

Central Line-Associated Bloodstream Infections in Home Parenteral Nutrition: Insights from a National Home Infusion Provider



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ABSTRACT

Long-term parenteral nutrition (LTPN) patients rely on central venous access devices, posing a risk for central line-associated bloodstream infections (CLABSI). This study assessed CLABSI incidence in a national home infusion cohort and identified associated risk factors.

A retrospective review (March 2023 – May 2024) analyzed demographics, parenteral nutrition prescriptions, lipid use, nursing utilization, and CLABSI history. Patients were stratified into CLABSI and non-CLABSI groups, with statistical comparisons performed.

Among 198 LTPN patients, the CLABSI rate was 0.49 per 1000 catheter days. CLABSI patients had higher body weight, fewer days of injectable lipid emulsions, and shortercatheterdwellduration. No significant differences were found for LTPN duration, rural residence, home health use, or ethanol locks.

The CLABSI rate was lower than previously reported. Significant associations were found with weight, lipid infusion days, and catheter dwell time. Further studies are needed to confirm these findings and refine prevention strategies.

BACKGROUND

Long-term parenteral nutrition (LTPN) within the home is a lifeline for many patients throughout the United States. Patients utilize central venous access devices (CVAD) to administer LTPN. Central line-associated bloodstream infection(CLABSI) is a serious risk associated with patients who require LTPN. Rates of CLABSI in LTPN populations range from 0.9-1.1 per 1000 catheter days. The aim of this study was to determine the incidence of CLABSI in a cohort of patients serviced by a national home infusion provider specializing in LTPN and identify variables associated with an increased incidence of CLABSI.

METHODS

A retrospective review of electronic medical records of LTPN patients with intestinal failure was queried from March 2023 to May 2024 for patient demographics, anthropometric data, nursing utilization, parenteral nutrition prescription including lipid type, length of therapyuse, geographic distribution, prescriber specialty, history of CLABSI, blood culture results as available, and use of ethanol lock. Patient zip codes were used to determine rural health areas, as defined by the US Department of Health & Human Services.

Patients were divided into two groups:

- 1.) Patients that had at least one CLABSI
- 2.) Patients with no CLABSI during the study period

Demographic and clinical variables were compared between the two groups. Nominal data were analyzed by Fisher's exact test and continuous data were analyzed with studentt-test for normal distributed data and Mann-Whitney U-test was used for non-normal distributed data.

RESULTS

We identified 198 persons that were maintained on LTPN during the study time. The overall CLABSI rate for this cohort during the study period was 0.49 per 1000 catheter days. Forty-four persons with LTPN had one or more CLABSI and 154 persons with LTPN did not have a CLABSI during the study period. Persons who experienced CLABSI weighed significantly more, had fewer days of infusing injectable lipid emulsions (ILE), and had a shorter catheter dwell duration compared to those that did not have a CLABSI (TABLE 1). There was no significance difference in between the CLABSI and no CLABSI groups in the length of time on LTPN, location of consumer (rural versus non-rural), utilization of home health services, number of days parenteral nutrition (PN) was infused, or use of ethanol locks (TABLE 1).

TABLE 1			
	CLABSI (YES) N=44	CLABSI (NO) N=154	P-value
Basic Demographics			
Age (years) (mean±SD)	42±22	44±24	0.54
Weight (kg) (median, range)	62.6 (8.7-111)	54.5 (4-221)	0.03
Patient Location and Home Care			
Rural N, %			1
Yes	8 (18)	28 (18)	
No	36 (82)	124 (82)	
Unknown	0	2 (1)	
Home Nursing N, %			0.55
Yes	25 (57)	103 (67)	
No	13 (30)	41 (27)	
Unknown	6 (13)	10 (6)	
LTPN Data			
Days/Wk on PN (mean±SD)	6.3±1.2	6.3±1.4	0.93
Lipids Days/Wk on PN	2.9±2.7	4.1±2.5	< 0.01
Total Length on PN in Years (Clinical Intake or Application) (median, range)	13.5 (2-39)	14.75 (0.5-56)	0.44
Catheter Dwell Days (median, range)	198 (0-8977)	646 (1-45420)	< 0.01
Use of Ethanol lock			0.69
Yes	9	38	
No	35	116	

CONCLUSION

In this retrospective cohort study we report a CLABSI rate of 0.49 per 1000 catheter days, which is lower than previously published CLABSI rates for similar patient populations. Patient weight, days of infusing ILE, and catheter dwell duration were significantly different between those that did and did not have a CLABSI in this study period. Yet, variables such as use of ethanol lock and proximity to care providers that had previously been reported to impact CLABSI were not significantly different in this cohort. An expanded study with more LTPN patients or a longer study duration may be necessary to confirm these results and their impact on CLABSI rates.