Chapter

Introductory Chapter: Biliary Tract – Review and Recent Progress

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1. Introduction

1.1 Biliary diseases

Biliary diseases are common digestive system disorders in clinical practice worldwide. Diseases in this segment of the biliary tract are diverse and can manifest with mild clinical signs or can be life-threatening. These diseases exert their effects on our normal lives and have an impact on our physical well-being. It is important to correctly recognize the features of these disorders and, with the right management options in hand. It presents a challenge for every clinician. This book discusses the work-up, diagnosis, and management of the varying pathologies that make up biliary disease including common bile duct stones (CBDS), choledochal cyst (CC), gallbladder cancer (GBCa), and bile duct injury (BDI). Therefore, it can provide clinicians with a platform to learn about these disorders in order to better serve patients.

2. Chronic recurrent hepatobiliary disease

CBDS is a chronic recurrent hepatobiliary disease whose pathological bases are impaired cholesterol, bilirubin, and bile acid metabolism. The incidence of cholelithiasis is 5% to 15%, in the incidence of CBDS is about 5–30% [1]. This is also associated with serious complications, including obstructive jaundice, acute suppurative cholangitis, and acute pancreatitis. Early diagnosis and prompt treatment are the most important for managing CBDS [2]. Endoscopic ultrasonography (EUS) and magnetic resonance cholangiopancreatography (MRCP) have high sensitivity, specificity, and accuracy for the diagnosis of CBDS. At present, it is recommended that patients with CBDS be treated with minimally invasive surgery promptly after diagnosis to reduce iatrogenic trauma or complications caused by surgery based on expelling the stones. The endoscopic retrograde cholangiopancreatography (ERCP) and laparoscopic transcystic common bile duct exploration (LTCBDE) approaches have become two different minimally invasive treatments for choledocholithiasis [3]. Their advantages of good curative effect, small trauma, quick recovery, and fewer complications have been recognized by the majority of medical workers.

3. Congenital biliary dilation

CC, also known as congenital biliary dilation, presents as the dilation of extrahepatic bile ducts. It has a worldwide incidence of about 1:100,000 to 1:150,000 but the incidence can be as high as 1 in 1000 in Asians [4]. Todani classification focuses on the location and morphology of the lesions and classifies intrahepatic and extrahepatic dilated bile ducts into five types, which are currently the most widely used. CC is a rare anomaly that is sometimes considered a precancerous lesion, which often poses a diagnostic dilemma. The typical presentation of this condition is nonspecific. The medical team must have a high level of clinical suspicion for choledochal cysts when investigating patients with jaundice, abdominal pain, and palpable abdominal masses. Because of these symptoms and the ambiguity of the physical findings, appropriate imaging studies are essential for their diagnosis [5]. The three major principles of surgical management of CC are total cyst resection, resolution of stenosis, and biliopancreatic diversion. The bilio jejunal Roux-en-Y anastomosis is currently the standard surgical procedure for biliary reconstruction. The biggest challenge in the surgical management of biliary cysts is how to ensure long-term postoperative biliary system patency and prevent subsequent strictures, stones, and carcinogenesis. This requires the physician to build systematic thinking preoperatively about the complex conditions and anatomic features that bile duct cysts may combine to properly and meticulously address key intraoperative details.

4. GBCa

GBCa is the most common cancer of the biliary tract system and is ranked as the top six in general gastrointestinal tract neoplasms worldwide [6]. Due to the aggressive behavior and limited treatment options available for GBCa, the prognosis is very poor at late diagnosis. Early detection at a curable stage remains challenging because patients rarely manifest symptoms; indeed, most GBCs are discovered incidentally following cholecystectomy for symptomatic gallbladder stones. Cancer can also present with subtle, vague symptoms such as loss of appetite, chronic abdominal discomfort, weight loss, pruritus, scleral icterus, and jaundice. The diagnosis of GBCa is based on a combination of history, physical examination, laboratory tests, radiological imaging (ultrasound, CT, MRI, and/or PET), and biopsy. Long-standing chronic inflammation is an important driver of GBC, regardless of the lithiasic or non-lithiasic origin. Advances in omics technologies have led to a greater understanding of GBC pathogenesis, revealing mechanisms associated with inflammation-driven tumorigenesis and progression. Surgical resection is the only curative treatment for GBC, but cases suitable for resection are rare and response rates to most adjuvant therapies are very low. Several unmet clinical needs require to be addressed to improve GBC management, including the discovery and validation of reliable biomarkers for screening, treatment selection, and prognosis [7].

5. BDI

BDI is still a much-feared complication following gallbladder surgery. It occurs because of the inability to avoid the biliary tract and its blood supply during dissection. Several factors are associated with an increased risk of BDI associated with cholecystectomy. These include the inability to clearly identify the cystic duct prior

to clipping or dividing, surgery for acute cholecystitis, the presence of choledocholithiasis, anatomic variations in the anatomy of the biliary tree, and emergency surgery [8]. The most common complaints of BDI patients are persistent abdominal pain, abdominal distension, nausea and/or vomiting, fever, and jaundice [9]. The clinical manifestations of BDI are related to the type of injury. The two most common clinical conditions are biliary leakage and biliary obstruction. Strasberg classification of BDI is fairly comprehensive for defining the type and extent of injury and guiding surgical repair. The effective surgical management of low-grade Strasberg types A-D injuries can include biliary drainage, primary repair of the bile duct, or duct-to-duct biliary reconstruction. High-grade Strasberg type E injuries should be always repaired with Roux-en-Y hepatojejunostomy [10].

This book covers the above four common diseases of the biliary tract. A focused and concise introduction to the basic concepts, clinical manifestations, diagnosis, and therapeutic measures of each disease is given. It is hoped that this book will help physicians at large to reinforce their personal experience and standardize the behavior of clinical diagnosis and treatment of biliary-related diseases, becoming a powerful helper for front-line clinical workers.

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References

[1] Deng F, Zhou M, Liu PP, et al. Causes associated with recurrent choledocholithiasis following therapeutic endoscopic retrograde cholangiopancreatography: A large sample sized retrospective study. World Journal of Clinical Cases. 2019;**7**(9):1028-1037

[2] Wu Y, Xu CJ, Xu SF. Advances in risk factors for recurrence of common bile duct stones. International Journal of Medical Sciences. 2021;**18**(4):1067-1074

[3] Zhang R, Liu J, Li H, Zeng Q, Wu S, Tian H. Evaluation of therapeutic efficacy, safety and economy of ERCP and LTCBDE in the treatment of common bile duct stones. Frontiers in Physiology. 2022;**13**:949452

[4] Ye Y, Lui VCH, Tam PKH. Pathogenesis of choledochal cyst: Insights from genomics and transcriptomics. Genes (Basel). 2022;**13**(6):1030

[5] Hoilat GJ, John S. Choledochal Cyst. Treasure Island (FL): StatPearls Publishing; 2022

[6] Song X, Hu Y, Li Y, et al. Overview of current targeted therapy in gallbladder cancer. Signal Transduction and Targeted Therapy. 2020;**5**(1):230

[7] Roa JC, García P, Kapoor VK, et al. Gallbladder cancer. Natural Review in Diseases Primers. 2022;**8**(1):69. DOI: 10.1038/s41572-022-00398-y

[8] Ahmad DS, Faulx A. Management of postcholecystectomy biliary complications: A narrative review. The American Journal of Gastroenterology. 2020;**115**(8):1191-1198

[9] Mercado MA, Domínguez I. Classification and management of bile duct injuries. World Journal of Gastrointestinal Surgery. 2011;**3**(4):43-48

[10] de Angelis N, Catena F, Memeo R, et al. 2020 WSES guidelines for the detection and management of bile duct injury during cholecystectomy. World Journal of Emergency Surgery. 2021;**16**(1):30