

## Case Report

**Pneumoperitoneum with Muyo Hook on Laparoscopic Cholecystectomy**Fadli R. Amsriza,<sup>1\*</sup> Rizka Fakhriani,<sup>2</sup> Sagiran<sup>1</sup><sup>1</sup>Department of Surgery, <sup>2</sup>Department of Otorhinolaryngology-Head and Neck Surgery,  
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**Abstract**

Gallstone migration into the cystic duct aperture can prevent bile from exiting the gallbladder during contraction. Gallbladder wall strain increases due to a distinct form of pain (biliary colic). A more prolonged cystic duct obstruction can cause acute gallbladder inflammation (acute cholecystitis). Cholecystectomy is a popular treatment for gallstone-related illnesses. We present a 49-year-old male with heartburn, nausea, and vomiting for one month, worsening in the last week. On general examination, vital signs and urine output are expected. On clinical examination, he had tenderness on the upper right quadrant abdomen, and Murphy's sign was positive. An abdominal ultrasound (US) showed multiple cholelithiasis. The patient was performed elective laparoscopic cholecystectomy with pneumoperitoneum by Muyo hook. The patient was discharged on the third day after surgery. Recent research has highlighted this unusual method. In this unique and challenging situation, Muyo hook may be an option.

**Keywords:** Pneumoperitoneum, Muyo hook, laparoscopic cholecystectomy, gallstone.

**Pneumoperitoneum dengan Muyo Hook pada Kolesistektomi Laparoskopik****Abstrak**

Migrasi batu empedu ke dalam lubang saluran kistik dapat mencegah empedu keluar dari kantong empedu. Ketegangan dinding kantong empedu meningkat karena adanya rasa nyeri yang berbeda (kolik bilier). Obstruksi duktus kistik yang lebih lama dapat menyebabkan peradangan kantong empedu akut (kolesistitis akut). Kolesistektomi adalah penanganan yang populer untuk penyakit yang berhubungan dengan batu empedu. Seorang pria berusia 49 tahun datang dengan nyeri ulu hati, mual, dan muntah selama satu bulan, yang memburuk dalam satu minggu terakhir. Pada pemeriksaan umum, tanda-tanda vital dan produksi urin normal. Pada pemeriksaan klinis, pasien mengalami nyeri tekan pada perut kuadran kanan atas, serta tanda Murphy positif. Ultrasonografi abdomen (USG) menunjukkan adanya kolelitiasis multipel. Pasien menjalani kolesistektomi laparoskopik elektif dengan pneumoperitoneum menggunakan Muyo hook. Pasien keluar dari rumah sakit pada hari ketiga setelah operasi. Penelitian terbaru telah menyoroti metode yang tidak biasa ini. Dalam kondisi yang unik dan menantang, Muyo hook dapat menjadi pilihan.

**Kata kunci:** Pneumoperitoneum, Muyo hook, kolesistektomi laparoskopik, batu empedu.

## Introduction

Cholelithiasis was the most prevalent cause of abdominal pain worldwide.<sup>1</sup> Cholelithiasis affects about 10% of individuals in the United States, 5.9% in Western Europe, and from 3.2% to 15.6% in Asia.<sup>2</sup> Gallstones (cholelithiasis) are stones in the gallbladder or biliary system produced by abnormally high cholesterol or bilirubin in bile. Bile is a substance produced by the liver and retained in the gallbladder. The presence of stones, benign/malignant stenosis of the biliary tract and cystic duct blockage are the causes of cholecystitis.<sup>3</sup>

The most common symptom is upper abdomen pain, often localized to the upper right quadrant. The pain in acute calculous cholecystitis is often severe and abrupt, although it can also be cramping, dull, or constant. Cholecystitis symptoms include moderate and mild to severe discomfort and complications. Patients usually get their diagnosis from their symptoms, blood test results, and imaging.<sup>4</sup> Multiple risk factors predispose patients to the production of gallstones. Obesity, diabetes mellitus (DM), feminine gender, hormone therapy or oral contraceptive use, and physical inactivity are related to elevated hepatic cholesterol absorption and secretion, which increases stone development.<sup>5</sup> Even though most instances are asymptomatic, a tiny minority might have catastrophic (and occasionally fatal) effects. The effects include acute cholecystitis, pancreatitis, and (rarely) gallbladder cancer.

The stage of disease decides the treatment for gallstones. To some measure, gallstone formation could be prevented using lithogenic state interventions. When gallstones become symptomatic, cholecystectomy is usually recommended (usually, laparoscopic cholecystectomy is the first thing doctors do at centers that have done this kind of surgery before).<sup>6</sup> Cholecystectomy (gallbladder removal) is a popular treatment for gallstone-related illnesses.<sup>4</sup> Cholecystectomy using the Muyo hook is like general laparoscopic cholecystectomy, including how to access the gallbladder. The difference is how we use the Muyo hook to create a pneumoperitoneum. Compared to a towel clamp, the Muyo hook is a more ethical instrument. Without assistance from a helper, the operator may use it independently. It makes the pneumoperitoneum closed procedure safer, quicker, more efficient, and more cost-effective. This report describes a case of cholelithiasis in a male patient. The patient underwent pneumoperitoneum with Muyo hook on laparoscopic cholecystectomy.

## Case Illustration

A 49 years old male, a laborer, came to the Surgery Department with a primary complaint of heartburn accompanied by nausea and vomitus in the last month of recurrence and worsening in the last week. On general examination, vital signs and urine output are expected. On clinical examination, he had tenderness on the upper right quadrant abdomen, and Murphy's sign was positive. An abdominal ultrasound (US) showed multiple cholelithiasis. (Figure 1).



**Figure 1. Abdominal Ultrasound (US) Showed Multiple Cholelithiasis**

The patient underwent elective laparoscopic surgery. The surgeries were carried out by surgeons who were familiar with laparoscopic surgery. According to local hospital procedures, patients got a single dosage of preoperative antibiotic prophylaxis. After administering anesthetic and intubation, laparoscopic cholecystectomy can begin. The patient's position is supine. In the operating room, an aseptic antiseptic was utilized. After a 20-mm incision has been made, the incision is widened until the linea alba is visible. A Muyo hook is used to lift the linea alba. With the peritoneal trocar penetrated and

inserted into the port, the abdominal cavity is filled with CO<sub>2</sub> to create a pneumoperitoneum. The umbilical canal was entered into the abdominal cavity using a video scope. Three trocars are implanted while paying close care to the intra-abdominal puncture site. The first trocar was introduced 5 cm below the xiphoid process in the epigastrium with intra-abdominal penetration above the falciform ligament. The midclavicular line, a few cm below the lowest rib, was used to place the second trocar in the right upper region of the abdomen. The third trocar is inserted at the right upper quadrant, lateral to the second trocar.

The patient's position is changed to a mild anti-Trendelenburg (10-15°) and slightly tilted to the left. The bladder is held with grippers/forceps from the lateral port (4), then protrudes superiorly and is held in this position. The infundibulum is grasped with the gripper from the medial port (3) and retracted towards the tail. Dissecting forceps are inserted from the epigastric port (2), and the tissue around the cystic duct and cystic artery is removed until the two structures are visible. The cystic artery was clamped with one metal clip distally and two metal clips proximal and then cut. The visible cystic duct is clamped with a metal clip close to the gallbladder. The proximal cystic duct was joined using two metal clamps, and then the duct was clipped.

The umbilical video scope is moved to the epigastric port. The gallbladder is removed using umbilical forceps. Decompressing the umbilical orifice with CO<sub>2</sub> removes the gallbladder. Remove the entire trocar, and cover the wound with stitches. The cholecystectomy was performed, and the gall stone was removed. The macroscopic appearance and the gall stone appear in Figure 2. The total operative duration was 60 min. The postoperative period was good. The patient was discharged from the hospital on the third day after surgery. The patient was OK after three months of observation.



**Figure 2. The Gall Stone and Gall Bladder**

## Discussion

Symptomatic cholelithiasis with recurrent pain episodes is usually the only type of cholelithiasis treated. Elective cholecystectomy is the definitive treatment, both advised and shown to improve life expectancy.<sup>7</sup> Based on history taking and abdominal ultrasound (US), the patient got symptomatic cholelithiasis, so the patient got elective laparoscopic cholecystectomy. For symptomatic cholelithiasis, the standard gold treatment for gallstones is laparoscopic cholecystectomy.<sup>8</sup> The removal of gallbladder disease with laparoscopic cholecystectomy is a minimally invasive surgical operation. This method has supplanted the open approach for regular surgery to remove the gallbladder since the mid-1990s.<sup>8</sup>

Cholecystectomy, also known as laparoscopic cholecystectomy, is an invasive procedure that includes creating four small incisions and extracting the gallbladder with long tools while utilizing a camera to observe the gastrointestinal tract. Elective cholecystectomies are 90% laparoscopic, making them one of the most common surgeries in the world.<sup>9</sup> Compared to open cholecystectomy, laparoscopic cholecystectomy has the most benefits for patients, including a lower risk of postoperative problems, earlier feeding, trauma causing a decreased metabolic-endocrine-immune reaction (REMIT), and a shorter average hospital stay.<sup>10</sup>

As laparoscopy has significant advantages over laparotomy, it has gradually replaced open abdominal surgery for several operations, even in young patients. In particular, laparoscopy is linked to quicker recovery, reduced postoperative discomfort, shorter hospital stays, and improved cosmetic outcomes.<sup>11</sup> It does not come without short- and long-term comorbidities, such as minor aches, discomfort in the abdomen, and adhesion formation.<sup>12</sup>

In many surgical disciplines, laparoscopy is a common practice. Laparoscopy complications are frequently linked to the procedure's first entry into the abdomen. Injury to the viscera (e.g., bowel, bladder) or the vasculature can be life-threatening (e.g., anterior and central vessels of the abdominal wall). There does not appear to be much agreement on the best laparoscopic approach for getting to the peritoneal cavity. It is essential in laparoscopic surgery due to the device's improved visibility and movement at the operating site. Tradition has held that pneumoperitoneum is produced by either raising the skin on each side (by the operator and helper) or using clamps such as a towel or Kocher clamps.<sup>13</sup>

Gaining access to the peritoneal cavity and establishing a pneumoperitoneum is the first and most crucial stage in any laparoscopic procedure. The remaining steps of the surgical operation can be carried out without incident after the pneumoperitoneum has been successfully established. Despite the remarkable advancements made in laparoscopic surgery during the past three decades, there is still no unambiguous agreement on the best way to access the peritoneal cavity.<sup>14</sup> As the gold-standard procedure, closed pneumoperitoneum is often achieved by blindly inserting a Veress needle into the peritoneal cavity.<sup>15</sup> However, dangers including intestinal and vascular damage remain a possibility when using a Veress needle.<sup>15,16</sup>

Muyo hook is a simple hook-shaped tool that can assist in the insertion of a trocar in laparoscopy without the assistance of an assistant, making the procedure faster, simpler, and safer. Muyo hook can be used without having to expand the incision. Furthermore, the tool's design avoids the risk of piercing internal organs. This tool was built by Sagiran, who acquired a basic patent certificate from the Republic of Indonesia's Ministry of Law and Human Rights on January 13, 2017. Figure 3 depicts the Muyo hook design.



Figure 3. Muyo Hook

Muyo hook can be used with either your left or right hand. Figure 4 shows how to hold a Muyo hook. The Muyo hook is controlled by one hand, while the Veress needle is controlled by the other. The index finger goes inside the circle's bottom, and the thumb is glued from the outside. This part serves as a securing point. Two fingers (middle and ring fingers) on the outside and one small finger on the inside flank the stem. Because it may move back and forth, this component becomes a movable part, generating a narrow slope between the tool and the abdominal wall. The tool's sharp

end is squeezed and stabbed into the fascia as far as the horizontal fascia segment, then hooked and lifted to the abdominal wall. Figure 5 shows how to insert a Muyo hook.



Figure 4. How to Hold Muyo Hook



Figure 5. Insertion of Muyo Hook

## Conclusion

A 49-year-old man had a successful laparoscopic cholecystectomy with pneumoperitoneum by Muyo hook. Recent research has highlighted this unusual

method. In this unique and challenging situation, Muyo hook may be an option.

### Conflict of Interest

There is no conflict of interest in this case report.

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