A comparison study of left-hand three-port videoscopy, left-hand four-port videoscopy and standard four-port videoscopy in laparoscopic cholecystectomy

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A comparison study of left-hand three-port videoscopy, left-hand four-port videoscopy and standard four-port videoscopy in laparoscopic cholecystectomy

AIM: *Reviewing the recent publishments on the safeness and practicality of three-port cholecystectomy we aimed to introduce the results of cholecystectomy that were performed by the primary surgeon's left hand videoscopy application through three ports.*
MATERIAL AND METHODS: *The data of 60 total laparoscopic cholecystectomy patients were retrospectively anaylsed. 20 patients underwent three-port laparoscopic cholecystectomy with videoscopy using the primary surgeon's left hand, 20 patients underwent four-port laparoscopic cholecystectomy, again with left hand videoscopy application, and the other 20 patients underwent standard four-port laparoscopic cholecystectomy by a more experienced surgeon. Kolmogorov-Smirnov test was used to evaluate the distribution normalization of parameters. To compare the parameters of multiple groups; one-way ANOVA-Tukey HSD was used for normal distributed, the Kruskal-Wallis test was used for abnormal distributed values. Pearson's chi-squared test was used for categorical values. The results with p-values of less than 0.05 were accepted as statistically significant.*
RESULTS: *There were no differences between the groups for preoperative (p=0.456) and perioperative clinical characteristics (p=0.918), mean operation time (p=0.855), perioperative complication (p=0.153), conversion to open surgery (p=0.362) and the need for first assistant surgeon (p=0.235). However, the need for second assistant surgeon (p=0.017), assistant nurse (p=0.014) and fourth tool usage (p=0.000) were significantly lower in the three port group.*
CONCLUSION: *Left-hand videoscopy in three-port laparoscopic cholecystectomy is reliable and effective as the conventional techniques and cheaper than conventional techniques. It's easily applicaple and learnable for experienced surgeons.*

KEY WORDS: Cholecystectomy, Four ports, Laparoscopy, Left-hand videoscopy, Three ports

Introduction

Gallstone disease is a frequent surgical problem. The prevalence of gallstones in autopsy studies has been reported as 11% to 36% [1]. The main treatment for the disease is cholecystectomy. It is the most common major abdominal procedure performed in Western countries [2]. The first successful cholecystectomy was performed by Carl Langenbuch in 1882 [2]. Open cholecystectomy was accepted as safe and effective treatment for both acute and chronic cholecystitis for many years. The introduction of a scope for visualizing the peritoneum of a dog by Kelling in 1901 initiates the basis of laparoscopic surgery [3]. As known from the performance of the first laparoscopic cholecystectomy (LC) by Erich Muhe from Germany in 1985 [4], followed by Philip Mouret from France in 1987 [5], it has been the standard procedure of choice for symptomatic gallbladder disease.

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Classical/conventional/traditional LC (CLC) was performed with four ports by one primary surgeon and one or two assistants [6,7]. Eventually, the invasiveness, cosmesis and cost of this procedure became questioned over the years after which it was first performed. The authors performed this research to promote less invasive surgery, better cosmesis and less manpower for this surgery. In this regard, several studies were published. The idea of reducing the port number [8-31], reducing the port diameter [13,20,32,33], changing the abdominal access points [13,34,35], using of natural orifices [36] compelled the surgeons do more and more work.

The rationality of reducing the port numbers depends on lesser wound & scar and lesser ports & surgical instruments as thought. Also, reducing the operation member would help to designate the surgical team, thereby leading to less manpower, especially in highly patient volumes and/or with lesser healthcare professionals of second step health-care centers. In several recent studies many similar issues were discussed. However, reducing the number of surgical team member would put extra stress on operator/primary surgeon to complete the case successfully together with two member of surgical team. We thought that this topic has not been sufficiently examined. Thus, the primary surgeon would experience a learning-curve for performing a technique different from the classical methods that videoscope is on the assistant's hand. This different technique is: videoscope on primary operator's left hand three ports (left hand videoscopy three-port) laparoscopic cholecystectomy (LTLC). In this method the videoscope was held by primary surgeon. In addition, we performed this method with three and four ports.

Our aim was to evaluate the safety and effectiveness of the primary surgeon's left hand-operated three and four-port LC performed for benign disease of the gallbladder *with this different technique* and with fewer surgical team members compared to traditional method(s).

Material and Method

We studied the clinical, surgical properties and operational dynamics of 60 total LC patients (18 males and 42 females) who underwent an operation between June 2013 and December 2017 retrospectively. A total of 20 patients underwent LTLC with operator left handed videoscopy (group1), 20 patients underwent to four-port LC again with left hand videoscopy (LFLC) by the same surgeon (group 2), and the other 20 patients underwent CLC by another surgeon who was more experienced in laparoscopic and hepatobiliary surgery (group 3). Other surgical team members included first assistant surgeon, second assistant surgeon and an assistant nurse. The first assistant surgeon was more experienced in laparoscopic interventions than the second assistant surgeon and the assistant nurse.

Patients with preoperative/perioperative suspected malignancy, initial upper abdomen and midline incision scar and history of upper gastrointestinal surgery were excluded. Additionally, the patients who had bile duct/biliary tree abnormalities preoperatively and the patients of whose abnormalities could not be diagnosed preoperatively were excluded.

Preoperative detailed history, general physical status and systemic examination were obtained from each patient. Laboratory tests included complete blood counts, liver/urine function tests, serological tests and hemorrhage & coagulation parameters. Radiological imaging, including ultrasonography (USG) and magnetic resonance imaging (MRI), were performed in all patients when necessary.

Operation technique

1) LTLC (GROUP1)

The first 10-mm trocar was inserted two cm below the umbilicus. The other 10-mm trocar was inserted on midline three cm below the xiphoid bone. The operator surgeon held the videoscope with the left hand and held the operative equipment with right hand. The videoscope was sent through the infraumbilical 10-mm port, and the operative equipment was sent through the infraxiphoidal 10-mm port. The five mm trocar was inserted through the right hypochondrium on anterior axillary line three cm below the costal margin. The assistant (assistant surgeon/nurse)held the fundus of gallbladder at

Fig. 1: LTLC- Holding of endoinstruments by the surgical team members; the endocamera/videoscope is in the left hand of the primary surgeon, the endodissector is in the right hand of the primary surgeon, and the grasper is in the assistant's hand. The 'mental contribution' of the assistant is less than that of the primary surgeon. The control of the instruments is 'predominantly' under the responsibility of the primary surgeon.

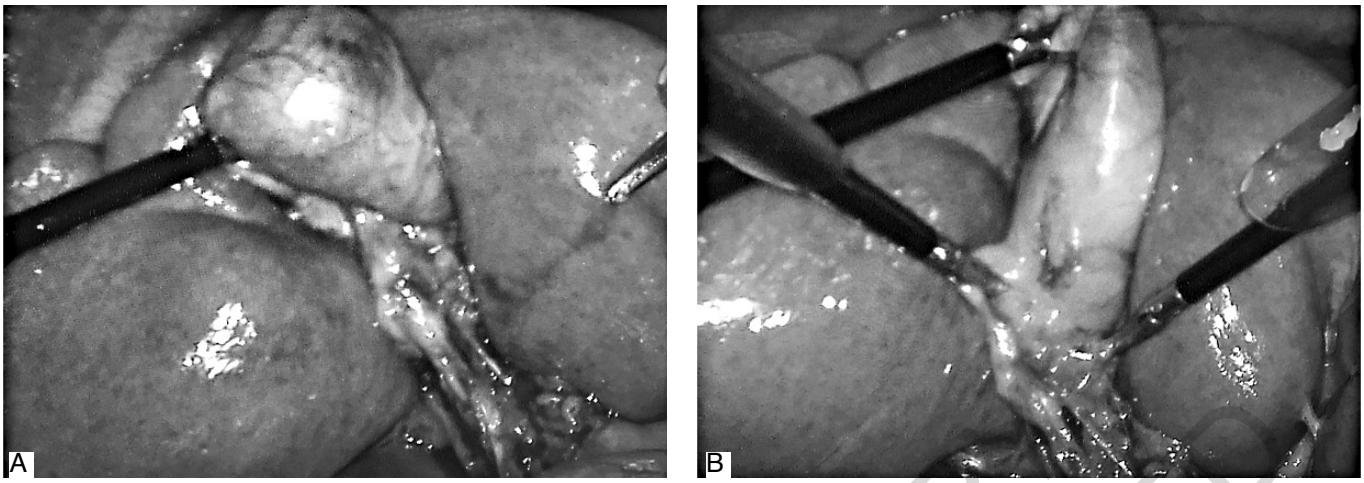

Fig. 2: A) Optimal point for holding the gallbladder in the 3-port technique; B) Holding the gallbladder in the 4-port technique.

the first stage with a grasper through the five-mm trocar under the supervision of primary operator surgeon. With the aid of dissector (through upper 10 mm trocar) being held the fundus by the operator, the assistant changed the holding point of gallbladder from fundus to body of it with grasper (Fig. 1).The grasper held the 'optimal point' of the gallbladder (nearly equivalent to distal part of infundibulum) and provided sufficient traction of the gallbladder for obtaining the visualization of Calot's triangle (Fig, 2a). Meanwhile, the operating surgeon provided oral directions to the assistant (up, down, left, right, towards, upwards, etc.) with respect to the grasper. Dissection of the cystic duct and artery was completed using the right hand of the operating surgeon. During the operation, the operating surgeon held the videoscope with the left hand and *maneuvered* it 'just right through the area he wanted to see *instantaneously*'.

Fig. 3: LFLC- Holding of endoinstruments by the surgical team members; the endograspers are in the assistant's hands.

2) LFLC (GROUP2)

The first difference from LTLC is the insertion of the second trocar (five-mm) through the bottom of right hypochondrium on the mid axillary line eight to 10 cm below the costal margin. The grasper was sent into the abdomen via the bottom five-mm port. The fundus of the gallbladder was held with grasper and pushed through the upper part of the liver to obtain traction of the gallbladder. The second grasper was sent into abdomen via the upper five-mm port. The infundibulum of the gallbladder was held with second grasper (Fig. 2b). Graspers were on the left and the right hands of assistant. The movement direction and movement quantity of the assistant's right hand was similar to LTLC but with the need of 'lesser movement accuracy'. The remaining part of this method was same as LTLC (Fig. 3).

3) CLC (GROUP3)

CLC is some different from both techniques defined above. The assistant's left hand held the fundus of the gallbladder with grasper which was sent through abdomen via lower five-mm port and the right hand held the videoscope sent through the lower 10-mm port. Or the first assistant held the videoscope, the second assistant/nurse held the fundus of the gallbladder in some cases (need of more surgical members). The primary operator surgeon's left hand held the infundibulum of the gallbladder with second grasper, which was sent through abdomen via the upper five-mm port, and the right hand held the operative instruments through the 10-mm infraxiphoidal port (Fig. 4).

Fig. 4: CLC- Holding of endoinstruments by the surgical team members; the 1st grasper is in the assistant's hand, the endocamera/videoscope is in the hand of the 2nd surgeon/assistant, the infundibulum of the gallbladder is held in the left hand of the surgeon with a 2nd grasper, which was sent through the abdomen via the upper 5-mm port, and the operative endoinstruments (dissector,scissor, hook-shaped endocautery) are held in the right hand.

Preoperative patients' age, gender, comorbidity, clinical status (cholecystitis/pancreatitis), operation time, conversion to open surgery, postoperative analgesics use/need, duration of hospitalization, preoperative complications, contribution of first and second assistant surgeon, assistant nurse and the need for fourth port/additional endosurgical instrument(s) were evaluated and compared in these three groups.
In all three techniques, no perioperative urgent second surgeon/assistant were needed. All the cases were completed by initial operative team members from start to end.

Statistical Analyses

Statistical Package for the Social Sciences (SPSS), version 16.0 (IBM® SPSS® Inc. Chicago, IL, USA) software was used for the whole statistical analyses. Kolmogorov-Smirnov test was used to evaluate the distribution normalization of parameters. To compare the parameters of multiple groups; one-way ANOVA-Tukey HSD was used for normal distributed, the Kruskal-Wallis test was used for abnormal distributed values. Pearson's chi-squared test was used for categorical values. The results with p-values of less than 0.05 were accepted as statistically significant

Results

The baseline data are summarized in Table I. The non-significant values that were obtained for mean age and mean gender (p=0.536 and p=0.490, respectively) contributed to the design of the study.
Preoperative clinics showed no significant difference (p=0.456) when the three groups were compared (Table II). The operation dynamics results showed some differences when analyzed (Table III). The mean operation times were nearly equal across the group.
In three groups, perioperative clinical characteristics were similar to each other.
The fourth port was needed in two patients because of hardly dissection and difficult holding of the gallbladder (secondary to preoperative/preoperative cholecystitis) in group1; there was no significant difference between the groups.
There were minor perioperative complications as minimal perforation of the gallbladder and minimally bile contamination to surgical area in group1 and group2, but there were no significant differences between the groups (p=0.153) (Table III).
Conversion to open surgery in group2 was needed for nonlaparoscopically controllable cystic artery rupture in one case. The proximal part of the artery was not suitable for endoclipping, and thus, conversion to open surgery was chosen in order to safely suture the artery and to stop bleeding in this case.

Table I - *Baseline data*

	Group 1	Group 2	Group 3	p
Mean age (min-max)	47,45(19-69)	49,50(29-66)	51,90(25-76)	0.536
Mean gender - M/F (%)	4/16(20/80%)	7/13(35/65%)	7/13(35/65%)	0.490

Table II - *Preoperative clinics*

	Group 1	Group 2	Group 3	Total	p
Normal	14(70%)	16 (80%)	12(60%)	42(70%)	0.456
Cholecystitis	5(25%)	4(20%)	5(20%)	14(23,3%)	
Pancreatitis	0(0%)	0(0%)	2(10%)	2(10%)	
Cholecystopancreatitis	1(5%)	0(0%)	1(5%)	2(3,3%)	

TABLE III - *Operation dynamics*

		Group 1	Group 2	Group 3	Total	p
Operation time	Mean minutes(min-max)	89,00(50-125)	89,00(50-145)	88,75(40-165)	88,91(40-165)	0.855
	Std. deviation	23,43	21,86	31,32	25,43	
Veress needle use	-	6 (30%)	4 (20%)	20 (100%)	30 (50%)	0.000
	+	14 (70%)	16 (80%)	0 (0%)	30 (50%)	
Peroperatuar clinics	Normal	15 (75%)	15 (75%)	14 (70%)	44 (73,3%)	0.918
	Cholecystitis	5 (25%)	5 (5%)	6 (30%)	16 (26,7%)	
1st assistant surgeon	-	17 (85%)	18 (90%)	14 (70%)	49 (81,7%)	0.235
	+	3 (15%)	2 (2%)	6 (30%)	11 (18,3%)	
2nd assistant surgeon	-	8 (40%)	1 (5%)	3 (15%)	12 (20%)	0.017
	+	12 (60%)	19 (95%)	17 (85%)	48 (80%)	
Assistant nurse	-	11 (55%)	19 (95%)	15 (75%)	45 (75%)	0.014
	+	9 (45%)	1 (5%)	5 (25%)	15 (25%)	
4th tool usage	-	18 (90%)	0 (0%)	0 (0%)	18 (30%)	0.000
	+	2 (10%)	20 (100%)	20 (100%)	42 (70%)	
Conversion from 3 to 4 port (Group 2 and 3 start directly with 4 ports)	-	18 (90%)	20 (100%)	20 (100%)	58 (96,7%)	0.126
	+	2 (10%)	0 (0%)	0 (0%)	2 (3,3%)	
Peroperatuar complication	-	19 (95%)	17 (85%)	20 (100%)	56 (93,3%)	0.153
	+	1 (5%)	3 (15%)	0 (0%)	4 (6,7%)	
Conversion to open surgery	-	20 (100%)	19 (95%)	20 (100%)	59 (98,3%)	0.362
	+	0 (0%)	1 (5%)	0 (0%)	1 (1,7%)	

TABLE IV - *Postoperative data*

		Group 1	Group 2	Group 3	Total	p
Mean analgesics usage	Dose (min-max)	6,75 (2-16)	5,80 (1-22)	4,30 (1-12)	5,61 (1-22)	0.071
	Std. deviation	3,75	5,73	2,81	4,32	
Mean hospital stay	Day (min-max)	2,75 (1-4)	2,6 (1-7)	2,35 (1-5)	2,57 (1-7)	0.252
	Std. deviation	0,91	1,39	1,27	1,98	

The most significant parameters of the groups when compared to each other were need of assistant surgeon (p=0.017), need of an assistant nurse (p=0.014) and the fourth port/tool usage (p=0.000) (Table III).
To summarize the data for interpretation; the cases that involved LTLC needed fewer surgical team members, *lesser-qualified surgical team members*, and fewer instruments compared to the other two (LFLC, CLC) techniques. Mean analgesics usage and mean hospital stay times were similar between the three groups (Table IV).

Discussion

Investigations of the surgical minimization and cost effectiveness of the LC are ongoing. We emphasize that the term of critical view of safety (CVS) is indisputable, and all kinds of surgical techniques should depend on the CVS. The one of the important rule of CVS, according to Pecse et al. [37], is that the surgeon should see only two luminal structures connecting to the gallbladder. The correct visualization of the Calot's triangle has been maintained with the CLC, and this method has been gold standard. However, it should be questioned whether all four approach points are really required, especially for benign diseased, noncomplicated easy maneuverable gallbladders. The idea of minimalizing the surgical approach for benign gallbladder disease has been questioned in several studies. For example, the single incision laparoscopic surgery (SILS) was considered to be popular following the early times when first announced. According to the meta-analysis study of Guiro et al. [38], SILS was thought to be safer, has lesser postoperative pain, provided fast recovery and better cosmesis in several studies. However, they concluded that total cost of this technique is higher than conventional laparoscopic cholecystectomy due to ports fixing time and total operating time. Furthermore, it can be thought that from its development, the SILS procedure lost its popularity due to poorer ergonomic situation, the triangulation difficulties of the endo-instruments and higher postoperative incisional hernia incidence [38,39]. In addition, these disadvantages did not allow SILS to be standardized for LC. When reviewing the literature, we see that the issue of

minimalizing the invasiveness of gallbladder surgery revolves around the three-port technique. Eroler et al. [26] reported that when compared to CLC; they have found no significant difference in the parameters of hospital stay and total surgery time with three-port technique. Our results promoted their conclusions. Additionally, Reshie et al. [9] concluded that when performed with experts; the three-port technique is safe and leads to lesser port site pain, better cosmesis and better costeffectiveness. The parameters of postop pain and cosmetic result were not evaluated in our study because we primarily had been focused on the feasibility of our different technique. However, the need of analgesics usage between groups was similar in our study. Reshie et al. and Chalkoo et al. [13] emphasized that surgical experience is an important criterion for three-ports techniques. Reducing the port number would make us think that may we reduce the surgical team member(s)/qualified surgical member(s) too. Mayir et al. [10] needed one assistant surgeon or two assistant nurses. Chalkoo et al. [13] performed the operations with two members (primary surgeon and one assistant). Azawi et al. [14] needed one assistant surgeon and an assistant nurse. In Lee et al.'s [20] study of two-port cholecystectomy, there were three operation members.

In these reduced port studies, the need of contribution of at least one experienced assistance (one assistant surgeon or two nurses) is remarkable. In our technique (LTLC), we needed fewer and less-qualified surgical team members (Table III).

In Reshie et al.9's study, the three-port group cases were performed by three surgical members in which the videoscope was held by another member rather than the primary surgeon. Likewise, in the three-port group examined by Mayir et al. [10], Chalkoo et al. [13], Azawi et al.[14], Sharma et al. [22], thethe videoscope was always held by 'another' surgical member.

One of most important arguments in the literature was suggested by Bartnicka et al. [40]. They mentioned that the primary operator's optimal requirement of vision is not sufficient in the techniques with fewer than classical four ports in which the videoscope was held by the other members of surgical team. This idea formed the basis for our study.

Almost all the three-port technique studies as mentioned above suggested that three-port cholecystectomy can be performed safely. After reviewing all these studies, we contributed to the discussion by examining whether the three-port technique may be more applicable and safer *when modified*.

The major difference between our technique and the three-port technique studies is that the videoscope is on the left hand of the primary surgeon. As far as we know, *this if the first study to examine LTLC.* We thought adequate traction of the gallbladder and optimal movement of the gallbladder away from the hepatic pediculate could also be achieved with fewer instruments and fewer team members. Thus, our technique (LTLC) provides 'perfect visualization of the Calot's triangle' for the operating surgeon to aid in preventing and/or self/full control of the white shines, insufficient light episodes, blurring and having the ability of immediate cleaning the videoscope lens, etc. Likewise, obtaining the correct and safe visualization of the Calot's triangle depends on optimal distance of videoscope to the work area. Thus, we think that the primary surgeon's optimal visual requirement of the worked area and maximum diminution of illusion can only be provided by him/herself perfectly. Furthermore, having the instantaneously movement ability of the videoscope, the operator surgeon also maintains and provides the 'full' command and control of the whole instruments and the whole case. The left hand of the operator surgeon worked simultaneously with the right hand to provide the fully following the dangerous terminal parts of the endoscissor, endocautery and endodissector, thereby preventing any iatrogenic injury. Having the primary surgeon's holding the fundus of the gallbladder may not be essential. The assistant may manipulate the fundus sufficiently. We thought that focusing on the infundibulum and Calot's triangle is more important, and this can be better maintained by the primary surgeon than by the other surgical team members.

Once perfect visualization of the worked area and gentle movement of the primary/operative instruments (dissector, cautery, etc.) are provided by the primary surgeon, there are no differences in the cholecystectomy with respect to operation time, perioperative complications, conversion to open technique, hospital stay and dose of analgesics when compared to CLC especially held on by experienced surgeon. When comparing the three groups to each other, there were no differences in operation time or perioperative complications. Moreover, LTLC is performable with lesser qualified surgical team member (lesser experienced assistant, nurse, etc.) but with the same safety limits of standard techniques. Despite the lesser mental contribution of the assistance to the case (sufficiency of lesser experienced assistance and usage of only one hand), LTLC may be as safe as CLC for the primary operator of whom is skilled in this technique. We thought that if the primary operator surgeon was skilled in holding and controlling the videoscope with the left hand, then he/she can perform cholecystectomy with three ports easily and may add a fourth port if necessary. In a way, LFLC can be thought as complementary to LTLC when a fourth port is necessary. When compared to conventional techniques, the lesser cost due to fewer ports and instruments (and fewer team members) is obvious in LTLC. Thus, this method would be available for surgeons who work in second step health centers with one surgical member, who is usually a surgical nurse.

We recommend this method to be performed by surgeons currently experienced in laparoscopic techniques/skills and who have no visual impairment(s), since

laparoscopy has only a two-dimensional view, which is susceptible to visual faults. We recommend that this surgery should be started with three ports, and the fourth one should be placed only when necessary.
The small number of subjects and retrospective design are the main limitations of our study. Future research will focus on long-term follow-up outcomes.

Conclusion

LTLC is as reliable and effective as CLC for the treatment of benign gallbladder diseases. Furthermore, it is favorable because of a lesser need for the instrument and manpower, thus reducing cost. Hence, it can be deemed a preferable technique for experienced surgeons. LTLC may contribute to the technical standardization of LC in its use to treat benign gall diseases (polyps, non-complicated stones, etc.) in the future.

Riassunto

In relazione con le recenti pubblicazioni sulla sicurezza e praticità della colecistectomia video-laparoscopica a tre accessi, vengono presentati i nostri risultati della colecistectomia VL eseguita con controllo della telecamera dell'operatore con mano sinistra e l'adozione di tra accessi.
La casistica analizzata retrospettivamente è composta di 60 pazienti colecistectomizzati in laparoscopia, di cui 20 pazienti sottoposti a colecistectomia VL con tre accessi e con la telecamera affidata alla mano sinistra del chirurgo operatore, 20 pazienti sottoposti a colecistectomia VL a quattro accessi, sempre con la telecamera affidata alla mano sinistra del chirurgo operatore, e gli altri 20 pazienti sottoposti a colecistectomia VL con quattro porte di accesso secondo la tecnica standard eseguita da un chirurgo più esperto. Il test di Kolmogorov-Smirnov è stato utilizzato per valutare la normalizzazione della distribuzione dei parametri. Per confrontare i parametri di più gruppi; ANOVA-Tukey HSD a una via è stato utilizzato per la distribuzione normale, il test Kruskal-Wallis è stato utilizzato per valori distribuiti anormali. Il test chi quadrato di Pearson è stato utilizzato per valori categoriali. I risultati con valori di p inferiori a 0.05 sono stati accettati come statisticamente significativi.
Nei risultati non ci sono state differenze tra i gruppi per le caratteristiche cliniche preoperatorie (p = 0.456) e perioperatorie (p = 0.918), tempo medio di operatività (p = 0.855), complicanza perioperatoria (p = 0.153), conversione in chirurgia aperta (p = 0,362) e la necessità di un primo assistente chirurgo (p = 0,235). Tuttavia, la necessità di un secondo assistente chirurgo (p = 0.017), assistente infermiera (p = 0.014) e il quarto utilizzo dello strumentario (p = 0.000) sono risultati significativamente inferiori nel gruppo a tre accessi..
Si conclude che la videoscopia con la mano sinistra nella colecistectomia VL a tre accessi appare affidabile ed efficace come le tecniche convenzionali e più economica rispetto alle tecniche convenzionali. È facilmente utilizzabile con facile apprendimento da parte di chirurghi esperti.

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Commento e Commentary

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Gli Autori presentano una casistica relativamente modesta e oggetto non di uno studio prospettico randomizzato ma retrospettivo, reclutando solo pazienti con litiasi non complicata e assenze di malformazioni anatomiche operati dal 2013 al 2017. Da rilevare che in 2 pazienti (10%) del gruppo 1 (LTLC) si è stato necessario un quarto trocar per difficoltà insorte nella dissezione e mobilizzazione della colecisti e in 1 caso (5%) del gruppo 2 (LFLC) è stata necessaria una conversione laparotomica per lesione dell'arteria cistica con emorragia non dominabile laparoscopicamente. In entrambi i gruppi con tecnica "left hand" inoltre si sono verificate piccole lesioni della colecisti con una sia pur minima contaminazione biliare del campo operatorio. Nessuna complicazione o conversione si è verificata, viceversa, in 20 pazienti del gruppo 3 operati con tecnica tradizionale.

In base a queste osservazioni, almeno in base alla casistica al momento presentata, non si possono condividere pienamente e far proprie le conclusioni degli AA che ritengono la tecnica "left hand" proponibile per risparmio di operatori e di costi, e non ritenere che, in particolare nella curva di apprendimento dei medici in formazione, resta una esigenza fondamentale la bimanualità del primo operatore nell'eseguire egli stesso con entrambe le sue mani le gestualità chirurgiche, in particolare nell'esposizione e nel trattamento degli elementi del triangolo di Calot.
Giova ricordare che in chirurgia il dimostrare che una tecnica sia fattibile non significa sempre che essa rappresenti il gold standard di riferimento.

* * *

The authors present a relatively modest series and not a prospective randomized but retrospective study, recruiting only patients with uncomplicated lithiasis and absences of anatomical malformations operated from 2013 to 2017. To be noted that in 2 patients (10%) of group 1 (LTLC) a fourth trocar was required due to difficulties in the dissection and mobilization of the gallbladder and in 1 (5%) of group 2 (LFLC) a laparotomic conversion was required for cystic artery injury with laparoscopically non-dominable haemorrhage. In both groups with the "left hand" technique, small gallbladder lesions occurred with a minimum of biliary contamination of the operative field. No complication or conversion occurred, vice versa, in 20 patients of group 3 operated with traditional technique.

On the basis of these observations, at least according to the cases actually presented, we cannot fully share and accept the conclusions of the AAs who consider the "left hand" technique to be saving for operators and costs, and not to believe that, particularly in the learning curve of the doctors in training, the first operator's bimanuality remains essential in executing the surgical gestures with both his hands, particularly in the exposure and treatment of the elements of the Calot triangle. It should be remembered that in surgery the demonstration that a technique is feasible does not always mean that it represents the gold standard of reference Università di Modena