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A Comparative Study of Laparoscopic Versus Open Cholecystectomy: A Teaching Hospital Based Study

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Abstract

Background: Gallstone (GS) disease is a major health problem worldwide particularly in the adult population. Gallstones are a common occurrence in northern India. Prevalence of gallstone ranges from 10 to 20% in India.2 It affects nearly 4.3% of the population. **Subjects and Methods:** 76 Patients of cholelithiasis aged between 16 years to 65 years operated during the period from July 2016 to December 2017. They were divided into open and laparoscopic Cholecystectomy group. The patients were studied with respect to their clinical presentation and were categorized as patients with asymptomatic Gall stones, acute calculus cholecystitis and chronic calculus cholecystitis. **Results:** In open cholecystectomy group 45% were males and 55% females. In laparoscopic cholecystectomy group 36% were males and 64% females. The age range was from 16-65 year in both the groups. The mean age was 36.29±14.60 years for group open cholecystectomy and 34.47±11.20 years for group laparoscopic cholecystectomy. Symptoms of patients in both the groups were almost same. The mean operation time for Laparoscopic cholecystectomy was significantly longer than for Open cholecystectomy. **Conclusion:** The laparoscopic cholecystectomy is a safe and effective treatment of complicated gallstone disease. Laparoscopic cholecystectomy is better than open cholecystectomy in terms of post-operative pain, analgesic requirement and early return to work.

Keywords: Laparoscopic chlolecystectomy, Open cholecystectomy and Gallstone.

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Introduction

Gallstone disease is a major health problem worldwide particularly in the adult population.[1] Prevalence of gallstone ranges from 10 to 20% in India.[2] It affects nearly 4.3% of the population.[3] Earlier open cholecystectomy was the gold standard for treatment of stones in the gall bladder. Most studies now suggest that laparoscopic cholecystectomy is the standard surgery for symptomatic gall stone disease. It has improved patient satisfaction in terms of early post-operative pain relief, need for post-operative analgesia, hospital stay, total cost and return to normal activity when compared to open cholecystectomy.[4] Cholecystectomy is one of the most common operations carried out in general surgery.[5] Traditional open cholecystectomy was performed for the first time in 1882 by Carl August Langerbach.[5,6] Open cholecystectomy has been accepted as gold standard treatment of gallstones.[7] The change came after 100 years, when in 1987 Professor Mouret from France started with a new operative method of laparoscopic cholecystectomy.[5,8] Laparoscopic cholecystectomy has revolutionized the treatment of gallstone disease and has almost replaced open cholecystectomy.[9] Since then it became an established procedure due to short hospitalization period, rapid return to normal activity, less post-operative pain, more acceptable cosmetic results and lesser morbidity and mortality rates which are the principle advantages of this technique.[8,10] With this knowledge of advantages and disadvantages of laparoscopic cholecystectomy and open chlolecystectomy in symptomatic cholelithiasis, further studies are necessary to provide conclusion as to which method is safer, cost effective and provides better patient satisfaction. The aim of this study was to compare the outcome of the laparoscopic and open cholecystectomy in patients with complicated gallstone disease.

Subjects and Methods

This present study was conducted in the Department of Surgery, Varun Arjun Medical College & Rohilkhand Hospital, Banthra, Shahjahanpur, Uttar Pradesh, India. A total of 76 Patients of cholelithiasis aged between 16 years to 65 years operated during the period from July 2016 to December 2017. They were divided into open and laparoscopic Cholecystectomy group by drawing a lottery. Patient's written valid informed consent for the particular procedure was taken and the advantages and disadvantages of both the operative procedure were explained in detail to the patients. Patients between 16 years to 65 years with

acute cholecystitis chronic cholecystitis and gall stones without pain abdomen including those with diabetes were included in the study. Patient's written valid informed consent for the particular procedure was taken. Patients less than 16 years and more than 65 years or those with Gall bladder cancer and Choledocholithiasis were excluded. This study involved evaluation of patients in the preoperative phase, intraoperative procedure and post-operative management and follow for 6 months. All the patients were studied with reference to duration of surgery, post-operative analgesic, and post-operative hospitalization, intra operative and post-operative complications. Patients were admitted a day prior to surgery in case of elective cholecystectomy from OPD. Some patients were admitted from Casualty ward of hospital as they had presented with acute abdomen. These patients were investigated for the same. Investigations performed in these patients include Complete Blood Count, Blood sugar level, Urine examination, Liver function test, Kidney Function test, Chest x-ray, ECG and Ultrasonography of abdomen. The patients were studied with respect to their clinical presentation and were categorized as patients with asymptomatic Gall stones, acute calculus cholecystitis and chronic calculus cholecystitis. After complete investigations and after satisfying the inclusion and exclusion criteria for this study patients were subjected to either open or laparoscopic cholecystectomy depending upon allocation based on lottery. First dose of antibiotics administered to the patient just prior to incision, immediately after intubation. Nasogastric tube is inserted routinely irrespective of the nature of operation. General anesthesia was administered to all the patients. Foleys Catheterization and Ryle's tube insertion was done in all patients. Post-operative management included nil by mouth till morning after surgery. Intravenous fluids in the form of crystalloids, Broad spectrum antibiotics (Inj ceftriaxone). Injection amikacin and Injection Metronidazole were added in cases of bile leak. Analgesics in the form of Injection Diclofenac were given. Top-up analgesia in the form of intramuscular Injection Tramadol was given, whenever it was required. Patients were discharged after tolerating of oral diet and without any signs of postoperative wound infection at first dressing change. If sign of wound infection were present then pus from wound was taken and sent for microbiological culture and sensitivity testing. Appropriate antibiotics started after reports and wound care taken accordingly. Follow up in OPD for stitch removal after 7 days, if operative wound is healthy. All laparoscopic cholecystectomy converted to open cholecystectomy were considered as laparoscopic cholecystectomy for evaluation of data. The data was analyzed on SPSS software.

Results & Discussion

In this study 76 patients with complicated gallstone disease were divided into two groups. In open cholecystectomy group 45% were males and 55% females. In laparoscopic cholecystectomy group 36% were males and 64% females. The age range was from 16-65 year in both the groups. The mean age was 36.29±14.60 years for group open cholecystectomy and 34.47±11.20 years for group laparoscopic cholecystectomy. Symptoms of patients in both the groups were almost same. The mean operation time for Laparoscopic cholecystectomy was significantly longer than for Open cholecystectomy.

Table 1: Operating Time (Minutes).

Nature of operation	Operation time	Mean Operation time
Laparoscopic cholecystectomy	52-165 min	102 min
Open cholecystectomy	40-94 min	72 min

[Table 1] shows the median (range) operation time for laparoscopic cholecystectomy was 52-165 min (mean=102 min) and 40-94 min (mean=72 min) for open cholecystectomy ($p<0.01$). [Table 2] shows that the duration of post-operative pain and analgesia required were significantly less in laparoscopic cholecystectomy group than open cholecystectomy group.

Table 2: Pain duration for both open and Laparoscopic cholecystectomy operation

Nature of opseration	Pain duration in days	Mean (Pain duration in days)
Laparoscopic cholecystectomy	1-4 days	1.6 days
Open cholecystectomy	2-8 days	3.6 days

The mean post-operative hospital stay was 2.8 days after laparoscopic cholecystectomy and 4.9 days after open cholecystectomy. Therefore, Open cholecystectomy group had significantly less hospital stay than laparoscopic cholecystectomy group ($p<0.01$).

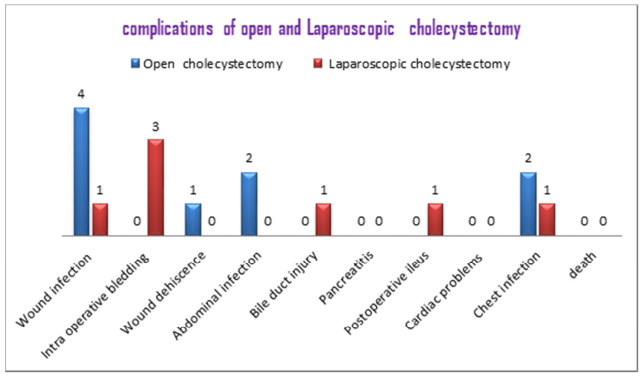

Figure 1: Shows the complications of open and Laparoscopic cholecystectomy

Conversion of laparoscopic to open cholecystectomy occurred in (5) of the thirty eight (38) patients i.e. 15.8% of initially scheduled to undergo laparoscopic

cholecystectomy. One cases of laparoscopic cholecystectomy were converted to open surgery due to common bile duct injury and three due to intra operative hemorrhage, and one due inadequate visualization of Calots triangle. Rest of the laparoscopic cholecystectomies was uneventful. In open cholecystectomy group largest number of complications were due to wound infections (n=4) which significantly higher as compared with laparoscopic cholecystectomy (n=01). Postoperative ileus was present in 3 patients of open cholecystectomy group necessitated the need for continuation of nasogastric decompression. Two patient from open group developed chest infection post operatively [Figure 1].

Gallstone disease is a major problem worldwide particularly in adult population. Its incidence shows a considerable geographical and regional variation.[11] The morbidity and mortality associated with cholecystectomy has decreased to an extremely low level in the past few decades.[12] In the modern era of surgery, very few operations have revolutionized the thought process and operating technique of surgeons as swiftly and in such major way as laparoscopic cholecystectomy. This technique of small incision for cholecystectomy has shown good result in terms of reducing pain and morbidity and paved the way for use of minimal access surgery.[13,14] Conversion rates in laparoscopic cholecystectomy ranges from 3% to 15%. In our series conversion rate is 15.8%; only 1 cases were converted to open because of common bile duct injury and 3 due to intraoperative hemorrhage and one due inadequate visualization of Calots triangle. The frequency of bile duct injury is 0.0% to 0.1% for open cholecystectomy and 0.2% to 0.5% for laparoscopic cholecystectomy. Two most common reasons for conversion are dense upper abdominal adhesions or necrotic gall bladder wall that precludes grasping and elevation with grasper. Common risk factors for conversion are male gender, obesity, acute cholecystitis (especially after 72 to 96 hours after onset of symptoms) and choledocholithiasis. Most conversions happen after a simple inspection or a minimum dissection, and the decision to convert should be considered as a sign of surgical maturity rather than a failure. It is vital for the surgeons and patients to appreciate that the decision to go for conversion is not failure but rather implies safe approach and sound surgical judgment. It is therefore mandatory to explain the patients about possibility of conversion to open technique at the time of taking consent for laparoscopic cholecystectomy.[15,16] In this present study duration of operative time for laparoscopic cholecystectomy is considerably longer than duration of open cholecystectomy and the indications for analgesia in both procedures were different. Whereas in open cholecystectomy group this was due to wound pain, the patients in the laparoscopic group required post-operative analgesia for relief of shoulder tip pain secondary to diaphragmatic irritation due to CO2 insufflation.[17,18] The wound infection rate is more in and the hospital stay is longer in open cholecystectomy as compared to laparoscopic cholecystectomy. The findings in the present study showed that in a strictly controlled sampling frame, laparoscopic cholecystectomy is a viable, less complicated, more effective and more satisfactory procedure that shortens the hospital stay and assures early return to work. However, the usefulness of laparoscopic surgery in a variable profile of patients needs to be evaluated further.

Conclusion

In conclusion, the laparoscopic cholecystectomy is a safe and effective treatment of complicated gallstone disease. Laparoscopic cholecystectomy is better than open cholecystectomy in terms of post-operative pain, analgesic requirement and early return to work. With low threshold of conversion it has significant advantages over open cholecystectomy with earlier mobilization, minimum hospitalization and fast recovery towards normal life without increasing mortality and morbidity.

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