



A COMPARATIVE STUDY BETWEEN FRENCH AND AMERICAN APPROACH TO LAPAROSCOPIC CHOLECYSTECTOMY

General Surgery

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ABSTRACT

Background: The "French technique" and the "American technique" are two approaches to laparoscopic cholecystectomy that are widely used. Only the location of the ports and the surgeon's position (between the patient's legs in the "French" approach and on the left side in the "American" approach) differ between the two approaches. Hence this study was conducted to assess the efficacy of French and American methods of laparoscopic cholecystectomy and also to find the impact of these two techniques on surgeon's ergonomics and their satisfaction. **Objective:** This study was done in an attempt to assess the efficacy of French and American methods of laparoscopic cholecystectomy and also to find the impact of these two techniques on surgeon's ergonomics and their satisfaction. **Patients and Methods:** A cross sectional study was done in NARAYANA MEDICAL COLLEGE AND HOSPITAL (DEPARTMENT OF SURGERY) from Jan 2022 to Jan 2023. Patients attending outpatient and inpatient department of General surgery with gallbladder stones during the study period were included in the study. **Results:** Mean operative time and proportion of cases with intra-operative complications were found to be significantly lower in the French approach group compared to the American approach group. **Conclusions:** Both patient's satisfaction and surgeon's satisfaction were found to be significantly high in the French approach group compared to the American approach group. Thus from this study, we infer that French approach is comparatively better than American approach both in terms of efficacy of the procedure and on ergonomic grounds of the surgeons.

KEYWORDS

INTRODUCTION

Laparoscopic cholecystectomy (LC) was a driving force behind the growth and success of laparoscopic surgery, and was sometimes mistakenly associated with it. The highlighted benefits of laparoscopic cholecystectomy, as well as the continuous improvement of equipment and instruments, have sparked widespread enthusiasm and unanimous agreement among surgeons, resulting in widespread adoption.

The laparoscopic cholecystectomy is now unquestionably the "gold standard" for the surgical treatment of gallbladder diseases. Even some conditions that were once considered absolute contraindications to laparoscopic cholecystectomy, such as Mirizzi's syndrome and situs viscerum inversus, can now be treated with laparoscopy, limiting open surgery to a small number of cases, with mini laparotomy techniques used in some cases.

The "French technique" and the "American technique" are two approaches to laparoscopic cholecystectomy that are widely used. Only the location of the ports and the surgeon's position (between the patient's legs in the "French" approach and on the left side in the "American" approach) differ between the two approaches.

Most studies show that both techniques produce similar results, so the choice comes down to the surgeon's preferences. However, another thought is that "French" method causes less pulmonary function impairment but is associated with more postoperative pain.

Ergonomics is a relatively new field of science that has gained popularity

A growing body of research examines the ergonomic issues that video endoscopic surgery teams face. The majority of them are focused on improving operating room working conditions and, as a result, increasing productivity. One of the most serious issues is the inadequacy of laparoscopic instrument handle designs. Another major issue arises when performing surgery via a monitor, which is primarily due to the monitor's non-ergonomic positioning.

Hence this study was conducted to assess the efficacy of French and American methods of laparoscopic cholecystectomy and also to find the impact of these two techniques on surgeon's ergonomics and their satisfaction.

Ethical consideration: This research is done under the supervision of the Ethical committee of Narayana Medical College, Nellore.

Statistical Analysis

statistical package for social sciences (SPSS) for Windows 10.0 program was used for descriptive statistical mean, standard deviation, frequency, and median were used.

MATERIALS AND METHODS

The current study was done in the department of surgery, Narayana Medical College, Nellore. It is a cross sectional study done on patients admitted with gallstones in the department of surgery, during the period from January 2022 to December 2022. Ethical clearance was obtained by the college Ethical Committee.

Inclusion Criteria

- Cases with gall bladder stones
- Cases aged more than 18 years were included in this study.

Exclusion Criteria

Cases with

- Common bile duct stones
- Recurrent cholecystitis
- Empyema
- Suspected gall bladder carcinoma were excluded from the study.

Patients attending the outpatient and inpatient department of general surgery with gall bladder stones from the months of Jan 2022 to Jan 2023 were included in the study. The individual participant's were explained about the study and they were also assured that their identity would be kept strictly confidential and they have the option to refuse participation in the study at any time.

Based on the group allotted cases in American approach group for surgery were made to lie in supine position with surgeon and first assistant standing to his left and the monitor placed on the right side of the patient whereas cases in French approach group were kept in lithotomy position and the surgeon stands between the patients legs and the first assistant stands to the left and the monitor to the right of the patient.

Outcome includes assessment of surgical indications, complications at the time of presentation, mean operative time, intra operative complications, mean pain score, post-operative complications, duration of Hospital stay, patients satisfaction and surgeons satisfaction and ease of handling the instruments. All the findings from both the groups were entered in the same proforma where clinical presentation was entered by the principal investigator.

Sample Size

Based on literature, considering the proportion of surgeon's

satisfaction as 50% and 75% for American and French techniques of laparoscopic cholecystectomy with power of 80% and level of significance of 5%, the calculated sample size was found to be 50. Hence a total of fifty patients with gall bladder stones above the age of 18 years were included in the study and among them twenty five cases were assigned to American approach group and another twenty five cases were assigned to French approach group through computer generated random numbers.

RESULTS

Table 1 showed In this current study the mean operative time for surgical procedure was recorded as 69.5±19.5 mins in American approach and 60.1±8.6mins in French approach, the difference between both the approaches was statistically significant for mean operative time (p value 0.0323).

Table 1: Mean Operative Time Among The Study Group Participants

Parameter	American approach	French approach	P value
Mean operative time (in minutes)	69.5±19.5	60.1±8.6	0.0323*

*Significant

Table 2 : Intra-operative complications were recorded among 14% and 2% of the participants from American approach and French approach group respectively. Specific intra operative complications were absent among 36% and 48% of the patients from American and French approach groups respectively. The difference between both the groups for specific intra operative complications was found to be statistically significant (p value 0.0206).

Table 2: Specific Intra Operative Complications Among The Study Participants

Intra-operative complications	American approach	French Approach	Total	P value
Present	07 (14)	01 (02)	08 (16)	0.0206*
Absent	18 (36)	24 (48)	42 (84)	
Total	25 (50)	25 (50)	50 (100)	

*Significant

Table 3 : In American approach among 14% of the cases who had specific intra operative complications 6% of them had Injury to bile duct, 4% of the cases had Injury to gall bladder, 4% of the cases had excessive bleeding. In French approach group injury to bile duct was the commonspecific intra operative complication noted among 2% of the participants. There was no statisticalsignificant association noted among the groups for specific intra operative complication (p value=0.1187).

Table 3: Association Between Specific Intra Operative Complications Between The Groups

Specific Intra- operative complications	American approach	French approach	Total	P value
Injury to bile duct	03 (06)	01(02)	04 (08)	0.1187
Injury to gall bladder	02 (04)	00 (0)	02 (04)	
Excessive bleed	02 (04)	00 (0)	02 (04)	
None	18 (36)	24(48)	42 (84)	
Total	25 (50)	25(50)	50(100)	

Table 4: In this present study, among 10% and 2% of the cases conversion to open cholecystectomy was done as the surgical procedure. There was no statistically significant difference seen among both the groups for open cholecystectomy.

Table 4: Conversion To Open Cholecystectomy Among The Study Groups

Conversion to open cholecystectomy	American approach	French approach	Total	P value
Yes	05(10)	01 (02)	06 (12)	0.0817
No	20(30)	24 (48)	44 (88)	
Total	25(50)	25 (50)	50(100)	

Table 5: On assessing the post-operative complications 6% and 2% of the participants had infection in American approach group and French approach group respectively and there was no statistical significant association found for post-operative complications between both the groups, with p value 0.2971.

Table 5: Post-operative Complications Among The Study Participants

Post-operative complications	American approach	French approach	Total	P value
Infection	03 (06)	01 (02)	04 (08)	0.2971
None	22 (44)	24 (48)	46 (92)	
Total	25 (50)	25 (50)	50 (100)	

DISCUSSION

Cholecystectomy has been performed with a laparoscopic technique since the late 1980s, and it is now the gold standard. Less blood loss, less postoperative pain, a shorter hospital stay, quicker reintegration into society, and better cosmetic results are just a few of the benefits of laparoscopic surgery.

Laparoscopic procedures, on the other hand, present ergonomic challenges to the surgeon and surgical team. The surgeon's working field and line of vision are diverted during laparoscopy. This misalignment of the visual and working axes can result in unnatural static postures such as spine rotation, neck extension, and upper-extremity elevation, which can impair surgical task performance.

Procedure

The modification is a compromise between the French technique for surgeons' table positions and the American approach to trocar placement. On the operating table, the patient is positioned supine. The head rests on a gel-filled headboard. The right upper limb is supported by a padded holder arm that is fixed in an abducted position of less than 90 degrees, while the other arm is left along the body. The legs are spread apart and placed at the same level of the body on the leg-holding.

The patient is rotated to the left side and placed in anti-Trendelenburg 10-20°. The surgeon's bed is set up so that he can operate with his shoulders completely relaxed and his elbows bent at more than 90 degrees. The patient's right shoulder is where the video column is placed. The camera is held between the patient's legs by the operator, who is to the patient's left. If one is present, the second assistant should be to the patient's right. The ports are arranged as in the American technique, with the first optical port at the navel, the operator port from 10 mm below the xiphoid to the right of the round ligament, a 5 mm port along the right anterior axillary line, and the fourth 5 mm port in the right hypochondrium, along the chondro-costal margin, on the right mid-clavicular line, in accordance with the American technique. LC is performed on a universally standardised operative time. The gripper that grips the bottom of the gallbladder is inserted through the patient's right side port and lifts the lower face of the hepatic right lobe by moving the bottom of the gallbladder upwards and to the right. The operator manoeuvres a second gripper through the emiclavear port to grab the gallbladder's infundibulum, pulling it down and to the right to increase the distance between the cystic duct and the common hepatic duct, thus opening the Calot triangle and identifying the cystic duct and common bile duct. An instrument inserted through the 10 mm port is used to dissect the junction between the infundibulum and the cystic duct. The peritoneum is incised anteriorly, a few millimetres from the peritoneum's reflection on the liver at the midpoint of the gallbladder's body. The gallbladder-cystic duct junction is then reached. The back of the gallbladder is then treated in the same way. The cystic duct and artery are clipped close to the infundibulum once they have been identified. The procedure is then finished with the dissection of the gallbladder from the liver bed, hemostasis control, drainage positioning, and gallbladder extraction via the umbilical incision and suture of incisions.

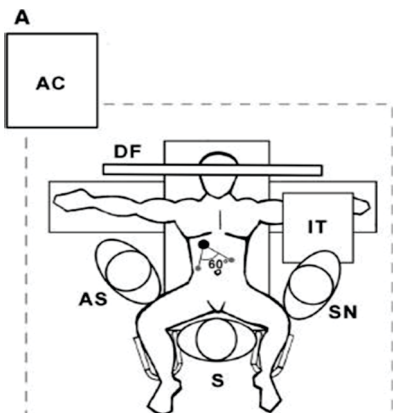


Figure 1: Operation Room Setup For French Technique

AC- Anesthesia console; DF- double flat screen; SF – single flat screen; S- operating surgeon; AS

Assistant surgeon; SN – Scrub nurse; IT – instrument table; Black dot – Location of gall bladder; Gray dots – Location of instrument ports

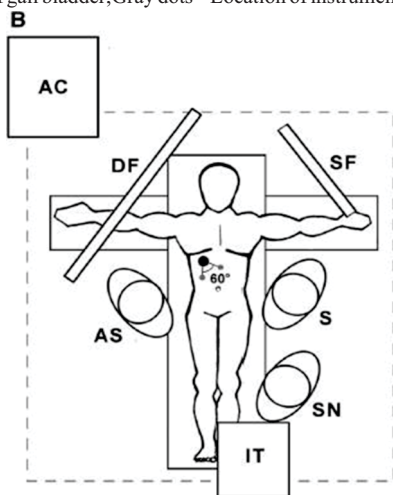


Figure 2: Operation Room Setup For American Technique

AC- Anesthesia console; DF- double flat screen; SF – single flat screen; S- operating surgeon; AS

Assistant surgeon; SN – Scrub nurse; IT – instrument table; Black dot – Location of gall bladder; Gray dots – Location of instrument ports

Wauben LSG et al (2006) in their study assessed the ergonomic status of surgeons and residents. They reported that the common musculoskeletal disorders reported included discomfort in neck, shoulders and back, in their study. Also they stated that although all were felt that ergonomic is an important factor to consider for their well being, 89% of their study participants were unaware of ergonomic guidelines.

Lee G et al (2008) in their study conducted to assess the ergonomic of surgeons it was reported that the weight-loading ratio (WLR) was found to be significantly increased with proximal targets and the same was decreased 75%, 74%, and 71% over time, in their study. There were no difference existed between the grip strategies. They concluded that the high-risk ergonomic situation usually occurs with assistant's left or caudal leg disproportionately bearing 70–80% of body weight over time, in their study. Also an increase in distance between the camera head location and the camera holder increases ergonomic risk.

Kaya OI et al (2008) assessed the ergonomics of the team which performs endoscopic surgeries. They reported that the surgeon's physical health related disorders were ranged from 32% to 72% owing to poor ergonomic conditions, in their study. Also they stated that their ergonomic status could affect the productivity of the surgical team and the safety and efficiency of the surgery.

CONCLUSION

Mean operative time and proportion of cases with intra-operative complications were found to be significantly lower in the French approach group compared to the American approach group.

However, the proportion of cases which required conversion of laparoscopic to open cholecystectomy, post operative complications, mean pain score during the post operative period and duration of hospital stay were found to be similar in both French and American approach groups.

The clinical symptoms and difficulty in gaze among the surgeons were significantly higher in the American approach group compared to the French approach group. Also ease of handling instruments was found to be significantly higher in the French approach group.

Also notably, both patient's satisfaction and surgeon's satisfaction were found to be significantly high in the French approach group compared

to the American approach group.

Thus from this study, we infer that French approach is comparatively better than American approach both in terms of efficacy of the procedure and on ergonomic grounds of the surgeons.

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