

Delayed gastric emptying after pylorus preserving pancreaticoduodenectomy—does gastrointestinal reconstruction technique matter?

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KEYWORDS:

Delayed gastric emptying;
Pylorus preserving pancreaticoduodenectomy;
Antecolic;
Retrocolic;
Gastrojejunostomy;
Duodenojejunostomy

Abstract

BACKGROUND: The best gastrointestinal reconstruction route after pylorus preserving pancreaticoduodenectomy remains debatable. We aimed to evaluate the incidence of delayed gastric emptying (DGE) after antecolic (AC) and retrocolic (RC) duodenojejunostomy in these patients.

DATA SOURCES: Studies comparing AC to RC reconstruction after pylorus preserving pancreaticoduodenectomy were identified from literature databases (PubMed, MEDLINE, EMBASE, SCOPUS, and Cochrane). The meta-analysis included 10 studies with a total of 1,067 patients, where 504 patients underwent AC and 563 patients underwent RC reconstruction. The incidence of DGE was significantly lower with AC reconstruction in both randomized controlled trials (risk ratio = .44, confidence interval = .24 to .77, $P = .005$) and retrospective studies (risk ratio .21, confidence interval .14 to .30, $P < .001$) with less output and days of nasogastric tube use. AC reconstruction was associated with a decreased length of stay. There was no difference in operative time, blood loss, pancreatic fistula, and abdominal abscess/collections.

CONCLUSIONS: AC reconstruction seems to be associated with less DGE, with no association with pancreatic fistula or abscess formation.

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The authors declare no conflicts of interest.

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Manuscript received March 31, 2015; revised manuscript October 23, 2015

Delayed gastric emptying (DGE) has been one of the common, yet unresolved postoperative complications after pancreaticoduodenectomy (PD) operations for both benign and malignant indications.^{1–3} It was 1st reported by Warsaw and Torchiana.⁴ In pancreatic head cancer patients,

where PD is most commonly done, only 10 % to 15 % of are candidates for surgical resection on presentation with a dismal 5-year survival of 5% of all comers.⁵⁻⁷ postoperative DGE can significantly affect the quality of life in this already disadvantaged patient population. The mechanism of DGE is still unclear but has been suggested to be predisposed for by variable factors as the extent of gastric resection, loss of the pylorus, interrupted gastrointestinal neural connections, diabetes, local ischemia, or loss of gastrointestinal hormonal production,^{8,9} as well as some postoperative complications as pancreatic fistula and intra-abdominal abscesses.¹⁰

Pylorus preserving pancreaticoduodenectomy (PPPD) was developed by Traverso and Longmire with full preservation of the pylorus with its nerve supply in a trial to decrease the high incidence of DGE reported with the classic pancreaticoduodenectomy described by Whipple which has a reported incidence of DGE ranging 20% to 40%.^{1,11-14} Ever since, many surgeons have been proponents of that technique with reported better overall outcomes. However, prospective studies and meta-analyses failed to confirm the superiority of PPPD in terms of DGE.¹⁵⁻¹⁷ Therefore, another additional factor being examined by authors was, whether it is better to do antecolic or retrocolic gastrointestinal reconstruction after PPPD. Those who prefer antecolic claim it is better situated with no angulation or torsion of the duodenojejunostomy during the early postoperative period and less risk for internal herniation, whereas those who prefer retrocolic claim the intestinal loop is closer and provides better drainage with gravity.¹⁸⁻²⁷

The aim of this study is to systematically review the literature and analyze the available evidence in published literature comparing incidence of DGE among these 2 techniques.

Methods

Literature search and study selection

A comprehensive search of MEDLINE, EMBASE, Google Scholar, SCOPUS, and the Cochrane database was performed for all articles published in English language comparing the outcomes including DGE after antecolic (AC) vs retrocolic (RC) reconstruction after PPPD. The search was conducted using the following Medical Subject Headings terms: “PPPD with delayed gastric emptying”, “AC duodenojejunostomy and delayed gastric emptying”, “RC duodenojejunostomy with delayed gastric emptying” and gastrojejunostomy. The related-articles function was used to expand the search from each relevant study identified. All citations and abstracts identified were thoroughly reviewed. The latest search was performed on, September, 2014. Bibliographies of retrieved papers were further screened for any additional eligible studies.

Outcomes of interest

Only studies reporting on the comparison between AC vs RC reconstruction after PPPD were included. The primary endpoint was DGE with recording of postoperative nasogastric tube (NGT) use duration and output amount. The secondary endpoints included operative time, blood loss, and length of hospital stay (LOS) in addition to other postoperative complications as overall morbidity, mortality, pancreatic fistula, and abdominal abscess/collection.

Inclusion criteria

To be included in the analysis, studies had to:

1. Compare the outcome measures mentioned previously between patients who had AC reconstruction and those who had RC reconstruction after PPPD.
2. Report on at least 1 of the outcomes of interest mentioned previously.
3. When the same institution reported 2 studies, we included either the one of better quality (eg, larger sample size) or the most recent publication.

Exclusion criteria

Studies were excluded from analysis if:

1. They were either noncomparative studies or case series.
2. The study included any surgical technique other than PPPD.
3. The outcomes of interest were not reported for the 2 techniques.
4. There was an overlap between authors, institution, or patient cohorts.

Definitions and surgical techniques

In studies published after 2007, DGE was evaluated as defined and graded by the International Study Group of Pancreatic Surgery (ISGPS) classification (2007).⁷ Studies published before 2007 defined DGE as the need for NGT after postoperative day 7 to 10 (Table 2).

The resection and anastomosis for all patients from the standpoint of pancreatic, gastric, and biliary parts was done as described in the original PPPD.¹⁴ Studies included compared whether the jejunum was brought for gastrointestinal reconstruction in-front and on top of the transverse colon to do an AC duodenojejunostomy or through the right side of the transverse mesocolon behind the colon to do a RC duodenojejunostomy.

Data extraction and quality assessment

Two reviewers (M.H. and R.G.) independently extracted the following data from each study: study

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