



## Trabajo Original

Nutrición artificial

### Results of a survey on peri-operative nutritional support in pancreatic and biliary surgery in Spain *Resultados de una encuesta sobre el soporte nutricional perioperatorio en la cirugía pancreática y biliar en España*

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### Abstract

**Introduction:** a survey on peri-operative nutritional support in pancreatic and biliary surgery among Spanish hospitals in 2007 showed that few surgical groups followed the 2006 ESPEN guidelines. Ten years later we sent a questionnaire to check the current situation.

**Methods:** a questionnaire with 21 items sent to 38 centers, related to fasting time before and after surgery, nutritional screening use and type, time and type of peri-operative nutritional support, and number of procedures.

**Results:** thirty-four institutions responded. The median number of pancreatic resections (head/total) was 29.5 (95 % CI: 23.0-35; range, 5-68) (total, 1002); of surgeries for biliary malignancies (non-pancreatic), 9.8 (95 % CI: 7.3-12.4; range, 2-30); and of main biliary resections for benign conditions, 10.4 (95 % CI: 7.6-13.3; range, 2-33). Before surgery, only 41.2 % of the sites used nutritional support (< 50 % used any nutritional screening procedure). The mean duration of preoperative fasting for solid foods was 9.3 h (range, 6-24 h); it was 6.6 h for liquids (range, 2-12). Following pancreatic surgery, 29.4 % tried to use early oral feeding, but 88.2 % of the surveyed teams used some nutritional support; 26.5 % of respondents used TPN in 100 % of cases. Different percentages of TPN and EN were used in the other centers. In malignant biliary surgery, 22.6 % used TPN always, and EN in 19.3 % of cases.

**Conclusions:** TPN is the commonest nutrition approach after pancreatic head surgery. Only 29.4 % of the units used early oral feeding, and 32.3 % used EN; 22.6 % used TPN regularly after surgery for malignant biliary tumours. The 2006 ESPEN guideline recommendations are not regularly followed 12 years after their publication in our country.

#### Keywords:

Pancreas. Biliary. Surgery. Nutrition.

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Part of these results were shown as a poster at the 40<sup>th</sup> ESPEN Congress in Madrid in September 2018.

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## Resumen

**Introducción:** realizamos una encuesta sobre soporte nutricional perioperatorio en cirugía pancreática y biliar en hospitales españoles en 2007, que mostró que pocos grupos quirúrgicos seguían las guías de ESPEN 2006. Diez años después enviamos un cuestionario para comprobar la situación actual.

**Métodos:** treinta y ocho centros recibieron un cuestionario con 21 preguntas sobre tiempo de ayunas antes y después de la cirugía, cribado nutricional, duración y tipo de soporte nutricional perioperatorio, y número de procedimientos.

**Resultados:** respondieron 34 grupos. La mediana de pancreatomecías (cabeza/total) fue de 29,5 (IC 95 %: 23,0-35; rango, 5-68) (total, 1002), la de cirugías biliares malignas de 9,8 (IC 95 %: 7,3-12,4; rango, 2-30) y la de resecciones biliares por patología benigna de 10,4 (IC 95 %: 7,6-13,3; rango, 2-33). Solo el 41,2 % de los grupos utilizaban soporte nutricional antes de la cirugía (< 50 % habían efectuado un cribado nutricional). El tiempo medio de ayuno preoperatorio para sólidos fue de 9,3 h (rango, 6-24 h), y de 6,6 h para líquidos (rango, 2-12). Tras la pancreatomecía, el 29,4 % habían intentado administrar una dieta oral precoz, pero el 88,2 % de los grupos usaron algún tipo de soporte nutricional y el 26,5 % usaron NP en el 100 % de los casos. Los demás grupos usaron diferentes porcentajes de NP y NE en sus casos. En la cirugía biliar maligna, el 22,6 % utilizaron NP siempre y NE en el 19,3 % de los casos.

**Conclusiones:** la NP es el soporte nutricional más utilizado tras la cirugía de cabeza pancreática. Solo el 29,4 % de las unidades usan nutrición oral precoz y el 32,3 % emplean la NE tras este tipo de cirugía. El 22,6 % de las instituciones usan NP habitualmente tras la cirugía de tumores biliares malignos. Las guías ESPEN 2006 no se siguen de forma habitual en nuestro país tras más de 10 años desde su publicación.

### Palabras clave:

Páncreas. Biliar.  
Cirugía. Nutrición.

## INTRODUCTION

The issue of nutrition around pancreatic and biliary surgery has not been solved yet (1-3). Complex procedures with a high rate of complications make it difficult to standardize the nutritional support needed. Though mortality is less than 5 % in specialist centers, morbidity is around or exceeding 50 % (4-6). Malnutrition before surgery and as the effect of surgical complications makes the nutritional management of these patients an unavoidable task.

We performed a nationwide survey in Spain in 2007 about perioperative nutritional management in pancreatobiliary surgery. We contacted 33 surgical units and received responses from 25 (75.7 %) of them. The survey was based on 18 simple questions related to perioperative nutritional care habits. The results were published in the journal *Nutrición Hospitalaria* (7). We realized that the situation in Spain at that time was far from the recommendations issued by ESPEN (8). Parenteral nutrition was the most prevalent modality of support (82.6 %), and enteral nutrition (via a nasojejun tube or jejunostomy) was used only in 21.7 % of Units in pancreatic surgery.

Ten years later, we decided to send a similar questionnaire to assess the current situation in Spain.

## MATERIALS AND METHODS

A questionnaire with 21 items was sent to 38 centers with known activity in pancreatic and biliary surgery. Questions were related to fasting time (hours) before and after surgery (liquid and solid), nutritional screening use and type, time (days) and type of peri-operative nutritional support (enteral by tube or jejunostomy, parenteral) and number of procedures of each type (pancreatic and biliary, benign and malignant). The results obtained from the different centers were transferred to an Excel sheet and analyzed.

## STATISTICAL ANALYSIS

In the descriptive analysis, categorical variables are presented with their frequency distribution (numbers and percentages) and

quantitative variables as mean and median values with confidence interval (CI) and range.

## RESULTS

We received responses from 34 institutions (89.5 %). The median number of pancreatic resections (head and/or total pancreatectomies) was 29.5 (95 % CI: 23.0-35; range, 5-68) (totalling 1,002 cases). Surgery for biliary malignancies (non-pancreatic, above the pancreatic gland) averaged 9.8 (95 % CI: 7.3-12.4; range, 2-30), and the mean number of main biliary resections for benign conditions, non related to liver transplantation reconstruction of the biliary tree, was 10.4 (95 % CI: 7.6-13.3; range, 2-33) (Fig. 1, number of procedures).

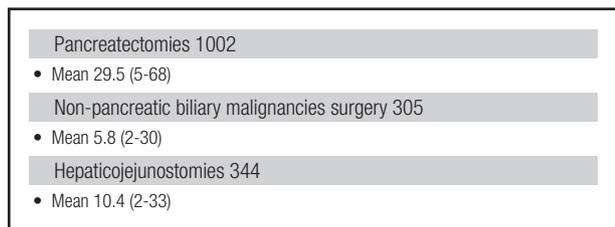
Before surgery only 41.2 % of the groups used nutritional support and less than 50 % used any nutritional screening method.

The mean duration of preoperative solid food fasting was 9.3 h (range, 6-24 h). It was 6 hours in 11 centers and 8 hours in 12. Mean preoperative fasting was 6.6 h for liquids (range, 2-12), it being 2 hours in only 5 centers and 4 hours in one. It was 6 or 8 hours in the majority of Units (Fig. 2).

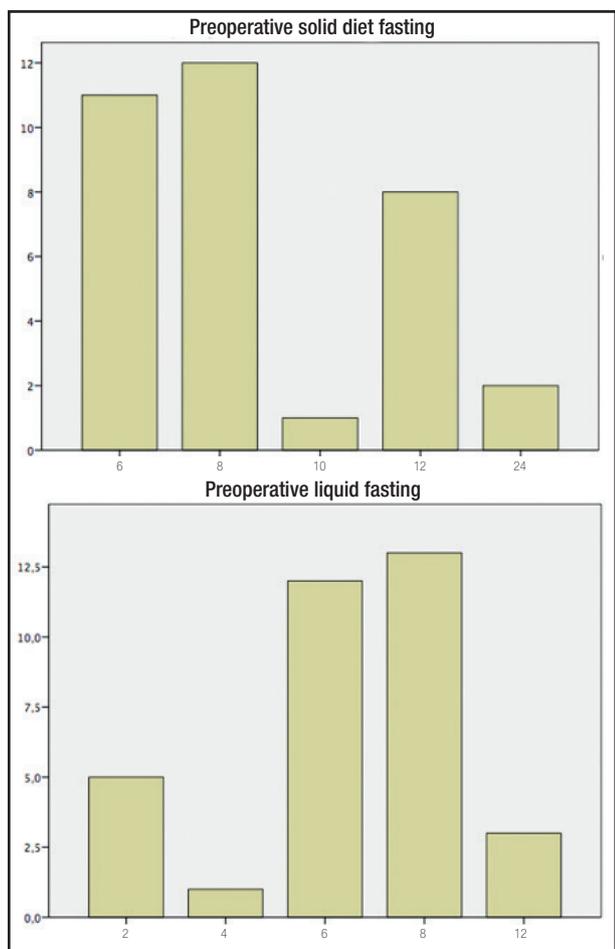
Following pancreatic surgery, 29.4 % of respondents tried to use early oral feeding, but 88.2 % of the groups involved used some nutritional support. In 26.5 % of the groups TPN was used for 100 % of cases. It was used for 0-20 % of cases in 50 % of the responding centres (Fig. 3). The mean number of PN days was 6. Different percentages of TPN and EN were used in the other centers. Sixteen centers did not use EN or PN in only 0-10 % of their cases.

Jejunostomy was used only in 3 centers (in 20-30 % of the patients). Tube EN use was highly variable – 26 centers did not use it, but 12 were using it in 1-90 % of their cases. EN was used for a mean of 3.7 days (median, 5 days).

Postoperative oral feeding was initiated at a median of 2 days (mean, 2.5 days) after pancreatectomy. One center started it on post-operative day (POD) 0, 9 in POD 1, 9 in POD 2, and 15 in POD 3-5. There was great variability for solids; in 1 center they started them on POD1, in 3 on POD 2, in 9 on POD 3, and in 1 on POD 8.



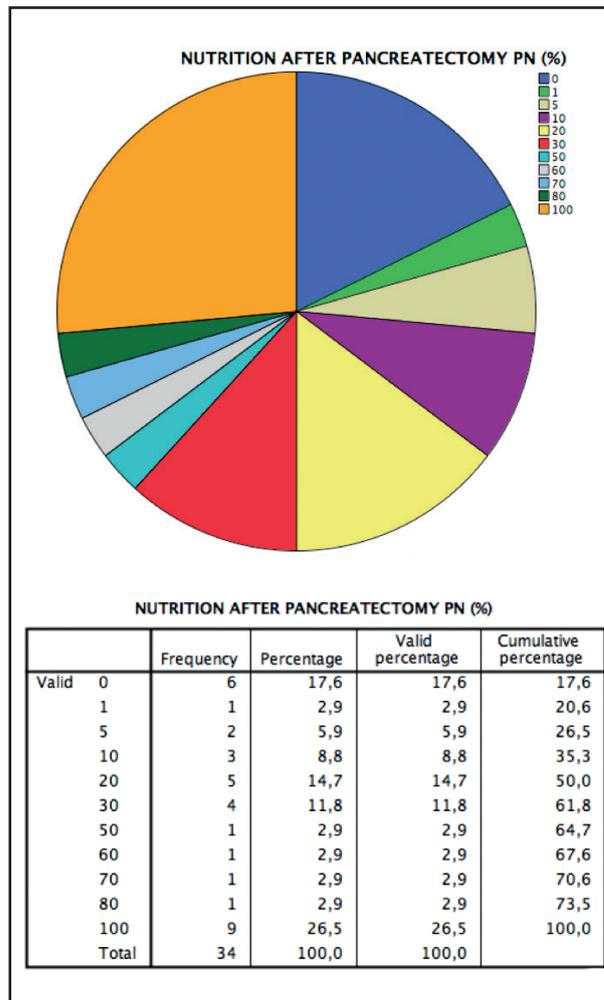
**Figure 1.**  
Number of procedures of each type – total, mean by center, and range.



**Figure 2.**  
Distribution of fasting time for solid and liquid diet in the units that responded to the survey.

In malignant biliary surgery, 22.6 % of centers used TPN always, and 6 additional centers in 40-80 %. EN was used in 19.3 % of centers. Five centers used EN in 10-80 % of cases, and 7 centers used neither EN nor PN.

The use of artificial nutrition in benign biliary surgery was much less frequent. Almost 80 % of the responding Units used EN or PN in < 20 % of their cases. Only 3 centers used PN in 50 % of their cases.



**Figure 3.**  
Percentage distribution of parenteral nutrition use in patients after pancreatectomy at the different study centers.

## DISCUSSION

Concerned by the low adherence of Spanish centers to the 2006 ESPEN guidelines on enteral nutrition after pancreatic surgery in 2007, we decided to review this issue a decade later. Enteral nutrition guidelines remained unchanged (8), and parenteral nutrition guidelines after surgery were published shortly after our first survey was carried out (9). The ESPEN guidelines on clinical nutrition in surgery published in 2017 (10) are an update of those two and the the German Society for Nutritional Medicine (DGEM) Guideline “Clinical Nutrition in Surgery” of 2013, but they contain no substantial differences with respect to the previous guidelines in relation to nutrition in upper gastrointestinal or pancreatic surgery. They appeared at the same time we had our survey readied, similar to what happened in 2006. We sent our questionnaire to 38 centers with known activity in pancreatic surgery, and obtained a high response rate (89.5 %).

As centers were of different sizes, there was great variability in the number of procedures performed, ranging from 5 to 68 pancreatectomies (head or total-gland resections) in a year (2017), but with a significant median of 29.5 surgeries. Surgery for malignant biliary tree tumors involved fewer patients as expected, with numbers ranging from 2 to 30. Finally, procedures for benign biliary problems, i.e., biliary-enteric anastomoses in the liver transplantation setting, involved a median of 10 cases/center/year.

Malnutrition and/or significant weight loss in pancreatic and biliary cancer patients is not unusual (27-74 %) (11-12). All these patients should be nutritionally evaluated (3), but there are still many centers that do not use nutritional screening routinely. In our recent survey, less than 50 % of Units used any nutritional screening tool. Accordingly, only 41.2 % of the responding groups were using nutritional support before surgery.

The Espen Guidelines on Enteral Nutrition from 2006 (8) indicated EN even in patients without obvious undernutrition when it is anticipated that the patient will be unable to eat for more than 7 days perioperatively, and also in patients who cannot maintain their oral intake above 60 % of the recommended intake for more than 10 days. A delay in surgery to allow preoperative EN was recommended for patients at severe nutritional risk, defined by the presence of at least one of the following criteria: weight loss > 10-15 % within 6 months, BMI < 18.5 kg/m<sup>2</sup>, Subjective Global Assessment (SGA) Grade C, and serum albumin < 30 g/L (with no evidence of hepatic or renal dysfunction).

The ISGPS (International Study Group on Pancreatic Surgery) position paper (3) recommends nutritional support if one of the following criteria is met (almost the same parameters, but considering weight loss only if > 15 % and adding the nutritional risk score as an alternative to SGA): weight loss > 15 % within 6 months, BMI < 18.5 kg/m<sup>2</sup>, SGA grade C or nutritional risk score > 5, and serum albumin < 30 g/L (with no evidence of hepatic or renal dysfunction).

As regards preoperative fasting, there was great variability in the durations reported by the responding Units. Anesthesia society guidelines support the current use of 2 hours fasting for liquids and 6 hours fasting for solids (13-14), as there is no evidence of a higher risk for aspiration when compared to traditional, longer-time schedules. We saw that some surgical teams followed these guidelines while others were still using much longer fasting times both for liquids and solids. The most recent ESPEN guidelines on clinical nutrition in surgery (10) state that preoperative fasting from midnight is unnecessary in most patients with the highest grade of recommendation, as this had reached a very strong consensus among the authors (97 %).

Postoperative early feeding is another issue that has changed tremendously in recent years. The ESPEN 2017 guidelines recommend oral intake within hours in most patients (10). Recent meta-analyses showed significant benefits in terms of postoperative recovery and infection rates (15). The guidelines dealing with perioperative care for pancreaticoduodenectomy, published by the ERAS Society (16), state that most patients tolerate normal oral intake soon after elective pancreaticoduodenectomy, and recommend allowing a normal diet after surgery without restric-

tions albeit with caution, starting carefully and increasing intake according to tolerance over 3-4 days. Their recommendation is to use enteral tube feeding only for specific indications, and that parenteral nutrition should not be employed routinely. Bozzetti and Mariani challenge this point of view (16) arguing that there is a high prevalence of malnutrition in patients with pancreatic cancer, and there is evidence that many of these patients should be candidates for perioperative nutritional support according to the ESPEN guidelines. There may be a gap between the recommended and the effective start of feeding, and though the ERAS guidelines discourage the use of a nasogastric/jejunal tube or of a needle-catheter jejunostomy, their use could prove beneficial in patients who are recognized at high risk for postoperative complications.

The 2006 ESPEN guidelines support the use of enteral supplementation in those patients that are not able to cover at least 60 % of their energy requirements by the oral route. This can be done by tube or jejunostomy feeding, and each method has its pros and cons. Our survey showed that jejunostomy was used only in 3 centers and in 20-30 % of patients, and that the use of tube EN was highly variable, only in one third of the responding centers and in very different percentages of patients.

More worrying is the widespread use of parenteral nutrition. In more than one quarter of the groups TPN was used for 100 % of cases. It was used for 0-20 % of cases in 50 % of the responding centers, but in more than 80 % of patients in 10 centers. The 2009 ESPEN guidelines (9) recommend its preoperative use in malnourished hospitalized patients who cannot be adequately fed either orally or enterally, and the use of postoperative parenteral nutrition in patients who cannot meet their caloric requirements within 7-10 days whether orally or enterally. Patients on parenteral nutrition need close monitoring to reduce the risk of thromboembolic, infectious, and metabolic complications (17).

As for the use of TPN in malignant biliary surgery, the survey showed that more than 20 % of the groups assessed were using it always, and 6 more units used it in 40-80 % of their cases. These results show a liberal use of parenteral nutrition in this subgroup of patients as well, something that goes in parallel with the policy followed in pancreatic surgery. This could not be justified by the use of the current guidelines, unless a high proportion of the patients involved were undernourished before surgery, something unusual nowadays and impossible to demonstrate by the nature of a simple survey without laboratory and in-depth nutritional assessment data. Conversely, the use of enteral nutrition was scarce (less than 20 % of the responding Units, though in 5 centers it was used for 10-80 % of cases).

The results obtained about the use of artificial nutrition in the setting of benign biliary surgery are different, as expected. This surgery is usually simpler and less frequently followed by severe complications, which explains that almost 80 % of the Units assessed used EN or PN in < 20 % of their cases. But still, 3 of the centers were using PN in 50 % of their cases, something that sounds out of the ordinary, and should be a reason for policy review.

Potential methodological inconsistencies of this work may be related to the nature of the study. It being a survey that was sent to most

of the different Units that perform pancreatic and biliary surgery in Spain, without an audit made afterwards, makes it possible that some of the results received do not exactly represent the real experience of some of the working groups. However, personal communications and interpersonal knowledge support most of the results shown, in many cases unfortunately distant from current recommendations. This publication may also work as a stimulus for change.

## CONCLUSIONS

TPN is the most usual nutritional support after pancreatic head surgery in Spain. Only 29.4 % of the assessed Units use early oral feeding, and 32.3 % use enteral feeding after this kind of surgery.

In all, 22.6 % of the surveyed institutions use TPN regularly after surgery for malignant biliary tumours. The 2006 (enteral) and 2009 (parenteral) ESPEN guideline recommendations are not regularly followed in our country a decade after their publication.

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