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Management of Home Parenteral Nutrition in Gastroenterology Office Infusion Centers

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Introduction

Home parenteral nutrition (PN) is commonly provided to patients with gastrointestinal dysfunction [1-2]. There is very little data on the provision of PN through gastroenterology office infusion centers (OICs). We evaluated the management of patients in this setting.

Methods

A retrospective, observational study was conducted in patients receiving PN through gastroenterology OICs over a 6-year period from 2016 to 2022.

Patients were selected for PN therapy by their gastroenterologist. The physician and PN-trained pharmacist managed the PN formula. PN-trained nurses performed patient teaching, drew weekly labs, and provided catheter care in the OIC. All patients self-administered PN with solution and supplies dispensed weekly from the pharmacy.

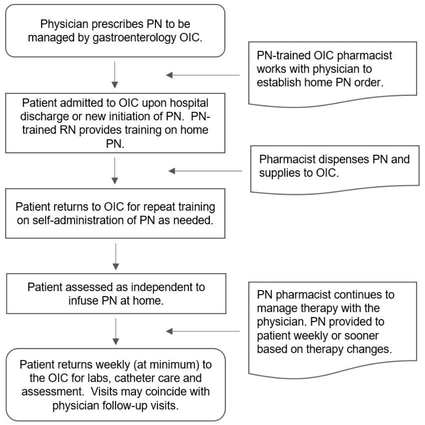
Study data included:

- Demographics
- PN indications
- PN regimen including PN initiation location
- Monitoring parameters (i.e., weight and albumin)
- PN outcomes
- Catheter-related blood stream infections (CRBSI)

Descriptive statistics included means, standard deviations (SD), medians, interquartile ranges (IQR), frequencies, and percentages. The rate of CRBSI was calculated per 1000 days. All results reflect updated data through August 2022.

Patient Flow

Figure 1. Patient Flow Diagram



Results

Study Cohort

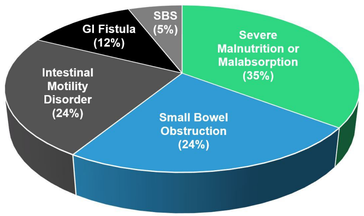
- 17 patients received PN therapy managed through gastroenterology OICs during the study period

Table 1. Demographics

Parameter	OIC PN N=17
Age in years, mean ± SD	44 ± 16.7
Female gender, n (%)	12 (71%)
Body mass index in kg/m^2, median (min, max)	22 (15, 28)
Duration of disease in years, mean ± SD	7 ± 6.6
Underlying diseases, n (%)	
Inflammatory bowel disease	9 (53%)
Malignant disease	3 (18%)
Other*	5 (29%)

*Other includes hyperemesis gravidarum of pregnancy (n=1), anorexia nervosa (n=1), short bowel syndrome (n=1), idiopathic gastroparesis (n=1), and s/p gastric sleeve and gastric bypass (n=1).

Figure 2. Indications for PN Therapy



SBS=short bowel syndrome

- 8 patients (47%) initiated PN at the gastroenterology OIC

OIC PN Utilization

Table 2. OIC-Managed PN Utilization

Parameter	N=17
Diet at initiation of PN, n (%)	
Limited oral diet	13 (76%)
NPO	4 (24%)
Calories at PN start in kcal/kg/day, mean ± SD	28 ± 6.0
Hours of cyclic PN, median (min, max)	14.0 (9, 18)
Duration of PN therapy in months, median [IQR]	10.3 [1-23]

- All received cyclic PN with protein, carbohydrates, and fat.
- PN caloric intake was increased in 7 patients (41%)
- 37 formulation changes were made in 11 patients; those requiring no changes were primarily on short-term therapy

Monitoring Parameters

Table 3. Patient Weight and Albumin

Parameter	N=17
Weight, mean ± SD	
Initial weight (kg)	60 ± 12.2
Increase in weight (kg)	4 ± 5.5
Albumin, mean ± SD	
Initial albumin (g/dL)	3.4 ± 0.7
Increase in albumin (g/dL)	0.2 ± 0.8

- There was a weight increase of 6% across all patients
- 14 patients had stable or improved weight changes with a median [IQR] weight increase of 5.1 [3-7] kg
- Weight loss was observed in 3 patients with malignant disease (n=2) and uncontrolled ulcerative colitis (n=1)
- There were slight increases in albumin over the study period

PN Outcomes

Table 4. Current OIC PN Status

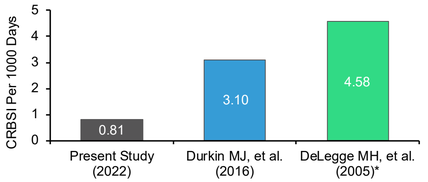
Parameter	N=17
Continuing OIC PN, n (%)	3 (18%)
Moved to J-tube feeding, n (%)	4 (24%)
Moved to oral diet, n (%)	3 (18%)
Discontinued, n (%)*	7 (41%)

*Discontinued due to cancer-related death (n=1), CRBSI then moved to oral diet (n=1), patient preference (n=1), transfer of care / transferred to hospice (n=4).

- 3 patients (18%) were continuing PN at the end of the study period and have been on therapy for a mean of 4.9 ± 2.4 years

Catheter-Related Events

Figure 3. Catheter-Related Blood Stream Infections



*CRBSI rate represents peripherally inserted central catheter (PICC) line patients only.

- There were 7 CRBSI events over 9016 days resulting in a CRBSI rate of 0.78 per 1000 days
- Most used PICC only (n=15), with 1 port and 1 PICC/ tunneled central venous catheter
- 1 had DVT in PICC (new line placed, then PN resumed)

Table 6. Individual Patient Details

Gastroenterology OIC-Managed PN										
No.	Age	Gender	PN Indication	Underlying Disease	Pertinent Therapies	PN Initiation Location	Months of OIC PN	Weight Δ	Albumin Δ	PN Outcome
1	46	F	Small bowel obstruction	Crohn's disease	-	OIC	0.3	2%	1	Moved to J-tube feeding
2	23	F	Small bowel obstruction	Crohn's disease	ustekinumab	OIC	0.6	4%	1.4	Moved to oral diet
3	61	F	Small bowel obstruction	Bladder neoplasm	-	Hospital	22.9	-2%	-0.6	D/C - cancer-related death
4	33	F	Severe M/M	Ulcerative colitis	vedolizumab	OIC	0.7	-2%	-0.1	D/C - transfer of care
5	46	F	Severe M/M	S/P gastric sleeve & gastric bypass	-	Hospital	0.2	6%	1.2	Moved to oral diet
6	49	M	Intestinal motility disorder	Gastric adenocarcinoma	-	Hospital	10.3	-19%	-0.7	D/C - transferred to hospice
7	32	F	Severe M/M	Hyperemesis gravidarum of pregnancy	-	OIC	3.3	20%	-1.3	D/C - patient preference
8	20	M	Short bowel syndrome	Short bowel syndrome	teduglutide	OIC	74.3	6%	-0.1	Continuing PN
9	53	M	GI fistula	Crohn's disease	-	Hospital	4.3	9%	0.2	Moved to oral diet
10	39	F	GI fistula	Anal adenocarcinoma	-	OIC	25.2	15%	0.7	Continuing PN
11	61	M	Severe M/M	Crohn's disease	ustekinumab	Hospital	1.0	3%	1	D/C - transferred to hospice
12	64	M	Severe M/M	Crohn's disease	adalimumab, teduglutide	Hospital	13.5	19%	0.5	D/C - CRBSI, moved to oral diet
13	21	F	Intestinal motility disorder	Anorexia nervosa with bulimia	-	OIC	16.3	9%	-0.5	Moved to J-tube feeding
14	30	F	Intestinal motility disorder	Crohn's disease	vedolizumab	OIC	36.1	16%	-0.4	Moved to J-tube feeding
15	72	F	Severe M/M	Ischemic colitis	-	Hospital	0.4	6%	0.8	Moved to J-tube feeding
16	62	F	Small bowel obstruction	Ulcerative colitis	-	Hospital	11.8	2%	-0.5	D/C - transfer of care
17	31	F	Intestinal motility disorder	Idiopathic gastroparesis	-	Hospital	75.1	10%	1.4	Continuing PN

PN = parenteral nutrition, ID = identification, OIC = office infusion center, Δ = change from pre- to post-OIC PN therapy, J-tube = jejunostomy tube, M/M = malnutrition or malabsorption, D/C = discontinued, GI = gastrointestinal

Discussion

This is the first home PN study to our knowledge focusing solely on patients who received PN management from gastroenterology OICs. We present data over a 6-year period.

- Patients were predominantly young, female, and had severe malnutrition/malabsorption or small bowel obstruction. Over half had underlying inflammatory bowel disease.
- Almost half initiated home PN through the OIC, all infused cyclic PN, and most were on a limited oral diet with multiple formulation changes managed by PN-pharmacist over time.
- Most patients (82%) had weight increases over the study, and concomitant biologics and teduglutide were used with OIC PN in 5 patients (29%).
- Forty-one percent of patients were able to transition to enteral intake by end of study period.
- Our population had primarily PICC lines (88%) with an infection rate of 0.78 per 100 catheter days. This was low compared to other published rates.
- Dunkirk, et al. reported an incidence of 3.01 CRBSI's per 1000 days in home PN patients, where the largest group had non-tunneled catheters, followed by PICC lines [3]. DeLegge, et al. a found an infection rate of 4.58 per 1000 days in home PN in patients with PICC lines [4].
- Low rates of CRBSI with home PN are very dependent on good patient hygiene and catheter care compliance [3]. Our low rate of CRBSI may have been a result of consistent patient training and with catheter care performed within the gastroenterology OIC by the same PN nurse.
- The present study is limited by its small sample size.

Conclusion

Home PN was successfully managed through gastroenterology OICs. This setting provides readily accessible care with PN-trained nurses, pharmacists, and gastroenterologists.

Home PN was successfully initiated at the OIC in almost half of the study patients, and PN patients discharged from the hospital received effective continuity of care.

There was a lower rate of catheter-related infections compared to reported rates with traditional home care. Gastroenterology OICs offer safe and effective provision of home PN.

References

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2. Boullata JI, et al. JPEN 38 (3), 2014.
3. Durkin MJ, et al. JPEN 40 (7), 2016.
4. DeLegge MH, et al. JPEN 29 (6), 2005.

Disclosures: TER is a speaker and/or advisor for AbbVie, Arena, BI, BMS, Ferring, Genentech, Gilead, Gossamer, Intercept, Janssen, Lilly, Pfizer, Prometheus and Sanofi and Takeda. The other authors have no disclosures.