

Review Article

Risk factors for choledocholithiasis: a literature review

Glendy Alejandra Martínez*

Facultad de medicina, Universidad Autónoma de Sinaloa, Culiacán, Sinaloa, México

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*Correspondence:

Dr. Glendy Alejandra Martínez,

E-mail: Glendymartinez1395@gmail.com

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ABSTRACT

Choledocholithiasis is a disease characterized by the presence of stones in the common bile duct, which can lead to serious complications. This literature review aims to explore in detail the risk factors associated with choledocholithiasis, examining its epidemiology, clinical significance and aspects related to its diagnosis, surgical treatment and complications. An exhaustive search of the updated scientific literature was carried out, consulting various specialized databases, in order to provide a complete and updated vision on this relevant topic in the medical field.

Keywords: Choledocholithiasis, Risk factors, Management

INTRODUCTION

Choledocholithiasis is a common medical condition that affects a wide population globally. It is characterized by stone formation in the common bile duct, which carries bile from the liver to the small intestine. These stones can be of primary origin, formed directly in the common bile duct, or secondary, migrating from the gallbladder. The presence of stones in the common bile duct can obstruct the flow of bile, leading to symptoms such as abdominal pain, jaundice, and serious complications such as cholangitis, pancreatitis, and sepsis.^{1,2}

EPIDEMIOLOGY

Choledocholithiasis is a disease with a significant incidence and prevalence worldwide, although its frequency varies according to the geographical region and demographic factors studied. It is estimated that millions of people are diagnosed with choledocholithiasis each year. Epidemiological studies have revealed that certain demographic factors, such as age and gender, can influence the onset of the disease. In addition, differences in the incidence of choledocholithiasis have been

observed between different ethnic groups and populations.³

CLINICAL SIGNIFICANCE

Choledocholithiasis has significant clinical significance due to the possible serious complications that may arise. Gallstones in the common bile duct can lead to bile flow obstruction, which can lead to obstructive jaundice, acute cholangitis, biliary pancreatitis and sepsis. These complications can be life-threatening and require prompt medical and surgical intervention to prevent further damage and improve the patient's prognosis.⁴

DEFINITION

Choledocholithiasis is defined as the presence of gallstones in the common bile duct, which is the tube that carries bile from the liver to the small intestine. Stones can be of different types, including cholesterol, pigmentary and mixed stones. Choledocholithiasis can be primary, when stones form directly in the common bile duct, or secondary, when they migrate from the gallbladder.⁵

DIAGNOSIS

Diagnosis of choledocholithiasis is based on a combination of medical history, physical examination, laboratory tests, and imaging studies. In the clinical evaluation, the patient's symptoms, such as abdominal pain, jaundice, and fever, are taken into account. Laboratory tests may reveal alterations in liver enzyme and bilirubin levels, as well as the presence of leukocytosis.⁶

Abdominal ultrasound is a widely used imaging tool in the initial diagnosis of choledocholithiasis. It can detect the presence of gallstones in common bile duct and assess degree of dilation of bile ducts. However, ultrasound has limitations in terms of sensitivity and specificity, especially in patients with obesity or intestinal gas.⁷

Endoscopic retrograde cholangiopancreatography (ERCP) is considered the gold standard for the diagnosis of choledocholithiasis. It allows direct visualization of gallstones in the common bile duct, as well as the performance of therapeutic procedures, such as endoscopic sphincterotomy and stone extraction. However, ERCP is an invasive procedure and has associated risks, such as pancreatitis and perforation.⁸

Magnetic resonance cholangioresonance imaging (MRS) is a non-invasive alternative for the diagnosis of choledocholithiasis. It uses magnetic resonance imaging to visualize the bile ducts and detect the presence of stones. MRS has high sensitivity and specificity, and does not carry the risks associated with ERCP. However, it may have limitations in patients with claustrophobia or with metal devices in the body.⁹

SURGICAL TREATMENT

The surgical treatment of choledocholithiasis has as its main objective the removal of stones and the restoration of adequate bile flow. ERCP with endoscopic sphincterotomy and stone removal is the standard approach for symptomatic gallstones. During ERCP, an endoscope is used to access the common bile duct and make an incision in the sphincter of Oddi, allowing the stones to be removed.⁸

COMPLICATIONS

Choledocholithiasis can lead to various serious complications. One of the most common complications is bile flow obstruction, which can lead to obstructive jaundice, a symptom characterized by yellowing of the skin and eyes due to the accumulation of bilirubin in the bloodstream. Other complications include acute cholangitis, which is a bacterial infection of the common bile duct, and biliary pancreatitis, an inflammation of the pancreas due to the migration of stones into the pancreatic duct. These complications can be life-threatening and require urgent medical attention.¹⁰

DISCUSSION

One of the most prominent risk factors is older age. It has been observed that choledocholithiasis is more common in people over the age of 60. This can be attributed to several factors, such as decreased gallbladder function with age, which can predispose to gallstone formation. In addition, changes in bile composition related to aging may contribute to the development of common bile duct stones. The presence of gallstones in the elderly may have important clinical implications, as they may present an increased risk of complications and require a more individualized management approach.¹¹

Gender has also been identified as a significant risk factor for choledocholithiasis, with a higher prevalence in women compared to men. Female sex hormones, such as estrogen, are thought to play a role in gallstone formation by affecting the concentration of cholesterol in the bile and gallbladder motility. In addition, pregnancy and the use of hormone replacement therapy may further increase the risk of choledocholithiasis in women. These findings highlight the importance of considering gender as a risk factor in the evaluation and management of patients with choledocholithiasis.¹²

Obesity and a diet high in saturated fat and cholesterol have been recognized as risk factors for gallstone formation in general, including choledocholithiasis. Obesity is associated with alterations in bile metabolism, which can promote stone formation. In addition, obesity is linked to a higher incidence of metabolic diseases, such as type 2 diabetes, which can also increase the risk of choledocholithiasis. Adopting a balanced diet and promoting healthy lifestyles, including weight loss in cases of obesity, can play an important role in preventing choledocholithiasis.¹³

Family history and genetic factors have also been associated with an increased risk of choledocholithiasis. It has been observed that first-degree relatives of patients with choledocholithiasis have an increased risk of developing the disease. Research studies have identified several genes involved in the formation and metabolism of gallstones, such as the ABCG5/8 gene and the NPC1L1 gene. These genes are involved in the transport of cholesterol and other lipids through liver cells and the small intestine. Genetic variants in these genes can influence the concentration of cholesterol in the bile and thus increase the predisposition to the formation of gallstones, including those that develop in the common bile duct.¹⁴

In addition to the risk factors mentioned above, liver and pancreatic diseases have also been associated with an increased risk of choledocholithiasis. Liver cirrhosis, for example, can alter the composition of bile and promote gallstone formation. Crohn's disease, a chronic inflammatory disease of the gastrointestinal tract, may also increase the risk of choledocholithiasis due to

inflammation and alterations in intestinal motility. Chronic pancreatitis, a chronic inflammatory disease of the pancreas, can predispose to stone migration into the pancreatic duct and then into the common bile duct. Proper management of these diseases with specific therapeutic approaches may help reduce the risk of choledocholithiasis in these patients.¹⁵

Importantly, previous biliary surgery, such as cholecystectomy (removal of the gallbladder), may also be a risk factor for the development of choledocholithiasis. After cholecystectomy, gallstones may migrate into the common bile duct, either as a result of the surgery itself or due to the presence of pre-existing stones not detected during surgery. This migration can cause obstruction of the common bile duct and lead to the formation of choledocholithiasis. Patients undergoing cholecystectomy should be closely monitored and considered periodic imaging studies for the presence of common bile duct stones.¹⁶

CONCLUSION

In conclusion, the discussion on risk factors for choledocholithiasis highlights the importance of advanced age, female gender, obesity, a diet rich in saturated fats and cholesterol, family history, liver and pancreatic diseases, and previous biliary surgery as factors that may increase the predisposition to develop this disease. Understanding these risk factors is essential for the early identification of patients at risk and for implementing appropriate preventive and management strategies. In addition, more research is needed to delve deeper into the underlying mechanisms and develop more effective therapeutic approaches for the management of choledocholithiasis.

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