leads to a high risk of blood infections, which are considered major causes of morbidity, mortality and high medical costs. The aim of this

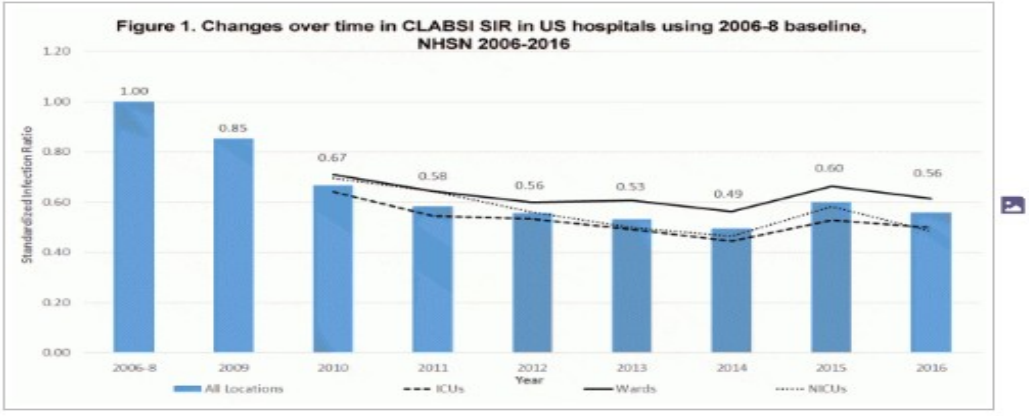
Data Summary of HAIs in the US: Assessing Progress 2006-2016

250,000 Clabsi ετησίως
80.000 στις ΜΕΘ

Central Line-Associated Bloodstream Infection (CLABSI)

Prevention Highlights

- Hospitals have made significant progress in preventing CLABSIs–nationally, there has been a roughly 50% drop in CLABSIs between 2008 and 2016. (Figures 1 and 2)



US: COVID-19 Impact on HAIs in 2020

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People™
EMERGING INFECTIOUS DISEASES®
ISSN: 1080-6059
EID Journal □ Volume 27 □ Number 10—October 2021 □ Main Article

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Volume 27, Number 10—October 2021

Research

Bloodstream Infection Risk, Incidence, and Deaths for Hospitalized Patients during Coronavirus Disease Pandemic

Bhavarth S. Shukla✉, Prem R. Warde, Eric Knott, Sebastian Arenas, Darryl Pronty, Reinaldo Ramirez, Arely Rego, Miriam Levy, Martin Zak, Dipen J. Parekh, Tanira Ferreira, and Hayley B. Gershengorn

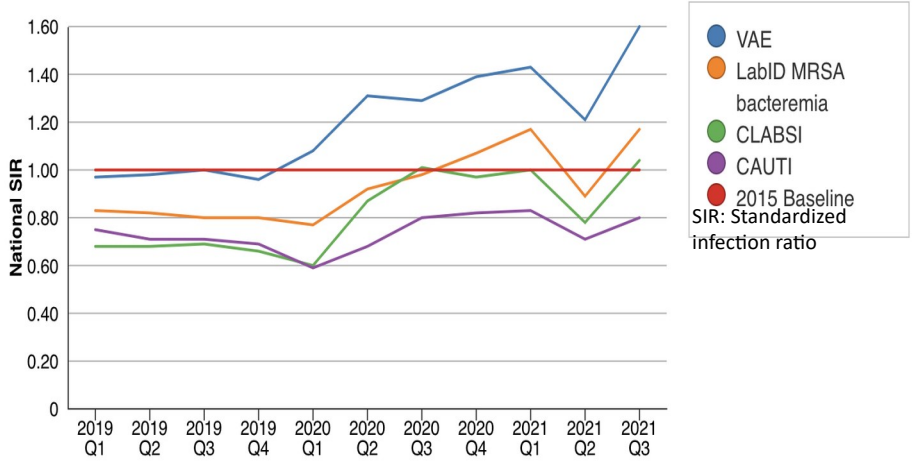
Author affiliations: University of Miami Health System, Miami, Florida, USA (B.S. Shukla, P.R. Warde, S. Arenas, D. Pronty, R. Ramirez, A. Rego, M. Levy, D.J. Parekh, T. Ferreira, H.B. Gershengorn); University of Miami Miller School of Medicine, Miami (B.S. Shukla, E. Knott, M. Zak, D.J. Parekh, T. Ferreira, H.B. Gershengorn); Albert Einstein College of Medicine, Bronx, New York, USA (H.B. Gershengorn)

Cite This Article

Abstract

Hospital-acquired infections are emerging major concurrent conditions during the coronavirus disease (COVID-19) pandemic. We conducted a retrospective review of hospitalizations during March-October 2020 of adults tested by reverse transcription PCR for severe acute respiratory syndrome coronavirus 2. We evaluated associations of COVID-19 diagnosis with risk for laboratory-confirmed bloodstream infections (LCBIs, primary outcome), time to LCBI, and risk for death by using logistic and competing risks regression with adjustment for relevant covariates. A total of 10,848 patients were included in the analysis: 918 (8.5%) were given a diagnosis of COVID-19, and 232 (2.1%) had LCBIs during their hospitalization. Of these patients, 58 (25%) were classified as having central line-associated bloodstream infections. After adjusting for covariates, COVID-19-positive status was associated with higher risk for LCBI and death. Reinforcement of infection control practices should be implemented in COVID-19 wards, and review of superiority and inferiority ranking methods by National Healthcare Safety Network criteria might be needed.

Figure 1. Quarterly National SIRs for Select HAI Types, 2019-Q1 - 2021-Q3



SIR: Standardized infection ratio

- CLABSI: 47% increase in Q4 across all location types
  - 65% increase in intensive care units (ICUs)
  - 16% increase in select inpatient wards

Πηγή: https://www.cdc.gov/hai/data/portal/covid-impact-hai.html

DATA SUMMARY OF HAIs in EUROPE 2008-2017

European Centre for Disease Prevention and Control
An agency of the European Union

All sections | Enter your keyword

Infectious disease topics | Data | Analysis and guidance | Training and tools | About ECDC

Home > Analysis and guidance > Healthcare-associated infections in intensive care units - Annual Epidemiological Report for 2017

< Analysis and guidance

Healthcare-associated infections in intensive care units - Annual Epidemiological Report for 2017

Surveillance report
10 Oct 2019

Publication series: Annual Epidemiological Report on Communicable Diseases in Europe

Time period covered: 1 January 2017 - 31 December 2017

Cite:

Translate this page

This report is based on data for 2017 retrieved from The European Surveillance System (TESSy) on 26 April 2019. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases. EU Member States and EEA countries contribute to the system by uploading their infectious disease surveillance data at regular intervals.

Executive summary

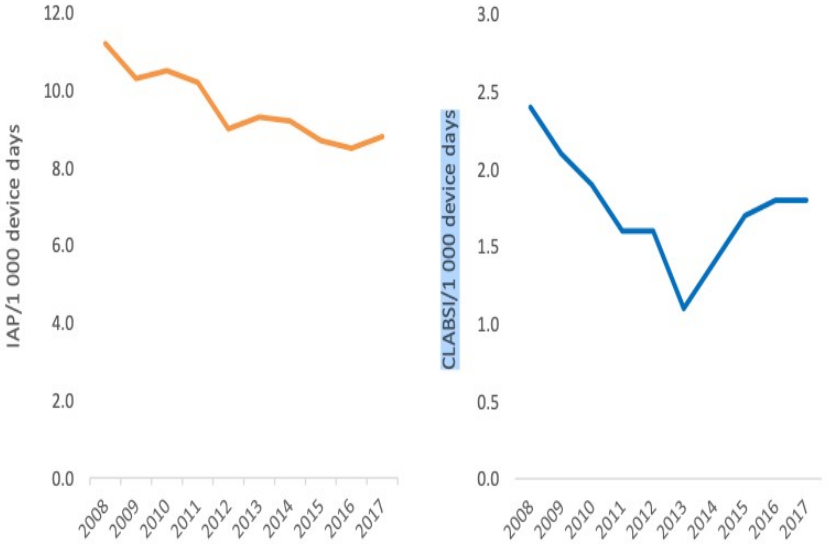
Key facts:

- In 2017, 8.3% (11 787) of the patients who stayed in intensive-care units (ICUs) for more than two days presented with at least one ICU-acquired healthcare-associated infection (HAI) under surveillance (pneumonia, bloodstream infection, or urinary tract infection).
- Of all patients staying in an ICU for more than two days, 6% presented with pneumonia, 4% with bloodstream infection (BSI), and 2% with urinary tract infection (UTI).
- Ninety-seven per cent of pneumonia episodes were associated with intubation, 37% of BSI episodes were catheter-related, and 98% of UTI episodes were associated with presence of a urinary catheter.
- The most frequently isolated microorganism was *Pseudomonas aeruginosa* in ICU-acquired pneumonia episodes, coagulase-negative staphylococci in ICU-acquired BSIs, and Esc herichia coli in ICU-acquired UTIs.
- Twenty-four per cent of *Staphylococcus aureus* isolates were oxacillin-resistant (MRSA) and 10% of *Enterococcus spp.* were glycopeptide resistant. Resistance to third-generation cephalosporins was reported in 16% of E. coli isolates, 40% of *Klebsiella spp.* isolates and 34% of *Enterobacter spp.* isolates. Carbapenem resistance was reported in 15% of Klebsiella spp. isolates, 26% of P. aeruginosa isolates and 64% of *Acinetobacter baumannii* isolates.

Trends

Trend analysis of yearly median incidence of HAIs acquired in ICUs from seven European countries with uninterrupted participation since 2008 (Belgium, France, Italy (SPIN-UTI), Lithuania, Portugal, Slovakia, Spain), demonstrated a decreasing trend for IAP ($p<0.001$) while there was no clear trend for CLABSI (p=NS) despite an overall decrease from 2.4 to 1.8 infections/1 000 device-days over this period (Figure 2).

Figure 2: Incidence trend of intubation-associated pneumonia (IAP) and central line-associated bloodstream infections (CLABSI), seven EU/EEA countries and networks, 2008–2017



Europe: COVID -19 Impact on BSIs

Intensive Care Med. 2021 Feb;47(2):180-187. doi: 10.1007/s00134-021-06346-w. Epub 2021 Jan 27.

COVID-19 increased the risk of ICU-acquired bloodstream infections: a case-cohort study from the multicentric OUTCOMEREA network

Niccolò Buetti [#] [1] [2], Stéphane Ruckly [#] [1], Etienne de Montmollin [1] [3], Jean Reignier [4], Nicolas Terzi [5] [6], Yves Cohen [7] [8] [9], Shidasp Siami [10], Claire Dupuis [1] [11], Jean-François Timsit [12] [13]

Affiliations + expand

PMID: 33506379 PMCID: PMC7839935 DOI: 10.1007/s00134-021-06346-w

Free PMC article

Abstract

Purpose: The primary objective of this study was to investigate the risk of ICU bloodstream infection (BSI) in critically ill COVID-19 patients compared to non-COVID-19 patients. Subsequently, we performed secondary analyses in order to explain the observed results.

Methods: We conducted a matched case-cohort study, based on prospectively collected data from a large ICU cohort in France. Critically ill COVID-19 patients were matched with similar non-COVID-19 patients. ICU-BSI was defined by an infection onset occurring > 48 h after ICU admission. We estimated the effect of COVID-19 on the probability to develop an ICU-BSI using proportional subdistribution hazards models.

Results: We identified 321 COVID-19 patients and 1029 eligible controls in 6 ICUs. Finally, 235 COVID-19 patients were matched with 235 non-COVID-19 patients. We observed 43 ICU-BSIs, 35 (14.9%) in the COVID-19 group and 8 (3.4%) in the non-COVID-19 group (p ≤ 0.0001), respectively. ICU-BSIs of COVID-19 patients were more frequently of unknown source (47.4%). COVID-19 patients had an increased probability to develop ICU-BSI, especially after 7 days of ICU admission. Using proportional subdistribution hazards models, COVID-19 increased the daily risk to develop ICU-BSI (sHR 4.50, 95% CI 1.82–11.16, p = 0.0012). Among COVID-19 patients (n = 235), a significantly increased risk for ICU-BSI was detected in patients who received tocilizumab or anakinra (sHR 3.20, 95% CI 1.31–7.81, p = 0.011) but not corticosteroids.

Conclusions: Using prospectively collected multicentric data, we showed that the ICU-BSI risk was higher for COVID-19 than non-COVID-19 critically ill patients after seven days of ICU stay. Clinicians should be particularly careful on late ICU-BSIs in COVID-19 patients. Tocilizumab or anakinra may increase the ICU-BSI risk.

Buetti et al. Critical Care (2022) 26:319
https://doi.org/10.1186/s13054-022-04166-y

Critical Care

RESEARCH Open Access

Different epidemiology of bloodstream infections in COVID-19 compared to non-COVID-19 critically ill patients: a descriptive analysis of the Eurobact II study

Niccolò Buetti[1,2*], Alexis Tabah[3,4,5], Ambre Loiodice[6], Stéphane Ruckly[6], Abdullah Tarik Aslan[7], Giorgia Montrucchio[8,9], Andrea Cortegiani[10,11], Nese Saltoglu[12], Bircan Kayaaslan[13], Firdevs Aksoy[14], Akova Murat[15], Özlem Akdoğan[16], Kemal Tolga Saracoglu[17], Cem Erdogan[18], Marc Leone[19], Ricard Ferrer[20], José-Artur Paiva[21,22], Yoshiro Hayashi[23], Mahesh Ramanan[24,25,26], Andrew Conway Morris[27,28,29], François Barbier[30,31], Jean-François Timsit[2,32] and the Eurobact 2 study group

Abstract

Background: The study aimed to describe the epidemiology and outcomes of hospital-acquired bloodstream infections (HABSIs) between COVID-19 and non-COVID-19 critically ill patients.

Methods: We used data from the Eurobact II study, a prospective observational multicontinental cohort study on HABSI treated in ICU. For the current analysis, we selected centers that included both COVID-19 and non-COVID-19 critically ill patients. We performed descriptive statistics between COVID-19 and non-COVID-19 in terms of patients' characteristics, source of infection and microorganism distribution. We studied the association between COVID-19 status and mortality using multivariable fragility Cox models.

Results: A total of 53 centers from 19 countries over the 5 continents were eligible. Overall, 829 patients (median age 65 years [IQR 55; 74]; male, *n* = 538 [64.9%]) were treated for a HABSI. Included patients comprised 252 (30.4%) COVID-19 and 577 (69.6%) non-COVID-19 patients. The time interval between hospital admission and HABSI was similar between both groups. Respiratory sources (40.1 vs. 26.0%, $p < 0.0001$) and primary HABSI (25.4% vs. 17.2%, $p = 0.006$) were more frequent in COVID-19 patients. COVID-19 patients had more often enterococcal (20.5% vs. 9%) and *Acinetobacter* spp. (18.8% vs. 13.6%) HABSIs. Bacteremic COVID-19 patients had an increased mortality hazard ratio (HR) versus non-COVID-19 patients (HR 1.91, 95% CI 1.49–2.45).

Conclusions: We showed that the epidemiology of HABSI differed between COVID-19 and non-COVID-19 patients. Enterococcal HABSI predominated in COVID-19 patients. COVID-19 patients with HABSI had elevated risk of mortality.

Trial registration ClinicalTrials.org number NCT03937245. Registered 3 May 2019.

Keywords: Bloodstream infection, ICU-acquired, COVID-19, *Enterococcus*, Bacteremia

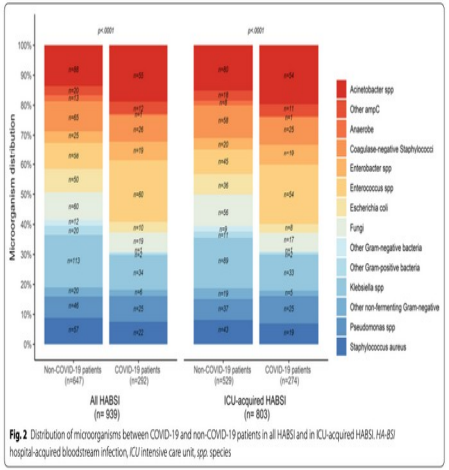


Fig. 2 Distribution of microorganisms between COVID-19 and non-COVID-19 patients in all HABSI and in ICU-acquired HABSI. *HA-BSI* hospital-acquired bloodstream infection, *ICU* intensive care unit, *spp.* species

International Journal of Infection Control
www.ijic.info ISSN 1996-9783
ORIGINAL ARTICLE

Central line associated bloodstream infections in hospitalised children in Greece before and after implementation of a prevention bundle

*Katerina Mougkou[1], *Despoina Gkentzi[2], Georgia Kourlaba[1], Sofia Kouni[1], Ioannis Kopsidas[1], Charalampia Nteli[3], Theoklis Zaoutis[1,4], Susan Coffin[4]

1 Collaborative Centre for Clinical Epidemiology and Outcomes Research (CLEO), University of Athens School of Medicine, Greece
2 Department of Paediatrics, University General Hospital of Patras, Greece
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doi: 10.3396/IJIC.v11i3.019.15

In Greece, data on the epidemiology of CLABSIs in hospitalised adults are limited as reporting systems are currently under development;[6-10] most published data are derived from single centre institutions. Even less has been published about CLABSIs in high-risk paediatric populations where central lines are used, such as the neonatal[11] and paediatric intensive care units (NICUs, PICUs) as well as oncology wards[12]. In addition to the limited knowledge of the epidemiology of CLABSI, the emergence and spread of multi-drug resistant organisms (MDROs) in Greece, in both adults[13] and children,[14] increases the need for microbiologic data about the pathogens

Ελληνική εμπειρία !!!!!!

episodes were recorded. The overall mean CLABSI rate was 4.41 infections per 1000 CL-days, and the CLU ratio was 0.31. CLABSI rates were 6.02 in NICUs, 6.09 in PICUs, and 2.78 per 1000 CL-days in ONCs. A total of 123 pathogens were isolated. The most common pathogens were

Kouni, S., Tsolia, M., Roilides, E., Dimitriou, G., Tsiodras, S., Skoutelis, A., . . . the PHIG Investigators. (2018). Establishing nationally representative central line-associated bloodstream infection surveillance data for paediatric patients in greece. *Journal of Hospital Infection*

The incidence for CRBSI and catheter colonization (CC) was 1.47 and 19.49 per 1,000 catheter days, respectively.

Tarpatzi, A., Aviamis, A., Papaparaskevas, J., Daikos, G. L., Stefanou, I., Katsandri, A., . . . Petrikkos, G. L. (2012). Incidence and risk factors for central vascular catheter-related bloodstream infections in a tertiary care hospital. *New Microbiologica, 35*(4), 429-437.

he CLABSI rate wa 11.8 (95% CI: 9.2-14.8) per 1000 catheter-days,

Apostolopoulou, E., Raftopoulos, V., Filntisis, G., Kithreotis, P., Stefanidis, E., Galanis, P., & Veldekis, D. (2013). Surveillance of device-associated infection rates and mortality in 3 greek intensive care units. *American Journal of Critical Care, 22*(3), e12-e20.

In Greece, high rates of CRIs have been reported (23, 24). However, to date, the national CVC colonization rates in ICUs remain unknown. During the preceding year of the study, a baseline rate of 10% for CRIs, 20% for colonization, and 3% for CR-BSIs was recorded in the supervising ICU (personal data). These ob-

Arvaniti, K., Lathyris, D., Clouva-Molyvdas, P., Haidich, A. -., Mouloudi, E., Synnefaki, E., . . . Matamis, D. (2012). Comparison of oligon catheters and chlorhexidine-impregnated sponges with standard multilumen central venous catheters for prevention of associated colonization and infections in intensive care unit patients: A multicenter, randomized, controlled study. *Critical Care Medicine, 40*(2), 420-429.

Βασικές Αρχές Πρόληψης και Ελέγχου Λοιμώξεων

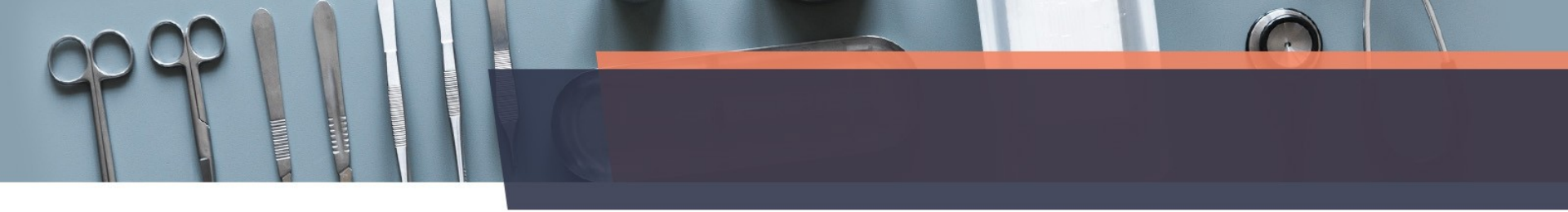
Πηγή: Πρόγραμμα: "Βασικές Αρχές Πρόληψης & Ελέγχου Λοιμώξεων".

Βαρύτητα των προηγούμενων στατιστικών

CLABSI:

- Μόνο στην Αμερική αγγίζουν τις 250,000 περιπτώσεις ετησίως, από αυτές 80,000 στις ΜΕΘ
- Συνδέονται με το 12-15% των θανάτων στα νοσοκομεία
- Αυξημένο χρόνο παραμονής στα νοσοκομεία
- Αυξημένο κόστος νοσηλείας (κάθε περίπτωση στην Αμερική κοστίζει περίπου 46,000$.
- Τα νοσοκομεία με αυξημένο ποσοστό clabsi κρίνονται μη αποδοτικά
- Το τμήμα ΜΕΘ κρίνεται μη αποδοτικό και επικίνδυνο με ποσοστά θνησιμότητας που αγγίζουν το 10%-30% από clabsi

Toor H, Farr S, Savla P, et al. (March 03, 2022) Prevalence of Central Line-Associated Bloodstream Infections (CLABSI) in Intensive Care and Medical-Surgical Units. Cureus 14(3): e22809. DOI 10.7759/cureus.22809
K. Rahmani et al. / American Journal of Infection Control 50 (2022) 440–445
Jenks M. et al, Tegaderm CHG IV Securement Dressing for Central Venous and Arterial Catheter Insertion Sites: A NICE Medical Technology Guidance, Appl Health Econ Health Policy, 2015
Pronovost P., An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU, The New England Journal of Medicine, 2006



What is a central line-associated bloodstream infection?

A central line-associated bloodstream infection (CLABSI) is a serious infection that occurs when germs (usually bacteria or viruses) enter the bloodstream through the central line. Healthcare providers must follow a strict protocol when inserting the line to make sure the line remains sterile and a CLABSI does not occur. In addition to inserting the central line properly, healthcare providers must use stringent infection control practices each time they check the line or change the dressing. Patients who get a CLABSI have a fever, and might also have red skin and soreness around the central line. If this happens, healthcare providers can do tests to learn if there is an infection present.

ΠΗΓΗ: https://www.cdc.gov/hai/bsi/clabsi-resources.html

Μονοπάτια Διερεύνησης Μικροβιαιμίας + ΚΓ (Ορισμοί)

Catheter - Related bloodstream infection (CRBSI):

- Κλινικός ορισμός που χρησιμοποιείται κατά τη διάγνωση και θεραπεία ασθενών.
- Χρησιμοποιείται για έρευνα αλλά όχι για σκοπούς επιτήρησης
- Χρειάζεται ειδικές εργαστηριακές τεχνικές που δεν συμβαίνουν πάντα, για να αποδειχθεί η σχέση του καθετήρα με μικροβιαιμία
- Γενικά δύσκολη η διερεύνηση μικροβιαιμίας συνδεόμενης με ΚΓ και δεν προτιμάται από επίσημους οργανισμούς

K. Rahmani et al. / American Journal of Infection Control 50 (2022) 440–445
Afr J Thoracic Crit Care Med 2022;28(1):15-19
Infect Dis Clin North Am. 2017 September ; 31(3): 551–559. doi:10.1016/j.idc.2017.05.007.
https://www.cdc.gov/infectioncontrol/guidelines/bsi/background/terminology.html

Μονοπάτια Διερεύνησης Μικροβιαιμίας + ΚΓ (Ορισμοί)

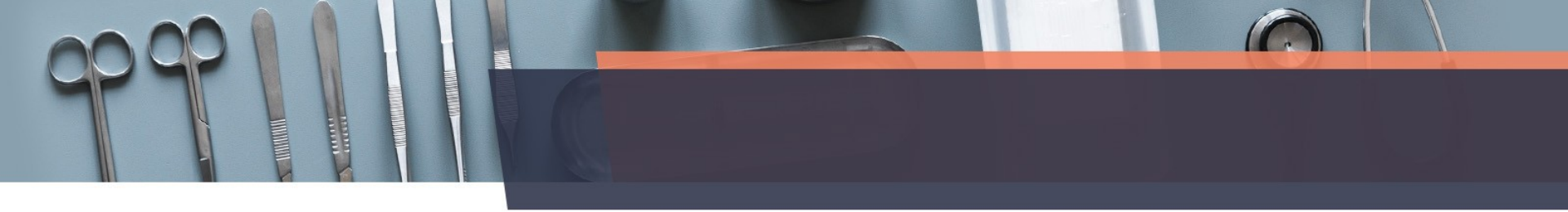
Central line –associated bloodstream infection (CLABSI):

- Απλοποιημένη τεχνική διερεύνησης
- Χρησιμοποιείται για σκοπούς επιτήρησης

Χρειάζεται:

- Εργαστηριακή επιβεβαίωση παθογόνου από κ/α αίματος
- Σε ΚΓ που έχει τοποθετηθεί >48^{h} και έχει γίνει πρόσβαση
- Να είναι πρωτοπαθής μικροβιαιμία: Δεν οφείλεται σε άλλη λοίμωξη
- Κίνδυνος υπερεκτίμησης CLABSI όταν δεν είναι εμφανής μια άλλη πηγή λοίμωξης που θα καταστήσει την CLABSI Δευτεροπαθή μικροβιαιμία.
- Χρησιμοποιείται κατά κόρον από επίσημους οργανισμούς λόγω της ευκολίας της τεχνικής για τον προσδιορισμό βακτηριαιμίας σχετιζόμενης με ΚΓ

K. Rahmani et al. / American Journal of Infection Control 50 (2022) 440−445
Afr J Thoracic Crit Care Med 2022;28(1):15-19
Infect Dis Clin North Am. 2017 September ; 31(3): 551–559. doi:10.1016/j.idc.2017.05.007.
https://www.cdc.gov/infectioncontrol/guidelines/bsi/background/terminology.html



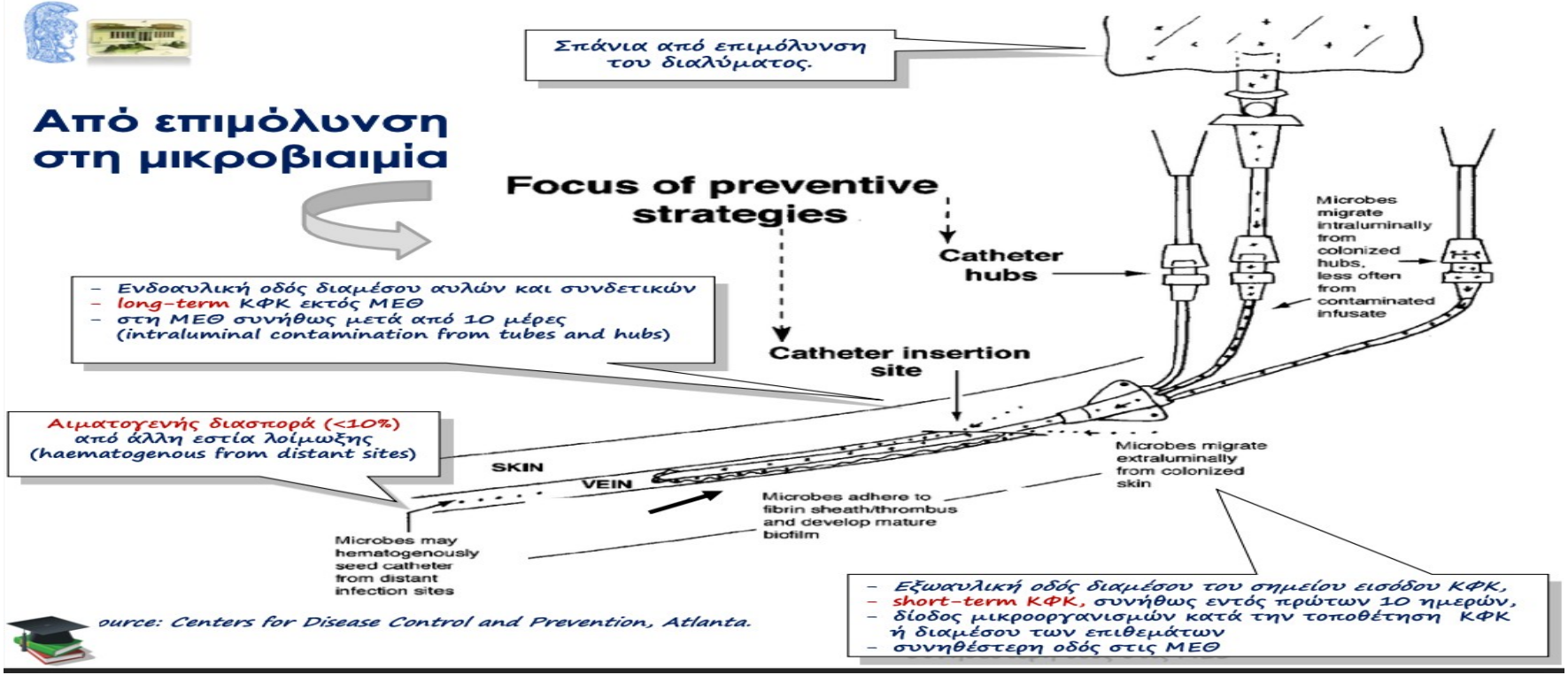
Since CLABSI

is the more commonly used definition for quality initiatives,

it will be the focus of this tutorial

Μικροβιαιμία από ΚΓ

Από επιμόλυνση στη μικροβιαιμία



Κύκλος ανάπτυξης παθογόνου

Επιμόλυνση ΚΦΚ ⇨ μικροβιαιμία

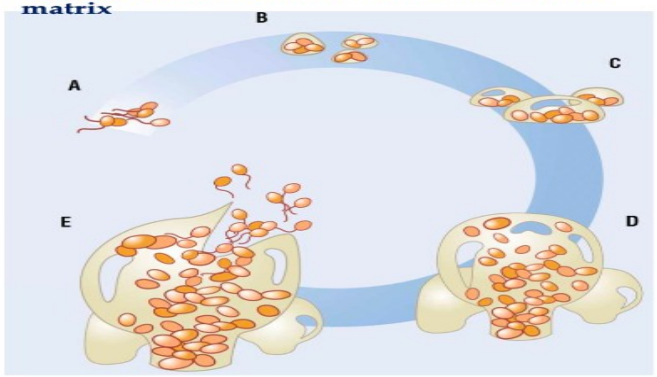
A. Attachment (προσκόλληση)

B. Irreversible attachment, aggregation and formation of extracellular matrix

C. Maturation (ωρίμανση)

D. Maximal thickness (μεγιστοποίηση πάχους)

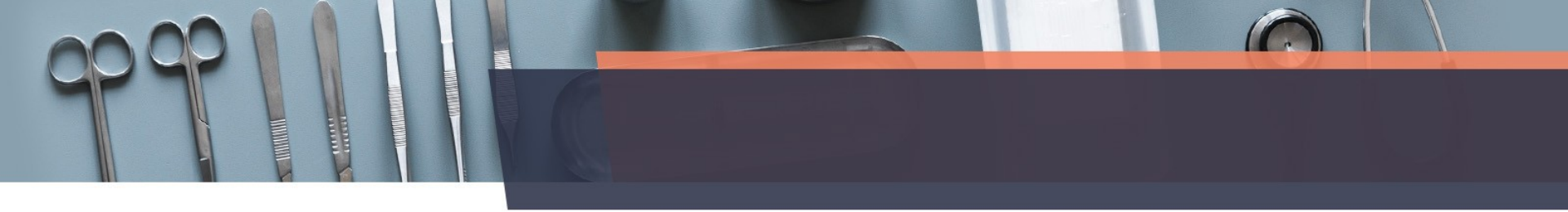
E. Detachment of planktonic bacteria (απόσπαση των μικροβίων προς την κυκλοφορία)



Schachter, Nature Biotechnology 2005;21:361

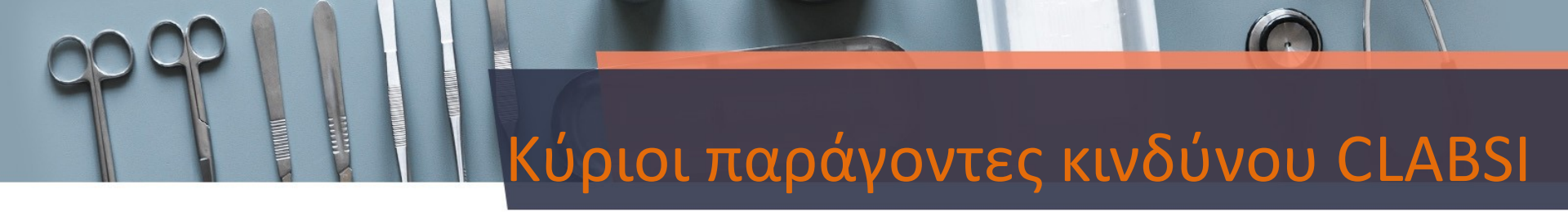
Βασικές Αρχές Πρόληψης και Ελέγχου Λοιμώξεων

Πηγή: Πρόγραμμα: "Βασικές Αρχές Πρόληψης & Ελέγχου Λοιμώξεων".
V.E.L.M. Gillis et al. / American Journal of Infection Control 00 (2022) 1−9



ΕΡΩΤΗΣΗ

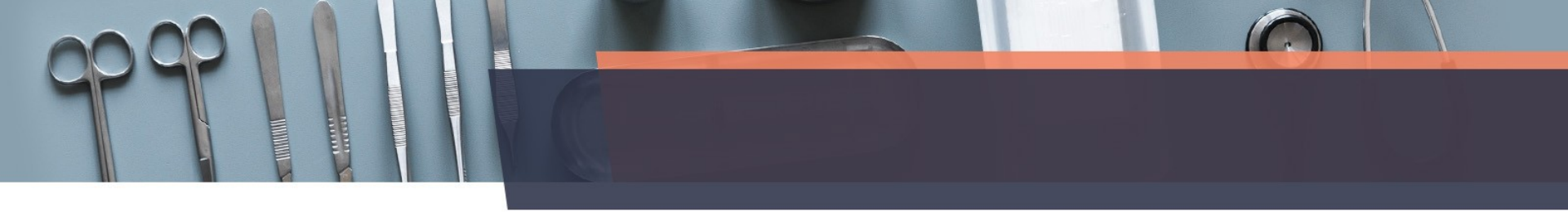
Είναι η άρτια τοποθέτηση ΚΓ, το μοναδικό μέτρο προστασίας
από λοιμώξεις συνδεόμενες με ΚΓ ;



Κύριοι παράγοντες κινδύνου CLABSI

- Ιστορικό ασθενούς
- Κατάσταση ανοσοποιητικού του ασθενούς
- Ουδετεροπενία (<500PMN/mm^3)
- Σημείο τοποθέτησης ΚΓ
- Διάρκεια καθετηριασμού
- Μέτρα αντισηψίας κατά τον καθετηριασμό και κατά τη διαχείριση της ΚΓ

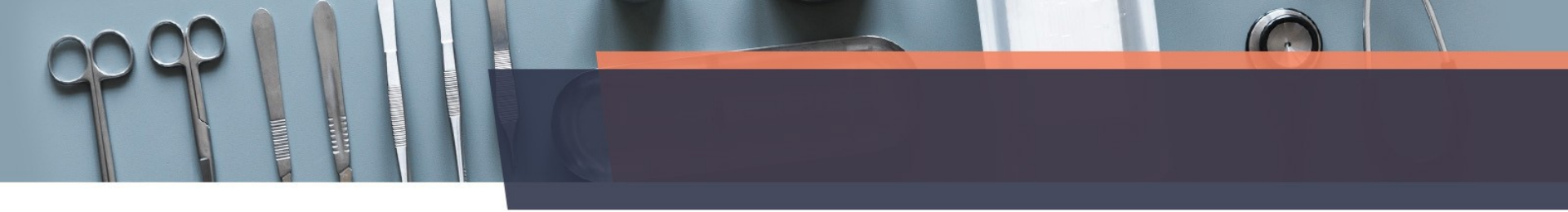
K. Rahmani et al. / American Journal of Infection Control 50 (2022) 440–445
Infect Dis Clin North Am. 2017 September ; 31(3): 551–559. doi:10.1016/j.idc.2017.05.007.
V.E.L.M. Gillis et al. / American Journal of Infection Control 00 (2022) 1–9



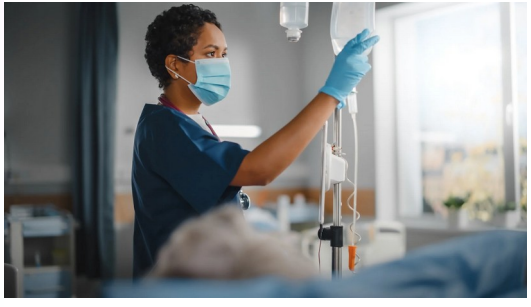
Χρειάζεται ΟΛΙΣΤΙΚΗ προσέγγιση στην προστασία μιας ΚΓ από λοιμώξεις

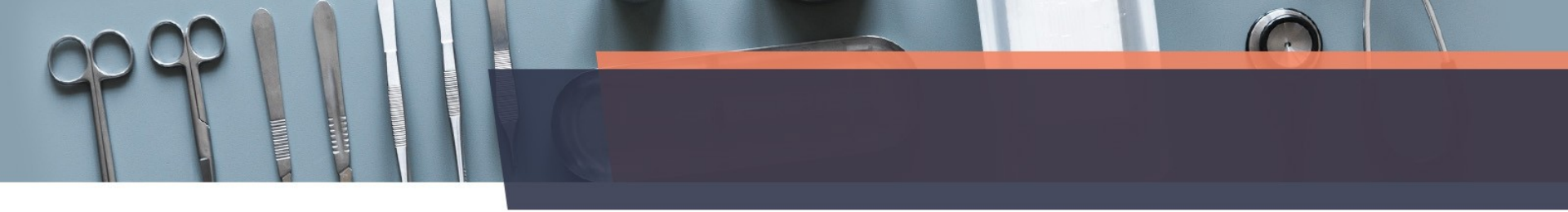
https://www.cdc.gov/hai/bsi/clabsi-resources.html

Toor H, Farr S, Savla P, et al. (March 03, 2022) Prevalence of Central Line-Associated Bloodstream Infections (CLABSI) in Intensive Care and Medical-Surgical Units. Cureus 14(3): e22809. DOI 10.7759/cureus.22809



- Από αυτούς που είναι υπεύθυνοι για την τοποθέτηση μιας Κ.Γ.
- Από αυτούς που διαχειρίζονται μια Κ.Γ.
- Από αυτούς που έρχονται σε άμεση επαφή με τον ασθενή
- Από αυτούς που είναι υπεύθυνοι για την καθαριότητα του άμεσου και ευρύτερου άψυχου περιβάλλοντος του ασθενή





ΚΑΙ ΤΙ ΠΡΕΠΕΙ ΝΑ ΚΑΝΟΥΝ ΟΛΟΙ ΑΥΤΟΙ;

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Healthcare-Associated Infections (HAIs)

- Once the central line is in place:
  - Follow recommended central line maintenance practices

Εφαρμογή Τεχνικών αντισηψίας

Επιτήρηση Clabsi

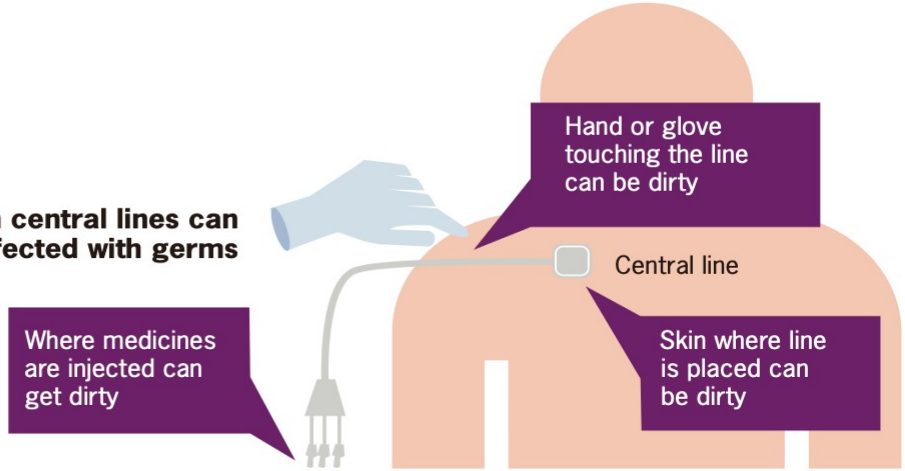
Σχεδιασμός Στρατηγικών πρόληψης - διαχείρισης

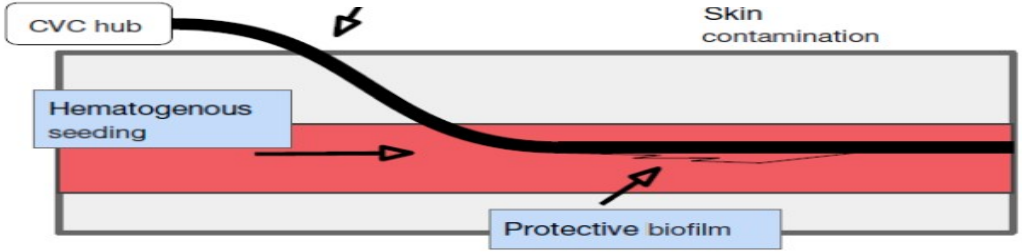
https://www.cdc.gov/hai/bsi/clabsi-resources.html

Toor H, Farr S, Savla P, et al. (March 03, 2022) Prevalence of Central Line-Associated Bloodstream Infections (CLABSI) in Intensive Care and Medical-Surgical Units. Cureus 14(3): e22809. DOI 10.7759/cureus.22809

Anti-fouling str

How patients with central lines can get infected with germs





Prevention Guidelines
1) Hugiene, 2) barrier precautions, 3) antiseptic protocols, 4) appropriate site selection, 5) frequent examinations

Cardiovasc Diagn Ther 2017;7(Suppl 3):S246-S257

Προβληματισμοί

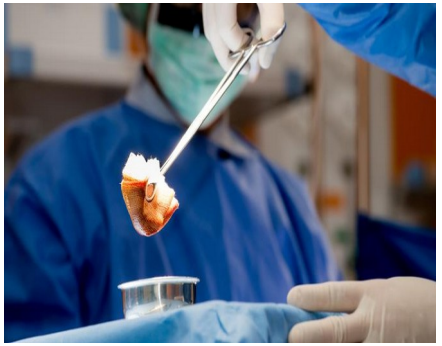
- Αντισηψίας
- Επιλογή σημείου τοποθέτησης ΚΓ

Προβληματισμοί: Αντισηπτικά

Which Skin Preparation is Best?

Available skin preparations include

- Chlorhexidine-gluconate (CHG)
  - Aqueous
  - Alcohol-containing
- Povidone-iodine
- Alcohol preparation without iodine or CHG



ΠΗΓΗ:https://www.cdc.gov/infectioncontrol/pdf/strive/CLABSI103-508.pdf

Προβληματισμοί αντισηψίας

What is the Active Ingredient?

- Is it the alcohol or the chlorhexidine that matters most?
  - In identical concentrations of alcohol, does CHG outperform povidone iodine?
- Does cleaning the skin with soap before catheter insertion make a difference?
- What concentration of chlorhexidine is best?

The CLEAN Trial

Skin antisepsis with chlorhexidine–alcohol versus povidone iodine–alcohol, with and without skin scrubbing, for prevention of intravascular-catheter-related infection (CLEAN): an open-label, multicentre, randomised, controlled, two-by-two factorial trial

*Olivier Mimoz, Jean-Christophe Lucet, Thomas Kerforne, Julien Pascal, Bertrand Souweine, Véronique Goudet, Alain Mercat, Lila Bouadma, Sigismond Lasocki, Serge Alfandari, Arnaud Friggeri, Florent Wallet, Nicolas Allou, Stéphane Ruckly, Dorothée Balayn, Alain Lepape, Jean-François Timsit, for the CLEAN trial investigators**

Randomized controlled trial, n=2,546

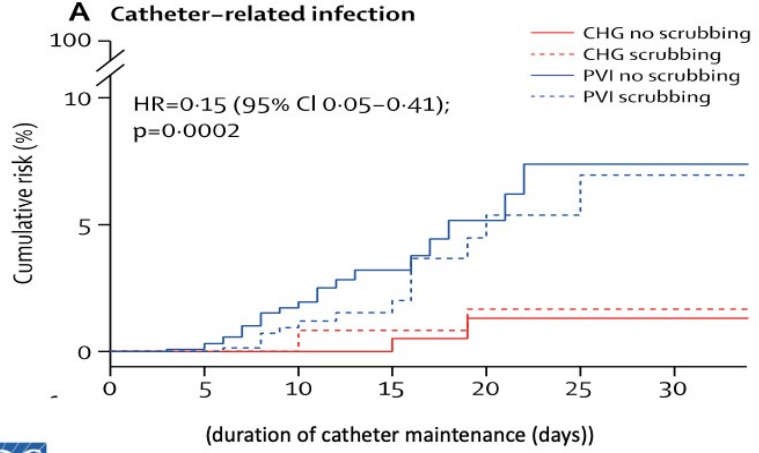
11 ICUs, six different hospitals in France

Two-by-two factorial design, four treatment groups:

- CHG or povidone iodine for antisepsis
- Scrubbing with detergent versus no scrubbing

(Mimoz O, Lancet, 2015)

The CLEAN Trial: Results



(Mimoz O, Lancet, 2015)

CHG is superior to PI when administered in the same alcohol concentration

Skin scrubbing is a relic of the past

- No longer necessary in an era of modern antiseptics and CHG use

Alcohol-containing CHG should be standard for skin antisepsis prior to CVC insertion

- If the patient is allergic or under two months of age, PI is a reasonable alternative

Προβληματισμοί: Αντισηπτικά

Chlorhexidine-Gluconate as a Skin Antiseptic

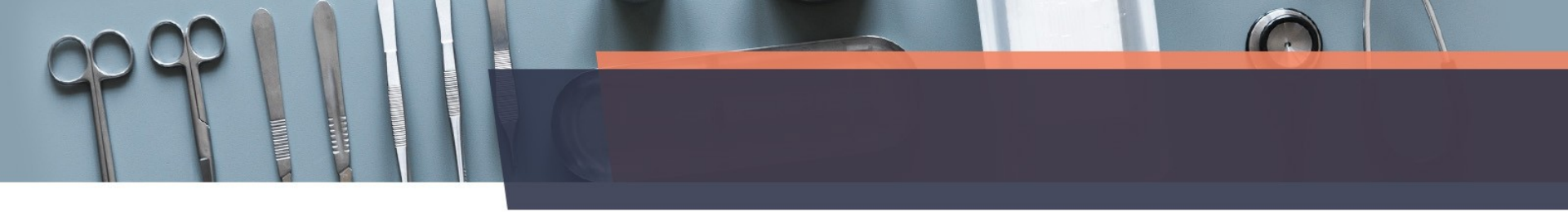
Compared to povidone iodine, chlorhexidine use for skin antisepsis significantly reduced risk of CLABSIs

Risk Ratio 0.51 (95%CI 0.27-0.97%)

CDC

(Chaiyakunapruk N, Ann Intern Med, 2002)

6



What About Skin Asepsis and Site for Peripherally Inserted Central Catheters (PICCs)?

Limited data available

Avoid antecubital site or sites around elbow

- Increase kink of catheter, which increases failure
- Higher bacterial density on skin, aka the "groin of arm"

Upper arm placement under ultrasound guidance associated with reduction in CLABSI

Placement of PICCs in ICU settings – same risk of CLABSI as traditional CVCs

CDC

(Harnage SA, JAVA 2007; Yokoe DS, Am J Inf Control, 2014; Chopra V 2013, Marschall J, 2015)

ΠΡΟΒΛΗΜΑΤΙΣΜΟΙ Σημείου τοποθέτησης ΚΓ

Traditional Thinking About Site

Avoid the femoral site

- Higher bacterial density
- Harder to keep clean
  - Core component of Keystone study, CLABSI Bundle

What about the jugular site?

- Problematic to keep site clean, dry, intact
  - Dressing, oral secretions, weight of catheter/tubing

How do femoral and jugular vein placement compare to subclavian placement?

CDC

Σημείο τοποθέτησης

CARING FOR THE CRITICALLY ILL PATIENT

Femoral vs Jugular Venous Catheterization and Risk of Nosocomial Events in Adults Requiring Acute Renal Replacement Therapy

A Randomized Controlled Trial

Randomized controlled trial with 750 adult patients requiring acute renal replacement therapy

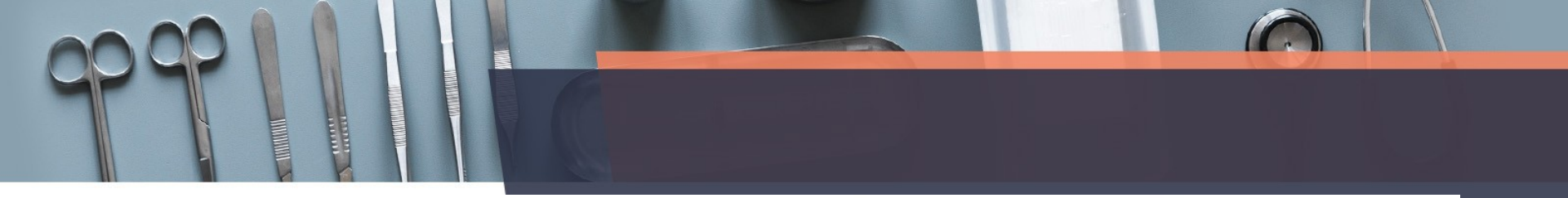
From 12 hospitals in France

Randomized to jugular or femoral catheter site placement

Results:

- More hematomas in the jugular group
- No difference in rate of catheter-related bloodstream infection

(Parienti JJ, JAMA, 2008)



Meta-analysis of subclavian insertion and nontunneled central venous catheter-associated infection risk reduction in critically ill adults*

Parienti, Jean-Jacques MD, PhD; du Cheyron, Damien MD, PhD; Timsit, Jean-François MD, PhD; Traoré, Ousmane MD; Kalfon, Pierre MD; Mimoz, Olivier MD, PhD; Mermel, Leonard A. DO, ScM, AM (Hon)

Systematic review of randomized or prospective cohort studies

Reviewed 19 studies and 10 were included in the meta-analysis

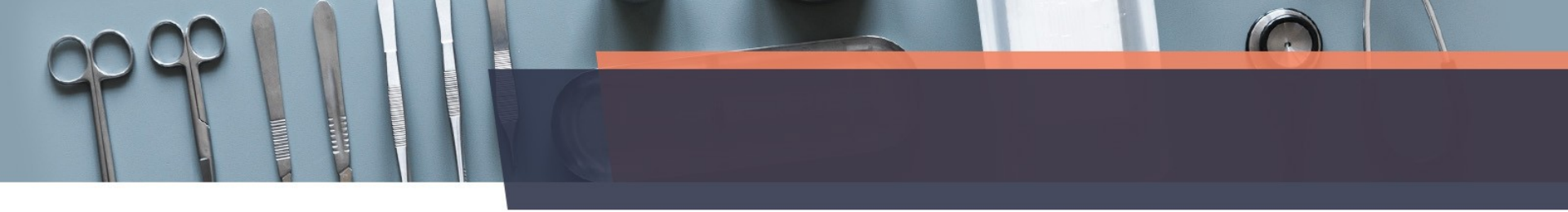
- Only one randomized site of insertion

Results:

- Risk of infection lower for subclavian site versus jugular and femoral sites
  - RR 0.47 [95%CI=0.27-0.82]

Όταν όμως αποκλείστηκε μια μεγάλη μελέτη, τα αποτελέσματα άλλαξαν στο ότι δεν βρέθηκε διαφορά κινδύνου CLABSI μεταξύ Μηριαίας και Υποκλειδίας ΚΓ

Parienti JJ, Crit Care Med,2012

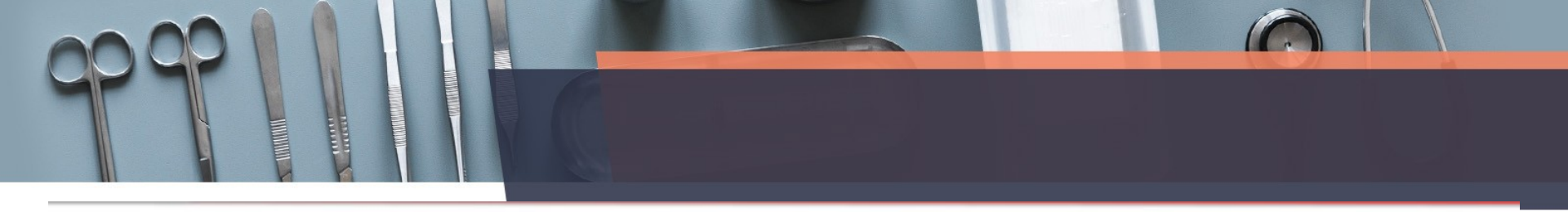


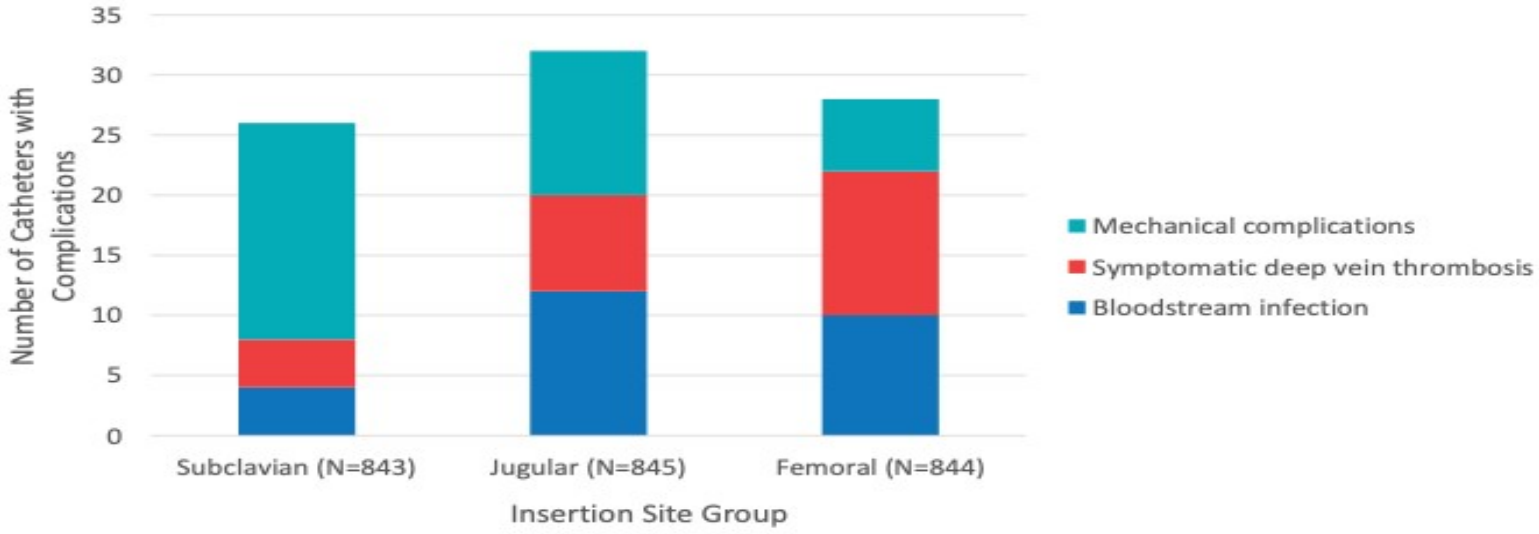
The risk of catheter-related bloodstream infection with femoral venous catheters as compared to subclavian and internal jugular venous catheters: a systematic review of the literature and meta-analysis

Paul E Marik [1], Mark Flemmer, Wendy Harrison

Conclusions: Although earlier studies showed a lower risk of catheter-related bloodstream infections when the internal jugular was compared to the femoral site, recent studies show no difference in the rate of catheter-related bloodstream infections between the three sites.

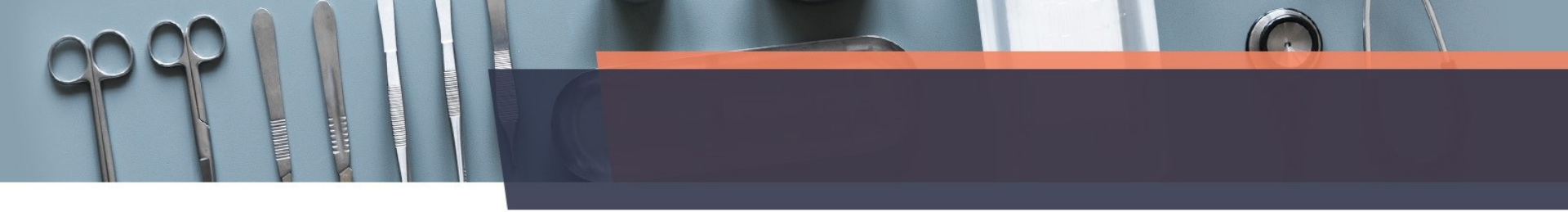
Crit Care Med. 2012 Aug;40(8):2479-85. doi: 10.1097/CCM.0b013e318255d9bc.





Subclavian site associated with lower risk of catheter-related bloodstream infection and deep vein thrombosis, but higher risk of pneumothorax.

(Parienti JJ, N Engl J Med, 2015)



Summary

Alcohol-containing chlorhexidine-gluconate is the most effective skin antisepsis at reducing CLABSI

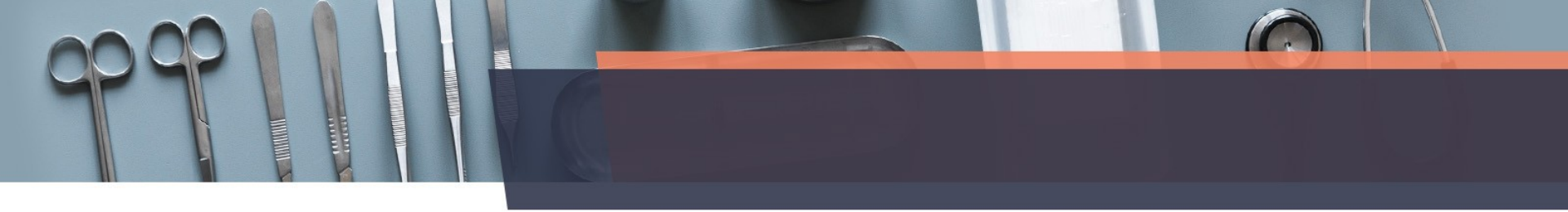
For patients allergic to CHG, povidone iodine is a suitable alternative

Weigh the risk of infection against the risk of mechanical complications when placing central venous devices

- Subclavian placement has the lowest risk of infection but highest risk for insertion-related complications
- No clear difference in infection risk between jugular and femoral sites

PICCs have similar rates of infection as CVCs

- Avoid the antecubital fossa
- Use ultrasound guidance for insertion



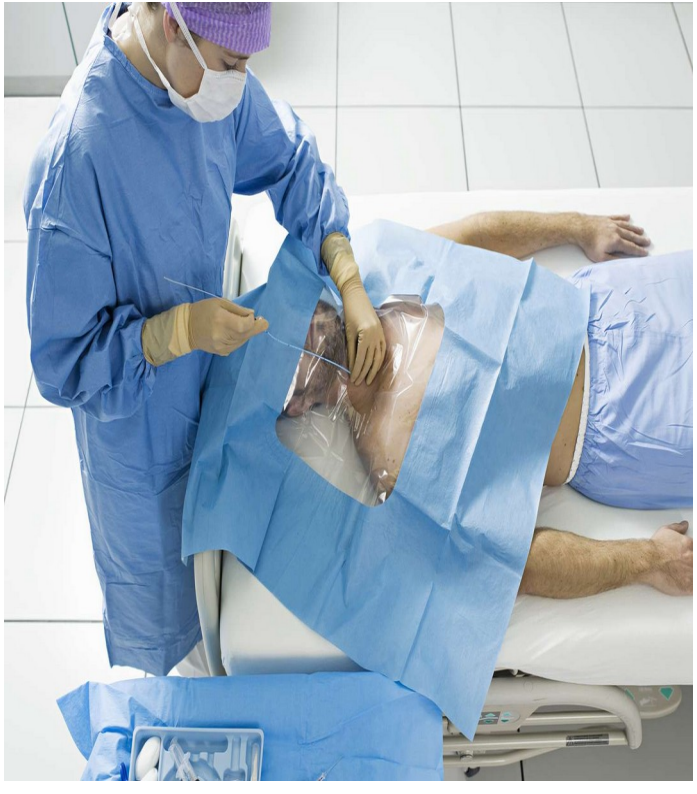
Τοποθέτηση ΚΓ

Τοποθέτηση ΚΓ

- Υγιεινή χεριών
- Μέγιστα αποστειρωμένα εμπόδια κατά την εισαγωγή (στολή, πεδίο, μάσκα σκούφος), από όλους τους εμπλεκόμενους
- Όχι συνωστισμός στο χώρο επέμβασης
- Σωστή Αντισηψία σημείου εισόδου (αφήνουμε να στεγνώσει το αντισηπτικό)

Toor H, Farr S, Savla P, et al. (March 03, 2022) Prevalence of Central Line-Associated Bloodstream Infections (CLABSI) in Intensive Care and Medical-Surgical Units. Cureus 14(3): e22809. DOI 10.7759/cureus.22809
Buetti N, et al. (2022). Strategies to prevent central line-associated bloodstream infections in acute-care hospitals: 2022 Update. Infection Control & Hospital Epidemiology, 43: 553–569, https://doi.org/10.1017/ice.2022.87
Infect Dis Clin North Am. 2017 September ; 31(3): 551–559. doi:10.1016/j.idc.2017.05.007.

Πρότυπα

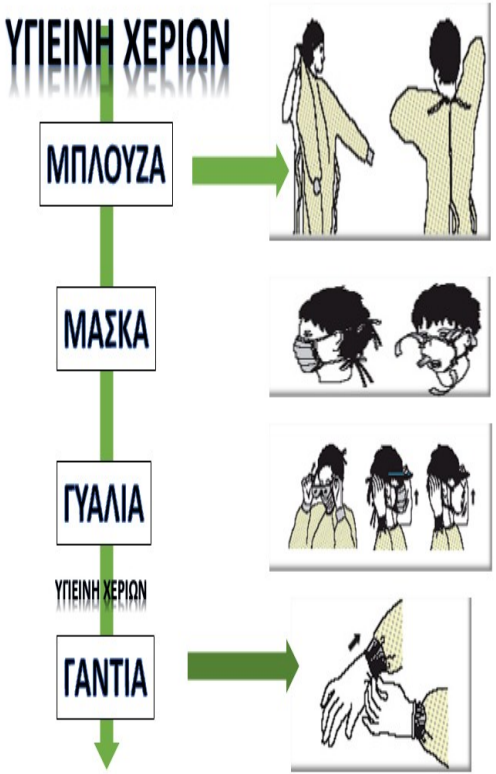


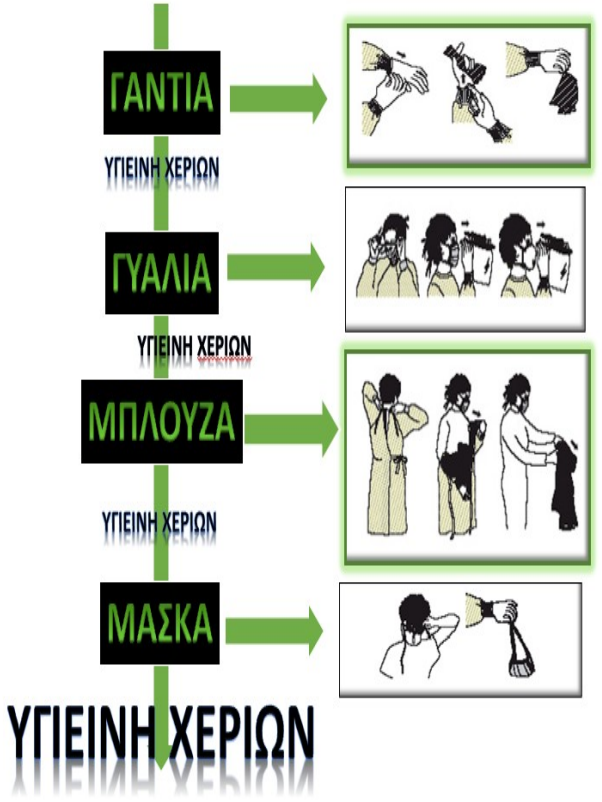
Σίγουρα όχι αυτό

Σίγουρα όχι αυτό

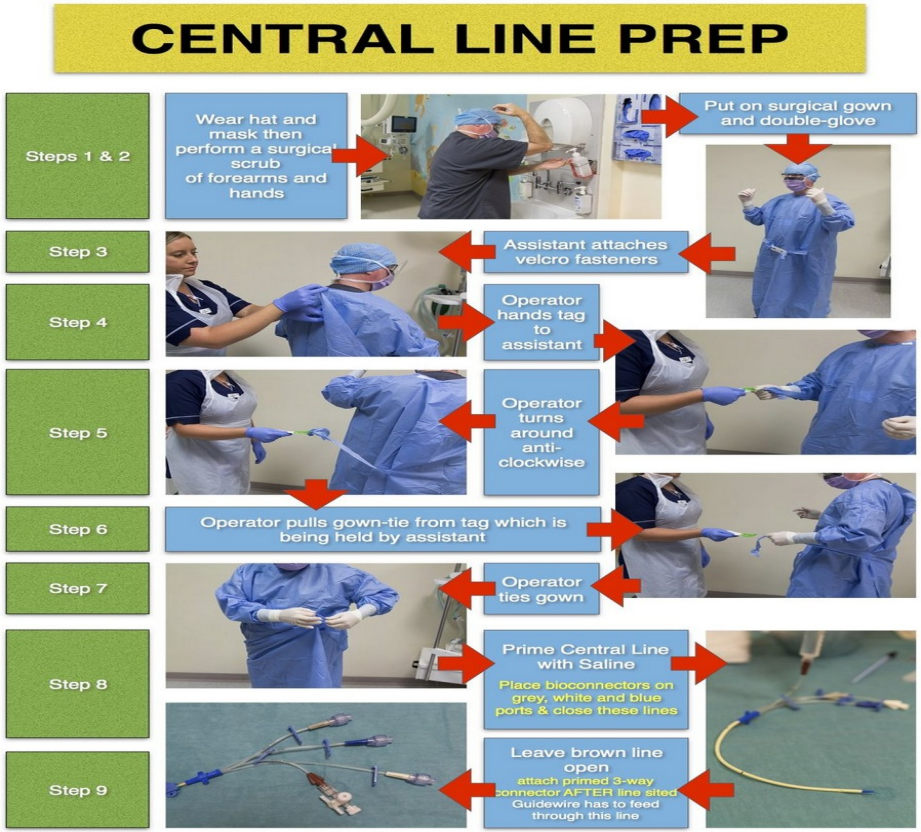
Αλλά ούτε αυτό όταν δεν απαιτείται

Αυτό που απαιτεί η περίσταση

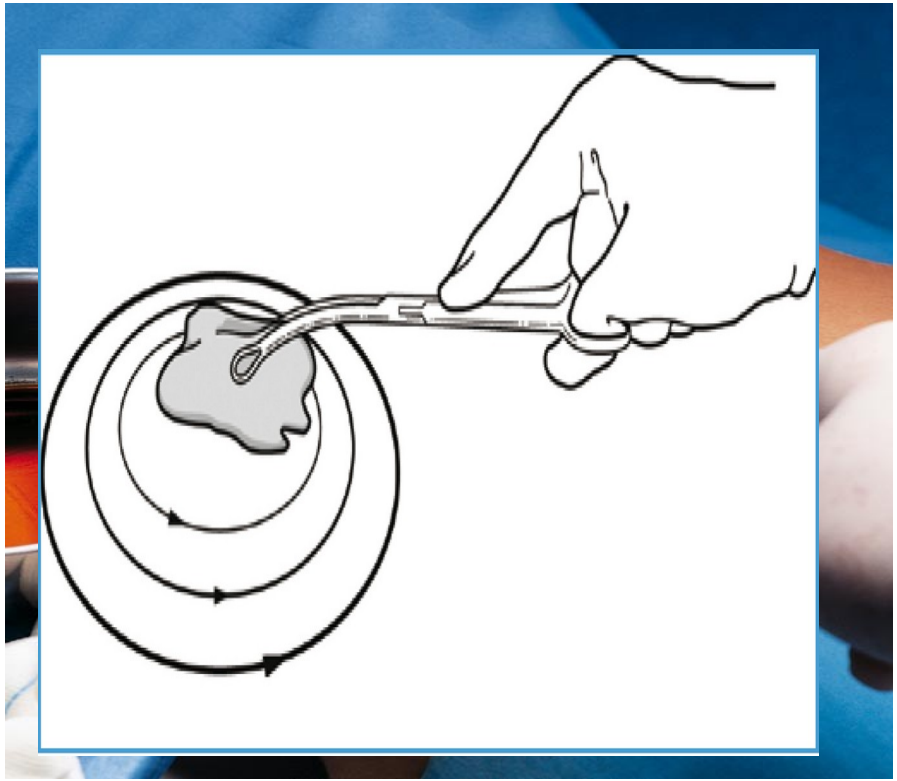


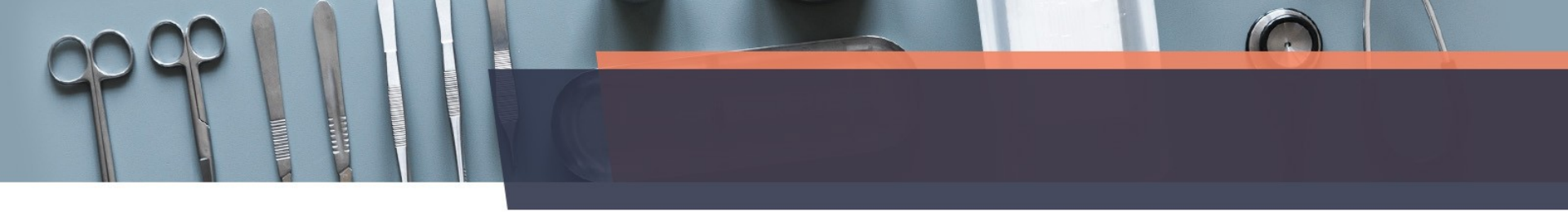


Προετοιμασία σημείου τοποθέτησης



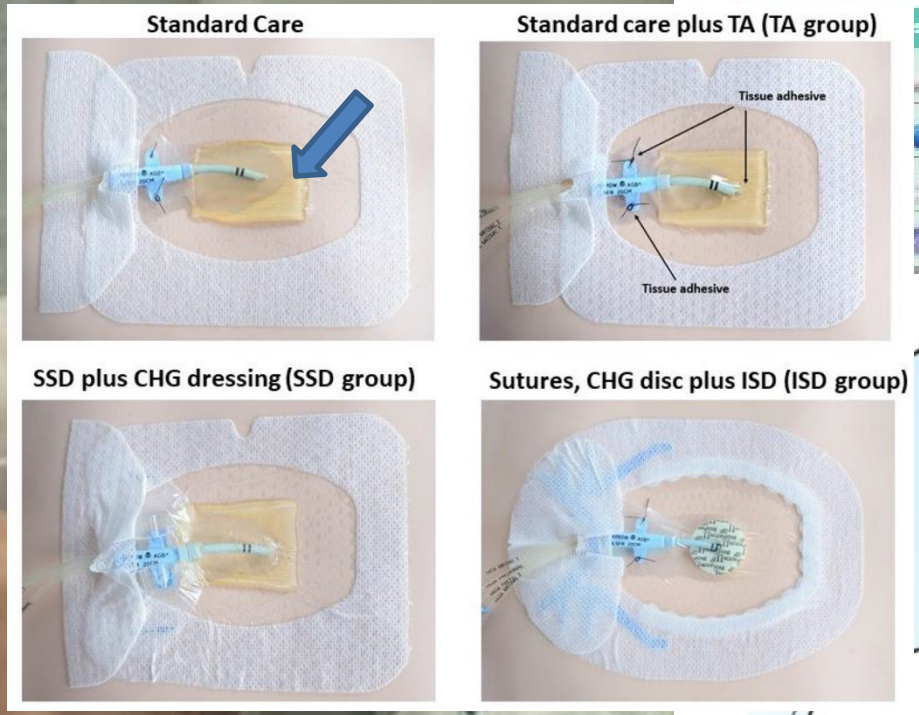
Προετοιμασία πεδίου - ΕΠΕΜΒΑΣΗ

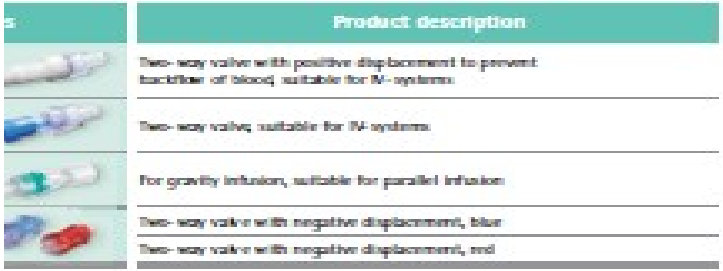


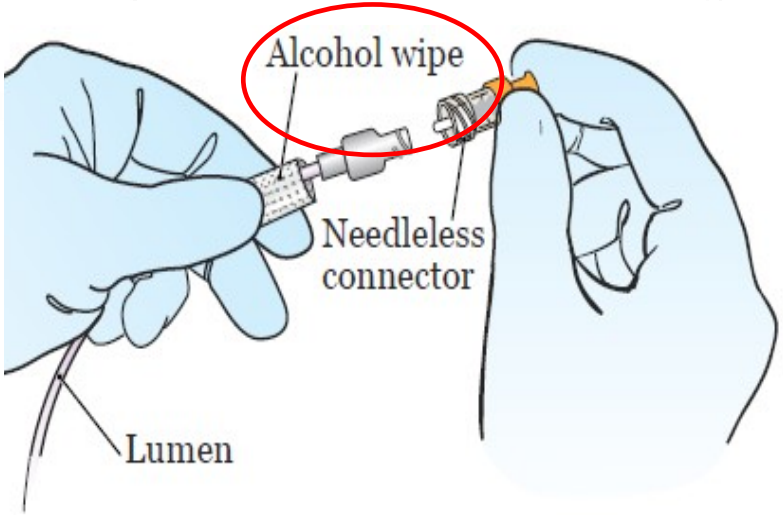


Διαχείριση – Χρήση ΚΓ

ΣΤΑΔΙΟ 2: ΔΙΑΧΕΙΡΙΣΗ – ΧΡΗΣΗ ΚΓ

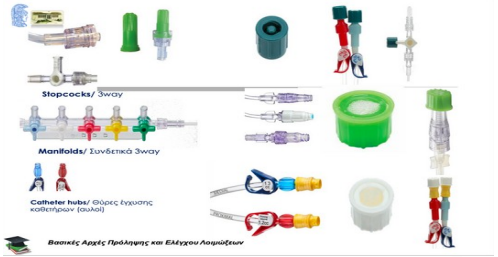






Διαχείριση – Χρήση ΚΓ

”Scrub-the-Hub” :
Αντισηπτικά καλύμματα φραγμού



- Περιέχουν απολυμαντικό: Ισοπρυλική αλκοόλη 70% ή και Γλυκονική Χλωρεξιδίνη
- Δεν χρειάζεται αλλαγή ούτε αφαίρεση μεταξύ των χρήσεων
- Έναρξη τοποθέτησης από την εισαγωγή της ΚΓ
- Είναι αποτελεσματικά έως 7 ημέρες
- Φαίνεται να είναι αποδεκτά από τους ΕΥ λόγω της ευκολίας χρήσης (μείωση χρόνου έγχυσης υγρών)

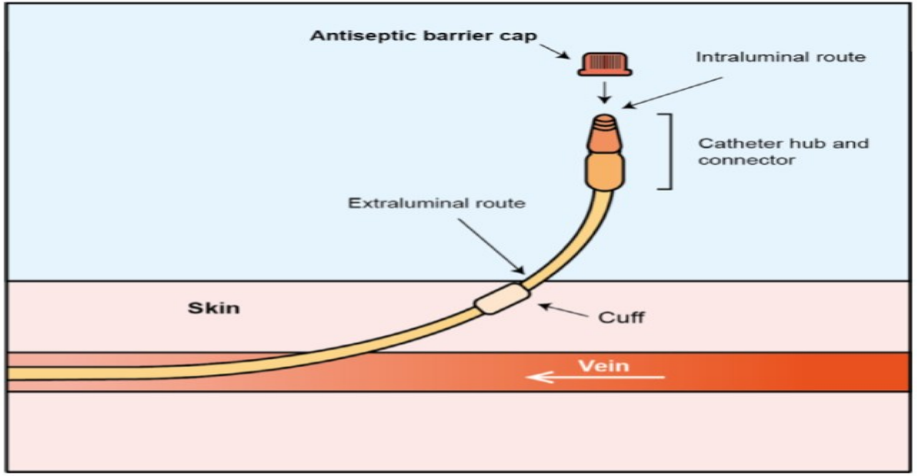


Fig 1. Central venous catheter with antiseptic barrier cap.

V.E.L.M. Gillis et al. / American Journal of Infection Control 00 (2022) 1–9

Από επιμόλυνση στη μικροβιαιμία

Σπάνια από επιμόλυνση του διαλύματος.

Focus of preventive strategies

- Ενδοαυλική οδός διαμέσου αυλών και συνδετικών
- long-term ΚΦΚ εκτός ΜΕΘ
- στη ΜΕΘ συνήθως μετά από 10 μέρες (intraluminal contamination from tubes and hubs)

Catheter hubs

Microbes migrate intraluminally from colonized hubs, less often from contaminated infusate

Catheter insertion site

Αιματογενής διασπορά (<10%) από άλλη εστία λοίμωξης (haematogenous from distant sites)

SKIN

VEIN

Microbes adhere to fibrin sheath/thrombus and develop mature biofilm

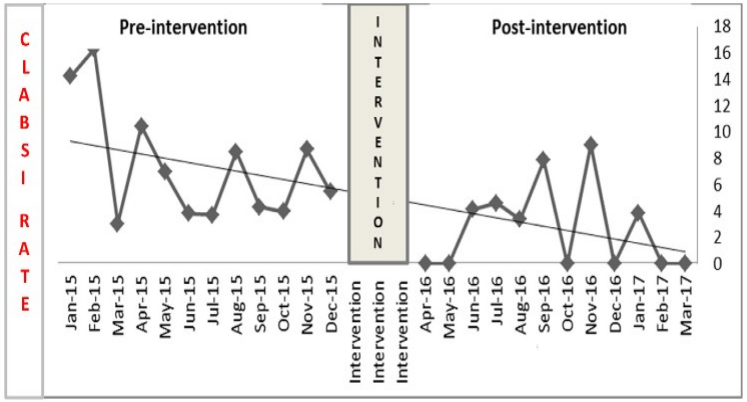
Microbes migrate extraluminally from colonized skin

Microbes may hematogenously seed catheter from distant infection sites

- Εξωαυλική οδός διαμέσου του σημείου εισόδου ΚΦΚ,
- short-term ΚΦΚ, συνήθως εντός πρώτων 10 ημερών,
- δίοδος μικροοργανισμών κατά την τοποθέτηση ΚΦΚ ή διαμέσου των επιθεμάτων
- συνηθέστερη οδός στις ΜΕΘ

ource: Centers for Disease Control and Prevention, Atlanta.

Αποτελέσματα από συμμόρφωση στα bunndles (δεσμίδες μέτρων)



Monthly trend of central line-associated bloodstream infections (CLABSI) in pre-and post-intervention phases

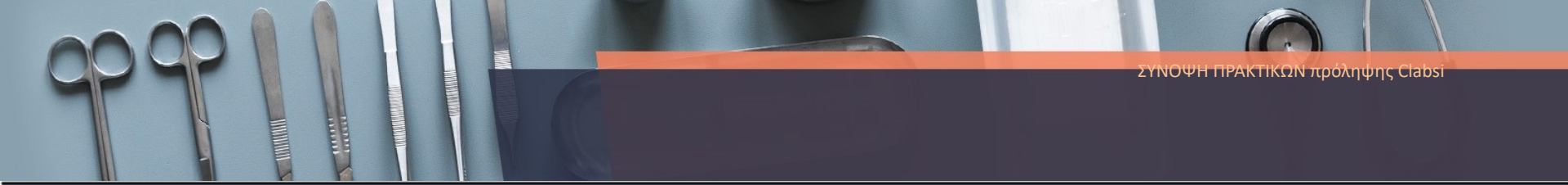
Table 4 The percentage of central line checklist compliance in pediatrics and neonatal intensive care units April 2016–March 2017.

Intervention Elements[a]		April 2016	May 2016	June 2016	July 2016	Aug 2016	Sep 2016	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	March 2017
1	Line inserted by central line team	78	76	86	77	90	80	91	83	85	81	85	86
2	Using central line Kit	87	90	88	98	92	89	94	95	97	93	96	94
3	Using sterile dressing	100	100	100	100	100	100	100	100	100	100	100	100
4	Hand Hygiene	87	85	90	82	84	86	90	88	90	83	86	91
5	Maximum barrier	91	82	88	92	83	88	97	96	84	93	93	89
6	Approved antiseptics	91	75	83	87	87	85	97	90	90	86	91	94
7	Optimum site selection	76	80	76	87	93	82	83	89	97	100	90	83
8	Daily revision	77	85	78	89	79	91	91	90	92	90	94	89
Overall compliance		**70.7**	**71.4**	**72.5**	**83.5**	**77.2**	**79**	**80.3**	**84.5**	**81**	**79.5**	**83.7**	**81.6**

[a] The elements mentioned in details in Table 1.

Throughout the pre-intervention period there was a total of 23 healthcare-associated CLABSI developed in 23 patients, 3085 central line-days and 3502 patient-days, and the calculated overall CLABSI rate was 7.5/1000 central line-days. After implementing the intervention and during the follow-up period, 9 noted CLABSI among nine patients, 2995 central line-days and 3454 patient-days; the incidence density was 3.0 CLABSIs/1000 central line-days. This result indicates a 59.5% reduction in the CLABSI rate ($P < 0.05$) (Table 2), and the monthly trends in the two study periods

W.S. Hamza, E.A.-T.M. Hamed, M.A. Alfadhli et al.



Essential Practices

Before insertion

1. Provide easy access to an evidence-based list of indications for CVC use to minimize unnecessary CVC placement (Quality of Evidence: LOW)
2. Require education and competency assessment of HCP involved in insertion, care, and maintenance of CVCs about CLABSI prevention (Quality of Evidence: MODERATE)[74–78]
3. Bathe ICU patients aged >2 months with a chlorhexidine preparation on a daily basis (Quality of Evidence: HIGH)[86–90]

At insertion

1. In ICU and non-ICU settings, a facility should have a process in place, such as a checklist, to ensure adherence to infection prevention practices at the time of CVC insertion (Quality of Evidence: MODERATE)[101]
2. Perform hand hygiene prior to catheter insertion or manipulation (Quality of Evidence: MODERATE)[102–107]
3. The subclavian site is preferred to reduce infectious complications when the catheter is placed in the ICU setting (Quality of Evidence: HIGH)[33,37,108–110]
4. Use an all-inclusive catheter cart or kit (Quality of Evidence: MODERATE)[118]
5. Use ultrasound guidance for catheter insertion (Quality of Evidence: HIGH)[119,120]
6. Use maximum sterile barrier precautions during CVC insertion (Quality of Evidence: MODERATE)[123–128]
7. Use an alcoholic chlorhexidine antiseptic for skin preparation (Quality of Evidence: HIGH)[42,129–134]

After insertion

1. Ensure appropriate nurse-to-patient ratio and limit use of float nurses in ICUs (Quality of Evidence: HIGH)[34,35]
2. Use chlorhexidine-containing dressings for CVCs in patients over 2 months of age (Quality of Evidence: HIGH)[45,135–142]
3. For non-tunneled CVCs in adults and children, change transparent dressings and perform site care with a chlorhexidine-based antiseptic at least every 7 days or immediately if the dressing is soiled, loose, or damp. Change gauze dressings every 2 days or earlier if the dressing is soiled, loose, or damp (Quality of Evidence: MODERATE)[145–148]
4. Disinfect catheter hubs, needleless connectors, and injection ports before accessing the catheter (Quality of Evidence: MODERATE)[150–154]
5. Remove nonessential catheters (Quality of Evidence: MODERATE)
6. Routine replacement of administration sets not used for blood, blood products, or lipid formulations can be performed at intervals up to 7 days (Quality of Evidence: HIGH)[164]
7. Perform surveillance for CLABSI in ICU and non-ICU settings (Quality of Evidence: HIGH)[13,165,166]

Buetti N, et al. (2022). Strategies to prevent central line-associated bloodstream infections in acute-care hospitals: 2022 Update. Infection Control & Hospital Epidemiology, 43: 553–569, https://doi.org/10.1017/ice.2022.87

ΣΥΝΟΨΗ ΠΡΑΚΤΙΚΩΝ πρόληψης Clabsi

Additional Approaches

1. Use antiseptic- or antimicrobial-impregnated CVCs (Quality of Evidence: HIGH in adult patients[38,39,169–171] and Quality of Evidence: MODERATE in pediatric patients)[172,173]
2. Use antimicrobial lock therapy for long-term CVCs (Quality of Evidence: HIGH)[177–184]
3. Use recombinant tissue plasminogen activating factor (rt-PA) once weekly after hemodialysis in patients undergoing hemodialysis through a CVC (Quality of Evidence: HIGH)[192]
4. Utilize infusion or vascular access teams for reducing CLABSI rates (Quality of Evidence: LOW)[193,194]
5. Use antimicrobial ointments for hemodialysis catheter insertion sites (Quality of Evidence: HIGH)[197–201]
6. Use an antiseptic-containing hub/connector cap/port protector to cover connectors (Quality of Evidence: MODERATE)[202–208]

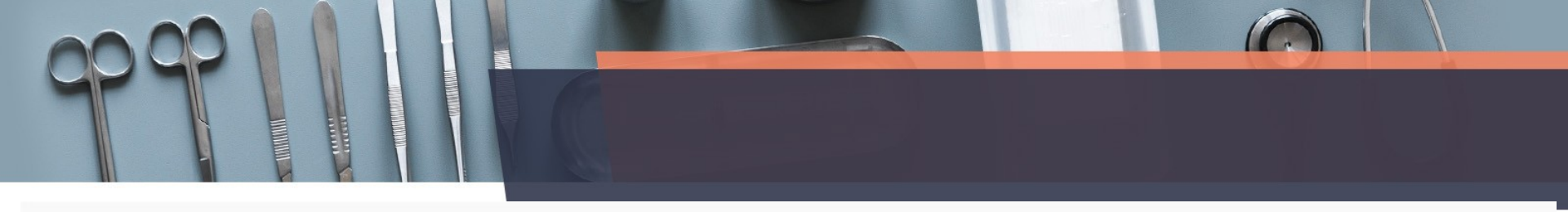
Approaches that Should Not Be Considered a Routine Part of CLABSI Prevention

1. Do not use antimicrobial prophylaxis for short-term or tunneled catheter insertion or while catheters are *in situ* (Quality of Evidence: HIGH)[209–213]
2. Do not routinely replace CVCs or arterial catheters (Quality of Evidence: HIGH)[214]

Unresolved Issues

1. Routine use of needleless connectors as a CLABSI prevention strategy before an assessment of risks, benefits, and education regarding proper use[215–219]
2. Surveillance of other types of catheters (eg, peripheral arterial or peripheral venous catheters)[11,21,22]
3. Standard, nonantimicrobial transparent dressings and CLABSI risk.
4. The impact of using chlorhexidine-based products on bacterial resistance to chlorhexidine
5. Sutureless securement
6. Impact of silver zeolite-impregnated umbilical catheters in preterm infants (applicable in countries where it is approved for use in children)[227]
7. Necessity of mechanical disinfection of a catheter hub, needleless connector, and injection port before accessing the catheter when antiseptic-containing caps are being used

Buetti N, et al. (2022). Strategies to prevent central line-associated bloodstream infections in acute-care hospitals: 2022 Update. Infection Control & Hospital Epidemiology, 43: 553–569, https://doi.org/10.1017/ice.2022.87

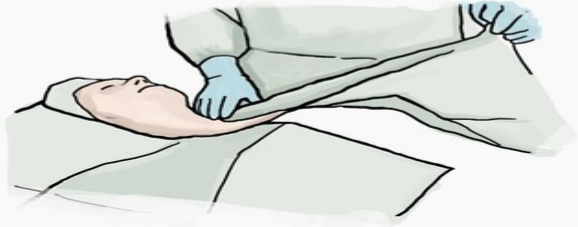


Five steps to prevent central line infections

1 Wash hands using soap or alcohol prior to placing the catheter.

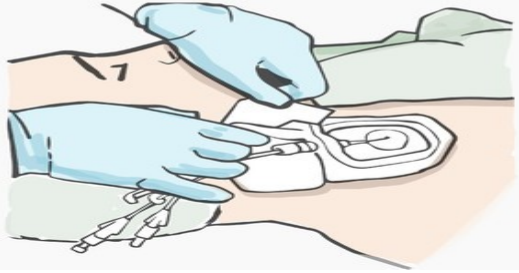
2 Wear sterile gloves, hat, mask and gown.

3 Completely cover the patient with sterile drapes. Avoid placing the catheter in the groin, if possible.



4 Clean the insertion site on the patient's skin with chlorhexidine antiseptic solution.

5 Remove catheters when they are no longer needed.



SOURCE: *Safe Patients, Smart Hospitals. Peter Pronovost*

Vox

ΕΠΙΤΡΟΠΗ ΝΟΣΟΚΟΜΕΙΑΚΩΝ
ΛΟΙΜΩΞΕΩΝ ΠΓΝΑ

Ευχαριστούμε πολύ
για την προσοχή σας
#infectioncontrol_team!