

ผลการผ่าตัดโรคน้ำดีโป่งพองในเด็กด้วยการผ่าตัดแบบผ่านกล้องและการผ่าตัดแบบเปิด

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Laparoscopic Versus Open Surgery in Children with Choledochal Cysts

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หลักการและวัตถุประสงค์: โรคน้ำดีโป่งพองเป็นความผิดปกติที่พบได้ตั้งแต่แรกเกิด ซึ่งสามารถผ่าตัดรักษาได้ทั้งแบบผ่านกล้องและแบบเปิด โดยมีวัตถุประสงค์เพื่อเปรียบเทียบผลของการรักษาด้วยการผ่าตัดทั้งสองแบบในโรงพยาบาลศรีนครินทร์

วิธีการศึกษา: เป็นการศึกษาจากเวชระเบียนผู้ป่วยโรคน้ำดีโป่งพองที่อายุน้อยกว่า 18 ปี ที่เข้ารับการรักษาระหว่างเดือนมกราคม พ.ศ. 2557 ถึงเดือนพฤศจิกายน พ.ศ. 2562 โดยเก็บข้อมูลต่าง ๆ ของการผ่าตัดเพื่อเปรียบเทียบระหว่าง 2 กลุ่ม

ผลการศึกษา: ผู้ป่วยทั้งหมด 29 ราย มีผู้ป่วย 25 รายได้รับการผ่าตัดแบบเปิดและอีก 4 รายได้รับการผ่าตัดผ่านกล้อง พบว่าปัจจัยที่พบความแตกต่างทางสถิติ คือระยะเวลาการผ่าตัด โดยการผ่าตัดผ่านกล้องใช้เวลา 663.8 ± 67.5 นาที ส่วนการผ่าตัดแบบเปิดใช้เวลา 326.4 ± 138.5 นาที ($p < 0.001$) และขนาดของถุงน้ำ โดยกลุ่มที่ผ่าตัดผ่านกล้องมีขนาด 1.5 ซม. ซึ่งเล็กกว่าขนาดของกลุ่มที่ผ่าตัดแบบเปิดคือ 4.5 ซม. ($p = 0.005$) ในขณะที่ปัจจัยอื่น ๆ ที่ศึกษาไม่มีความแตกต่างกันในผู้ป่วยทั้งสองกลุ่ม

สรุป: การผ่าตัดผ่านกล้องเพื่อรักษาโรคน้ำดีโป่งพองในเด็กเป็นหัตถการที่สามารถทำได้ด้วยความปลอดภัย โดยไม่มีความแตกต่างของผลลัพธ์ในการรักษา รวมทั้งภาวะแทรกซ้อนเมื่อเปรียบเทียบกับวิธีการผ่าตัดแบบเปิด

คำสำคัญ: ถุงน้ำดีโป่งพอง, การผ่าตัดผ่านกล้องในเด็ก, ประสบการณ์ต้น

Background and Objective: Choledochal cyst is an abnormal cystic dilatation of the biliary system. Many literature showed the laparoscopic surgery is a safe procedure when compared with open approach. The objective of this study was to compare the clinical safety of laparoscopic surgery with conventional open surgery in our hospital.

Methods: A retrospective study was conducted on all patients younger than 18 years who presented with a choledochal cyst in Srinagarind hospital from January 2014 to November 2019. The data were collected from medical records. The clinical safety defined as the operative time, intraoperative blood transfusion, blood loss, postoperative complication, time of first food intake and length of hospital stay. Data were compared between the 2 groups.

Results: A total of 29 patients were reviewed. 25 patients underwent open surgery, whereas 4 patients underwent laparoscopic reconstruction. Operative time and the cystic size had significant difference. The operative time in Laparoscopic group was 663.8 ± 67.5 minutes and open group was 326.4 ± 138.5 minutes ($p < 0.001$). The cyst size in laparoscopic group was 1.5 cm. and in open surgery group was 4.5 cm. ($p = 0.005$). There were no significant difference among other factors of both groups.

Conclusions: Our initial experience indicates that the laparoscopic approach is safe and having no difference in the patient outcomes, including the complications when compared with the open operation.

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Keyword: choledochal cyst, Laparoscopic surgery in children, Early experience

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Introduction

Choledochal cyst is a congenital anomaly which is an abnormal cystic dilatation of the biliary system. It is relatively rare in western but more common in asia¹. The etiology of the choledochal cyst remains unknown². The patients can present at any age, but most are initially seen before the first decade of life³. The classical triad of the presentation are abdominal pain, right upper quadrant mass and recurrent obstructive jaundice. If the patient does not receive treatment, the choledochal cysts can develop cholangiocarcinoma⁴. The treatment of choice is a total cyst excision, following by Roux-en-Y hepaticoenterostomy reconstruction. Nowadays the laparoscopic excision for the choledochal cysts has increasingly performed. Its potential advantages include less postoperative morbidity, a shorter recovery time, lower blood loss and improved cosmetic when compared with open approach⁵. In addition, there are no differences in the early and late complication⁶. The objective of this study is to compare the clinical safety of laparoscopic surgery with conventional open surgery in our hospital.

Materials and Methods

A retrospective study was conducted on all patients younger than 18 years who presented with a choledochal cyst in Srinagarind hospital from January 2014 to November 2019. After approval from the institutional review board, the data were collected from medical records, including the demographic data, clinical presentations, operative findings, operative procedures, post-operative data and pathological reports. The five-type Todani's classification was referred to classify type of the choledochal cyst. Intraoperative cholangiography was performed routinely in all cases before cyst dissection.

The surgical procedures are total cyst excision and Roux-en-Y hepaticoenterostomy. The conventional open surgery followed by standard procedure. Data were compared between the 2 groups (open versus laparoscopic surgery). The clinical safety defined as the operative time, intraoperative blood transfusion, blood loss, postoperative

complication, time of first food intake and length of hospital stay. Data were analyzed by the STATA 10.1, using count, percentage, mean, standard deviation, median, interquartile range, chi-square, Fisher exact, t-test and Mann Whitney U test. P values less than 0.05 indicated statistical significance.

Laparoscopic surgery

The laparoscopic approach was performed with five 5-mm port technique, 1 port was just below umbilicus, 2 ports were in right upper abdomen and 2 ports were in the left upper abdomen (Fig.1 and 2). A 30° angle telescope was used. For exposure of the liver hilum, the retraction suture of 2-0 vicryl was placed inferiorly to the falciform ligament through the abdominal wall below the xyphoid process and then tie it extracorporeally (Fig.3). The 45-cm Roux limb was created extracorporeally through an extended umbilical incision, and an end-to-side hepaticojejunostomy was performed intracorporeally with an interrupted using absorbable 4-0 polyglactin sutures (Fig.4). Roux limb was placed in retro-colic manner via colonic mesentery. Jackson-Pratt drain was inserted through one of the port site wound and its tip was placed left at subhepatic space. The operative time, size of the cyst, blood loss and intraoperative blood transfusion were recorded.

Postoperatively, when the patient had passage of flatus, clear gastric content from nasogastric tube and presented with bowel sounds, they would then start oral intakes and step diet as usual. The date and time to first food intake, postoperative complications and pathological reports were collected.

Results

A total of 29 patients' medical records were reviewed and data were collected during the study period. In all, 58.6% of the patients were females, in which the proportion of females (n=17) to males (n=12) was 1.4 : 1. Twenty-five patients underwent open surgery, whereas 4 patients underwent laparoscopic reconstruction. Most of the patients (n=24, 82.7%) had type I and five patients (17.2%) had type IV. There was no difference in the mean age at the time of surgery

between the 2 groups. The demographic data was reported and clinical presentations were demonstrated in Table 1 and 2. The Classic triad was found in

89.7 %. The follow-up time was 5 months after the surgery.

The operative time and the cystic size (the greater diameter of cyst) had significant difference. The laparoscopic surgery took doubled time more than conventional open surgery. The operative time in Laparoscopic group was 663.8 ± 67.5 minutes and open group was 326.4 ± 138.5 minute ($p < 0.001$). The median of cyst size in laparoscopic group was 1.5 cm. and in open surgery group was 4.5 cm. ($p = 0.005$). There were no significant difference among age, volume of blood loss, intraoperative blood transfusion, time to first food intake and length of stay in both groups. The variety of hepaticoenterostomy and complications are demonstrated in Table

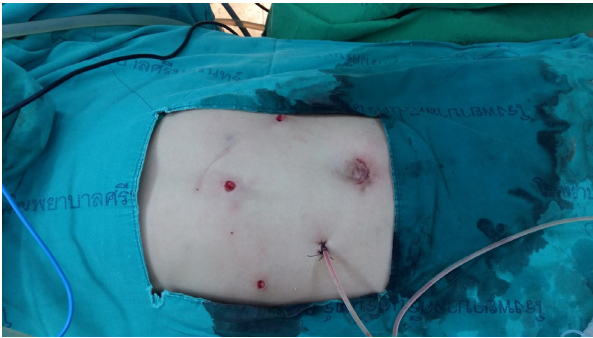


Figure 1 The ports position of laparoscopic surgery. Jackson-Pratt drain was placed left through one of port site.



Figure 2 Position of the patient and surgeons' arrangement

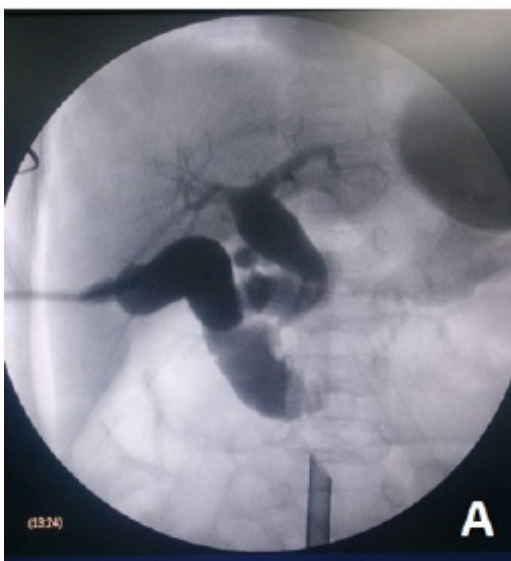


Figure 3 A. Intraoperative cholangiography of 1.6-year-old boy with type 1 choledochal cyst; B. the contrast study was injected extracorporeally into gallbladder and the liver hilum was clearly defined after performing retraction suture between falciform ligament and abdominal wall.

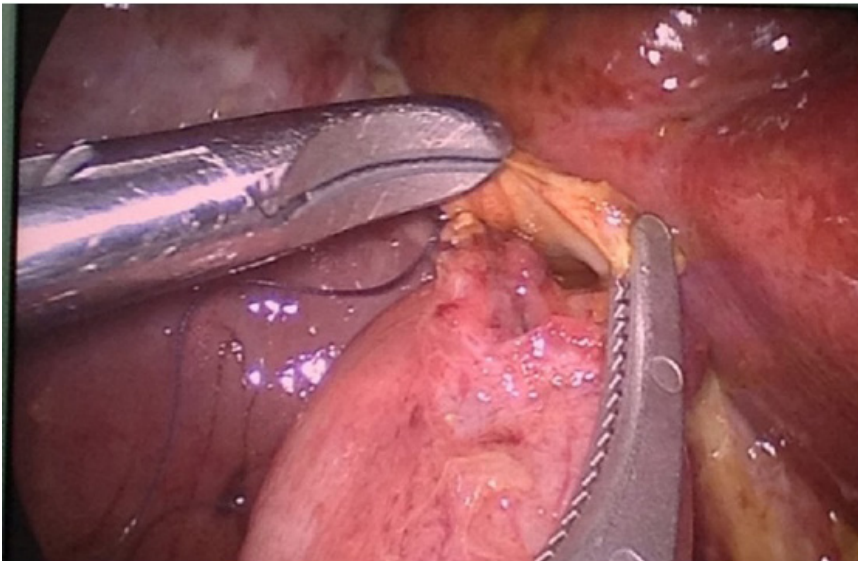


Figure 4 Before completion of the hepatico-jejunosotomy anastomosis suturing, the anterior anastomosis was lifted up.

Table 1 Clinical presentation of choledochal patients

Manifestation	Number (%)
Classic triad (abdominal mass, jaundice, abdominal pain)	26 (89.7)
Icterus	18 (62.7)
Jaundice	19 (65.5)
Vomit	5 (17.2)
Abdominal pain	18 (62.0)
Discolored stool	9 (31.0)
Abdominal mass	4 (13.7)
Fever	3 (10.3)
Cholangitis	9 (31.0)
Pancreatitis	1 (3.4)

2,3. There are no significant difference of overall complications between the laparoscopic and open surgery ($p = 0.18$). The pathological reports of all patients showed choledochal cyst without malignancy changes.

Discussion

The surgical treatments of choledochal cyst are total cyst excision and hepaticocenterostomy. This procedure is consensual the complex surgery. In minimal invasive surgery era, a laparoscopic approach is a technical challenge and many literature reviews showed no significant differences between the conventional open and laparoscopic surgery⁷⁻¹⁰.

Huo-Jian Shen, et al. performed a meta-analysis study in 2015 and concluded that the laparoscopic

surgery is a feasible, safe treatment of choledochal cyst with less postoperative morbidity, a shorter length of stay and a lower blood loss when compared with open approach⁵. According to this study, our operative time factor is in the same direction. The meta-analysis showed that in the laparoscopic group compared with open surgery group, the operative time was longer (Mean Difference = 59.11, 95 % Confidence Intervals 27.61–90.61, $p = 0.0002$), while the length of postoperative hospital stay was less (MD = -2.01, 95 % CI -2.49 to -1.54, $p < 0.00001$)⁵. In our study, we found laparoscopic surgery took doubled time more than open surgery but there were not significant different in the hospital stay between the two groups. The possible explanation may be the small sample size of the laparoscopic group. The operative time and the cyst size were found significantly difference between the two group. This may be because of a complicated procedure and there was also in the learning curve period of our institute to perform this procedure. There were no significant differences in other factors between the two groups, including volume of blood loss, intraoperative blood transfusion, time to first food intake and length of stay.

The advantage of minimally surgery in children are minimal tissue manipulation, less tissue injury, less bleeding than open surgery. In particularly, Laparoscopic surgery are technically demanding and require advanced laparoscopic skills¹⁰. More than less scar and cosmetic outcome, the postoperative pain is considered. The upper abdomen incision from open surgery can cause atelectasis and respiratory tract infection in children. For all these reasons there is a need to continue and develop laparoscopic surgery in children in our hospital.

Table 2 Laparoscopic versus open surgery for choledochal cysts

	Laparoscopic (n=4)	Open (n=25)	p-value
Age (month) ^a	70.5 (35.4 - 95.1)	28.4 (16.5 - 78.5)	0.66
Weight (kg) ^a	20.8 (13.8 - 22.5)	15.0 (9.8 - 26.0)	0.57
Todani's classification, n (%)			
Type I ^b	4 (100)	20 (80)	1.00
Type IV ^b	0 (0.0)	5 (20.0)	
Prenatal ultrasound ^b	1 (25.0)	3 (12.0)	0.48
Operative time (min) ^c	663.8 (67.5)	326.4 (138.5)	<0.001
Cyst size* (cm) ^a	1.5 (1.3 - 1.6)	4.5 (3.0 - 6.0)	0.005
Operative procedure , n (%)			
Hepaticoduodenostomy ^b	0 (0.0)	5 (20.0)	
Hepaticojejunostomy ^b	4 (100.0)	20 (80.0)	
Volumes of blood loss (mL) ^a	47.5 (27.5 - 95.0)	50.0 (20.0 - 100.0)	0.90
Blood transfusion (mL) ^a	0 (0 - 125.0)	0 (0 - 120.0)	0.85
Time of first food intake (d) ^c	4.8 (1.0)	3.8 (1.1)	0.12
Length of stay(d) ^a	17.0 (10.0 - 199.5)	9.0 (7.0 - 18.0)	0.15

Notes * The greater diameter.

^a: Presented as median (interquartile range) and P Value using the Mann Whitney U Test.

^b: Presented as N (%) and P Value using the Fisher exact Test.

^c: Presented as mean (standard deviation) and P Value using the Student's T-Test.

Table 3 Complications of the surgery.

	Laparoscopy (n=4) N (%)	Open (n=25) N (%)
Bile leakage	2 (50.0)	2 (8.0)
Respiratory tract	0 (0.0)	1 (4.0)
Cholangitis	0 (0.0)	1 (4.0)
Reoperation	1 (25.0)	2 (8.0)

p-value of overall complication = 0.18

Conclusions

Our initial experience with the laparoscopic approach for choledochal cyst indicates that the laparoscopic approach is safe and having no difference in the patient outcomes, including the complications when compared with the open operation.

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