

# Preferred anastomosis following choledochal cyst excision: A cross-sectional survey among pediatric surgeons



Jayakumar P<sup>1</sup>, Selvakumar M<sup>2</sup>, Meenakshi Sundari S<sup>3</sup>, Rock Britto D<sup>4</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, Department of Paediatric Surgery, Government Mohan Kumaramangalam Medical College Hospital, Salem, <sup>3</sup>Professor, Department of Paediatric Surgery, Madurai Medical College, Madurai, <sup>4</sup>Professor, Department of Community Medicine, Dhanalakshmi Srinivasan Medical College, Perambalur, Tamil Nadu, India

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## ABSTRACT

**Background:** Choledochal cyst (CC) is a cystic dilatation of various parts of the biliary tract that requires surgical intervention. Excision of the CC with biliary enteric anastomosis is the standard line of treatment. There are two types of biliary enteric anastomosis, hepaticojejunostomy (HJ), and hepaticoduodenostomy (HD). However, there is no consensus among surgeons regarding the preferred anastomosis technique. **Aims and Objectives:** In this study, we conducted a survey among pediatric surgeons in India to determine their preferred anastomosis technique following CC excision. **Materials and Methods:** A cross-sectional survey was conducted among pediatric surgeons in India by circulating a Google™ form containing information about their demographics and their preferred choice of anastomosis in the Indian Association for Pediatric Surgeons Official Telegram™ group called "Pediatric Surgery Academics." The survey was done in June and July 2019. **Results:** A total of 53 (9.96%) pediatric surgeons responded to the survey. Among them, 47 (88.7%) were male and 6 (11.3%) were female pediatric surgeons. The mean age of the surgeons was 46.21, and the mean number of cases operated by pediatric surgeons was 28.49. Experience-wise, 8 (15.1%) had <5 years of experience, 14 (26.4%) had 5–10 years, 17 (32.1%) had 11–20 years, and 14 (26.4%) had more than 20 years of experience in pediatric surgery. In their practice, 32 (60.4%) had done both HJ and HD, 18 (34%) had done only HJ, and HD was done by 3 (5.7%) pediatric surgeons only. Pediatric surgeon's preference of anastomosis was as follows, 27 (50.9%) inclined to HJ, 18 (34%) inclined to HD, and the remaining 8 (15.1%) inclined to both HJ and HD. **Conclusion:** This survey revealed that among pediatric surgeons in India, HJ is the preferred anastomosis technique following CC excision. However, further studies are required to determine the long-term outcomes of these techniques.

**Key words:** Choledochal cyst; Hepaticojejunostomy; Hepaticoduodenostomy; Pediatric surgery; Biliary enteric anastomosis

## INTRODUCTION

Choledochal cyst (CC) is cystic dilatation of various parts of biliary tract. The incidence of CC ranges from 1 in 13,000 to 1 in 2,000,000 live births in different populations which can be presents as diagnosed antenatally at times, with painless jaundice in new born period, in older children presents with abdominal pain, jaundice,

pancreatitis, and cholangitis. Malignant transformation also reported. Excision of the CC with biliary enteric anastomosis is the established line of treatment. Biliary enteric anastomosis includes hepaticojejunostomy (HJ) and hepaticoduodenostomy (HD). Among these two, surgeons differ in their preference. Hence, we did a survey among pediatric surgeons in India about their preferred anastomosis following CC excision.<sup>1</sup>

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### Address for Correspondence:

Dr. Jayakumar P, Assistant Professor, Department of Paediatric Surgery, Government Mohan Kumaramangalam Medical College Hospital, Salem, Tamil Nadu, India. **Mobile:** +91-9659798981. **E-mail:** drjayakumar1999@gmail.com

### Aims and objectives

In this study, we conducted a survey among pediatric surgeons in India to determine their preferred anastomosis technique following CC excision.

### MATERIALS AND METHODS

A cross-sectional survey was conducted among pediatric surgeons in India by circulating a Google Form™ containing information about their demographics and their preferred choice of anastomosis in the Indian Association for Pediatric Surgeons Official Telegram™ group called “Pediatric Surgery Academics.” The survey was done on month of June and July 2019. This is a cross-sectional study done in a professional group as a survey. Member pediatric surgeons who are willing to participate only answered in the online survey who are not willing are excluded by their own by not filling the Google Form™. Hence, Ethical Committee Clearance was not obtained. Descriptive and cross-table analysis was done.  $P \leq 0.05$  considered significant.

### RESULTS

The result is describing a survey conducted on a group of pediatric surgeons. The survey was completed by 53 surgeons, which accounts for approximately 10% of the total members of the pediatric surgery group, which had 528 members.

Out of the 53 respondents, 47 were male and 6 were female pediatric surgeons. The mean age of the surgeons who responded to the survey was 46.21, with the youngest pediatric surgeon being 32 years old and the oldest being 81 years old.

The respondents were asked about the number of cases they have operated on. The mean number of cases operated by pediatric surgeons was 28.49, with the minimum number of cases operated being 1 and the maximum being 250.

In terms of experience, 8 (15.1%) of the respondents had <5 years of experience in pediatric surgery, 14 (26.4%) had 5–10 years of experience, 17 (32.1%) had 11–20 years of experience, and 14 (26.4%) had more than 20 years of experience in pediatric surgery (Figure 1).

Out of the total 53 respondents, 32 (60.4%) had experience in performing both HJ and HD procedures, 18 (34%) had only performed the HJ procedure, and 3 (5.7%) had only performed the HD procedure (Figure 2).

Pediatric surgeon’s preference of anastomosis was as follows, 27 (50.9%) inclined to HJ, 18 (34%) inclined to HD, and the remaining 8 (15.1%) inclined to both HJ and HD (Figure 3).

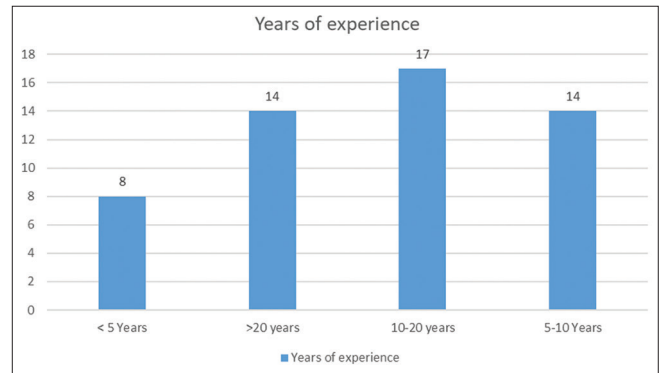


Figure 1: Years of experience of the pediatric surgeons

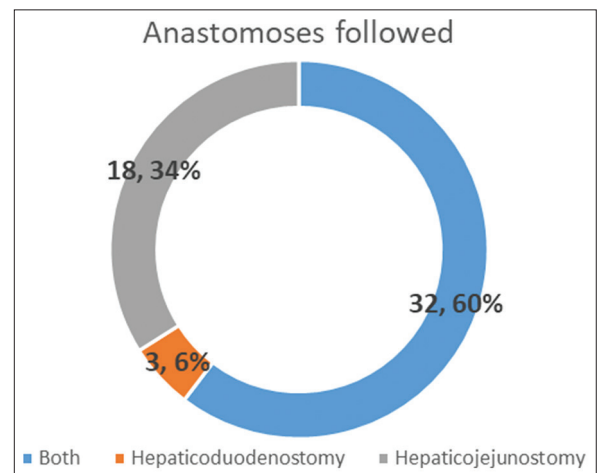


Figure 2: Anastomosis followed by surgeons in their practice

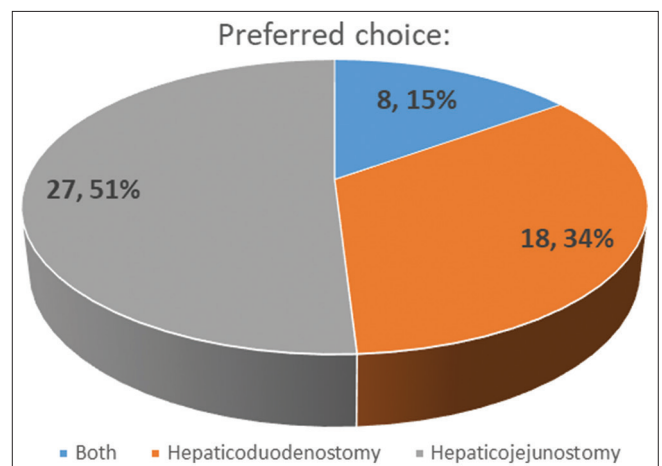


Figure 3: Preferred anastomosis by the surgeons

On cross-table analysis, no relationship was noted with preferred choice of anastomosis versus gender, years of experience, and number of cases operated. No relationship was established with anastomosis followed versus years of experience.

On cross-table analysis, people who preferred HJ over HD done HJ primarily ( $P=0.000$ ) (Figure 4).

Anastomosis followed versus preferred choice-cross-tabulation			Preferred choice			Total
			Both	Hepaticoduodenostomy	Hepaticojejunostomy	
Anastomosis followed	Both	Count % within anastomosis followed	7 21.9%	16 50.0%	9 28.1%	32 100.0%
	Hepaticoduodenostomy	Count % within anastomosis followed	1 33.3%	2 66.7%	0 0.0%	3 100.0%
	Hepaticojejunostomy	Count % within anastomosis followed	0 0.0%	0 0.0%	18 100.0%	18 100.0%
Total		Count % within anastomosis followed	8 15.1%	18 34.0%	27 50.9%	53 100.0%

**Figure 4:** Cross-table analysis of anastomosis preferred versus anastomosis followed

## DISCUSSION

Our study aimed to investigate the preferred choice of biliary enteric anastomosis among pediatric surgeons in India following CC excision. The study found that out of the 53 respondents, 51% preferred HJ, 34% preferred HD, and 15% preferred both HJ and HD.

The findings of this study are consistent with the existing literature, which shows that there is no consensus among surgeons regarding the preferred method of anastomosis after CC excision. Some surgeons prefer HJ due to the lower risk of anastomotic stricture and bile reflux, while others prefer HD because it is technically easier and faster to perform, reduced hospital stay and less chance for adhesive obstruction.<sup>1-4</sup>

Study shows that HJ had longer length of the anastomosis, which allows for better bile drainage and reduces the risk of anastomotic strictures.<sup>5</sup>

The results also revealed that the majority of the respondents (60.4%) had experience in both HJ and HD, which indicates that pediatric surgeons in India are proficient in performing both procedures. This finding is in line with a previous study, which found that most pediatric surgeons are trained in both procedures during their residency and fellowship training.<sup>6</sup>

The slight preference for HJ over HD is consistent with the previous studies, which reported that HJ is the preferred anastomosis in most cases due to its advantages such as better long-term outcomes, lower rates of anastomotic strictures, and easier access for endoscopic interventions in case of complications.<sup>7,8</sup>

HD is associated with higher rates of anastomotic strictures and a higher risk of bile reflux gastritis due to the proximity of the anastomosis to the pylorus.<sup>9,10</sup>

However, HD may be preferred in some cases where the cyst is located close to the duodenum, and the diameter of the common bile duct is small, making HJ technically difficult.<sup>11</sup>

People who preferred HJ were doing HJ as their primary anastomosis. One possible explanation for this result is that the surgeon who prefer HJ may have been more informed and educated about the advantages of this procedure compared to HD. Studies have shown that HJ may have lower rates of complications and better long-term outcomes including bile flow, and nutritional status than HD in certain cases, such as in patients with high bile duct injuries or those who have undergone previous biliary surgeries. The previous researches also suggested HJ as the feasible safe option in laparoscopically too in children.<sup>12-14</sup>

While many prefer HJ as the option for reconstruction, a retrospective study from our institution shows tendency toward HD due to reduced operative time reduced hospital stay and influence of a senior surgeon as role model by junior surgeons.<sup>15</sup>

The present study findings are important as they provide insights into the current practice patterns of pediatric surgeons in India.

### Limitation of the study

The limitations of this study include the small sample size and the fact that the survey was conducted only among pediatric surgeons in India. The Ethical Committee

Clearance was not obtained. Further studies with larger sample sizes and a more diverse population of surgeons are needed to validate these findings.

## CONCLUSION

This study provides insights into the preferred choice of biliary enteric anastomosis among pediatric surgeons in India following CC excision. While HJ was the most commonly preferred method, there is no consensus among surgeons regarding the preferred anastomosis technique. Surgeons should consider various factors, including patient age, comorbidities, and surgical expertise, when selecting the optimal anastomosis method.

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## REFERENCES

- Sathya S, Wayne M, Yanchar N, Chandranesan A, Skarsgard ED. Biliary reconstruction following excision of choledochal cyst: Hepaticojejunostomy vs hepaticoduodenostomy. *J Pediatr Surg.* 2010;45(1):153-156. <https://doi.org/10.1016/j.jpedsurg.2009.10.026>
- Zhou H, Zhang W, Hu J, Jin X, Wang W, Shen Y, et al. Hepaticoduodenostomy or hepaticojejunostomy for biliary reconstruction during choledochal cyst excision in children: A systematic review and meta-analysis. *Pediatr Surg Int.* 2019;35(5):551-560. <https://doi.org/10.1007/s00383-019-04467-9>
- Khan MR, Tariq M, Mansoor H, Zafar H and Saleem M. Hepaticoduodenostomy versus hepaticojejunostomy after choledochal cyst excision: A comparison of outcomes in a tertiary care hospital. *J Pak Med Assoc.* 2016;66(2):136-139.
- Sathyanarayana SA, Raju GS and Krishna KM. Hepaticoduodenostomy versus hepaticojejunostomy after excision of choledochal cyst: A randomized study. *J Pediatr Surg.* 2014;49(4):584-587.
- de Vries JS, de Vries S, Aronson DC, Bosman DK, Rauws EA, Bosma A, et al. Choledochal cysts: Age of presentation, symptoms, and late complications related to Todani's classification. *J Pediatr Surg.* 2002;37(11):1568-1573. <https://doi.org/10.1053/jpsu.2002.36186>
- Ohtsuka Y, Yasunaga H, Chandra G, Muto T, Horiguchi H, Matsuda S, et al. Surgical outcomes of hepaticojejunostomy and hepaticoduodenostomy for the treatment of choledochal cyst in children. *J Pediatr Surg.* 2013;48(11):2303-2308. <https://doi.org/10.1016/j.jpedsurg.2013.05.016>
- Todani T, Watanabe Y, Narusue M, Tabuchi K and Okajima K. Congenital bile duct cysts: Classification, operative procedures, and review of thirty-seven cases including cancer arising from choledochal cyst. *Am J Surg.* 1977;134(2):263-269. [https://doi.org/10.1016/0002-9610\(77\)90359-2](https://doi.org/10.1016/0002-9610(77)90359-2)
- Chai X, Peng C, Zhang Y, Li Y, Li H, Li J, et al. Hepaticojejunostomy or hepaticoduodenostomy for biliary reconstruction during pancreaticoduodenectomy. *World J Gastroenterol.* 2013;19(48):9356-9363.
- Sahoo MR and Nayak S. Hepaticojejunostomy vs hepaticoduodenostomy: A retrospective analysis of surgical outcomes. *World J Gastrointest Surg.* 2018;10(2):21-29.
- Todani T, Watanabe Y and Narusue M. Recent advances in the management of congenital bile duct cysts. *Pediatr Surg Int.* 2003;19(5):320-325.
- Wu Y, Zhang L, Wang C, Li W, Ye X, Zhu Q, et al. Different biliary reconstruction methods for choledochal cysts in children: A systematic review and meta-analysis. *Pediatr Surg Int.* 2016;32(10):947-957.
- Ratti F, Cipriani F, Ariotti R, Gagliardi S, Catena M, Paganelli M, et al. Hepaticojejunostomy or hepaticoduodenostomy for reconstruction after pancreaticoduodenectomy: Is there a difference in postoperative biliary complications? A systematic review and meta-analysis. *Ann Surg.* 2018;267(2):229-238. <https://doi.org/10.1097/SLA.0000000000002127>
- Tian Y, Zhang Z, Zhang J, Cai Y, Cai M, Yang Y, et al. Hepaticojejunostomy versus hepaticoduodenostomy after resection of hilar bile duct cancer: A systematic review and meta-analysis. *BMC Surg.* 2020;20(1):69. <https://doi.org/10.1186/s12893-020-00750-0>
- Saito T, Kawahara H, Urahashi T, Ihara Y, Yamamoto Y, Shirasaki K, et al. Hepaticojejunostomy for children with choledochal cyst: Technical aspects and long-term outcomes. *Pediatr Surg Int.* 2014;30(9):925-930.
- Ayyanar R, Narasimhan VM, Mosessundaram HR, Nallan K, Chandrasekaran A, Rajagopal S, et al. Choledochal cyst excision and preferred anastomosis for biliary reconstruction in our institution: A retrospective study. *J Surg.* 2021;12(2):29-31.

### Authors' Contributions:

**JP**- Definition of intellectual content, Literature survey, Concept, design, clinical protocol, data collection, manuscript preparation, editing, Prepared first draft of manuscript, implementation of study protocol, submission of article, and manuscript revision; **SM**- Concept, design, clinical protocol, manuscript preparation, editing, and manuscript revision; **MSS**- Concept, design, clinical protocol, manuscript preparation, editing, and manuscript revision; **RBD**- Design, manuscript preparation, editing, data analysis and manuscript revision.

### Work attributed to:

Government Rajaji Hospital, Department of Paediatric Surgery, Madurai Medical College, Madurai, Tamil Nadu, India.

### Orcid ID:

Jayakumar P - <https://orcid.org/0000-0002-2321-2562>  
 Selvakumar M - <https://orcid.org/0009-0005-9286-0896>  
 Meenakshi Sundari S - <https://orcid.org/0009-0001-2582-2217>  
 Rock Britto D - <https://orcid.org/0000-0002-6825-9540>

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