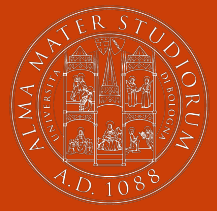


ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

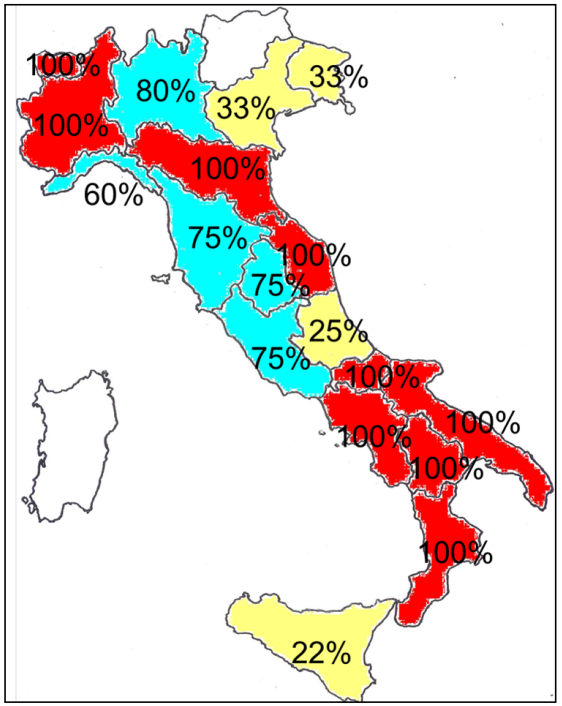
PICC e nutrizione parenterale

Loris Pironi

Centro per l'Insufficienza Intestinale Cronica Benigna
Policlinico di S. Orsola, Università di Bologna

Survey SINPE - NAD 2012

- **Contributing Regions:** **18**
- **LHCUs:** 95 **(65.5%)**
- **Inhabitants** (Mln): 44.36 **(73.2%)**
- **Territorial extent** (Km^2): 204.160 **(67.8%)**



Pironi L and SINPE Regional Coordinators, BCM Nutrition 2017

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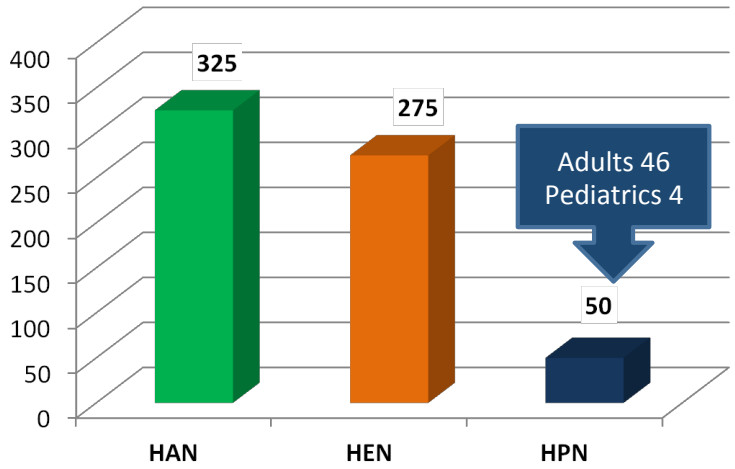
Survey SINPE - NAD 2012

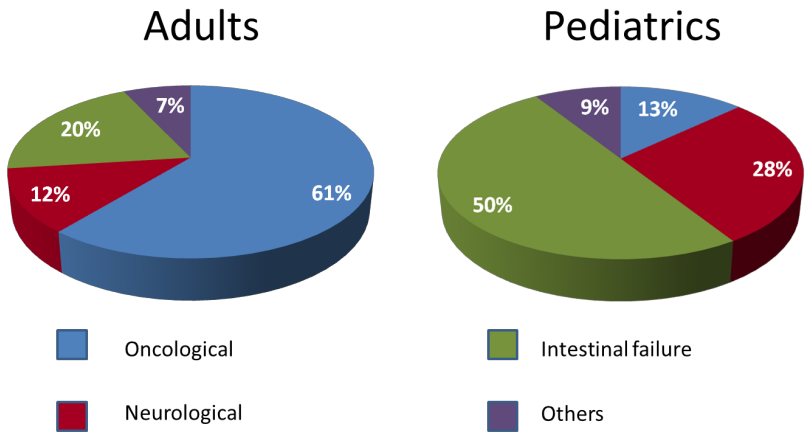
Prevalence

No. / 10^6 inhabitants



HEN 83.9% **HPN** 16.1%

HPN
"disease categories"



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La NPD nei
Percorsi Diagnostico Terapeutici Assistenziali

	Risultato atteso			
Patologia	**Durata**	**Qualità di vita**	**Riabilitazione socio - lavorativa**	**Necessità di Assistenza Domiciliare**
Insufficienza Intestinale Cronica B.	**Mesi-anni tutta la vita**	**– +++**	**– +++**	**– – –+**
Neurologica	**Mesi-anni**	**– – – +**	**– – –+**	**– +++**
Neoplastica "in terapia"	**Mesi**	**– – + +**	**– – + +**	**– –++**
Neoplastica "in palliativa"	**Settimane - mesi**	**– – – –**	**– – – –**	**++++**

ESPEN

THE EUROPEAN SOCIETY FOR CLINICAL NUTRITION AND METABOLISM

ESPEN Guidelines on Parenteral Nutrition: Central Venous Catheters (access, care, diagnosis and therapy of complications)

Mauro Pittiruti [a], Helen Hamilton [b], Roberto Biffi [c], John MacFie [d], Marek Pertkiewicz [e]

Clinical Nutrition 28 (2009) 365–377

2. How to choose the central venous access device for PN?

Short-term: *many non-tunneled central venous catheters (CVCs), as well as peripherally inserted central catheters (PICCs) are suitable for in-patient PN.*

Medium-term: *PICCs, Hohn catheters, and tunneled catheters and ports are appropriate. Non-tunneled central venous catheters are discouraged in HPN, because of high rates of infection, obstruction, dislocation, and venous thrombosis (Grade B).*

Prolonged use and HPN (>3 months) *usually require a long-term device. There is a choice between tunneled catheters and totally implantable device. In those requiring frequent (daily) access a tunneled device is generally preferable (Grade B).*

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ESPEN guidelines on nutrition in cancer patients☆

Jann Arends [a], Patrick Bachmann [b], Vickie Baracos [c], Nicole Barthelemy [d], Hartmut Bertz [a], Federico Bozzetti [e], Ken Fearon [f, †], Elisabeth Hütterer [g], Elizabeth Isenring [h], Stein Kaasa [i], Zeljko Krznaric [j], Barry Laird [k], Maria Larsson [l], Alessandro Laviano [m], Stefan Mühlebach [n], Maurizio Muscaritoli [m], Line Oldervoll [i, o], Paula Ravasco [p], Tora Solheim [q, r], Florian Strasser [s], Marian de van der Schueren [t, u], Jean-Charles Preiser [v, *]

Clinical Nutrition 36 (2017) 11–48

Nessuna raccomandazione riguardo la scelta del CVC

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Changes in Home Parenteral Nutrition Practice Based on the Canadian Home Parenteral Nutrition Patient Registry

Hortencio T, JPEN 2017

Abstract

Background: Since 2005, the Canadian home parenteral nutrition (HPN) registry has collected data on patients' demography, outcomes, and HPN clinical practice. At annual meetings, Canadian HPN programs review and discuss results. *Aim:* To evaluate changes over time in patient demography, outcomes, and HPN clinical practice using the registry data. *Methods:* This retrospective study evaluated 369 patients who were prospectively entered in the registry. Two periods were compared for the first data entry: 2005–2008 (n = 182) and 2011–2014 (n = 187). Patient demography, indications for HPN, HPN regimen, nutrition assessment, vascular access, and number of line sepsis per 1000 catheter days were evaluated. *Results:* For 2011–2014 compared with 2005–2008, indications for HPN changed significantly, with an increased proportion of patients with cancer (37.9% vs 16.7%) and with fewer cases of short bowel syndrome (32% vs 65.5%); line sepsis rate decreased from 1.58 to 0.97 per 1000 catheter days; and the use of tunneled catheters decreased from 64.3% to 38.0% and was no longer the most frequently chosen vascular access method. In contrast, the proportion of peripherally inserted central catheters increased from 21.6% to 52.9%. In addition, there was a reduction in number and days of hospitalizations related to HPN, and favorable changes were noted in the prescription of energy, proteins, and trace elements. *Conclusion:* The Canadian HPN registry is useful in tracking trends in demography, outcomes, and clinical practice. Results suggest a shift in patient demography and line access with improvement in line sepsis, hospitalizations, and HPN prescriptions. (*JPEN J Parenter Enteral Nutr*. 2017;41:830-836)

Duration of PICC for HPN in cancer patients

Author, year	Patient cohort	Type of CVC	Duration of CVC
Cotogni, 2013	Cancer 254	PICC 65	Median 158 days (15-657)
Cotogni, 2015	Cancer 250	PICC 269	Median 184 days (14-1384) >2 yr, 9 (>3 yr, 2)
Botella-Carretero, 2015	CIF 13 Cancer 59	Broviac 48 PICC 79	PICC >6 months: 11
Christensen, 2016	CIF 269 Cancer 26	Hickman 169 PICC 126	Hickman 325 ± 402 days PICC 127 ± 121 days

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ESPEN endorsed recommendations. Definition and classification of intestinal failure in adults

Intestinal failure

The **reduction** of gut function below the minimum necessary for the **absorption** of macronutrients and/or water and electrolytes, such that **intravenous supplementation (IVS) is required** to maintain health and/or growth.1

Pathophysiological classification

Five conditions that may results from GI or systemic, congenital or acquired, benign of malignant diseases

- **short bowel**
- **intestinal fistula**
- **intestinal dysmotility**
- **mechanical obstruction**
- **extensive small bowel mucosal disease**





- **Type III – chronic** condition, in metabolically stable patients, requiring IV supplementation over months or years (long-term HPN)

Pironi L, Clin Nutr 2015

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ESPEN guidelines on chronic intestinal failure in adults

Loris Pironi [a,*], Jann Arends [b], Federico Bozzetti [c], Cristina Cuerda [d], Lyn Gillanders [e], Palle Bekker Jeppesen [f], Francisca Joly [g], Darlene Kelly [h,i], Simon Lal [j], Michael Staun [f], Kinga Szczepanek [k], André Van Gossum [l], Geert Wanten [m], Stéphane Michel Schneider [n], the Home Artificial Nutrition & Chronic Intestinal Failure Special Interest Group of ESPEN

Clinical Nutrition 35 (2016) 247–307

83. **We recommend that tunnelled central venous catheters or totally implanted devices are used for long-term HPN.** (Grade of evidence: **very low**)
84. **We do not recommend the use of PICC lines for expected long-term HPN, because of the higher risk of thrombosis and issues related to self-administration of HPN.** (Grade of evidence: **low**)

Peripherally Inserted Central Venous Catheters (PICCs) are occasionally used, but are generally preferred only for those who will be on HPN for the short-term (<3 months) [4]. Most PICCs are easily dislodged and are difficult for the patient to use independently because arm movement is restricted. Central venous thrombosis is also more common with PICCs. The possibility that PICCs have a lower rate of catheter-related blood stream infections has been suggested, but not confirmed with consistent data. An RCT of PICC vs. non-tunneled subclavian catheters in 102 hospitalized patients documented a higher complication rate with PICC's, but this was primarily the result of central venous thrombosis rather than catheter infections [447].

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Central venous catheter infections in home parenteral nutrition patients: Outcomes from Sustain: American Society for Parenteral and Enteral Nutrition's National Patient Registry for Nutrition Care

Ross V, Am J Infect Contr 2016

	Entire sample n (%)
Total	1,046 (100)
Top-5 diagnoses	
Short bowel syndrome	299 (28.6)
Gastrointestinal cancer	196 (18.7)
Crohn's disease	171 (16.3)
Gastromotility/pseudo-obstruction disease	116 (11.1)
Gastrointestinal bypass for obesity	75 (7.2)
Duration of parenteral nutrition at follow-up (d)	
≤ 90	485 (46.4%)
91-180	172 (16.4%)
181-365	166 (15.9%)
> 365	223 (21.3%)

Variable	Entire sample n (%)
Total	1,046 (100)
Catheter type	N = 1,045
Peripherally inserted central catheter	449 (42.9)
Port	93 (8.9)
Tunneled	492 (47)
Other	11 (1.1)

Centro Insufficienza Intestinale Cronica Benigna
Policlinico di S. Orsola -Bologna

124 pazienti adulti in NPD – dicembre 2016

F 73, M 51

Età all'inizio NPD:	44±19 aa; range: 0.1 – 77
Durata della NPD:	8.1±8.1 aa; range: 0.1 – 34
Pazienti con PICC:	39 (31.4%)

Duration of PICC for HPN for CIF

Author, year	Patient cohort	Type of CVC	Duration of CVC
Szeinbach, 2014	CIF 163	PICC 163	Mean 117 ± 192 days (6-973)
Tourè, 2015	CIF 196	Broviac 133 PICC 71	Broviac 1247 ± 2144 days PICC 553 ± 1423 days
Opilla, 2017	CIF 19	PICC 26 (1.36/pz)	Mean 856 days (265-2500): >6 mo, 19 (1-3 yr, 14) >3 yr, 7 (>5 yr, 2)

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Peripherally Inserted Central Catheter Experience in Long-Term Home Parenteral Nutrition Patients

Opilla M, JAVA 2017

All patients had home health registered nurses or trained family caregivers to deliver PICC site care. None of the patients were able to administer self-site care due to the location of the insertion site. All patients were independent in the administration of their HPN infusion.

A comparative study of peripherally-inserted and Broviac catheter complications in home parenteral nutrition patients

Touré A, Clin Nutr 2015

Two hundred and four CVCs, including 133 Broviac and 71 PICC were inserted into 196 patients. Forty percent of Broviac and 51% of PICC were the first catheters placed in patients ($p = 0.14$). Broviac

Before catheter insertion and inclusion in this study, 77 patients with Broviac had already been on HPN for 1247 ± 2144 days and 35 patients with PICC for 553 ± 1423 days ($p = 0.01$). Patients received

Cumulative follow-up was 36,812 catheter-days for patients with Broviac and 12,322 catheter-days for patients with PICC.

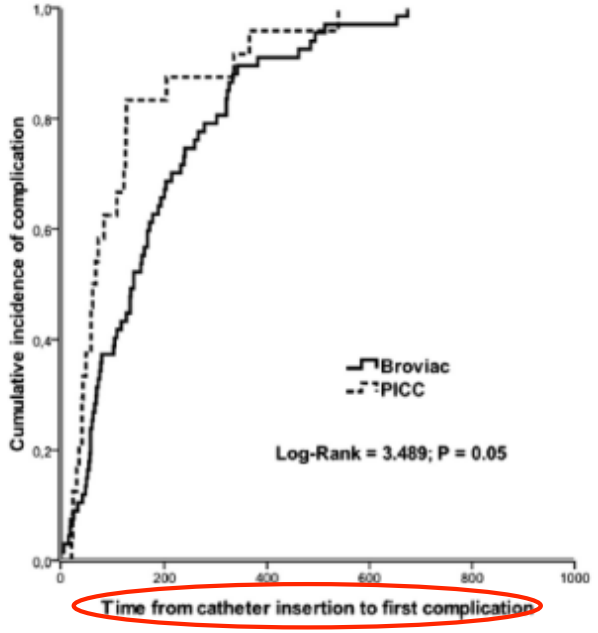


Fig. 1. Kaplan–Meier curves for first catheter complications in patients with Broviac vs. patients with peripherally inserted central catheters (PICC).

A comparative study of peripherally-inserted and Broviac catheter complications in home parenteral nutrition patients

Touré A, Clin Nutr 2015

into account, i.e. catheter-days. There were 91/133 (2.47/1000 catheter-days) Broviac complications and 26/71 (2.03/1000) PICC complications ($p = 0.12$). Catheter infection rate was lower in PICC

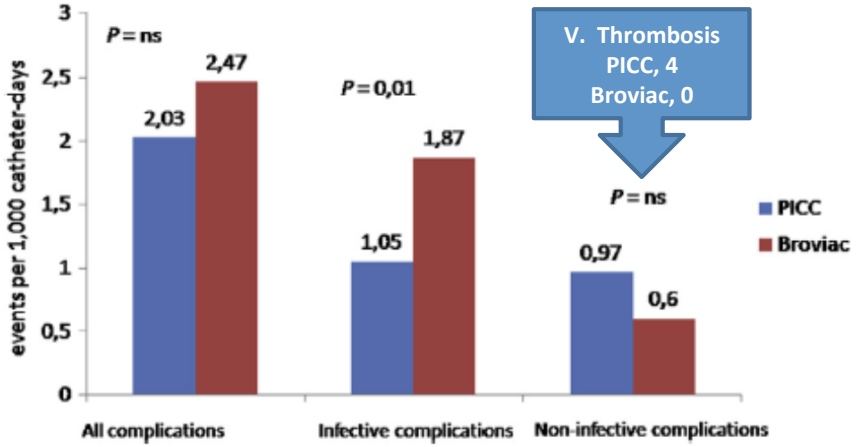


Fig. 2. Comparison of incidence rates of PICC and Broviac catheter complications in home parenteral nutrition patients.

Table 3
Reasons for catheter removal in patients on home parenteral nutrition.

	Broviac $n = 83/133$	PICC $n = 56/71$	p
Catheter-associated infection	21 (25.3%)	9 (16.0%)	0.32
Infection of insertion site	5 (6.0%)	1 (1.8%)	0.67
Occlusion	3 (3.6%)	2 (3.6%)	0.63
Venous thrombosis	0 (0.0%)	4 (7.1%)	0.01
Pericarditis	0 (0.0%)	1 (1.8%)	0.35
Catheter displacement	8 (9.6%)	0 (0.0%)	0.11
Leakage/breakage	1 (1.2%)	1 (1.8%)	0.51
End of HPN	11 (13.2%)	21 (37.5%)	0.001
Surgery[a]	25 (30.1%)	10 (17.9%)	0.41
Patient preference	3 (3.6%)	4 (7.1%)	0.20
Death[b]	6 (7.2)	3 (5.4%)	0.73

Centro Insufficienza Intestinale Cronica Benigna
Policlinico di S. Orsola -Bologna

124 pazienti adulti in NPD – dicembre 2016

Pazienti con PICC: 39 (31.4%)

Durata della NPD con PICC: 18.0 ± 19.7 mesi; mediana 10.7; range 1.1 – 75.4

Totale PICC posizionati: 67 (1.7/pz)

Durata per PICC: 10.4 ± 9.8 mesi; mediana 6.9; range 1.1 – 31.6

Motivo della sostituzione del PICC:

- Sepsi 20, pari 0.59/anno PICC (range atteso per i CVC tunnellizzati: 0.14 – 1.09)
- TV 2, pari 0.06/anno PICC (range atteso per i CVC tunnellizzati: 0.02 – 0.09)
- Cause meccaniche 8

Rate of Catheter-Related Bloodstream Infections Between Tunneled Central Venous Catheters Versus Peripherally Inserted Central Catheters in Adult Home Parenteral Nutrition: A Meta-analysis

Hon K, JPEN 2018 in press

Conclusion

Meta-analysis of the comparative studies showed that PICC use in adult HPN was associated with a lower rate of CRBSI when compared with TCVCs; however, meta-analysis of the single-arm studies showed that the rate of CRBSI in PICCs and TCVCs was comparable.

The decision to which type of catheter is most suited for patients receiving HPN should be based on the duration of treatment, level of care, patients' dexterity, as well patients' underlying comorbidities that may potentially contribute to other catheter-related complications. We found an association between proportions of males in the study with the RR of CRBSI. However, the results of this analysis must be interpreted with caution because of the significant heterogeneity across studies.

Motivazioni per la scelta del PICC per NPD

Pazienti con IICB

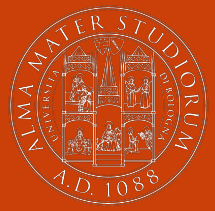
- Previsione di rapido recupero dell'autonomia intestinale in seguito a:
  - terapia medica
  - intervento chirurgico di ricostruzione della continuità intestinale
- PICC «ponte» tra due CVC tunnellizzati, di cui il primo rimosso per complicanza
- Più «breve lista attesa» per il rispetto ad un CVC tunnellizzato
- Preferenza del paziente

Pazienti con neoplasia

- PICC già posizionato per chemioterapia
- Previsione di breve durata della NPD
- Paziente non autonomo nella gestione della linea infusionale
- Preferenza del paziente

PICC per NPD
Conclusioni

- Può essere di prima scelta per trattamenti brevi 3-6 mesi
- Può essere mantenuto in sito per periodi prolungati (no sostituzione di routine)
- Richiede un caregiver per la medicazione del sito cutaneo di entrata
- Il paziente può essere indipendente per l'attacco-stacco della NP (ma necessita di una prolunga)
- Le complicanze compaiono più precocemente rispetto ai CVC tunnellizzati
- Rispetto ai CVC tunnellizzati sembra vi sia un minor rischio di infezioni ed un maggior rischio di trombosi venosa



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