

Original Article

Intra and Postoperative Complications of laparoscopic Surgery and their Management in General Surgical Practice in a Tertiary Hospital

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International License](https://creativecommons.org/licenses/by/4.0/).**ABSTRACT**

Introduction: Any new technique is associated with the development of new complication. The evolution of laparoscopy from a diagnostic tool to a modality for major surgical procedures has been rapid and represents one of the most important surgical advancements in the past 30 years, owing to many advantages for patients in terms of smaller scar, less post operative pain and quicker recovery. Despite the relative safety of laparoscopic techniques, inadvertent serious injuries to bowel, bladder and vascular structures do occur. Therefore, the need has arisen to study the various complications and their management inherent in this technique. The objective was to determine percentage of complications in laparoscopic surgeries of abdomen and also to study their management. **Methods:** This retrospective observational study was carried out Inpatients of Jalalabad Ragib

Rabeya Medical College hospitals undergoing abdominal laparoscopic surgeries from January 2020 to December 2020 who are above 16 years of age. Total 179 patients who undergoing elective or emergency surgeries or diagnostic laparoscopy for acute/Recurrent appendicitis, Gallbladder diseases, hernia repair and Others were selected from different surgical units of this hospital. Demographic information, clinical findings, intra operative and postoperative findings will be noted. Follow up of the patient is done for 4-6 weeks. **Result:** Out of the 179, 45(25.14%) were male patients and 134 (74.86%) were female patients, age group ranging between 16-80 years. 25 patients (31.65%) showed Gallbladder Perforation, twelve (15.19%) showed bile leak. 1 patient (1.88%) had laparoscopy converted into open procedure due to the intraoperative complications. Statistically significant impact was noted on the outcome of surgery due the complication that patient underwent during the study. **Conclusion:** Laparoscopy is a safe, effective and well tolerated procedure if conducted in the skilled and experienced hands. The morbidity and mortality are dependent on age, general condition, presence/ absence of comorbidities and hence preoperative thorough work up is imperative. Large proportions of these complications

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occur during the initial learning curve of the inexperienced laparoscopic surgeon.

Keywords: Laparoscopic surgery, Complication, Management

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INTRODUCTION

Over the last 20 years, laparoscopic surgery has changed the area of surgery due to several benefits for patients such as smaller scars, reduced post-operative discomfort, and faster recovery. George Kelling conducted the first laparoscopy in 1901, inserting a cystoscope into the abdominal cavity of a dog. Semm performed the first laparoscopic appendectomy in 1980 and world's first laparoscopic cholecystectomy was done by Erich Muhe (1985). This ended the era of "big surgeon-big incision" [1]. Laparoscopic surgery has many advantages but it is not without complications. The intricacy of the procedure has a considerable impact on the complication rate. Laparoscopic surgeons should be aware of the potential problems and how they may be avoided, identified quickly, and handled safely and effectively. Injuries to the arteries, bowel, and urinary tract are all serious problems. When a trocar 10 mm is utilized at the extraumbilical location, incisional hernia should be minimized by carefully closing the fascia. A gas embolism is an uncommon but possibly fatal consequence. Shoulder soreness is a small but common consequence; it is less likely to develop if as much gas as possible is released at the conclusion of the surgery while the patient is still in the head down Trendelenburg position. Pneumothorax, subcutaneous and preperitoneal emphysema, cardiac arrhythmia, nerve damage, and venous thrombosis are all rare consequences. Laparoscopic surgeons should also understand the principles of electrosurgery and how to avoid complications arising from the use of electrical energy including capacitive coupling, direct coupling and insulation

failure [2]. Hence, traditionally performed open surgery has been widely replaced by laparoscopy, with advantages being quicker recovery, decreased length of hospital stay, decreased pain and improved cosmesis [1]. The problems encountered during laparoscopy include:

- Pneumoperitoneum related problems
- Anesthesia related problems
- Procedure related problems

OBJECTIVE

- To evaluate the complications of Abdominal laparoscopic Surgeries, including early recognition, management and prevention, are reviewed.

METHODS

This retrospective observational study was conducted at the In-Patient Department of Jalalabad Ragib-Rabeya Medical College and Hospitals, Bangladesh. The study duration was 1 year, from January 2020 to December 2020. A total of 179 participants were selected from those undergoing abdominal laparoscopic surgeries in the study hospital. Demographic information, clinical manifestations, physical examination findings, intra and post-operative findings were tabulated. Follow up of patients after 4-6 weeks by in-person was done.

Inclusion criteria

- Patients >15 years
- All elective and emergency cases of acute appendicitis, Gallbladder

Diseases, umbilical and inguinal hernia repair and others

- Cases undergoing diagnostic laparoscopy
- Laparoscopic gynecology procedures

RESULT

This retrospective observational study was conducted in the Department of Surgery, Jalalabad Ragib Rabeya Medical College Hospital, Sylhet, Bangladesh, during the year January 2020-December 2020. Data obtained was tabulated and analyzed as Tables 1-4. Out of 179 samples, 45 (25.14%) were males and 134(74.86%) were females. The samples which met inclusion criteria are as described in Table-1 Acute appendicitis (n=15) and recurrent (n=4) appendicitis, cholelithiasis (n=71), chronic calculous cholecystitis (n=45), acute calculous cholecystitis (n=21), acute gangrenous gallbladder (n=4), empyema gallbladder (n=1) and hernia (n=1), diagnostic laparoscopy (n=6), and others (n=14). Cholelithiasis formed the bulk of present study accounting for 39.66%. Closed method of creation of pneumoperitoneum was performed in 137 cases (76.53%) and open method in

(23.46%) patients (Table-4). Most common procedure underwent by patients during this study (Table-2) was laparoscopic cholecystectomy, n=142 (79.32%), followed by laparoscopic appendectomy in 19 cases (10.61%). A total of 03 patients were converted to open surgery (1.68%). Intraoperative complications were seen in 79 patients (18.75 %) which included (Table 5): port site bleeding noted in 01(1.79%) cases, cystic artery injury in 3(2.11%) cases, spillage of stones into peritoneal cavity 12(8.45%), surgical site infection 15(8.38%), and Seroma 5(2.79%) Statistical significance noted with complications like bleeding (5.9%), Bile leak (12%), bowel injury (00%) and infection (10%) with a p value of <0.001 with respect to the outcome which led to laparoscopic conversion to open procedure. The Figure 4 depicts average length of stay, which most commonly ranged between 3-5 days.

Table 1: Sex distribution of patients studied (n=179)

Sl.No.	Sex	No. of cases (% age)
	Male	45 25.14%
	Female	134 74.86%

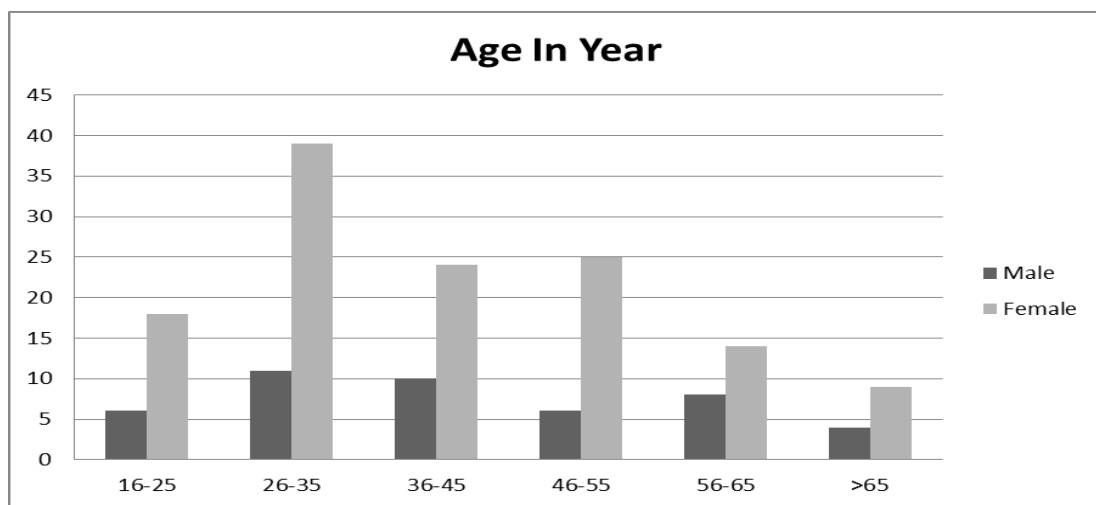


Figure 1: Age-Sex Distribution of Patients Studied (n=179)

Table 2: Operative procedures

Name of Operations	Male	Female	16-25	26-35	36-45	46-55	56-65	>65
Laparoscopic cholecystectomy	30	112	10	47	29	25	19	11
Laparoscopic appendicectomy	06	13	09	05	01	03	00	01
Diagnostic laparoscopy	02	04	04	01	00	00	01	00
Laparoscopic Choledocholithotomy	00	02	00	02	00	00	00	00
Laparoscopic Assisted Right Haemicolectomy	02	00	00	00	00	01	01	00
Laparoscopic Assisted Sigmoid Colectomy	01	00	00	00	01	00	00	00
Laparoscopic Assisted Hartman's Procedure	01	00	00	00	00	01	00	00
Laparoscopic Intraabdominal Abscess Drain	01	00	00	00	00	00	01	00
Laparoscopic Truncal Vagotomy With Gastrojejunostomy	01	00	00	00	01	00	00	00
Laparoscopic Reduction of Jejunojejunal Intussusception and Resection and anastomosis	00	01	00	00	01	00	00	00
Laparoscopic IPOM Plus	00	01	00	00	01	00	00	00
Laparoscopy into open cholecystectomy	01	01	00	00	00	01	00	01
Laparoscopy into open appendicectomy	01	00	01	00	00	00	00	00
Total	45	134	24	54	34	31	22	13

Table 3: Complications of patients studied

Complications	N (%)
Port Site Bleeding	01
Cystic Artery Bleeding	03

Bleeding From Liver Bed	05
Gallbladder Perforation	15
CBD injury	00
Bile Leak	12
Bowel injury	00
Spillage of stones	12
SSI	10
Port Site Hernia	00
Seroma	05
Total	63

Table 4: Method of pneumoperitoneum.

Method of Pneumoperitoneum	Gender		Total
	Male	Female	
Closed	32(71.11%)	105(77.2%)	137(76.53%)
Open	13(28.89%)	29(21.32%)	42(23.46%)
Total	45	136	179

DISCUSSION

A total of 179 patients were included in the study of which 45 were male and 134 females from 16-80 years. 19 patients underwent laparoscopic appendicectomy, 142 laparoscopic cholecystectomy, 6 diagnostic laparoscopy, 2 Laparoscopic Choledocholithotomy, Laparoscopic assisted right haemicolectomy, 1 laparoscopic Intraabdominal abscess drain, 1 Laparoscopic assisted Sigmoid colectomy, 1 laparoscopic hernia repair, 1 Laparoscopic assisted Hartman's procedure, and 1 laparoscopic reduction of jejunojejunal Intussusception followed by resection and anastomosis. Pneumoperitoneum was established by the open method in 35 patients and by closed method in the remaining 144. Intraoperative complications were noted in 58 patients (%) and are as follow: Port site bleeding- 01, Cystic artery injury- 03, Gallbladder Perforation-15, Bile Leak-12, Spillage of stones into peritoneal cavity- 12, Surgical site infection- 10, Seroma- 5. The following instances led to conversion to open procedure: Two

patients had Cystic Artery injury with bleeding despite using clips and cautery resulting in abandoned laparoscopy and difficult to define anatomy of Calot's triangle. One patient abandoned laparoscopy appendicetomy due to gross adhesion and difficult to define anatomy. In present study, 1 patients had port site bleeding which is controlled by U-stitches can be placed into the abdominal wall under direct laparoscopic visualization using a suture passer with absorbable braided sutures. A study conducted by Boswell WC et al, showed that abdominal wall haemorrhage occurs in 0.05-2.5% of cases and mostly manifests as oozing externally around an operating port or dripping along the shaft of the cannula into the peritoneal cavity¹. In their study, they also concluded that the source of bleeding is usually the inferior epigastric artery or one of its branches. A variety of procedures can be used to limit abdominal wall hemorrhage, such as applying direct pressure through the operating port, laparoscopic suture, or tamponade with a Foley's catheter put into the peritoneal cavity. Typically,

bleeding from trocar sites is managed by providing upward and lateral pressure with the trocar itself. If significant continuous bleeding from the falciform ligament occurs, haemostasis is achieved by percutaneously inserting a large, straight needle at one side of the ligament. A monofilament suture attached to the needle is passed into the abdominal cavity and the needle is exited at the other side of the ligament using a grasper. The loop is suspended and compression is achieved. Maintaining compression throughout the procedure usually suffices. After the procedure has been completed, the loop is removed under direct laparoscopic visualisation to ensure complete haemostasis. The author favours direct suturing of the bleeding vessel. This manoeuvre is accomplished by extending the skin incision by 3 mm at both ends of the bleeding trocar site wound. Two figure-of-eight sutures are placed in the path of the vessel at both ends of the wound. Rastogi V et al, presented their experience with 20 patients of port site bleeding by plugging the port site hole with surgiseal for controlling port site bleeding⁴. The vessel can be approached through another port and coagulated with bipolar cautery⁵. The trocar may be removed and through-and-through sutures placed cranially and caudally to ligate the bleeding vessel⁶. In our study, it was found that most frequently observed peroperative complication was bile leak and the incidence rates of perforation of gallbladder, vascular, hepatic bed hemorrhage were 9.3%, 4.7% and 4.0% respectively. Conversion to open procedure was done in approximately 9.9% cases. In the recent literature, complications associated with LC included massive hemorrhage (0.3-1%), bile duct injury (0.13%), duodenal injury (0.13%), colon injury (0.06%), and 9.8% patients needed conversion to open procedure [7]. Similarly, in a

retrospective analysis of 10-year records, successful LC was performed in 94% patients, the postoperative morbidity rate was 1.5%, and conversion to open laparotomy occurred in 3.5% patients⁸. In another Saudi study, the rate of complications associated with LC was 7.5% with hemorrhage (35%) and infection (22.5%) being the most common⁹. In present study two patients had spillage of gall stones into the peritoneal cavity during dissection. Stones were extracted through the ports using a laparoscopic bowel grasper. Peritoneal wash was given with saline and drain was placed in the subhepatic place. In a study conducted by David C et al, concluded that intraperitoneal spillage of gallbladder contents during laparoscopic cholecystectomy is associated with an increased risk of intraabdominal abscess.⁷ Attempt should be made to irrigate the operative field to evacuate spilled bile and to retrieve all gall stones spilled during the operative procedure. In yet another study conducted by Irkorucu O et al concluded in their study saying that stones left in the abdominal cavity or trapped in trocar sites after laparoscopic cholecystectomy can cause serious late complications requiring repeated surgical interventions.⁸ Every effort should be made to minimize stone leakage during gall bladder and cystic duct dissection and gall bladder extraction via the abdominal wall. In another study by Hashimoto et al, reported three patients with intra-abdominal abscesses developed as a result of dropped stones during laparoscopic cholecystectomy [9]. Author also had one patient who developed a bleeding during adhesiolysis while doing laparoscopic appendectomy. The procedure was converted to an open procedure and Ligation of bleeding point was done.

Limitations of The Study

The study was conducted in a single hospital with small sample size. So, the results may not represent the whole community.

Ethical approval: The study was approved by the Institutional Ethics Committee

Funding: No funding sources

Conflict of interest: None declared

CONCLUSION

Laparoscopy is a safe, effective and well tolerated procedure if conducted in the hands of a skilled and experienced operator. The reported mortality varies from 0-0.3%. The mortality and morbidity depend on general condition of the patient, age, associated comorbidities and history of previous surgeries. The common complications are trivial in nature, but a few are life threatening. Large proportion of these complications occurs during the initial learning curve of the inexperienced surgeon. The reported intra operative complications of laparoscopic surgeries based on several long-term trials are about 4-5%. However, in present study, the intra operative complication rate was found to be 21.32% This could be attributed to the fact that Jalalabad Ragib Rabeya Medical Collage hospital is a tertiary care centre, more patients with more risk factors and more complicated cases are likely to come here and hence the higher intra operative complication rate as compared to the ones presented in the literature which is due to this confounding bias. Most of the complications (n=71) were seen during laparoscopic cholecystectomies. Also, as the learning curve of the operating surgeon reaches a stable phase, the complication rate will also decline. Proper detection and control of comorbid conditions, through investigation of the patient pre-

operatively, are some of the measures recommended to decrease the chance of intra-operative complications.

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