

Choledochoduodenostomy is a safe alternative to choledochojejunostomy for biliary reconstruction in liver transplantation



Ronald Truong, Hunter B. Moore, Angela Sauaia, Pedro Carani, Jessie Jiang, Igal Kam, Thomas Pshak, Megan Adams, Kendra Conzen, Michael A. Zimmerman, James Pomposelli, Elizabeth Pomfret, Trevor L. Nydam.
University of Colorado School of Medicine and Division of Transplant Surgery



Background

Standard biliary anastomosis in liver transplantation is donor bile duct to recipient bile duct. This duct-to-duct (D2D) anastomosis may be contraindicated or not possible. Common complications include leaks, bleeding, strictures, or need for subsequent procedures. When standard D2D anastomosis is not possible, Roux-en-Y choledochojejunostomy (CDJ) is standard practice. This is not always an option with previous abdominal operations or dense adhesions. Choledochoduodenostomy (CDD) is an alternative to Roux-en-Y reconstruction. Traditional concerns with CDD include anastomosis breakdown and infection. Our center (Bennett *et al*, 2009) demonstrated comparable outcomes using CDD to CDJ anastomosis. The objective of this study is to update our database with a larger cohort and evaluate longer follow-up.

Hypothesis: Patients who receive CDD anastomosis continue to have comparable outcomes and rates of complication to duct-to-duct and choledochojejunostomy.

Methods

- Deceased donor transplants from Sep 2011 to Mar 2020 at the University of Colorado Anschutz Medical Campus were included in the study.
- Multiple logistic regression was used to assess the independent effect of anastomosis type on outcomes.

Disclosure: The authors have no conflicts of interest to disclose.

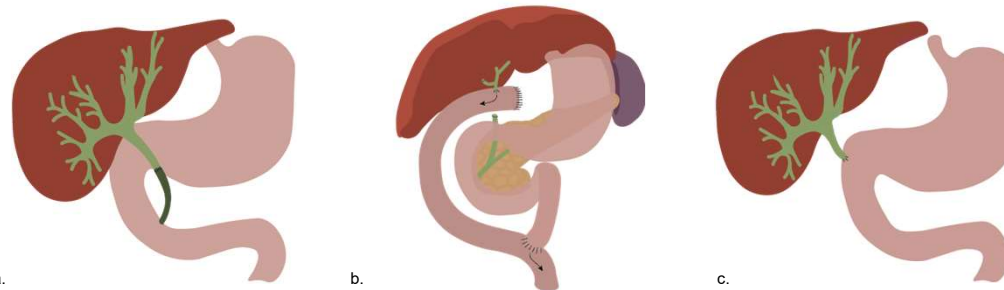


Figure 1. Various biliary reconstruction options in orthotopic liver transplantation.
a. Duct-to-duct anastomosis. b. Roux-en-Y choledochojejunostomy anastomosis. c. Choledochoduodenostomy anastomosis.

Results

- 1086 deceased donor transplants were included in the study.
- After adjustment for confounders, patients who received CDD were 56% less likely to have ERCP complications when compared to D2D. No differences in ERCP complications were found between CDJ and D2D.
- Odds of cholangitis were 10x higher in patients who received CDJ compared to D2D, whereas patients who received CDD were 3x more likely.
- No significant association were found when comparing bleeding, bile leaks, or strictures when comparing CDJ/CDD to D2D anastomosis.
- CDD was associated with 70% lower odds of cholangitis compared to CDJ.
- No significant difference were found between CDD to CDJ regarding ERCP complications, bleeding, bile leak, and anastomotic strictures.

	CDJ vs D2D		CDD vs D2D		CDD vs CDJ				
	Estimate	95% Confidence	Estimate	95% Confidence	Estimate	95% Confidence			
ERCP Complications	0.1665	0.37	1.95	-0.4988	0.27	0.72	0.514	0.203	1.304
Bleeding	1.823	0.223	14.932	2.118	0.798	5.62	1.162	0.133	10.12
Bile Leak	1.077	0.241	4.814	1.762	0.936	3.317	1.636	0.359	7.455
Anastomotic Stricture	0.133	0.018	0.978	0.263	0.135	0.513	1.975	0.246	15.828
Cholangitis	10.168	0.469	2.122	3.038	0.688	1.458	0.299	0.128	0.697

	D2D N=812	CDJ N=49	CDD N=225	p-value
Male	552 (68.0)	31 (63.3)	155 (68.9)	0.7463
Age	53.7±10.0	44.6±14.1	50.1±11.3	<0.0001
MELD Score	23.4±7.6	24.9±7.9	24.8±8.7	0.04
Cold Ischemia Time	411.1±128.4	316.4±160.4	375.1±149.5	<0.0001
Warm Ischemia Time	37.0±14.4	34.2±10.5	35.3±9.1	0.0753
Cholangitis	49 (6.0)	13 (26.5)	31 (13.8)	<0.0001
ERCP	241 (29.7)	11 (22.4)	66 (29.3)	0.5579
ERCP Duration	29.8±11.6	49.4±22.1	29.7±14.1	0.2651
Return to OR	42 (5.2)	2 (4.1)	21 (9.3)	0.0564
Bile Leak	31 (3.8)	3 (6.1)	17 (7.6)	0.0569
Stenosis	179 (22.0)	11 (22.4)	46 (20.4)	0.8691

Table 1. Patient demographics, transplant history, and complications between D2D, CDJ, and CDD anastomosis.

Table 2. Odd ratio estimates comparison between CDJ, CDD, and D2D.

Conclusion

- Important to have options in biliary reconstruction due to technical challenges and potential complications.
- Dogma is CDD has more complications—our findings with long term follow-up and a large cohort does not support this.

Conclusion: CDD continues to be a safe alternative to CDJ biliary reconstruction in liver transplantation when traditional D2D anastomosis cannot be performed.

Limitations: One limitation was the size discrepancy between CDJ and CDD cohorts. This was primarily due to institution and surgeon preference to perform one anastomosis over another.

Future Direction

- Explore outcomes and complications in living donor liver transplant recipients.
- Assess anastomosis type effects on biliary endoscopic access.

Acknowledgements: Thank you to the University of Colorado transplant surgeons who performed the liver transplants included in this study. A special thank you to Margaret Nguyen for her artistic contributions.

References

Campsen J, Zimmerman MA, Narkewicz MR, Sokol RJ, Mandell MS, Kam I, Dovel D, Karrer FM. Choledochoduodenostomy in pediatric liver transplantation. *Pediatr Transplant*. 2011 May;15(3):237-9. doi: 10.1111/j.1399-3046.2010.01338.x. Epub 2011 Jan 9. PMID: 21214697.

Jonica ER, Han S, Burton JR, Jennica, Pomposelli JJ, Shah RJ. Choledochoduodenostomy is associated with fewer post-transplant biliary complications compared to roux-en-y in primary sclerosing cholangitis patients. *Clin Transplant*. 2022 Jan 19:e14597. doi: 10.1111/ctr.14597. Epub ahead of print. PMID: 35043996.