

Case Report

Indocyanine green guided laparoscopic management of Mirizzi syndrome

Amol Rathod^{1*}, Santosh Thorat²

¹Department of General Surgery, PCMC YCIMH, Pimpri-Chinchwad, Maharashtra, India

²Department of General Surgery, PCMC YCMH, Pune, Maharashtra, India

Received: 25 October 2023

Revised: 17 November 2023

Accepted: 29 November 2023

*Correspondence:

Dr. Amol Rathod,

E-mail: a.s.rl2021996@gmail.com

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ABSTRACT

Mirizzi syndrome is a rare condition caused by the obstruction of the common bile duct or common hepatic duct by external compression from multiple impacted gallstones or a single large impacted gallstone in the Hartman's pouch. A 60-year-old female patient presented with complaints of abdominal pain with deranged liver functions. Mirizzi syndrome was diagnosed after radiological imaging and managed by laparoscopic cholecystectomy. Previously, Mirizzi syndrome was considered to be the absolute contra-indication for laparoscopic cholecystectomy. However, recent advances in radiology with the usage of indocyanine green and increased familiarity of the pathophysiology of the disease have successfully improved its laparoscopic management.

Keywords: Cholecystectomy, Laparoscopic, Indocyanine green, MIRIZZI syndrome, Case report

INTRODUCTION

Obstruction of the common bile duct or common hepatic duct by external compression from multiple impacted gallstones or a single large impacted gallstone in the Hartman's pouch is called as Mirizzi's syndrome (Figure 1). Underdeveloped countries have more promineny with prevalence ranging from 0.7% to 25%.¹

Moreover, this syndrome increases the likelihood of complications during treatment with laparoscopic cholecystectomy owing to difficult dissection and complications, such as bile duct injury.

Csendes classification of Mirizzi syndrome

The classification is as follows- type 1: extrinsic compression of the CBD by an impacted gallstone, type 2: cholecystobiliary fistula secondary to erosion of gallstone involving one third of the circumference of the CBD, type

3: cholecystobiliary fistula involving two thirds of the circumference of the CBD, type 4: cholecystobiliary fistula comprising whole circumference of the CBD, type 5: any type plus cholecystoenteric fistula, type 5A: without gallstone ileus, and type 5B: with gallstone ileus (McSherry et al described two types of Mirizzi syndrome based on endoscopic retrograde cholangio-pancreatography).^{3,8}

Timeline

The timeline includes- 17 March 2023: presentation of the patient at casualty with complaints, 20 March 2023: Mirizzi syndrome diagnosed after radiological imaging and laboratory findings, 21 March 2023: plan for operation, 23 March 2023: post-operative laboratory analyses monitoring [drain app 200 cc bilious tinge], 29 March 2023: normalised all laboratory parameters and dried off the drain, and 31 March 2023: discharge of the patient.

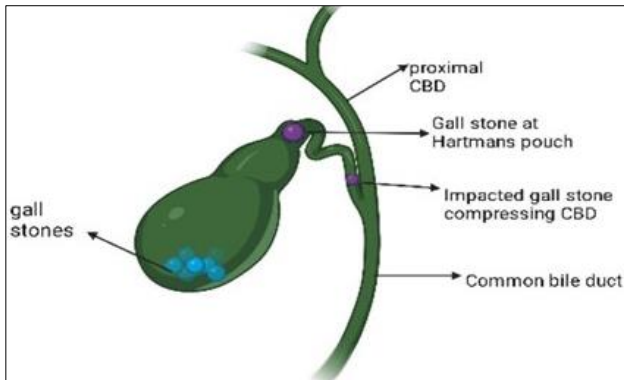


Figure 1: Mirizzi syndrome.

CASE REPORT

A 60-year-old female was brought to the casualty with complaints of abdominal pain ongoing for 8 days. The patient also stated that she had been experiencing multiple episodes of vomiting and spikes of fever for 4 days preceding admission. The patient reported no history of hematemesis, high coloured urine, or clay coloured stools. Upon examination, the patient had tenderness in the right hypochondriac region with localised guarding and no rigidity. Bowel sounds were sluggishly present. The patient was known to have diabetes mellitus and was on regular medication with oral hypoglycemic agents. No history of any abdominal surgical intervention was recorded. The patient had previously attended several practitioners for abdominal bloating and intermittent pain after consuming food but without any relief to her agony. Her ultrasonography from 6 months prior revealed s/o single solitary gall stone. Laboratory blood parameters were: haemoglobin, 11 mg/dl; total leukocyte count, 14000/ μ l; and platelet count, 132000/ μ l. A liver functional lab screening was done that showed derangements in the levels of total bilirubin, 4.3 mg/dl; direct bilirubin, 2.8 mg/dl; SGOT, 92 IU/l; SGPT, 79 IU/l; and GGT, 160 U/l, while the levels of other parameters were within normal ranges. This indicated obstructive jaundice in a known case of diabetes mellitus with gallstone disease.

Imaging studies

Present ultrasonography of abdomen and pelvis suggested cholelithiasis with cholecystitis and gallbladder empyema.

Contrast enhanced computed tomography showed a 15-mm calculus at the gallbladder neck region compressing the proximal common hepatic duct with features suggestive of cholelithiasis with cholecystitis and gallbladder empyema with severe dilatation of the proximal common hepatic duct with dilated right and left hepatic ducts and intrahepatic biliary radicals (Figure 3).

Magnetic resonance cholangiopancreatography (Figure 2) was suggestive of a 15-mm stone impacted at the neck of the gallbladder compressing the proximal common hepatic

duct and the cystic duct. The gall bladder distended with gallbladder sludge within features suggestive of cholelithiasis with cholecystitis and gallbladder empyema with a dilatation of the proximal common hepatic (8 mm), as well as the right and left hepatic ducts (6 mm), with the intra hepatic biliary radicles dilated.

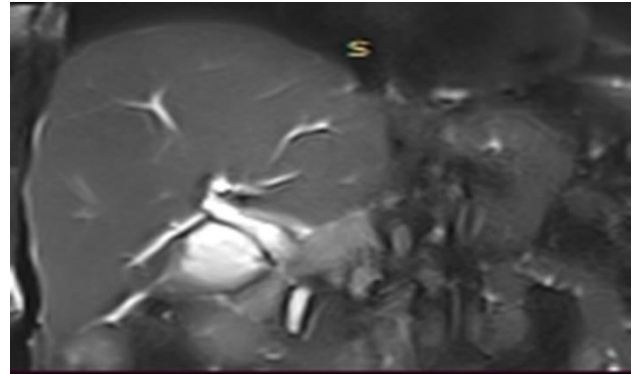


Figure 2: MRCP images suggestive of gallstone impacted at the junction of the cystic duct and the CHD with dilatation of the proximal CHD.



Figure 3: CECT image of the gallstone impacted at the junction of the cystic duct and common hepatic duct.

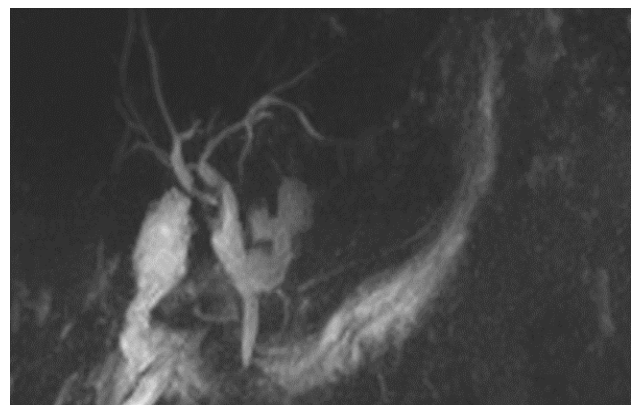


Figure 4: Postoperative MRCP image showing the patient's CHD and CBD, MRCP, CHD, CBD.

After 2 days of the initial broad-spectrum antibiotic course, the patient was scheduled for laparoscopic

cholecystectomy after obtaining written informed consent. Indocyanine green was injected at 2 µg/kg 1 hour prior to the surgery.⁶ With the patient in the supine position, ports were inserted similar to that for a standard laparoscopic cholecystectomy (Figure 5). Intra op evidence of frozen calot's triangle. Dissection was initiated with the fundus-first approach. Gallbladder was opened at the Hartman pouch and a 1.5-cm large gallstone impacted at the junction of the cystic and common hepatic ducts was observed (Figures 6 and 7).

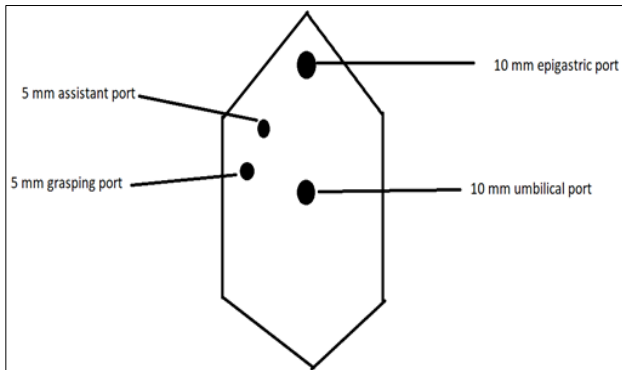


Figure 5: Diagrammatic representation of standard laparoscopic cholecystectomy port insertion.

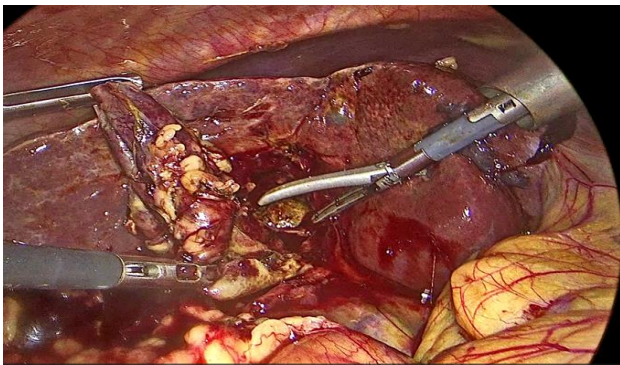


Figure 6: Dislodged impacted stone from the gallbladder.

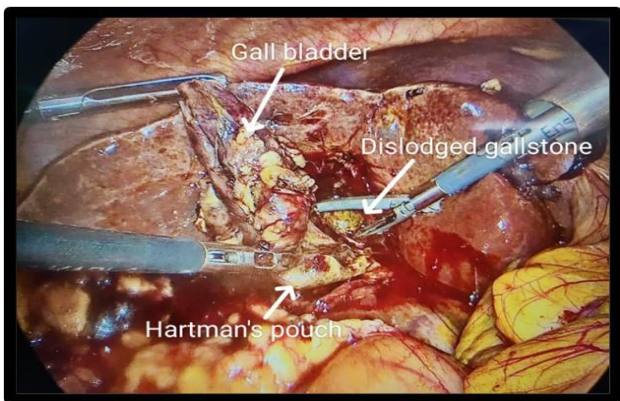


Figure 7: Dissection at the Calot's triangle, labelled as the gallbladder, Hartman's pouch, and gall stone.

The stone was dislodged by milking. Subtotal cholecystectomy was performed, and the stump mucosa was cauterised and closed using polyglactin 2-0 intraoperative imaging with Indocyanine green dye to avoid bile leakage post repair. A 28 no. abdominal drain was placed in the Morrison's pouch in which a bilious drain of approx. 200 cc (volume) was observed on the first postoperative day, which decreased on a daily basis and dried off on the seventh day. Liver function tests were repeated on the second day postoperatively and monitored thoroughly; a decreasing trend in the daily bilirubin levels was observed, which were normalised by day seven.



Figure 8: Intraoperative image of green colored ICG dye suggestive of bile leakage.

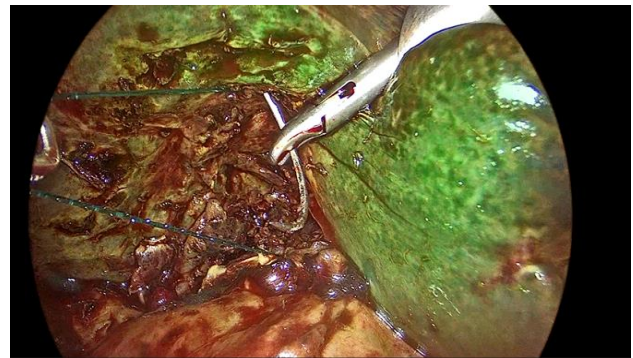


Figure 9: Intraoperative image of closing the common hepatic duct as visualized on using the indocyanine green dye.

DISCUSSION

Mirizzi syndrome has been previously considered to be the absolute contraindication for laparoscopic cholecystectomy. This may be because of limited visibility, a lack of awareness in the surgical community regarding laparoscopic biliary anatomy, and the anticipated threat of bile duct injuries and complications. Few most common complications occur due to compression of the stone over the common hepatic duct causing its erosion.¹ These factors prolong the operative time, which further increases the likelihood of bile duct and cystic artery/hepatic artery injuries, reducing the visibility of clear anatomy. Some known complications include cutaneous fistula formation, secondary biliary

cirrhosis, and delayed biliary strictures.² Biliary fistulas formed secondary to Mirizzi syndrome can be managed by laparoscopic cholecystectomy.¹⁰

Laparoscopic cholecystectomy was successful in 73/124 patients (59%) in systematic review of 10 case series. A significantly lower risk for conversion ($p < 0.05$), procedure-related complications ($p < 0.05$), and reoperation ($p < 0.05$) seen in patients with pre operatively diagnosed cases when compared with studies of patients with a lower rate of preoperative diagnosis.⁹ Performing subtotal cholecystectomy in patients with difficult anatomy and pathological complicated conditions are safer and feasible.⁵

With advancement in biomedical technologies, such as excellent visual exposure with 4K arrangements, telescopes empowered with near infra-red imaging detection capabilities, and ICG dye detection capacities, performing laparoscopic surgery for Mirizzi syndrome has become feasible.⁴ The ICG dye is excreted from the body with almost no complications and none to negligible known cases of dye allergies.⁷ Nevertheless, management of such rare cases of Mirizzi syndrome should be attempted at high-volume centres, with anticipation of complicated anatomy, technical difficulties that demand highly skilled surgeons, and lots of patience for positive outcomes.

CONCLUSION

Mirizzi syndrome is rare complication of cholelithiasis. Dislodgement and removal of impacted gallstone is main purpose of treatment in these cases. Primary hand suturing Repairs in a dilated and effaced CHD and Cystic duct junction area (due to larger impacted stones responsible for mirizzi's) with or without Biliary stents is a feasible option with ERCP and stenting kept as an reserve Procedure as per need arises. Laparoscopic subtotal cholecystectomy is useful and feasible in Mirizzi syndrome.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Rathod A, Thorat S. Indocyanine green guided laparoscopic management of Mirizzi syndrome. Int J Res Med Sci 2024;12:266-9.