MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.1.454.457

OPEN ACCESS

Key Words
Laparoscopic, cholecystectomy, conventional, three port, gallbladder, surgery

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Received: 20 January 2024
Accepted: 23 February 2024
Published: 25 February 2024

Citation: Sela Hema Bhargavi and Parameswaran Unnithan, 2024. Comparison Between Single Incision Laparoscopic Cholecystectomy using Conventional Laparoscopic Instruments with three Port Cholecystectomy: A Prospective Randomized Study. Res. J. Med. Sci., 18: 454-457, doi: 10.36478/makrjms.2024.1.454.457

Comparison Between Single Incision Laparoscopic Cholecystectomy using Conventional Laparoscopic Instruments with Three Port Cholecystectomy: A Prospective Randomized Study

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Abstract
Cholecystectomy is a common surgical procedure of the biliary tract. It is associated with pain, inflammation and discomfort. The aim of present study is to compare single incision laparoscopic cholecystectomy by conventional laparoscopic instruments with three port cholecystectomy. This study was conducted in the department of General Surgery, Sree Mookambika Institute of Medical Sciences, Kulasekharam, Tamil Nadu. The study was conducted during the period of Jan 2023 to Dec 2023. A total of 40 patients selected based on inclusion and exclusion criteria. The patients were divided in two groups each of 20. All patients clinical and postoperative data was collected and analyzed. The data was analyzed by Statistical Package for Social Sciences (20.0) version. Comparison of intraoperative time, VAS score, body image, one week and three week follow up not showed any significant difference between the groups. There is a significant difference compared time taken to start ambulation between group-I and group-II. At three weeks both groups patients showed excellent body image. The study concluded that single incision laparoscopic cholecystectomy is safe, convenient, better cosmetic with less cost.

INTRODUCTION

Cholecystectomy is the most common surgery of the biliary tract and the second most common operative procedure performed now a days all over the world. Precision and quality care in the management of symptomatic gall stone disease from open cholecystectomy to minimal invasive surgery has taken long years[1-3]. In minimally invasive surgery the traditional three-part laparoscopic cholecystectomy has established its safety and this surgical procedure was well taken by laparoscopic surgeons[4]. According to available technology and the expertise and confidence developed by surgeons in laparoscopy the desire to reduce surgical procedure, leave less foot prints of surgery the number and size of these incisions needs to be reduced[5]. Single-incision laparoscopic surgery (SILS) refers to the technique in which a surgical procedure is carried out through one incision. In 1997 Navarra introduced this single incision laparoscopic cholecystectomy (SILC)[6]. In the last two decades many different techniques of SILC have been reported but there is no standardized technique. The advantage of SILC over conventional laparoscopic cholecystectomy and one technique of SILC over the other is debatable[7,8]. With this background the present study aimed to evaluate and compare various intra-operative and post -operative parameters of SILC with TPLC.

MATERIALS AND METHODS

Study Design: Prospective randomized study

Study Settings: This study was conducted at department of General Surgery, Sree Mookambika Institute of Medical Sciences, Kulasekharam, Kanyakumari (Dist), Tamil Nadu.

Study Period: This study was conducted for the period of one year (Jan 2023-Dec 2023)

Inclusion Criteria:

- Age between 30-80 years
- ASA score not >3 or less than 3

Exclusion Criteria:

- Acute cholecystitis
- Bleeding disorders
- Recent abdominal Surgeries
- Body mass index more >40 kg/m2
- COPD
- Diabetes mellitus
- Coronary artery disease

Study groups:
Group-I: Single incision (n=20)

Group-II: Three port (n=20)

Procedure: Three-port cholecystectomy was performed using three ports, i.e., two 10-mm and one 5-mm port in the umbilical, epigastrium and right hypochondrium, respectively. Pneumoperitoneum was generated using CO2 insufflation with the help of Veress needle, through the umbilical port. The rest of the procedure was similar to conventional laparoscopic cholecystectomy. Single-Incision Laparoscopic Cholecystectomy with Conventional Instruments was done by making a single infra umbilical incision about 2.5 cm. Pneumoperitoneum was created by using a Veress needle. A 10-mm port was placed, through which a 30° laparoscope was introduced, one 5-mm and another 10-mm port was introduced on either side of the central port through the same incision but through separate fascial defects . A 5-mm grasper was introduced through the right port for traction of fundus and the 10-mm left port was used as working instrument. The working instrument in the left lateral port was placed in 2 o'clock position and the other instrument was placed in the right lateral in 10 o'clock position for gallbladder retraction leading to triangulation of instruments. Posterior dissection was done and gallbladder was lifted. This helped in easy identification and dissection of Calot's triangle. Clip applicator was introduced through the left lateral 10-mm port. After dissection of gallbladder from the bed and achieving hemostasis, the gallbladder was removed through the 10-mm left lateral port.

Statistical Analysis: The data was expressed in number, percentage, mean and standard deviation. Statistical Package for Social Sciences (SPSS 20.0) version. Chi square test applied to find the statistical significant between the groups. $p<0.05$ consider statistical significant at 95% confidence interval.

RESULTS AND DISCUSSIONS

This study was conducted in 40 patients. They were divided into two groups of each 20. Comparison of mean intraoperative time between the groups not showed any significant difference. 18 patients in group-I and 20 patients in group-II not have fundal suture. Maximum number of patients in group-I (17) and group-II (18) not have additional mini epigastric port. Comparison of mean VAS score between the groups not showed any significant difference. Time taken to start ambulation showed significant difference between the groups (Table-1). At first week follow up 13 in group-I and 1 in group-II showed excellent and 7 in group-I ad 19 in group-II had good. At third week in both groups all the patients showed excellent body image (Table-2). In group-I and II maximum number of patients showed intraoperative time 31-45 min. 4 in group-I and 3 in group-II had 46-60 min. These results

Table-1: Comparison of clinical observations between the groups

Observation	Group-I (n=20) (MEAN±SD)	Group-II (n=20) (MEAN±SD)
Intraoperative time	32.89±8.67	31.45±6.42
Fundal suture (n)		
Yes	2	0
No	18	20
Additional mini epigastric port		
Yes	3	2
No	17	18
VAS score	5.24±0.41	5.98±0.19
Time taken to start ambulation	5.26±0.94	7.12±0.12*

(*p<0.05 significant compared group-I with group-II)

Table-2: Comparison of body image of patients on first and third week between the groups

	Group-I (n=20)		Group-II (n=20)	
Week (%)	Number	Percentage (%)	Number	Percentage
First week				
1-3 (Poor)	0	0.00	0	0.00
4-7 (Good)	7	35.00	19	95.00
8-10 (Excellent)	13	65.00	1	5.00
Third week				
1-3 (Poor)	0	0.00	0	0.00
4-7 (Good)	0	0.00	0	0.00
8-10 (Excellent)	20	100.00	20	100.00

Table-3: Distribution of patients based on intraoperative time and time taken to start ambulation between the groups

	Group-I (n=20)		Group-II (n=20)	
Observation (%)	Number	Percentage (%)	Number	Percentage
Intraoperative time				
15-30	8	40.00	6	30.00
31-45	8	40.00	11	55.00
46-60	4	20.00	3	15.00
Time taken to start ambulation				
< 6 hours	12	60.00	7	35.00
> 6 hours	8	40.00	13	65.00

not showed any significant difference. In group-I 12 have less than 6 hr and 8 had more than 6 hours to start ambulation. In group-II 13 had more than 6 hours and 7 had less than 6 hr to start ambulation. Time taken to start ambulation between the groups not showed any significant difference (Table-3).

Cholecystectomy is one of the most common abdominal surgeries performed all over the world. The traditional open cholecystectomy is associated with fear, anxiety, disfiguring scars, prolonged recovery and pain.9The conventional laparoscopic cholecystectomy is generally done through 3 small incisions in the abdomen. One for optic source and three to perform the surgical procedures. In recent years, a less invasive method has been used in an effort to reduce postoperative pain and complications such as wound infection, inflammation, oedema and trocar site hernias while further enhancing the cosmetic results.10 There have been attempts to perform the procedure through three and two ports or with reduced diameters of the trocars[11]. Further decreasing the number of ports, single-incision laparoscopic surgery has come in practice. This type of surgery refines the use of laparoscopic and allowing procedures to be carried out through a single incision, making the procedure even more minimally invasive. In the present study we compared single incision with three port incision procedures. Rao *et.al.,* study used 5 mm mini epigastric port, in our study also some patients needed similar port. In the present study the duration of operative time was between 15-60 min with mean of 30-31 mins in three port surgery[12]. The pain score (VAS) showed significant difference. Prasad et.al study showed the pain scores in the single incision group is less as compared to conventional laparoscopy group[13]. Meining *et. al* study observed that body image composition at first week and 3rd week showed improvement[14]. All the patients in both groups had excellent body image composition. In the present study also in both groups at 1st week had difference but at 3rd week all the patients showed excellent change.

CONCLUSION

The study concluded that single incision laparoscopic cholecystectomy using conventional laparoscopic instruments vs threeport is safe effective with better cosmetic results without increasing the cost.

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