Al-Azhar International Medical Journal

Volume 3 | Issue 9 Article 21

9-1-2022

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How to Cite This Article

Helal, Mohamed; Sharaf, Mohammed; and Aboulyazied, Alsayed (2022) "Rate of Conversion of Laparoscopic Cholecystectomy in Patient with Previous upper Abdominal Surgery," *Al-Azhar International Medical Journal*: Vol. 3: Iss. 9, Article 21.
DOI: https://doi.org/10.21608/aimj.2022.127408.1879

OPEN AIMJ ORIGINAL ARTICLE

Rate of Conversion of Laparoscopic Cholecystectomy in Patient with Previous upper Abdominal Surgery

General Surgery

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Received *for publication March 21, 2022;* ***Accepted*** *September 24, 2022;* ***Published online*** *September 24, 2022.*

doi: *10.21608/aimj.2022.127408.1879*

Citation: *Mohamed G. , Mohammed F. and AlSayed B. , Rate of Conversion of Laparoscopic Cholecystectomy in Patient with Previous upper Abdominal Surgery. AIMJ. 2022; Vol.3-Issue9 : 123-129.*

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ABSTRACT

Background: There are still a significant number of patients in whom laparoscopic cholecystectomy (LC) cannot be performed successfully, necessitating conversion to open surgery .
Some surgeons are hesitant to use the laparoscopic operation in patients with symptomatic gallstones and a history of upper abdominal surgery due to the possible dangers (UAS).
Aim of the work: To evaluate the rate of Conversion from In a patient who has had previous upper abdominal surgery, a laparoscopic cholecystectomy is performed.
Patients and methods: This was a retrospective study included collected records of 50 patients underwent cholecystectomy with previous upper abdominal surgery to detect rate of conversion among them in Al-Azhar University Hospitals & Damanhour Hospital.
Results: In our study, regarding Techniques for safe entry to the abdomen among the participants, Safe entery of first trocar was our goal in all patients so we used different methods for 1st trocar insertion thus preventing injury to bowel or any structure that would adhere to abdominal wall, the Hasson's technique was used among 52%, Veress needle was used among 24%, Palmer's point was used among 18%, Visiport was used among 6% of the participants.
Conclusion: In some cases, laparoscopic cholecystectomy is a viable and safe treatment option for symptomatic gallstone disease. patients with previous upper abdominal surgery history. However, appropriate preoperative preparations, patients' assessment, careful intraoperative techniques, and well-experienced surgeon are mandatory for good outcomes.

Keywords: *Conversion to open surgery; Laparoscopic cholecystectomy; Upper abdominal surgery.*

Disclosure: *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.*
Authorship: *All authors have a substantial contribution to the article.*

INTRODUCTION

The gold standard treatment for symptomatic gallstones is laparoscopic cholecystectomy. Reduced postoperative discomfort and problems, quicker ambulation, shorter hospital stay, and improved cosmoses are all advantages over open cholecystectomy.[1] LC has a number of advantages over open surgery, including a shorter hospital stay (and hence a quicker return to daily activities and work), less postoperative pain, a faster recovery, better cosmesis, and a cheaper cost [2] During LC, a number of issues may develop, some of which are unique to this approach and others which are common to laparoscopic surgery in general.

Anesthesia-related complications, peritoneal access complications (e.g., vascular injuries, visceral injuries, and port-site hernia formation), pneumoperitoneum complications (e.g., cardiac complication, pulmonary complications, and gas embolism), and thermocoagulation complications are just a few of them. [3] Many difficulties have been documented during LC, including anaesthesia, Peritoneal access, pneumoperitoneum, surgical exploration, and thermocoagulation are all concerns that may need conversion from LC to open cholecystectomy, along with a variety of additional factors (OC). [4] Conversion should not be regarded as a technical failure when it is appropriate, but rather as a superior surgical practise by both the patient and the doctor.[5]

Regardless of the fact that different studies have revealed varying rates of the reasons of this global medical problem, every institution must be completely aware of the rate and causes of conversion to open surgery depending on culture and geography, as well as inside the institution .[6] A history of abdominal operations has traditionally been considered a contraindication to the laparoscopic approaches, but recently new ones have

been involved to help reduce Open cholecystectomy in comparison with laparoscopic cholecystectomy.[7]

Previous abdominal surgery has long been thought to add to the complexity of subsequent laparoscopic surgeries. Patients who have had previous abdominal surgery are typically treated with a cholecystectomy. Patients affected by various gastrointestinal malignancies often develop metastases to the gall bladder, and Cholecystectomy has gained wide acceptance as a potentially curative treatment after primary surgery.[8] The aim of the present study was to evaluate the rate of Conversion from laparoscopic cholecystectomy in patient with previous upper abdominal surgery.

PATIENTS AND METHODS

This was a retrospective study included collected records of 50 patients underwent cholecystectomy with previous upper abdominal surgery to detect rate of conversion among them in Al-Azhar University Hospitals & Damanhour Hospital.The study protocol was approved by the Ethical Committee of the Al- Azhar University Faculty of Medicine. Informed consent was taken from each participant before being involved in the study.

Inclusion criteria: Age 18-65+, sex: male & female, and Patients with cholelithiasis/cholecystitis symptoms identified by abdominal ultrasonography after previous upper abdominal surgery. Exclusion criteria: Patients with CBD calculus, dilated CBD, CBD investigation required, and patients with obstructive jaundice symptomsMalignant gall bladder disease is suspected.Patient is unable to have laparoscopic surgery due to a medical condition., and cardiac, renal and hepatic patients.Study Procedures: We collected records about the rate of Conversion from laparoscopic to open cholecystectomy in patient with previous upper abdominal surgeryby collecting:

All patients were subjected to the following:

History taking: Demographic date: name, age, residence, consanguinity. Routine history from All individuals with symptomatic gallbladder disease who come in for treatment.A brief history of anesthesia-related complications.During LC, there have been reports of peritoneal access, pneumoperitoneum, surgical exploration, and thermal Coagulation.. Medical history: diabetes, hypertension, anemia, Preeclampsia, others. History of previous upper abdominal operations, and general examination: heart rate, blood pressure (bp), respiratory rate (rr), temperature of patient.Laboratory investigation: Routine laboratory investigations and liver profile.Complete general examination: Vital signs, signs of (Pallor, Cyanosis, Jaundice, and Lymph node enlargement), and body mass index. Abdominal Examination:(1) For an abdominal inspection and subsequent palpation, lie the patient flat on the bed with their arms by their sides and their legs uncrossed. Examination of the patient's abdomen for symptoms of gastrointestinal disease. (2) Abdominal palpation: Check each of the nine abdominal regions for clinical evidence of gastrointestinal pathology using a superficial palpation. (3) Abdominal deep palpation: Palpate each of the nine abdominal locations once more, this time applying more pressure to detect any deeper lumps. Keep an eye on the patient's face for signs of discomfort (as they may not vocalise this). (4) Abdominal percussion: Percussing the liver. (5) Abdominal auscultation: Auduible intestinal perstalisis.Transabdominal Ultrasound: Transabdominal ultrasound was performed with a low-frequency probe, with a large convex footprint. (1) Finding in acute cholecystitis: U/S showing GB A picture of acute cholecystitis has sludge, numerous stones, a thicker wall, and a tiny amount of pericholecystic fluid.. (2) Finding in chronic cholecystitis: Gall bladder is normal in size, pear shape, thichened wall and multible or single stone, no wall oedema or pericholecystic collection.CT scan: The liver, bile ducts, gall bladder, and pancreas can all be seen using this imaging technique. It is the modality of choice in the staging of malignancies of the liver, gall bladder, bile ducts, and pancreas, and is particularly helpful in detecting hepatic and pancreatic lesions. It can determine the primary tumor's size and location in respect to other organs and blood arteries. Additionally, enlarged lymph nodes or metastatic disease may be visible. Standard computerised tomography (CT) is not a very useful examination for benign biliary disorders. MRCP stands for magnetic resonance cholangiopancreatography.

The gall bladder and biliary system are imaged using magnetic resonance cholangiopancreatography (MRCP), a technique based on nuclear magnetic resonance principles. It is non-invasive and can produce images in cross-section or projection. Contrast is not necessary, and good pictures of the biliary tree can be acquired using proper procedures, demonstrating ductal blockage, strictures, or other intraductal abnormalities. Images produced with endoscopic retrograde cholangiopancreatography (ERCP) or percutaneous transhepatic cholangiography are comparable (PTC), but without the risks associated with either procedure. If there was dilated CBD by U/S or elevated alkaline phosphatase enzyme, the patients were subjected to MRCP to exclude the presence of obstructing lesion or stones in biliary system.Intra-operative data that were assessed: Operative difficulties that faced the surgeon during the operation were assessed as difficulty of creation of pneumoperitonium, 1st trocar insertion, excessive adhesions with obscured anatomy, difficult dissection, injury to viscera, bleeding; operation time which was recorded from first port insertion to last port site closure, conversion to open cholecystectomy was estimated.Post-operative management:

Postoperative analgesia was carried out with ketorolac during the first 24 hours postoperatively and thereafter at the request of the patient. Postoperative pain was assessed by using the visual analog score (VAS) within 24 hours postoperatively, zero equaled no pain and 10 was the worst pain. Patients were observed for sepsis, bleeding, intestinal leak, and jaundice and bile leak. These complications could occur usually within 24 hours postoperatively.All patients had warm oral liquids at the evening, provided there was normal bowel

movement and no nausea nor vomiting (ileus). The majority of patients were discharged from the hospital after 24 hours. Otherwise hospital stay was assessed. Patients were reviewed at weeks one and four postoperatively in the surgical outpatient clinic.

Statistical analysis:

SPSS (Statistical Package for Social Sciences) version 22 for Windows® was used to code, process, and analyse the obtained data (IBM SPSS Inc, Chicago, IL, USA). The Shapiro Walk test was used to determine if the data had a normal distribution. Frequencies and relative percentages were used to depict qualitative data. To calculate the difference between two or more sets of qualitative variables, use the Chi square test (2). The mean and standard deviation (SD) were used to express quantitative data (Standard deviation). To compare two independent groups of normally distributed variables, the independent samples t-test was used (parametric data). Mann The Whitney test was used to calculate the difference between quantitative variables in two groups of data that were not regularly distributed. To compare the proportion of outcome between the two groups, use the Z-test for percentages.The chances or risk of a disease occurring among persons who had a certain characteristic or who have been exposed to a risk factor were compared to the odds or risk of the disease occurring among individuals who did not have the characteristic or who had not been exposed to the risk factor. Significant was defined as a P value of less than 0.05.

RESULTS

The mean age was 42.5 ± 15.7 years among the participants. There were 42% males and 58% females among the participants. There were 34% smokes and 66% non-smokers among the participants. Regarding BMI the mean was 25.4 ± 6.1 among the participants. There were 4% had wound infection, 2% had retained CBD stones, 4% had Trocar- site bleeding, 8% had nausea and vomiting and 2% had atelectasis (Table 1).

There were 18% had para umbilical hernia repair, 18% had sleeve gastrectomy,20% had splenectomy, 10% had exploration operation, 6% had perforated peptic ulcer, 10% had gastric bypass, 6% had fatty hernia of Linea alba repair, 2% had right nephrectomy and 2% had congenital umbilical hernia repair among the participants. Regarding type of incision there were 42% had transverse upper abdominal incision, 24% had midline incision, 18% had five port site small incisions, 8% had para median incision and 8% had left subcostal incision. Regarding techniques for safe entry to the abdomen, the Hasson's technique was used among 52%, Veress needle was used among 24%, Palmer's point was used among 18%, Visiport was used among 6% of the participants (Table 2).

Regarding intra-abdominal adhesions score, the mean was 2.3± 1.1. There were 18% scored 1, 46% scored 2, 16% scored 3 while 20% scored 4. Among our participants there were 70% needed adhesiolysis, while 30% didn't need adhesiolysis. The mean operation time was 63.7± 22.8 min. there were 60% had operation time lower than 60 min while 40% had operation time equal or more than 60 min. The conversion rate among the participants was 10%. Among them 4% were due to failed pneumoperitoneum from massive intraperitoneal adhesions, 2% due to dense adhesions in periportal area, and 2% due to small intestine injury. Hospital stay duration, the mean duration was 2.2± 1.8 days while there were 56% stayed for less than 2 days and 44% stayed for 2 days or more (Table 3).

The mean ALT was 63.1± 11.3, the mean AST was 25.1± 8.4, the mean GGT was 18.8± 9.5, the mean serum transaminase was 38.4± 7.6, the mean alkaline phosphatase was 69.5± 13.1, the mean albumin was 3.32± 0.43 and the mean total bilirubin was 1.5± 0.83. The mean WBCs was 5.5± 1.4, the mean random blood sugar was 120.7± 15.3, the mean blood urea nitrogen was 8.7± 4.1 and the mean serum creatinine was 1.1± 0.2. The mean PT was 10.7± 0.8 seconds among the participants. The mean PTT was 33.5± 2.4 seconds while INR was 0.93± 0.3 among the participants. The mean Hb was 11.2± 1.2 among the participants.

There were 82% had cholelithiasis/cholecystitis, 14% had common bile duct stones and 4% had biliary pancreatitis. The mean gall bladder thickness was 4.6± 0.7, there were 24% had pericholecystic fluid (Table 5).

The mean post-operative pain score was 4.2 ± 2.1. While there were 24% scored 2, 22% scored 3, 28% scored 4 and 10% scored 5 among the participants (Table 6).

Variables	N= 50
Age	
Mean± SD	42.5± 15.7
Gender	
Male n (%)	21 (42)
Female n (%)	29 (58)
Smoking	
Smokers n (%)	17 (34)
Non-smokers n (%)	33 (66)
BMI: Mean± SD	25.4± 6.1
Complications: n (%)	
Wound infection	2 (4)
Retained CBD stones	1 (2)
Trocar-site bleeding	2 (4)
Pulmonary embolism	0 (0)
Subphrenic abscess	0 (0)
Nausea /vomiting	4 (8)
Atelectasis	1 (2)

Table 1: Basic characteristics and postoperative complications among the participants

Variables		n (%)
Types of previous:		
Para umbilical hernia repair		9 (18)
Sleeve gastrectomy	Laparoscopic	5 (10)
	Open surgery	4 (8)
Splenectomy		10 (20)
Exploration operation	Post abdominal blunt trauma	2 (4)
	Post stab, SI injury repair	1 (2)
	Post RTA	2 (4)
Perforated peptic ulcer		3 (6)
Epigastric hernia repair surgery		4 (8)
Gastric bypass	Laparoscopic	4 (8)
	Open surgery	1 (2)
Fatty hernia of Linea alba repair operation		3 (6)
Right nephrectomy		1 (2)
Congenital umbilical hernia repair		1 (2)
Type of incision:		
Transverse upper abdominal incision	Epigastric	4 (8)
	Supraumbilical	13 (26)
	Umbilical	4 (8)
Midline incision	Upper	7 (14)
	Exploratory (upper+ lower)	5 (10)
Five port site small incisions		9 (18)
Para median incision	Right	2 (4)
	Left	2 (4)
Left subcostal incision		4 (8)
Techniques for safe entry to the abdomen		
Hasson's technique		26 (52)
Veress needle		12 (24)
Palmer's point		9 (18)
Visiport		3 (6)

Table 2: Types of previous, type of incision surgeries among the participants and Techniques for safe entry to the abdomen

Variables		n (%)
Intra-abdominal adhesion score (1-4) Mean ± SD		2.3± 1.1
1		9 (18)
2		23 (46)
3		8 (16)
4		10 (20)
Need for adhesiolysis:		
Yes		35 (70)
No		15 (30)
Conversion:		
Yes		5 (10)
No		45 (90)
Causes of conversion	Failed pneumoperitoneum from massive intraperitoneal adhesions	3 (6)
	Dense adhesions in periportal area	1 (2)
	Small intestine injury	1 (2)
Operation time (min):		
Mean ± SD		63.7± 22.8
<60 min		30 (60)
≥ 60 min		20 (40)
Hospital stay (days)		
Mean ± SD		2.2± 1.8
<2 days		28 (56)
≥ 2 days		22 (44)

Table 3: Intra-abdominal adhesion score, need for adhesiolysis, conversion rate among the participants, operation time and hospital stay duration among the participants

Variables	Mean± SD
Liver function tests:	
ALT (U/L)	63.1± 11.3
AST (U/L)	25.1± 8.4
GGT (IU/L)	18.8± 9.5
Serum transaminase (IU/L)	38.4± 7.6
ALP (IU/L)	69.5± 13.1
Albumin (g/dl)	3.32± 0.43
Total bilirubin (mmol/L)	1.5± 0.83
Other laboratory parameters:	
WBCs (*10^9)	5.5 ± 1.4
Random blood sugar (mg /dl)	120.7± 15.3
Blood urea nitrogen (mg/dl)	8.7± 4.1
Serum creatine (mg/dl)	1.1± 0.2
PT	10.7± 0.8
PTT	33.5± 2.4
INR	0.93± 0.3
Hb	11.2± 1.2

Table 4: Liver function tests and other laboratory parameters among the participants

Variables	n (%)
Diagnosis:	
Cholelithiasis/cholecystitis	41 (82)
CBD stones	7 (14)
Biliary pancreatitis	2 (4)
Radiological finding:	
Gall bladder thickness	
Mean± SD	4.6± 0.7
Pericholecystic fluid	
Present n (%)	12 (24)
Absent n (%)	38 (76)

Table 5: Diagnosis and radiological finding among the participants

Post-operative pain score (0 – 10)	n (%)
1	2 (4)
2	12 (24)
3	11 (22)
4	14 (28)
5	5 (10)
6	4 (8)
7	2 (4)
Mean ± SD.	4.2 ± 2.1

Table 6: Post-operative pain score among the participants

DISCUSSION

As regarding demographic data of the mean age was 42.5 ± 15.7 years among the participants. There were 42% males and 58% females among the participants. There were 34% smokes and 66% non-smokers among the participants. Regarding BMI the mean was 25.4 ± 6.1 among the participants. These data are consistent with the fact that chronic cellular is commoner in obese women above 40 years old. As previous reported in the studies of Vikas et al.[9] and Metwalli et al. [10].The study of Nabil et al.[11] in their study Patient preoperative data showed a total of 50 patients (22 men/28 women; mean age 37±5.32 years; range, 46–28 years) underwent LC. The mean BMI was 25.2 (range, 16.5–33.5).In our study, as regarding Postoperative complications among the participants, there were 4% had wound infection, 2% had retained CBD stones, 4% had Trocar- site bleeding, 8% had nausea and vomiting and 2% had atelectasis.Our results were comparable to other results as regard complications. Metwalli et al. [10] reported That morbidity rate was (4.16%) in the form of wound infection in three cases, bile leakage from cystic duct in one case, paralytic ileus in two cases, and umbilical hernia in two cases. No cases were clarified with a bile duct injury or postoperative bleeding and there was no blood transfusion required. No mortality was reported.

Also Nabil et al.[11] reported higher post-operative complication rate, No operative complications attributable to adhesiolysis occurred in any case in this study group. However, 12 patients had postoperative complications: wound infection (n=3, 6%), umbilical hernia (n=1, 2%), paralytic ileus (n=8, 16%), and hemorrhage (n=0, 0%). There was no recorded mortality in this study group.In our study, as regarding Types of previous surgeries

among the participants, 18% had para umbilical hernia repair, 18% had sleeve gastrectomy, 20% had splenectomy, 10% had exploration operation, 6% had perforated peptic ulcer, 10% had gastric bypass, 6% had fatty hernia of Linea alba repair, 2% had right nephrectomy and 2% had congenital umbilical hernia repair among the participants. Most of our patients had upper abdominal surgery; this adds high risk of adhesion formation in the upper abdomen which makes the operation more difficult. Regarding type of incision there were 42% had transverse upper abdominal incision, 24% had midline incision, 18% had five port site small incisions, 8% had para median incision and 8% had left subcostal incision.

The study of Karayiannakis et al.[12] conducted a retrospective study on 473 patients whom had undergone previous abdominal surgery (58 patients with UAS and 415 patients with LAS). Of these, 402 patients had undergone 1 previous operation, 59 had undergone 2 previous operations, 11 had undergone 3 pervious operations, and 1 had undergone 4 previous operations whereas our study included patients with only 1 incision. On the same subject Kohli et al.[13] study compared the feasibility of laparoscopic cholecystectomy in patients with and patients without previous abdominal surgery, concerning the number of patients included, only 8 patients out of 195 patients included in his study had previous upper abdominal incisions while 97 patients with no history of previous abdominal operation and 90 patients with history of previous lower abdominal operations, with age ranging from 18 to 70 years. The majority of adhesions from past upper abdominal surgery, according to Akyurek et al.14, do not change the anatomy of the right upper quadrant of the abdomen and do not have a substantial impact on the success of a laparoscopic cholecystectomy In our study, regarding Techniques for safe entry to the abdomen among the participants, Safe entery of first trocar was our goal in all patients so we used different methods for 1st trocar insertion thus preventing injury to bowel or any structure that would adhere to abdominal wall, the Hasson's technique was used among 52%, Veress needle was used among 24%, Palmer's point was used among 18%, Visiport was used among 6% of the participants.It is reasonable to suppose that adhesions will make insertion of a laparoscope problematic in individuals who have had previous upper abdominal surgery. The effect of previous UAS on LC has been widely investigated, and in most trials, prior surgery did not increase the time of surgery, the rate of complications, the rate of conversion, or the length of stay in the hospital.[9]

In comparison to other research, there were no significant differences in hospital stay or complication rate in the current study. Patients having a history of upper abdominal surgery may require more trocars, a longer operation time, and a higher open conversion rate for adhesiolysis, according to our findings. .[15] In our study, the presence of the conversion rate among the participants was 16%. In the study of Nabil et al.[11] no mortality occurred. Adhesiolysis was not required in all cases. In the present study we noted that the type of incision and the indication of previous operation were the main determinant of the extent and severity of adhesions in the same line with that finding Ercan et al.[16] studied the effects of previous abdominal surgery incision type either upper or lower on outcome of Laparoscopic Cholecystectomy. Matching with our findings Akyurek et al.[14] discovered adhesions in 90.2% of patents with previous upper abdominal surgery and adhesiolysis was required in 77.1% of these patients.

Adhesions around the abdominal wall, the Calot's triangle, and its surrounding organs are common in patients with a history of UAS, but not all of them require adhesiolysis. Adhesions were responsible for 28.2 percent of all conversions. A higher percentage of patients who needed conversion due to adhesion had previously undergone gastrectomy surgery.[17]

LC's difficulties is exacerbated by previous abdominal surgery. Patients who had previously undergone upper abdominal surgery had a longer operating time, higher VAS scores, and higher complication rates than those who had previously undergone lower abdominal surgery, according to Atasoy et al.18. Those who haven't had any abdominal surgery. In this study, 223 individuals who had never had abdominal surgery before had no conversion rate. When both upper and lower abdominal surgery groups were merged, the conversion rate was 5.6 percent. Prior upper abdominal surgery, according to the findings of this study, causes a much longer process length, more postoperative pain, and a higher complication rate following laparoscopic cholecystectomy. The length of hospital stay, on the other hand, was unaffected by the variables studied. Nabil et al.11 also reported Six of the 50 cases (12%) requiring previous abdominal surgery required conversion to open surgery. Adhesions were directly responsible for all of the conversions, particularly the thick adhesion in Calot's triangle. This percentage is comparable to our findings.

In a study by Ercan et al.16, a total of 677 patients were divided into three groups. When the conversion rates were compared, it was found that 27.27 percent of patients who had previously had upper abdominal surgery (n=66), 2.82 percent of patients who had previously had lower abdominal surgery (n=567), and 25% of patients who had previously had both upper and lower abdominal procedures (n=44) were converted to open surgery. Also in the study of Metwalli et al.[10] three cases were converted to open with (6.25%) conversion rate. The mean hospital stay was 2.8±1.1 days. The morbidity rate was (4.16%) in the form of wound infection in three cases, bile leakage from cystic duct in one case, paralytic ileus in two cases, and umbilical hernia in two cases.

No cases were clarified with a bile duct injury or postoperative bleeding and there was no blood transfusion required. No mortality was reported.Upper-abdominal surgery history There is undoubtedly a factor that raises the danger of open conversion via laparoscopic surgery. The severity of adhesion, on the other hand, has a greater impact than the sort of past operation that can be addressed with a proper laparoscopic approach.[19] As for safety and conversion rate, safety should and must be always the corner stone for evaluating and judging

any new emerging technique and it should be never compromised for the wrong goals. The request and concern in ‘‘scarless’’ surgery cannot be denied. However, safety should always come first and never be sacrificed to do the procedure quickly. Safety must be the leading focus of any new technique.[20]

CONCLUSION

Laparoscopic cholecystectomy is a feasible and safe treatment for symptomatic gallstone disease in selected patients with previous upper abdominal surgery history. However, appropriate preoperative preparations, patients' assessment, careful intraoperative techniques, and well-experienced surgeon are mandatory for good outcomes. Previous UAS does not exclude safe LC, but it is linked to a larger need for adhesiolysis, a longer operating time, a higher open conversion rate, and, in some situations, a higher number of trocars.

Conflict of interest : none

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