文章类型：论文 | 刊号（ISSN）：2972-4457(P) / 2972-452X(O)

单孔腹腔镜胆囊切除结合腹腔镜下经胆囊管胆总管探查术病例汇报

张景旭 周志杰 张昊 刘伟 王晓亮*
上海市浦东医院
DOI:10.12238/ffcr.v3i6.17307

[摘 要] 目的：探讨单孔腹腔镜联合超细胆道镜经胆囊管途径同期治疗胆囊结石合并胆总管结石的技术可行性及临床价值。方法：针对 1 例 53 岁女性患者（术前 CT 确诊胆囊多发结石，合并胆总管结石可能），于脐部建立 2.0cm 单孔操作通道，胆囊三角解剖清晰，在距胆囊管-胆总管汇合部 1cm 处切开胆囊管， EyeMax 超细胆道镜（外径 8.4Fr）经此开口插入胆总管，直视下使用网篮取尽胆总管结石，术中反复检查肝外胆管及肝内一、二级胆管，确认无结石残留后切除胆囊。结果：手术时间 140 分钟，出血量<20ml，结石清除率 100%。患者术后 6 小时下床活动，3 天出院，无胆漏、胰腺炎等并发症。术后随访显示无明显并发症，脐部切口呈线性瘢痕（长 2.0cm）。经检索国内外各三大数据库（CNKI/万方/CSCD，Pubmed/Web of Science/Medline，2000-2024 年），未见同类技术报道，本例系全国首例单孔腹腔镜下一体化解决胆囊结石及胆总管结石病例。结论：单孔腹腔镜胆囊切除结合经胆囊管胆总管探查术既具微创性，又保留了 Oddi 括约肌完整，规避了传统 T 管引流或 ERCP 二次手术的风险，为胆囊结石合并胆总管结石患者提供了安全有效的治疗新策略，尤其适用于胆囊管直径≥3mm、结石≤1cm 的择期手术患者。
[关键词] 单孔腹腔镜胆囊切除术；腹腔镜下经胆囊管胆总管探查术；胆总管结石症；微创外科；Oddi 括约肌保全
中图分类号：R657.4 文献标识码：A

Case Report: Single-Incision Laparoscopic Cholecystectomy with Laparoscopic Transcystic Common Bile Duct Exploration (SILC-LTCBDE)

Jingxu Zhang, Zhijie Zhou, Hao Zhang, Wei Liu, Xiaoliang Wang*
Shanghai Pudong Hospital

Abstract: Objective: To evaluate the technical feasibility and clinical value of single-incision laparoscopic cholecystectomy combined with a laproscopic transcystic approach for the concurrent management of cholecystolithiasis and choledocholithiasis. Methods: A 53-year-old female patient with preoperative CT-confirmed multiple gallbladder stones and latent common bile duct (CBD) stone underwent single-port access via a 2.0-cm umbilical incision. Following dissection of Calot's triangle, the cystic duct was incised 1 cm proximal to its junction with the CBD. A 8.4Fr EyeMax choledochoscope was introduced for stone extraction under direct visualization. Cholecystectomy was performed after confirming complete stone clearance from CBD, primary and secondary bile duct via intraoperative choledochoscopy. Results: Operative time was 140minutes, with blood loss <20 mL and a stone clearance rate of 100%. The patient ambulated 6 hours postoperatively and was discharged on postoperative day 3, with no complications such as bile leakage or pancreatitis. Follow-up revealed no complication, and the umbilical incision had healed as a 2.0-cm linear scar. Comprehensive searches of major databases (CNKI/Wanfang/CSCD for Chinese literature; PubMed/Web of Science/Medline for international literature; 2000 - 2024) confirmed no prior reports of this integrated technique, establishing this case as China's first single-incision laparoscopic procedure simultaneously addressing gallbladder and CBD stones. Conclusion: Single-incision laparoscopic cholecystectomy with laproscopic transcystic CBD exploration （SILC-LTCBDE）integrates minimally invasive advantages with intact sphincter of Oddi . This approach eliminates risks associated with traditional T-tube drainage or secondary Endoscopic Retrograde Cholangiopancreatography（ERCP）, offering a safe and effective novel strategy for patients with concomitant gallbladder and CBD stones—particularly elective cases with cystic duct diameter ≥3 mm and stones ≤1cm.
Keywords: Single-Incision Laparoscopic Cholecystectomy (SILC); Laproscopic Transcystic Common Bile Duct Exploration (LTCBDE); Choledocholithiasis; Minimally invasive surgery; Oddi sphincter preservation

文章类型：论文 | 刊号（ISSN）：2972-4457(P) / 2972-452X(O)

1 病例介绍

53 岁女性，右上腹持续性胀痛 7 天来诊，无黄染、发热等其他不适主诉，外院超声提示胆囊结石，既往开腹阑尾切除术后 20 余年，余病史及个人史无殊。查体见右上腹轻压痛，无反跳痛及肌紧张，全身皮肤巩膜无黄染。实验室检查提示：丙氨酸氨基转移酶（ALT）186 U/L，天门冬氨酸氨基转移酶（AST）54 U/L，谷氨酰转移酶 （GGT）181 U/L，碱性磷酸酶（ALP） 121U/L，乳酸脱氢酶（LDH）200 U/L，结合胆红素（BC）0.00 umol/L，非结合胆红素（BU）8.63 umol/L，总胆红素（TBIL）11.7umol/L；余指标未见明显异常。超声提示：胆囊大小、形态正常，壁增厚毛糙，约 4.4mm，透声良好。胆囊内 18*15mm 点状强回声伴声影。胆总管内径 11mm，中下段显示不清；肝内胆管未见扩张；CT 提示：胆囊腔内见斑片状高密度结石，胆总管轻度扩张。结合上述检查，考虑患者胆囊结石，胆总管结石不除外，拟于 2025-06-03 行单孔腹腔镜胆囊切除结合经胆囊管胆总管探查术。患者全麻见效后取仰卧位，常规消毒铺巾，于脐孔侧下缘作一 2cm 长皮肤切口，直视下置入单孔腔镜转换器，充 C02 气腹压力达 12mmHg，体位调至头高脚低、左倾 30°。探查见胆囊体积约 10x4x3cm，壁厚约 3mm，胆囊与周围网膜轻度粘连，胆总管未见扩张。钝性+锐性分离粘连组织，打开胆囊三角浆膜分离出胆囊颈管，看清胆总管、肝总管及胆囊颈管汇合部，分离并用超声刀离断胆囊动脉，3-0 倒刺线将胆囊底悬吊于腹壁，充分暴露胆囊管。近胆囊管汇入口约 1cm 处剪开，经此开口置入 eyeMAX 胆道镜探查。见胆总管内多枚黄褐色碎石，使用网篮取出块状结石。胆道镜直视引导下，网篮经 Oddi 括约肌入十二指肠，胆总管内残余碎石经网篮间隙顺水流排入肠道。随后反复探查肝外胆管及肝内一、二级胆管无结石残留。退出胆道镜后 hemolock 夹闭胆囊管，切除胆囊，严密止血，经单孔 port 拉出胆囊。切开胆囊见多发黄褐色泥沙样结石。检查无活动性出血，引流管置入文氏孔，逐层缝合切口。手术经过顺利，出血少。术后予患者预防感染、对症支持治疗，患者恢复稳定，无明显不适主诉，随访未见并发症，切口愈合可。

2 讨论

2.1 腹腔镜胆囊切除术（Laparoscopic Cholecystectomy, LC）自 1987 年首次实施，已成为胆囊结石治疗的金标准。单孔腹腔镜胆囊切除术（Single-Incision Laparoscopic Cholecystectomy , SILC）[1]通过脐部单一切口完成操作，较传统三孔法进一步减少创伤，在术后疼痛控制、美容效果及早期恢复方面具有显著优势。然而，当合并胆总管结石时，传统术式面临两难困境：腹腔镜胆总管探查术（LCBDE）+T 管引流[2]：需切开胆总管，导致术后带管 4-6 周，伴随胆汁丢失、电解质紊乱、胆漏（发生率 5%-8%）等；分期处理方案（LC+ERCP）[3]：虽避免 T 管留置，但 ERCP 术后胰腺炎、出血及十二指肠穿孔风险不可忽视[4]，且二次手术增加医疗成本及患者心理负担。上述困境凸显 Oddi 括约肌完整性与微创性统一的需求。且普通胆道镜直径较粗（约 4mm），无法经胆囊管取胆总管结石。本中心创新性提出单孔腹腔镜胆囊切除结合经胆囊管胆总管探查术（Single-Incision Laparoscopic Cholecystectomy with Laproscopic Transcystic Common Bile Duct Exploration（SILC-LTCBDE）），避免胆总管切开及二次手术干预。本文正式提出单孔腹腔镜胆囊切除结合腹腔镜下经胆囊管胆总管探查术的规范的术式名称，并报道国内外首例可追溯的成功案例，为胆石症微创治疗提供新范式。

2.2 本例患者为胆囊结石合并多枚胆总管内小结石，本中心行单孔腹腔镜下胆囊切除，同时经唯一手术切口置入超细胆道镜、经胆囊管探查胆总管、取出结石，随后切除胆囊及胆囊管，整个胆道系统唯一断面为常规腹腔镜下胆囊切除术断端-胆囊管与胆总管汇合部，最大程度上保证了胆道的完整性。镜身外径 8.4Fr（约 2.8mm）的 EyeMax 超细胆道镜[5]可插入胆囊管行胆道探查，取尽胆总管内结石，并向上探查肝内至各胆管二级分支，未见结石残留。实现三重突破——（1）较 LCBDE：规避 T 管相关并发症及胆管切开损伤，保全生理功能；（2）较 ERCP+LC：消除分期手术风险，降低医疗负担；（3）较传统 TCBDE：杜绝附加创伤，以腹腔镜手术及超细胆道镜（≤3mm）达成单孔操作闭环。真正实现"以最小侵袭换取最大功能保护"的精准外科理念。且经检索国内外各三大数据库（CNKI/万方/CSCD，Pubmed/Web of Science/Medline，2000-2024 年），未见同类技术报道，为全球可追溯的首例。

3.结论

单孔腹腔镜胆囊切除结合经胆囊管胆总管探查术（Single-Incision Laparoscopic Cholecystectomy with Laparoscopic Transcystic Common Bile Duct Exploration（SILC-LTCBDE））可满足一站式微创治疗胆囊结石合并胆总管结石，方法安全有效，为全球首例可追溯的病例报道。

表 1 缩略词表

缩略词	英文全称	中文释义
SILC	Single-Incision Laparoscopic Cholecystectomy	单孔腹腔镜胆囊切除术
LTCBDE	Laparoscopic Transcystic Common Bile Duct Exploration	腹腔镜下经胆囊管胆总管探查术
SILC-LTCBDE	Single-Incision Laparoscopic Cholecystectomy with Laparoscopic Transcystic Common Bile Duct Exploration	单孔腹腔镜胆囊切除联合经胆囊管胆总管探查术
TCBDE	Transcystic Common Bile	经胆囊管胆总管探

	Duct Exploration	查术
LC	Laparoscopic Cholecystectomy	腹腔镜胆囊切除术
LCBDE	Laparoscopic Common Bile Duct Exploration	腹腔镜胆总管探查术
ERCP	Endoscopic Retrograde Cholangiopancreatography	内镜逆行胰胆管造影术

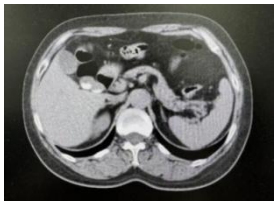

图 1 可见胆囊内及胆囊颈部多发结石

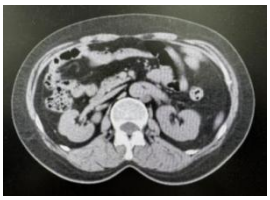

图 2 胆总管下段显示不清，部分呈现高信号，可能存在胆总管结石

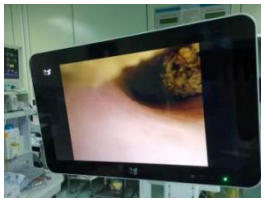

图 3 术中超细胆道镜可见胆总管内多发结石

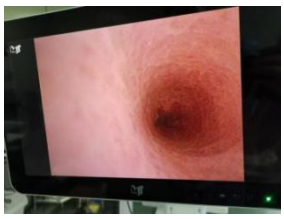

图 4 取尽结石后探查至十二指肠乳头证实结石已取尽

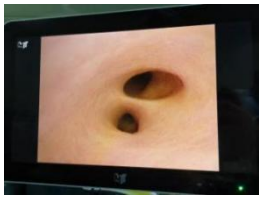

图 5 向上探查肝内胆管至二级分支，未见结石残留

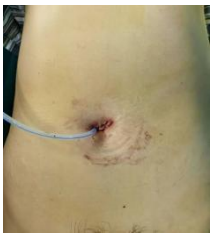

图 6 手术切口及引流

[参考文献]

[1]Nam, C., et al., Evolution of minimally invasive cholecystectomy: a narrative review. BMC Surg, 2024. 24(1): p. 378.

[2]Yang, Q.S., et al., Analysis of risk factors for bile leakage after laparoscopic exploration and primary suture of common bile duct. World J Gastrointest Surg, 2025. 17(3): p. 102190.

[3]Manes, G., et al., Endoscopic management of common bile duct stones: European Society of Gastrointestinal Endoscopy (ESGE) guideline. Endoscopy, 2019. 51(5): p. 472-491.

[4]Sadeghi, A., et al., Impact of major duodenal papilla morphology on the outcomes of primary needle-knife fistulotomy for deep biliary cannulation. Sci Rep, 2024. 14(1): p. 31949.

[5]Robles-Medranda, C., et al., Accurate and safe diagnosis and treatment of neoplastic biliary lesions using a novel 9F and 11F digital single-operator cholangioscope. Endosc Int Open, 2024. 12(4): p. E498-E506.

作者简介：

张景旭（1992.05-），男，汉族，辽宁鞍山人，硕士研究生，住院医师，研究方向为肝胆外科、胆石症、肝肿物。

王晓亮（1975.08-），博士研究生，主任医师，研究方向为肝胆外科、胆道系统疾病。

基金项目：

课题名称：SULT2A1 基因 rs2547231 位点多态性与胆固醇性胆囊结石的相关性及机制研究，课题编号：PWR12022-04。