Practice analysis and cost evaluation regarding the prescriptions of artificial nutrition in the Medical Oncology setting of Brest Institute of Oncology and Haematology in 2015 (ENROBE Study).

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Background

- Numerous international evidence-based guidelines are available regarding the prescription of parenteral (PN) and enteral nutrition (EN) in adult cancer patients (ASPEN, ESPEN, SFNEP).
- Data from literature shows that real-life practice does not always follow those guidelines, especially in the palliative setting.
- Nutritional management being part of the supportive care provided to cancer patients, investigating the real-life practices and their consequences was mandatory.

Objectives

- The aim of this study** was to evaluate if the initial prescriptions of nutritional support issued from our facilities complied with the recommendations available at that time.
- Secondary objectives** were to study the evolution of the nutritional status of the patients under nutritional support, median overall survival from the prescription time, the complication rates and the costs represented by the prescriptions.
- An exploratory analysis concerning inadequate PN prescriptions was performed.

Methods

- All the prescriptions of EN and PN made by the Oncology, Nutritional Sciences and Head and Neck Surgery hospitalization units between 1/01/2015 and 31/12/2015 were screened. 309 patients were concerned.
- It had to be a first exposure to EN and/or PN. Two cohorts were created, according to the type of artificial nutrition prescribed : PN (n=70) and EN (n=46). Cut off date : 31/12/2017.
- A summary of the guidelines (Grade A) issued from ASPEN, ESPEN and SFNEP was made in order to analyse every prescription included.

Patients characteristics and Primary End Point

	Parenteral Nutrition (n=70)	Enteral Nutrition (n=46)
Gender		
Male	43 (61 %)	34 (74 %)
Female	27 (39 %)	12 (26 %)
Median Age (years, range)	64 [27 ; 85]	64 [44 ; 83]
Median albumin level (g/l, range)	28,5 [11 ; 43] ^a	29 [17 ; 38] ^b
Median BMI (kg/m ² , range)	21,2 [14,6 ; 36,7] ^c	20,7 [11,1 ; 33,6]
Median NRI (% , range)	79,4 [55,4 ; 102,1] ^d	79,2 [62,9 ; 98,4] ^e
Nutritional state		
Missing data	8 (11 %)	21 (46 %)
Well fed	5 (7 %)	3 (7 %)
Moderately undernourished	15 (21 %)	8 (17 %)
Severely undernourished	42 (60 %)	14 (30 %)
Tumor Type		
Intrathoracic	25 (36 %)	2 (4 %)
Digestive	18 (26 %)	2 (4 %)
Upper digestive and respiratory tract	16 (23 %)	40 (87 %)
Urinary	3 (4 %)	1 (2 %)
Gynaecologic	3 (4 %)	0
Neurologic	2 (3 %)	1 (2 %)
Breast	2 (3 %)	0
Endocrine glands	1 (1 %)	0
Phase of the disease		
Curative	20 (29 %)	42 (91 %)
Palliative	31 (44 %)	4 (9 %)
Advanced Palliative	16 (23 %)	0
Terminal	3 (4 %)	0
Functionality of the digestive track		
Functional	32 (46%)	7 (15%)
Nausea-Vomiting	12 (17%)	0
Unfunctional		
Whole Digestive unfunctional	14 (20%)	0
Superior Digestive unfunctional	20 (29%)	39 (85%)
Inferior Digestive unfunctional	4 (6%)	0

Missing data : ^a 8 patients ^b 21 patients ^c 4 patients ^d 18 patients ^e 26 patients
BMI : BodyMass Index. NRI : Nutritional Risk Index

Items concerning global prescription of artificial nutrition (AN)

- Item AN 1** : Prefer the enteral route when there is no gastro-intestinal reason for intestinal failure (ESPEN).
- Item AN 2** : Use nutritional support in patients with moderate or severe nutritional risk for 7 - 14 days prior to major surgery (ESPEN, ASPEN, SFNEP).

- Item AN 3** : In patients who require postoperative AN, EN or a combination of enteral and supplementary PN is the first choice. PN is indicated in undernourished patients when oral or EN is not possible for at least 7 days (ESPEN).
- Item AN 4** : The routine use of AN in patients receiving curative, palliative or advanced palliative chemotherapy is not recommended if the nutritional state and/or the nutrient intake is adequate (SFNEP).

Items concerning exclusively prescription of parenteral nutrition (PN)

- Item PN 1** : PN is not recommended if oral/enteral nutrient intake is adequate (ESPEN).
- Item PN 2** : Preoperative PN is indicated in severely undernourished patients who cannot be adequately orally or enterally fed (7 - 10 days) (ESPEN).
- Item PN 3** : All components of the PN mix should be administered simultaneously over 24 hours (ESPEN) .
- Item PN 4** : Weaning from PN is not necessary (ESPEN).
- Item PN 5** : High osmolarity PN requires central venous access (CVC) (ESPEN).
- Item PN 6** : Diagnosis of Catheter Related Sepsis (CRS) is best achieved (a) by quantitative or semi-quantitative culture of the catheter, or (b) by paired blood cultures from a peripheral vein and from de catheter, with continuous monitoring of the differential time to positivity (ESPEN).
- Item PN 7** : The routine use of PN during chemotherapy, radiotherapy or combined therapy is not recommended (ESPEN, SFNEP).

Items concerning exclusively prescription of enteral nutrition (EN)

- Item EN 1** : Use perioperative EN preferably with immune modulating substrates for 5 - 7 days in all patients undergoing programmed major abdominal or oro-pharyngeal surgery independent of their nutritional status (ESPEN, ASPEN, SFNEP).
- Item EN 2** : Apply tube feeding in patients in whom early oral nutrition cannot be initiated, with special regard to those undergoing major head and neck or gastrointestinal surgery for cancer with special regard to those with obvious undernutrition at the time of surgery (ESPEN, SFNEP).

Secondary End Points

- Median duration of prescription** : PN cohort (n=64) : 14 days [2 ; 294], EN cohort (n=34) : 22 days [2 ; NR].
- Median weight change** : PN cohort (n=46) : 0 kg [-10 ; +11,4], EN cohort (n=25) : 0 kg [-8,7 ; +9] .
- Median seric albumin rate change** : PN cohort (n=30) : - 2,5 g/l [-9 ; +15,5], EN cohort (n=12) : -1,5 g/l [-11 ; +11].
- Median overall survival (OS)** from first administration : PN cohort : 4,5 months [0,1; NR], EN cohort : NR.
- Estimated mean cost of treatment** (solutions only) : PN cohort : 19,8 € (SD : 3,8) / patient / day and EN cohort : 2,4 € (SD : 2,2) / patient / day.

	Parenteral Nutrition (n=70)	Enteral Nutrition (n=46)
Catheter thrombosis	1 (1%)	
Inflammation of administration site	4 (6%)	
Infection of administration site		5 (11%)
Pain at administration site		6 (13%)
Dysfunction / migration of nutritional device		12 (26%)
CVC infection	7 (10%)	
Fluid overload	8 (11%)	
Constipation and / or diarrhoea		14 (30%)
Nausea / Vomiting		12 (26%)
Aspiration pneumonia		5 (11%)
Refeeding syndrome	21 (30%) ^a	4 (9%) ^b
Interruption of AN due to side effect	14 (20%)	9 (20%)
Death due to AN	0	3 (7%)

Missing data : ^a 34 patients (49% population). ^b 39 patients (85% population).
CVC : Central venous catheter. AN : Artificial Nutrition.

- Total PN cost** : 45 608 € (n=64, 2 327 days), total EN cost : 11 816 € (n=41, 3 779 days).
- Population in inadequacy according to NA 1 (n=19)**
- More patients with **intra-thoracic tumours** (68% vs 24%, p : 0,0008) and **functional digestive tracks** (84% vs 25%, p < 0,0001).
- Shorter** duration of prescription (6,5 days vs 17,5 days, p=0,0033) and OS (1,1 months vs 8,5 months, p<0,0001)
- No difference in nutritional status under treatment.
- Estimated treatment cost** : 10 843€ (n=17, 257 days).

Conclusion

Despite good adequacy rates, except in the pre-operative setting, the biological and clinical data from this study warrant practice changing.