ORIGINAL ARTICLE

OPERATIVE DIFFICULTY OF LAPAROSCOPIC CHOLECYSTECTOMY IN OBESE PATIENTS - A THQ HOSPITAL EXPERIENCE

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ABSTRACT

Objective: To determine the factors responsible for operative difficulty of laparoscopic cholecystectomy in obese patients at a THQ hospital Lahore, was the objective of this study.

Methods: This retrospective study was conducted at department of General surgery, Government THQ Hospital Sabzazar, Lahore from May 2021 to October 2023 and included 189 obese patients with gall bladder disease. All Patient underwent laparoscopic cholecystectomy by single consultant surgeon. Patient`s demographics and factors responsible for operative difficulty were recorded.

Results: Mean age of obese patients was 48.63±10.72 years. There were 41 (21.69%) male and 148 (78.30%) female patients. Mean BMI was 37.89±1.29Kg/m^2. Out of 189 obese patients, 72 (38.09%) patients were diabetic and 127 (67.19%) patients were hypertensive. Indication of surgery was biliary colic in 183 (96.82%) patients and gall bladder polyp in 6 (3.17%) patients. Mean operative time and mean hospital stay were 112.03±6.89 minutes and 3.01±1.27 days, respectively. Factors responsible for operative difficulty in obese patients were difficult umbilical access in 97 (51.32%) patients, insufficient gall bladder retraction in 73 (38.62%), visceral hindrance in getting adequate calot's triangle exposure in 128 (67.72%), problematic calot's triangle dissection in 149 (78.83%), gall bladder perforation in 7 (3.70%), troublesome gall bladder bed dissection in 37 (19.57%), hemorrhage in 64 (33.86%), biliary injury in 0 (0.00%) and difficult port closure in 119 (62.96%) patients during laparoscopic cholecystectomy.

Conclusions: Perplexity in Calot's triangle dissection is the quotidian factor responsible for operative difficulty of laparoscopic cholecystectomy in obese patients to implement safe cholecystectomy.

Key-words: Laparoscopic cholecystectomy; obese; operative difficulty

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INTRODUCTION

Obesity is a global disease and attracts more diseases e.g. diabetes mellitus, hypertension, cardiac and kidney diseases.[1,2] It is growing day by day.[2] In Pakistan, 26% of women and 19% of men are obese and obesity is more prevalent in urban population i.e. 67% woman and 56% men.[1-3] The renowned set of four "F" risk factors i.e. Fat, Female, Fertile and Forty, signpost the prevalence of gall bladder stones in obese females.[4,5] Laparoscopic cholecystectomy is a gold standard procedure and a familiar minimal access surgery

among population for the treatment of gall stone disease.[6,7] Surgery in obese patient is challenging, both for anesthetist and surgical team, and it is linked to respiratory issues and thromboembolism.[8-10] Severity of gall bladder disease flares up the intraoperative struggles of surgeons to achieve safe laparoscopic cholecystectomy in obese patients.[11-13]

Though, longer operative time of laparoscopic cholecystectomy in obese patients are being reported by several surgeons in literature but factors accountable for operative difficulty that protract operative time, were not analyzed.[13-15] In a systemic review by Christina NM[14] et al, the statistically significant longer surgical time among the obese group ($p<0.00001$) was reported than in non-obese group. Similarly, Enami Y[15] et al, in a retrospective study, reported that operative time was significantly longer in the obese patients ($p= 0.0001$) as compared to non-obese patients. However, none of them analyzed the factors that extended the duration of laparoscopic cholecystectomy in obese patients. The aim of this study was to determine the factors responsible for operative difficulty that prolong operative time of laparoscopic cholecystectomy in obese patients to execute safe cholecystectomy at a THQ hospital Lahore.

METHODS

This retrospective study was conducted at the department of General surgery, Government THQ Hospital Sabzazar, Lahore from May 2021 to October 2023. This study included 189 patients with biliary colic (cholelithiasis) and gall bladder polyp, of both gender, BMI ≥ 30 Kg/m^2, between 18 to 80 years of age and for elective laparoscopic cholecystectomy. Patient with BMI >40 Kg/m^2, ASA (American Society of Anesthesiologists) score III & IV, jaundice, bleeding disorders (deranged coagulation profile), hepatitis C, post ERCP patients with cholelithiasis and patients for interval cholecystectomy were excluded from the study. Patients displaced choledocholithiasis, features of acute cholecystitis, impacted gall bladder neck stone and contracted gall bladder on USG were also excluded from the study. Patients with mucocele, empyema and intra-abdominal adhesion (encountered during laparoscopic cholecystectomy) and laparoscopic cholecystectomy converted to open were excluded from the study. The study was approved from Ethical Review committee as per institutional guidelines.

Surgical Technique: All cholecystectomies were performed laparoscopically with four port technique, by single consultant surgeon. We utilized 30^0 telescope and orthodox laparoscopic instruments of 36cm length. Intrabdominal access was attained by open technique through curvilinear infra-umbilical skin incision. Gall bladder was extracted through epigastric port in a glove made endobag. Sub-hepatic drain was positioned only in those cases where gall bladder was perforated. Port site was closed without using port closure needle and device. Rectus sheath was approximated with 2/0 prolene on round bodied circle needle. Rest of the operative technique was as per standard.

Operative difficulty in obese patient in terms of difficult umbilical access due to abdominal wall fat, insufficient gall bladder retraction due to large liver, visceral hindrance (omentum and gut) in getting adequate calot's triangle exposure, problematic calot's triangle dissection due to excessive fat, gall bladder perforation, hemorrhage, biliary injury, troublesome gall bladder bed dissection and difficult port closure were recorded**.** All the collected data was entered into SPSS version 22 and analyzed. Quantitative data like age, BMI, operative time was presented as means and standard deviations. The qualitative data like gender, DM, HTN and operative difficulty was presented as frequency.

RESULTS

Mean age of obese patients was 48.63±10.72 years (range: 18-71). There were 41 (21.69%) male and 148 (78.30%) female patients with male to female ratio of 1:3. Mean BMI was 37.89 ±1.29 Kg/m^2. Out of 189 obese patients, 72 (38.09%) patients were diabetic and 127 (67.19%) patients were hypertensive. Out of 189 obese patients, 136 (71.95%) patients had ASA score I and 53 (28.04%) patients had ASA score II. The indication of surgery was biliary colic in 183 (96.82%) patients, followed by gall bladder polyp in 6 (3.17%) patients. Mean operative time and mean hospital stay were 112.03±6.89 minutes and 3.01±1.27 days respectively. Mortality was not observed in any (0.0%) patient. The factors responsible for operative difficulty in obese patients are shown in graph I.

DISCUSSION

Laparoscopic cholecystectomy is an evergreen focus of debate among general surgeons. No doubt, methodology of triangle of safety comforts the surgeon to overcome the fear of initiating safe laparoscopic cholecystectomy, but surgeons still face several other issues including difficult calot`s triangle dissection and wide cystic duct closure, to tackle to get done safe laparoscopic cholecystectomy. Obesity is also a hot issue for the surgeon especially when

modern gadgets of laparoscopy are not available. In the present study, we recognized the factors responsible for operative difficulty of laparoscopic cholecystectomy at a THQ hospital, accomplished by a single surgeon with traditional laparoscopic equipment.

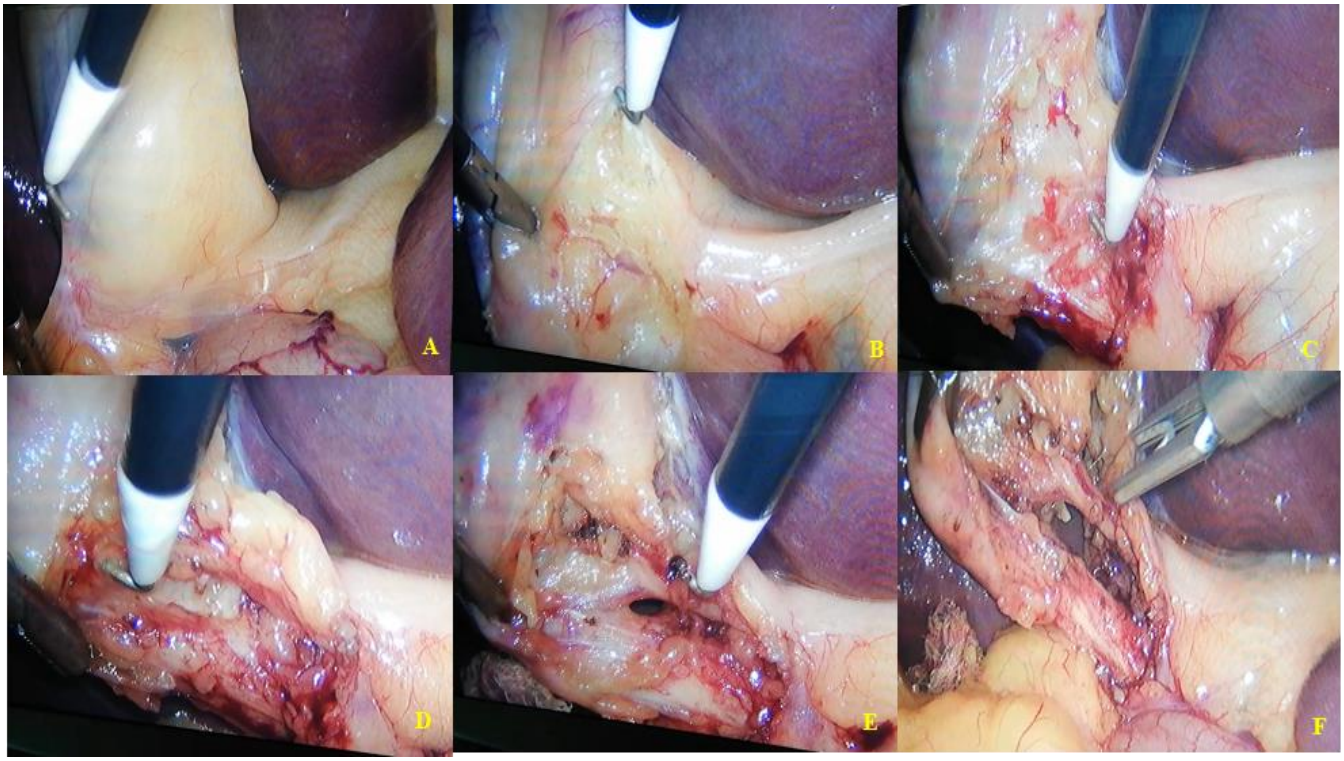
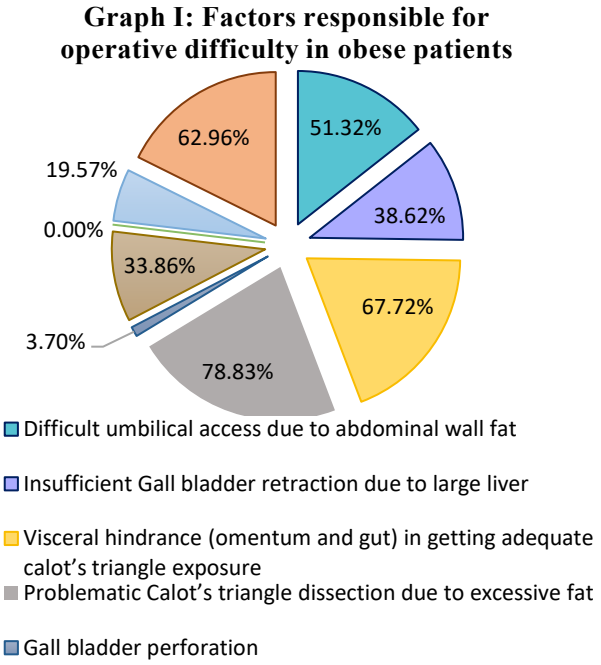


Figure 1: Calot`s triangle dissection. A & B: Abundant fat in calot`s triangle; C, D & E: Calot`s triangle dissection in process; F: Triangle of safety achieved in obese patient



In our study, majority of the obese patients were belonged to middle age group i.e. 48.63±10.72 years. Similar to our study, middle aged obese patients were also witnessed in studies by Abdulla MA[7] et al, Wong A[16] et al and Awad ET[12] et al. However, Enami Y[15] et al, in a retrospective study, reported laparoscopic cholecystectomy in elderly obese patients i.e. 56.6 ± 13.0 years. Analogous to studies by Abdulla MA[7] et al, Awad ET[12] et al, Nassar AH[13] et al and Wong A[16] et al, female predominance was observed in our study. Similar to a study by Wong A[16] et al, mean BMI of patients in our study was 37.89 ±1.29 Kg/m^2.

Corresponding to a study by Abdulla MA[7] et al, majority of the obese patients i.e. 71.95%, had ASA score I in our study. However, main stream of obese patients i.e. 60.2% and 59.9%, had ASA II score in the studies by Nassar AH[13] et al and Enami Y[15] et al, respectively. Hypertension was the commonest co-morbidity i.e. 67.19%, in our study, conversely Abdulla MA[7] et al, Enami Y[15] et al and Wong A[16] et al, reported prevalence of diabetes mellitus in their studies i.e. 80.5%, 14.1% and 13.5%, respectively. Similar to a prospective cohort

study by Abdulla MA[7] et al, biliary colic (cholelithiasis) was the common indication of laparoscopic cholecystectomy i.e. 96.82%, in our study. Longer mean operative time i.e. 112.03±6.89 minutes, was recorded in our study. However, shorter operative time i.e. 99.4 ± 39.1 minutes and 61.54 ± 32.121 minutes, was reported by Enami Y[15] et al and Awad ET[12] et al, respectively. There are several explanations of longer operative time which comprise challenging port insertion and closure, derisory calot`s triangle exposure, demanding calot`s triangle dissection and difficult suction & irrigation due to visceral hindrance in case of bile leak from ruptured gall bladder. Careful removal of fat in calot`s triangle to achieve triangle of safety was the prime reason. Similar to our study, hospital stay was 3.5 ± 2.4 days in a study by Enami Y[15] et al.

The rampant factor responsible for operative difficulty in obese patients during laparoscopic cholecystectomy was problematic calot's triangle dissection due to excessive fat (78.83%) in this region. Because of obesity, calot`s triangle was cushioned in adipose tissue (Figure 1). Hemorrhage from blood vessels inside the peri-viceral fat had also made dissection troublesome. Similar to our study, difficulty in dissecting the Calot's triangle was frequently noted i.e. 20%, in a prospective study by Awad ET[12] et al. In our study, we found umbilical access difficult due to abdominal wall fat in 51.32% patients, however Awad ET[12] et al, reported difficulty in abdominal cavity access only in 5% patients. The main reason was excessive pre-peritoneal fat, rather excessive subcutaneous fat. Chasing the stalk of umbilicus facilitated us to land on rectus sheath and by this way, the issue of excessive subcutaneous fat was dealt well, in our study. Later, pre-peritoneal fat and peritoneum were stabbed at the base of umbilicus. Ample amount of pre-peritoneal fat kept peritoneum out of the reach of being punctured.

In our study, insufficient gall bladder retraction due to large liver were observed in 38.62% patients. Huge liver didn't give enough space to work beneath it and fear of gall bladder rupture was also linked to forceful retraction of gall bladder against massive liver. Visceral hindrance by bulky omentum and gut, in getting adequate calot's triangle exposure, was seen in 67.72% patients in our study. Size of omentum is usually directly proportional to the obesity. Obese abdomen accommodates great greater omentum. Gall bladder perforation was reported in 3.70% patients in our study, however higher rate of perforation i.e. 14% and 16.1%, was reported by Awad ET[12] et al and Nassar AH[13] et al, respectively. Forceful gall bladder retraction, to get adequate exposure of calot`s triangle during dissection, had perforated gall bladder at two sites i.e. fundus and at the neck of gall bladder. Troublesome gall bladder bed dissection was encountered in 19.57% patients in our study, however Awad ET[12] et al, reported difficult gall bladder bed dissection only in 12% patients. The colossal liver sheltering the gall bladder was the reason of it. Intra-operative hemorrhage was encountered in 33.86% patients in our study. The blood vessels present in the fat of calot`s triangle was the source of this hemorrhage. However, a lower rate of hemorrhage i.e. 9.3% and 2.0%, was reported in studies by Abdulla MA[7] et al and Awad ET[12] et al, respectively. Biliary injury was not observed in any (0.00%) patient in our study because only uncomplicated gall balder diseases were included in present study and triangle of safety was achieved in all cases. Difficulty in port closure was faced in 62.96% patients in the present study. The main cause was that we didn't have port closure device and needle. Mortality was not observed in any (0.0%) patient in our study.

In the present study, problematic calot's triangle dissection due to excessive fat was found the prevalent operative difficulty in obese patients while performing laparoscopic cholecystectomy. Inadequate gall bladder retraction, hemorrhage and visceral hindrance were the factors responsible for more time consumption to achieve triangle of safety. However, port insertion and port site closure were also included in those factors that prolong operative time. Visiport for port insertion, omental retractor, harmonic scalpel for calot`s fat dissection and port closure device can be helpful in reducing operative time of laparoscopic cholecystectomy in obese patients.

Single center, THQ hospital and single surgeon were the limitation of this study.

CONCLUSION

From the present study, it is concluded that the problematic calot`s triangle dissection, intra-abdominal access and port site closure due to excessive fat are the major factors that cause operative difficulty during laparoscopic cholecystectomy in obese patients.

ETHICAL APPROVAL

Ethical approval of synopsis was granted by the Review Board Biomedical/Clinical/Social/Behavioral of Indus Hospital & Health Network Institutional IRB No. IHHN_IRB_2023_11_006 Dated 03 November, 2023.

CONFLICT OF INTEREST
Authors declare no conflict of interest.

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AUTHOR'S CONTRIBUTIONS
SDM: Manuscript writing, data collection, literature review, statistical analysis and topic selection
MSF: Literature review
NS: Literature review
MRS: Data collection
All Authors: Approval of the final version of the manuscript to be published

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