



doi:10.7659/j.issn.1005-6947.2022.08.004  
http://dx.doi.org/10.7659/j.issn.1005-6947.2022.08.004  
Chinese Journal of General Surgery, 2022, 31(8):1017-1023.

· 专题研究 ·

## 腹腔镜胆总管探查术中T管、双J管引流与单纯一期缝合的应用比较

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### 摘要

**背景与目的:** 腹腔镜胆总管探查术(LCBDE)以“创伤小、恢复快”的临床优势成为临床治疗胆总管结石的主要手段,甚至是一线推荐方案。但LCBDE后是否需引流胆汁及不同胆汁引流方式的选择仍存在诸多争议,如传统的LCBDE+胆道外引流管(T管)引流适应证的探讨、单纯一期缝合(PDC)是否导致高术后并发症发生率、胆道内引流是否优于外引流等。针对以上问题,本文采取回顾性研究,比较T管、胆道内引流管(双J管)与PDC在LCBDE中的临床应用,并就其相应适应证进行探讨。

**方法:** 回顾性收集2015年3月—2018年5月昆明医科大学第二附属医院363例行LCBDE患者的临床资料,根据治疗方式不同分为T管组(128例)、双J管组(115例)和PDC组(120例)。比较三组术前一般资料(性别、肝功能、胆总管直径、结石直径);围手术期相关资料(手术时间、住院时间、住院费用)及术后并发症(胆源性胰腺炎、胆汁漏、胆管狭窄、引流管脱落、残余结石)发生率等。

**结果:** 三组患者术前一般资料差异无统计学意义(均 $P>0.05$ )。PDC组平均手术时间(75.5 min)明显短于T管组(98.5 min)与双J管组(90.5 min),PDC组与双J管组的平均住院时间(4.8 d与5.4 d)均少于T管组(7.8 d),PDC组与双J管组平均住院费用(18 489元与20 157元)均低于T管组(24 034元),差异均有统计学意义(均 $P<0.05$ )。三组术后总并发症发生率差异无统计学意义( $P=0.521$ );PDC组胆汁漏发生率(3.3%)高于另两组(均 $P<0.05$ ),且患者均为多发胆管结石(>1枚),其中3例结石嵌顿于Oddi括约肌,2例胆管直径<10 mm;双J管组术后胆源性胰腺炎发生率(4.3%)明显高于另两组(均 $P<0.05$ ),其中2例患者由于结石嵌顿致十二指肠乳头水肿,2例十二指肠乳头旁憩室,1例乳头炎性狭窄。

**结论:** 虽然PDC在住院时间及住院花费方面有优势,但术后并发症发生率较高,T管引流与双J管引流也有各自优势与适应证。是否需要引流及引流方式的选择,应根据患者经济情况,结合术前检查,术中腹腔镜及胆道镜对胆道情况的评估进行综合判断,“个体化”选择,以期尽量减少术后并发症,提高患者满意度。

### 关键词

胆总管结石病;腹腔镜检查;引流术

中图分类号:R657.4

**基金项目:** 云南省科技厅科技计划基金资助项目(202101AY070001-141)。

**收稿日期:** 2021-05-17; **修订日期:** 2022-03-11。

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# Comparison of the application of T-tube or double J-tube drainage and primary duct closure in laparoscopic common bile duct exploration

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## Abstract

**Background and Aims:** Laparoscopic common bile duct exploration (LCBDE) has become the main method and even the first-line recommended procedure for the treatment of common bile duct stones because of its clinical advantages of small trauma and rapid recovery. However, whether bile drainage is required after LCBDE and the choice of different bile drainage methods are still controversial, such as the discussion of the indications of traditional LCBDE plus external biliary drainage tube (T-tube), whether the primary suture alone leads to high incidence rate of postoperative complications, and whether the internal biliary drainage (double J-tube) is superior to T-tube. To solve the problem mentioned above, this study was conducted to compare the clinical application of T-tube drainage, double J-tube drainage and primary duct closure (PDC) in LCBDE through a retrospective method, and discuss their indications.

**Methods:** The clinical data of 363 patients undergoing LCBDE in the Second Affiliated Hospital of Kunming Medical University from March 2015 to May 2018 were retrospectively collected. The patients were divided into T-tube group (128 cases), double J-tube group (115 cases) and PDC group (120 cases) according to the treatment method used. The preoperative general data (sex, liver function, diameter of the common bile duct, and stone size), perioperative variables (operation time, postoperative hospital stays, and hospitalization cost), and incidence of postoperative complications (biliary pancreatitis, bile leakage, biliary stricture, tube detachment, and residual stones) were compared among the three groups.

**Results:** There were no significant differences in the preoperative general data among the three groups of patients (all  $P>0.05$ ). The average operative time in PDC group (75.5 min) was shorter than that in T-tube group (98.5 min) or double J-tube group (90.5 min), the average length of hospital stay in PDC group (4.8 d) or double J-tube group (5.4 d) was shorter than that in T-tube group (7.8 d), and the average medical cost in PDC group (18 489 yuan) or double J-tube group (20 157 yuan) was less than that in T-tube group (24 034 yuan). All the differences had statistical significance (all  $P<0.05$ ). There was no significant difference in the overall incidence of complications among the three groups ( $P=0.521$ ), but the incidence rate of biliary leakage in PDC group (3.3%) was higher than those in the other two groups (both  $P<0.05$ ), and all the patients had multiple bile duct stones ( $>1$  stone), of whom, 3 cases had incarcerated calculus of the sphincter of Oddi, and the diameter of the common bile duct in 2 cases was less than 10 mm; the incidence rate of postoperative pancreatitis in double J-tube group (4.3%) was higher than those in the other two groups (both  $P<0.05$ ), and the causes included duodenal papillary edema were caused by incarcerated stones in 2 cases, juxta-papillary duodenal diverticula in 2 cases, and inflammatory papillary stenosis in 1 case.

**Conclusion:** Although the PDC has some advantages in terms of length of hospital stay and cost of hospitalization, the incidence of postoperative complications is higher, and T-tube drainage and double J-tube drainage also have their own advantages and indications. The necessity of drainage and drainage method selection should be considered based on the patient's economic situation, combined with a

comprehensive judgment on the biliary tract conditions by preoperative examination, intraoperative laparoscopy and choledochoscopy, so as to make an "individualized" determination, minimize the postoperative complications and improve patients' satisfaction.

#### Key words

Choledocholithiasis; Laparoscopy; Drainage

CLC number: R657.4

胆石症是消化系统和肝胆外科最常见的疾病,主要包括胆囊结石和胆管结石两大类,胆管结石占胆石症患者的15%~31%<sup>[1-2]</sup>,可引发急性胆管炎,急性胰腺炎等危及生命的并发症。随着腹腔镜及内镜技术的飞速发展,越来越多的中心采用“三镜”联合手术来治疗胆总管结石<sup>[3-4]</sup>,腹腔镜胆总管探查术(laparoscopic common bile duct exploration, LCBDE)以“创伤小、恢复快”的临床优势,已成为临床治疗胆总管结石的主要手段<sup>[5]</sup>,甚至是首选推荐方案<sup>[6]</sup>。同时传统胆道外引流管(T管)引流也逐渐有被胆道内支架甚至单纯一期缝合取代的趋势。但有关LCBDE后是否需留置T管引流胆汁,胆道内引流是否优于外引流,单纯一期缝合是否是最佳选择等问题都尚存争议<sup>[7-9]</sup>。因此本文回顾性分析LCBDE的患者资料,就T管、胆道内引流管(双J管)与单纯一期缝合(primary duct closure, PDC)的临床效果进行比较,分析如下。

## 1 资料与方法

### 1.1 临床资料

回顾性收集2015年3月—2018年5月昆明医科大学第二附属医院行腹腔镜胆总管探查363例患者的临床资料。其中男191例,女172例;年龄18~74岁,平均(55.4±4.6)岁。胆囊结石合并胆总管结石321例,单纯胆管结石42例。胆管多发结石214例,单发结石149例。128例接受T管引流(T管组),115例在胆管内放置双J管引流基础上行胆总管一期缝合(双J管组),单纯胆总管一期缝合(PDC组)120例。纳入标准:术前均经和磁共振胰胆管成像(MRCP)和/或B超诊断为胆总管结石。排除标准:(1)合并肝内胆管结石;(2)合并急性化脓性胆管炎;(3)合并急性胆源性胰腺炎;(4)中转开腹。

### 1.2 手术方法

LCBDE均采用“四孔法”,结扎离断胆囊动脉

后,胆囊管近端夹闭后暂不切断,将胆囊向右上牵拉,充分显露胆总管。切开胆管前壁,胆道镜下用取石篮取尽结石,确保胆总管下段通畅、无结石残留。T管组根据胆管直径选用18~24号T管,胆管切口4-0可吸收缝线间断“8”字缝合(图1A)。双J管组经胆道镜置入斑马导丝,于胆道镜引导下经Oddi括约肌插入十二指肠降段。取出胆道镜,双J管沿导丝进入十二指肠,近端放置于左、右肝管汇合部,再次经胆道镜确定位置。4-0可吸收缝线间断“8”字缝合胆管切口(图1B)。PDC组采用4-0可吸收缝线间断“8”字缝合胆管切口(图1C)。三组均完成胆管缝合后切除胆囊,于文氏孔常规放置乳胶引流管。

### 1.3 观察指标

比较三组手术时间、住院时间、住院费用之间的差异。比较术后胆源性胰腺炎、胆管炎、胆汁漏发生率及T管或双J管脱落率。术后24 h内出现腹痛,伴血淀粉酶/脂肪酶升高3倍以上即诊断为胆源性胰腺炎<sup>[10]</sup>;术后胆管炎指发热超过38℃持续24 h伴胆汁淤积表现<sup>[11]</sup>;胆汁漏为术后连续3 d腹腔引流管出现胆汁、单次引流量>100 mL/d或术后出现局限性腹膜炎、腹腔穿刺抽出胆汁<sup>[12]</sup>。

### 1.4 术后随访

所有患者术后均电话或门诊定期随访,随访期6~36个月。若出现黄疸,腹痛等则行B超或MRCP检查以排除结石复发或胆管狭窄。比较残余结石、胆管狭窄发生率。术后6个月内影像学检查再次发现胆管结石诊断为胆道残余结石;胆管狭窄指影像学检查出现胆管局限性,对称性缩小伴其上方胆管扩张。

### 1.5 统计学处理

采用SPSS 19.0软件进行分析,计量资料用均数±标准差( $\bar{x} \pm s$ )表示,采用单因素方差分析,两两比较采用LSD法;计数资料用例数(百分率)[ $n$ (%)]表示,采用 $\chi^2$ 检验或Fisher确切概率法, $P < 0.05$ 为差异有统计学意义。



图1 术中相关照片 A: T管组(胆管内放置T管); B: 双J管组(胆管内放置双J管); C: PDC组(胆管一期缝合)  
Figure 1 Intraoperative pictures A: T-tube group (insertion of T-tube drainage into the common bile duct); B: Double J-tube group (insertion of double J-tube into the common bile duct); C: PDC group (primary suture of the common bile duct)

## 2 结果

### 2.1 一般资料比较

三组患者一般资料、术前肝功能、胆管直径及结石情况等差异均无统计学意义(均  $P > 0.05$ ) (表1)。

### 2.2 手术情况比较

PDC组手术时间明显短于另两组(均  $P < 0.05$ ), 但另两组间差异无统计学意义( $P > 0.05$ ); PDC组与双J管组住院时间均低于T管组( $P < 0.05$ ), 但另两组间差异无统计学意义( $P > 0.05$ ); PDC组及双J管组住院费用均低于T管组(均  $P < 0.05$ ), 但另两组间差异无统计学意义( $P > 0.05$ ) (表2)。

### 2.3 并发症及处理

三组患者中, 双J管组术后发生胆源性胰腺炎

5例, 发生例数明显多于其他两组(均  $P < 0.05$ ), 均经禁食、抑制胰酶分泌等治疗后治愈。三组术后均有发生胆汁漏患者, PDC组发生率(3.3%)明显高于其他两组(均  $P < 0.05$ ), 患者均经保守治疗后治愈, 无再次手术。双J管组术后2例发生支架移位, 经胃镜取出; T管组5例脱出, 其中1例发生于术后4d并出现局限性腹膜炎, 经保守治疗后好转; 3例窦道内置入引流管后到期拔除, 1例自行封闭愈合。各组残余结石发生率及总并发症发生率差异无统计学意义(均  $P > 0.05$ ), 残余结石均经胆道镜或行内镜下十二指肠乳头括约肌切开取石(endoscopic sphincterotomy, EST)取出, 无再次手术(表3)。

表1 三组术前一般资料比较

Table 1 Comparison of the preoperative general data among three groups

| 资料  | T管组(n=128) | 双J管组(n=115) | PDC组(n=120) | $\chi^2/t$ | P     |
|---|------------|-------------|-------------|------------|-------|
| 性别[n(%)]                                    |            |             |             |            |       |
| 男   | 66(51.6)   | 60(52.2)    | 65(54.2)    | 0.365      | 0.416 |
| 女   | 62(48.4)   | 55(47.8)    | 55(45.8)    |            |       |
| ALT(U/L, $\bar{x} \pm s$ )                  | 189.7±76.1 | 201.6±85.4  | 180.4±63.6  | 0.801      | 0.351 |
| TBIL( $\mu\text{mol/L}$ , $\bar{x} \pm s$ ) | 63.9±2.3   | 67.6±1.8    | 41.8±1.3    | 1.624      | 0.258 |
| 胆管直径(cm, $\bar{x} \pm s$ )                  | 1.2±0.1    | 1.1±0.3     | 1.2±0.2     | 1.729      | 0.163 |
| 结石直径(cm, $\bar{x} \pm s$ )                  | 1.0±0.2    | 0.9±0.6     | 1.1±0.3     | 1.453      | 0.185 |

表2 三组手术情况比较 ( $\bar{x} \pm s$ )

Table 2 Comparison of perioperative variables among three groups ( $\bar{x} \pm s$ )

| 指标        | T管组(n=128)             | 双J管组(n=115)                | PDC组(n=120)                | t      | P     |
|-----------|------------------------|----------------------------|----------------------------|--------|-------|
| 手术时间(min) | 98.5±7.8 <sup>1)</sup> | 90.5±6.3 <sup>1)</sup>     | 75.5±4.7                   | 1.708  | 0.024 |
| 住院时间(d)   | 7.8±0.9                | 5.4±0.3 <sup>2)</sup>      | 4.8±0.4 <sup>2)</sup>      | 33.841 | 0.000 |
| 住院费用(元)   | 24 034±431.9           | 20 157±523.6 <sup>2)</sup> | 18 489±630.9 <sup>2)</sup> | 42.527 | 0.000 |

注: 1)与PDC组比较,  $P < 0.05$ ; 2)与T管组比较,  $P < 0.05$

Notes: 1)  $P < 0.05$  vs. PDC group; 2)  $P < 0.05$  vs. T-tube group



表3 三组并发症发生率比较[n (%) ]

Table 3 Comparison of the incidence rates of complications among three groups [n (%)]

| 指标      | T管组(n=128)           | 双J管组(n=115)          | PDC组(n=120)          | F     | P     |
|---------|----------------------|----------------------|----------------------|-------|-------|
| 胆源性胰腺炎  | 1(0.8) <sup>1)</sup> | 5(4.3)               | 0(0.0) <sup>1)</sup> |       | 0.008 |
| 胆汁漏     | 1(0.8) <sup>2)</sup> | 1(0.9) <sup>2)</sup> | 4(3.3)               |       | 0.032 |
| T/双J管脱落 | 5(3.9)               | 2(1.7)               | —                    |       | 0.021 |
| 残余结石    | 2(1.6)               | 2(1.7)               | 3(2.5)               |       | 0.565 |
| 胆管狭窄    | 0(0.0)               | 0(0.0)               | 0(0.0)               | —     | —     |
| 总并发症    | 9(7.0)               | 10(8.7)              | 7(6.1)               | 1.672 | 0.521 |

注:1)与双J管组比较, $P<0.05$ ;2)与PDC组比较, $P<0.05$

Notes: 1)  $P<0.05$  vs. double J-tube group; 2)  $P<0.05$  vs. PDC group

## 2.4 随访情况

平均随访(23.6±7.1)个月。三组均无死亡病例, T管组术后5~9 d夹闭T管, 4~9周造影后根据有无残余结石及窦道形成情况拔除T管。双J管组术后7~14 d行门诊胃镜检查, 镜下于十二指肠内找到双J管远端后, 用取石网篮或活检钳将其固定, 拉入胃腔后拔除。

## 3 讨论

胆管结石的治疗目的在于取净结石, 可采用的方法多种多样, 代表性的有EST及LCBDE。EST的优势在于通过切开十二指肠乳头括约肌, 可清除大多数胆总管结石, 同时无需术后留置T管<sup>[13-15]</sup>。但EST可能导致术后胰腺炎、出血及穿孔等并发症, 甚至有可能由于Oddi括约肌切开后十二指肠液及胰液返流而诱发结石再发、胆管肿瘤等<sup>[16-18]</sup>。LCBDE在安全性及有效性方面均体现出优势, 有研究<sup>[19-20]</sup>认为多数情况下应首先考虑LCBDE。但传统LCBDE手术常规采用T管引流, 带来了诸如胆汁漏、电解质紊乱及T管脱落等并发症, 更重要的是, 带管时间超过4周给患者带来生理及心理上的痛苦<sup>[21-23]</sup>, 故有学者<sup>[24-26]</sup>提出胆总管一期缝合。但一期缝合仍有其局限性, 主要为当胆管直径过细(<7 mm)时可能导致术后胆汁漏及胆道狭窄风险增高, 故一期缝合更适用于胆管直径>10 mm的患者<sup>[27-28]</sup>。胆管内引流既可保护Oddi括约肌功能, 又可在保证胆汁正常流向的基础上降低胆管压力, 减少胆汁漏、胆管狭窄等并发症的发生<sup>[29-30]</sup>。

本研究结果显示, 单纯一期缝合无论在手术时间、住院时间还是住院费用方面均优于T管及双J管引流, 似乎支持无胆管引流的单纯一期缝合为

最佳手术方式。但从并发症发生率情况分析, PDC组患者胆汁漏发生率最高, 进一步分析发现, PDC组发生胆汁漏患者均为多发胆管结石(>1枚), 其中3例结石嵌顿于Oddi括约肌, 2例胆管直径<10 mm。可能由于取石网篮镜经胆道镜反复于胆管下端操作, 引发括约肌痉挛水肿, 甚至出血, 血凝块堵塞胆管下端, 胆汁排泄障碍, 而较细的胆管代偿性扩张能力有限, 最终导致胆管内压增高, 发生胆汁漏。因此单纯一期缝合适用于胆管结石数目<2枚、胆管直径>10 mm, 同时胆管下端无炎症、水肿及狭窄等情况的患者。

双J管引流方式相对于T管更符合胆管传输胆汁的生理功能, 减少了由于胆汁丢失而造成的电解质紊乱, 并提高了患者的生活质量<sup>[31]</sup>。本研究中, 双J管组较T管组住院时间更短, 住院费用更低, 但双J组术后胆源性胰腺炎发生率高达3.9%。研究<sup>[32]</sup>发现, 术后胰腺炎的发生与以下因素有关: (1)超过1次的插管; (2)多支胰腺导管; (3)胰腺导管内注射造影剂。本研究双J管组发生的5例胰腺炎, 经Oddi括约肌插管均超过1次, 最高达3次。而5例胰腺炎患者中2例由于结石嵌顿致十二指肠乳头水肿, 2例十二指肠乳头旁憩室, 1例乳头炎性狭窄。笔者经验, 在行双J管置管前应仔细阅读患者MRCP检查结果, 排外十二指肠憩室及胆管变异, 术中应通过胆道镜观察胆管下端Oddi括约肌形态, 若出现十二指肠憩室及/或胆管变异, 可尝试插管, 但若1次无法成功, 则放弃双J管引流。置管成功后, 应再次用胆道镜观察确认远端通过十二指肠乳头。若仍无法准确判断, 应联合术中十二指肠镜检查, 明确远端插入的位置及长度。

虽然T管组手术时间最长, 住院时间最长, 住院费用最高, 且5例(4.3%)出现T管脱落, 脱

管风险明显高于双J管组，但T管组术后胆汁漏及胆源性胰腺炎等并发症发生率相较其他两组更低，笔者认为，由于T管管径较J管粗大，能更好地引流胆汁，降低胆管内压，减少了Oddi括约肌的压力，因此术后胆汁漏及胰腺炎的发病率较低。T管这种“大口径、大流量”的引流方式尤其适用于：(1)胆管多发结石，需反复多次取石；(2)结石嵌顿，十二指肠乳头水肿，狭窄；(3)结石较大，需胆管切开切口较大；(4)胆管炎症较重、胆管壁水肿的患者。而双J管的适应证则较宽，除部分患者因拒绝胃镜取出而放弃双J管引流，其余均可在全面的术前、术中评估后放置。但由于其可能涉及术中外科医生和内镜医生的配合，对技术要求较高。

综上所述，虽然单纯一期缝合在住院时间及花费有优势，但术后并发症发生率较高，T管引流与双J管引流也有各自优势与适应证。是否需要引流及引流方式的选择，应根据患者经济情况，结合术前检查，术中腹腔镜及胆道镜对胆道情况的评估进行综合判断，“个体化”选择，以期尽量减少术后并发症，提高患者满意度。

利益冲突：所有作者均声明不存在利益冲突。

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(本文编辑 宋涛)

**本文引用格式:** 于恒海, 魏晓平. 腹腔镜胆总管探查术中T管、双J管引流与单纯一期缝合的应用比较[J]. 中国普通外科杂志, 2022, 31(8):1017-1023. doi:10.7659/j.issn.1005-6947.2022.08.004

**Cite this article as:** Yu HH, Wei XP. Comparison of the application of T-tube or double J-tube drainage and primary duct closure in laparoscopic common bile duct exploration[J]. Chin J Gen Surg, 2022, 31(8): 1017-1023. doi: 10.7659/j.issn.1005-6947.2022.08.004