

EFFECTIVENESS OF LAPAROSCOPY SURGERY TECHNIQUE COMPARED TO OPEN SURGERY PROCEDURE IN CHOLECYSTOLITHIASIS THERAPY

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ARTICLE INFO

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Kata kunci:

kolesistolithiasis
Batu empedu
Bedah laparoskopi
Kolesistektomi

Keywords:

Cholesistolithiasis
Gallstones
Laparoscopic Surgery
Cholecystectomy

Original submission:

June 1, 2025

Accepted:

June 20, 2025

Published:

September 20, 2025

ABSTRAK

Kolesistektomi laparoskopi adalah teknik bedah minimal invasif untuk mengurangi rasa nyeri pasca operasi dan pemulihan cepat. Hal ini didemonstrasikan lebih lanjut menggunakan kasus seorang pria berumur 45 tahun dengan nyeri perut kanan atas akibat batu empedu 1,5 cm setelah didiagnosis melalui ultrasonografi. Hasil menunjukkan batu empedu berhasil diangkat melalui operasi laparoskopi tanpa komplikasi berarti. Kolesistektomi laparoskopi memiliki keunggulan dibandingkan bedah terbuka, karena rasa sakit pascaoperasi pasien lebih ringan, pemulihan terjadi lebih cepat, dan jangka waktu rawat inap lebih singkat. Teknik ini terbukti efektif dan lebih aman untuk pasien tanpa komplikasi signifikan.

ABSTRACT

Effectiveness of Laparoscopy Surgery Technique Compared To Open Surgery Procedure in Cholecystolithiasis Therapy. Laparoscopic cholecystectomy is a minimally invasive surgical technique to reduce post-operative pain and speed the recovery process. This was further demonstrated using the case of a 45-year-old man with right upper abdominal pain due to a 1.5 cm gallstone after being diagnosed via ultrasonography. The results showed that the gallstones were successfully removed via laparoscopic surgery without significant complications. Laparoscopic cholecystectomy has advantages over open surgery, because the patient's postoperative pain is lighter, recovery occurs more quickly, and the hospital stay is shorter. This technique has been proven to be effective and safer for patients without significant complications.

INTRODUCTION

Cholelithiasis or commonly known as gallstones are crystals that can be found deposited in the gallbladder, bile duct, or even both. Cholelithiasis can be symptomatic or asymptomatic. Most gallstones block the cystic duct, often causing acute cholecystitis, which is inflammation of the gallbladder. Cholelithiasis can also cause disorders on the pancreas, biliary tract, liver, and digestive tract.^{1,2} Meanwhile, cholecystolithiasis is defined as a condition in which stones are in the gallbladder. Based on its type, cholelithiasis or gallstones are divided into three types, namely cholesterol stones, pigment stones (bilirubin stones), and mixed stones. Pigment stones can be brown pigments and black pigments, while cholesterol stones are the most common type.^{3,4,5}

Some studies indicate that the majority of people with cholelithiasis are asymptomatic; nonetheless, this does not preclude the occurrence of discomfort, referred to as biliary colic.⁶ 3-10%

of patients experience abdominal pain, while 20% experience biliary colic. Over time, treatment with cholecystectomy procedures has increased. In the United States, approximately 20 million people are estimated to have gallstones, and as many as 750,000 cholecystectomy procedures are performed each year. Therefore, although patients with cholelithiasis are usually asymptomatic, each year, 1–2% of patients develop symptoms.^{6,7}

Cholelithiasis is said to appear without symptoms. This is because it is supported by risk factors for cholelithiasis such as age, gender, excess weight, high-fat foods, lack of physical activity, and long-term intravenous nutrition. People over the age of 40 are more likely to develop cholelithiasis than younger people due to increased cholesterol secretion into the bile with age. Lack of physical activity also increases the risk of cholelithiasis because the gallbladder contracts less. Although it can appear without symptoms, cholelithiasis is often accidentally discovered during an abdominal ultrasound examination.^{2,3}

The number of patients with cholelithiasis in Indonesia has increased due to things related to daily habits, such as consuming high-fat foods, smoking, low-fibre foods, alcoholic beverages, rapid weight loss programs, and lack of protein consumption.³

Cholelithiasis is a condition characterised by the formation of stone-like material in the gallbladder and cystic duct, resulting from several contributing factors. In the gallbladder, the most common are cholesterol stones. The incidence of gallstones in Western countries is 20%, and most of them are experienced by adults and the elderly. Meanwhile, 80% of gallstones experienced are cholesterol stones.⁵

The condition leads to clinical symptoms that appear resembling cholelithiasis caused by stones, so supporting examinations are needed to confirm this.⁸ Chronic gallstone disease is commonly found in the form of complications, such as acute cholecystitis, acute pancreatitis, and acute cholangitis.⁹ Meanwhile, there are also benign but rare and unusual complications, such as Mirizzi Syndrome. Mirizzi Syndrome is a form of continuous obstructive jaundice caused by the impaction of gallstones in the neck of the gallbladder (cystic duct). This condition causes the hepatic duct to become narrow. Only 0.1% to 0.7% of patients with gallstones experience this complication, making it extremely rare.⁹ However, the symptoms of Mirizzi Syndrome are similar to those of cholecystitis caused by other conditions, such as bile duct stones and ascending cholangitis related to jaundice, which often leads to confusion in diagnosis. In essence, Mirizzi Syndrome is a rare complication of cholecystitis and chronic cholelithiasis because it is accompanied by jaundice, but it does not mean that cholecystitis is the same as Mirizzi Syndrome.^{10,11}

Laparoscopic surgery is a minimally invasive surgical technique used in the abdomen and pelvis. Laparoscopic surgery uses two to four small incisions measuring half an inch or less. One incision is for the camera, and the other incisions are for the surgical instruments. The Beira Surgery Department identified a total of 363 laparoscopic procedures, mainly related to gynaecological diseases, cholelithiasis, and appendicitis, with only a 1.6% (6 cases) complication rate and a 1.9% (7 cases) conversion rate to open surgery. Laparoscopy is a diagnostic and therapeutic surgical tool used to view intra-abdominal organs. Several studies have begun to assess the effectiveness and efficiency of laparoscopy compared to conventional surgery. In addition to accelerating the patient's healing process and shortening hospitalization, laparoscopy has been shown to provide positive outcomes, efficiency, and lower infection rates. Therefore, laparoscopy shows clear advantages, namely minimizing postoperative pain, better recovery quality, faster recovery, and shorter hospitalization time.⁷

Laparoscopy itself is different from open surgical techniques. Both are equally capable of treating cholecystitis, but in terms of their advantages are different. In general, the risk of infection is smaller and recovery is faster, calculated at 1 to 2 days when using the laparoscopic technique. This makes the laparoscopic technique considered effective and efficient compared to conventional techniques such as open surgery. A study has been conducted on patients at the Jambi Regional Hospital proving that as many as 67% of patients who have undergone surgery with the laparoscopic technique were only hospitalized for an average of 2.37 days.¹² In addition, the laparoscopic technique is also said to be a *gold standard* procedure when compared to open surgery.¹³

Meanwhile, open surgical techniques are performed by making a large incision in the abdomen, in contrast to laparoscopic techniques that only require small incisions. Open surgical techniques leave larger incisions and longer recovery times. Moreover, it is also proven by a study in open surgery that the incision scar can still be clearly seen along 1.5 cm.¹⁴

A study evaluating the pain levels of patients with open and laparoscopic surgery showed that 86.4% and 11.4% of patients experienced moderate to severe pain after undergoing open surgery.¹³ Meanwhile, laparoscopic surgery showed that 50% of patients experienced mild pain and 50% did not experience pain.¹³ Of course, this evidence makes laparoscopic techniques superior to open surgery.^{15,16}

Research conducted Sudibyoko,¹⁷ concluded that the length of treatment for patients undergoing laparoscopic cholecystectomy and mini laparotomy did not differ significantly because both groups of subjects underwent the same treatment, namely 2 days. Meanwhile, the recovery time for patients to return to normal activities was the same, less than 2 weeks. The average VAS of the laparoscopic method (VAS score 2.5 ± 0.6) was lower than that of the mini laparotomy method (VAS score 2.8 ± 0.74).¹⁷ This is contrary to research conducted at Dr. Kariadi General Hospital, Semarang, which concluded that the average length of hospitalization for patients undergoing laparoscopic cholecystectomy was 3 days, while for patients undergoing mini laparotomy cholecystectomy, the average was 5 days.¹⁸ Single-incision laparoscopic surgery (SILS) is a new laparoscopic method that only uses 1 single incision (laparoscopic port) in performing laparoscopy.¹⁹ This article aims to evaluate the effectiveness of a laparoscopic technique compared with an open surgical technique in the treatment of cholecystolithiasis based on a case study.

METHOD AND CASE ILLUSTRATION

Anamnesis

A 45-year-old man came with a chief complaint of right upper abdominal pain like being stabbed by a sharp object that felt intermittent and spread to the right shoulder area, which had become increasingly severe since 2 days before admission to the hospital. The patient reported feeling more pain than usual for the last 30 minutes after consuming fried foods. In addition, usually the right upper abdominal pain is felt more severely when the patient consumes fatty and oily foods. However, when the patient's stomach is empty the pain feels lighter. In fact, the patient has felt the pain for the past 2 years, and during that time the patient has taken painkillers and UDCA. The patient also complained of nausea. There were no complaints of chest pain, shortness of breath or fever. There were no complaints of coughing, night sweats, or weight loss. The patient's urine was clear yellow. There was no history of painful urination or dysuria. There were no complaints about the patient's bowel movements. The patient did not complain of his body and his eyes did not turn yellow.

Two days before entering the hospital, the patient felt increasingly severe pain in the upper right abdomen accompanied by complaints of nausea. There were no other significant comorbidities in this patient, but it was noted that the patient often consumed fatty foods and rarely consumed vegetables. In addition, the patient admitted that he did not smoke. The patient also had regular check-ups and routinely consumed UDCA twice a day for 1 year.

Physical Examination

From the physical examination of vital signs, blood pressure was 132/84 mmHg, HR 86 x/minute, and temperature 36.3°C. The patient weighs 77 kg with a height of 170 cm. The visual analogue scale patient is 8. The sclera did not show icteric features, and there was pain in the right hypochondrium/subcostal region with a positive Murphy sign. Examination of other organ functions showed no abnormalities.

Diagnostics Tests

Laboratory examination results showed Hb 15 g/dL, leukocytes 6000 μ L and platelets 245,000 μ L. Liver transaminase examination results showed normal limits, except for a slight increase in bilirubin levels (total bilirubin 1.29 mg/dL; direct 0.42 mg/dL, and indirect 0.87 mg/dL). Kidney function, blood glucose levels, and electrolyte levels showed normal limits. Chest radiology examination showed no abnormalities.

Next, additional diagnostic examinations were performed on this patient, including ultrasonography (USG). The results of the gallbladder USG examination found a solitary stone in the gallbladder, with a stone size of 1.5 cm. During the treatment, the patient was advised to undergo surgery with a laparoscopic procedure. The action was suggested because the patient had been taking painkillers for 2 years, so the patient asked for his gallbladder to be removed. The patient was given consent information and agreed.



Figure 1. Ultrasound result of the patient's gallbladder

Operative Procedure

This operation takes 4 hours, and this patient lost about 200 cc of blood. The laparoscopic surgery procedure is performed by making an incision at the bottom of the umbilicus approximately 2 cm, deepened layer by layer. Then a 10-millimetre trocar is inserted through the peritoneum, and CO₂ is inserted into the abdominal cavity, then the camera is inserted. After that, an incision in the epigastric region and right hypochondrium is made, the right lumbar to install the port. Furthermore, the patient's position is changed to anti-trendelenburg and slightly tilted to the left.

The gallbladder was held with forceps from the lateral port and pushed superiorly and maintained. Then the cystic artery and large bladder were identified in the cystic duct. The cystic duct was opened above the stone, then the stone was removed by breaking it into small pieces, and the stone was successfully evacuated from the cystic duct. The cystic duct was traced 2x proximally and 1x distally, cut between the clamps. Gallbladder released from the hepatic bed and bleeding control is performed. Then the surgical wound is sutured layer by layer and finally the operation is completed.

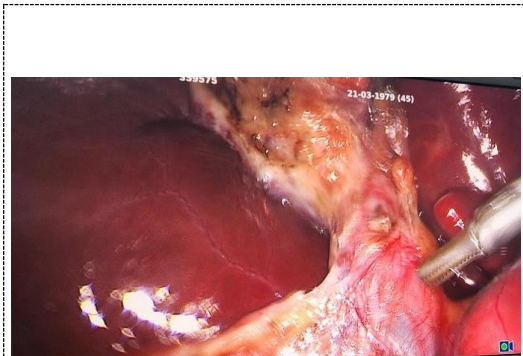


Figure 2. Patient's gallbladder during laparoscopy surgery



(a)



(b)

Figure 3. Patient's gallbladder after laparoscopy surgery (a) Patient's Gallstone (b) Patient's Gallbladder

DISCUSSION

Suspicion of indication of cholecystolithiasis is based on complaints in the upper right area, tenderness in the right hypochondrium, and a positive Murphy's sign on physical examination. This is in line with the literature review. Risk factors for acute cholecystitis are often associated with 4F, consisting of *fat* (fat), *female* (woman), *fertile* (fertile), and *forty* (*forties*). This is in accordance with the condition of this patient, namely, that the patient is over 40 years old (forty). Based on the consensus on obesity in Asia Pacific, the patient is classified as *overweight* grade I (fat) considering the body mass index calculation is 26.6 kg/m².

Typical complaints are right upper quadrant abdominal pain, nausea, vomiting, and fever. In addition, sometimes the pain can radiate to the right shoulder or scapula. The severity of the complaint varies greatly depending on the presence of mild inflammatory disorders to gangrene or perforation of the gallbladder. Right upper quadrant abdominal tenderness, a palpable gallbladder, and a positive Murphy's sign on physical examination are characteristics of acute cholecystitis. A positive Murphy's sign has a specificity of 79%-96% for acute cholecystitis.

Jaundice can be found in 20% of cases and is generally mild (bilirubin <0.4 mg/dl). This jaundice is thought to occur due to partial biliary obstruction triggered by inflammation in the CBD. If the bilirubin concentration is high, it is necessary to consider the presence of stones in the extrahepatic bile duct. This condition was not found in the patient.

Ultrasonography (USG) examination is the main diagnostic modality and is highly recommended. USG should be performed routinely and is very useful for showing the size, shape, and thickening of the gallbladder wall, stones, and extrahepatic bile ducts. The sensitivity and accuracy of USG reach 90%-95%. In this patient, the USG results showed a picture of stones.

The definitive therapy for acute cholecystitis is cholecystectomy, in addition to antibiotics and analgesics. The determination of when to perform cholecystectomy is still debated. Surgeons say that by performing early surgery, the onset of gangrene and complications of failed conservative therapy can be avoided, the length of hospitalization can be shortened, and costs can be reduced. The literature states that in 50% of cases it will improve without surgical intervention. Clinically, after several days of treatment, patients admit that their right upper abdominal pain has decreased significantly.

Currently, the laparoscopic cholecystectomy technique has been developed, which is safer than conservative therapy (open cholecystectomy). In the department of digestive surgery, FKUI-RSCM, laparoscopic cholecystectomy is performed in less than 72 hours after the initial diagnosis is established.

After surgery, the patient reported having a VAS of 3. Patient hospitalized for 3 days. This patient showed clinical improvement within 36 hours postoperatively and was discharged on day 2. the patient was able to return to activity after 1 week postoperatively.

CONCLUSION

Based on this case and previous studies, cholecystolithiasis using laparoscopic surgery has been proven to be one of the effective surgical techniques because there are several advantages produced, namely reducing post-operative patient pain, better patient recovery quality, faster recovery time, and shorter length of stay.

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