



La recente rivoluzione nel campo degli accessi venosi periferici: nuove tecnologie, nuovi materiali, nuove raccomandazioni di impianto e gestione

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▶ AGOCANNULE

▶ CANNULE PERIFERICHE LUNGHE ○ MINI-MIDLINE

AGOCANNULE

- ▶ TEMPI DI SOSTITUZIONE
- ▶ REALE INCIDENZA DELLE COMPLICANZE
- ▶ UTILIZZO DI US PER IL POSIZIONAMENTO

TEMPI DI SOSTITUZIONE



History of PIV replacement

Year	Replacement	Evidence
<1970	Unlimited	Expert opinion
CDC Recommendation		
1970/71	24h	Expert opinion, response to epidemic
1981	48-72h	Expert opinion
1996	48-72h	Collin et al 1975 Cohort study Band & Maki 1980 Cohort study (n=148)
2002	At least 72-96h	Lai et al 1998 Cohort Study (N=2503)
2011	Not more frequently than 72-96h	Maki & Ringer 1991 RCT (N=714) Tager et al 1983 Cohort study (N=3094) Lai et al 1998 Cohort Study (N=2503)
2011	Clinically indicated 'unresolved'	Webster et al 2008 RCT (N=755) Van Donk et al 2009 RCT (N=316) Webster et al Syst Review (N= 3,408)

RCN 2010

Peripheral devices

- A peripheral cannula should be removed every 72-96 hours or sooner if complications are suspected and re-sited if still required (DH, 2007c).
- Document the reason for the removal and condition of the site, for example by using a scoring system such as the VIP scale to document evidence of phlebitis, see appendix 1.



CDC, 2011

Replacement of Peripheral and Midline Catheters

1. There is no need to replace peripheral catheters more frequently than every 72-96 hours to reduce risk of infection and phlebitis in adults [36, 140, 141]. Category 1B
2. No recommendation is made regarding replacement of peripheral catheters in adults only when clinically indicated [142–144]. Unresolved issue



Clinically-indicated replacement versus routine replacement of peripheral venous catheters (Review)

Webster J, Osborne S, Rickard C, Hall J



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Main results

In five trials (3408 participants) there was a 44% reduction in suspected catheter-related bacteraemia in the clinically-indicated group (0.2 versus 0.4%) but this was not statistically significant (odds ratio (OR) 0.57; 95% confidence interval (CI) 0.17 to 1.94; $P = 0.37$). Phlebitis was assessed in six trials (3455 patients); there was a non-significant increase in phlebitis in the clinically-indicated group (9% versus 7.2%); the OR was 1.24 (95% CI 0.97 to 1.60; $P = 0.09$). We also measured phlebitis per 1000 device days using data from five trials, (8779 device days). No statistical differences in the incidence of phlebitis per 1,000 device days was found (clinically indicated 1.6 cases per 1,000 catheter days versus 1.5 cases per 1,000 catheter days in the routine-replacement group). The combined OR was 1.04 (95% CI 0.81 to 1.32; $P = 0.77$). Cost was measured in two trials (961 patients). Cannulation costs were significantly reduced in the clinically-indicated group (mean difference (MD) -6.21; 95% CI -9.32 to -3.11; $P = < 0.000$).

Authors' conclusions

The review found no conclusive evidence of benefit in changing catheters every 72 to 96 hours. Consequently, health care organisations may consider changing to a policy whereby catheters are changed only if clinically indicated. This would provide significant cost savings and would also be welcomed by patients, who would be spared the unnecessary pain of routine re-sites in the absence of clinical indications.

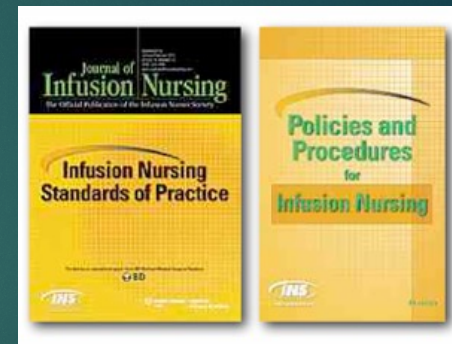
INS, 2011

Practice Criteria

I. Short Peripheral Catheters

- A. The nurse should consider replacement of the short peripheral catheter when clinically indicated and when infusion treatment does not include peripheral parenteral nutrition. The decision to replace the short peripheral catheter should be

based on assessment of the patient's condition; access site; skin and vein integrity; length and type of prescribed therapy; venue of care; integrity and patency of VAD; dressing; and stabilization device.¹⁻¹⁰ (I)



THE LANCET

Routine versus clinically indicated replacement of peripheral intravenous catheters: a randomised controlled equivalence trial.

Rickard CM, Webster J, Wallis MC, Marsh N, McGrail MR, French V, Foster L, Gallagher P, Gowardman JR, Zhang L, McClymont A, Whitby M.

Lancet 2012; 380: 1066–1074

AVA  2013

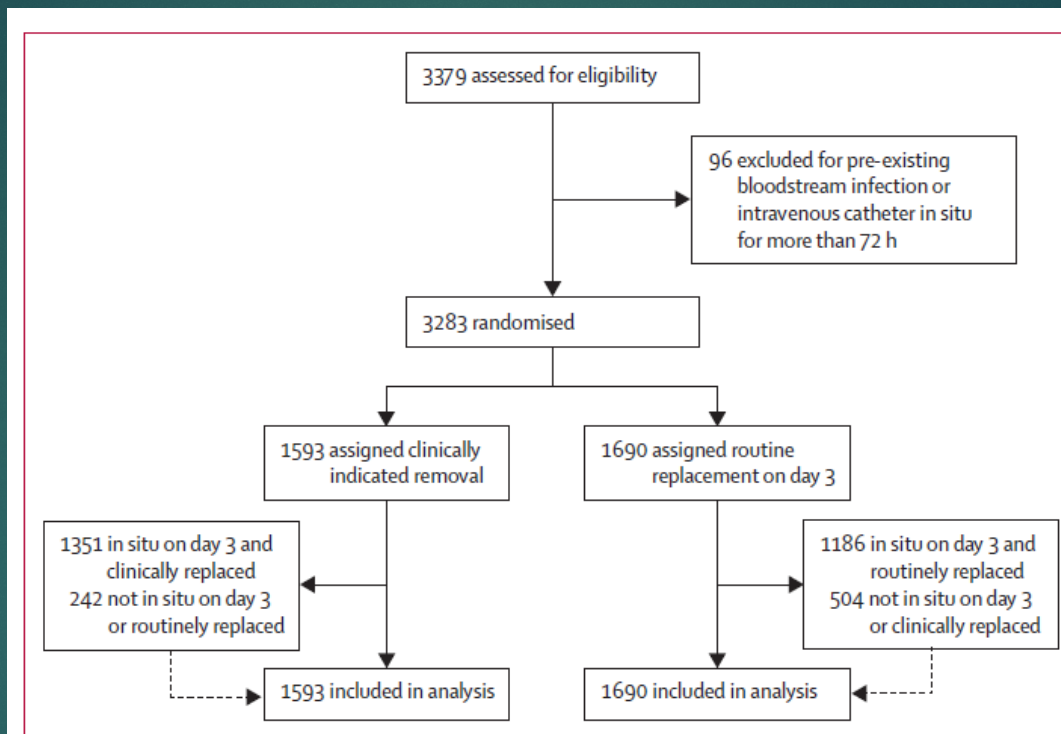


Figure 1: Study profile of patient flow

	Clinically indicated (n=1593)	Routine replacement (n=1690)
Intravenous catheter dwell time (h)*		
Mean (SD)	99 (54)	70 (13)
Median (IQR)	84 (64-118)	70 (57-77)
Age (years)	55.1 (18.6)	55.0 (18.4)
Men	1022 (64%)	1034 (61%)
Type of admission		
Medical	292 (18%)	331 (20%)
Surgical	1301 (82%)	1359 (80%)
Comorbidities		
None	387 (24%)	411 (24%)
One	350 (22%)	372 (22%)
Two or more	856 (54%)	907 (54%)
Present wound infection	256 (16%)	244 (14%)
Wound drain	95 (6%)	116 (7%)
Stoma	27 (2%)	37 (2%)
Data are mean (SD) or n (%). *Per protocol, N=1351 clinically indicated; N=1186 routine replacement.		
Table 1: Baseline demographics and clinical characteristics of patients		

	Clinically indicated* (n=2692)	Routine replacement† (n=3215)
Inserted by		
General clinical staff	1656 (62%)	1856 (58%)
Intravenous insertion service	1002 (38%)	1320 (42%)
Catheter gauge		
≤18	430 (16%)	481 (15%)
20	1517 (57%)	1746 (54%)
≥22	736 (27%)	984 (31%)
Insertion in		
Ward	2002 (74%)	2467 (77%)
Emergency	276 (10%)	305 (9%)
Operating theatre or radiology	361 (13%)	386 (12%)
Other	53 (2%)	57 (2%)
Skin integrity		
Poor	116 (4%)	153 (5%)
Fair	767 (29%)	849 (26%)
Good	1809 (67%)	2213 (69%)
Vein quality		
Poor	381 (14%)	499 (16%)
Fair	928 (35%)	1154 (36%)
Good	1383 (51%)	1562 (49%)
Insertion side		
Left side	1390 (52%)	1616 (50%)
Right side	1301 (48%)	1599 (50%)
Insertion site		
Cubital fossa	347 (13%)	394 (12%)
Hand	577 (21%)	726 (23%)
Inner forearm	277 (10%)	346 (11%)
Lower forearm	561 (21%)	662 (21%)
Mid forearm	442 (16%)	532 (17%)
Outer forearm	182 (7%)	164 (5%)
Wrist	69 (3%)	81 (3%)
Upper arm	201 (8%)	248 (8%)
Other	36 (1%)	62 (2%)
Prescribed treatment		
Oral antibiotic	84 (3%)	88 (3%)
Intravenous antibiotic	1835 (68%)	2235 (70%)
Intravenous crystalloid	2668 (99%)	3180 (99%)
Intravenous potassium	222 (8%)	247 (8%)
Intravenous antipyretic	160 (6%)	158 (5%)
Intravenous cortisone	92 (3%)	73 (2%)
Other intravenous drugs	1158 (43%)	1327 (41%)

In some instances, total numbers are not 2692 or 3215 per group because of missing data. Some totals do not add to 100% because of rounding. *in 1593 patients. †in 1690 patients.

Table 2: Characteristics of peripheral intravenous catheters (per intravenous catheter analysis)

	Clinically indicated (n=1593)	Routine replacement (n=1690)	Risk (95%CI)	p value
Primary outcome, intention-to-treat analysis				
Phlebitis per patient, n (%)	114 (7%)	114 (7%)	RR 1.06 (0.83 to 1.36); ARD 0.41% (-1.33 to 2.15)	0.64
Phlebitis/1000 intravenous catheter days (95% CI)	13.08 (10.68–15.48)	13.11 (10.71–15.52)	HR 0.94 (0.73 to 1.23)	0.67
Primary outcome, per-protocol analysis*				
Phlebitis per patient	63/1351 (5%)	47/1186 (4%)	RR 1.18 (0.81 to 1.70); ARD 0.70% (-0.88 to 2.28)	0.39
Phlebitis/1000 intravenous catheter days (95% CI)	11.4 (8.6–14.2)	13.8 (9.9–17.8)	IRR 0.83 (0.56 to 1.23)	0.32
Secondary outcomes, n (n per 1000 intravenous catheter days)				
Any infusion failure†	670 (76.9)	636 (73.2)	HR 0.99 (0.89 to 1.11)	0.87
Infiltration	279 (32.0)	235 (27.0)	HR 1.06 (0.89 to 1.27)	0.51
Occlusion	344 (39.5)	344 (39.6)	HR 0.92 (0.79 to 1.07)	0.92
Accidental removal	166 (19.0)	159 (18.3)	HR 0.98 (0.79 to 1.23)	0.88
CRBSI‡	0 (0)	1 (0.11)	..	..
All BSI	4 (0.46)	9 (1.03)	HR 0.46 (0.14 to 1.48)	0.19
Venous (local) infection‡	0	0	..	..
Mortality, n (%)§	4 (<1%)	4 (<1%)	RR 1.06 (0.27 to 4.23)	0.93

ARD=absolute risk difference. BSI=bloodstream infection. CRBSI=catheter-related bloodstream infection. HR=hazard ratio. IRR=incident rate ratio. RR=relative risk. *First catheter per patient only. †Combined endpoint of phlebitis, infiltration, occlusion, accidental removal, and CRBSI. ‡Risk and p value inestimable because of 0 incidence in one or both groups. §In all cases, mortality was unrelated to intravenous catheter treatment.

Table 3: Study outcomes by treatment group (per-patient analysis)

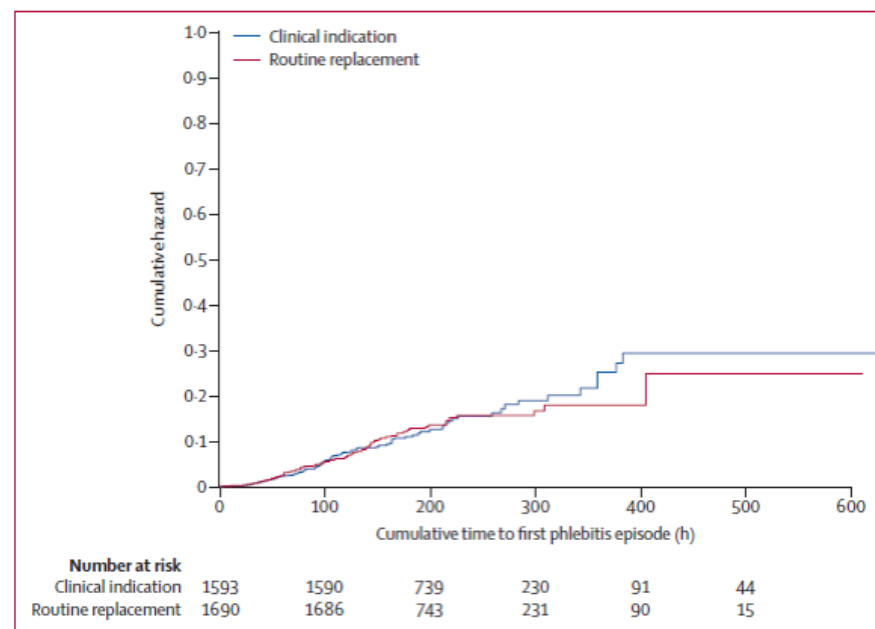


Figure 2: Kaplan-Meier analysis of survival from phlebitis per patient
Includes all catheters per patient, log-rank $p=0.96$.

	Clinically indicated (n=1593)	Routine replacement (n=1690)	Difference (95% CI)	p value
Duration of therapy (h)*	98 (69–161)	96 (66–162)	..	0.12
Intravenous catheters used	1.7 (1.0)	1.9 (1.2)	0.21 (0.13–0.29)	<0.0001
Cost of therapy (AU\$)†	\$61.66 (\$39.46)	\$69.24 (\$43.45)	\$7.58 (\$4.78–10.38)	<0.0001

Data are median (IQR) or mean (SD). *Cumulative of all intravenous catheters per patient. †2011 cost.

Table 5: Comparison of resource use and costs by treatment group (per patient analysis)

EPIC 2014

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



Available online at www.sciencedirect.com

Journal of Hospital Infection

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



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

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^a Richard Wells Research Centre, College of Nursing, Midwifery and Healthcare, University of West London (London).

^b Faculty of Health Sciences, University of Southampton (Southampton).

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EPIC 2014

IVAD29 Peripheral vascular catheters should be re-sited when clinically indicated and not routinely, unless device-specific recommendations from the manufacturer indicate otherwise.

New recommendation *Class B*

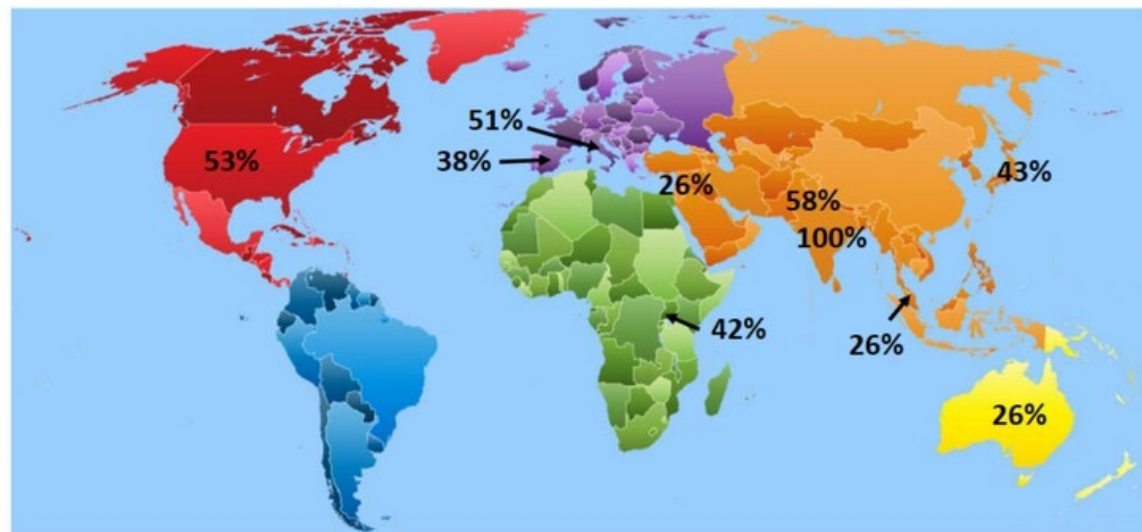
EPIC 2014

IVAD28 Peripheral vascular catheter insertion sites should be inspected at a minimum during each shift, and a Visual Infusion Phlebitis score should be recorded. The catheter should be removed when complications occur or as soon as it is no longer required.

New recommendation *Class D/GPP*

- 
- ▶ Il 26% della agocannule va incontro a complicanze
 - ▶ Almeno il 40% dei pazienti nel corso della loro terapia va incontro ad una complicanza da agocannula
 - ▶ Il 20 % delle agocannule presenta occlusione/stravaso
 - ▶ Il 7 % delle agocannule presenta flebite

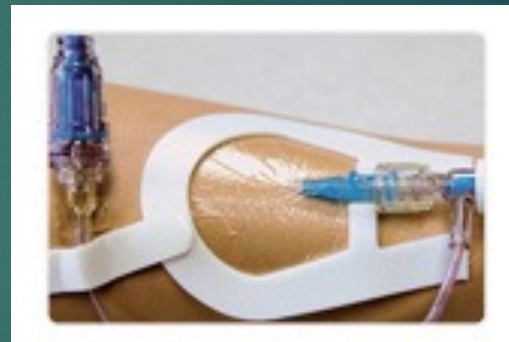
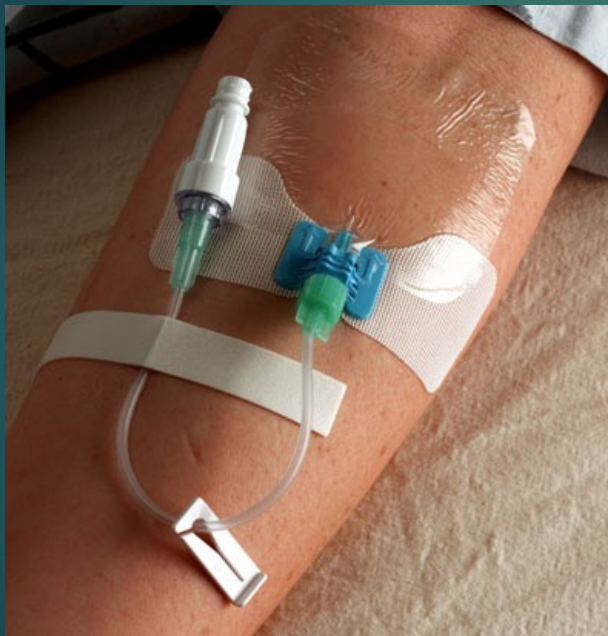
PIVs are failing around the globe



AVA 2013

Courtesy of C. Rickards

PERCHE' IL TASSO DI COMPLICANZE DELLE AGOCANNULE E' COSI' ALTO?



Ma è più probabile vedere
questo...



Qualcuna anche abbastanza
rilevante...



Though, no-US PIVs are known to have a lot of complications...

- ▶ 3-month prospective study in our University Hospital
 - ▶ 251 patients in a medical ward
 - ▶ 365 PIVs
 - ▶ Mean duration of each line 3.8 days (+/- 2.7)
 - ▶ 59% were removed due to complications
 - ▶ Mechanical complications (dislocation, occlusion) **133**/1000 days
 - ▶ Thrombosis/phlebitis **62**/1000 days
 - ▶ Overall complications: **195**/1000 days (!)

Vallecoccia et al.
Journal of Hospital Infection (2015) 89: 72-73

A worldwide point prevalence study 2014



Evan Alexandrou
Principal Investigator

“A day in the life of peripheral cannulae”

Email : omgstudy-group@griffith.edu.au

Web: <http://www.omgpivc.org/>

Twitter: @OMGstudy1



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The One Million Global Catheters Study 2014-2015

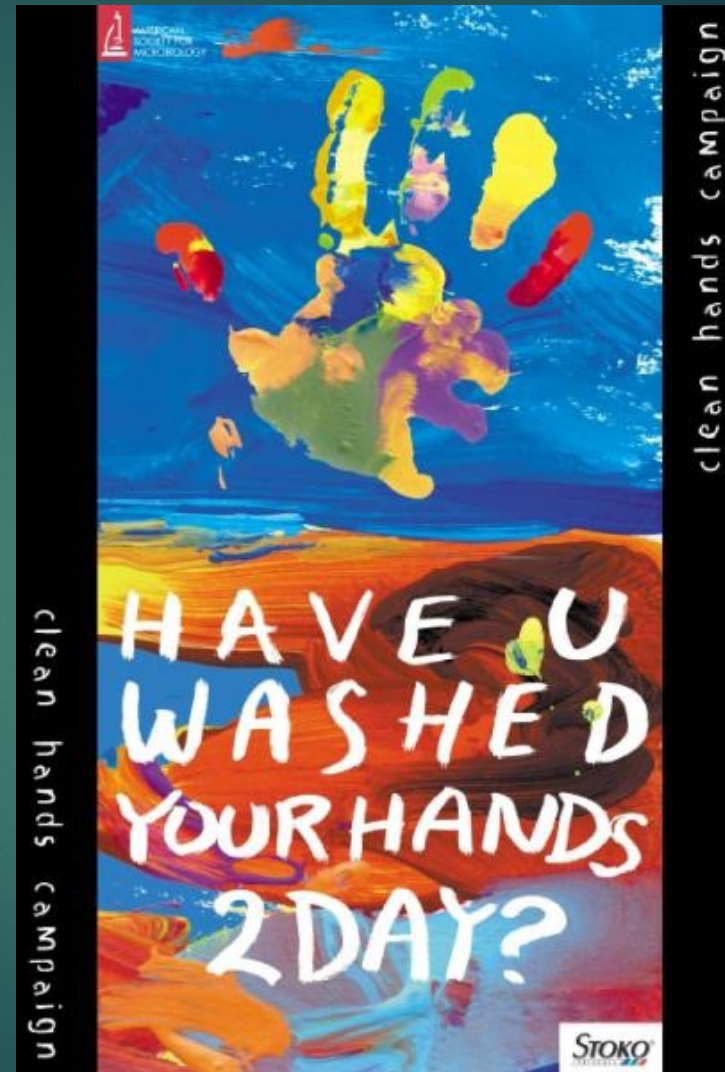


Registration for the OMGPiVC study has now closed.

The One Million Global catheters study is the largest peripheral intravenous catheter prevalence study ever undertaken, with data collected on more than 40,000 PIVCs! We wish to thank everyone who has made the project a success. Over 400 hospitals have participated in 49 countries and 15 languages. The team is currently in the process of collating and analysing data, so stay tuned for the results. Our most recent newsletter is now available **OMG Newsletter 5 (published 29 July 2015)** If you have any questions, please contact us by email.

Aspetti da migliorare

- ▶ Applicazione di principi generali di prevenzione delle infezioni (Igiene delle mani)
- ▶ Antisepsi cutanea prima dell'inserimento
- ▶ Stabilizzazione e fissaggio
- ▶ Antitesi cutanea durante la gestione
- ▶ Corretto protocollo di flushing
- ▶ Disinfezione dell'hub



Improved skin antisepsis at insertion

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

New recommendation *Class D/GPP*

EPIC 2014

Preferred use of transparent dressing

IVAD17 Use a sterile, transparent, semi-permeable polyurethane dressing to cover the intravascular insertion site.

Class D/GPP

IVAD18 Transparent, semi-permeable polyurethane dressings should be changed every 7 days, or sooner, if they are no longer intact or if moisture collects under the dressing.

Class D/GPP

EPIC 2014

Preferred use of transparent dressing

IVAD19 Use a sterile gauze dressing if a patient has profuse perspiration or if the insertion site is bleeding or leaking, and change when inspection of the insertion site is necessary or when the dressing becomes damp, loosened or soiled. Replace with a transparent semi-permeable dressing as soon as possible.

Class D/GPP

EPIC 2014

Improved skin antisepsis during maintenance

IVAD24 Use a single-use application of 2% chlorhexidine gluconate in 70% isopropyl alcohol (or povidone iodine in alcohol for patients with sensitivity to chlorhexidine) to clean the peripheral venous catheter insertion site during dressing changes, and allow to air dry.

New recommendation *Class D/GPP*

EPIC 2014

SwabFlush™



SwabFlush™

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

When to use SwabFlush

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

SwabCap
NON-VENTING
DISINFECTION CAP
CONTAINS 70% IPA

Single Use Only
Sterile Packaging
Luer Lock Design

US e PIV



US e PIV

- ▶ L'utilizzo degli US per il posizionamento di PIV in pazienti che necessitano di un accesso venoso periferico per una durata limitata (non superiore a 7-10 giorni) ha una storia relativamente recente
- ▶ Gli US hanno il vantaggio di
 - ▶ Permettere l'incannulamento in pazienti con vasi non visibili e non palpabili
 - ▶ Eliminare la necessità di accessi vascolari non indicati o sovraindicati (Midline, PICC, CVC a breve termine)



Ultrasound-Guided Peripheral Intravenous Access Program Is Associated With a Marked Reduction in Central Venous Catheter Use in Noncritically Ill Emergency Department Patients

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Study objective: We examine the central venous catheter placement rate during the implementation of an ultrasound-guided peripheral intravenous access program.

Methods: We conducted a time-series analysis of the monthly central venous catheter rate among adult emergency department (ED) patients in an academic urban ED between 2006 and 2011. During this period, emergency medicine residents and ED technicians were trained in ultrasound-guided peripheral intravenous access. We calculated the monthly central venous catheter placement rate overall and compared the central venous catheter reduction rate associated with the ultrasound-guided peripheral intravenous access program between noncritically ill patients and patients admitted to critical care. Patients receiving central venous catheters were classified as noncritically ill if admitted to telemetry or medical/surgical floor or discharged home from the ED.

Results: During the study period, the ED treated a total of 401,532 patients, of whom 1,583 (0.39%) received a central venous catheter. The central venous catheter rate decreased by 80% between 2006 (0.81%) and 2011 (0.16%). The decrease in the rate was significantly greater among noncritically ill patients (mean for telemetry patients 4.4% per month [95% confidence interval (CI) 3.6% to 5.1%], floor patients 4.8% [95% CI 4.2% to 5.3%], and discharged patients 7.6% [95% CI 6.2% to 9.1%]) than critically ill patients (0.9%; 95% CI 0.6% to 1.2%). The proportion of central venous catheters that were placed in critically ill patients increased from 34% in 2006 to 81% in 2011 because fewer central venous catheterizations were performed in noncritically ill patients.

Conclusion: The ultrasound-guided peripheral intravenous access program was associated with reductions in central venous catheter placement, particularly in noncritically ill patients. Further research is needed to determine the extent to which such access can replace central venous catheter placement in ED patients with difficult vascular access. [Ann Emerg Med. 2013;61:198-203.]

U ltrasound-Guided Brachial and Basilic Vein Cannulation in Emergency Department Patients With Difficult Intravenous Access

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Eric R Snoey, MD
Barry C Simon, MD
David Christy, MD

- ▶ 101 pz. arruolati ((che richiedevano un PIV e in cui erano stati effettuati senza successo due tentativi di incannulamento)
- ▶ Inserimento ecoguidato
- ▶ Successo in 91 pz. (91%)
- ▶ In 73 (73%) successo al primo tentativo
- ▶ Tempo medio per l'incannulamento: 77 secondi
- ▶ In 8 pazienti dislocazione entro 1 ora dall'inserimento

Ultrasonography-Guided Peripheral Intravenous Access Versus Traditional Approaches in Patients With Difficult Intravenous Access

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Figure 1. The “2-person” method of peripheral intravenous access using ultrasonographic guidance.

Table. Patient demographics and variables across groups.

Patient Data	Ultrasonography ($\pm$ SD) (N=39)	Control (N=21)
IVDA, No. (%)	11 (28)	5 (24)
Chronic medical condition, No. (%)	19 (49)	12 (57)
Obesity, No. (%)	9 (23)	4 (19)
Success, No. (%)	38 (97)	7 (33)
Total time, minutes, median	13 $\pm$ 25.4	30 $\pm$ 21.3
Time of attempt, minutes, median	4 $\pm$ 5.6	15 $\pm$ 11.8
No. of sticks	1.7 $\pm$ 0.7	3.7 $\pm$ 2
Patient satisfaction	8.7 $\pm$ 1.6	5.7 $\pm$ 3.2

IVDA, Intravenous drug abuse.

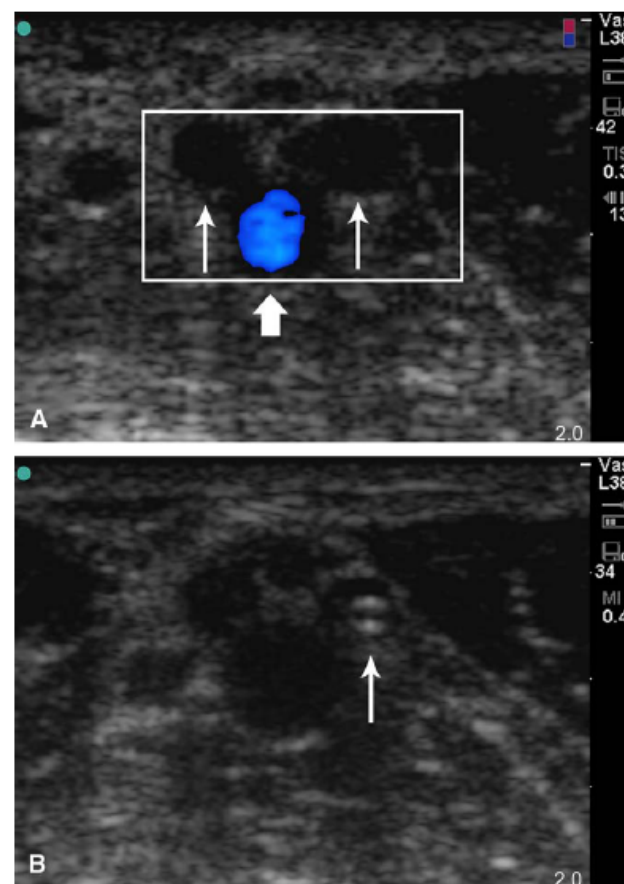


Figure 2. A, Brachial artery (thick arrow) with flow from color power Doppler (CPD) and 2 brachial veins (thin arrows). B, Intravenous catheter in one brachial vein with reverberation

Editor's Capsule Summary

What is already known on this topic

Ultrasonography is helpful for central line placement. Its utility in the placement of peripheral lines in patients whose peripheral veins are difficult to access by standard techniques is unknown.

What question this study addressed

This study compared randomized ultrasonography-guided peripheral intravenous insertion with traditional peripheral intravenous insertion in a subset of emergency department patients with difficult intravenous access.

What this study adds to our knowledge

The use of ultrasonography to guide peripheral intravenous insertion markedly decreased the time needed to achieve intravenous access, decreased the number of attempts, and increased patient satisfaction.

How this might change clinical practice

This study suggests that practitioners who gain expertise in this skill will be able to obtain peripheral intravenous access in patients who would otherwise be subjected to multiple attempts, require central line placement, or both.



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American Journal of
Emergency Medicine

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Original Contribution

ED technicians can successfully place ultrasound-guided intravenous catheters in patients with poor vascular access^{☆, ☆ ☆}

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Received 21 October 2009; revised 25 November 2009; accepted 25 November 2009

Abstract

Objective: The objective of the study was to assess the success rate of emergency department (ED) technicians in placing ultrasound (US)-guided peripheral intravenous (IV) catheters.

Methods: In this prospective, observational trial, 19 ED technicians were taught to use US guidance to obtain IV access. Training sessions consisted of didactic instruction and hands-on practice. The ED technicians were then prospectively followed. The US guidance for IV access was limited to patients with difficult access. The primary outcome was successful peripheral IV placement.

Results: A total of 219 attempts were recorded, with a success rate of 78.5% (172/219). There was a significant correlation between operator experience and success rate. Complications were reported in 4.1% of patients and included 5 arterial punctures and 1 case of a transient paresthesia.

Conclusions: Emergency department technicians can be taught to successfully place US-guided IVs in patients with difficult venous access. Teaching this skill to ED technicians increases the pool of providers available in the ED to obtain access in this patient population.

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Critical Care

Ultrasound-guided peripheral intravenous access in the intensive care unit

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Keywords:

Ultrasound;
Peripheral intravenous
access;
Central venous catheters;
Intensive care unit

Abstract

Purpose: Central venous catheters continue to be a popular means of maintaining vascular access in surgical intensive care units despite well-described complications. With edema, obesity, and difficult to visualize veins potentially affecting the surgically ill, inability to obtain peripheral intravenous (PIV) access may hinder the clinician's ability to avoid the use of central lines. With ultrasound gaining increased popularity for obtaining vascular access, we evaluated its utility in ultrasonographically placing PIV catheters for the purposes of either avoiding central venous access or removing central venous catheters.

Materials and Methods: We performed a retrospective cohort review of our requests for ultrasound-guided PIV access in the intensive care unit between September 2007 and February 2008.

Results: Over a 6-month period, 77 requests for ultrasound-guided PIV access were made for 59 surgical, trauma, and cardiothoracic intensive care unit patients. Reasons for inability to obtain PIVs through standard means included edema (95%), obesity (42%), IV drug abuse history (8%), and emergency access (4%). Of the 148 PIV lines that were requested, 147 PIV catheters were successfully placed (99%). Of these, 105 PIV catheters were placed on the first attempt (71%). Complications of PIVs included IV infiltration (3.4%), inadvertent removal (2.7%), and phlebitis/cellulitis (0.7%). As a result of placing these PIV catheters, 40 central lines were discontinued and 34 central lines were avoided. The average number of line days at the time of central venous catheter removal was 11 ± 11 days.

Conclusion(s): In intensive care unit patients who do not require central venous lines, ultrasound-guided PIV access can have a high placement success rate and can result in fewer central line days and/or less reliance on central venous catheters for access-only purposes.

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Possibili indicazioni all'utilizzo di US per l'inserimento di PIV

- ▶ Pazienti che necessitano di un accesso venoso periferico per 7-10 giorni
- ▶ Fallimento dell'inserimento tradizionale "blind"
- ▶ Pazienti con severa disidratazione
- ▶ Pazienti obesi
- ▶ Pazienti edematosi
- ▶ IVDA
- ▶ Pazienti ripetutamente sottoposti in passato a inserimento di PIV
- ▶ Pazienti con riscontro di emocolture positive, che non hanno una indicazione assoluta al CVC

Ultrasound guidance for difficult peripheral venous access: systematic review and meta-analysis

Grace Egan,^{1,2} Donagh Healy,¹ Heidi O'Neill,² Mary Clarke-Moloney,¹
Pierce A Grace,² Stewart R Walsh^{1,2}

Emerg Med J 2013;**30**:521–526. doi:10.1136/emmermed-2012-201652

Ultrasound-guided peripheral venous access: a systematic review of randomized-controlled trials

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Objective To systematically review the current literature on the effect of using ultrasound (US) guidance for the placement of peripheral intravenous (PIV) catheters in patients with difficult access.

Materials and methods A systematic search was performed for the keywords ultrasonography, catheterization, and peripheral vein. A systematic review was performed on randomized-controlled studies comparing the use of dynamic US guidance with the conventional landmark technique. The primary outcome was the success rate of PIV placement and the secondary outcomes included the number of attempts and time to successful PIV placement.

attempts were required to achieve success for patients randomized to US compared with the traditional method. The six studies included were found to vary significantly in the definition of difficult venous access, recording of procedure time, definition of success rate, and other important factors, making a meta-analysis inappropriate.

Conclusion On the basis of this review, routine use of US guidance for PIV placement is not strongly supported by the literature. *European Journal of Emergency Medicine* 00:000–000 © 2013 Wolters Kluwer Health | Lippincott Williams & Wilkins.

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Keywords: peripheral intravenous catheterization, ultrasound

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Original Contribution

Ultrasonography-guided peripheral intravenous catheter survival in ED patients with difficult access[☆]

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Abstract

Objectives: We determined the survival and complications of ultrasonography-guided peripheral intravenous (IV) catheters in emergency department (ED) patients with difficult peripheral access.

Methods: This was a prospective, observational study conducted in an academic hospital from April to July of 2007. We included consecutive adult ED patients with difficult access who had ultrasonography-guided peripheral IVs placed. Operators completed data sheets and researchers examined admitted patients daily to assess outcomes. The primary outcome was IV survival >96 hours. As a secondary outcome, we recorded IV complications, including central line placement. We used descriptive statistics, univariate survival analysis with Kaplan Meier, and log-rank tests for data analysis.

Results: Seventy-five patients were enrolled. The average age was 52 years. Fifty-three percent were male, 21% obese, and 13% had a history of injection drug use. The overall IV survival rate was 56% (95% confidence interval, 44%-67%) with a median survival of 26 hours (interquartile range [IQR], 8-61). Forty-seven percent of IVs failed within 24 hours, most commonly due to infiltration. Although 47 (63%) operators reported that a central line would have been required if peripheral access was unobtainable, only 5 (7%; 95% confidence interval, 2%-15%) patients underwent central venous catheterization. Only 1 central line was placed as a result of ultrasonography-guided IV failure. We observed no infectious or thrombotic complications.

Conclusion: Despite a high premature failure rate, ultrasonography-guided peripheral IVs appear to be an effective alternative to central line placement in ED patients with difficult access.

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Original Contribution

The effect of vessel depth, diameter, and location on ultrasound-guided peripheral intravenous catheter longevity[☆]

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Abstract

Introduction: Ultrasound-guided peripheral intravenous catheters (USGPIVs) have been observed to have poor durability. The current study sets out to determine whether vessel characteristics (depth, diameter, and location) predict USGPIV longevity.

Methods: A secondary analysis was performed on a prospectively gathered database of patients who underwent USGPIV placement in an urban, tertiary care emergency department. All patients in the database had a 20-gauge, 48-mm-long catheter placed under ultrasound guidance. The time and reason for USGPIV removal were extracted by retrospective chart review. A Kaplan-Meier survival analysis was performed.

Results: After 48 hours from USGPIV placement, 32% (48/151) had failed prematurely, 24% (36/151) had been removed for routine reasons, and 44% (67/151) remained in working condition yielding a survival probability of 0.63 (95% confidence interval [CI], 0.53-0.70). Survival probability was perfect (1.00) when placed in shallow vessels (<0.4 cm), moderate (0.62; 95% CI, 0.51-0.71) for intermediate vessels (0.40-1.19 cm), and poor (0.29; 95% CI, 0.11-0.51) for deep vessels (≥ 1.2 cm); $P < .0001$. Intravenous survival probability was higher when placed in the antecubital fossa or forearm locations (0.83; 95% CI, 0.69-0.91) and lower in the brachial region (0.50; 95% CI, 0.38-0.61); $P = .0002$. The impact of vessel depth and location was significant after 3 hours and 18 hours, respectively. Vessel diameter did not affect USGPIV longevity.

Conclusion: Cannulation of deep and proximal vessels is associated with poor USGPIV survival. Careful selection of target vessels may help improve success of USGPIV placement and durability.

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Original Contribution

Standard-length catheters vs long catheters in ultrasound-guided peripheral vein cannulation

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Abstract

Purpose: Ultrasound (US) is a useful tool for peripheral vein cannulation in patients with difficult venous access. However, few data about the survival of US-guided peripheral catheters in acute care setting exist. Some studies showed that the survival rate of standard-length catheters (SC) is poor especially in obese patients. The use of longer than normal catheters could provide a solution to low survival rate. The aim of the present study was to compare US-guided peripheral SCs vs US-guided peripheral long catheters inserted with Seldinger technique (LC) in acute hospitalized patients with difficult venous access.

Methods: This was a prospective, randomized controlled trial. A total of 100 consecutively admitted subjects in an urban High Dependency Unit were randomized to obtain US-guided intravenous access using either SC or LC after 3 failed blind attempts. Primary outcome was catheter failure rate.

Results: Success rate was 86% in the SC groups and 84% in the LC group ($P = .77$). Time requested to positioning venous access resulted to be shorter for SC as opposed to LC (9.5 vs 16.8 minutes, respectively; $P = .001$). Catheter failure was observed in 45% of patients in the SC group and in 14% of patients in the LC group (relative risk, 3.2; $P < .001$).

Conclusions: Both SC and LC US-guided cannulations have a high success rate in patients with difficult venous access. Notwithstanding a higher time to cannulation, LC US-guided procedure is associated with a lower risk of catheter failure compared with SC US-guided procedure.

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Una nuova tipologia di accesso
venoso

Le cannule periferiche lunghe
o
“Mini-Midline”

Vantaggi delle cannule periferiche lunghe o mini-midline

- ▶ Possono essere inseriti anche nel paziente senza vene (US)
- ▶ Poliuretano
- ▶ Power injectable
- ▶ Seldinger diretto = aumentato tasso di successi
- ▶ Costo: Maggiore delle agocannule ma inferiore ai midline
- ▶ L'inserzione è più semplice e rapida se paragonata a quella del Midline standard (maggiore possibilità di utilizzo in urgenza)
- ▶ Maggiore durata rispetto ai PIV
- ▶ Minor tasso di complicanze rispetto ai PIV

Cannule periferiche lunghe

- ▶ VAD specifici (The Wand, Flexicath, Power-Glide, etc.:)
- ▶ VAD “polivalenti” già sul mercato (LeaderFlex, LeaderCath, Vygon; Arrow) che possono essere usati come cannule periferiche lunghe

PUR



PE





“Mini-Midline”

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midterm
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Sterile sleeve

Catheter

Flexible introducer with unique springback mechanism

Introducer

The First Midterm Catheter System To Go Mainstream.

The M29 is FDA-cleared and suitable for a broad range of applications requiring up to 29 days of IV therapy, including:

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- Alternate Site
- Infectious Disease
- Maternity
- Military
- ER
- Orthopedics
- General Medicine
- Trauma

In a Category All By Itself.

- The only midline catheter system designed with infection control in mind.
- The only midline catheter with an integral sterile barrier to prevent both airborne and touch contamination of the catheter.
- The only midline catheter that locks into the introducer while the catheter is advanced into the vein to minimize exposure to bloodborne pathogens.
- The only midline catheter system with a peel-away introducer that prevents catheter migration during peel away.
- The only midline catheter with a both a color coded hub and an integral pivot.

Alleviates post placement confusion.

Other brands of midline catheters often look like a PICC. The M29 is the only catheter with a unique shape and color coding of the catheter and hub that appears distinctly different from other midlines and PICC's - reducing the potential for a mistake.

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Perils of Power Injection: CE Course

Caratteristiche

- ▶ Lunghezza da 8 a 15 cm
- ▶ Power injectability
- ▶ Durata garantita fino a 29 giorni
- ▶ Possibilità di fare prelievi
- ▶ Design e tecnica di introduzione protettivi per eventuali contaminazioni al momento del posizionamento

An 'historical' consideration...

- Midline catheters were originally designed for 'blind' insertion at the antecubital fossa: their length (20-25 cm) was still consistent with the location of the tip in the brachial tract of the axillary vein
- When US guidance and micro-introducer technique were applied to Midline caths, the insertion site moved at the middle 1/3 of upper arm, so that the tip was now in the thoracic tract of the axillary vein (or in even in the subclavian vein), in a position which have been termed 'mid-clavicular')

So...

- What is the REAL difference between 'long peripheral cannulas' or 'mini-Midline' vs 'traditional midline catheters' or 'midclavicular' ?
- Just a question of length ???



The difference is CLINICAL

Mini-midline = tip in the brachial tract of the axillary vein

Less prone to malfunction due to the fibroblastic sleeve

Blood sampling may be difficult

In case of thrombosis, mild consequences

**Midline = tip in the thoracic tract of the axillary vein
or in the subclavian vein ('midclavicular')**

Less prone to malfunction

Blood sampling is easier

In case of thrombosis, consequences may be more severe

Svantaggi

- ▶ Non costo-efficaci se utilizzati come agocannule lunghe per periodi limitati
- ▶ Ma soprattutto.... Essere un Midline

POWERGLIDE



POWERGLIDE
Midline Catheter

BARD | ACCESS SYSTEMS

FLEXICATH



Midline Catheters: An Essential Tool in CLABSI Reduction

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By:

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 PRINT

By Robert B. Dawson, MSA, BSN, RN, CRNI, CPUI, VA-BC, and Nancy L. Moureau, BSN, RN, CRNI, CPUI, VA-BC

The confluence of recent economic factors and emerging clinical evidence now makes the use of central venous access devices (CVADs) far less desirable than in the past. Conversely, the same factors and facts greatly enhance the appeal of Midline catheters—catheters measuring 3 to 8 inches in length, inserted in an upper arm vein and with tip location distal to the shoulder.^(1,2) Evidence now demonstrates that certain midlines offer patients the possibility of full length of stay infusion therapy, with reduced risk of bloodstream infection and avoidance of repetitive needlesticks for labs and restarts. Thus, in many cases, midlines are becoming the go-to device for safe, uninterrupted intravenous (IV) therapy.

Conclusioni

Agocannule periferiche

- ▶ Passaggio dalla sostituzione programmata al «clinically indicated»
- ▶ Alto tasso di complicanze
- ▶ Necessità di definire in maniera precisa il numero e la tipologia delle complicanze con studi su larga scala, al fine di elaborare strategie di prevenzione che rendano effettivamente vantaggiosa la sostituzione su indicazione clinica
- ▶ Necessità di rivalutare la prevenzione delle complicanze legate alle agocannule, considerando queste come responsabili di eventi avversi frequenti e talora anche gravi

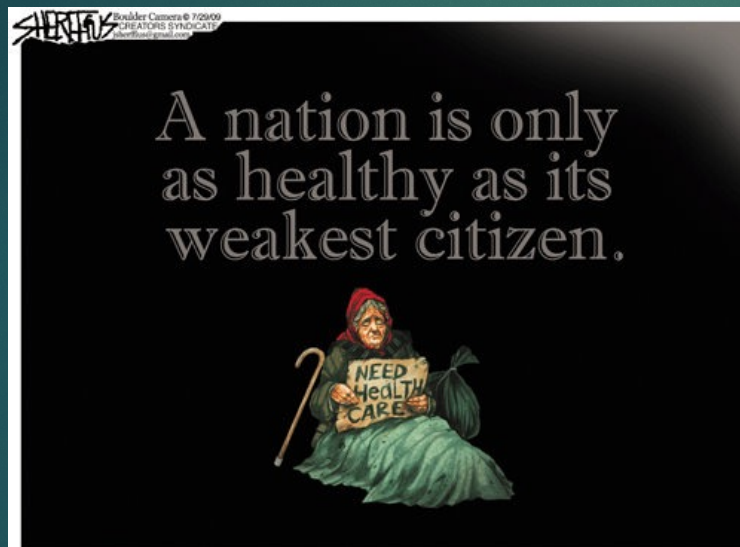
Conclusioni Mini-Midline

- ▶ Possibilità di accesso venoso periferico «a termine» (7-30 giorni) in pazienti con irreperibilità venosa periferica e quindi candidati a posizionamento di agocannule ecoguidate – con alto rischio di dislocazione entro 24 ore dal posizionamento – oppure, in maniera sovraindicata, all'inserimento di un Midline, di un PICC o di un CVC
- ▶ Basso tasso di complicanze, se viene effettuata una scelta accurata della vena
- ▶ Power injectability
- ▶ Comfort del paziente
- ▶ Chiara costo-efficacia

Conclusioni

Mini-Midline

- ▶ Possibilità di fare prelievi, design e tecnica di introduzione protettivi per eventuali contaminazioni al momento del posizionamento)
- ▶ In linea generale sui Midline e in particolare su queste nuove tipologie di Mini-midline, necessità di studi che verifichino in maniera precisa le complicanze infettive e trombotiche per un utilizzo su larga scala



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