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Case Series

Experience in the intraoperative diagnosis and treatment of Mirizzi Syndrome in Grodno region, Belarus

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ABSTRACT

The goal of this retrospective study is to highlight the rarity of Mirizzi syndrome, which should not be omitted because this uncommon discovery can lead to iatrogenic post-operative complications, lowering patients' quality of life. Discussed below is an overview of twenty individuals treated with Mirizzi syndrome from 2013 to 2016All surgeries must be executed with expertise and prudence because an unexpected discovery of Mirizzi syndrome during an operation might make it more challenging to fix the anomaly. Using contemporary imaging techniques such as magnetic resonance cholangiopancreatography, endoscopic retrograde cholangiopancreatography and hepatobiliary iminodiacetic acid (HIDA) scan will aid in early and accurate diagnosis. While a surgeon's caution will help prevent iatrogenic injury to the biliary system.

Keywords: Endoscopic retrograde cholangiography, Mirizzi syndrome, Case series

INTRODUCTION

A rare disorder known as Mirizzi syndrome (MS) is brought on by stones in the cystic duct or the gallbladder's neck compressing the main hepatic duct.[1] Pablo Luis Mirizzi, an Argentinean surgeon, is honored by the name of this condition. In 1931, Mirizzi performed the first intraoperative cholangiogram.2 It is thought that extrinsic pressure on the common hepatic duct and persistent gallbladder inflammation, together with a history of gallstone illness, are the causes of Mirizzi syndrome.

Common variables that raise the risk of Mirizzi syndrome include a reluctance to seek medical counsel, the use of proton pump inhibitors to treat biliary colic due to gastroduodenal dyspepsia, or a reluctance to accept the surgical recommendation of a cholecystectomy.[2] Patients are at risk of developing Mirizzi syndrome due to common congenital anatomic abnormalities in the cystic duct, which occur in 18–23% of cases.[2] Clinical signs of Mirizzi syndrome include fever, right upper quadrant discomfort, and obstructive jaundice. Preoperative diagnosis of Mirizzi syndrome is rare because of the unique nature of the condition.[3] Elevated liver enzymes and hyperbilirubinemia are the most frequent test results.[4] MS is classified in numerous ways, but the Csendes' classification is the most widely used when considering surgery. This unusual disorder is classified into five distinct categories based on compression severity and the creation of fistulas.[5]

Open surgery was thought to be the mainstay of care for MS because of the possibility of harm to Calot's triangle structures. Laparoscopic treatment was initially recommended for a limited number of individuals with type I MS. Nonetheless, the research states that endoscopic retrograde cholangiopancreatography (ERCP) and laparoscopic surgery are used in the treatment of patients with type II MS. Furthermore, minimally

invasive surgery will be an effective therapeutic option for patients with different forms of multiple sclerosis in the future due to advancements in technology and growing experience with laparoscopic surgery.[4]

CASE SERIES

In this retrospective study, we present data collected from 20 patients who were diagnosed with Mirizzi syndrome following biliary tract surgeries performed between 2013 to 2016. Out of the 20 patients, 18 were diagnosed in 2013 and 2 were diagnosed in 2016. In all cases, the disease was verified during surgery at the surgical department of the Grodno Regional Clinical Hospital. Among the 20 patients, there were 17 women and 3 men. The age of the patients ranged from 35 to 79 years. In most cases (11 patients), jaundice with signs of acute cholangitis was noted. Severe concomitant diseases were present in 8 patients. Ultrasound, ERCP, MRI scans were used as preoperative investigation methods.

One significant clinical observation during our study involves a 66-year-old female patient who was admitted to the surgical department with the diagnosis of "Gallstone disease: chronic calculous cholecystitis, choledocholithiasis " for further examination and surgical treatment. Patient complained of periodic aching pain in the right hypochondrium, nausea and bitterness in the mouth. The anamnesis revealed that the patient has had gallstone disease for a long time, and a week before admission she had presented with jaundice and was treated in a surgical hospital closer to her residence. The physical examination during the admission process revealed absence of visible jaundice of the skin and sclera, the abdomen was soft upon palpation, tender right hypochondrium upon palpation. Complete blood count and biochemical blood tests were carried out in every patient.

According to laboratory tests, leukocytosis and increased ESR were not detected in the blood. In some patients, a slight increase in blood transaminases was observed in the biochemical analysis. Ultrasound examination and the MRI scan was performed in all the patients as preoperative imaging investigation. In one case, the ultrasound examination revealed a 1.5 cm calculus in the projection of the gallbladder and in another case, 2.5 cm diameter stone was located near the porta hepatis with complete destruction of the gallbladder walls. During the MRI scan, significant reduction in the size of the gallbladder, sclerosis of the gallbladder and an irregularly shaped calculus in its lumen was noted. The MRI concluded the signs of cholelithiasis, and originated the suspicion of Mirizzi syndrome. (Figure 1).

Based on complaints, medical history, physical examination data, laboratory and instrumental examination results, the preoperative diagnosis for majority of the patients was made as “chronic calculous cholecystitis”, with the suspicion of Mirizzi syndrome. It was decided to start the surgical procedure to clarify the diagnosis with further adjustments based on the results of the surgical finding. Mirizzi syndrome was usually and unintentional discovery during laparoscopy, as demonstrated by our retrospective investigation. The main radiographic symptoms indicating the possible presence of Mirizzi syndrome were compression and dislocation of the hepaticocholedochus, which was caused by stones in the gallbladder neck area, dilation of the hepatic ducts in the absence of changes in the distal parts of the common bile duct. Although the radiological data suggested the potential existence of Mirizzi syndrome, diagnosis of this condition could not be established prior to surgery. This necessitated corrective surgery, namely a cholecystectomy with fistula closure, in accordance with the syndrome type.

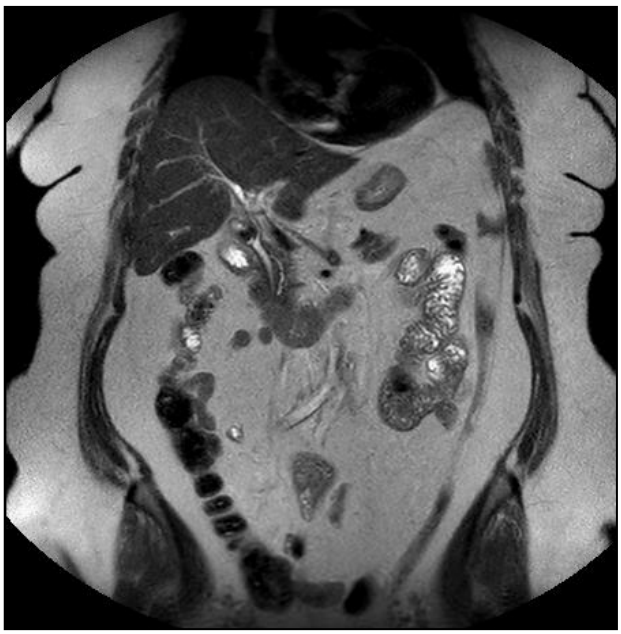

Figure 1: MRI of a patient with Mirizzi syndrome. A gallstone prolapses into the common bile duct above the cystic duct opening.

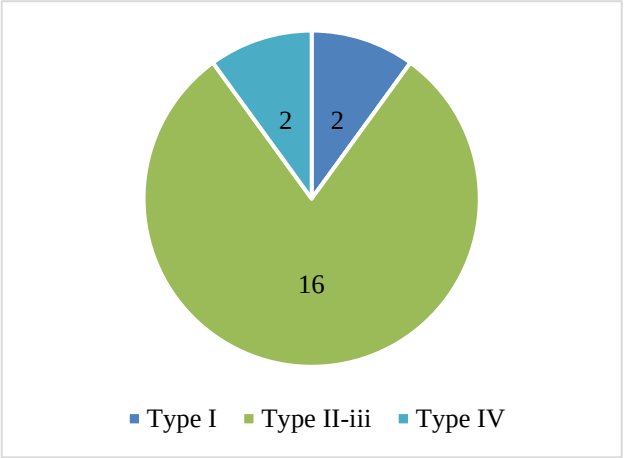

Figure 2: Distribution of the types of Mirizzi syndrome among the patients.

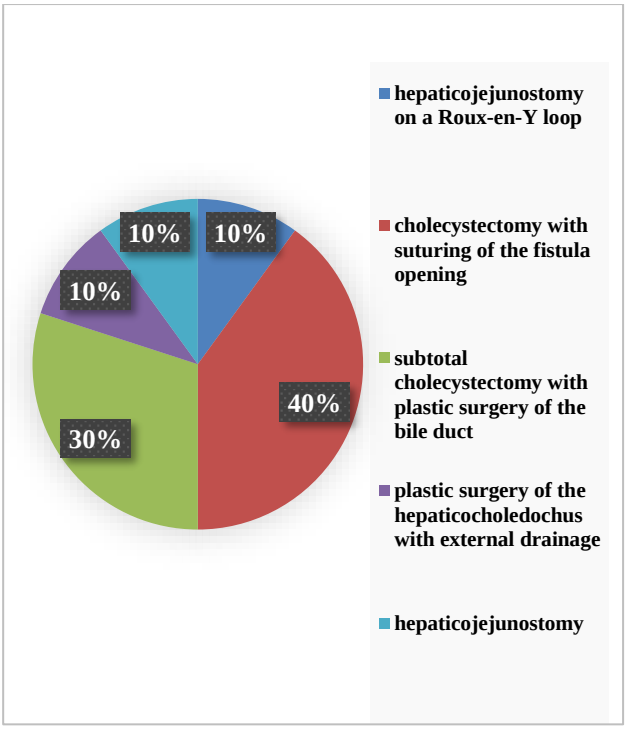

Figure 3: Surgical interventions provided for the patients.

To date, there is no single generally accepted tactic for surgical treatment of this disease. All patients underwent surgery via laparotomy, with a dense infiltrate usually found in the subhepatic space, making it difficult to differentiate elements of the hepatoduodenal ligament; the anatomy of the bile ducts was significantly distorted. Most often, the gallbladder was sclerosed, with small stones or one large stone in its lumen.

In one observation, a 2.5 cm diameter stone was located near the porta hepatis with complete destruction of the gallbladder walls. In another similar clinical scenario, it was revealed that the gallbladder was fibrously altered, measuring 7×3×2.5 cm, tightly fused in the area of the bottom with the duodenum. A calculus 1.5 cm in diameter was palpated in the area of the neck of the gallbladder. Intraoperative diagnosis for the above two patients was made as "Chronic calculous cholecystitis, Scleroatrophic gallbladder and Mirizzi syndrome type 1".

Both patients had stenosis of the major duodenal papilla. Types II - III of Mirizzi syndrome were found in 16 patients but it was not possible to diagnose this pathology before surgery, although the X-ray diagnostic methods were used, which was due to the closure of the fistula tract by a stone mimicking a Klatskin tumor. A similar situation was observed in 2 patients with type IV of the syndrome.

Surgical interventions for the Mirizzi syndrome Type I included cholecystectomy, choledocholithotomy, trans duodenal papillosphincterotomy with external drainage of the bile ducts. One patient was treated by creating hepaticojejunostomy on a Roux-en- Y loop. Four patients were treated with cholecystectomy with suturing of the fistula opening using tissues from the neck of the gallbladder and drainage of the hepaticocholedochus through a separate incision to decompress the biliary ducts.

In three cases, subtotal cholecystectomy with plastic surgery of the bile duct with the remaining part of the gallbladder. The most difficult situation was observed in two patients, when percutaneous transhepatic cholangiogram was performed, a round shadow was determined in the area of transition of the common bile duct into the common bile duct, which did not exclude a calculus and neoplasm.

During the operation, complete destruction of the walls of the hepaticocholedochus (type IV syndrome) was established due to compression of the tissue by a large calculus. In one case, a hepaticojejunostomy was formed, in the other, due to the purulent inflammatory process, it was unable to perform a hepaticojejunostomy.

Taking into account the topographic and anatomical features of the structures in the area of the hepatoduodenal ligament, when there was non-simultaneous maturation of granulation and connective tissue, plastic surgery of the hepaticocholedochus was performed with an external drainage.

There were no fatal post-operative complications, with the exception of micro myocardial infarction, local bile leakage, and thrombosis of minuscule pulmonary artery branches. Modern techniques such as MRCP (magnetic resonance cholangiopancreatography) and contrast studies like endoscopic retrograde cholangiopancreatography (ERCP) were not utilized for diagnosis in our case; however, they could facilitate the mitigation of bile duct injuries during diagnostic surgical procedures and decrease postoperative complications in the future.

Table 1: Classification of Mirizzi syndrome.[6]

Type	Characteristic
I	Extrinsic compression of the common bile duct by an impacted gallstone
II	Cholecystobiliary fistula secondary to an eroded gallstone involving one third of the circumference of the common bile duct
III	Cholecystobiliary fistula secondary to an eroded gallstone involving two third of the circumference of the common bile duct
IV	Cholecystobiliary fistula comprising the whole circumference of the common bile duct
V	Formation of a cholecystoenteric fistula
Va	Absence of gallstone ileus
Vb	Presence of gallstone ileus

Table 2: Demographic data of the study.

Characteristic	N
Participants	20
Age	35-79 years
Sex	
Female	17
Male	3

DISCUSSION

Mirizzi syndrome presents a significant diagnostic and surgical challenge, particularly when the condition manifests in advanced stages, such as Type II, III, or IV. This study highlights the radiographic features, diagnostic difficulties, and surgical management strategies of Mirizzi syndrome, providing critical insights into the complexity of this rare disease.[7,8]

Sixteen patients with Type II and III Mirizzi syndrome, along with two patients with Type IV, were not diagnosed until surgery, highlighting the limitations of current radiographic techniques. Notably, in some cases, the stones' imitating characteristics caused confusion with Klatskin tumors or Hilar cholangiocarcinoma, further complicating preoperative assessment. This underscores the need for a multidisciplinary approach to diagnosis, combining advanced imaging modalities with clinical judgment. While X-ray surgical diagnostic methods, including cholangiograms, were utilized, they were not always definitive, particularly in cases where there was significant anatomical distortion and fibrosis in the biliary tract. The study also discusses the varied surgical approaches employed to treat Mirizzi syndrome. The application of hepaticojejunostomy on the Roux-en- Y loop is an acceptable operation in the surgical treatment of Mirizzi syndrome. This type of surgical intervention promotes the fastest possible rehabilitation of patients. Given the often-distorted anatomy of the bile ducts and the presence of dense infiltrates in the subhepatic space, laparotomy was the standard approach for most patients.[9]

This is consistent with the notion that Mirizzi syndrome frequently requires open surgery due to the complexity of the biliary anatomy and the surrounding inflammatory changes.[9] In this study, the gallbladder was typically found to be sclerosed, with either small stones or a single large stone obstructing the duct. In one case, a large stone (2.5 cm in diameter) located near the porta hepatis had led to complete destruction of the gallbladder walls, a situation that highlights the aggressive nature of Mirizzi syndrome when left untreated.

The variety of surgical techniques employed in this study reflects the challenges in managing the different types of Mirizzi syndrome. In a similar study, nine cases of Mirizzi syndrome were reported out of three hundred cases of laparoscopic cholecystectomy. According to this study, laparoscopic cholecystectomy was performed in four cases successfully without causing bile duct injury, despite significant difficulties and time. In two cases, laparoscopic procedures were abandoned for open procedures due to bile duct injury or risk of injury.[10] Another study describes the surgical treatment used for type I Mirizzi syndrome involves removing the gallbladder and leaving the common bile duct-adherent section of the infundibulum and in type II Mirizzi syndrome, the gallbladder is partially removed and the infundibular wall is utilized to close the Common Bile Duct.[11] Despite the technical challenges, our study reports that there were no fatalities, though there were postoperative complications, including myocardial infarction, local bile leakage, and thromboembolism.

These complications are consistent with the risks associated with complex biliary surgeries, particularly in the context of advanced Mirizzi syndrome, where inflammatory changes and anatomical distortions complicate surgical procedures.[9,12] The presence of postoperative complications further underscores the importance of careful preoperative planning and precise surgical techniques to minimize risk and improve outcomes.

CONCLUSION

With few diagnostic options, surgery is the sole choice, although it has a higher risk of bile duct damage and mild (non-fatal) complications during the postoperative period. Using present-day techniques like MRCP and ERCP in the future may further lessen the risk of life-threatening postoperative complications while boosting the patient's recovery. However, this condition necessitates that surgeons exercise caution while undertaking surgical procedures in the hepatobiliary zone, as well as be familiar with bile duct reconstructive surgery techniques.

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