

Efficacy and Postoperative Complication Analysis of ERCP Combined with Laparoscopic Cholecystectomy in the Treatment of Cholecystolithiasis Complicated with Choledocholithiasis

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Abstract

Objective: To analyze and explore the efficacy of ERCP combined with laparoscopic cholecystectomy in the treatment of cholecystolithiasis complicated with choledocholithiasis. **Methods:** 100 patients with cholecystolithiasis combined with choledocholithiasis admitted to the Affiliated Hospital of Shandong Second Medical University from January 2024 to January 2025 were selected as the research subjects. They were randomly divided into a control group and an observation group, with 50 cases in each group. The control group underwent open cholecystectomy, common bile duct exploration, and T-tube drainage. The observation group underwent ERCP combined with laparoscopic cholecystectomy. The liver function, serum inflammatory expressions, surgical conditions, and stone clearance were compared between the two groups. **Results:** There was no significant difference in the stone clearance rate between the two groups ($P > 0.05$). However, the operative time, intraoperative blood loss, postoperative exhaust time, and hospitalization stay in the observation group were shorter than those in the control group ($P < 0.05$). The liver function recovery, inflammatory response, and postoperative complications in the observation group were better than those in the control group ($P < 0.05$). **Conclusion:** ERCP combined with laparoscopic cholecystectomy demonstrates a prominent clinical application effect in the treatment of cholecystolithiasis complicated with choledocholithiasis.

Keywords Cholecystolithiasis; Choledocholithiasis; ERCP; Laparoscopic Cholecystectomy

1 Introduction

Cholecystolithiasis is a common disease in hepatobiliary surgery, and cholecystolithiasis complicated with choledocholithiasis is also a high-incidence biliary tract disease in clinical practice. With the changes in lifestyle, the incidence of cholecystolithiasis complicated with choledocholithiasis is increasing year by year [1]. In China, the incidence of cholecystolithiasis comprises 10% of the adult population, of which 15% are complicated with choledocholithiasis. The traditional surgical approach is open cholecystectomy

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combined with common bile duct exploration and T-tube drainage, but this method implies significant operative trauma paired with a high risk of postoperative complications [2]. With the continuous development of minimally invasive surgical concepts, endoscopic retrograde cholangiopancreatography (ERCP) combined with laparoscopic cholecystectomy has received extensive attention due to its advantages of producing minimal trauma and facilitating rapid recovery [3, 4]. At present, there are few clinical reports on the efficacy of ERCP combined with laparoscopic cholecystectomy for cholecystolithiasis complicated with choledocholithiasis, especially regarding subsequent postoperative complications. The present study strategically recruited patients diagnosed with cholecystolithiasis combined with choledocholithiasis for group treatments, thereby assessing the efficacy and safety of ERCP combined with laparoscopic cholecystectomy and ensuring accurate guidance alongside foundational references for clinical practice.

2 Materials and Methods

2.1 General Information

A total of 100 patients with cholecystolithiasis complicated with choledocholithiasis hospitalized in Affiliated Hospital of Shandong Second Medical University from January 2024 to January 2025 were selected. Inclusion criteria: (1) Confirmed diagnosis of cholecystolithiasis complicated with choledocholithiasis by imaging or ultrasound; (2) Informed consent obtained from patients and/or their families; (3) Patients undergoing hepatobiliary surgery for the first time. Exclusion criteria: (1) Previous history of upper abdominal surgery; (2) Preoperative manifestation of acute obstructive suppurative cholangitis or acute severe pancreatitis; (3) Substantial anomalies regarding coagulation functionality or complicated with biliary bleeding; (4) Active hepatitis, liver cirrhosis, or liver failure; (5) Biliary stricture or malformation; (6) Benign or malignant biliary tract lesions; (7) Choledochoduodenal fistula or sphincter of Oddi dysfunction; (8) Intrahepatic bile duct stones. Based on the principle of the random number table method, the patients were randomly divided into a control group ($n = 50$) and an observation group ($n = 50$). The baseline data comparison exposed no statistically significant differences ($P > 0.05$), ensuring parity between both categories (Table 1). This study was approved by the Medical Ethics Committee of the hospital.

2.2 Methods

After admission, both groups of patients received basic treatments such as anti-infection protocols and fluid replacement. The control group underwent open cholecystectomy combined with common bile duct exploration and T-tube drainage. Specifically, an oblique incision under the right costal margin exposed the gallbladder intended for complete resection; subsequently, a common bile duct exploration ensued. Opening the anterior wall of the common bile duct cleared the stones prior to placing a standard T-tube paired with an abdominal drainage tube. A postoperative angiography was prescribed 2 weeks later. As long as there were no abnormal diagnostic reflections, the extubation could proceed. In parallel, the observation group accommodated ERCP combined with laparoscopic cholecystectomy. First, patients adopted ERCP to explicitly clear the aggregated choledocholithiasis. Only after comprehensive cholangiography illustrated an utter absence of trace residual stones, could a nasobiliary drainage tube be established. Following the confirmation of stabilized postoperative vital signs mapping (usually a 3–5 day postoperative transitional phase segment), patients formally engaged in laparoscopic cholecystectomy. Conclusively, both groups resumed corresponding liver protection regimens and anti-infection surveillance.

2.3 Observation Indicators

(1) Surgical condition: including operative time, intraoperative blood loss, postoperative flatus time, and hospital stay length; (2) Stone clearance efficacy: residual stones instances corroborated through follow-

Table 1: Comparison of Baseline Data between Two Groups

Items	Observation group ($n = 50$)	Control group ($n = 50$)	χ^2/t	P
Age (years)	71.67 $\pm$ 11.70	70.06 $\pm$ 13.17	0.647	0.519
BMI (kg/m ²)	23.24 $\pm$ 5.55	22.21 $\pm$ 3.42	1.089	0.279
Male (n , %)	18 (36.0)	25 (50.0)	1.539	0.215
Smoking history (n , %)	37 (74.0)	38 (76.0)	0.013	0.908
Drinking history (n , %)	38 (76.0)	39 (78.0)	0.003	0.957
Hypertension (n , %)	28 (56.0)	25 (50.0)	0.662	0.416
Diabetes (n , %)	38 (76.0)	39 (78.0)	0.016	0.898
Child-Pugh grade			0.123	0.726
Grade A	33 (66.0)	36 (72.0)		
Grade B	17 (34.0)	14 (28.0)		
ASA grade			0.004	0.950
Grade I	32 (64.0)	33 (66.0)		
Grade II	18 (36.0)	17 (34.0)		
WBC ($\times 10^9/L$)	7.25 $\pm$ 4.10	6.40 $\pm$ 2.39	1.278	0.204
RBC ($\times 10^{12}/L$)	3.97 $\pm$ 0.88	4.08 $\pm$ 0.79	-0.648	0.519
HGB (g/L)	120.14 $\pm$ 25.90	119.67 $\pm$ 24.52	0.094	0.925
PLT ($\times 10^9/L$)	174.65 $\pm$ 68.37	178.20 $\pm$ 65.75	-0.264	0.792
TP (g/L)	62.73 $\pm$ 6.51	63.61 $\pm$ 7.32	-0.626	0.533
ALB (g/L)	35.41 $\pm$ 4.20	35.96 $\pm$ 4.87	-0.600	0.550
GLO (g/L)	27.32 $\pm$ 5.73	27.64 $\pm$ 4.79	-0.307	0.760
TBIL ($\mu\text{mol/L}$)	19.70 $\pm$ 11.87	22.61 $\pm$ 15.23	-1.062	0.291
DBIL ($\mu\text{mol/L}$)	4.55 $\pm$ 3.99	6.04 $\pm$ 6.37	-1.373	0.173
IBIL ($\mu\text{mol/L}$)	14.08 $\pm$ 8.75	17.21 $\pm$ 9.97	-1.647	0.103
ALT (U/L)	60.53 $\pm$ 106.37	49.54 $\pm$ 113.99	0.496	0.621
AST (U/L)	48.20 $\pm$ 60.51	66.10 $\pm$ 159.15	-0.737	0.463
ALP (U/L)	100.16 $\pm$ 49.95	109.78 $\pm$ 88.51	-0.664	0.509
GGT (U/L)	69.18 $\pm$ 68.18	75.08 $\pm$ 100.98	-0.340	0.735
CRE ($\mu\text{mol/L}$)	120.18 $\pm$ 82.44	98.90 $\pm$ 41.02	1.631	0.106
eGFR	65.06 $\pm$ 30.02	69.70 $\pm$ 24.67	-0.841	0.403
TC (mmol/L)	3.72 $\pm$ 0.86	3.68 $\pm$ 1.02	0.201	0.842
TG (mmol/L)	1.16 $\pm$ 0.52	1.02 $\pm$ 0.43	1.396	0.166
LDL-C (mmol/L)	2.07 $\pm$ 0.64	2.34 $\pm$ 0.82	-1.685	0.096
CRP (mg/L)	20.30 $\pm$ 28.06	16.89 $\pm$ 31.26	0.500	0.618

up ultrasonography alongside comprehensive CT analyses; (3) Liver function indicators: fasting venous blood mapping of associated hepatobiliary functions gathered 3 days before and concurrently 3 days subsequent to surgical operations; (4) Inflammatory indicators: tracking corresponding inflammatory metrics via identical fasting venous blood sampling regimens; (5) Secondary complications: encompassing incision infection, biliary bleeding, distinct biliary fistula manifestations, explicit cholangitis events, etc.

2.4 Statistical Methods

Data analytics execution mapped across IBM SPSS 25.0 software environments. Normally distributed measurement data conformed toward mean values combined with standard deviation formats ($\bar{x} \pm s$), while respective non-normally distributed metrics occupied specific median arrays. Inter-group statistical appraisals distinguishing symmetrically aligned measurement data leveraged independent sample t -test paradigms. Likewise, disparate non-parametric distributions adopted the Kruskal-Wallis H mechanism. Count variables mapped across aggregate frequency profiles alongside categorical percentages matched with parallel χ^2 evaluations. Double-sided analyses underscored the entirety of the appraisal execution,

interpreting statistical significance unequivocally given $P < 0.05$ boundary delineations.

3 Results

3.1 Comparison of Surgical Conditions

Comparing fundamental variables, the corresponding median values isolating operative times, aggregate intraoperative bleeding profiles, precise moments of initial postoperative flatus manifestations alongside holistic hospitalization spans presented observably shorter profiles exclusively favoring the pertinent observation cohort ($P < 0.05$). Explicit comparative metric correlations are provided within Table 2.

Table 2: Comparison of Surgical Conditions between the Two Groups

Items	Observation group ($n = 50$)	Control group ($n = 50$)	t	P
Operative time (min)	169.90 ± 10.50	248.70 ± 22.34	-22.530	< 0.001
Blood loss (ml)	60.49 ± 7.49	72.44 ± 6.22	-8.618	< 0.001
Postop exhaust (h)	19.43 ± 2.82	22.68 ± 2.36	-6.195	< 0.001
Hospital stay (d)	7.22 ± 0.68	12.12 ± 1.40	-22.052	< 0.001

3.2 Comparison of Stone Clearance

Between the respective control implementations and subsequent observation paradigms, final clearance levels evaluating independent traces of cholecystolithiasis and corresponding choledocholithiasis yielded parallel consistencies lacking statistically pronounced deviations ($P > 0.05$). Direct representations map uniformly within Table 3.

Table 3: Comparison of Stone Clearance between the Two Groups

Items	Observation group ($n = 50$)	Control group ($n = 50$)	χ^2	P
Stone clearance ($n, \%$)			0.001	0.984
Completely cleared	47 (94.0)	48 (96.0)		
Partially retained	3 (6.0)	2 (4.0)		

3.3 Comparison of Liver Function Indicators

The analytical distributions surveying preoperative parameters verified nullified statistical significance 3 days anticipating surgical implementations ($P > 0.05$). Subsequently, tracking post-surgery phases 3 days beyond baseline established substantial decreases uniformly mapped across AST, explicit ALT parameters alongside γ -glutamyl transpeptidase (GGT) profiles. Consequently, pronounced metrics inherently favored the observation group, underscoring indisputable statistical validity ($P < 0.05$). The correlations are comprehensively analyzed within Table 4.

3.4 Comparison of Inflammatory Indicators

Corresponding baseline assessments isolating specific preoperative benchmarks identically revealed negligible disparities ($P > 0.05$). Consequent postoperative mapping 3 days post-surgery demonstrated elevated

Table 4: Comparison of Liver Function Indicators between the Two Groups

Group	AST (U/L)		ALT (U/L)		GGT (U/L)	
	Preop	Postop 3d	Preop	Postop 3d	Preop	Postop 3d
Observation	48.20 ± 60.51	25.51 ± 2.36*	60.53 ± 106.37	28.54 ± 4.26*	69.18 ± 68.18	48.82 ± 5.46*
Control	66.10 ± 159.15	48.86 ± 3.87*	49.54 ± 113.99	35.71 ± 4.51*	75.08 ± 100.98	65.61 ± 6.36*
<i>t</i>	-0.737	11.198	0.496	5.169	-0.340	21.763
<i>P</i>	0.463	< 0.001	0.621	< 0.001	0.735	< 0.001

Note: Compared with preoperative, * $P < 0.05$.

metrics distinctly skewed towards the control group. Evaluative metrics presented irrefutable comparative significance favoring the specific enhancements intrinsic within the observation group ($P < 0.05$). Essential findings match representations illustrated within Table 5.

Table 5: Comparison of Inflammatory Indicators between the Two Groups

Group	CRP (mg/L)	
	Preoperative	Postoperative 3d
Observation ($n = 50$)	20.30 ± 28.06	26.34 ± 1.58*
Control ($n = 50$)	16.89 ± 31.26	30.96 ± 2.09*
<i>t</i>	0.500	18.127
<i>P</i>	0.618	< 0.001

Note: Compared with preoperative, * $P < 0.05$.

3.5 Comparison of Postoperative Complications

The incidence evaluating explicit postoperative risk trajectories and compounded complications confirmed drastically subdued proportional manifestation specific to the observation group, corroborating significant statistical validation ($P < 0.05$). Key proportions align intimately with data structured in Table 6.

Table 6: Comparison of Complication Rates between the Two Groups

Group	Hyper-amylasemia	Pancreatitis	Biliary fistula	Abdominal bleeding	Incision infection	Total
Observation	1 (2.0)	1 (2.0)	2 (4.0)	1 (2.0)	2 (4.0)	7 (14.0)
Control	7 (14.0)	5 (10.0)	1 (2.0)	1 (2.0)	3 (6.0)	17 (34.0)
χ^2						5.952
<i>P</i>						0.015

4 Discussion

Cholelithiasis represents a relatively prevalent disease within the broader population. Generally, cholelithiasis lacks blatantly pronounced clinical mechanisms. However, an estimated 10%–25% of patients frequently encounter distinctive symptom profiles, noticeably featuring intense biliary colic interlaced with acute cholecystitis. Substantive concurrent progressions culminate in related secondary complications dictating 1%–2% of comprehensive diagnoses [5]. Specifically, symptoms and pronounced sequential complications primarily trace corresponding trajectories mapping instances of sequential stone migrations directly obstructing subsequent common bile ducts. Identifiable consequences underscore explicit bile flow

stagnation propelling systemic biliary pain paired directly alongside distinct jaundice profiles [6]. Chole-
docholithiasis is clinically branching into primary versus juxtaposed secondary occurrences. Primary con-
figurations characterize distinctly intrinsic stone formulation deeply situated within corresponding biliary
architectures, whereas associated secondary representations typically constitute migrations departing fun-
damental gallbladder formations. Explicitly evaluating primary typologies highlights prominently brown
pigmentations composed sequentially of corresponding calcium bilirubinate. Correspondingly, such man-
ifestations remain remarkably rare within distinct Western demographical representations yet portray es-
calated prevalence among Asian variants, albeit yielding inexact pathological mappings. Alternatively, dis-
tinct secondary derivations dominantly embed concentrated cholesterol typologies. Throughout annual
cholecystectomy mappings remedying fundamental cholelithiasis implementations, subsequent choledo-
cholithiasis profiles account for 5%–15% of related incidence rates, directly driving subsequent secondary
developments spanning post-surgical frameworks [7].

Effective choledocholithiasis management commands pronounced clinical focus. Managing symp-
tomatic profiles explicitly targets definitive comprehensive choledocholithiasis ablation paired closely
alongside corresponding cholecystectomy procedures. Conventional open surgical pathways character-
istically prescribe cholecystectomy combined with sequential common bile duct investigation supple-
mented through parallel T-tube drainage schemas. Unavoidably, parallel protocols mandate drastically
elevated surgical lesion implications subsequently driving substantial arrays dictating pronounced postop-
erative complication likelihood [8]. During preceding decades spanning medical evolution arrays, paral-
lel minimally invasive transformations sequentially pioneered groundbreaking restorative schemas. Ac-
cordingly, independent laparoscopic cholecystectomy deployments emerged solidifying gold-standard
paradigms effectively managing symptomatic cholelithiasis models, yet lacking unilaterally standardized
benchmarks targeting interconnected choledocholithiasis deployments. Currently, dominant therapeu-
tic schemas managing compounded expressions broadly categorize toward ERCP combined alongside
distinct laparoscopic cholecystectomies versus parallel laparoscopic cholecystectomies paired sequentially
intersecting distinct choledochoscopy-centric trans-cystic extractions. Correspondingly, subsequent pro-
cedural orientations executing explicit ERCP configurations alongside laparoscopic variables differentiate
distinctly highlighting preceding ERCP execution models subsequently opposed utilizing post-surgical
ERCP frameworks. Currently, implementing fundamental preoperative ERCP paradigms preceding sub-
sequent sequential laparoscopic cholecystectomy deployments effectively remains establishing uniformly
preferred therapeutic representations internationally [9].

Parallel analytical assessments confirm sequentially mitigated ERCP combined laparoscopic technique
outcomes subsequently highlighting significantly subsided generalized complication metrics actively con-
tradicting alternative control configurations ($P < 0.05$). Explicit comparative evaluation targeting parallel
open surgical schemas uniquely defines profoundly condensed operational profiles, accelerated general-
ized recovery metrics, dramatically minimized generalized complications paired favorably intersecting
substantially contracted corresponding clinical hospitalizations [10]. Distinct physiological reviews under-
score explicitly amplified tissue trauma configurations intricately governing specific open methodologies.
Inevitably intensified intraoperative bleeding compounded across expanded generalized incisions strictly
inflates substantial associative possibilities propelling profound systemic infections natively. Additionally,
mandated pervasive T-tube implementations sequentially aggravate comprehensive gastrointestinal op-
erational stability, profoundly disrupting subsequent indispensable nutrient assimilation frameworks uni-
formly depressing overall convalescent expedition paths. Correspondingly incorporating minimally in-
vasive ERCP alongside subsequent sequential laparoscopic execution empowers explicit clinical oversight
navigating distinctly comprehensive common bile duct stone variables. Furthermore, uniformly evading
mandatory T-tube deployments radically excludes associated localized abdominal pain constraints seam-
lessly abolishing interrelated sequential biliary tract complications actively validating prominent minimal

trauma advantages. Simultaneously, absolute circumvention distinctly preserving fundamental localized biliary structural integrities firmly ensures corresponding substantial safety configurations consistently contracting systemic hospital stay parameters uniformly optimizing generalized recuperation ^[11].

Patients diagnosed across compounded cholecystolithiasis mapping interconnected choledocholithiasis scenarios broadly present specific hepatic pathological conditions significantly prompted via distinct cholecystitis manifestations intimately aligned against systemic stone obstruction impacts. Empirical analytical representations derived from corresponding distinct study iterations assert explicitly validating robust minimally invasive methodologies remarkably recuperating corresponding fundamental localized intrahepatic functionality mapping significantly eclipsing corresponding open methods. Substantial underlying causalities delineate profound sequential traumatic parameters intrinsically tied across distinct open methodologies. Substantial postoperative complication inflations identically paired alongside comprehensive foundational T-tube architectural impairments drastically hinder associated sequential functional recovery dynamics ^[12]. Alternatively, explicit integrated minimally invasive integrations distinctly optimize comprehensive common bile duct extraction variables seamlessly mapping the secondary laparoscopic execution phases. Systemic physiological observations sequentially align emphasizing pronounced reductions highlighting precise patient tissue edema instances identically maintaining superior integrated systemic functional statuses, specifically alleviating respective overall profound systemic manifestations intimately promoting rapid convalescent capabilities unconditionally.

Complex pathophysiological cascades and fundamental surgical interventions indiscriminately transmit explicit traumatic stimulations directing interconnected sequential bodily inflammatory variables uniquely culminating inside generalized biological expressions. Simultaneously, explicitly inflicted systemic surgical operations comprehensively induce intensified localized somatic pain mapping explicitly mediating underlying corresponding neurogenic inflammatory variables strictly delaying uniform holistic sequential rehabilitation spans ^[13]. Subsequent analytical interpretations decisively map congruent alignments actively validating specific ERCP and laparoscopic permutations sequentially neutralizing precise postoperative systemic inflammatory cascades. Pronounced correlations exclusively attribute distinctive significant tissue impairments sequentially mapped across comprehensive open architectures identically propelling extensive intense postoperative manifestations uniformly inflaming subsequent biological generalized defensive responses ^[14, 15]. Thus, comprehensive explicit endoscopic combined integrated laparoscopic visual protocols exclusively safeguard immaculate clinical precision distinctly inhibiting pervasive incremental internal destructions. Explicitly narrow procedural incisions decisively obviate cyclical intrusive tract repetitions implicitly minimizing comprehensive invasive systemic interactions inherently depressing precise explicit sequential inflammation manifestations alongside seamlessly reversing localized mucosal edema frameworks securely nullifying uniform immunosuppression cascades unconditionally ^[16].

In conclusion, employing ERCP combined with laparoscopic cholecystectomy perfectly governs cholecystolithiasis compounded with sequential choledocholithiasis models, yielding consistently superior postoperative stone clearance efficacies intimately aligned against pronounced contracted physiological hospitalizations. Distinctive explicit advantages uniformly feature substantially suppressed complication implementations smoothly mapping minimal functional hepatobiliary discrepancies seamlessly minimizing holistic overarching inflammatory profile translations explicitly reinforcing phenomenal ultimate clinical applicability values.

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References

[1] Liao Y, Cai Q, Zhang X, et al. Single-stage intraoperative ERCP combined with laparoscopic chole-

- cystectomy versus preoperative ERCP Followed by laparoscopic cholecystectomy in the management of cholecystocholedocholithiasis: A meta-analysis of randomized trials[J]. *Medicine (Baltimore)*, 2022, 101(10): e29002.
- [2] Guo T, Wang L, Xie P, et al. Surgical methods of treatment for cholecystolithiasis combined with choledocholithiasis: six years' experience of a single institution[J]. *Surg Endosc*, 2022, 36(7): 4903-4911.
- [3] Zhang JX, He XP, Zhang J, et al. Effectiveness and safety of LCBDE with primary duct closure versus ERCP plus laparoscopic cholecystectomy[J]. *Journal of Practical Medicine*, 2021, 37(12): 1574-1579.
- [4] Editorial Board of Chinese Journal of Digestion, Hepatobiliary Disease Collaboration Group of Chinese Society of Gastroenterology. Consensus point of view of diagnosis and treatment of chronic cholecystitis and gallstones in China (2018)[J]. *Chinese Journal of Digestion*, 2019, 39(2): 73-79.
- [5] Fang J, Wang A, Sun XY, et al. Comparison of three-endoscope combined multistage surgery and laparoscopic surgery in the treatment of elderly patients with choledocholithiasis combined with cholecystolithiasis[J]. *Journal of Clinical Hepatology*, 2022, 25(5): 730-733.
- [6] Chen A, Bo QS, Tan K. Clinical efficacy of laparoscopic cholecystectomy combined with endoscopic retrograde cholangiopancreatography for elderly patients with gallstones combined with common bile duct stones[J]. *China Journal of Endoscopy*, 2022, 28(11): 57-64.
- [7] Chen XL, Pan YH, Zhang MQ. Optimal timing of laparoscopic cholecystectomy in patients with mild pancreatitis after ERCP[J]. *Chinese Journal of Pancreatology*, 2022, 22(1): 68-71.
- [8] Yin Y, He K, Xia X. Comparison of primary suture and t-tube drainage after laparoscopic common bile duct exploration combined with intraoperative choledochoscopy in the treatment of secondary common bile duct stones: A single-center retrospective analysis[J]. *J Laparoendosc Adv Surg Tech A*, 2022, 32(6): 612-619.
- [9] Lei C, Lu T, Yang W, et al. Comparison of intraoperative endoscopic retrograde cholangiopancreatography and laparoscopic common bile duct exploration combined with laparoscopic cholecystectomy for treating gallstones and common bile duct stones: a systematic review and meta-analysis[J]. *Surg Endosc*, 2021, 35(11): 5918-5935.
- [10] Wu ZD, Xu G, Ban KF. Clinical analysis of ERCP+LC and LCBDE+LC+T-tube drainage in the treatment of choledocholithiasis combined with cholelithiasis[J]. *Chinese Journal of Medical Physics*, 2022, 39(11): 1412-1416.
- [11] Xie J, Liu XD, Rao XL, et al. Comparison of different minimally invasive surgical methods for cholecystolithiasis combined with choledocholithiasis[J]. *Chinese Journal of General Surgery*, 2021, 30(09): 1121-1126.
- [12] Liang B, Jiang YB, Zheng JJ. Effectiveness and mechanism of LC+LCBDE versus ERCP+LC in the treatment of cholecystolithiasis combined with choledocholithiasis[J]. *Journal of North Sichuan Medical College*, 2022, 37(10): 1296-1299.
- [13] Duan XB, Li XM, Ma C, et al. Comparative study on LC+LCBDE+PDC versus ERCP+EST+LC for the treatment of cholecystolithiasis combined with choledocholithiasis[J]. *Journal of Hepatobiliary Surgery*, 2021, 33(01): 10-14.
- [14] Li JY, Hao JC, Zhao JX, et al. Effects of one-stage LC and LCBDE on elderly patients with cholecystolithiasis and choledocholithiasis[J]. *Journal of Beihua University (Natural Science Edition)*, 2022, 23(05): 638-642.
- [15] Lin QM, Wang GL, Wu ZX, et al. Meta-analysis of the efficacy and safety of one-stage LCBDE+LC versus sequential two-stage ERCP/EST+LC in the treatment of cholecystolithiasis combined with choledocholithiasis[J]. *Chinese General Practice*, 2021, 24(14): 1805-1812.