

Overview of recurrent pyogenic cholangitis

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ABSTRACT

Background: The clinical illness known as recurrent pyogenic cholangitis (RPC) is characterized by recurrent suppurative cholangitis caused by hepatolithiasis and extrahepatic stones in the biliary channels. The actual pathophysiology of RPC is still unknown, but certain enteric bacterial species colonizing the biliary tract in conjunction with potential dietary variables have been suggested as potential causes. RPC is frequently referred to as having hepatobiliary surgery, especially segmental hepatectomy, as the only effective treatment.

Objectives: to determine the prevalence of recurrent pyogenic cholangitis, explain the typical symptoms a patient with the condition would exhibit, and describe the diagnosis and treatment of RPC.

Methods: the PubMed database and EBSCO Information Services were utilized to choose the articles. In our review, all pertinent articles related to both our topic and other articles were used. Other articles that have nothing to do with this subject were not included. The group members looked through a certain format in which the data had been extracted.

Conclusion: Recurrent pyogenic cholangitis is a complicated illness, and it is becoming more common in Western nations. Radiologists need to understand how to diagnose this condition and how to use imaging as a benchmark for subsequent treatment. Before the surgical intervention, the intrahepatic distribution of the patient's condition must be determined, and the combined efforts of gastroenterologists, radiologists, and surgeons are necessary for the effective treatment of recurrent pyogenic cholangitis.

Keyword: recurrent pyogenic cholangitis, hepatolithiasis, biliary stones, cholangitis, Cholangiocarcinoma.

Introduction

Recurrent pyogenic cholangitis (RPC) is a syndrome characterized by recurrent bouts of cholangitis caused by intrahepatic and extra hepatic stones, biliary duct structuring, and liver parenchymal atrophy[1,2]. It is an episodic condition brought on by chronic intrahepatic stones, unlike cholangitis brought on by CBD stones (common bile duct stones). In terms of

Symptoms and test results, RPC and spontaneous cholangitis associated with hepatolithiasis are comparable, but RPC has a different pathoetiology and natural history [1, 3]. The first instance of recurrent pyogenic cholangitis was documented in Hong Kong in 1930 [4]. It is also known as Hong Kong illness, Oriental infestation cholangitis, and Oriental

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Cholangiohepatitis [5]. This disease, which was once only seen in South East Asia, is now widespread due in part to increased international travel and population mobility. Its distinctive characteristic is the presence of many intraductal calculi that cause biliary tree dilatation and stricture [6]. Because RPC is an illness with inherent complexity, managing it is challenging. It involves a multidisciplinary team approach for eliminating all stones, establishing adequate biliary outflow, and resecting non-functioning liver regions that could act as infection foci. The literature has documented several surgical and minimally invasive methods. Extracorporeal upset wave lithotripsy, endoscopic retrospective cholangiopancreatography (ERCP), percutaneous transhepaticcholangioscopic lithotripsy (PTCSL), per-oral cholangioscopic lithotripsy (POCSL), and stone extraction are examples of minimally invasive techniques [7,8-9-10]. With these treatments, however, the prevalence of persistent and recurring stones remains significant (20%–50%) [7, 8-9]. RPC surgery typically produces better outcomes than non-operative methods. Biliary enteric bypass surgeries are the major treatment for RPC involving first-order ducts [9]. Some of the complications are as follows: Cholangiocarcinoma, secondary biliary cirrhosis, acute renal damage, Septicemia, disease recurrence, pancreatitis, liver abscess (pyogenic), and portal hypertension [11]. Understanding risk factors is crucial for lowering the likelihood of recurring pyogenic cholangitis. Patients from areas where the disease is endemic need to be informed about the symptoms and minimize risk factors that can be controlled, such as consuming a balanced diet and maintaining a healthy weight. Antihelminthic medications should be used to treat liver fluke infections as necessary to lower the risk of persistent infection. To minimize serious illness consequences, patients with recurring pyogenic cholangitis should seek medical help as soon as possible [11].

Study Objective: To identify the prevalence of recurrent pyogenic cholangitis, describe the typical symptoms a patient with recurrent pyogenic cholangitis would present with and explain the management and treatment of RPC.

Methods

Sample & study groups: Exploratory research employing a quantitative approach was included in this integrative literature review (ILR). It is a strategy used in the health sciences to find health-care approaches and determine innovations, allow the deployment of evidence-based services, ensure

quality, and enhance patient safety. It consists of six phases that must be completed in the following order: The problem of the study was stated, the inclusion and exclusion criteria were listed, the sample was detailed, the included studies were evaluated, the results were interpreted, and the ILR synthesis was presented. Due to their reputation as reliable sources, PubMed and EBSCO Information Services would be used as search databases for the publications used in the study. The National Center for Biotechnology Information (NCBI), a division of the United States National Library of Medicine, founded PubMed, one of the biggest online digital libraries. Topics relevant to recurrent pyogenic cholangitis would be used in the writing of the paper. The titles and abstracts of the published publications would be reviewed. Articles would be chosen for inclusion based on their relevance to the project, which would contain one of the following subjects; recurrent pyogenic cholangitis, RPC, management, or oriental cholangitis. Exclusion criteria: All other papers, repeated studies, and reviews of studies that did not have one of these themes as their major end were disregarded.

Statistical analysis

The data were analyzed without utilizing any application. Data were collected from the source using a prescribed manner that includes (the article title, writer's name, objective, summary, results, and outcomes). To confirm the validity and minimize results, each member was double-checked for mistakes. During the article selection process, studies and their results were double-reviewed to ensure that we enroll research related to the purpose of our study and to avoid or reduce inaccuracies in the results.

Results

The selection and identification of research are shown in (Figure 1). A total of 470 studies were found after searching the aforementioned databases, which were then used for title screening. One hundred and ninety of them were excluded while 307 of them were included for abstract screening. The full texts of the remaining 110 publications were examined. One hundred and one studies were excluded as a result of the full-text revision due to different inclusion criteria, and 9 were enrolled for final data extraction (Table 1). Seven studies out of 9 were prospective studies (searched hospital databases for recurrent pyogenic cholangitis diagnosed patients) and the two studies were from doctors' perspectives after a face-to-face interview or questionnaire-based studies. The only patients (47.5%) who gave their consent to hepatectomy had histological proof of the disease that

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emerged following biliary drainage and stone removal. 31.3% of patients had reoccurring stones after the initial operation, and 28.8% still had extra stones that needed to be removed [12]. Out of the 80 patients, 31 had nonsurgical treatments. ERCP-guided procedures were conducted in 25 of them, while PTC-guided procedures were performed in 6. Out of the 49 patients who had surgical procedures, eight only had hepatectomy, eleven also had operational biliary drainage therapies, and thirty only had operative biliary procedures. Two patients who received bilateral hepatectomy surgery to treat bilateral illness were among those who underwent hepatectomy surgery [9]. In 15% of cases, co-morbidities were found. With or without biliary tract surgery, 39% of patients had cholecystectomy surgery. Thirty-four percent of patients had undergone ERCP and had CBD stones removed before surgery. (49%), the right lobe (13%), and both liver lobes (38%), but not the other two, were damaged. (17%) of the patients who had gallbladders at the time of the surgery also had cholelithiasis, and (63%) of the patients had related choledocholithiasis [13]. Ten percent of patients required HALS and LCDs because of intraoperative bleeding from the left hepatic vein, a lost or damaged ultrasonic dissector tip, and substantial bleeding during choledochotomy, respectively. Four bile leaks, three wound infections, and one intra-abdominal collection made up 26.6% of concerns. The remaining stones were surgically removed in postoperative procedures in 96.6% of patients, utilizing a combination of endoscopic and percutaneous techniques [14]. In 81.6% of the instances, a stone in the intrahepatic duct was found. The liver size was decreasing by (59.7%). The proportion of patients who experienced acute cholangitis, liver abscesses, cirrhotic complications, and (cholangiocarcinoma) CCA, in that order, was 41.3%, 19.4%, 9.7%, 7.4%, and 7.4%. Following hepatectomy, biliary bypass surgery, and choledocholithotomy with T-tube insertion, the complete resolution rates were 82.3%, 55.2%, and 42.1%, respectively [15]. Thirty-six percent of individuals underwent no surgery, while 64% underwent it. In addition to 17 hepatectomies, there were 10 common bile duct explorations with a Hutson loop and a choledochojejunostomy (10 with, 7 without Hutson loop). For cases of lobar atrophy or stones that were limited to a single lobe, liver resection was indicated. Comparable amounts of complications occurred during hepatectomy and common bile duct exploration (35% vs. 30%). Of the 21 patients with

Hutson loops, (33%) needed additional loop use, including three failures. At the most recent check-up, 15 percent of surgical patients reported stone-related symptoms that required percutaneous treatment [16]. Seven of the patients underwent open resections, while ten 17 individuals had hand-assisted laparoscopic resections performed on them. Although the postoperative complication rates for the hand-assisted laparoscopic group were lower than those for the control group (20% vs. 57%; $p = 126$), the difference was not statistically significant. Surgery-related mortality didn't occur in any patient group [17]. Hepatic masses, such as bilomas, abscesses, inflammatory pseudotumors, and cholangiocarcinomas, were seen in 58 out of 352 patients. Additionally, they graded the malignancy using conventional MR findings. The receiver operating characteristic analysis and the Chi-square test were both used. Statistics were used to evaluate the interobserver agreement. MR imaging is quite useful for distinguishing between malignant and benign hepatic tumors in patients with RPC [18]. To address the underlying cause of their recurrent infections, biliary stasis, and hepatic shrinkage, all four East Asian patients had surgery using ERCP. The result for the East Asian patients who underwent surgical therapy was favorable, with no further episodes of cholangitis necessitating a second ERCP and stone removal, in contrast to the Caucasian patient who opted not to undergo surgery [19].

Discussion

Oriental cholangiohepatitis, also known as the liver illness recurrent pyogenic cholangitis is endemic to South East Asia and is characterized by recurrent infections of the biliary system, intrahepatic strictures, and hepatolithiasis. Multiple intraductal calculi that cause biliary tree dilatation and stricture without extrahepatic biliary blockage are what define it. Hepatolithiasis, which causes recurrent pyogenic cholangitis, sets off a vicious cycle of continuing biliary inflammation, chronic epithelial destruction, and recurrent bacterial infection. It is possible to mistake hilar CCA for a possible hilar stricture brought on by hepatolithiasis and prolonged epithelial injury. MRI is the most effective technique for defining calculi, the degree of stricture, and possible lobar atrophy [24]. There are few precise figures available on the prevalence of recurrent pyogenic cholangitis globally. It is uncommon in the West and the United States (prevalence 2%), and it is more common among immigrant groups from East and Southeast Asia.

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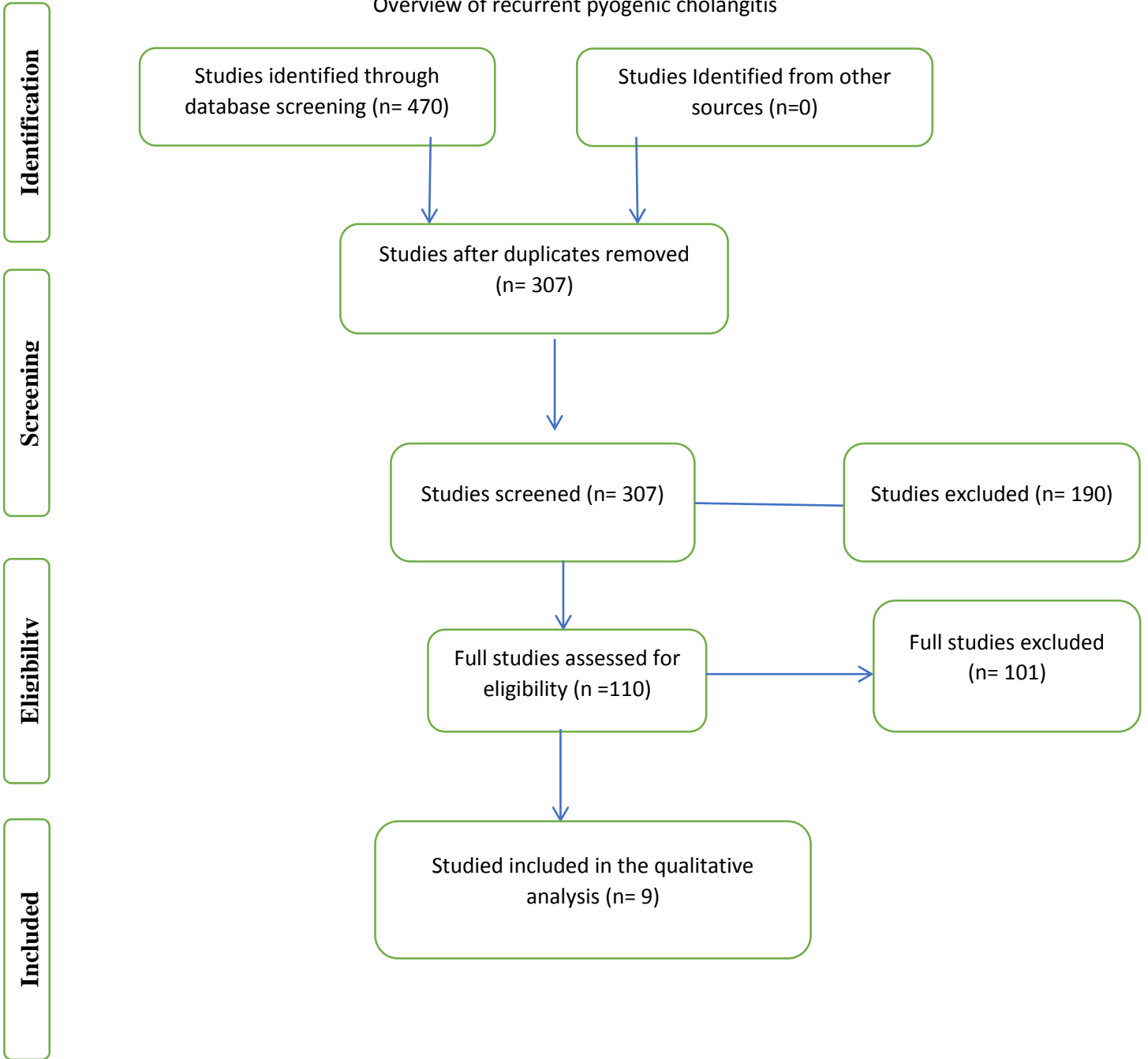


Figure 1: The included studies had different study designs.

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Table 1: Author, country, year of publication, methodology, and outcome:

Author, Publishing Year	Methodology	Outcome
Koh, Ye Xin et al. (25 May. 2013) [9]	In Singapore, 89 patients in a row received an RPC diagnosis. Nine patients defaulted before treatment began and were eliminated from the trial; 80 patients later received therapy from the institution's hepatopancreaticobiliary department.	31 patients had nonoperative procedures out of the 80 individuals. In 25 of them, ERCP-guided procedures were performed, and in 6 of them, PTC-guided procedures were performed. Eight patients had a hepatectomy alone, eleven had a hepatectomy together with operative biliary drainage treatments, and thirty had operative biliary procedures exclusively out of the 49 patients that underwent surgical procedures. Two patients who received bilateral hepatectomies for the treatment of bilateral illness were among those who underwent hepatectomy surgery.
Co, Michael et al. (2014) [12]	80 RPC patients who underwent surgical therapy in Hong Kong were retrospectively reviewed. 45 are women, and 35 are men. The median patient age was 60 years. The types of operations, rates of residual, recurrent stones, the number of cholangitis episodes following main surgery, complication rates following surgery, and the number of patients in the cohort who developed cholangiocarcinoma were all factors that were examined.	For biliary drainage and stone removal, HCJ (or a modified version) was performed on each of the 80 patients. The only patients who had histological confirmation of the condition, which developed after hepatectomy, were the 38 patients (47.5%) who also consented to hepatectomy. After the initial surgery, 25 (31.3%) patients experienced recurring stones, and 23 (28.8%) patients still had leftover stones that needed to be removed. The latter group all underwent choledochoscopy using a T-tube for biliary clearing. 14.5% (n = 14/80) of the patients in the current study experienced surgical complications, the majority of which were wound infections. In situ biliary catheterization, biliary blockage, and biliary stasis all played a role. When doing biliary surgery, whether it entails a hepatectomy or a drainage treatment, bile spillage is frequently unavoidable. As a result, intravenous antibiotics were given. In lengthy operations, additional dosages of antibiotics are administered.
Ray, Sukanta et al. (2016) [13]	94 patients who underwent surgery in Kolkata, India were reviewed retrospectively. Patients with secondary biliary cirrhosis, severe portal hypertension (n = 3) and primary defaulters (n = 6), and those who declined surgery (n = 2) were among the exclusion criteria. Based on clinical and radiological data, RPC was diagnosed. Computed tomography (CT) scan of the abdomen and magnetic resonance cholangiopancreatography (MRCP) were used to determine the severity of the condition. A few patients additionally had ERCP.	Co-morbidities were present in 14 patients (15%). 37 patients (39%) have undergone cholecystectomy surgery in the past, either with or without biliary tract surgery. Before surgery, 32 patients (34%) had undergone ERCP and had CBD stones removed. Only the left lobe of the liver was affected in 46 patients (49%), the right lobe in 12 patients (13%), and both lobes of the liver in 36 patients (38%). 59 (63%) of the patients had associated choledocholithiasis, and 16 (17%) of the patients who had gallbladders at the time of the surgery had cholecystolithiasis. In 8 individuals (8%), characteristics of portal hypertension were discovered. Lobar atrophy and liver abscess were discovered in 6 (6%) and 35 (37%), respectively, individuals.

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<p>Tang, Chung-Ngai et al. (2005) [14]</p>	<p>30 patients were reviewed retrospectively. With a mean age of 63.2±14.9 years, the patients were split evenly between 23 women and 7 men (range, 29–92 years). All of these patients had a history of recurrent cholangitis attacks, and they had all undergone many sessions of endoscopic lithotripsy or surgical retrieval. We examined the selective application of laparoscopic choledochoduodenostomy (LCD) and hand-assisted laparoscopic segmentectomy (HALS) in the treatment of recurrent pyogenic cholangitis (RPC).</p>	<p>10 HALS and 23 LCDs were present. In the same procedure, three patients received simultaneous LCD and HALS. Three open conversions (10%) occurred because of intraoperative bleeding from the left hepatic vein, a lost or damaged ultrasonic dissector tip, and substantial bleeding during choledochotomy, respectively. The mean operating time was 172 63.5 minutes (range, 75-290 minutes). Eight (26.6%) problems, including four bile leaks, three wound infections, and one intraabdominal collection, were observed. Except for one patient (rate: 96.6%), all patients had their stones completely removed. In this patient, the remaining stones were removed postoperatively using a combination of endoscopic and percutaneous methods. After a mean follow-up of 34.7 months, the long-term results were good, and only one stone recurrence was found (range, 1–107 months).</p>
<p>You, Min Su et al. (2019) [15]</p>	<p>At the Seoul National University Hospital, 310 people were identified as having RPC. The management of complications and follow-up were noted. The likelihood of not developing CCA was calculated using the Kaplan-Meier technique, and the risk variables for developing CCA were examined using the log-rank test and Cox's proportional hazard regression model.</p>	<p>253 patients (81.6%) had an intrahepatic duct stone. 185 individuals (59.7%) had liver atrophy, which was most frequently found in the left lobe (65.4%). In 41.3%, 19.4%, 9.7%, and 7.4% of cases, acute cholangitis, liver abscesses, cirrhotic complications, and (cholangiocarcinoma)CCA, respectively. Following hepatectomy, biliary bypass surgery, and choledocholithotomy with T-tube insertion, the complete resolution rates were 82.3%, 55.2%, and 42.1%, respectively. By the final follow-up day, none of the patients who had complete resolution had developed CCA.</p>
<p>Al-Sukhni, W., Gallinger, S., Prutzer, A. et al.(2008) [16]</p>	<p>a North American hepatobiliary center's surgical strategy for recurrent Pyogenic Cholangitis with hepatolithiasis. 42 patients were examined retrospectively; the average age was 54.3 years (24–87).</p>	<p>After unsuccessful ERCP or percutaneous intervention in 19/27 patients, 27 patients (64%) had surgery. There were 10 common bile duct explorations with choledochojejunostomy and a Hutson loop and 17 hepatectomies (10 with, 7 without Hutson loop). For lobar atrophy or stones localized to a single lobe, liver resection was recommended. The rate of complication for hepatectomy and common bile duct exploration was comparable (35% vs. 30%). 24-month median follow-up (3–228). Only seven (33%) of the 21 patients with Hutson loops required subsequent loop use, including three failures. At the last follow-up, 4/27 (15%) surgical patients experienced stone-related symptoms that necessitated percutaneous intervention, compared to 4/11 (36%) nonoperative survivors.</p>

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<p>Tang, C.N., Tai, C.K., Ha, J.P.Y. <i>et al.</i>(2005) [17]</p>	<p>In this study, 17 patients who received left lateral segmentectomy for RPC were retrospectively examined from a prospectively maintained database of both open and laparoscopic procedures for RPC in a single center. Either a hand-assisted laparoscopic method or an open approach utilizing an ultrasonic surgical aspirator was used to carry out the procedures.</p>	<p>Ten of the 17 patients got hand-assisted laparoscopic resections, and seven others underwent open resections. There were no variations in age, sex distribution, the number of cholangitis attacks, sessions of endoscopic retrograde cholangiopancreatography before surgery, or the number of prior operations between the two groups, despite the limited patient population and potential type 2 error. Although the hand-assisted laparoscopic group had lower postoperative complication rates than the control group (20% vs 57%; $p = 126$), the difference was not statistically significant. Again, the hand-assisted laparoscopic group required less intramuscular pethidine (0 vs 600 mg; $p = 0.002$). Neither patient group experienced surgical mortality. Neither group experienced recurrent cholangitis throughout the median follow-up period of more than 3 years.</p>
<p>Eun, H.W., Kim, J.H., Hong, S.S. <i>et al.</i> (2012) [18]</p>	<p>There were 352 patients treated. To evaluate the diagnostic accuracy of MR findings in recurrent pyogenic cholangitis for separating malignant from benign hepatic masses (RPC).</p>	<p>Among them, 58 had hepatic masses that were verified; these included bilomas ($n = 3$), abscesses ($n = 37$), inflammatory pseudotumors ($n = 3$), and cholangiocarcinomas ($n = 15$). In addition to enhancing patterns, intratumoral appearance, peritumoral alterations, mass location, and multiplicity, two radiologists also evaluated MR findings. They used typical MR results to grade the malignancy as well. Both the Chi-square test and the receiver operating characteristic analysis were applied. To assess interobserver agreement, statistics were utilized. In patients with RPC, MR imaging is quite helpful for differentiating between malignant and benign hepatic tumors.</p>
<p>John H. Stroger, Jr. (2017) [19]</p>	<p>5 RPC patients (4 East Asians and 1 Caucasian). We contrasted the Caucasian woman with no travel experience or ties to East Asia with four East Asian women who all had symptoms consistent with cholangitis, including fever, pain in the right upper quadrant, and jaundice. All of them had previously had cholecystectomy procedures with recurring post-cholecystectomy cholangitis. The diagnosis was made using the patient's medical history, typical abdominal computer tomography (CT), and endoscopic retrograde cholangiopancreatography results (ERCP). Individual radiological and clinical.</p>	<p>All four East Asian patients showed benign biliary stricture, pigment stones, and substantial dilatation of the left intrahepatic duct (IHD), common hepatic duct (CHD), and common bile duct (CBD). The Caucasian patient, on the other hand, had a mixture of pigment and cholesterol stones, less intrahepatic dilatation, no biliary stricture, and neither liver atrophy nor biliary stricture. In management, an interdisciplinary approach was used. Surgery was performed on all 4 East Asian patients to remove the source of their recurring infections, biliary stasis, and hepatic atrophy. The East Asians who received surgical therapy had a successful outcome with no additional bouts of cholangitis, in contrast to the Caucasian patient who declined surgery and had one more episode of cholangitis that required repeat ERCP and stone removal. For an early multidisciplinary team to be involved in the therapy of individuals with RPC, increased awareness and prompt diagnosis are required.</p>

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In areas with endemic helminthic infection [20], such as East Asia and Southeast Asia, disease prevalence has been observed to reach up to 30%. Since more people have access to healthcare, cleanliness standards have improved, and diets have become more westernized, this is probably down. More women than men are affected by this condition, and getting older than 50 is a risk factor. One Korean study found that the average patient was 59 years old at the time of diagnosis, with 71% of patients being women and 29% being men. In 82% of instances, there were intrahepatic duct stones [21]. According to Taiwanese data, more than 50% of cases may have intrahepatic bile duct stones. The presence of intra and extrahepatic stones were present in 70% of patients [22]. These calcium bilirubinate-based stones are to blame for the repeated pyogenic cholangitis that they cause [23]. Patients with RPC frequently provide a history of recurrent events as well as right hypochondrial discomfort, fever, or jaundice [25]. The condition may change into malignancy as it worsens. The emergence of constitutional symptoms like anorexia and rapid weight loss, as well as biochemical anomalies like increased blood alkaline phosphatase, should raise the possibility of cholangiocarcinoma and trigger additional cancer research [26]. Cholangitis relapses can result in sepsis and the development of abscesses at remote places [27, 28]. Bilateral peritoneal rupture and bilioenteric fistula are two more possible side effects [29, 30]. There have also been reports of hemobilia and portal vein thrombosis. Surgical scars may be found during a physical examination of the abdomen. [27, 28]. Patients with RPC have a higher chance of getting liver abscesses [31]. The right lobe of the liver is most frequently afflicted, however, abscesses can develop in both the affected and unaffected areas of the organ. Additionally, several abscesses could be found [32]. The absence of enhancing walls distinguishes bilomas from an abscess, which can likewise develop. Strictures are frequently observed and need to be managed using a multidisciplinary approach. The most terrifying side effect, cholangiocarcinoma, can occur in up to 5% of patients [33]. Theoretical explanations include chronic bacterial infection, biliary stasis, and recurrent irritations brought on by calculi [34]. It usually happens at atrophied segments or segments with a high stone burden. Unfortunately, the existence of other RPC-related alterations can make diagnosis difficult. Similar to de novo cholangiocarcinoma, the radiological features, and prognosis of cholangiocarcinoma are associated with RPC [35].

Antibiotics and biliary tract drainage are the pillars of treating an acute case of sepsis. To protect against gram-negative and anaerobic organisms, antibiotics should be divided. Local antibiograms, bacterial sensitivity findings, and prior bouts of sepsis all serve as helpful indicators for antibiotic treatment. Biliary drainage is advised when antibiotics alone are unable to treat sepsis. In the present day, percutaneous interventional biliary drainage techniques are frequently used instead of surgery as the first-line alternative for biliary drainage. Biliary drainage aids in surviving the acute crisis and gives time for investigations before the use of a final remedy. Nasobiliary drains, stenting, and endoscopic sphincterotomy can all be used to relieve biliary compression [36]. If intrahepatic stones and strictures cannot be adequately evacuated, percutaneous methods may be required. Failure of conservative therapy is more likely to happen when the complete biliary system is blocked rather than just a single section, according to research by Fan et al. In an aseptic patient, biliary decompression should be taken into consideration as an adjuvant to resuscitation and should not be postponed in the hopes that sepsis may resolve with antibiotics. Percutaneous drainage is safe even in massive abscesses and improves outcomes in patients with pyogenic liver abscesses [37, 38]. Retrospective studies indicate that despite efforts to find a permanent cure, disease recurrence is frequent [39]. Patients who underwent hepatectomy as a component of their treatment have experienced some of the greatest results for recurring pyogenic cholangitis [40]. In one research, 31% of patients experienced stone recurrence during long-term follow-up, and 5% developed cholangiocarcinoma [41]. Recurrent pyogenic cholangitis and its associated consequences, some of which are frequently lethal, may result in the death of 20% of patients.

Conclusion

The chronic infectious disease known as recurrent pyogenic cholangitis, which has historically been seen in South East Asia, is characterized by recurring bouts of acute bacterial cholangitis in the context of intrahepatic biliary ductal dilatation and strictures. An active multidisciplinary approach improves the results of RPC management. To treat sepsis effectively, biliary drainage, stone removal, bypassing restrictions, and resecting the non-functioning hepatic parenchyma are all necessary. A critical component of the diagnosis of RPC is imaging. Imaging is crucial for planning treatments, determining risks, and performing image-guided operations that are complementary to different endoscopic and surgical

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techniques. It is prudent to actively monitor an illness to find malignant change.

Conflict of Interest

None

Funding

None

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