Economic evaluation of Home Parenteral Nutrition in Cancer patients; The French context

Objective

This study aims to estimate incremental cost and utility of Home Parenteral Nutrition (HPN) in a heterogeneous group of cancer patients from the French public purchaser perspective, when compared with the same patients hypothetically receiving no nutrition.

Methods

Two economic cost-utility models, from public French perspective, were defined: 1) 28 day model and 2) Lifetime, 2 years, state transition model with a cycle duration of one week. Patients receiving Home parenteral Nutrition (HPN) were compared to those not receiving (HPN-). Main Model inputs were adapted from different studies that were carried out on comparable populations (1-5).

Transition probabilities:

Hospitalization probabilities: obtained from reported hospitalization rate (1) for HPN+ and estimated using a published relative risk (7) for the HPN- group. These probabilities were multiplied by the probability of whether being at a nutritional risk or not. Death probabilities: The survival data were defined regardless of the health status of a patient and were based on the reported survival data in similar populations for both groups (3, 4). Home probabilities:

They are calculated as the complementary probabilities of hospitalization and death states.

HPN+ and HPN- estimated survival curves used to compute death probabilities in the state transition model.

Costs

HPN+ costs:

1) Daily cost per patient of the HPN products costs (bags and raw materials) and health services consumption due to nutrition provision (5).

2) HPN+ catheter-related complications costs (8) HPN- costs: These are the costs attributed to malnutrition-related extra length of hospital stay (2)

Utilities

HPN+ utilities: The FACT-G scores (1) were used to compute the utility weights using published algorithm (9).

HPN- utilities: Utility when the patient is at high nutritional risk was equal to 87% of the reported baseline utility, based on (10).

Assumptions

- Malnutrition burden: Burden of Malnutrition was assessed based only on survival data and LOS
- Cost of hospital stay: Cost of French medical ward stay was used
- Lifetime State Transition Model:

Utility was considered to equal zero after the death of 95% of subjects. Patients at the hospital state were assigned 25% of the full utility weight at that cycle. Death probabilities were the same for all health states.

- Complications costs: 

complication reported in reference study (1) did not include major complications like sepsis or thrombosis. Cost inputs used in the cost structure were derived from a costing study in French ICU department.

Sensitivity Analysis

Two types of sensitivity analyses were performed for each model. One way Deterministic Sensitivity Analysis (DSA) and Probabilistic Sensitivity Analysis (PSA) were carried out in order to study the effect of uncertainty of the input variables on the outputs.

Results

831 Euros for HPN+ 0.074 and 0.072

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State transition model

HPN+ 17,096 0.1107

HPN 4,430 0.0413

Difference 12,666 0.0693 182,584

In the 28 days model, the HPN+ utility was 0.58 and 0.61 at days 0 and 28, respectively. Based on a mortality risk of 0.08 in the HPN+ group and 0.13 in the HPN-group, the quantity of life spent in the 28 days model was valued to be 0.074 and 0.072 years in HPN+ and HPN- groups, respectively.

On the other hand, the mean survival of HPN+ and HPN-patients was 3.5 and 1.4 months in the state transition model. These values were used to calculate the average monthly costs per patient giving 4,944 Euros for HPN+ patients and 3,114 Euros for HPN- groups.

Conclusions

This is the first cost-effectiveness analysis of HPN in the French context where the comparator is the absence of HPN. HPN seems to be not cost-effective according to standard WTP thresholds but judgment on HPN cost-effectiveness still remains difficult because the quality of available data sources is limited (forming research control group receiving no nutrition is unethical).

References


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