

Research Article

Our experience of enteral and parenteral nutrition support assessment in Turkey

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ABSTRACT

Background: Enteral nutrition (EN) is administration of macro-micro nutrients to gastrointestinal system (GIS) through nasofeeding tubing (NF) (nasogastric, nasoduodenal, nasojejunal) or percutaneous access path. We aimed to evaluate demographic data's, nutrition pathways, number of feeding days, the reasons for the outcome, domain enteral and parenteral nutrition support (ENS and PNS).

Methods: The sample is formed with 2113 ENS patients and 5438 PNS patients. Specified in the objective parameters were retrospectively followed by clinical nutrition unit (CNU).

Results: 2113 and 5438 patients respectively were given ENS and PNS. The cause of termination was mostly death. 387 patients of PNS became apparent that with the use of enteral and parenteral access path area. These patients were fed an average of 3.14 days in combination.

Conclusions: Although our results show that ENS is lower than PNS, ENS is preferred to PNS because of safety, effectiveness and low cost. PNS is an important diet in patients who haven't got adequate oral intake or non-oral feeding. CNU should be established in hospitals and patients should be closely monitored.

Keywords: Enteral, Parenteral, Nutrition

INTRODUCTION

Enteral nutrition (EN) is administration of macro-micro food elements to gastrointestinal system (GIS) through nasofeeding tubing (NF) (nasogastric, nasoduodenal, nasojejunal) or percutaneous access path. Parenteral nutrition is intravenous delivery of food when need of feeding cannot be met by enteral nutrition alone due to any reason.¹

American Society for Parenteral Enteral Nutrition (A.S.P.E.N) and European Society for Parenteral and

Enteral Nutrition (E.S.P.E.N) in 1999 have established definition, specific indication and contraindication of nutrition with legal regulations.^{1,2}

Despite advancement in medical research, malnutrition is an important health problem due to its high prevalence in hospitalized patients. Nutrition deficit progresses together with increased morbidity and mortality.¹

Nutrition support is a part of medical treatment. This support is provided through oral, enteral and parenteral nutrition. Enteral nutrition has advantages compared to parenteral nutrition because of the use of physiological

paths. Total daily energy or protein energy deficiency cause infective complications and increase of the number of days on mechanical ventilation and hospitalization.^{1,3,4} Retardation is observed in growth, learning and cognitive functions as a result of non-optimal nutrition.¹

Nutrition support should be started in an early period in patients with malnutrition whom oral intake is impaired in a period longer than 5-7 days or expected to be impaired. First option is enteral way in all the intensive care unit patients who will not fed with complete dose within 3 days, if there is not any contraindication. Additional parenteral support is not necessary in the patients who tolerate this way and achieve target nutrition values.^{2,5}

Nasofeeding tubing is preferred for a nutrition period shorter than 4 weeks. Percutaneously or surgically opened gastrostomy and jejunostomy is applied in patients who are fed for longer periods.⁶⁻⁸ After NG tubes are inserted in the patients, infusion should be started after confirmation of their location. Gastric content is aspirated and pH is measured. The location is accurate if pH<4. Two-lumen tube is used in order to provide gastric aspiration and nutrition.^{9,10}

Percutaneous endoscopic gastronomy (PEG) is indicated in patients who will be fed for at least 30 days and have dysphagia. Dysphagia in various degrees is graded by clinicians before the application.⁷

Enteral nutrition can be used in every hemodynamically stable patients with a gastrointestinal path which can be used. However, EN should be terminated in patients with elevated serum level of lactate, those use vasopressor, having APACHE score >15, septic shock, patients with high blood glucose and suspected for intestinal obstruction.¹¹

PNS is indicated in the cases of GIS cannot be used or is inconvenient, if it is thought that patients will not be able to be fed for at least one week and if there is malnutrition. All the macro and micro nutrient requirements intravenously met. PNS can be partly applied in addition to EN. Patients should always be assessed also for EN and at least intestinal feeding should be attempted in PNS applications.¹²

Peripheral and central veins are used as PNS pathways. While peripheral intravenous way peripheral parenteral nutrition support (PNS) can be performed if the treatment will last shorter than 7-10 days providing adequate osmolality (<900 mOsm/L), central parenteral nutrition support (CPNS) is used through central vein path and for longer treatment periods. Appropriate selection of the vein in which PNS will be carried out is closely related to the nutrition period and nutritional needs of patients. PNS is contraindicated in conditions including severe shock, advanced respiratory failure and deep acidosis.¹³

Objective of this study was to evaluate age, distribution of the year, the clinics, nutrition pathways, diagnosis, and number of feeding days, the reasons for the outcome and nutritional products in patients administered enteral nutrition support (ENS) and parenteral nutrition support (PNS).

METHODS

Performed with the scan pattern, the scope of the study is composed of hospitalized patients in Ankara Numune Education and Research Hospital and the sample is formed with 2113 patients who takes ENS and 5438 patients who takes PNS from Clinical Nutrition Unit (CNU). Specified in the objective parameters were retrospectively followed by CNU. SPSS 21.0 software was used in statistical analysis of data and frequency, mean and Chi-square test were used. P values less than 0.05 were considered significant.

RESULTS

It was found that 2113 patients with a mean age of 67.89 years (52.3% male, 47.7% female) were administered ENS. While number of patients fed through enteral way was 247 in 2010, this number has increased over years and reached to 558 patients 2013. This number approached to 338 in only the first 6 months of 2014. This rate was seen to reverse in PNS. Number of patients who received intravenous nutrition was 1337 in 2010 and dropped to 1146 in 2013 and 457 in the first 6 months of 2014 (Table 1). Increase of the number of patients administered EN compared to PNS was found to be statistically significant (p<0.05).

Table 1: Demographical features of parenteral and enteral nutritional support.

Year	Parenteral			Enteral				
	Number	%	Gender (M/F) (n)	Mean Age	Number	%	Gender (M/F) (n)	Mean Age
2010	1337	24.5	574/763	63.70	247	11.7	123/124	64.27
2011	1276	23.5	570/706	64.57	498	23.6	266/232	68.29
2012	1222	22.5	558/664	64.85	478	22.6	244/234	67.82
2013	1146	21.1	510/636	65.37	558	26.4	295/263	68.33
2014 (first 6 month)	457	8.4	214/243	66.06	332	15.7	177/155	69.33
Total	5438	100	2426/3012	64.71	2113	100	1105/1008	67.89

Table 2: Distribution of the patients received parenteral and enteral nutritional support according to clinics.

Clinic	Parenteral		Enteral	
	Number	%	Number	%
Surgery	1233	22.7	78	3.7
Internal medicine	741	13.6	217	10.3
Burn unit	1	0.1	16	0.8
Neurology	929	17.1	160	7.6
Oncology	210	3.9	36	1.7
Intensive care	2324	42.6	1606	75.9
Total	5438	100	2113	100

When distribution of the hospitalized patients was evaluated according to clinics, intensive care unit was in the first range both in enteral and parenteral ways ($p<0.05$). Internal medicine and neurology clinics were in the first range among the clinics with ENS administered. Patients hospitalized in the surgery, neurology, internal medicine and oncology received PND (Table 2).

ENS was observed to be most commonly given to the patients in neurological disease group by 31.5% followed by patients diagnosed for internal medicine by 19.9%, oncology by 13% and respiratory failure by 11.8% ($p<0.05$). ENS paths and distribution of enteral products are given in Table 3. Nasogastric (NG) was applied with a high rate as 86.6%. PEG was in the second range by 12% ($p<0.05$). Standard product was the most commonly used product by 41.7%.

Table 3: Distribution of enteral nutrition ways and enteral products.

Enteral nutrition ways	Number	%
Nasogastric	1828	86.6
Nasojejunal	2	0.1
Percutaneous endoscopic–radiological gastrostomy	254	12
Surgical gastrostomy	9	0.4
Jejunostomy	20	0.9
Enteral Products		
Diabetic	599	28.3
Fibrous	430	20.4
Hypercaloric	19	0.9
Hipovolemic	139	6.6
Immunonutrition	6	0.3
Oncologic	33	1.6
Semi elementel	4	0.2
Standard	883	41.7
Total	2113	100

Main cause of the termination of ENS and PNS was loss of the patients (40.4% - 38.7% respectively). Shifting to oral nutrition and discharge were the other indication for

stopping ENS, while the same range applied for PNS (Table 4).

Table 4: Causes of the termination of parenteral and enteral nutritions.

Causes of termination	Parenteral		Enteral	
	Number	%	Number	%
Acidosis	4	0.1	3	0.2
Shift to enteral nutrition	93	1.7	0	0
Shift to enteral nutrition at home	142	2.6	152	7.2
Refusal of consultation	657	12.1	106	5
Referral to other center	110	2	111	5.3
Shift to oral nutrition	1345	24.7	516	24.4
Death	2109	38.8	855	40.4
Discharge	971	17.9	366	17.2
Other	7	0.1	1	0.1
Shift to parenteral nutrition	3	0.2	0	0
Total	5438	100	2113	100

DISCUSSION

Among all the various population groups studied type II feeding with artificial tubing has begun with insertion of a gum elastic tube with esophageal and rectal ways in 19th century. The first fluid diet was used by Dobbie and Hoffmeister in 1976.¹⁴ Enteral nutrition is more physiologic with less complications than parenteral nutrition. It is believed to prevent mucosal atrophy and endotoxin translocation, thus protecting barrier function.^{4,6} Due to this advantage it provided to our patients, number of ENS increased in the last four and a half years.

Early enteral nutrition leads to improvements in clinical outcomes. It decreases gastric intolerance, provides regain of motility. ENS is known to shorten length of stay in ICU, decreases infection rate and diminishes mechanical ventilation time especially within the first 48 hours following trauma and surgical intervention.⁴ In our results, increase of the enteral nutrition in ICU patients was found to be parallel to the increase of ENS over years.

Primary access way used in enteral nutrition is nasogastric tube. In this study, nasogastric tube was in the first range by 86.6% and found to be statistically significant. It has side effects such as acute sinusitis, pharyngeal irritation, discomfort and aspiration risk. In order to decrease this risk, nasoduodenal or nasojejunal

tubes can be used. Need of energy aimed is achieved more readily and in a shorter time.⁶

In patients who will not be able to be fed through oral way (>30 days), alternative methods such as PEG, laparoscopic or surgical gastrostomy, percutaneous fluoroscopic jejunostomy. PEG is the most inexpensive and reliable method.¹⁵ PEG was opened in 12% of our patients within the period studied.

Neurological diseases lead to disruption of swallowing ability rapid loss of food deposits, especially proteins as a result of hypermetabolism, causing death due to aspiration pneumonia and affecting obtaining and use of nutritional resources. In our study, enteral nutrition support was most commonly used in neurological diseases group ($p < 0.05$).¹⁶

PNS is important for preparation of the patients with malnutrition or catabolic condition exists during presentation or may develop during hospitalization in whom enteral ways are not suitable and in order to prevent increase of morbidity, mortality and infection and delay of wound healing from various diseases including severe trauma, sepsis, inflammatory bowel disease.¹⁷ Similarly in our study, need for PNS was found to be higher in the patients admitted to the intensive care units due to trauma and major surgery. According to ESPEN; PNS should be considered in patients who are not expected to shift to normal nutrition within 3 days, contraindicated for ENS within 24-48 hours or those cannot tolerate ENS and patients who are fed less than targeted at the end of 2 days. Although duration of parenteral nutrition differs among the patients, this is closely related with the clinical condition.^{17,18} According to our results, PNS has decreased from 2010 until today, while ENS application has increased ($p < 0.05$).

Selection of patients and products, determination and follow of appropriate access ways can be provided by a actively working team. Teamwork would lead to decrease in mortality, hospitalization and re-hospitalization rates.^{19,20} Clinical nutrition team is composed of physicians, nurses, dieticians and pharmacists.²¹ In our CNU, there is a wide nutritional support team composing of multidiscipline.

Besides ENS, CNU in our hospital applies also single pouch mixtures which are specifically tailored to patients and disease with parenteral compounder system since 2008. Previously used multi-bottle PNS application has been left due to its drawbacks.

CONCLUSION

Target of our nutritional support team has been established as to prepare PNS with patient-specific solution, within physiological limits, with an affordable cost and quality nutritional support while continuing to increase ENS.

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