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Review Article

Clinical patterns and causes of post-cholecystectomy syndrome

Muhammed Ihsan Muhammad[1]*, Abdullah Hasem Alhassan[2], Abdulmohsen Yaseer Alkhars[3], Rayan Abdulkhaliq Alzahrani[4], Mohammed Hamad Al Mansour[5], Fares Hamoud Alghamdi[6], Mohammad Saleh Almarri[7], Fatimah Ali Ghzoi[8], Rakan Hamad Alwadai[5], Mohannad Yousef Aljarallah[9], Abdullah Ahmed Saihb[5]

[1]Department of General Surgery, Khulais General Hospital, Khulais, Saudi Arabia
[2]College of Medicine, Medical University of Lodz, Lodz, Poland
[3]College of Medicine, King Faisal University, Al Ahsaa, Saudi Arabia
[4]College of Medicine, Baha University, Al Baha, Saudi Arabia
[5]College of Medicine, Najran University, Najran, Saudi Arabia
[6]College of Medicine, Ibn Sina National College, Jeddah, Saudi Arabia
[7]Department of General Surgery, Aladan Hospital, Hadiya, Kuwait
[8]College of Medicine, Medical University of Warsaw, Warsaw, Poland
[9]Department of Radiology, King Fahad Specialist Hospital, Burydah, Saudi Arabia

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***Correspondence:**
Dr. Muhammed Ihsan Muhammad,
E-mail: ihsan863@yahoo.com

ABSTRACT

Post-cholecystectomy syndrome is suspected when the patients complain about the persistent presence of pain in the right upper abdominal quadrant. Other symptoms might appear which are related to the gastrointestinal tract. These symptoms appear after performing cholecystectomy. The manifestations are usually similar to those experienced before the procedure. In this study, the aim to conduct a literature review to increase the knowledge and to explore facts related to the clinical patterns and causes of post-cholecystectomy syndrome. The most commonly reported cause of this syndrome is the prior development of an extra-biliary disorder, which includes many modalities as peptic ulcer, reflux esophagitis, chronic pancreatitis, irritable bowel syndrome, and biliary-related disorders. However, the etiology of postcholecystectomy is hugely variable across the different studies in the literature. Patients that develop postcholecystectomy syndrome usually present with non-specific gastrointestinal symptoms that may or may not be similar to the symptoms that were exhibited before conducting the surgery. Some of the common physiological changes that have been reported with postcholecystectomy syndrome include the disruption of cholecysto-antral reflex, the cholecystosphincter of oddi reflex, and the cholecysto-esophageal related reflexes. In addition, the development of other changes that can significantly affect the normal physiology of the gastrointestinal tract leads to the development of significant symptoms and clinical patterns.

Keywords: Post-cholecystectomy syndrome, Bile duct, Bile stones, Cholecystectomy, Etiology

INTRODUCTION

Postcholecystectomy syndrome is suspected when the patients complain about the persistent presence of pain in the right upper abdominal quadrant. Other symptoms might appear which are related to the gastrointestinal tract. These symptoms appear after performing cholecystectomy. The manifestations are usually similar to those experienced before the procedure. Estimates from the United States have shown that a total of 500000 cholecystectomy procedures were performed in the late 1990s, with a total of 50000 patients developing the postcholecystectomy syndrome, and an estimated incidence of 10%.[1,2] The global epidemiology of

postcholecystectomy syndrome has been reported to be similar to that estimated in the United States and Saudi Arabia. Incidence rate has been reported to be 19.8%.[3]

Evidence in the literature supports that the symptoms and clinical patterns of the postcholecystectomy syndrome are not the same in all patients, as some patients might develop clinical patterns related to the gall bladder pathology that was present before cholecystectomy. On the contrary, other patients might present with other novel symptoms that are usually associated with the gall bladder and the related functions. A variety of symptoms have been reported with the syndrome as nausea, vomiting, diarrhea, fatty food intolerance, jaundice, indigestion, flatulence, heartburn and abdominal pain. The period after which postcholecystectomy develops has also been reported to be variable across the different studies in the literature. Additionally, there is evidence that it usually develops following the procedure within the post-operative period. Some authors indicated that it can also develop late years after conducting the procedure. In this study, the aim to conduct a literature review to increase the knowledge and to explore facts related to the clinical patterns and causes of postcholecystectomy syndrome.

A systematic search was conducted to identify relevant studies in the following databases: PubMed, Medline, Web of science, Embase, Google scholar, and Scopus. The following search terms were used ("postcholecystectomy" or "postcholecystectomy syndrome") and ("clinical") and ("outcomes") and ("patterns"). The Reference lists were manually searched to identify additional relevant studies meeting inclusion criteria. We included any study that reported clincal features, patterns and outcomes of postcholecystectomy syndrome. No restrictions were applied.

DISCUSSION

Etiology and clinical patterns

Several symptoms and clinical patterns have been previously associated with cholecystectomy due to multiple physiological changes that usually affect the gastrointestinal tract leading to persistence of symptoms or the development of new symptoms following the procedure. Even in successful cases, some of the common physiological changes that have been reported with the postcholecystectomy syndrome include the disruption of cholecysto-antral reflex, the cholecystosphincter of oddi reflex, and the cholecysto-esophageal related reflexes. Moreover, the development of other changes that can significantly affect the normal physiology of the gastrointestinal tract leads to the development of significant symptoms and clinical patterns.[4-7] Gastro-esophageal reflux, gastritis, and dudenogastric refluxes were all reported following cholecystectomy, which might be the direct and clear factors that contribute to the development of the postcholecystectomy syndrome. Additionally, Shirah et al reported that the most common symptoms for patients suffering from postcholecystectomy syndrome were right upper abdominal pain, nausea, vomiting, dyspepsia, abdominal colics, and fever.[3] In the same context, the most common signs included tenderness in the right upper abdominal pain, jaundice, and generalized followed by epigastric tenderness that is related to abdomen of affected patient.

Many causes have been previously proposed for the development of postcholecystectomy syndrome. In the previous investigation by Shirah et al, the authors reported that no clear causes for the development of postcholecystectomy syndrome.[3] Nevertheless, the most common etiology followed by helicobacter pylori infections, pancreatitis, peptic ulcer, recurrent stones in the common bile duct, retained stones, bile leakage, sphincter of oddi stenosis, cystic duct dump syndrome, and strictures of the common bile duct. Among studies in the literature, the most commonly reported causes of the syndrome include the prior development of an extra-biliary disorder, which includes many modalities as peptic ulcer, reflux esophagitis, chronic pancreatitis, and irritable bowel syndrome.[8] In another context, many biliary causes were also reported among the various studies in the literature and include bile leakage, biliary strictures, retained calculi, chronic abscess or biloma, repeated calculi, remnants of a long cystic duct, gastritis, and diarrhea that is related to bile salts, and dyskinesia or stenosis of the sphincter of oddi.[9-11] Following laparoscopic cholecystectomy, bile duct injuries are very common and can significantly be associated with the development of syndrome in a very common correlation that has been reported to be ranging between 0.4 and 4%, according to previous studies and clinical surgical opinions.[12-14] The occurrence of injuries might lead to two common pathways and mechanisms that lead to the development of postcholecystectomy syndrome, including biliary obstruction or leakage. Moreover, it should be noted that many of the injuries that follow laparoscopy might go unnoticed by the performing surgeons until the development of related symptoms and complications as sepsis, abdominal pain, and jaundice. Another cause for the development of the syndrome, which is also a common one, is the underlying presence and development of acute biliary obstruction due to multiple causes and underlying etiologies as open cholecystectomy, which has also been previously reported to be two times more common than in case of bile duct injury following laparoscopic cholecystectomy.[15] It has been reported to classically occur when surgeons accidentally identify and mistake the cystic duct with the common bile duct. In such cases, radiological assessments are key factors that might aid to the diagnosis of the condition by exhibiting the significant presence of intrahepatic bile segmental or diffuse dilatation, and secondary presence of surgical clips, which were installed during the procedure at the point where the obstruction developed. It was previously reported that there is an increasing incidence rate of extrahepatic biliary

obstruction following the related surgical procedures, which is probably attributable to the increased demand and frequency of performing laparoscopic cholecystectomy.[16] While mild injuries can lead to the development of fibrosis, significant injuries resulting from trauma and thermal effects can lead to bile leakage and acute bile duct necrosis, and secondary obstruction. Strictures following the development of bile duct inflammation and necrosis might also occur secondary to the installment and persistence of the surgical clips during and after conducting the procedure. There is still conflicting evidence regarding the true mechanism and natural history and pathogenesis behind the development of biliary stones. However, it was previously demonstrated that the incidence of the recurrent and retained bile ducts ranges between 1.2% and 14%, and estimates also show that the prevalence of biliary stones causing symptoms is around 0.3% only.[17] Although it was previously demonstrated that magnetic resonance cholangiopancreatography (MRCP) is a significantly validated modality that can effectively evaluate and indicate the presence of bile duct obstruction and biliary stones, it has been previously reported to be not adequately performed due to the potential cost burdens that are associated with performing the procedure. On-table cholangiography (OTC), and common bile duct exploration can be routinely performed during laparoscopic cholecystectomy. However, they are not performed unless a strong indication was obtained. When OTC was performed, surgeons should be directed to performing common bile exploration procedures or towards performing endoscopic retrograde cholangiopancreatography (ERCP). During dissection where the common bile duct might be pulled cephalad, it was previously reported that a rare complication might develop in patients with patulous cystic duct, which is reported to be the potential that small calculi might migrate to the common bile duct of these patients. It has been reported that in such cases ERCP are effective modalities in the evaluation and diagnosis ,and exhibiting significant therapeutic options. Figure 1 summarizes a previously proposed algorithm for the proper diagnosis of postcholecystectomy syndrome.[18]

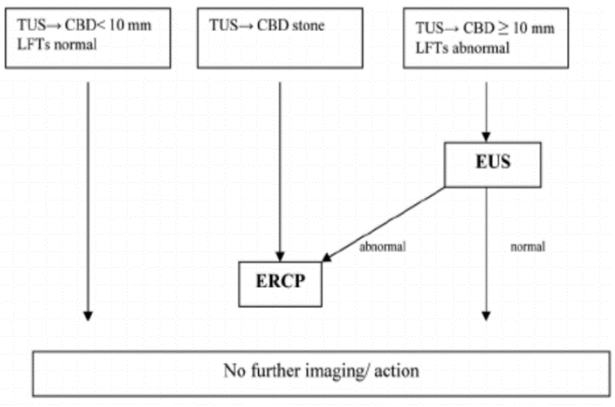

Figure 1: A brief algorithm for approaches used for evaluation of the postcholecystectomy syndrome.[18]

During laparoscopic cholecystectomy, it was also previously reported that around 0.1-20% of the cases will eventually suffer from the potential development of gallstone spillage, leading to significant complications and postcholecystectomy syndrome development.[19,20] Although these cases have been reported with minor symptoms and few complications, it should be noted that these cases should be adequately managed when suspected to prevent any risk of developing complications, which might include abdominal or peritoneal abscess formation in these patients most commonly. Conditions causing erosions through the skin have also been previously reported to be significantly associated with spilled gallstones, including colovesical fistulas.[21,22] Moreover, other complications have also been previously linked with spilled gallstones as the development of an incarcerated hernia.[23] The diagnosis of complications that occur secondary to spilled gallstones as abscess formation has been previously marked as being difficult because it usually develops late after surgery by one year or more. Ultrasonography might be used to detect spilled gallstones which usually appear as small hypertrophic lesions, usually with significant fluid collections that are usually located within the subhepatic or subdiaphragmatic spaces. Computed tomography can also detect the lesion if it was calcified, which appears as a hyperdense area, while it is usually observed on T1-weighted magnetic resonance imaging as signal void. Cystic duct dump syndrome was also provided as an etiology for the development of postcholecystectomy syndrome as a result of the potential presence of a >1 cm in length cystic duct remnant following performed cholecystectomy. Previous studies have also demonstrated that biliary stones can develop in these remnants, and common bile ducts lead to the development of the postcholecystectomy syndrome.[24-26] It has been reported that such cases are usually associated with jaundice, in addition to right upper abdominal pain that might be severe and persistent. It was previously estimated that the formation of a biliary stone within the bile duct remnants following cholecystectomy is usually less than 2.5%.[27] However, there is no sufficient evidence that the development of gall stones within the bile duct remnants is associated with performing laparoscopic cholecystectomy than open procedures.

Postcholecystectomy syndrome has also been previously associated with the dysfunction of the sphincter of oddi. Moreover, stenosis of the sphincter can also be a significant cause, which usually develops from other causes leading to spasm of the sphincter. In such cases, it has been previously reported that the diagnosis and management are usually difficult and need further attention. In this context, it was previously reported that such cases poorly respond to the administration of calcium channel blockers and nitrates.[28] On the other hand, it was previously suggested that sphincterotomy might be the most significant solution. However, many risks of developing complications were previously reported, including the development of pancreatitis and

bleeding, which indicates the need for conducting adequate evaluation and diagnosis of these cases to avoid the development of serious complications. Biliary manometry was previously reported to be a more effective modality with less frequent complications (except for pancreatitis). Nevertheless, it was previously reported to be associated with significant discomfort to the corresponding patient and significant difficulty to the performing surgeon. Besides, it was also reported that the dysfunction of the sphincter of Oddi is not always the cause of the clinical pattern and development of postcholecystectomy syndrome, even if the biliary manometer was effective in detecting such lesions.[29] In this context, it should not be surprising because the dysfunction of the sphincter of oddi might be significantly associated with symptoms like esophageal motility disorders and gastroparesis.

CONCLUSION

In this literature review, the discussion was around the current evidence regarding the clinical patterns and causes of postcholecystectomy syndrome. The most commonly reported causes of the syndrome include the prior development of an extra-biliary disorder, which includes many modalities as peptic ulcer, reflux esophagitis, chronic pancreatitis, and irritable bowel syndrome, in addition to the biliary-related disorders. However, the etiology of postcholecystectomy is hugely variable across the different studies in the literature. Patients that develop postcholecystectomy syndrome usually present with non-specific gastrointestinal symptoms that may or may not be similar to the symptoms that were exhibited before conducting the surgery.

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