



Infezioni dei PICC e dei Midline nel paziente COVID

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First: protect the operator

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Catholic University, Rome

WoC*o*VA *live!*

First of all...

IS IT CORRECT THE TITLE OF THIS PRESENTATION...?

IN MY OPINION, AT THE TIME OF COVID 19, IT COULD BE BETTER "FIRST: PROTECT THE OPERATOR... BUT WITHOUT FORGETTING THE PATIENT'S SAFETY"!





World Map



U.S. Map



Critical Trends



COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopki...



Total Confirmed

7.449.476

Confirmed Cases by
Country/Region/Sovereignty

2.016.630 US

772.416 Brazil

501.800 Russia

292.854 United Kingdom

286.577 India

242.707 Spain

236.142 Italy

214.788 Germany

Admin0

Last Updated at (M/D/YYYY)

6/11/2020, 11:33:23 PM

188

countries/region

Lancet Inf Dis Article: [Here](#). Mobile Version: [Here](#).

Lead by JHU CSSE. Technical Support: [Esri Living Atlas team](#) and [JHU APL](#). Financial Support: [JHU](#) and [NSF](#). Click [here](#) to donate to the CSSE dashboard team, and other



Esri, FAO, NOAA

Cumulative Confirmed Cases

Global Deaths

418.846

113.652 deaths
US

41.364 deaths
United Kingdom

39.680 deaths
Brazil

34.167 deaths
Italy

29.349 deaths

Global Dea...

US State Level

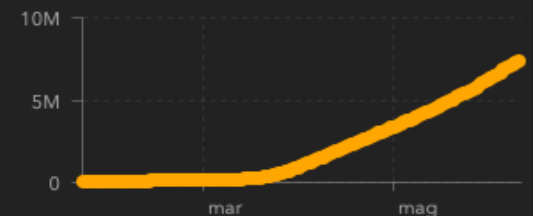
Deaths, Recovered

30.575
deaths, **68.019**
recovered
New York US

12.443
deaths, **28.207**
recovered
New Jersey US

7.454 deaths,
recovered

US Deaths...



Confirmed

Logarithmic

Daily Cases

Istantanea Schermo

Note

Commenti





COVID-19 Personal Protective Equipment (PPE) for Healthcare Personnel

Preferred PPE – Use N95 or Higher Respirator



Acceptable Alternative PPE – Use Facemask



In the field of vascular access, at the time of Covid – 19, our main goals are:

The safety of the operator

- Knowledge of proper PPE
- Certified competency in the use of PPE (donning and doffing)

The safety of the patient

- Wise choice of vascular device (peripheral or central)
- Wise choice of the technique of insertion
- Wise choice of strategies to prevent contamination during insertion
 - Hand hygiene
 - 2% Chlorhexidine in 70% isopropyl alcohol skin antisepsis
 - Maximal barrier precautions

Vascular access in COVID-19 patients: Smart decisions for maximal safety

Giancarlo Scoppettuolo¹, Daniele Guerino Biasucci²
and Mauro Pittiruti³ 

The Journal of Vascular Access
1–3
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Abstract

The 2020 COVID pandemic has forced everyone to update the usual medical procedures and adapt them to a new situation characterized by a high risk of contamination of the health operator. The placement of a venous access device is no exception. In the experience of the vascular access team of our hospital, hit by the COVID epidemic in March 2020, the safety of both the patient and the staff can be ensured by an insertion bundle of few smart strategies, which include choice of long dwelling peripheral catheters (midline catheters) rather than short venous cannulas; use of power injectable peripherally inserted central catheters in the COVID patients in intensive care unit requiring a central line; use of wireless probes—easy to carry, easy to clean—for ultrasound guided venipuncture; avoidance of x-rays, using alternative methods for tip location such as intracavitary electrocardiography or trans-thoracic echocardiography; strict adoption of the barrier precautions recommended by the international guidelines.

Keywords

COVID, coronavirus, venous access device, central venous catheter, PICC, midline, tip location, ultrasound guidance

Date received: 25 March 2020; accepted: 14 April 2020

WISE CHOICE OF THE PERIPHERAL
VAD

WISE CHOICE OF THE CENTRAL
VAD

WISE CHOICE OF THE TECHNIQUE
OF INSERTION

**ADOPTION OF PRECAUTIONS
FOR AVOIDING
CONTAMINATION**

Scoppettuolo, JVA 2020

Adoption of the recommended precautions for avoiding contamination

Last but not least, insertion of MC and PICC is performed following the CDC recommendations for vascular access in COVID patients:¹² the operator must strictly adopt the “standard” maximal barrier precautions (hand hygiene, surgical mask, beret, sterile impermeable gown, sterile gloves, wide sterile drapes over the patient, appropriate sterile cover for the ultrasound probe); furthermore, the patient and all other persons in the room must wear a mask. The use of N95 mask is strongly recommended for aerosol generating procedures, which is usually not the case of VAD insertion, and in particular not when the VAD (MC or PICC) is inserted at the arm. Nonetheless, in COVID patients, a N95 mask should be always considered, and used appropriately (i.e. coupled with a surgical mask).

As COVID-19 unfortunately continues, it is important to focus on infection control. For this reason, we expect that more and more hospitals will have to develop local policies for vascular access insertion in these very special patients. We hope that these few suggestions from our VAD team can aid others to develop insertion bundles apt to minimize any possible harm to the patient and to the staff.

COMMENTARY

Open Access

Recommendations for the use of vascular access in the COVID-19 patients: an Italian perspective



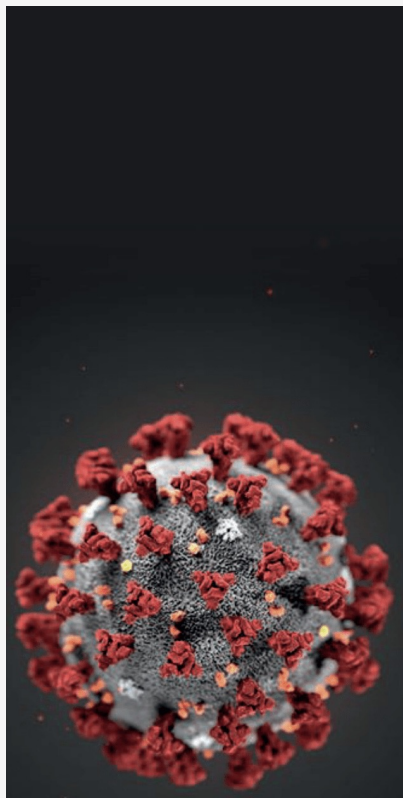
Mauro Pittiruti^{1*} , Fulvio Pinelli² on behalf of the GAVeCeLT Working Group for Vascular Access in COVID-19

Keywords: COVID-19, Vascular access devices, Central venous catheters

Pittiruti, Critical Care 2020

- For patient protection, adopt the standard barrier precautions (hand hygiene, skin antisepsis with 2% chlorhexidine in 70% isopropyl alcohol, non-sterile surgical mask, non-sterile cap, sterile gloves, waterproof sterile gown, wide sterile field on the patient, sterile probe cover of appropriate length).
- For protection of the operator, adopt the standard personal protective equipment for contact protection (double glove, full suit, goggles or face shield, footwear); use both a surgical mask and a protective mask with N95 filter (equivalent to FFP2 of the European nomenclature), considering the high risk of aerosol in the environment, especially in the extubated and symptomatic COVID patient on NIV.

SIAARTI, 2020

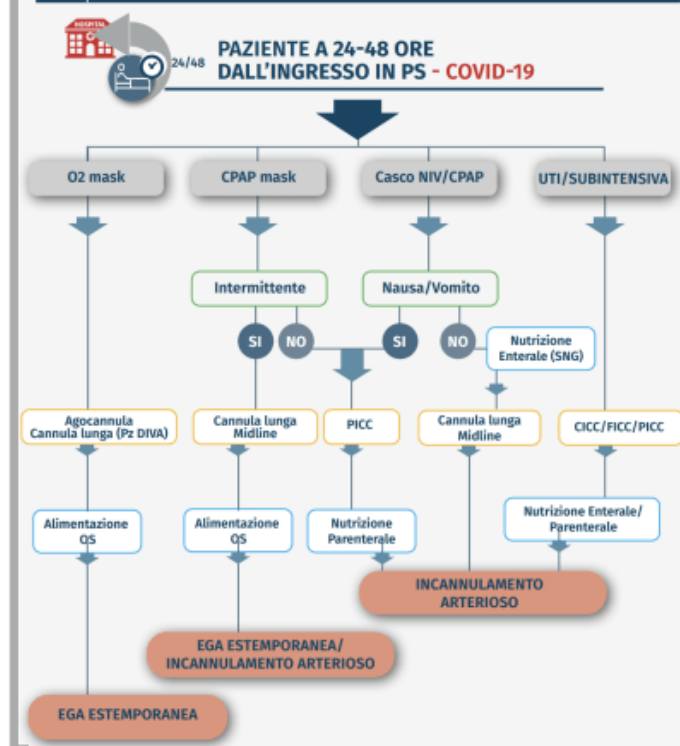


SIAARTI

PRO VITA CONTRA DOLOREM SEMPER

**SIAARTI VASCOVID:
APPROCCIO VASCOLARE
AL PAZIENTE COVID-19 POSITIVO**

FIG. 1 | VASCOVID

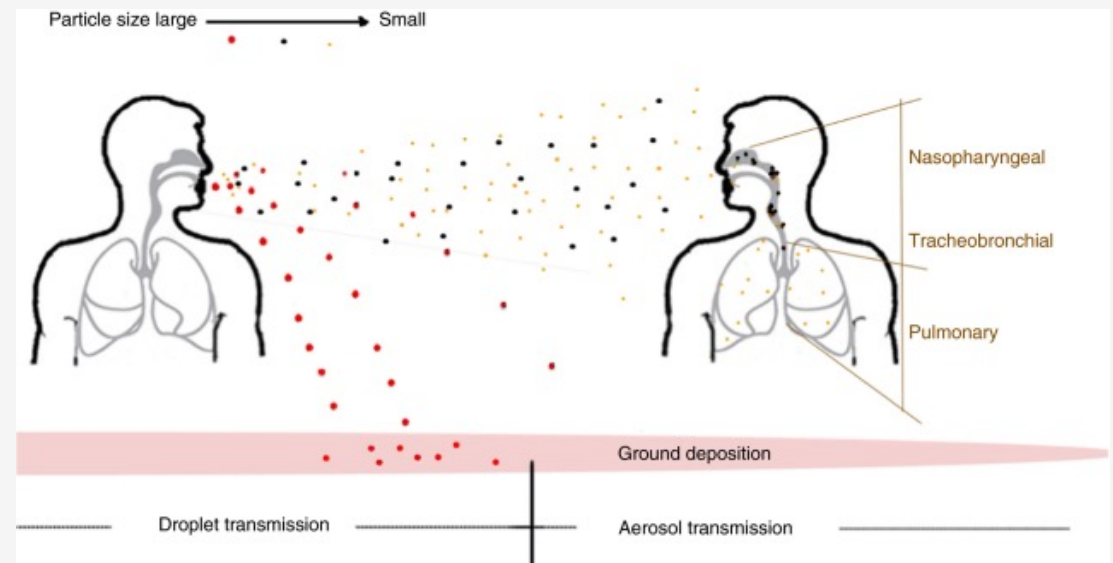


But what is the proper PPE in the setting of COVID 19?

And what are the changes to PPE during the insertion of a vascular access to prevent infections?

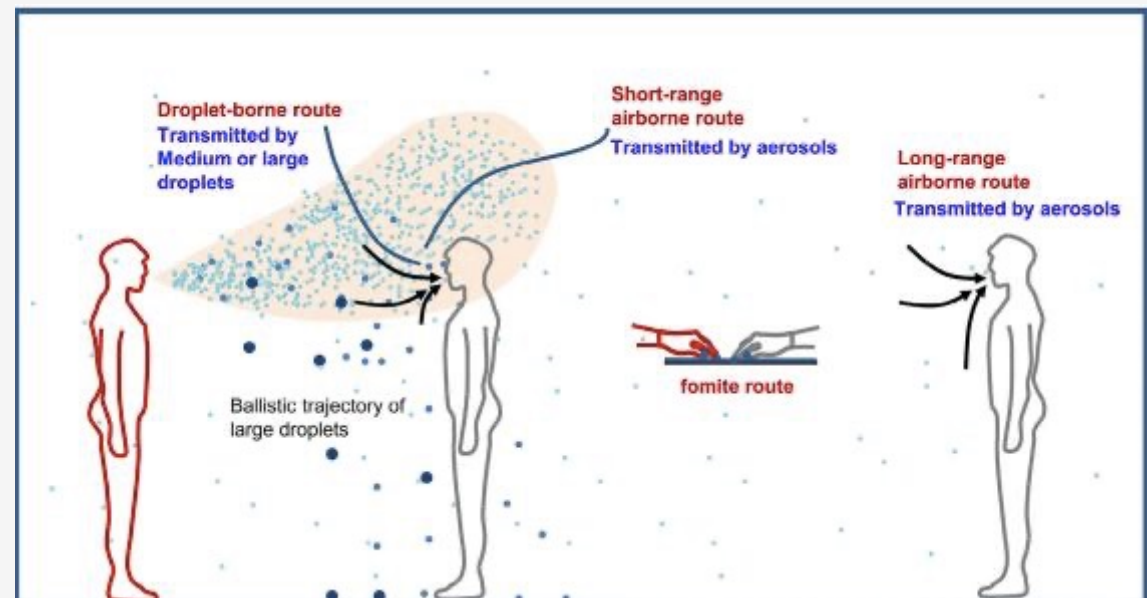
Modes of transmission of the Covid – 19 virus

Respiratory infections can be transmitted through **droplets** of different sizes: when the droplet particles are $>5\text{-}10\text{ }\mu\text{m}$ in diameter they are referred to as respiratory droplets (**DROPLETS TRANSMISSION**), and when they are $<5\mu\text{m}$ in diameter, they are referred to as droplet nuclei (**AIRBORNE TRANSMISSION**).



Modes of transmission of the Covid – 19 virus

In the context of COVID-19, airborne transmission may be possible in specific circumstances and settings in which procedures or support treatments that generate aerosols are performed; i.e., endotracheal intubation, bronchoscopy, open suctioning, administration of nebulized treatment, manual ventilation before intubation, turning the patient to the prone position, disconnecting the patient from the ventilator, non-invasive positive-pressure ventilation, tracheostomy, and cardiopulmonary resuscitation.



PPE – WHO RECOMMENDATIONS

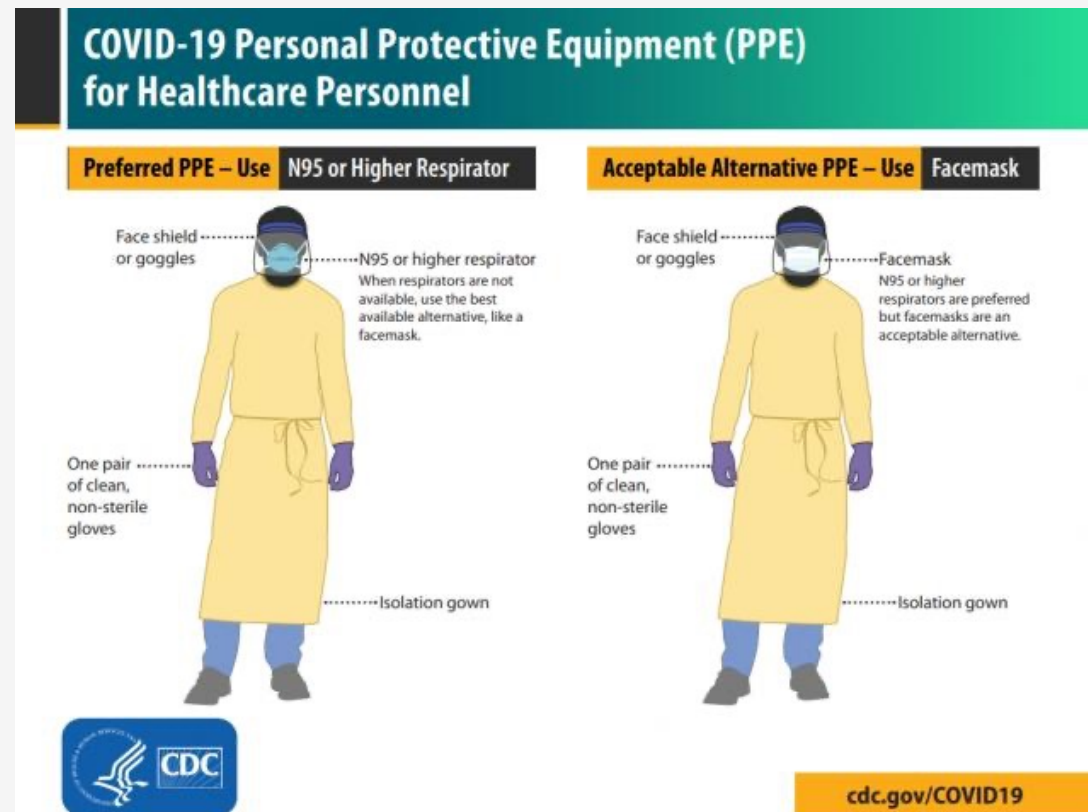
Based on this evidence, WHO continues to recommend droplet and contact precautions for those people caring for COVID-19 patients (gloves, gown, goggles, surgical facemask).

WHO continues to recommend airborne precautions (as above, but with respirators instead of facemasks) for circumstances and settings in which aerosol generating procedures and support treatment are performed, according to risk assessment. These recommendations are consistent with other national and international guidelines, including those developed by the European Society of Intensive Care Medicine and Society of Critical Care Medicine and those currently used in Australia, Canada, and United Kingdom.



PPE – US CDC AND e-CDC RECOMMENDATIONS

US Centers for Diseases Control and Prevention and the European Centre for Disease Prevention and Control, recommend airborne precautions for any situation involving the care of COVID-19 patients, and consider the use of medical masks as an acceptable option in case of shortages of respirators (N95, FFP2 or FFP3)



A. GEMELLI HOSPITAL'S INDICATIONS FOR DONNING AND DOFFING

Gemelli 
Università degli Studi di Roma Tor Vergata

UTILIZZO D.P.I.
PER PAZIENTI CON INFEZIONE DA COVID-19 SOSPETTA O ACCERTATA
PROCEDURA DI VESTIZIONE

- 
RIMUOVERE OGGETTI E OGGETTI PERSONALI DALLE MANI
- 
PRATICARE L'IGIENE DELLE MANI CON SOLUZIONE ALCOLICA
- 
CONTROLLARE L'INTEGRITÀ DEI DISPOSITIVI NON UTILIZZARE DISPOSITIVI NON INTEGRALI
- 
INDOSSARE IL CAMICE MONOUSO
- 
INDOSSARE LA MASCHERINA CHIRURGICA MONOUSO
- 
SE INDICATO
INDOSSARE LA MASCHERA FFP2
- 
ESPIRARE CON FORZA E SUCCESSIVAMENTE INSPIRARE PROFONDAMENTE PER VERIFICARE IL CORRETTO POSIZIONAMENTO DELLA MASCHERA
- 
INDOSSARE OCCHIALI DI PROTEZIONE O VISIERA OPPURE MASCHERINA CHIRURGICA CON VISIERA PREASSEMBLATA
- 
INDOSSARE I GUANTI PULVINAGGIO A DORSO SOPRA I POLSINI DEL CAMICE MONOUSO

Gemelli 
Università degli Studi di Roma Tor Vergata

UTILIZZO D.P.I.
PER PAZIENTI CON INFEZIONE DA COVID-19 SOSPETTA O ACCERTATA
PROCEDURA DI SVESTITIZIONE

- 
RIMUOVERE IL CAMICE PROTETTIVO ASSIEME AI GUANTI RIVOLTANDOLI DALL'INTERNO VERSO L'ESTERNO
- 
RIMUOVERE IL CAMICE PROTETTIVO ASSIEME AI GUANTI RIVOLTANDOLI DALL'INTERNO VERSO L'ESTERNO
- 
SMALTIRE CAMICE E GUANTI IN MANIERA SICURA NEL CONTENITORE PER I RIFIUTI A RISCHIO INFETTIVO
- 
PRATICARE L'IGIENE DELLE MANI CON SOLUZIONE ALCOLICA
- 
RIMUOVERE GLI OCCHIALI DALLE STANGHETTE LATERALI OPPURE DAGLI ELASTICI SULLA NUCA (SE PRESENTI)
- 
RIPORRE GLI OCCHIALI IN UN CONTENITORE SEPARATO PER LA SUCCESSIVA DISINFESTAZIONE (ALCOHOL 70°)
- 
RIMUOVERE LA MASCHERINA DALLA NUCA E SMALTIRLA IN SICUREZZA NEL CONTENITORE PER I RIFIUTI PERICOLOSI
- 
PRATICARE L'IGIENE DELLE MANI CON SOLUZIONE ALCOLICA

But what is the proper PPE in the setting of COVID 19?

And what are the changes to PPE during the insertion of a vascular access to prevent infections?

DONNING PPE BEFORE ENTERING THE ISOLATION ROOM



US SCAN OF THE VEINS



STERILE GOWN AND STERILE GLOVES



FULL BODY STERILE DRAPE



REMOVING STERILE GOWN AND STERILE GLOVES (IN THE ROOM)



REMOVING FOOTWEARS, NON STERILE GOWN AND NON STERILE GLOVES (IN THE ROOM)



REMOVING GOOGLES, RESPIRATOR AND CAP



TAKE HOME MESSAGES FOR THE VASCULAR ACCESS OPERATOR AT THE TIME OF COVID 19

PROTECT YOURSELF

- Knowledge of proper PPE
- Demonstrated competency in the use of PPE

PROTECT YOUR PATIENT

- Knowledge and compliance with international guidelines for infection prevention in the field of vascular access (CDC 2011, EPIC2 2014, SHEA/IDSA 2014, INS 2016).

Weiner-Lastinger, ICHE 2022

Infection Control & Hospital Epidemiology (2022), **43**, 12–25
doi:10.1017/ice.2021.362



Original Article

The impact of coronavirus disease 2019 (COVID-19) on healthcare-associated infections in 2020: A summary of data reported to the National Healthcare Safety Network

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Abstract

Objectives: To determine the impact of the coronavirus disease 2019 (COVID-19) pandemic on healthcare-associated infection (HAI) incidence in US hospitals, national- and state-level standardized infection ratios (SIRs) were calculated for each quarter in 2020 and compared to those from 2019.

Methods: Central-line-associated bloodstream infections (CLABSIs), catheter-associated urinary tract infections (CAUTIs), ventilator-associated events (VAEs), select surgical site infections, and *Clostridioides difficile* and methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia laboratory-identified events reported to the National Healthcare Safety Network for 2019 and 2020 by acute-care hospitals were analyzed. SIRs were calculated for each HAI and quarter by dividing the number of reported infections by the number of predicted infections, calculated using 2015 national baseline data. Percentage changes between 2019 and 2020 SIRs were calculated. Supporting analyses, such as an assessment of device utilization in 2020 compared to 2019, were also performed.

Results: Significant increases in the national SIRs for CLABSI, CAUTI, VAE, and MRSA bacteremia were observed in 2020. Changes in the SIR varied by quarter and state. The largest increase was observed for CLABSI, and significant increases in VAE incidence and ventilator utilization were seen across all 4 quarters of 2020.

Conclusions: This report provides a national view of the increases in HAI incidence in 2020. These data highlight the need to return to conventional infection prevention and control practices and build resiliency in these programs to withstand future pandemics.

(Received 12 July 2021; accepted 15 July 2021; electronically published 3 September 2021)

Infection Control & Hospital Epidemiology (2021), **42**, 997–1000
doi:[10.1017/ice.2020.1335](https://doi.org/10.1017/ice.2020.1335)



Concise Communication

The impact of coronavirus disease 2019 (COVID-19) response on central-line-associated bloodstream infections and blood culture contamination rates at a tertiary-care center in the Greater Detroit area

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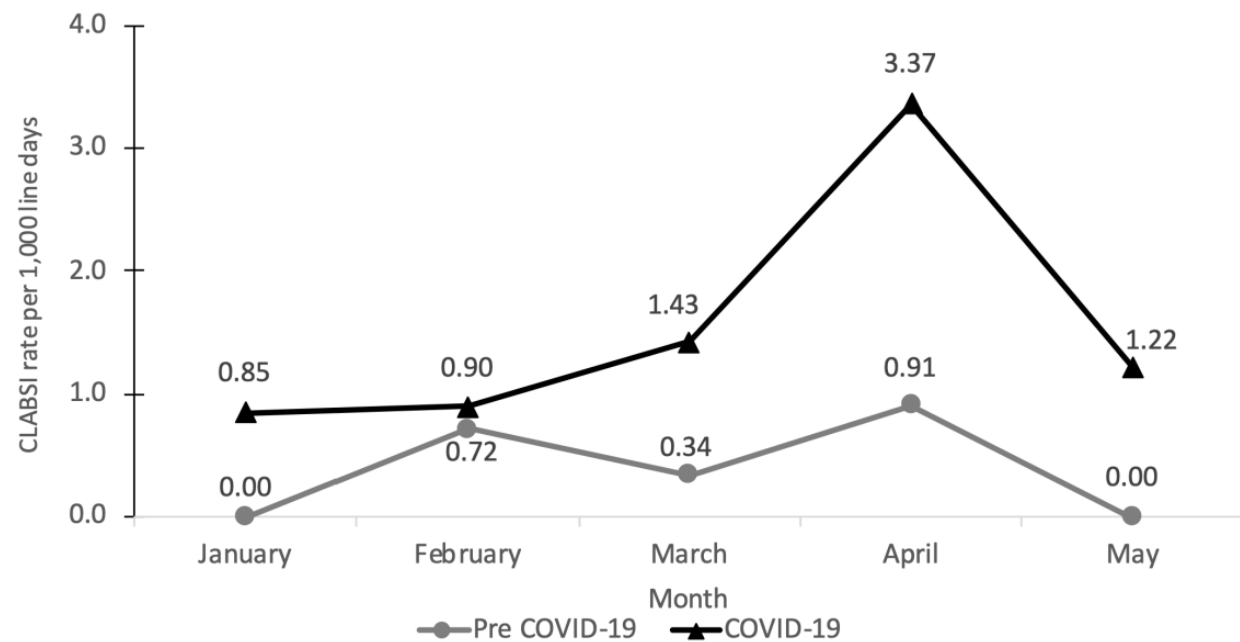
¹School of Osteopathic Medicine, Michigan State University, East Lansing, Michigan, ²Division of Infectious Diseases, Department of Internal Medicine, Detroit Medical Center, Wayne State University School of Medicine, Detroit, Michigan, ³Department of Infection Control, Detroit Medical Center, Detroit, Michigan and ⁴Division of Pulmonary Medicine and Critical Care, Department of Internal Medicine, Detroit Medical Center, Wayne State University School of Medicine, Detroit, Michigan

Abstract

We conducted a comparative retrospective study to quantify the impact of coronavirus disease 2019 (COVID-19) on patient safety. We found a statistically significant increase in central-line-associated bloodstream infections and blood culture contamination rates during the pandemic. Increased length of stay and mortality were also observed during the COVID-19 pandemic.

(Received 11 August 2020; accepted 22 October 2020; electronically published 20 November 2020)

Fig. 1. Central-line-associated bloodstream infections per 1,000 central-line days between January through May. The pre-COVID-19 cohort had 6 central-line bloodstream infections (CLABSIs) per 15,026 central-line days, and the COVID-19 cohort had 30 CLABSIs per 18,106 central-line days. The change in the CLABSI rate was statistically significant at $P < .05$.



Smith, Shock 2022

SHOCK, Vol. 58, No. 5, pp. 358–365, 2022

INCIDENCE, RISK FACTORS, AND OUTCOME OF SUSPECTED CENTRAL VENOUS CATHETER-RELATED INFECTIONS IN CRITICALLY ILL COVID-19 PATIENTS: A MULTICENTER RETROSPECTIVE COHORT STUDY

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Micah L.A. Heldeweg,^{*,†} Lucas Fleuren,^{*} Patrick Thorat,^{*} Tariq A. Dam,^{*}
Leo M.A. Heunks,[§] Diederik Gommers,[§] Olaf L. Cremer,^{||} Rob J. Bosman,[‡]
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Dave A. Dongelmans,^{††} Remko de Jong,^{‡‡} Marco Peters,^{§§} Marlijn J.A. Kamps,^{||}
Dharmanand Ramnarain,^{¶¶} Ralph Nowitzky,^{##} Fleur G.C.A. Nooteboom,^{***}
Wouter de Ruijter,^{†††} Louise C. Urlings-Strop,⁺⁺⁺ Ellen G.M. Smit,^{§§§}
D. Jannet Mehagnoul-Schipper,^{||||} Tom Dormans,^{¶¶¶} Cornelis P.C. de Jager,^{###}
Stefaan H.A. Hendriks,^{****} Sefanja Achterberg,^{††††} Evelien Oostdijk,⁺⁺⁺
Auke C. Reidinga,^{§§§§} Barbara Festen-Spanjer,^{|||||} Gert B. Brunnekeer,^{¶¶¶¶}
Alexander D. Cornet,^{#####} Walter van den Tempel,^{****} Age D. Boelens,^{†††††}
Peter Koetsier,⁺⁺⁺⁺⁺ Judith Lens,^{§§§§§} Harald J. Faber,^{||||||} A. Karakus,^{¶¶¶¶¶}
Robert Entjes,^{#####} Paul de Jong,^{*****} Thijs C.D. Rettig,^{††††††} Sesmu Arbous,⁺⁺⁺⁺⁺
Bas Vonk,^{§§§§§§} Tomas Machado,^{§§§§§§} Armand R.J. Girbes,^{*} Elske Sieswerda,^{|||||||}
Paul W.G. Elbers,^{*} and Pieter R. Tuinman^{*,†}

SHOCK NOVEMBER 2022

SUSPECTED CATHETER-RELATED INFECTIONS IN CRITICALLY ILL COVID-19 PATIENTS

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ABSTRACT—Background: Aims of this study were to investigate the prevalence and incidence of catheter-related infection, identify risk factors, and determine the relation of catheter-related infection with mortality in critically ill COVID-19 patients. **Methods:** This was a retrospective cohort study of central venous catheters (CVCs) in critically ill COVID-19 patients. Eligible CVC insertions required an indwelling time of at least 48 hours and were identified using a full-admission electronic health record database. Risk factors were identified using logistic regression. Differences in survival rates at day 28 of follow-up were assessed using a log-rank test and proportional hazard model. **Results:** In 538 patients, a total of 914 CVCs were included. Prevalence and incidence of suspected catheter-related infection were 7.9% and 9.4 infections per 1,000 catheter indwelling days, respectively. Prone ventilation for more than 5 days was associated with increased risk of suspected catheter-related infection: odds ratio 5.05 (95% confidence interval 2.12–11.0). Risk of death was significantly higher in patients with suspected catheter-related infection (hazard ratio, 1.78; 95% confidence interval, 1.25–2.53). **Conclusions:** This study shows that in critically ill patients with COVID-19, prevalence and incidence of suspected catheter-related infection are high, prone ventilation is a risk factor, and mortality is higher in case of catheter-related infection.

KEYWORDS—Central venous catheters, catheter-related infections, COVID-19, intensive care

Kakih, ICHE 2022

> [Infect Control Hosp Epidemiol.](#) 2022 Jan;43(1):26–31. doi: 10.1017/ice.2021.70.
Epub 2021 Feb 19.

Coronavirus disease 2019 (COVID-19) pandemic, central-line-associated bloodstream infection (CLABSI), and catheter-associated urinary tract infection (CAUTI): The urgent need to refocus on hardwiring prevention efforts

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Allison Ottenbacher ³, Karl Saake ³, Angela Winegar ³, Richard Fogel ¹, Joseph Cacchione ¹

Variable	Before COVID-19 (March 2019–February 2020)			During the COVID-19 Pandemic (March–August 2020)			Before COVID-19 vs During COVID-19	
	No. of Events (Organisms ^a)	Device Days	Rate (Events per 1,000 Device Days)	No. of Events (Organisms ^a)	Device Days	Rate (Events per 1,000 Device Days)	P Value	Relative Change, %
CLABSI	302 (344)	537,124	0.56	219 (236)	257,898	0.85	<.001	51.0
Gram-positive organisms	143 (155)	537,124	0.27	124 (129)	257,898	0.48	<.001	80.6
<i>Staphylococcus aureus</i>	53 (53)	537,124	0.10	33 (33)	257,898	0.13	.24	29.7
Methicillin resistant <i>Staphylococcus aureus</i>	21 (21)	537,124	0.04	16 (16)	257,898	0.06	.16	58.7
Coagulase-negative <i>Staphylococcus</i>	39 (42)	537,124	0.07	43 (44)	257,898	0.17	<.001	129.6
Gram-negative organisms	103 (112)	537,124	0.19	48 (50)	257,898	0.19	.86	–2.9
<i>Candida</i> spp	73 (76)	537,124	0.14	55 (55)	257,898	0.21	.01	56.9

Verberk, Antimicrob Resist Infect Contr 2023

Verberk et al.
Antimicrobial Resistance & Infection Control (2023) 12:2
<https://doi.org/10.1186/s13756-022-01201-z>

Antimicrobial Resistance
and Infection Control

RESEARCH

Open Access

Healthcare-associated infections in Dutch hospitals during the COVID-19 pandemic

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➤ **Incidenza di CR-BSI aumentata (4.0 eventi/1000 giorni catetere) durante la pandemia rispetto a quella prevista (1.4 eventi/1000 giorni catetere)**

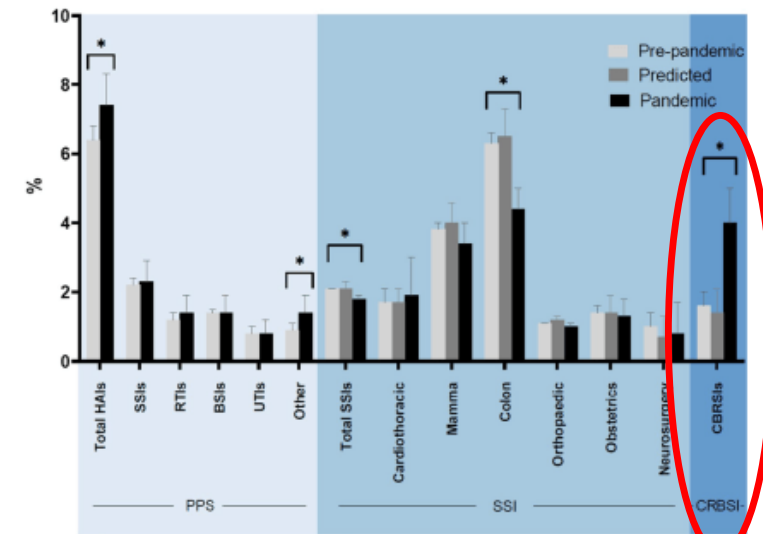


Fig. 1 Infection rates pre-pandemic, and predicted and observed infection rates during the pandemic period. HAIs healthcare-associated infections, PPS point prevalence survey, SSIs surgical site infections, RTIs respiratory tract infections, BSIs bloodstream infections, UTIs urinary tract infections, CRBSIs catheter-related bloodstream infections

Zanella, Emerg Infect Dis 2024

EMERGING INFECTIOUS DISEASES®

ISSN: 1080-6059

EID Journal > Volume 30 > Early Release > Main Article > Figure 1

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Volume 30, Number 1—January 2024

Dispatch

Increased Peripheral Venous Catheter Bloodstream Infections during COVID-19 Pandemic, Switzerland

Marie-Céline Zanella¹, Eva Pianca¹, Gaud Catho, Basile Obama, Marlieke E.A. De Kraker, Aude Nguyen, Marie-Noëlle Chraïti, Jonathan Sobel, Loïc Fortchandre, Stephan Harbarth, Mohamed Abbas, and Niccolò Buetti✉

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Zanella, Emerg Infect Dis 2024

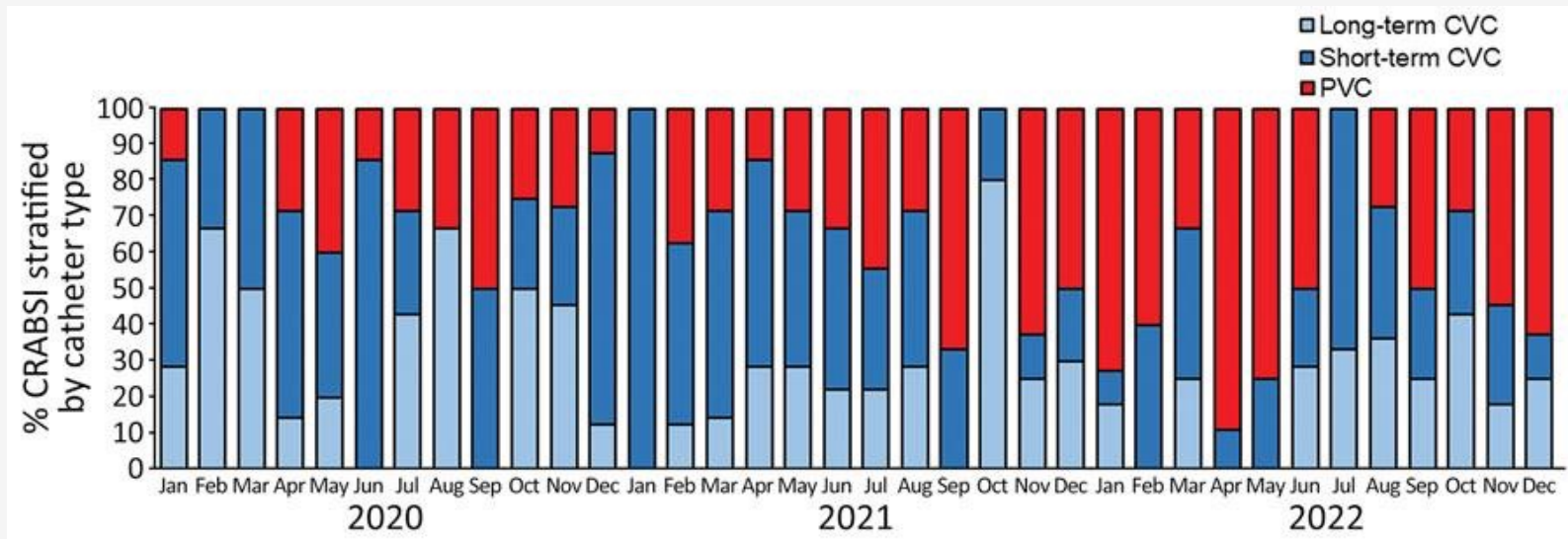


Figure 1. Percentage of intravascular catheter infections stratified by catheter type in study of intravascular catheter bloodstream infections during the COVID-19 pandemic, Switzerland, January 1, 2020–December 31, 2022. CRABSI, catheter-related or -associated bloodstream infections; CVC, central venous catheter; PVC, peripheral venous catheter.

Zanella M, Pianca E, Catho G, Obama B, De Kraker M, Nguyen A, et al. Increased Peripheral Venous Catheter Bloodstream Infections during COVID-19 Pandemic, Switzerland. *Emerg Infect Dis.* 2024;30(1). <https://doi.org/10.3201/eid3001.230183>

E le infezioni di Midline e PICC?

The risk of bloodstream infection in adults with different intravascular devices: a systematic review of 200 published prospective studies

Dennis G Maki¹, Daniel M Kluger, Christopher J Crnich

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								

- PICC-related CR-BSI 2.1/1000 catheter-days
- Midline-related CR-BSI 0.2/1000 catheter-days

Maki et al. (2006)



Increase in the frequency of catheter-related bloodstream infections during the COVID-19 pandemic: a plea for control

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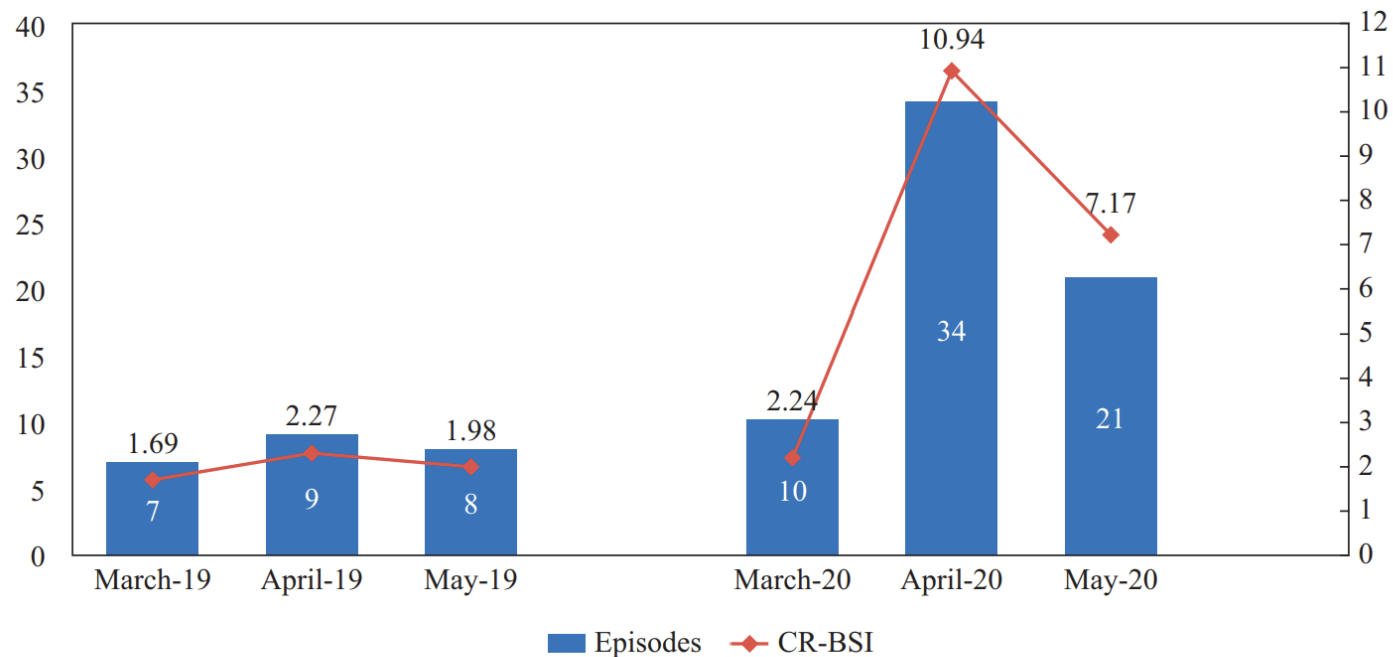


Figure 1. Incidence rate of catheter-related bloodstream infections (CR-BSIs)/1000 admissions during the study periods.

Table II
Characteristics of the catheters

Catheters	Total N = 89	2019 N = 24	2020 N = 65	P
Type of catheter, adults, N (%)				
Non-tunneled central venous	49 (55.05)	7 (29.16)	42 (64.61)	0.004
Tunneled central venous	12 (13.48)	8 (33.33)	4 (6.15)	0.204
Peripheral venous catheter	3 (3.37)	0 (0.0)	3 (4.61)	1.000
Peripherally inserted central catheter	15 (16.85)	1 (4.16)	14 (21.53)	0.277
Arterial	10 (11.23)	8 (33.33)	2 (3.07)	1.000
Location of non-tunneled central venous, N=49 (%)				
Jugular	35 (71.42)	2 (28.57)	33 (78.57)	0.015
Subclavian	8 (16.32)	4 (57.14)	4 (9.52)	0.009
Femoral	6 (12.24)	1 (14.28)	5 (11.90)	1.00
Catheter days, median (IQR)	17.00 (11.00–28.50)	27.50 (11.75–126.00)	16.00 (11.00–23.50)	0.032
Catheter days, total	5222	3637	1585	NA

IQR, interquartile range.

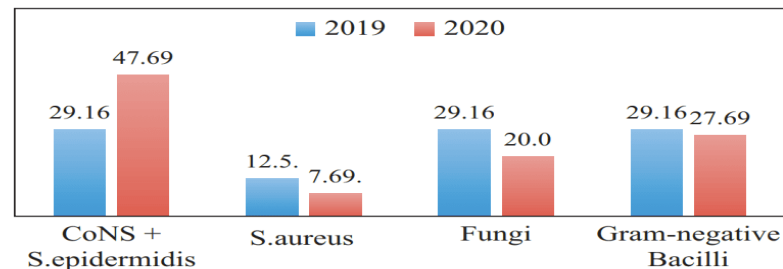


Figure 2. Aetiology of episodes of catheter-related bloodstream infection (CR-BSI). Percentages of micro-organisms causing CR-BSI in 2019 and 2020.

Fungal superinfections are also a considerable problem [33,34] and include invasive candidiasis and candidaemia [35], coronavirus-associated pulmonary aspergillosis [36–39], and even *Saccharomyces fungaemia* [40].

Interestingly, data on episodes of bacteraemia were contradictory in the initial reports of the pandemic period and usually do not specify the policy of blood cultures drawing in different institutions [41,42]. However, it seems clear that prolonged hospital stay, in ICUs, has led most authors to report an increase in episodes of bacteraemia [43].

Our series includes 81 patients with proven CR-BSIs and compared a similar time period in 2019 and 2020; we found that the frequency of CR-BSIs increased three-fold during the COVID-19 period. Very recently, Le Rose *et al.* [30] reported an



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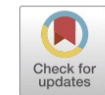
American Journal of Infection Control

journal homepage: www.ajicjournal.org



Major Article

Complications associated with the use of peripherally inserted central catheters and midline catheters in COVID-19 patients: An observational prospective study



Federico Frondizi MD^{a,*}, Laura Dolcetti^b, Mauro Pittiruti MD^c, Maria Calabrese MD^d,
Massimo Fantoni MD^{a,b}, Daniele Guerino Biasucci MD^e, Giancarlo Scoppettuolo MD^b

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^e Dipartimento di Scienze Cliniche e Medicina Translazionale, Università degli Studi di Roma Tor Vergata, Rome, Italy

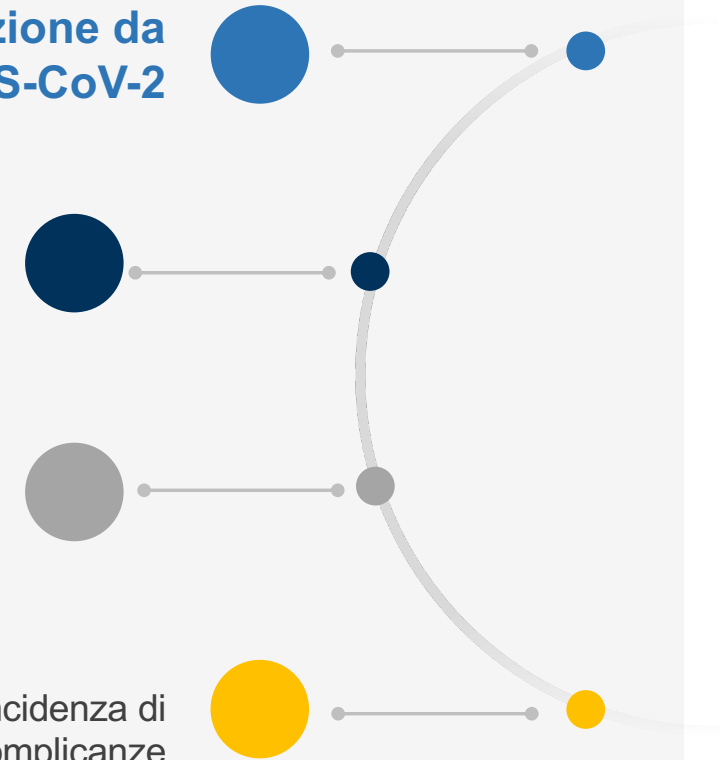
Frondizi, American Journal of Infection Control, 2023

Incidenza di CR-BSI in pazienti con infezione da SARS-CoV-2

Tempo medio di insorgenza dell'infezione per
PICC e Midline

Tempo medio di insorgenza di trombosi

Fattori in grado di correlare con un'aumentata incidenza di
complicanze



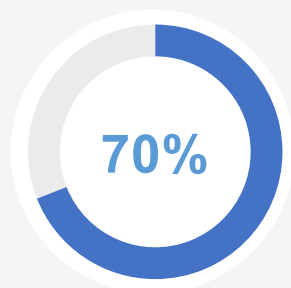
Frondizi, American Journal of Infection Control, 2023

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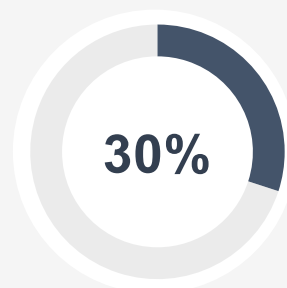
Pazienti arruolati

(Ottobre 2020- Aprile 2021)

**STUDIO MONOCENTRICO
OSSERVAZIONALE PROSPETTICO**



**158
Midline**



**69
PICC**

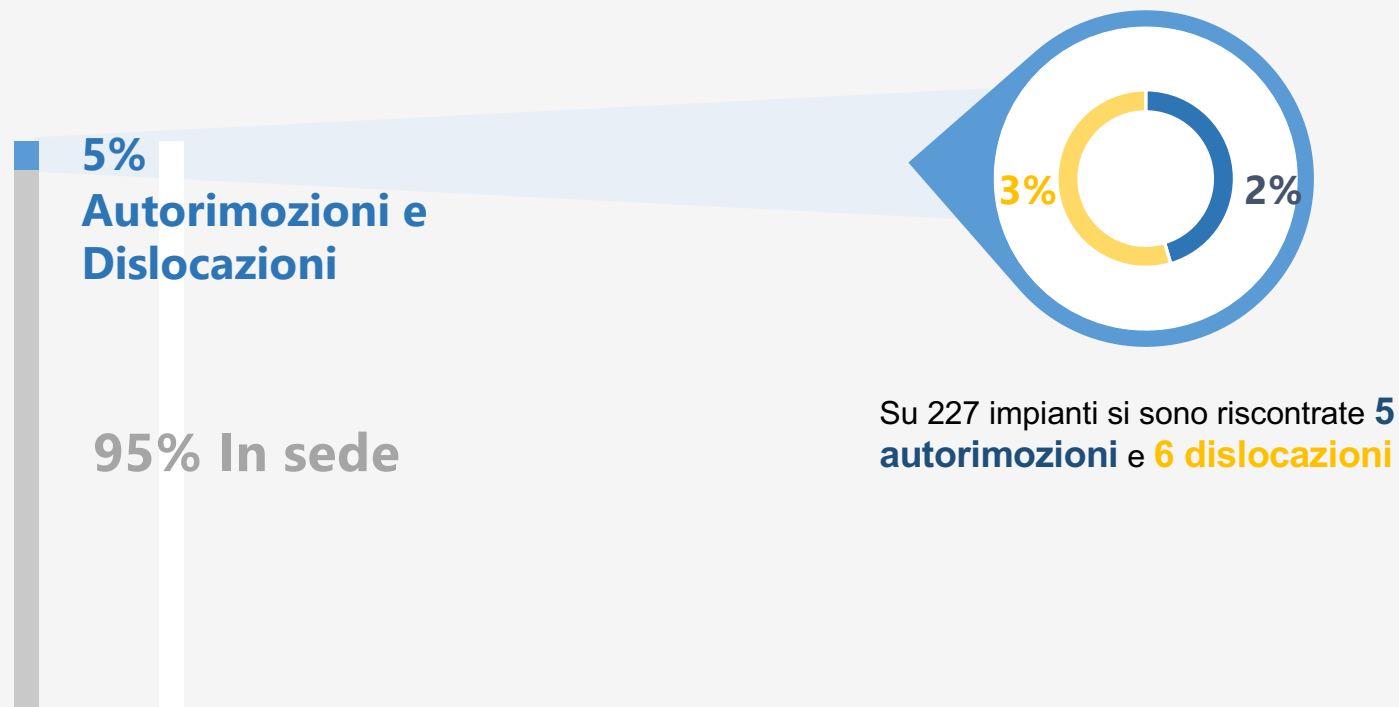
Impiantati dal PICC Team secondo le Raccomandazioni Aziendali sugli accessi vascolari della Fondazione Policlinico Universitario "A. Gemelli" IRCCS

Frondizi, American Journal of Infection Control, 2023

Età media	78,08 ± 13,49 anni
Maschi	41,7% (96)
Femmine	58,3% (134)
Patologie polmonari pregresse	23,01% (53)
Diabete	20,4% (47)
HbA1C > 7,6%	1,3% (3)
Ipertensione	52,6% (121)
Malattie cardiovascolari	60,8% (140)
BMI > 30	22,1% (51)

Frequenza respiratoria > 24 apm	4,78% (11)
Frequenza cardiaca > 125 bpm	0,43% (1)
SpO2 < 94%	29,57% (68)
PaO2/FiO2 < 300	51,73% (119)
D-dimero >1000 ng/mL	42,17% (97)
CPK > 340 UI/L	22,17% (57)
Troponina elevata	10,43% (24)
PCR >100 mg/L	40% (92)
LDH >250 UI/L	62,61% (144)
Linfociti < 800 cellule/mm ³	36,95% (85)
Ferritina >500 ng/mL	26,96% (62)
IL-6 > 4,4 ng/L	26,08% (60)
SARS-CoV-2 IgA/IgM/IgG	16,52% (38)

Frondizi, American Journal of Infection Control, 2023



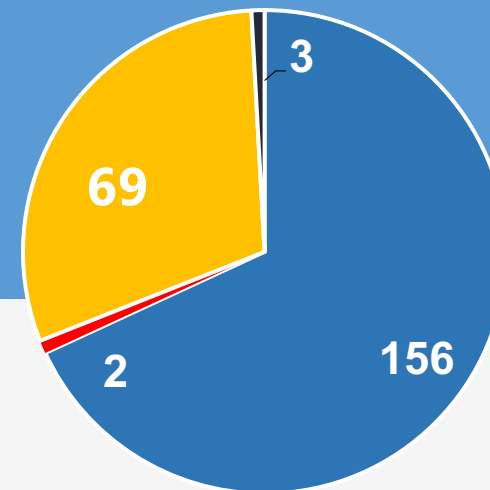
INCIDENZA DI TROMBOSI CATETERE-CORRELATA (CRT)

2 trombosi su **227** impianti

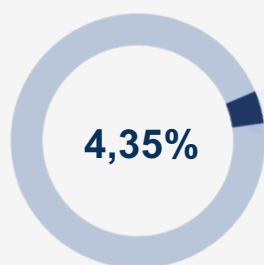
Tutte a carico di cateteri **Midline**

1,07 trombosi su
1000 giorni/catetere **Midline**

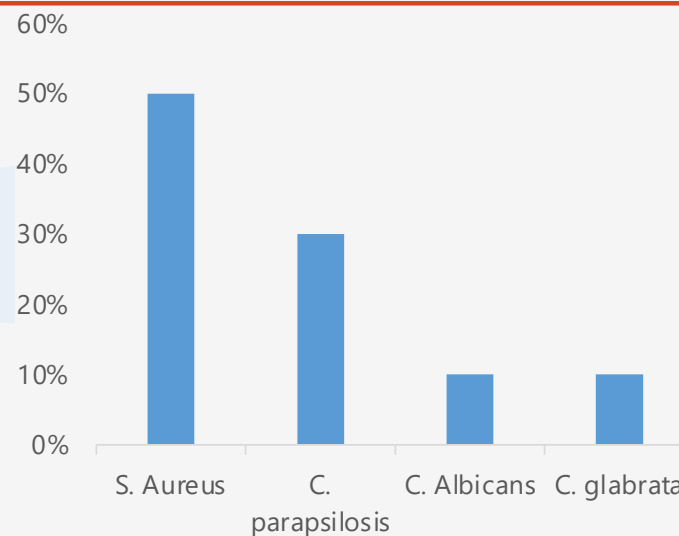
Tempo medio di insorgenza di **6 giorni**



INCIDENZA DI INFEZIONE CATETERE CORRELATA (CR-BSI)



Percentuale di infezioni su
227 impianti



Tipologia di accesso	Numero di infezioni	Incidenza %	Incidenza per 1000 giorni/catetere
PICC	4	5,8%	4,5
Midline	6	3,8%	3,2
Totale	10	4,4%	3,5

Tempo medio di insorgenza CRBSI

Total catheter days and incidence of CRBSI among PICCs and MCs

	PICCs	MCs
Total number	69	158
Catheter days	889	1,863
CRBSI (%)	4 (5.8)	6 (3.8)
CRBSI/catheter days	4.5	3.2
Days before onset of CRBSI (mean)	13.17 + 8.35	14.25 + 3.59
Days before onset of CRBSI (CI)	4.04-21.93	8.53-19.97

**Inferiore a quello descritto
Da Yong et al. di (19 – 24 giorni)**

Tipologia di accesso	Numero di infezioni	Tempo medio di insorgenza di CR-BSI	CI
PICC	4	13,17 ± 8,35 giorni	4,04 – 21,93
Midline	6	14,25 ± 3,59 giorni	8,53 – 19,97
Totale	10	13,6 ± 6,59 giorni	8,88 – 18,31

> J Vasc Access. 2021 Jan 13;1129729820987373. doi: 10.1177/1129729820987373.
Online ahead of print.

Comparing catheter related bloodstream infection rate between cuffed tunnelled and non-cuffed tunnelled peripherally inserted central catheter

Teoh Sze Yong ¹, Anushya A/P Vijayanathan ¹, Eric Chung ¹, Wei Lin Ng ¹, Nur Adura Yaakup ¹, Norshazriman Sulaiman ¹

Incidenza CRBSI PICC e Midline

The risk of bloodstream infection in adults with different intravascular devices: a systematic review of 200 published prospective studies

Dennis G Maki¹, Daniel M Kluger, Christopher J Crnich

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	110	10,910	28,720	13	0.1	0.1-0.2	0.5	0.2-0.7
Plastic catheters	1	148	350	3	2.0	0.0-4.3	8.6	0.0-18.2
Steel needles	1	27	111	1	3.7	0.0-10.8	9.0	0.0-26.6
Venous cutdown	3	514	9251	2	0.4	0.0-0.9	0.2	0.0-0.5
Midline catheters	14	4366	21,397	37	0.8	0.6-1.1	1.7	1.2-2.3
Arterial catheters for hemodynamic monitoring	15	3566	105,839	112	3.1	2.6-3.7	1.1	0.9-1.3
Peripherally inserted central catheters	6	625	7137	15	2.4	1.2-3.6	2.1	1.0-3.2
Inpatient and outpatient	9	2813	98,702	97	3.5	2.8-4.1	1.8	0.8-1.2
Inpatient								
Outpatient								
Short-term noncuffed central venous catheters								
Nonmedicated								

Tipologia di accesso	Numero di infezioni	Incidenza %	Incidenza per 1000 giorni/catetere
PICC	4	5,8%	4,5
Midline	6	3,8%	3,2
Totale	10	4,4%	3,5

Nei **PICC**, il tasso di infezione è stato del **5,8%** (vs. 2,4% Maki et al. 2006) con **4,5 CR-BSI su 1000 giorni/catetere PICC** (vs. 2,1 Maki et al 2006).

Nei **Midline**, il tasso di infezione è stato del **3,8%** (vs. 0,4% Maki et al. 2006) con **3,2 CR-BSI su 1000 giorni/catetere Midline** (vs. 0,2 Maki et al. 2006)

Malattie Infettive			
Mese	Giorni catetere	CR-BSI	CR-BSI su 1000 giorni/catetere
Febbraio 2021	167	0	0
Marzo 2021	184	0	0
Aprile 2021	122	1	8,1
Maggio 2021	52	0	0
Cumulativi	525	1	1,9

Neurochirurgia			
Mese	Giorni catetere	CR-BSI	CR-BSI su 1000 giorni/catetere
Febbraio 2021	204	0	0
Marzo 2021	275	0	0
Aprile 2021	101	1	9,9
Maggio 2021	85	1	11,7
Cumulativi	665	2	3,0

Pazienti trapiantati di midollo			
Mese	Giorni catetere	CR-BSI	CR-BSI su 1000 giorni/catetere
Febbraio 2021	419	0	0
Marzo 2021	436	0	0
Aprile 2021	401	0	0
Maggio 2021	524	0	0
Cumulativi	1780	0	0

Pneumologia			
Mese	Giorni catetere	CR-BSI	CR-BSI su 1000 giorni/catetere
Febbraio 2021	201	3	14,9
Marzo 2021	131	0	0
Aprile 2021	223	0	0
Maggio 2021	278	2	7,19
Cumulativi	833	5	6,0

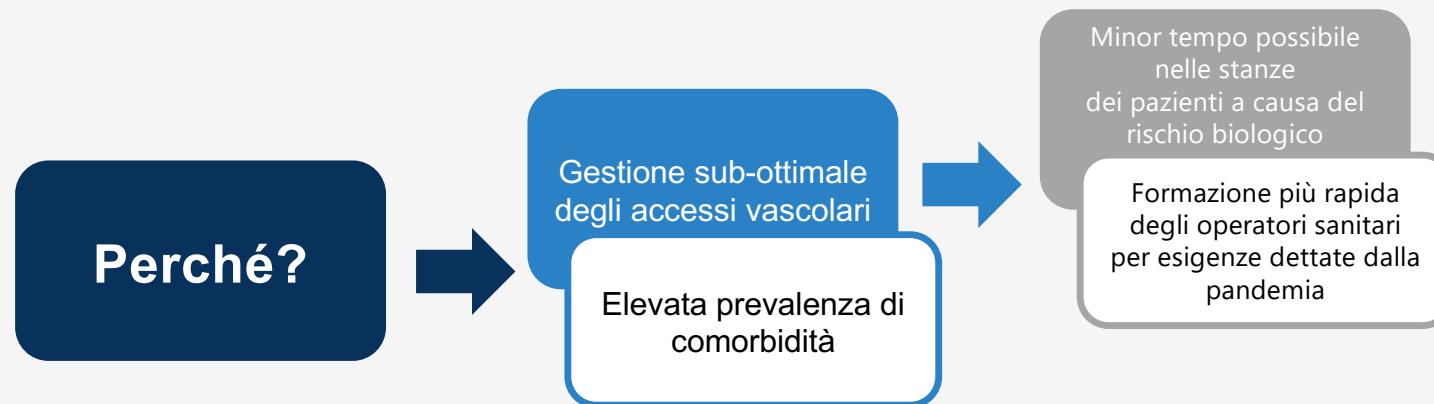
Incidenza di **CR-BSI** maggiore rispetto a 3 dei 4 reparti pilota analizzati presso la Fondazione Policlinico Universitario A. Gemelli IRCCS nello stesso periodo

Tipologia di accesso	Numero di infezioni	Incidenza a %	Incidenza per 1000 giorni/catetere
PICC	4	5,8%	4,5
Midline	6	3,8%	3,2
Totale	10	4,4%	3,5

Conclusioni dello studio

Incidenza di **CR-BSI** nei pazienti **COVID-19** è risultata **maggiore** rispetto a quella registrata in letteratura e a quella calcolata in 3 dei 4 reparti pilota campionati della Fondazione Policlinico Universitario A. Gemelli IRCCS.

Non sono state osservate delle differenze significative nell'incidenza di infezione tra PICC e Midline.



CONCLUSIONI

- Durante la pandemia da COVID 19 è stata osservata a livello globale una aumentata incidenza di infezioni correlate all'assistenza
- In particolare, in molti studi è stata evidenziata una maggiore incidenza di CRBSI e CLABSI e una maggiore mortalità correlata a questa tipologia di infezioni
- Questo dato si applica a tutte le tipologie di accesso vascolare, inclusi PICC e Midline
- Le cause sono sicuramente da ricercare – almeno per il periodo 2020-inizio 2023 – nel ridotto tempo di assistenza dedicato a tale tipologia di pazienti e all'impiego di personale poco formato
- Dall'inizio del 2023 ad oggi, probabilmente stiamo entrando in una fase di «normalizzazione» dell'assistenza a questa tipologia di pazienti
- Proprio per questo, sarà necessario raccogliere ulteriori dati realtivi ai tassi di infezione in questo nuovo scenario assistenziale



Grazie per l'attenzione!

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