MACOVA 2020

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BD

MACOVA 2020

Multidisciplinary Advanced Course
on Vascular Access

The appropriate choice of device in the oncology patient: review of the literature and survey 2019

Prof. Baudolino Mussa

The present… open our minds..

Technavio's analysts forecast the central venous access devices market in the US to grow at a CAGR of 7.85% over the period 2015-2019.

Market Driver

- Increasing Aging Population

Market Challenge

- High Risk of Vein Thrombosis

Market Trend

- Growing Incidence of CABSI

The picc explosion..

Technavio's market research analysts estimate the global PICC market to grow at a CAGR of around6.5% between 2015 and 2019. The global market for peripherally inserted central catheter (PICC) is heavily influenced by factors like the rising incidence of chronic diseas patients that require PICCs for nutrition and drug delivery. The Americas dominate the global market for PICCs, accounting for around 72% of the total market share. The region's market share is expected to reach around 90% during the forecast period owning to factors like the increasing incidence of diseases like cancer and viral infections.

Global Central Venous Access Devices Market 2014-2018
Published: January 2014

TechNavio's analysts forecast the Global Central Venous Access Devices market to grow at a CAGR of 4.10 percent over the period 2013-2018. One of the key factors contributing to this market growth is the increasing aging population. The Global Central Venous Access Devices market has also been witnessing the increased use of antimicrobial catheters. However, the high risk of vein thrombosis could pose a challenge to the growth of this market.

REVIEW

THE AMERICAN JOURNAL of MEDICINE®

Bloodstream Infection, Venous Thrombosis, and Peripherally Inserted Central Catheters: Reappraising the Evidence

Vineet Chopra, MD, MSc,[a] Sarah Anand, MD,[a] Sarah L. Krein, RN, PhD,[a,b] Carol Chenoweth, MD,[c] Sanjay Saint, MD, MPH[a,b]

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during line insertion.[24,25] Initial studies supported this hypothesis, finding PICC-related bloodstream infection rates of 0.4 to 0.8 per 1000 catheter days, an incidence significantly lower than the 2.0 to 5.0 central line-associated bloodstream infections per 1000 catheter days reported for other catheter types.[8,14–16,18]

days. In an accompanying systematic review of the literature, subgroup analysis showed that inpatient PICC insertion was associated with twice the rate of bloodstream infection than outpatient placement (2.1 [95% confidence interval {CI}, 1.0-3.2] vs 1.0 [95% CI, 0.8-1.2] per 1000 catheter days). The authors theorized that inadvertent selection of healthier patients in ambulatory settings might have confounded the low-rate of PICC-related bloodstream infections in the literature.[26] Supportively, Shuman et al[27]

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without cancer.[1,20,29–32] In a retrospective cohort analysis of PICC-related venous thromboembolism at the Cleveland Clinic, 51 of 2063 patients (2.47%) experienced PICC thrombosis.[32] In the only randomized controlled trial comparing PICC use with peripheral intravenous lines in adults, PICCs were associated with a substantial risk of deep vein thrombosis (relative risk, 6.6; $P = .03$).[20] In a single-center

Although cancer inherently increases the risk for thrombosis, several factors related to PICCs themselves may increase the likelihood of venous thromboembolism. For example, a retrospective analysis of patients with hematologic malignancy found that when practice was changed to insert PICCs through a tunneled fashion in the internal jugular vein, the PICC-related thrombosis rate declined from 7.8% to 0.4%.[53] This dramatic decline suggests that route of

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There is an unprecedented need for a research agenda that examines the benefits and risks related to PICC use. For example, a recent systematic review and meta-analysis found that PICCs were associated with greater overall complications than other central venous catheters (17% vs 10%; OR, 2.02; 95% CI, 1.26-3.24), including greater rates of thrombophlebitis (OR, 5.82; 95% CI, 2.37-14.20).[19] Because no randomized controlled trials comparing the risk of venous thromboembolism or central line-associated bloodstream infection between PICCs and other central venous catheters exist, clinicians have no evidence to guide the decision regarding which central venous catheter is safest for their patients. This void represents a significant knowl-

Complication rate PICC versus other VAD (Cotogni Mussa 2013)

Table 3. Complications: PICC vs Tunneled and PICC vs Port

	PICC	Tunneled	*P* value[a]	IRD[a](95% CI)	Port	*P value*[b]	IRD[b](95% CI)
No. of VADs	269	89			179		
Catheter-days	55,293	17,208			34,981		
CRBSI	0.05	0.52	<.001	-0.47 (-0.69,-0.25)	0.17	0.09	-0.12 (-0.25,0.02)
Venous thrombosis	0.05	0.06	0.95	-0.00 (-0.13, 0.12)	0.03	0.52	0.02 (-0.06,0.11)
Mechanical complications	0.63	0.81	0.43	-0.18 (-0.63, 0.26)	0.34	0.06	0.29 (-0.02,0.60)
Total complications[c]	0.85	1.63	0.006	-0.78 (-1.33,-0.23)	0.71	0.48	0.14 (-0.24,0.51)

Data are expressed as n/1000 catheter-days. IRD, incidence rate difference; CI, confidence intervals; CRBSI, catheter-related blood stream infection.

[a]PICC vs Tunneled.

[b]PICC vs Port.

[c]Infectious and non-infectious.

Vad out hospital complication rate (Cotogni Mussa 2013)

Table 1. Complications of Venous Access Devices (VADs)

	PICC	Nontunneled	Tunneled	Port	Total
No. (%) of VADs	269 (37.3)	184 (25.6)	89 (12.3)	179 (24.8)	721 (100)
Catheter-days	55,293	33,570	17,208	34,981	141,052
Local infection, No.	6	5	4	6	21
No./1000 catheter-days	0.11	0.15	0.23	0.17	0.15
CRBSI, No.	3[a,b]	23	9	6[a,c]	41
No./1000 catheter-days	0.05	0.69	0.52	0.17	0.29
Venous thrombosis, No.	3	6	1	1	11
No./1000 catheter-days	0.05	0.18	0.06	0.03	0.08
Mechanical complications					
Catheter dislocation, No. (%)	19 (7.1)	26 (14.1)	5 (5.6)	0	50 (6.9)
Rupture of external tract, No. (%)	4 (1.5)	4 (2.2)	6 (6.7)	—	14 (1.9)
Lumen occlusion, No. (%)	12 (4.5)	11 (6)	3 (3.4)	12 (6.7)	38 (5.3)
Total	35[d](13)	41 (22.3)	14 (15.7)	12[a,c](6.7)	102 (14.1)
No./1000 catheter-days	0.63	1.22	0.81	0.34	0.72

CRBSI, catheter-related blood stream infection; —, not applicable.

[a] $P < .001$ vs Nontunneled.

[b] $P < .001$ vs Tunneled.

[c] $P < .05$ vs Tunneled.

[d] $P < .01$ vs Nontunneled.

Outcome CVC outside hospital VAD (Cotogni Mussa 2013)

Table 2. Outcomes of Venous Access Devices (VADs)

	PICC	Nontunneled	Tunneled	Port	Total
No. (%) of VADs	269 (37.3)	184 (25.6)	89 (12.3)	179 (24.8)	721 (100)
Complications, No. (%)					
Infectious	9 (3.3)	28 (15.2)	13 (14.6)	12 (6.7)	62 (8.6)
Non-infectious	38 (14.1)	47 (25.5)	15 (16.9)	13 (7.3)	113 (15.7)
Total	47[a,b](17.5)	75 (40.8)	28 (31.5)	25[a,b](14)	175 (24.3)
No./1000 catheter-days	0.85	2.23	1.63	0.71	1.24
Duration (days), median	184[b,c]	118	137[d]	176[b,c]	161
(range)	(15-1154)	(7-445)	(9-711)	(31-1706)	(7-1706)
Causes of removal, No. (%)					
VAD complication	19 (7)	53 (29)	14 (16)	8 (4)	94 (13)
End of IV therapy	85 (32)	18 (10)	18 (20)	37 (21)	158 (22)
Death	165 (61)	113 (61)	57 (64)	134 (75)	469 (65)
Removal ratio[e], No. (%)	19/47[a](40)	53/75 (71)	14/28 (50)	8/25[a](32)	94/175 (54)

IV, intravenous.

[a] $P < .001$ vs Nontunneled.

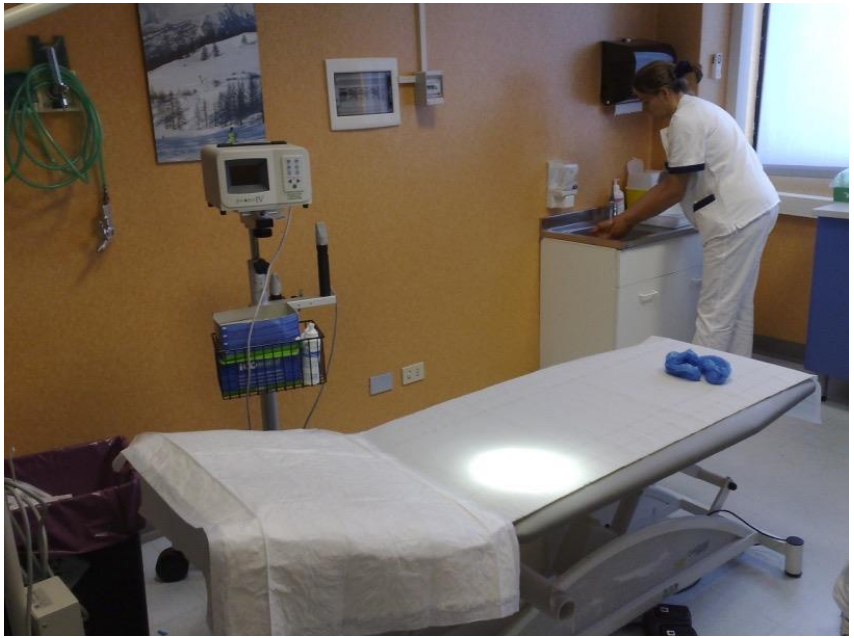
[b] $P < .01$ vs Tunneled.

[c] $P < .01$ vs Nontunneled.

[d] $P < .05$ vs Nontunneled.

[e] Ratio between number of removals because of complications and number of total VAD complications.

The right CVC at the beginning.
The right CVC for the right patients
The longest life for device….



Our idea: dedicated CVC Team

Every nurse or doctor with approved training course can ask to partecipate

Check of eligibility of formation received

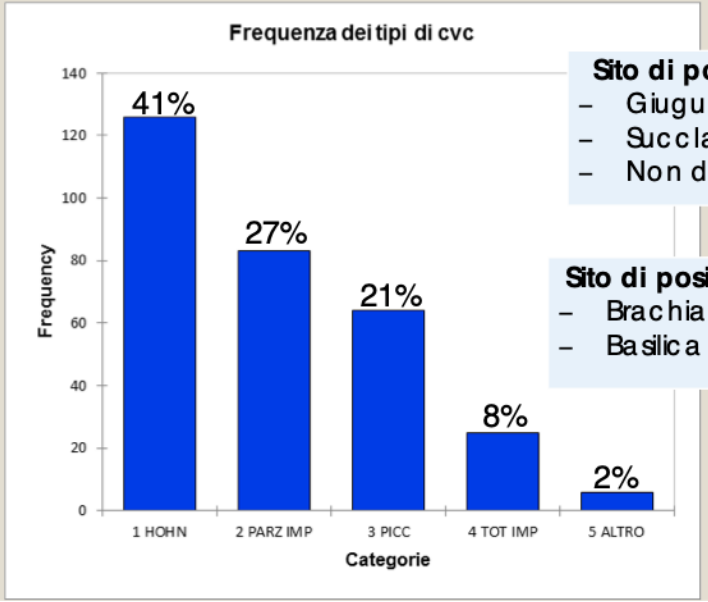
Enrollment in Cvc Team Albo

When the number of requested picc for member is more than 400 we insert a new member with:

- *50 picc placement tutored*
- *Practical examination with check list*

Complicanze Trombotiche, Settiche e Meccaniche dei pazienti in NPD-IICB
Risultati

Caratteristiche dei cateteri



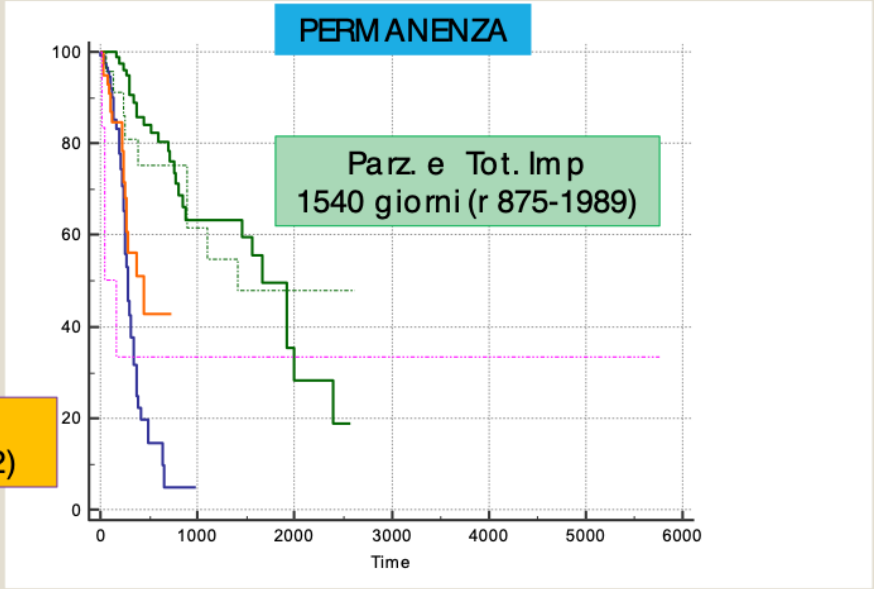
Sito di posizionamento	
– Giugulare int. Dx/Sn	– 31%/ 20%
– Succlavia Dx/Sn	– 17%/ 9%
– Non documentato	– 5%

Sito di posizionamento PICC	
– Brachiale Dx/Sn	– 5%/ 5%
– Basilica Dx/Sn	– 4%/ 2%

Frequenza infusioni	
7/7	181(60%)
<7/7	117 (38%)
Non noto	2 (2%)

Complicanze Trombotiche, Settiche e Meccaniche dei pazienti in NPD-IICB
Risultati

Caratteristiche dei cateteri



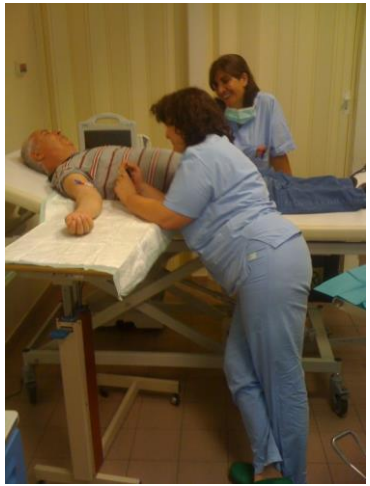
Complicanze Trombotiche, Settiche e Meccaniche dei pazienti in NPD-IICB

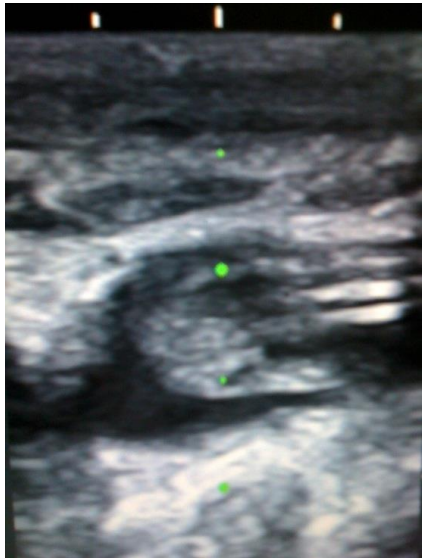
Risultati: Complicanze

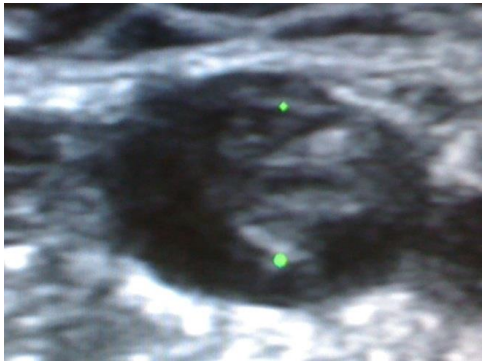
N. eventi nel I anno	N. cvc ≤ 1 anno	Trombosi N (%)	Sepsi N (%)	CM N (%)
TOT IMP	25	1 (4%)	4 (16%)	1 (4%)
PARZ IMP	83	2 (2.4%)	11 (13%)	11 (13%)
HOHN	126	1 (0.8%)	9 (7%)	22 (17.4%)
PICC	64	4 (6%)	3 (5%)	20 (31%)
TOTALE	298	7 (2.3%)	27 (9%)	53 (18%)
N. eventi nel II anno	**N. cvc > 1 anno**	**TVP N (%)**	**SEPSI N (%)**	**CM N (%)**
TOT IMP	16	0 (0%)	2 (12.5%)	0 (0%)
PARZ IMP	57	2 (3.5%)	9 (15.7%)	2 (3.5%)
HOHN	15	0 (0%)	0 (0%)	2 (13.3%)
PICC	11	0 (0%)	0 (0%)	0 (0%)
TOTALE	99	2 (2%)	11 (11%)	4 (4%)

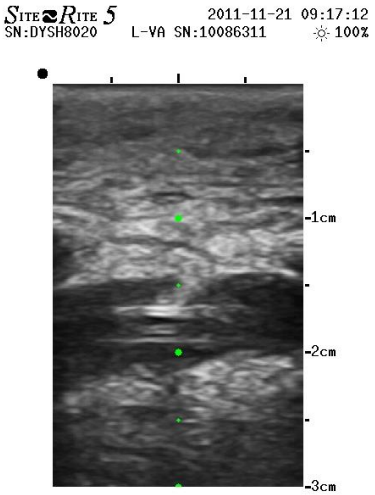
- La maggior parte, se non la totalità, degli eventi, si è verificato nei primi due anni.
- Nel caso di PICC e Hohn si sono verificate pressochè al 100% nel primo anno dal posizionamento

Early ecographic study in oncological patients with picc

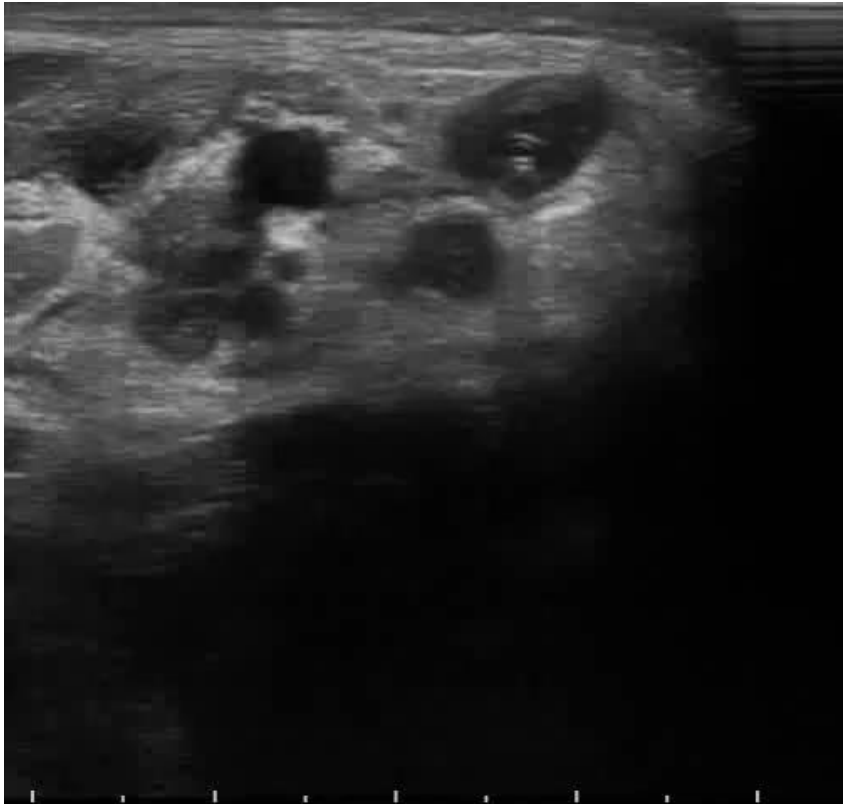


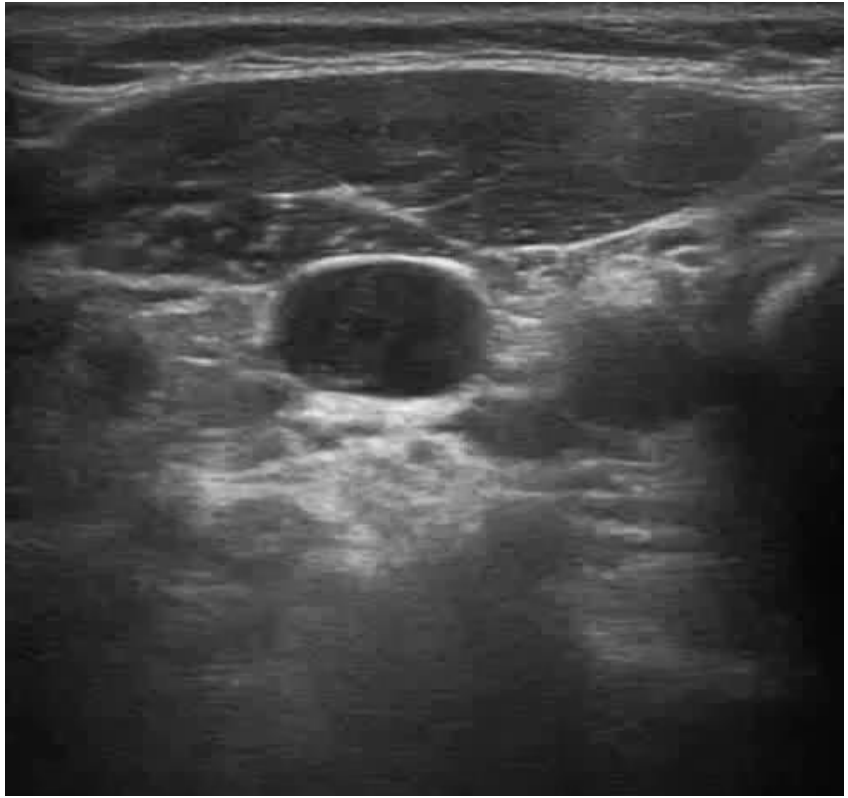






Early ecographic study in oncological patients with picc





INTERNAL DATA ANALYSIS

- 200 patients involved

Complete data recording (vein size, time for procedure, complications, etc)

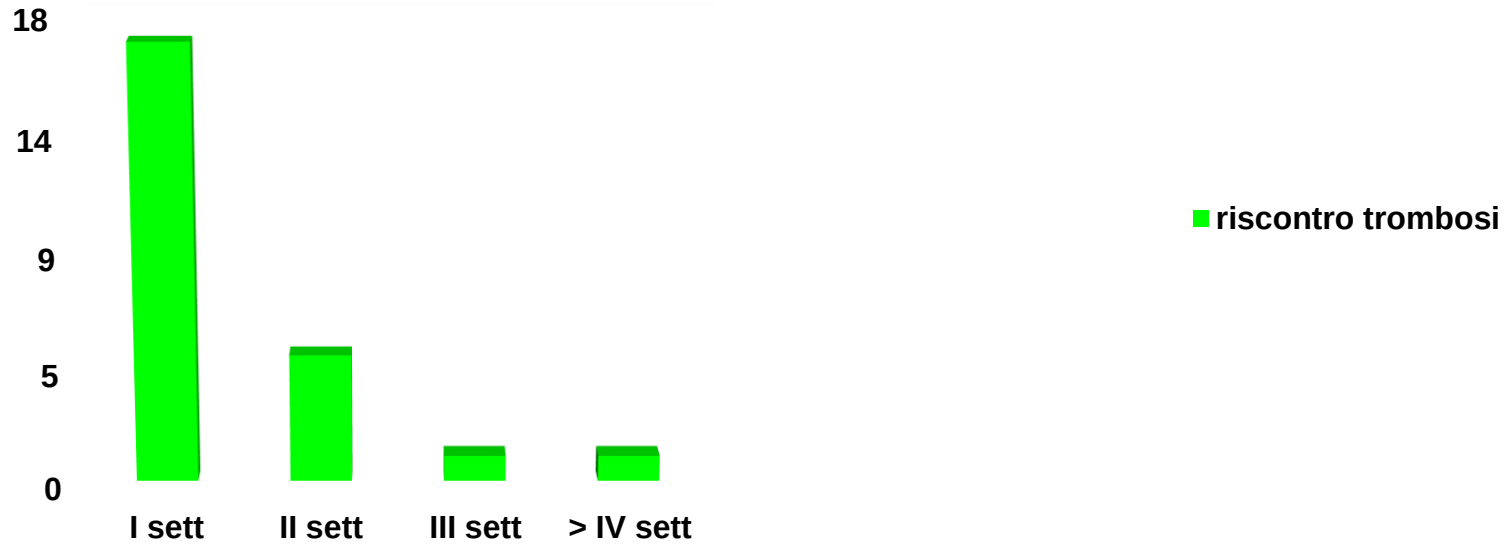
- Weekly echografic check for trombosis for 4 weeks then monthly

RESULTS

Total thrombosis: 26 (17% of 150 patients), 15 vein obstruction, 7 on vein wall, 4 free inside the vein

Only one symptomatic thrombosis

TIMING OF PICC THROMBOSIS



INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY

CONCISE COMMUNICATION

The Risk of Adverse Events Related to Extended-Dwell Peripheral Intravenous Access

Sara Campagna, PhD, RN;[1] Silvia Gonella, RN, MSc;[2] Pietro Antonio Zerla, RN;[3] Gianvito Corona, MD;[4] Tiziana Correggia, RN, MSc;[2] Baudolino Mussa, MD;[2] Paola Berchialla, PhD;[5] Valerio Dimonte, RN, MSc[1,2]

Midline catheters (MCs) may be useful to avoid repeated venipuncture in patients requiring prolonged intravenous infusions with limited adverse events (AEs). We analyzed 2 Italian hospital databases to ascertain the safety of MCs. Among 1,538 adult patients, 154 MC-related AEs (10%; 2.49 AEs per 1,000 MC days) were reported.

Infect Control Hosp Epidemiol 2018;1–3

positioning PICCs and MCs. All MCs were inserted using ultrasound-guided puncture and were 4–5 French (Fr) in diameter and 20–25 cm in length. Almost all MCs were single lumen; 4 were bilumen. After the catheter insertion, a sterile 5 × 5-cm gauze dressing was positioned and held in place with a transparent dressing, which was changed the day after insertion. Thereafter, transparent dressings were changed every 7 days. If evidence of hematic or serous leakage was noted, gauze plus transparent dressings were changed every 48 hours. Midline catheters were anchored with an adhesive-based suture-free device. After insertion, MCs were accessed by ward staff, and intravenous sites were inspected once per shift.

Midline catheters were left in situ until the end of therapy or until complications occurred, although MC manufacturers recommend a maximum dwell time of 28 days.[2]

Data Collection

TABLE 2. Individual Adverse Events (n = 154)

Adverse Events	No.	No. of Complications per 1,000 MC days	Time Elapsed Between MC Positioning and Onset of AE, median d (IQR; range)
Occlusion[a]	89	1.44	13 (6–28; 1–273)
Symptomatic thrombosis[b]	57	0.92	19 (8–32; 1–307)
Exit-site infection[c]	8	0.13	9 (7.8–39.8; 5–323)
All adverse events[d]	154	2.49	14 (6–28; 1–323)

NOTE. MC, midline catheter; AE, adverse event; IQR, interquartile range.

[a]Defined as the complete inability to flush, infuse, or aspirate (ie, complete occlusion), or resistance with flushing and aspiration or sluggish infusion (ie, partial occlusion), or ability to flush and infuse but not aspirate (ie, persistent withdrawal occlusion).[4]

[b]Defined as the lack of flow or nonpulsatile and nonphasic flow associated with lack of compressibility of the veins, edema, and erythema of the cannulated arm.[6] Symptomatic thrombosis was confirmed by ultrasound examination.

[c]Presence of tenderness, erythema, and/or purulent discharge at the catheter site.[5]

[d]Consisting of a composite of AEs: occlusion, exit-site infection, and symptomatic thrombosis.

In total, 1,538 (97.1%) patients had an MC removed during the study period. The removal due to AEs was associated with a shorter dwell time compared to other reasons, when receiving supportive therapy and when a MC with an open system was inserted (Table 1). Most MCs (n = 1,384, 90%) were removed

EVIDENCE BASED MEDICINE

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The Oncologist®

Symptom Management and Supportive Care

Can Peripherally Inserted Central Catheters Be Safely Placed in Patients with Cancer Receiving Chemotherapy? A Retrospective Study of Almost 400,000 Catheter-Days

Sara Campagna,[a] Silvia Gonella,[c] Paola Berchialla,[b] Giacomo Morano,[d] Carla Rigo,[e] Pietro Antonio Zerla,[f] Raffaella Fuzzi,[g] Gianvito Corona,[h] Silvana Storto,[d] Valerio Dimonte,[a,c] Baudolino Mussa[c]

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Disclosures of potential conflicts of interest may be found at the end of this article.

Key Words. Complications • Hematologic neoplasms • Medical oncology • Peripheral catheterization • Patient safety • Vascular access devices

Abstract

Background. Peripherally inserted central catheters (PICCs) are central venous catheters (CVCs) that are commonly used in onco-hematologic settings for chemotherapy administration. As there is insufficient evidence to recommend a specific CVC for chemotherapy administration, we aimed to ascertain PICC-related adverse events (AEs) and identify independent predictors of PICC removal in patients with cancer receiving chemotherapy.

Materials and Methods. Information on adult patients with cancer with a PICC inserted for chemotherapy administration between September 2007 and December 2014 was extracted from six hospital databases. The primary outcome was PICC removal due to PICC-related AEs (occlusion, infection, or symptomatic thrombosis). Independent predictors of PICC removal were identified using a multivariate Cox regression model.

Results. Among the 2,477 included patients, 419 PICC-related AEs (16.9%; 1.09 AEs per 1,000 PICC-days) were reported. AEs increased when PICC was inserted at the brachial site (hazard ratio [HR], 1.37; 95% confidence interval [CI], 1.02–1.84) and with open systems (HR, 1.89; 95% CI, 1.24–2.88) and decreased in older men (HR, 0.63; 95% CI, 0.49–0.81).

Conclusion. Use of PICC for chemotherapy administration was associated with a low all-AEs rate. The basilic vein was the safer site, and valved systems had fewer AEs than open systems. More research is needed to explore the interaction between AEs, sex, and age. ***The Oncologist*** 2019;24:1–7

Implications for Practice: These findings provide clinicians with evidence that peripherally inserted central catheters (PICCs) are safe for chemotherapy administration. They also suggest that clinicians should limit the use of open systems when long chemotherapy regimens are scheduled. Moreover, alternatives to PICCs should be considered when administering chemotherapy to young men.

EVIDENCE BASED MEDICINE

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with evidence that peripherally inserted central catheters suggest that clinicians should limit the use of open systems alternatives to PICCs should be considered when administer-

EVIDENCE BASED MEDICINE

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DOI: 10.1002/nur.21939

RESEARCH ARTICLE

WILEY RESEARCH IN NURSING & HEALTH

A retrospective study of the safety of over 100,000 peripherally-inserted central catheters days for parenteral supportive treatments

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Abstract

The type of central vascular access device providers chosen for providing parenteral supportive treatments has evolved over the past years, going from routinely used centrally inserted catheters to a more recent trend of peripherally-inserted central catheters (PICCs) when expected treatment duration is less than 6 months. This multicenter retrospective study aimed to provide a comprehensive assessment of the safety of PICCs in administering parenteral supportive treatments. All adult inpatients and outpatients who had a PICC inserted for the administration of parenteral supportive treatments (i.e., parenteral nutrition, intravenous fluids, blood products, or antibiotics) between September 2007 and December 2014 in four public Italian hospitals were included. The primary outcome was PICC removal because of an adverse event (AE, defined as occlusion, exit-site infection, or symptomatic thrombosis). Among the 1,250 included patients, 178 PICC-related removals because of AEs (14.2%; 1.62 AEs per 1,000 PICC days) were reported. Rates of PICC removal because of occlusion, exit-site infection, and symptomatic thrombosis were 1.08, 0.32, and 0.23 per 1,000 PICC days, respectively. The median dwell-time between PICC insertion and its removal because of an AE was 67 days (interquartile range 28–180 days). Risk of PICC removal due to AE was higher with open-system PICCs [hazard ratio = 2.75, 95% confidence interval 1.52–4.96]. In this study, we found preliminary evidence that PICCs can be safely used to administer parenteral supportive treatments lasting up to 6 months. PICCs may be a relevant alternative to centrally inserted catheters for medium-term parenteral supportive treatments.

KEYWORDS
adverse event (AE), outcome assessment, parenteral supportive treatment, patient safety, peripherally-inserted central catheter (PICC)

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THANK YOU

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