



# Expert Consensus on the Interventional Treatment of Choledocholithiasis with Integrative Medicine

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## Abstract

Percutaneous transhepatic papillary balloon drainage (PTPBD) is a newly emerging interventional treatment modality for choledocholithiasis in China. Compared with other treatments, it has some advantages. Traditional Chinese medicine has been proven to have certain advantages in the treatment of choledocholithiasis, with reliable efficacy, few side effects, and a low recurrence rate. To standardize the clinical practice of choledocholithiasis, facilitate the application of PTPBD, and improve the diagnosis and treatment of integrative medicine, the Chinese College of Interventionalists organized multidisciplinary experts to discuss and formulate this consensus. This consensus aims to regulate the patient selection and technical process of PTPBD and the diagnosis and treatment scheme of integrative medicine.

## Keywords

- ▶ choledocholithiasis
- ▶ integrative medicine
- ▶ expert consensus
- ▶ interventional treatment

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## Introduction

Cholelithiasis, including intrahepatic bile duct stones, gallbladder stones, common hepatic duct stones, and choledocholithiasis, is a common disease in China.<sup>1</sup> According to autopsy data from the 1980s, the average incidence of cholelithiasis in China was 7%, and it could reach 23% with an increase in age to 80 years.<sup>1</sup> Most patients with cholelithiasis have no clinical symptoms and are diagnosed during physical examination. Some patients, especially those with choledocholithiasis, exhibit symptoms such as recurrent biliary colic, jaundice, or fever.<sup>2</sup> Once the above symptoms appear (concurrent cholangitis, biliary obstruction, or biliary pancreatitis), they often lead to serious consequences.

Open common bile duct (CBD) exploration and lithotomy are the main treatments for choledocholithiasis. In recent decades, with the development of laparoscopic CBD lithotomy, endoscopic retrograde cholangiopancreatography (ERCP), and other techniques,<sup>3–14</sup> a batch of minimally invasive treatment methods have also been used in clinical practice,<sup>15</sup> which challenges traditional surgical methods, and the multidisciplinary diagnosis and treatment of patients with choledocholithiasis have made remarkable progress.<sup>16–18</sup>

Since the 1960s, Mondet and Mazzariello have begun to use percutaneous transhepatic technique to treat choledocholithiasis.<sup>19–24</sup> In recent years, many hospitals in China have successively performed percutaneous transhepatic papillary balloon dilation (PTPBD) for the treatment of choledocholithiasis and achieved satisfactory therapeutic effects.<sup>25–28</sup> Traditional Chinese medicine (TCM) has certain advantages in the treatment of choledocholithiasis, which can significantly improve the symptoms and inhibit the formation of cholelithiasis, with reliable efficacy, small side effects, and low recurrence rate.<sup>29</sup>

To standardize the clinical practice of choledocholithiasis, facilitate the application of PTPBD, and improve the diagnosis and treatment of integrative medicine, the Chinese College of Interventionalists organized many experts to discuss repeatedly and formulate this expert consensus on integrative medicine for interventional treatment of choledocholithiasis. This consensus follows the principles of evidence-based medicine and refers to domestic and foreign literature, expert experience, relevant professional consensus, or guidelines. It is formulated in the light of the actual domestic situation and will be continuously improved with the development of interventional technology.

## Diagnosis

### Symptoms and Signs

Typical patients with choledocholithiasis have abdominal pain, chills, high-grade fever, jaundice (Charcot's triad), and, in severe cases, decreased blood pressure and neuropsychiatric symptoms (Reynolds' quintuplet). On physical examination, yellow staining of the sclera and skin, pressure, rebound pain and/or muscle tension in the right upper

abdomen, and sometimes Murphy's sign (+) may be observed.<sup>2</sup> There may be no obvious signs or symptoms during the interictal period. Some patients with choledocholithiasis are asymptomatic.

### Laboratory and Imaging Investigations

(1) Assessment of patients with suspected choledocholithiasis usually includes serum tests,<sup>30</sup> including routine blood tests, liver function tests, renal function tests, blood biochemistry, coagulation series, CA199, and inflammatory markers (including procalcitonin, C-reactive protein, and erythrocyte sedimentation rate).

(2) Ultrasound of the abdomen: It can show dilatation of the internal and external bile ducts and is the screening tool of choice for choledocholithiasis.<sup>27</sup> However, transabdominal ultrasound often does not clearly demonstrate the lower part of the CBD and has a false-negative rate of more than 30% for the diagnosis of choledocholithiasis.<sup>31</sup> Therefore, further imaging is recommended in patients with suspected choledocholithiasis.

(3) Computed tomography (CT) or magnetic resonance imaging (MRI): CT has a specificity of 84 to 100% and a sensitivity of 65 to 93% for the diagnosis of choledocholithiasis<sup>31</sup>; tomographic MRI has a sensitivity and specificity similar to that of CT. It can be used in patients with negative ultrasound examinations.

(4) Magnetic resonance cholangiopancreatography (MRCP): MRCP can show lesions of the bile and pancreatic ducts and the anatomical details of the biliary system more visually and clearly and has a higher diagnostic rate for stones  $\geq 3$  mm.<sup>32,33</sup> MRCP has a high reference value for preoperative diagnosis and identifying indications and contraindications.

(5) Endoscopic ultrasonography: The sensitivity of diagnosing choledocholithiasis is 84 to 100% and the specificity is 96 to 100%,<sup>31</sup> and it is particularly suitable for diagnosing microscopic stones in the bile duct. However, the prevalence of this condition is low. This can be used as an alternative test.<sup>10,32</sup>

(6) Percutaneous transhepatic cholangiography (PTC): In patients with highly suspected or clearly diagnosed cholelithiasis, aggressive PTC imaging is recommended to further clarify the condition and establish access to percutaneous transhepatic lithotripsy.<sup>33</sup>

(7) ERCP: The sensitivity of diagnosing bile duct stones ranges from 79 to 100%, and the specificity ranges from 87 to 100%.<sup>31</sup> Because of the technical difficulty and risk of trauma, simple diagnostic ERCP is not recommended at present but only for others with unclear diagnosis and height.

### Establishing the Diagnosis

Imaging is the gold standard for diagnosis. The diagnosis should be established once abdominal ultrasound, CT, MRI, or MRCP shows choledocholithiasis, regardless of whether the patient presents with symptoms or positive signs and whether laboratory tests suggest infection or obstructive jaundice.

## Traditional Chinese Medicine Differentiation

### (1) Liver constraint and qi stagnation syndrome

Main symptoms: right costal distending pain, which may be associated with pain in the back of the shoulder; loss of appetite; emotional overlay.

Secondary symptoms: chest tightness and belching or nausea; dry throat and bitter taste; ungratifying defecation.

Tongue and pulse: pink tongue, thin white coating, wiry, and rough pulse.

Determination of the type of symptoms: with two of the main symptoms and one or two of the secondary symptoms, if the symptoms are not obvious, refer to the biochemical examination and the tongue and pulse manifestation.

### (2) Damp heat syndrome of liver and gallbladder

Main symptoms: right costal or upper abdominal unpalpable pain, mostly radiating to the right shoulder; deep-colored urine; loose stool or constipation; fever and aversion to cold; jaundice.

Secondary symptoms: dry, bitter, and sticky mouth; bloating and low appetite; general weakness; nausea and vomiting.

Tongue and pulse: red tongue with yellowish coating; wiry, slippery, and rapid pulse.

Determination of the type of symptoms: with two of the main symptoms and one or two of the secondary symptoms, if the symptoms are not obvious, refer to the biochemical examination and the tongue and pulse manifestation.

### (3) Liver yin insufficiency syndrome

Main symptoms: vague pain or slight burning sensation in the right costa; dry mouth and dry throat.

Secondary symptoms: dryness of the eyes; impatience and irritability, dysphoria in chest palms-soles; little sleep and dreaminess; dizziness.

Tongue and pulse condition: red or cracked tongue or light peeling tongue-coating, stringed and thin and rapid, or sunken and thin and rapid pulse.

Determination of the type of symptoms: with two of the main symptoms and one or two of the secondary symptoms, if the symptoms are not obvious, refer to the biochemical examination and the tongue and pulse manifestation.

### (4) Blood stasis syndrome

Main symptoms: stabbing pain in the right hypochondrium, with unpalpable pain in a fixed place; pain worsens at night.

Secondary symptoms: bitter and dry mouth; stuffy chest and dullness; dry stools; dull complexion.

Tongue and pulse condition: purple and dull tongue, or petechiae and petechiae on the edge of the tongue, deep, and rough pulse.

Determination of the types of symptoms: with two of the main symptoms and one or two of the secondary symptoms, if the symptoms are not obvious, refer to the

biochemical examination and the tongue and pulse manifestation.

### (5) Heat-toxin inner stagnation syndrome

Main symptoms: persistent high fever; severe pain in the right side of the ribs and abdomen; refusal to press on the painful area.

Secondary symptoms: delirium, shortness of breath; frequent urination, with a small volume of urine each time; a burning sensation when urinating; dipsesis, coma and delirium.

Tongue and pulse condition: vivid red or purple tongue, dry tongue, greasy tongue-coating or grayish black without coating, surging, and rapid pulse or wiry pulse.

Determination of the type of symptoms: with two of the main symptoms and one or two of the secondary symptoms, if the symptoms are not obvious, refer to the biochemical examination and the tongue and pulse manifestation.

## Differential Diagnosis

(1) Malignant tumors of the bile ducts: When malignant bile duct tumors develop to a certain degree, symptoms such as jaundice and fever may appear. In some patients with abdominal pain, poor appetite, weakness, weight loss, and other symptoms, abdominal contrast-enhanced CT and MRCP can play a role in diagnosis. Pathology is the gold standard for diagnosis.

(2) Pancreatic head carcinoma: If pancreatic head carcinoma compresses the end of the CBD, obstructive jaundice may occur. However, some patients have low back pain, and abdominal contrast-enhanced CT can provide a clear diagnosis. Pathology is the gold standard for diagnosis.

(3) Choledochal cyst: Mostly manifests as simple jaundice. Abdominal B-ultrasonography and CT can provide a clear diagnosis.

(4) Inflammatory lesions, such as primary sclerosing cholangitis, pancreatitis, cholecystitis, infectious hepatitis, jaundice, and fever may also appear. Serological and imaging studies can help clarify the diagnosis.

## Patients Selection

### Indications

(1) Patients with choledocholithiasis with definitive abnormalities in the upper gastrointestinal tract, including Billroth II anastomosis, gastroesophageal varices, and parapancreatic diverticulum.

(2) Patients with choledocholithiasis that fail in endoscopic treatment or recur after surgery.

(3) Patients with choledocholithiasis unwilling to undergo endoscopic or surgical treatment.

### Relative Indications

(1) Concomitant hepatolithiasis: three or more number of hepatolithiasis located in the right and left hepatic ducts

(primary bile duct) can be dragged into the CBD with a Fogarty balloon catheter, and then PTPBD can be performed to remove the stones.

(2) Concomitant gallbladder stones: three or more gallbladder stones of diameters  $\leq 1$  cm can be removed by oral administration of ursodeoxycholic acid, or an 8F guide catheter can be selectively inserted into the gallbladder via the gallbladder duct, and a lithotripsy basket can be placed via the guide catheter to grasp the stones into the CBD. After that, PTPBD can be performed to remove the stones.

(3) Nondilatation of the intrahepatic bile duct: In such patients, the gallbladder can be punctured under ultrasound guidance, and a channel can be established through the cystic duct for PTPBD stone extraction.<sup>34,35</sup>

(4) Concomitant acute cholangitis or biliary pancreatitis: With the administration of antibiotics, percutaneous transhepatic cholangial drainage (PTCD) should be performed. PTPBD should be performed after the symptoms of infection disappear.

### Contraindications

(1) Large choledocholithiasis with a diameter  $> 28$  mm.<sup>26</sup>

(2) Multiple intrahepatic bile duct stones: PTPBD is not recommended for patients with three or more number of intrahepatic bile duct stones or stones located in the secondary or tertiary bile ducts.

(3) Multiple gallbladder stones: Too many gallbladder stones ( $> 3$ ) with significant tortuosity of the cystic duct are not recommended for PTPBD treatment because of the long operation time, high exposure, and low rate of complete stone removal.

(4) Severe cardiac insufficiency (New York Heart Association class III–IV) or advanced lung disease as determined by consultation with respiratory disease specialists.

(5) Karnofsky performance score of less than 70.

(6) Liver dysfunction (Child–Pugh class C) or stage 3 to 5 chronic kidney disease.

(7) Uncorrectable coagulopathy (prothrombin time was prolonged by more than 3 seconds, platelet count  $< 60 \times 10^9/L$  with a baseline value of  $125\text{--}350 \times 10^9/L$ ).

## Percutaneous Transhepatic Papillary Balloon Drainage Procedure

### Preoperative Preparation

(1) Preoperative evaluation, including routine blood tests, liver function tests, renal function tests, blood biochemistry, coagulation function test, CA199, electrocardiograph, echocardiography, and pulmonary function examination.<sup>17,32</sup>

(2) Imaging examination, including abdominal ultrasound, CT, or MRCP, which can evaluate the number, diameter, location of the stones, and anatomic features of the bile duct.<sup>30</sup>

(3) Antibiotics: prophylactic administration should be considered in patients with jaundice and abdominal

pain without fever and bacterial infection. For patients with fever and bacterial infection, aggressive and sensitive antibiotics should be administered according to blood cultures.<sup>36</sup> Bile can be extracted through an intraoperative puncture sheath or a postoperative biliary drainage tube can be used for bacterial culture and drug sensitivity tests, and the medication regimen can be adjusted according to the results.

(4) Somatostatin and octreotide acetate: Biliary or intestinal hemorrhage may be caused by percutaneous puncture and damage of the sphincter of Oddi. Pancreatitis may be caused by tiny stones migrating into the pancreatic duct. Somatostatin and octreotide acetate may effectively reduce the incidence of such complications.

(5) Anesthesia: Puncture of the biliary tree and dilation of the sphincter of Oddi may cause discomfort. Biliary-cardiac reflexes could lower the heart rate and decrease blood pressure. Therefore, intravenous anesthesia should be recommended to ensure patient comfort and decrease risks.

### Percutaneous Transhepatic Papillary Balloon Drainage Protocol

Participants undergo moderate sedation with a 0.1-mg fentanyl bolus and dexmedetomidine infusion at a rate of  $1.5 \mu\text{g}/\text{kg}/\text{h}$ . A tertiary branch (right anterior branch) of the right hepatic duct should be punctured with fluoroscopic guidance in participants with intrahepatic biliary dilatation and with both fluoroscopic and US guidance in participants with no apparent intrahepatic biliary dilatation.<sup>26</sup> Cholangiography is conducted using contrast media diluted 1:1 in normal saline to delineate the anatomy of the biliary ductal system and reveal the location, size, and number of choledocholithiasis.

A 150-cm-long, 0.035-inch-diameter guidewire should be advanced to the duodenum using a 5-Fr tapered-angle angiographic catheter through a vascular introducer sheath. The 150-cm-long guidewire should then be exchanged for a 260-cm-long stiff guidewire. An appropriate balloon and catheter sheath are selected according to the diameter of the largest stone, and the diameter of the balloon should not exceed 28 mm.<sup>26,37,38</sup>

The papilla could gradually be dilated, which typically takes 30 to 60 seconds and should be repeated three to four times.<sup>38</sup> After sphincter dilatation, the balloon is deflated, withdrawn, reinflated, and used to push the stones into the duodenum. This procedure should be repeated until all stones are expelled into the duodenum, which can be verified using cholangiography. If the stone is too large, it can be used with a lithotripsy basket or other lithotripsy modalities.<sup>25,37,39</sup>

The sheath should be withdrawn, and the guidewire is left inside. An 8.5-Fr drainage catheter (Cook Medical, Bloomington, IN, United States) is introduced along the guidewire and placed in the CBD for external drainage.<sup>38</sup> Cholangiography should be performed 1 week later, and the drainage catheter could be withdrawn if there is no residual stones. PTPBD should be repeated if residual stones are identified.<sup>40,41</sup>

## Postprocedure Management

- (1) Persistent vital signs and oxygen saturation monitoring for 24 hours. The patient should remain in the supine position for 6 hours. Blood pressure, pulse rate, abdominal signs, and general status should be monitored.
- (2) Recording quantities and characteristics of bile. Antibiotics should be adjusted according to the results of bacterial culture and drug sensitivity of the bile if necessary.
- (3) Administration of hepatoprotective drugs, nutritional support, and symptomatic treatment to maintain biochemical balance.
- (4) Routine blood tests, hepatic and renal function tests, serum biochemistry, and amylase tests should be performed regularly.

## Complications and Management

- (1) Hemorrhage: This may occur due to puncture damage, including intercostal artery bleeding, intrahepatic artery bleeding, intrahepatic portal vein or hepatic vein bleeding, extrahepatic vascular bleeding. Moreover, patients with jaundice may experience an inhibition in the absorption of vitamin K, which deteriorates coagulation and causes severe hemorrhage. Sometimes, the bleeding stops spontaneously by closing the drainage catheter.<sup>42</sup> In severe cases, vessel embolization should be performed.
- (2) Infection: Patients with infection experience repeated shaking, fever, elevated white blood cells, and neutrophilic granulocytes that occur preoperatively or postoperatively. Cholestasis, inadequate drainage, and reflux cholangitis are the main causes. Therefore, for patients with acute biliary infection, adequate drainage should be recommended during the procedure. To prevent reflux cholangitis, the drainage catheter should be closed in patients with normal bilirubin levels.
- (3) Bile peritonitis: It should be considered a type of chemical peritonitis resulting from bile leakage. The breath-hold puncture should be performed to avoid liver damage. Access should be kept away from the hilum by puncturing the segmental biliary duct.<sup>43</sup>
- (4) Pancreatitis: It is rare. Somatostatin and octreotide acetate could effectively reduce the incidence of such complications. Once diagnosed, the patient should be treated with multidisciplinary consultation.<sup>44</sup>
- (5) Injury to the duodenum: This is associated with stone shape, stone diameter, the size of the balloon catheter, and unskilled operation. Stones with a large diameter and irregular shape should be pulverized before balloon pushing. A shorter balloon catheter and extrastiff guidewire help avoid duodenal injuries. Surgery should be performed if necessary.

## Traditional Chinese Medicine Treatment

It is generally accepted that extrahepatic and intrahepatic bile duct stones with good gallbladder function and no stenosis at the lower end of the CBD as well as residual stones after biliary surgery can be treated with Chinese

medicine for lithotripsy or litholysis, with gallstones not exceeding 10 mm in diameter.

## Traditional Chinese Medicine Treatment Based on Syndrome Differentiation

- (1) Liver constraint and qi stagnation syndrome  
Principle of treatment: Dispersing stagnated liver qi for relieving qi stagnation, regulating qi and relieving pain, and facilitating bile stone drainage.  
TCM prescriptions: modified Chaihu Shugan Powder (*Jing Yue Quan Shu*). Composition of the prescription: Chaihu (*Stellariae Radix*), Baishao (*Paeoniae Radix Alba*), Xiangfu (*Cyperus Rhizoma*), Zhiqiao (*Aurantii Fructus*), Jinqiancao (*Herba Lysimachiae*), Chenpi (*Citri Reticulatae Pericarpium*), Chuanxiong (*Rhizoma Ligustici Chuanxiong*), and Zhi Gancào (*Glycyrrhizae Radix*).  
Modification: If the pain is severe, add Yanhusuo (*Rhizoma Corydalis*), Qingpi (*Pericarpium Citri Reticulatae Viride*); if the qi stagnation turns into fire and phlegm fire disturbs the heart, the symptoms include dry mouth, bitterness, irritability, sleeplessness, yellow tongue coating and string-like pulse, add Shanzhizi (*Gardeniae Fructus*), Danpi (*Cortex Moutan*), Huangqin (*Scutellaria Baicalensis*), Huanglian (*Coptidis Rhizoma*); if the liver qi stagnation is heavy, accompanied by bitter fullness and pain in the chest and the heart and sighing, add Xiangfu (*Cyperus Rhizoma*) and Chuanlianzi (*Fuctus Meliae Toosendan*).
- (2) Damp heat syndrome of the liver and gallbladder  
Principle of treatment: clearing heat and removing dampness and facilitating bile stone drainage.  
TCM Prescriptions: modified Dachaihu Decoction (*Treatise on Typhoid Fever: Chapter Taiyang Disease*). Composition of the prescription: Chaihu (*Stellariae Radix*), Houpo (*Cortex Magnoliae Officinalis*), Huangqin (*Scutellaria Baicalensis*), Jinqiancao (*Herba Lysimachiae*), Zhishi (*Fructus Aurantii Immaturus*), Yujin (*Curcumae Radix*), Fuling (*Poria*), Dahuang (*Radix et Rhizoma Rhei*), Yinchen (*Herba Artemisiae Scopariae*), Gancào (*Glycyrrhizae Radix*).  
Modification: Add Zhizi (*Fructus Gardeniae*), Longdancào (*Gentiana scabra Bunge*) if the heat and toxicity are strong and jaundice is distinct; add Dahuang (*Radix et Rhizoma Rhei*) to 20 to 30 g if the abdominal distension is strong and jaundice is distinct; add Laifuzi (*Radish Seed*) and Mangxiao (*Glauber Salt*) if the abdomen is distended and the stool is constipated; add Danzhuye (*Iophatherum herb*), if the urine is deep-colored and astringent.
- (3) Liver yin insufficiency syndrome  
Principle of treatment: nourishing yin and clearing heat and facilitating bile stone drainage.  
TCM prescriptions: modified Yiguanjian Decoction (*Xu Mingyi Lei'an*). Composition of the prescription: unprocessed Dihuang (*Rehmannia Root*), Maidong (*Ophiopogonis Radix*), Shashen (*Adenophora Stricta*), Baishao (*Paeoniae Radix Alba*), Chishao (*Paeoniae Radix Rubra*), Gouqizi (*Lycii Fructus*), E Jiao (*Asini Corii Colla*), Danshen

(*Salvia Miltiorrhiza*), *Jineijin* (*Galli Gigerii Endothelium Corneum*), *Zhiqiao* (*Aurantii Fructus*), and *Chuanlianzi* (*Fuctus Meliae Toosendan*).

Modification: add *Xuanshen* (*Scrophulariae Radix*) and *Tianhuafen* (*Trichosanthis Radix*) if dry throat, dry mouth, and red tongue with little fluid; add *Digupi* (*Lycii Cortex*) and *Qinghao* (*Artemisiae Annuae Herba*) if the yin is deficient and the fire is strong.

#### (4) Blood stasis syndrome

Principle of treatment: removing blood stasis and clearing the ligaments and dispersing stagnated liver qi for promoting bile flow.

TCM prescriptions: modified *Gexia Zhuyu Decoction* (*Yi Lin Gai Cuo*). Composition of the prescription: fried *Lingzhi* (*Trogopterori Faeces*), *Taoren* (*Persicae Semen*), *Danggui* (*Angelicae Sinensis Radix*), *Danpi* (*Cortex Moutan*) to be ground for powder, *Chuanxiong* (*Rhizoma Ligustici Chuanxiong*), *Chishao* (*Paeoniae Radix Rubra*), *Yanhusuo* (*Rhizoma Corydalis*), *Xiangfu* (*Cyperii Rhizoma*), *Wuyao* (*Linderae Radix*), *Honghua* (*Carthami Flos*), *Zhiqiao* (*Aurantii Fructus*), and *Gancao* (*Glycyrrhizae Radix*).

Modification: for heavier blood stasis, add *Mengchong* (*Tabanus*), *Sanleng* (*Sparganii Rhizoma*), and *Ezhu* (*Curcumae Rhizoma*) to invigorate blood and break blood stasis; for the pain is obvious, add *Danshen* (*Salvia Miltiorrhiza*), *Ruxiang* (*Olibanum*), and *Moyao* (*Myrrh*) to invigorate blood and relieve pain.

#### (5) Heat-toxin inner stagnation syndrome

Principle of treatment: clearing heat and removing toxins and dispersing stagnated liver qi for promoting bile flow.

TCM prescriptions: modified *Dachengqi Decoction* combined *Yinchenhao Decoction* (*Treatise on Febrile Diseases*). Composition of the prescription: *Dahuang* (*Radix et Rhizoma Rhei*), *Houpo* (*Cortex Magnoliae Officinalis*), *Mangxiao* (*Natrii Sulfas*), *Zhishi* (*Fructus Aurantii Immaturus*), *Zhizi* (*Fructus Gardeniae*), *Yinchenhao* (*Artemisiae Scopariae Herba*), *Jinjiancao* (*Herba Lysimachiae*), *Yujin* (*Curcumae Radix*), *Huzhang* (*Giant Knotweed Rhizome*), *Pugongying* (*Dandelion*), *Chenpi* (*Citri Reticulatae Pericarpium*), and *Qingpi* (*Pericarpium Citri Reticulatae Viride*).

Modification: if jaundice is evident, add *Jinjiancao* (*Herba Lysimachiae*) and *Yinchenhao* (*Artemisiae Scopariae Herba*) to 30 to 60 g; if delirium is present, double the amount of *Dahuang* (*Radix et Rhizoma Rhei*) or treat with *Zhibao Bolus* or *Angong Niu Huang Pills*.

### Acupuncture Treatment

Point selection: Acupuncture is commonly used to take *Zhigou* (SJ 6), *Yanglingquan* (GB 34), *Qixu* (GB 40), *Danshu* (BL 19), *Riyue* (GB 24), *Qimen* (LR 14), *Zusanli* (ST 36), etc. The body acupuncture is done with a milli needle using the reinforcing and reducing method of acupuncture with the syndrome. Needle is retained for 20 to 30 minutes after *Deqi*. Syndrome differentiation-based modifications of acupoints: for liver depression and qi stagnation, *Zhigou* (SJ 6), *Taichong* (LR 3), and *Xingjian* (LR 2) are added, using the reducing

method of acupuncture; for blood stasis, *Xuehai* (SP 10) and *Geshu* (BL 17) are added, using the reducing method of acupuncture; for liver and gallbladder damp-heat, *Xingjian* (LR 2), *Xiaxi* (GB 43), and *Sanyinjiao* (SP 6) are used with a reducing method of acupuncture; for liver and kidney Yin deficiency, *Taixi* (KI 3), *Sanyinjiao* (SP 6), *Ganshu* (BL 18), and *Shenshu* (BL 23) are used with the reinforcing method of acupuncture. The common points of ear acupuncture are pancreaticobiliary, duodenum, dorsum of the ear and liver area, ear root, endocrine, subcortical, sympathetic, and god's gate. The operation method generally uses acupuncture or the routine sterilization of *Wangbu Liuxing seeds* (cowherb seeds) and the seeds are fixed on the ear points with adhesive tape and pressed four to six times a day, each time for 1 minute. Caution: each time the pressure is applied to a unilateral ear point, 3 times/d, two sides alternately. During the course of treatment, the patch is changed 10 times, and generally treated in three to five courses of treatment.

### Key Points of Integrative Medicine Treatment

(1) For patients with relatively small stones (diameter <10 mm), including intrahepatic bile duct stones and extrahepatic bile duct stones, TCM treatment based on syndrome differentiation can be considered, which can be used to soothe the liver and relieve depression, promote gallbladder treatment, and remove stones, and combined with western medicine with stone dissolving effects, such as chenodeoxycholic acid, to control the symptoms and development of cholelithiasis.

(2) TCM treatment based on syndrome differentiation is very important for patients who have undergone surgery to remove stones. It can change the internal environment and constitution of patients and prevent the recurrence of stones.

(3) In some patients with cholelithiasis, who are older or unwilling to undergo surgery, cholelithiasis can be controlled through TCM syndrome differentiation and demonstration, and it can coexist peacefully with cholelithiasis. In addition to the intervention and treatment of drugs, diet regulation, smooth flow of emotions, and mood are also important.

### CRedit Authorship Contribution Statement

B.L. was responsible for data curation and writing—original draft. Z.W. was responsible for data curation and formal analysis. J.G., H.W., C.L., and T.Y. were responsible for resources and formal analysis. K.Z. was responsible for methodology and project administration. Z.D. was responsible for supervision and validation. W.Z., L.J., Z.F., J.S., K.G., H.S., D.F., D.S., and H.J. were responsible for writing—review and editing. Y.L. was responsible for conceptualization, funding acquisition, and writing—review and editing.

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#### Conflict of Interest

The authors declare no conflict of interest.

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