

**IS LOST STONES IN THE PERITONEAL CAVITY AFTER CHOLECYSTECTOMY  
HARMFUL****Abdel-Ltif Ahmed Abdel-Ltif\***

Faculty of Medicine\_Al-Azhar University, Assiut, Egypt.

**\*Corresponding Author: Abdel-Ltif Ahmed Abdel-Ltif**

Faculty of Medicine\_Al-Azhar University, Assiut, Egypt.

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**ABSTRACT**

**Background:** Gall stones disease is one of the commonest causes of abdominal pain. Cholecystectomy is the only definitive treatment for this disease which offers cure. It should be done as early as possible before the onset of complications. The management of patients with this disease has been revolutionized in the last few years with the introduction and evolution of laparoscopic cholecystectomy. With increasing skills and improvement of equipments and instruments, more complicated cases of gall stones such as acute cholecystitis are conducted through laparoscope. This attitude add to increased incidence of operative complications during laparoscopic cholecystectomy. One of these complications is laceration of gall bladder with dispersion of the stones within the peritoneal cavity with subsequent infection or adhesions. This complication occurs in 9-20% of cases. **Patients and Methods:** A prospective study on 40 patients who were admitted to general surgery department in AL-Azhar Assiut university hospital presented with right upper abdominal pain after laparoscopic and open cholecystectomy in the period from January 2016 to January 2017. Adult patient (above 20 yrs old) (common in old age). both sex → female and male (but female > male). **Results:** In this study 40 patients were complaining from Rt upper Abd. Pain after open and laparoscopic cholecystectomy, 31 patients of them (77.5%) were females and 9 patients (22.5%) were males. Age range from 20 – 60 years. Most patients were in 5<sup>th</sup> and 6<sup>th</sup> decades of life. In our study 36 of forty patients (90%) had gall bladder stones and treated by laparoscopic cholecystectomy while 4 patients had treated by open cholecystectomy, 3 patients converted from laparoscopic cholecystectomy to open cholecystectomy. In 3 patients (7.5%) were presented by night sweats right back and loin pain and right loin swelling. On examination 2 patients (female 56 years old and male 59 years old) had a tender fluctuant swelling in the right lumbar region with overlying skin erythema. A computed tomography (CT) scan showed a complex subphrenic, subhepatic and subcutaneous collection. These collections were diagnosed as abscesses. These abscesses were drained under ultrasound guidance and the drains left in situ, the pus grew E-Coli (*Escherichia coli*) and streptococcus on culture. The 2 patients were treated with antibiotics for ten days and discharged home. **Conclusion:** complications arising from spillage of gall stones during cholecystectomy are of low incidence. The surgeon should take most care to prevent spillage of stones and attempt to remove all visible stones at the time of surgery especially if they are of infected type. Conversion to open technique to retrieve the stones is not indicated.

**KEYWORDS:** cholecystectomy, lost stones, subphrenic abscess.**INTRODUCTION**

Gall stones disease is one of the commonest causes of abdominal pain. Cholecystectomy is the only definitive treatment for this disease which offers cure. It should be done as early as possible before the onset of complications. The management of patients with this disease has been revolutionized in the last few years with the introduction and evolution of laparoscopic cholecystectomy.<sup>[1]</sup> Laparoscopic cholecystectomy provides a safe and effective treatment for most patients with gall stone. Now, it is considered as the standard procedure for cholecystectomy.<sup>[2]</sup> With increasing skills and improvement of equipments and instruments, more complicated cases of gall stones such as acute cholecystitis are conducted through laparoscope.<sup>[3]</sup> This

attitude add to increased incidence of operative complications during laparoscopic cholecystectomy.<sup>[4]</sup> One of these complications is laceration of gall bladder with dispersion of the stones within the peritoneal cavity with subsequent infection or adhesions.<sup>[5]</sup> This complication occurs in 9-20% of cases.<sup>[6]</sup>

**Patients and Methods****Patients**

This study included 40 patients, who were admitted to general surgery department in AL-Azhar Assiut university hospital in the period from January 2016 to January 2017. Those patients were diagnosed as having right upper abdominal pain after laparoscopic and open cholecystectomy.

**Inclusion criteria**

- 1) Adult patient (above 20 yrs old) (common in old age).
- 2) both sex → female and male (but female > male).
- 3) Patients had gallbladder stones which treated by open and lap cholecystectomy.
- 4) Post open cholecystectomy and laparoscopic cholecystectomy.
- 5) Cholecystectomy with missed stones in peritoneal cavity > 15 small size stones.
- 6) or missed single stone > 1.5 cm size.
- 7) Complications more with Spillage of infected pigmented gall stones.

**Exclusion criteria**

We excluded a group of patients having one or more of the following criteria from doning cholecystectomy

1. History of previous upper abdominal operation as gastrectomy, or pancreatic surgery.
2. Cardiorespiratory dysfunction.
3. Sever bleeding disorders.
4. Morbid obesity.
5. Pregnancy.
6. Stone(s) in the hepatic of common bile ducts.
7. Clinical, laboratory and/or ultrasonographic evidence of obstructive jaundice.
8. Evidence of sepsis or peritonitis.
9. Portal hypertension.

Every patient was subjected to full history taking, and through clinical examination as the following; sex and age of the patient, the presenting complaint and its duration, symptoms suggesting heart or chest disease. The body weight to the patient and his (or her) blood pressure were recorded, also any history of a previous operation was taken in consideration. Also the following investigations were done for every patient.

**I-Laboratory investigation**

- 1) Blood picture.
- 2) Fasting blood sugar and blood sugar curve.
- 3) Blood urea and serum creatinine.
- 4) Liver function testes and prothrmbin concentration.

**II- Radiological investigations**

- Chest X-ray + abdomin.
- Abdominal ultrasonography with special comment on the liver, gallbladder and bile ducts.
- CT abdomin in some cases.

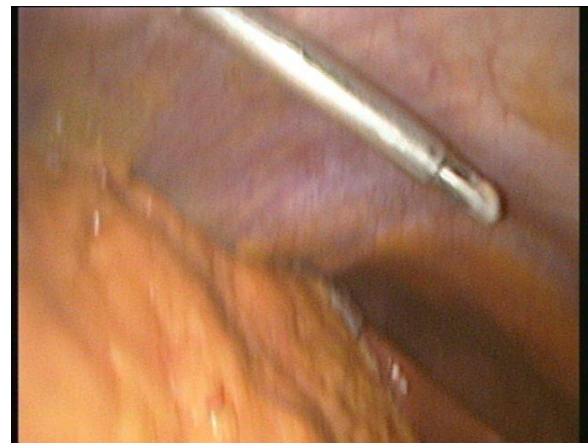
**III- Other investigations**

- E.C.G.

**METHODS****Surgical technique**

A pneumoperitoneum is made with a veress needle and automatic instillation of carbon dioxide under 14-mm Hg pressure. The positioning of trocars varies according to the surgeon's preference. We use 4 trocars. The first, 10 mm in diameter, is introduced through the umblicus and

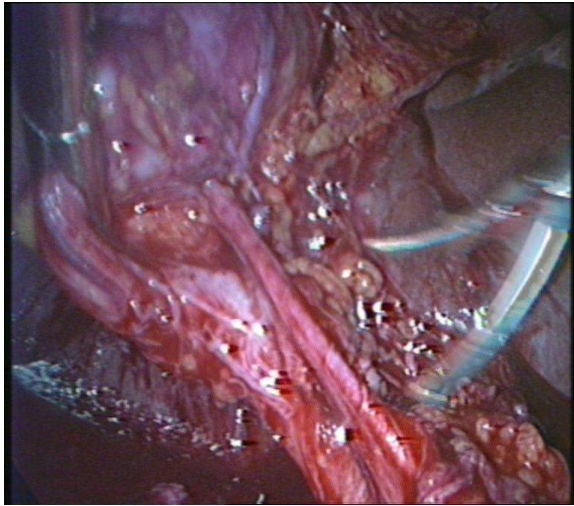
enables direct visualization. Exploration of the peritoneal cavity should be as thorough as possible. If the laparoscopic operation is feasible based on the appearance of the gall bladder, the other trocars are positioned. The second trocar, 5 mm in diameter, is placed in the right subcostal area for the forceps that grasps the gall bladder. The third trocar 5 mm in diameter is placed in the right lateroxiphoid area for the forceps that grasps the Hartmann's pouch. The fourth trocar, 10 mm in diameter, is placed in the left side for the instruments, hook, scissors, and clips. A fifth trocar may be necessary to retract the left lobe of the liver or the omentum in obese patients.<sup>[7]</sup> After the trocars are placed, the operation is done like a conventional cholecystectomy, possible pericholecystic adhesions are freed, and the Hartmann's pouch is grasped by forceps to expose the Y-junction. The peritoneum is incised by scissors or a hook on the posterior and then anterior aspect of the pedicle. The cystic duct and artery are isolated and clipped by Titane clips and sectioned (Figs. 3, 4 and 5). Then the gallbladder is separated progressively from the liver with coagulation of all attached biliary and vascular connections.



**Fig (1): Application of the trocars**

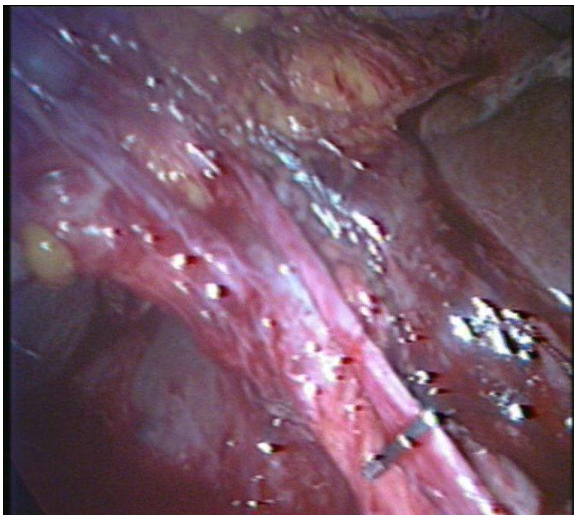


**Fig (2): Dissection of peritoneum at neck of gall bladder to expose triangle of calot's**



**Fig: (3):** Dissection of triangle of calot's to expose cystic duct and cystic arter

The completely freed gallbladder can be displaced to any point on the abdominal wall for extraction, but the epigastric port usually is selected. The gallbladder neck is grasped by a strong forceps to expose it entirely or partly. It may be necessary to aspirate the contents of the gallbladder or remove some stones with the forceps to facilitate extraction. A final examination of the pedicle and the gallbladder bed is done with saline lavage to ensure that there is no bleeding or bile effusion. Subsequently the orifices are closed with simple cutaneous sutures after careful emptying of the pneumoperitoneum and anesthetic infiltration of the wall. As a routine no drains are left.<sup>[8]</sup>

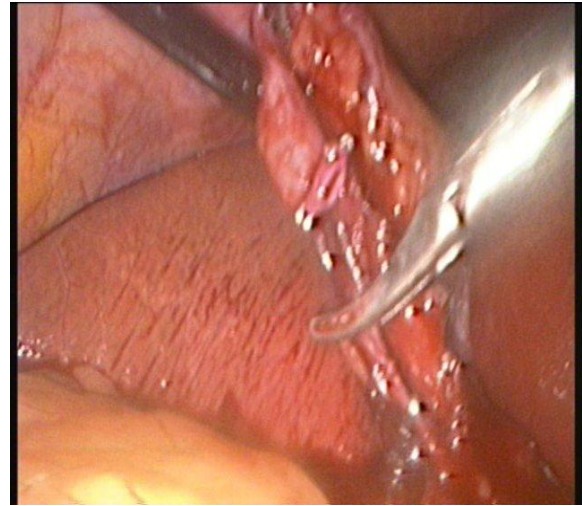


**Fig 4:** A Titanium clips is placed across the cystic duct

**Table (1):** Showing age incidence of complications

Groups	Age	Number	Percentage
Group I	20- 30 years	4	10 %
Group II	31- 40 years	8	20 %
Group III	41- 50 years	10	25 %
Group IV	51- 60 years	18	45 %

Age range from 20–60 years. Most patients were in 5<sup>th</sup> and 6<sup>th</sup> decades of life.



**Fig: 5** Cystic duct and cystic artery is clipped and subsequently divided.

#### Perioperative care

Perioperative care generally is minimal. Antibiotic therapy is optional except in acute cholecystitis. Intake of liquids resumes 6 hours after the operation, and the patient begins eating solids the following day. The patient is discharged on the second or third postoperative day.<sup>[9]</sup>

#### Advantages

The advantages of laparoscopic cholecystectomy account for the dramatic worldwide application of this procedure. The uneventful postoperative course is the major advantage of this procedure. Cicatricial and peritoneal pain is minimal. There is no postoperative ileus; the patient may eat the day after the operation. Hence, the consequences are minimal, particularly for patients at risk, namely, the elderly, the obese and patients with cardiac or respiratory failure. The easy postoperative course results in a shorter hospital stay. Some surgeons treat up to 50% of their patients as out patients. Work is resumed more quickly. Naturally, there are individual variations. Finally, the absence of the risk of eventuation and the minor cosmetic insult are important.<sup>[10]</sup>

#### RESULTS

In this study 40 patients were complaining from Rt upper Abd. Pain after open and laparoscopic cholecystectomy, 31 patients of them (77.5%) were females and 9 patients (22.5%) were males.



**Table: 2 Showing incidence of the presenting symptoms**

Complaint	Number	Percentage
Dull aching right hypochondrial pain	37	92.5 %
Acute right upper abdominal pain with fever (in one patient throbbing pain)	3	7.5 %

There was medical disease in 11 of 40 patients (27.5%), 4 patients have controlled mild hypertension, another 2 patients have chronic bronchitis and 5 patients is diabetic and controlled by oral hypoglycaemic drugs.

In our study only 4 patients of forty had an abdominal scars this scars were of Rt sub costal (Kocher's) incision of previous open cholecystectomy operation. The blood picture was normal in all patients except in 18

patients where there was leukocytosis. Liver function tests and prothrombin time and concentration were done in all patients and were found to be normal in all of them. In our study 36 of forty patients (90%) had gall bladder stones and treated by laparoscopic cholecystectomy while 4 patients had treated by open cholecystectomy, 3 patients converted from laparoscopic cholecystectomy to open cholecystectomy, one patient was HCV positive patient.

**Table (3): showing different causes of conversion to laparotomy**

Cause of conversion	Number	Percentage
Adhesion with disturbed anatomy and difficult dissection	2	5%
Uncontrollable haemorrhage	1	2.5%

Three cases (7.5%) were converted to open cholecystectomy, in 2 patients (5%) the cause was difficult dissection in callots triangle due to marked adhesion. In the other one case the causes were, uncontrollable bleeding from the cystic artery in one patient (2.5%), failure of retraction of the enlarged liver and so failure of exposure of the gallbladder in one

patient (2.5%) and in the 3<sup>rd</sup> patient, the cause was failure of illumination (2.5%).

**Post-operative hospital stay**

The hospital stay was evaluated in 40 patients who either passed smooth post-operative (after laparoscopic and open cholecystectomy operation) or with minor complications (fever-right hypochondrial pain).

**Table (4): showing post-operative hospital stay**

Hospital stay	Number	Percentage
2 days	35	87.5%
3- 4 days	4	10 %
5 – 10 days	1	2.5%

**Table (5): showing the incidence of operative complications**

Complications	Number	Percentage
<b>Minor complications</b>		
- Perforation of the gallbladder and bile leak	36	90%
- Small liver tear	1	2.5%
- Hematoma of anterior abdominal wall	1	2.5%
- Difficult extraction of the gallbladder	1	2.5%
<b>Major complications:</b>		
- CBD injury.	0	0%
- Haemorrhage.	1	2.5%

The range of post-operative hospital stay was 2-10 days with average equal (2.66 days). 35 patients (87.5%) were discharged in the 2<sup>nd</sup> post-operative day, this was the shortest post-operative stay in our study, those patients passed a smooth post-operative course with mild intraoperative complications and no immediate post-operative complications. 4 patients (10%) were discharged on the 3<sup>rd</sup> day (one day after removal of the drain). Those patients undergo minor intraoperative complications as small liver tear during dissection, in those patients there were either delayed return of the

intestinal sound or increased discharge from the drain in the 1<sup>st</sup> and 2<sup>nd</sup> post-operative days. The last one patient stays for about 10 days for control postoperative abdominal pain and recurrent vomiting and hematemesis and upper endoscopy was done to discover the cause of hematemesis which is superficial gastric ulceration and the patient take medical treatment then discharged. All of the above patients undergo spillage of gall stones in the peritoneal cavity during open and laparoscopic cholecystectomy. Minor complications were encountered in our both the operation and postoperatively. None of

these complications lead to serious morbidity. Perforation of the gallbladder during dissection occurred in 36 cases and there were bile spillage and stone lose in the peritoneal cavity. Irrigation and aspiration of the peritoneal cavity was done in these cases. Also escaped stones from the gallbladder to the peritoneal cavity were extracted in some cases. In one patient, iatrogenic small liver tear occurred during the operation, this tear leads to intraoperative bleeding which was controlled by diathermy electrocoagulation. Extraction of the gallbladder was difficult in one case and this needed evacuation of gallbladder content and extension of the abdominal wall occurred in one patient. Shoulder pain was one of the commonest postoperative complaint in 25 patients(62.5%) and was easily controlled by analgesics and did not persist for more than 12 hours. Bile leak for 3 days from gallbladder bed occurred in one case. Sometimes more than one minor complications occurred in the same patient. Major complications occurred in 3 patients (7.5%) of 40 patients. Avulsion of the cystic artery occurred in one case and lead to uncontrollable hemorrhage during the operation and required conversion to laparotomy.

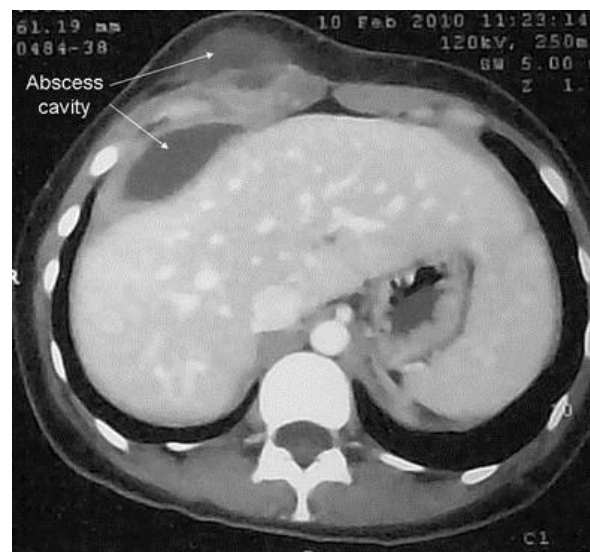
- Postoperative bleeding occurred in one patient in which a large hematoma in the gallbladder bed developed. Another patient developed severe attack of hematemesis in the 4<sup>th</sup> postoperative day due to non-related gastric erosions which was proved endoscopically. In 3 patients (7.5%) were presented by night sweats right back and loin pain and right loin swelling.
- On examination 2 patients (female 56 years old and male 59 years old) had a tender fluctuant swelling in the right lumbar region with overlying skin erythema.
- Blood tests showed neutrophilia of  $7.7 \times 10^9$  /liter and CRP of about 134mg/ liter.
- A computed tomography (CT) scan showed A complex subphrenic, subhepatic and subcutaneous collection.
- These collections were diagnosed as abscesses. These abscesses were drained under ultrasound guidance and the drains left in situ, the pus grew E-Coli (*Escherichia coli*) and streptococcus on culture.
- The 2 patients were treated with Antibiotics for ten days and discharged home.
- A barium enema of the colon was arranged to exclude neoplastic causes for the abscess, but the result simply showed mild sigmoid diverticular disease in one patient and normal study in the other patient and no fistulous connection. In addition, a contrast study through the percutaneous drain did not reveal any connection with intra abdominal viscera. There for the two patients were diagnosed with intra-abdominal sepsis secondary to retained

gallstones at the time of their laparoscopic cholecystectomy.

- In third patient, which was neglected (female patient 60 years old). The subphrenic, subhepatic and subcutaneous collection was proceeded by chronic sinus discharge.
- A Sonogram showed her sinus connecting with the right paracolic gutter and extending upwards and posteriorly.
- After identification of the offending gall stone on CT scan the patient was offered surgery to remove the offering gall stone and she accepted this mode of treatment and managed by medical treatment in the form of Antibiotics for 3 weeks after surgical intervention.



**Figure (6): Subphrenic abscess after cholecystectomy (in female patient 56 years)**



**Figure (7): CT demonstrating subphrenic abscess**

**Table (6): Development of post-operative complications**

	Group I	Group II	Group III	Group IV
Persistent fever	-	-	-	+
Infection	-	-	-	+
Abscess formation	-	-	-	++
Shoulder pain	+	+	+	++
Adhesions	+	+	++	++++

**Analysis of the results**

The four groups were compared as regards the age and sex distribution as much as their average. Although tense adhesions and its complications (intestinal obstruction, fecal fistulae) did not occur in all groups. Yet the incidence of moderate adhesions occurred in all groups and it was extensive in the fourth group.

**DISCUSSION**

Gall stones disease is one of the commonest causes of abdominal pain. Cholecystectomy is the only definitive treatment which offers cure. It should be done as early as possible before the onset of complications. The management of patients with this disease has been revolutionized in the last few years with the introduction and evolution of laparoscopic cholecystectomy. With the popularity and quality of diagnostic ultrasound and the therapeutic option of laparoscopic cholecystectomy more gall stones are now detected and consequently operated upon. With better patient satisfaction and a short hospital stay, laparoscopic cholecystectomy has become the method of choice.<sup>[11]</sup> With increasing skills and improvement of equipments and instruments, more complicated cases of gall stones such as acute cholecystitis are conducted through laparoscope.<sup>[12]</sup> However this change in practice from open surgery has lead to different problems and add to increased incidence of operative complications during laparoscopic cholecystectomy.<sup>[13]</sup> Of these complications, biliary tract injuries and laceration of gall bladder with intra-operative intraperitoneal spillage of stones are the commonest.<sup>[14]</sup> The first complication, though serious can be minimized with experience, supervision, and good training, whereas the later complication of spilled gall stones is often ignored. The incidence of this complication varies in different series. It ranges between 6-40%.<sup>[15,16,17 and 18]</sup> Spillage of stones can occur during dissection of the gall bladder off the liver bed, tearing with grasping forceps, or during extraction of the gall bladder through one of the port sites. The incidence is more common when operating on an acutely inflamed gall bladder.<sup>[19]</sup> It is also more common in women, the elderly, obese patients and in the presence of adhesions.<sup>[20]</sup> Stones spilled may remain in the peritoneal cavity adjacent to the liver or may migrate to various distant sites. These stones can cause a range of complications. In the majority of cases, these stones usually cause no bother and remain benign. Complications that result from stones are said to occur in 0.08-0.3 % of patients.<sup>[21]</sup>

In this study the incidence of complications is almost low which coincide with the very low incidence of Schafer and his associates in 1998 (about 0.08%).

Besides the incidence of complication is more with the infected types of stones<sup>[22]</sup> This goes with this work as the severest form of adhesions had occurred in infected cholesterol stones. Intra-abdominal abscess due to missed stones without accumulated bile and/or blood is extremely rare<sup>[23]</sup> and if it happened it can be treated by percutaneous drainage guided by CT or ultrasonography. This can be even followed by dilatation of the tract and removal of stones.<sup>[24]</sup> On the other hand, abdominal wall abscess due to stone caught at the port site is more common which necessitates spending most care to remove them.<sup>[25]</sup> In this study Intraoperative hemorrhage occurs either during dissection of the cystic pedicle or when the gallbladder is detached from the liver. The risk factors include difficult dissection, acute cholecystitis, and/or the presence of bleeding diathesis. Bleeding used to be the commonest cause for enforced conversion to open surgery and bleeding occurred in one patient (2.5%). on another study Bleeding has been reported to occur with an incidence of up to nearly 10% in various series, and can occur at any time during LC (during trocar insertion, dissection technique or slippage of clips/ligatures) or in the postoperative period. It can range from minor haematomas to life-threatening injuries to major intra-abdominal vessels (such as aorta, vena cava and iliacs).<sup>[26]</sup>

In this study We had reported a 7.5% complication rate for retained abdominal gallstones during laparoscopic cholecystectomy after a minimum of 9 months of follow-up evaluation .in another study Drs. Woodfield and Windsor stressed that spilled gallstones cannot be ignored because they have a small but quantifiable risk for causing serious complications. In the referenced literature search, Woodfield et al. estimated a 7% complication rate for incomplete stone retrieval, which mostly were serious complications such as abscesses, empyema, small-bowel obstruction, or sinus formation. There are numerous reported complications, some of them really serious, caused by retained gallstones, but they mostly are single case reports. Laparoscopic cholecystectomy is the most commonly performed major abdominal surgical procedure and the yearly number of cholecystectomies is around 700,000 in the United States alone. By using the estimations by Woodfield and Windsor, unretrieved gallstones are to be expected in 16,800 (2.4%), and causing serious complications in 386 to 1176 patients (2.3–7.0%) annually in the United

States. The reported complication rates are far less than this estimation. However, we agree with Woodfield and Windsor that spilled gallstones cannot and should not be ignored. When possible, every spilled gallstone should be retrieved. When this is not possible, we stressed that invasive procedures are not justified because the risk for complications caused by retained gallstones is very low, being 7.5% in our study. Although we do not have evidence, this low complication rate may be a result of routine copious irrigation of the abdominal cavity with saline and post-operative antibiotics for retained gallstones.

There is also a need to define the risk ratio for retained gallstones. Although all reported complications are case reports, we do not know whether the size or the number of retained stones increases the serious complication rate. Does acute cholecystitis or infected bile make a difference? Is the type of gallstone important? Retained gallstones are associated most commonly with hard cholecystectomies; is it a factor? There are numerous unanswered questions. If such a subset of retained gallstones can be defined in which a high complication rate is expected, in those patients a more aggressive antibiotic therapy course or even laparotomy can be recommended.<sup>[27,28,29,30 and 31]</sup>

## CONCLUSION

Gall stones disease is one of the commonest causes of abdominal pain. Cholecystectomy is the only definitive treatment for this disease. Cholecystectomy can be conducted by open method or through laparoscope. One of these complications is gall bladder perforation and spillage of stones within peritoneal cavity. Complications that result from stones are said to occur in 0.08-0.3% of patients. A comparative study was experienced on patients to determine the complication which may occur due to spillage of different types of stones within peritoneal cavity. Different stones were spilled in the peritoneal cavity in patients after open and laparoscopic cholecystectomy. Complications that occurred were adhesion in all groups but in the fourth group was more extensive. Other complications as persistent fever, abscess formation or shoulder pain occur in some groups (more at fifth and six decade of life). Perforation of the gall bladder occurs fairly frequently during laparoscopic cholecystectomy and is reported in the range of 10%–40% in various series. The incidence of gall stone spillage is less frequent and the true incidence of unretrieved stones is difficult to determine. Some series quote a range 6%–30%. Spillage of stones can occur during dissection of the gall bladder off the liver bed, tearing with grasping forceps, or during extraction of the gall bladder through one of the port sites. The incidence is more common when operating on an acutely inflamed gall bladder; it is also more common in women, the elderly, obese patients, and in the presence of adhesions. Stones spilled may remain in the peritoneal cavity adjacent to the liver or may migrate to various distant sites. These stones can cause a range of

complications and are discussed in the review of literature. In the majority of cases, these stones usually cause no bother and remain benign. Complications that result from these stones are said to occur in 0.08%–0.3% of patients. To conclude complications arising from spillage of gall stones during laparoscopic cholecystectomy are of low incidence. The surgeon should take most care to prevent spillage of stones and attempt to remove all visible stones at the time of surgery especially if they are of infected type. Conversion to open technique to retrieve the stones is not indicated.

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