Feeding patients following pancreaticoduodenectomy: a UK national survey

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ABSTRACT

INTRODUCTION Providing nutrition for patients following pancreaticoduodenectomy (PD) is vital but can be challenging. Due to the lack of UK national guidelines for the provision of nutrition and nutritional pre-operative assessment regarding PD, a national survey was conducted.

PATIENTS AND METHODS A questionnaire was sent to the Department of Nutrition and Dietetics at each of the 31 specialist pancreatic centres listed with the Pancreatic Society of Great Britain and Ireland. Questions were asked regarding the nutritional assessment and treatment of patients undergoing classical PD and pylorus-preserving PD (PPPD) resections.

RESULTS Twenty-two centres responded to the questionnaire. With regard to PD and PPPD, 82% routinely feed patients following resection, 32% have a regimen for starting feeds, 18% carry out pre-operative nutritional assessment, five centres have funding for an hepatobiliary dietitian, and only four centres have a specialist hepatobiliary dietitian employed. There was no consensus regarding the type or route of feeding, and at least one centre reported using parenteral nutrition exclusively.

CONCLUSIONS Very few centres in the UK have funding for a hepatobiliary dietitian. Hence pre-operative nutritional assessment in patients undergoing PD and PPPD does not receive much input. Although the importance of postoperative feeding in these patients is appreciated in all major units, there is no consensus with regards to feeding regimens. The authors hope this observational study will address these issues with this important message and stimulate further study in this area.

KEYWORDS

Pancreaticoduodenectomy – Nutrition

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Pancreatic surgery is becoming more common for both benign and malignant disorders due to the increasing accuracy of imaging and improved experience in critical care. However, pancreaticoduodenectomy (PD) remains associated with a substantial and well-documented morbidity (29–52%)^{1–4} and mortality (1–4%) in experienced centres.^{5,6}

A total of 144 consecutive PD resections were performed in our institution by four surgeons. However, a recent audit in our unit showed that there was no consensus regarding the type and route of the postoperative provision of nutrition by these four surgeons. The National Institute for Health and Clinical Excellence (NICE; *Nutrition Support in Adults*, February 2006) and European guidelines available provide guidelines for assessment and provision of nutrition for patients undergoing abdominal surgery in general.⁷ However, to the authors' knowledge, there are no specific nutritional guidelines for patients undergoing PD resections.

A survey was, therefore, constructed and sent to all the pancreatic centres in the UK to obtain a consensus on best

medical practice regarding nutritional assessment and provision following PD resection.

Materials and Methods

A questionnaire was sent to the Department of Nutrition and Dietetics at each of the 31 specialist pancreatic centres listed with the Pancreatic Society of Great Britain and Ireland. Questions were asked regarding the nutritional assessment and treatment of patients undergoing classical PD and pylorus-preserving PD (PPPD) resections.

Results

Twenty-two (71%) centres responded to the questionnaire. Table 1 shows the questions posed and the answers received. Following PD and PPPD resections, 18 centres routinely feed patients and seven centres have a set initial nutrition regimen. A variety of enteral and parenteral routes are utilised and the number of days taken to achieve

Table 1 Questionnaire questions and answers from the 22 pancreatic centres within the UK who replied

Questions	Answers	Number of centres (%)
Do you routinely feed patients following a Whipple/PPPD?		
	Yes	18 (82%)
	No	4 (18%)
Do you have a set starter regimen?		
	Yes	7 (32%)
	No	15 (68%)
Which route do you use?	Exclusively (12 centres)	More than 1 route (10 centres)
	Nasogastric tube	0
	Nasojejunal tube	4
	Jejunostomy	7
	Central parenteral nutrition	1
	Peripheral parenteral nutrition	0
	PEG with jejunal extension	0
How many days does it usually take to reach nutritional requirements?		
	1 day	1 (4.5%)
	2–3 days	6 (27%)
	3–4 days	6 (27%)
	> 5 days	8 (36%)
	Not answered	1 (4.5%)
What are the common complications seen in your unit?		
	None reported	7 (32%)
	Diarrhoea	5 (23%)
	Delayed gastric emptying	4 (18%)
	Bloating	4 (18%)
	Tube displacement	2 (9%)
	Nausea/vomiting	2 (9%)
	Early satiety	1 (4.5%)
	Blocked feeding tube	1 (4.5%)
	Poor tolerance to feeding tube	1 (4.5%)
	Abdominal cramps	1 (4.5%)
	Chyle leak	1 (4.5%) but stated this was occasional
What type of enteral feed do you use?		
	Standard polymeric	10 (45%)
	Fibre-enriched polymeric	5 (23%)
	Medium-chain triglyceride (MCT)	2 (9%)
	Semi-elemental/peptide	10 (45%)
	Elemental	1 (4.5%)
	MCT elemental	0
If your unit uses parenteral feeding, what types do you use?		
	Long-chain triglyceride lipid ready made	7 (32%)
	Medium-chain triglyceride lipid ready made	0
	Individually made feed bags	2 (9%)
	Mixture of above	9 (41%)

Table 1 (*continued*) Questionnaire questions and answers from the 22 pancreatic centres within the UK who replied

Questions Answers	Number of centres (%)
Do you have involvement with pancreatic enzyme replacement prescribing?	
Nil	2 (9%)
Occasional	1 (4.5%)
Request faecal elastase	2 (9%)
Advises doctors regarding alterations in dose and timing of prescription	14 (64%)
Advising junior/senior doctors regarding initiation of prescription	12 (55%)
Which pancreatic enzymes do you use in your trust?	
Creon unspecified	11 (50%)
Creon 10,000	4 (18%)
Creon 25,000	4 (18%)
Creon 40,000	3 (14%)
Pancrex V powder (for tube-fed patients)	6 (27%)
Do you assess nutrition status pre-operatively?	
Yes	4 (18%)
No	11 (50%)
Occasionally	7 (32%)
Is there specific funding for a dedicated specialist hepatobiliary dietitian in your trust?	
Yes	5 (23%)
No	15 (68%)
In-patients only	1 (4.5%)
Do not know	1 (4.5%)
Who sees your hepatobiliary surgical patients? (26 dietitians in 22 centres)	
General surgical dietitian	9
Site specific (pancreas/liver/hepatobiliary) dietitian	4
Intensive care dietitian	4
Oncology dietitian	3
Gastroenterology dietitian	2
Nutritional support dietitian	2
Upper gastrointestinal dietitian	1
Research dietitian	1

patients' nutritional requirements vary throughout the pancreatic centres. The types of feed used either via the enteral or parenteral routes are also varied.

The level of involvement regarding the assessment and prescription of pancreatic enzyme replacement ranged from none to advice given regularly to junior and senior medical staff.

Only four centres routinely carry out pre-operative nutritional assessment. Five centres have dedicated funding for a dietitian and only four centres who replied to the survey have employed specialist hepatobiliary dietitians.

Discussion

This survey was designed to find out the routine practice of assessment and feeding of patients undergoing PD and PPPD resections in the UK.

There is evidence that weight stabilisation in patients with unresectable pancreatic cancer is associated with improved survival.⁸ However, weight alone can be misleading when assessing patients' nutrition with pancreatic cancer due to the confounding effects of oedema, ascites and abdominal muscle wasting.⁸

It has been reported that 80–90% of patients with cancer of the head of pancreas have exocrine dysfunction and malabsorption, the degree of which is related to the proportion of pancreatic duct stenosis and the proximity of the cancer to the duodenum.^{9,10} Also, 62.5–71.4% of patients have some degree of malnutrition prior to PD resection,¹¹ which is substantially greater than general hospital admissions in which 40% have malnutrition.¹² In addition to this, pancreatic cancer is often accompanied by pain, nausea, anorexia, early satiety,^{8,15–16} changes in metabolic rate,¹⁷ catabolic cytokines¹⁸ and cachectic factors such as proteolysis inducing factor,¹⁹ all of which can affect food intake and utilisation. If this proportion of patients with tumours in the pancreatic head have potential malabsorption, it is important to assess their nutritional status pre-operatively (which this survey revealed only occurs in four of the centres who replied), especially prior to a PD resection where considerable pancreatic exocrine function will be removed. The lack of guidelines is clear as four centres did not routinely feed patients and 15 centres did not have a routine plan or consensus within their institution for feeding patients following PD resections. Furthermore, parenteral nutrition was given by eight centres but without fixed consensus regarding regimen.

It is clear from these results that there is no consensus regarding the best route for feeding following PD. Anecdotally, hepatobiliary surgeons have expressed concern regarding the potential complications associated with enteral nutrition, such as chyle leaks and pancreatic fistulae, which may explain why several centres employ the parenteral route with at least one centre using this route exclusively. However, only one centre reported chyle leaks as a complication, stating this was uncommon. As the survey revealed, the number of dedicated hepatobiliary dietitians was low and the level of dietitian involvement varied considerably. It is conceivable, therefore, that the complications reported regarding early feeding, including parenteral

nutrition provision, line placement and jejunostomy placement, for example, were not entirely comprehensive, as 32% of centres reported no complications at all.

Cardiopulmonary complications, pancreatic fistulae, dehiscence of anastomosis and biliary fistulae have all been reported in association with enteral and parenteral nutrition. However, the rates of these types of complications appear to be greater in association with the parenteral route for general abdominal surgery.²⁰

There is evidence that a multidisciplinary approach to many malignant and benign conditions improves survival and decreases morbidity. Patients undergoing PD and PPPD resections for benign and malignant disorders are often routinely discussed in such a setting. However, at least 15 specialist centres throughout the UK do not have funding for a dedicated hepatobiliary dietitian.

Like medical specialities, dietitians have an array of specialisations, training and experiences. With multidisciplinary teams managing patients undergoing PD and PPPD resections, it seems unacceptable to provide nutritional input from dietitians with varied backgrounds and roles. For example, oncology dietitians ($n = 3$) may not have input in patients with benign disease, gastroenterology dietitians ($n = 2$) may not have experience or input with surgical patients, *i.e.* those undergoing PD/PPPD resections and intensive care dietitians ($n = 4$) may not be able to offer outpatient support or follow-up.

We recommend that a specialist dietitian be a standard addition to the multidisciplinary team in specialist pancreatic centres. Also, pre-operative nutritional assessment should be routine prior to PD and PPPD resections. Enteral feeding should be standard in the postoperative setting in cases where long-term postoperative feeding becomes necessary. However, guidelines for a gold standard of care for the type of feed is yet to be determined. Therefore, a multicentre, randomised, controlled trial should be undertaken to determine which enteral route and type of feed should become the standard of care following PD and PPPD resections.

Conclusions

Very few centres in the UK have funding for an hepatobiliary dietitian. Hence pre-operative nutritional assessment in patients undergoing PD and PPPD does not receive much input. Although the importance of postoperative feeding in these patients is appreciated in all major units, there is no consensus with regards to feeding regimens. The authors hope this observational study will address these issues with this important message and stimulate further study in this area.

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