Duodenojejunostomy versus Duodenoduodenostomy in Congenital Duodenal Obstruction: A retrospective study

Rizki Diposarosa, MD, Dede Iskandar, MD, Patricia Oktaviani, MD

Pediatric Surgery Division, Department of Surgery, Padjadjaran University - Hasan Sadikin General Hospital, Bandung, Indonesia

ABSTRACT

Introduction: Congenital duodenal obstruction (CDO) is a common cause of neonatal intestinal obstruction, most requiring surgery to restore bowel continuity. Duodenoduodenostomy (DD) is the preferred procedure, but duodenojejunostomy (DJ) may be performed when DD is not feasible due to anatomy, particularly in small or premature infants. In our centre, choice of procedure was based on intraoperative findings, tension-free anastomosis feasibility, and surgeon preference. This study compared short-term outcomes of DJ and DD in CDO.

Materials and Methods: This is a retrospective study with a cross-sectional about outcome of congenital duodenal obstruction at Hasan Sadikin Bandung General Hospital in 2019-2024. Data were collected through medical records, including gestational age, age at surgery, surgical technique, operation time, time to first feed, time to full feed, length of stay, and mortality.

Results: There were a total of 36 congenital duodenal obstruction patients. There were 4 patients (11%) who died before surgery, and 32 patients (89%) underwent surgery. All procedures were performed open surgery. Duodenojejunostomy was performed in 10 patients (31%), duodenoduodenostomy in 22 patients (69%). Time to first feed (mean) is post operative day 8 vs 9 (P = 0.3), time to full feed (mean) post operative day 27.1 vs 25.4 (p=0.8) and length of stay (mean) 27.6 days vs 34.6 days (p=0.9). Three patient of each group died post operative due to sepsis.

Conclusion: Duodenojejunostomy and duodenoduodenostomy have similar outcomes in neonates with congenital duodenal obstruction. These findings are relevant for surgeons who repair congenital duodenal obstruction with duodenojejunostomy or duodenoduodenostomy in open surgery.

KEYWORDS:
Congenital duodenal obstruction, duodenojejunostomy, duodenoduodenostomy, outcome

INTRODUCTION

Congenital duodenal obstruction (CDO) is a common cause of intestinal obstruction in the newborn period, occurring in approximately 1 per 5,000–10,000 live births and affecting males more frequently than females.[1] Associated anomalies have been reported in 45–65% of cases. Most commonly, trisomy 21 is found in almost half the cases, cardiac malformations in 25–65% of cases, and malrotation in 30% of cases.[2]

Congenital duodenal obstruction can occur due to an intrinsic or extrinsic lesion.[2] Intrinsic CDO may be caused by duodenal atresia, stenosis, diaphragm, a perforated diaphragm, or a "wind-sock" web. Extrinsic CDO may be caused by annular pancreas, malrotation, or preduodenal portal vein.1 The most common cause of duodenal obstruction is atresia. Duodenal atresias have been traditionally classified by into three types: type 1—obstructing perforate or imperforate web within continuous bowel; type 2—fibrous cord connecting the two blind ends of the duodenum with an intact mesentery; and type 3—complete bowel discontinuity and a V-shaped mesenteric defect.[3] Errors of duodenal re-canalization during the eighth to the tenth week of embryological development leads to duodenal atresia. Approximately 50% of all cases of CDO are detected antenatally on routine foetal ultrasounds when the characteristic 'double bubble' sign is noted in the upper abdomen due to dilated fluid-filled stomach and proximal duodenum.[4]

In almost all situations, a duodenoduodenostomy, joining the bowel just proximal and distal to the obstruction, is the best corrective option. It is the most direct, physiologic repair and, of the available options, has the least potential for later complications. When this procedure is difficult because of patient anatomy, particularly in some small, premature infants, duodenojejunostomy is the next best choice. A loop of proximal jejunum is chosen that will comfortably reach the proximal duodenal segment and is brought through the mesentery of the right transverse colon in a retrocolic position. Duodenojejunostomy provides postoperative results that are generally equivalent to those obtained with duodenoduodenostomy. Gastrojejunostomy, the third bypass option, suffers from the frequent late complications of marginal ulceration and blind loop syndrome, and therefore should be avoided. The study aims to evaluate the post operative outcome in patient with congenital duodenal obstruction treated with duodeno-jejunostomy compared to duodeno-duodenostomy repair.[2,5]

MATERIALS AND METHODS

This was a retrospective, cross-sectional study conducted at Dr. Hasan Sadikin General Hospital, Bandung, Indonesia, from January 2019 to July 2024. All neonates diagnosed with

This article was accepted: 22 August 2025
Corresponding Author: Dede Iskandar
Email: dedeiskandar1409@gmail.com

CDO based on clinical presentation and radiological findings were included. Patients with incomplete medical records were excluded.

The decision to perform duodenoduodenostomy (DD) or duodenojejunostomy (DJ) was made intraoperatively, based on anatomical feasibility of a tension-free anastomosis. DJ was selected when DD was not technically feasible despite maximal mobilisation, such as in cases with short distal duodenum, marked calibre discrepancy, or abnormal bowel rotation. All surgeries were performed via open laparotomy by multiple paediatric surgeons.

We divided our patients into two groups: Group 1 consisted of 10 neonates treated with DJ, and Group 2 consisted of 22 neonates treated with DD. Outcome measures compared between the two groups included demographics (sex, gestational age, birth weight, reason for surgical delay, age at surgery, comorbidities, and operative time), time to first feed, time to full feed, length of stay (LOS), postoperative complications (wound infection, wound dehiscence, anastomotic leak), and mortality. Postoperative follow-up was conducted through outpatient clinic visits and review of medical records. Short-term outcomes were defined a priori as events occurring during the index admission or within 90 days after surgery. Longer follow-up beyond 90 days was recorded descriptively when available.

The DJ and DD groups were compared using non-parametric statistical tests for continuous variables and the Chi-square or Fisher's exact test for categorical variables. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to assess associations between potential risk factors and outcomes. Data are presented as numbers with percentages or as medians with ranges, as appropriate. A p-value <0.05 was considered statistically significant.

RESULTS

There were 36 congenital duodenal obstruction patients. There were 4 patients (11%) died before surgery and 32 patients (89%) underwent surgery. From 32 patients, there were 16 boys and 17 girls (Table I). Most patients were full-term baby (53 %). We found comoborbid such as congenital heart anomaly (VSD, PDA), trisomy 21 and pneumonia . Age at surgery in DJ range from 4 – 31 days (mean: 15,1 days), in DD range from 5 – 32 days (mean: 17,7 days). Operation time in DJ range from 90 – 160 minutes (mean: 129 minutes), and in DD range from 100 – 190 minutes (mean: 150 minutes).

All procedures were performed open surgery. Duodenojejunostomy was performed in 10 patients (31%) and duodenoduodenostomy in 22 patients (69%). In DJ feeding start range from POD 7–12 (mean: 8) and in DD range from POD 6-13 (mean: 9) (Table II). In DJ group time to full feed reached in range from POD 23-32 (mean: 27.1), in DD group range from 22– 37 (mean: 25.4). Length of stay (LOS) of DJ group range from 28 – 47 days (mean:38,8) and in DD group range from 25–56 days (mean: 34,63).

We found no differences between two groups for time to first feed (p=0.3), time to full feed (p=0.8) and length of stay (p=0.9) (Table II). Of 32 patients who underwent surgery, 6 patients died with 3 patients per group.

DISCUSSION

Comorbidities in this study found there were Down Syndrome, congenital heart anomaly and pneumonia. Down Syndrome found more frequent especially in DJ group. This result had similar result with study by Zani et al, they recorded the most common comorbid was Down Syndrome.[6] In our cohort, four patients died before surgery due to severe comorbidities, and six patients died postoperatively—three in each group. All postoperative deaths were attributable to sepsis, often secondary to pneumonia or wound infection.[6]

The standard bypass procedure for CDO has long been a retrocolic DJ. DD is reported to be the most physiologic operative procedure, with a lower complication rate and higher survival. Another technique described is a diamond-shaped DD. This method was compared with conventional DD and was found superior to side-toside DJ or end-to-end DD. The advantage of this method lay in earlier feeding and discharge of the patients from the hospital. DJ is considered an easy method perform with DD, on the other hand, is considered a more physiologic bypass procedure for intrinsic duodenal obstruction. However, it is reported to require considerably more extensive and difficult disection, with reflection of the right colon to mobilize a greater length of duodenum by Kocher's maneuver. The experienced surgeon performing a DD does not consider that type of anastomosis technically more difficult, as it needs only minimal dissection.[7-9] Study by Weber et al, showed similar result where DD's outcome was better and allows significantly earlier oral feeding and shorter hospital stay when compared to DJ. Safety and efficacy of DD also reported by previous series.[10-12] In contrast, our study found no statistically significant differences between DJ and DD in terms of time to first feed, time to full feed, and length of stay, although DD showed numerically shorter feeding times and hospital stay. DJ, however, had a shorter mean operating time than DD.

Potential long-term complications of DJ, such as blind loop syndrome or bacterial overgrowth, may not be evident in the short term. In our study, the median follow-up was only 3 months (range 1–12 months), which is insufficient to reliably detect these late events. Ideally, a minimum of 12 months' follow-up is required to assess these risks. No anastomotic leaks or recurrent obstructions were observed during the follow-up period.

Duodenojejunostomy remains the next best choice when DD is not feasible due to anatomical constraints—such as short distal duodenum, marked calibre discrepancy, or unusual rotation—despite maximal mobilisation. A loop of proximal jejunum is chosen that will comfortably reach the proximal duodenal segment and brought through the mesentery of the right transverse colon in a retrocolic position. Study by Zani et al, that compared DD and DJ reported had similar rates of postoperative outcome. This study also reported the two groups that there were no differences for time to first feed, time to full feed and length of stay.[6]

Table I: Demographics of neonates treated with duodeno-jejunostomy (DJ) or duodeno-duodenostomy (DD) for congenital duodenal obstruction

Demographic variables	DJ	DD
Age (days, mean)	15,2	16,22
Sex (n)		
Boy	5	13
Girl	5	9
Gestational age		
Preterm	6	9
Full term	4	13
Comorbid (n)		
Congenital Heart Anomaly	4	4
Pneumonia	5	4
Trisomy 21	5	1
Age at surgery (days, mean)	15,1	17,1
Operation Time (minute, mean)	129	150

Table II: Outcome of neonates treated with duodeno-jejunostomy (DJ) or duodeno-duodenostomy (DD) for congenital duodenal obstruction

Variables	DJ	DD	p-value
Time to First feed (days)	8 (7-12)	9 (6-13)	0,300
Time to Full feed (days)	27,1 (23-32)	25,4 (22-37)	0,800
Length of stay (days)	38.8 (28-47)	34,63 (25-56)	0,900
Mortality (%)	30%	13,6%	

This study has several limitations. It is retrospective in nature with non-randomised allocation of surgical technique. The procedures were performed by multiple pediatric surgeons rather than a single operator, introducing potential operator-dependent variability. The sample size was relatively small, and follow-up duration was short and heterogeneous, limiting the ability to detect rare or late complications, particularly after DJ. Future prospective studies with longer follow-up and standardised operative technique are warranted to clarify any long-term differences between DD and DJ.

CONCLUSIONS

This study has shown that duodeno-jejunostomy repair for neonates with congenital duodenal obstruction provides postoperative results that are equivalent with duodeno-duodenostomy. These findings are relevant for surgeons who perform duodeno-jejunostomy and this technique has equal clinical outcomes and in some cases could be easier to perform.

CONFLICT OF INTEREST

All the authors declare that there are no conflicts of interest.

ACKNOWLEDGMENT

The corresponding author would like to express his profound gratitude to Rizki Diposarosa, as Head of Division of Pediatric Surgery department, and Patricia Oktaviani, as Neonatal Surgery Subdivision of Pediatric Surgery department for their contributions to the completion of my project titled.

FUNDING

This study received no external funding.

REFERENCES

1. Puri, P. Duodenal obstruction in Newborn Surgery (4th ed.). CRC Press. 2018: 571-87.
2. Holcomb GW et al. 'Duodenal and Intestinal Atresia and Stenosis', in Holcomb and Ashcraft's pediatric surgery 7th Edition. Philadelphia, PA: Elsevier. 2020; 30: 489-506.
3. Deguchi K, Tazuke Y, Matsuura R, Nomura M, Yamanaka H, Soh H, Yoneda A. Factors Associated With Adverse Outcomes Following Duodenal Atresia Surgery in Neonates: A Retrospective Study. Cureus. 2022
4. Applebaum H, Sydorak R, Duodenal atresia and stenosis—annular pancreas. In: Coran A, Adzick NS, Krummel T, Laberge JM, Shamberger R, Caldamone A (eds) Pediatric surgery, 7th edn. Elsevier, Philadelphia, 2013: 1051-7.
5. Gray SW. Embryology for surgeons. The embryological basis for the treatment of congenital defects. 1972: 229-63.
6. Zani A, Yeh JP, King SK. Duodeno-duodenostomy or duodeno-jejunostomy for duodenal atresia: is one repair better than the other? Pediatr Surg Int. 2016.
7. Sigmon DF, Eovaldi BJ and Cohen HL.Duodenal atresia and stenosis. 2017
8. Chung PH, Wong CW, Ip DK, Tam PK, Wong KK. Is laparoscopic surgery better than open surgery for the repair of congenital duodenal obstruction? A review of the current evidences. Journal of Pediatric Surgery. 2017; 52(3): 498-503.
9. Estiarla, Agustriani N. Prognostic factors for mortality in patients with congenital duodenal obstruction at DR. Moewardi Hospital Surakarta. Precision Medical Sciences. 2021; 10: 26-32.
10. Kimura K, Tsugawa C, Ogawa K, Matsumoto Y, Yamamoto T, Asada S. Diamond-shaped anastomosis for congenital duodenal obstruction. Archives of Surgery. 1977; 112(10): 1262-3.
11. Weber TR, Lewis JE, Mooney D, Connors R. Duodenal atresia: a comparison of techniques of repair. Journal of pediatric surgery. 1986; 21(12): 1133-6.
12. Waever E, Nielsen OH, Arnbjörnsson E, Kullendorff CM. Operative management of duodenal atresia. Pediatric surgery international. 1995; 10(5): 322-4.