

# Early enteral nutrition still has advantages in patients undergoing pancreaticoduodenectomy

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The physiological benefits of enteral nutrition (EN) have been well documented, including its association with maintenance of the structural integrity of the gastrointestinal (GI) tract, reduced gut permeability, and increased mesenteric blood flow (1). EN has also been associated with reductions in infectious complications, mortality, length of hospital stay (LOS), and costs (2-5). Thus, enteral route is preferred in patients without a contraindication EN because it allows a faster recovery of patients.

The ESPEN guidelines recommend the provision of early EN (EEN) or early oral diet after GI surgery including pancreaticoduodenectomy (PD) (3). Previous studies reported the superiority of EEN to total parenteral nutrition (TPN) in terms of improving clinical outcomes in patients undergoing GI surgery (6). Furthermore, the beneficial effects of EEN in patients undergoing PD have been demonstrated by several studies.

A recent large multicenter randomized controlled trial showed that it was safe to allow patients undergoing upper GI surgery to eat normal food at will, immediately after a major surgery including PD (7). Furthermore, the enhanced recovery after surgery (ERAS) guidelines recommend the initiation of early oral diet after PD (8). Although institutions may differ from each other in terms of the time of starting EN or oral diet after PD, early diet at will after PD is a recent recommendation.

Despite recent recommendations, pancreatic surgeons tend to prefer delayed EN over EEN or early oral diet because of concerns about the occurrence of complications such as delayed gastric emptying (DGE), postoperative pancreatic fistula (POPF), postpancreatectomy hemorrhage (PPH), and infectious complications after EEN. However,

the literature review by Buscemi *et al.* revealed that EEN is safe and tolerated in patients undergoing PD, but does not have clear advantages of reducing DGE, POPF, PPH, infectious complications, and LOS (9).

In this issue of *Annals of Surgery*, Perinel *et al.* demonstrated contrasting results to those of previous studies that reported the benefits of EEN in patients undergoing PD (10). This was a prospective, multicenter, and randomized controlled trial involving 204 patients (age, >18 years) undergoing PD at nine French institutions. Eligible patients were randomly classified into two groups: those receiving EEN through the nasojejunal tube (NJEEN) and those receiving TPN postoperatively. NJEEN was defined as delivery of at least 50% of nutritional needs through the nasojejunal tube by postoperative day (POD) 5, and the absence of parenteral nutrition for consecutive 72 h or more. NJEEN was infused at 2 mL/h on POD 1, with the rate increasing, as tolerated, by 25 mL/h every 24 h. TPN was also started on POD 1 and delivered through a central venous catheter to achieve the target energy of  $30 \text{ kcal} \cdot \text{kg}^{-1} \cdot \text{day}^{-1}$  with  $1.5 \text{ amino acids} \cdot \text{kg}^{-1} \cdot \text{day}^{-1}$  with a carbohydrate-to-amino acids ratio of 3:2, which was continued until oral food intake reached 60% of the nutritional requirements. The primary outcome was the incidence of overall postoperative complication (graded according to the Clavien-Dindo classification), and the secondary outcomes were the occurrence of infectious complications, POPF grade B/C, PPH grade B/C, DGE, the Comprehensive Complication Index, LOS, and 30-day and 90-day mortality rates. In addition, the time to first flatus, time to starting oral food, and the impact on nutritional status (weight, body mass index, nutritional risk index, albumin, and prealbumin serum level) were evaluated.

This study has major implications and is a well-organized randomized study that investigated the effect of postoperative nutrition in patients undergoing PD. However, it is necessary to reconsider a few points carefully. The common complications after PD include DGE (19–23%), POPF (9–22%, especially grade B/C 19–22%), and PPH (1–17%, especially grade B/C 14%) (9,11–17). Among these complications, POPF was the most important risk factor for morbidity and mortality after PD. In general, the distribution of soft pancreatic texture was between 30% and 55% (11,18,19). However, only 5.4% of soft pancreas cases were observed in this study. The definition of soft pancreas in this study is different from that in previous publications. Nevertheless, the question of why the occurrence rate of POPF (27%) in this study was relatively higher than that in previous reports remains. In addition, the overall and individual complication rates reported in this study were relatively higher than those of previous studies. Furthermore, the overall complication, POPF, and the severity of POPF were significantly higher in the EEN group. This study concluded that EEN should not be recommended in patients undergoing PD. However, there is no strong evidence of an association between EEN and increased POPF. Therefore, it should be investigated whether EEN is significantly associated with a higher risk of POPF. Above all, we suggest that it is necessary to consider the risk factors that are associated with POPF. For example, other factors such as the anastomotic fashion, pancreatic duct stenting, or use of intraperitoneal drains should also be carefully considered as potential risk factors of POPF; however, these factors were not discussed in this study.

Another consideration is that patients receiving TPN were selected as a control group, and were initiated on TPN on POD 1. In the current guidelines, unless the patient is at high nutrition risk, early TPN is not recommended after GI surgery (20). Moreover, parenteral nutrition is not usually indicated in normally nourished patients if oral diet and EN is not contraindicated (20). Thus, the strategies for nutritional support after PD in this study are not in accordance with the current guidelines. Therefore, the results of this study should be interpreted with caution.

We conclude that EN or oral diet is safe and should be started as soon as possible after PD according to recommendations from the current guidelines. However, further studies are needed to clarify the efficacy of EEN after PD.

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## Footnote

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## References

1. Kompan L, Kremzar B, Gadzijev E, *et al.* Effects of early enteral nutrition on intestinal permeability and the development of multiple organ failure after multiple injury. *Intensive Care Med* 1999;25:157–61.
2. Bozzetti F, Braga M, Gianotti L, *et al.* Postoperative enteral versus parenteral nutrition in malnourished patients with gastrointestinal cancer: a randomised multicentre trial. *Lancet* 2001;358:1487–92.
3. Weimann A, Braga M, Harsanyi L, *et al.* ESPEN Guidelines on Enteral Nutrition: Surgery including organ transplantation. *Clin Nutr* 2006;25:224–44.
4. Beier-Holgersen R, Boesby S. Influence of postoperative enteral nutrition on postsurgical infections. *Gut* 1996;39:833–5.
5. Braunschweig CL, Levy P, Sheean PM, *et al.* Enteral compared with parenteral nutrition: a meta-analysis. *Am J Clin Nutr* 2001;74:534–42.
6. Lee SH, Jang JY, Kim HW, *et al.* Effects of early enteral nutrition on patients after emergency gastrointestinal surgery: a propensity score matching analysis. *Medicine (Baltimore)* 2014;93:e323.
7. Lassen K, Kjaeve J, Fetveit T, *et al.* Allowing normal food at will after major upper gastrointestinal surgery does not increase morbidity: a randomized multicenter trial. *Ann Surg* 2008;247:721–9.
8. Lassen K, Coolsen MM, Slim K, *et al.* Guidelines for perioperative care for pancreaticoduodenectomy:

- Enhanced Recovery After Surgery (ERAS®) Society recommendations. *World J Surg* 2013;37:240-58.
9. Buscemi S, Damiano G, Palumbo VD, et al. Enteral nutrition in pancreaticoduodenectomy: a literature review. *Nutrients* 2015;7:3154-65.
  10. Perinel J, Mariette C, Dousset B, et al. Early Enteral Versus Total Parenteral Nutrition in Patients Undergoing Pancreaticoduodenectomy: A Randomized Multicenter Controlled Trial (Nutri-DPC). *Ann Surg* 2016;264:731-7.
  11. Keck T, Wellner UF, Bahra M, et al. Pancreatogastrostomy Versus Pancreatojejunostomy for RECOstruction After PANCreatoduodenectomy (RECOPANC, DRKS 00000767): Perioperative and Long-term Results of a Multicenter Randomized Controlled Trial. *Ann Surg* 2016;263:440-9.
  12. Shubert CR, Wagie AE, Farnell MB, et al. Clinical Risk Score to Predict Pancreatic Fistula after Pancreatoduodenectomy: Independent External Validation for Open and Laparoscopic Approaches. *J Am Coll Surg* 2015;221:689-98.
  13. Shen Y, Jin W. Early enteral nutrition after pancreatoduodenectomy: a meta-analysis of randomized controlled trials. *Langenbecks Arch Surg* 2013;398:817-23.
  14. Wente MN, Veit JA, Bassi C, et al. Postpancreatectomy hemorrhage (PPH): an International Study Group of Pancreatic Surgery (ISGPS) definition. *Surgery* 2007;142:20-5.
  15. Wente MN, Bassi C, Dervenis C, et al. Delayed gastric emptying (DGE) after pancreatic surgery: a suggested definition by the International Study Group of Pancreatic Surgery (ISGPS). *Surgery* 2007;142:761-8.
  16. Bassi C, Dervenis C, Butturini G, et al. Postoperative pancreatic fistula: an international study group (ISGPF) definition. *Surgery* 2005;138:8-13.
  17. Harnoss JC, Ulrich AB, Harnoss JM, et al. Use and results of consensus definitions in pancreatic surgery: a systematic review. *Surgery* 2014;155:47-57.
  18. Ansoorge C, Strömmer L, Andrén-Sandberg Å, et al. Structured intraoperative assessment of pancreatic gland characteristics in predicting complications after pancreaticoduodenectomy. *Br J Surg* 2012;99:1076-82.
  19. Nishida Y, Kato Y, Kudo M, et al. Preoperative Sarcopenia Strongly Influences the Risk of Postoperative Pancreatic Fistula Formation After Pancreaticoduodenectomy. *J Gastrointest Surg* 2016;20:1586-94.
  20. Braga M, Ljungqvist O, Soeters P, et al. ESPEN Guidelines on Parenteral Nutrition: surgery. *Clin Nutr* 2009;28:378-86.

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