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A Comparative Study of Laparoscopic vs. Open Cholecystectomy in a Northwestern Medical School of Bihar

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Abstract

Introduction: *Gallstones are common in Indian population and its treatment has shown a decisive shift from open to minimally invasive route. Undoubtedly, laparoscopy requires longer and steeper learning curve and incurs higher cost. However, preferences of patients are changing rapidly due to better level of awareness and availability of healthcare facility.*

Aims: *To compare laparoscopic Cholecystectomy vs. open Cholecystectomy in patients of cholelithiasis by measuring parameters such as use of Post-operative analgesia, Operative Time, Post-operative hospital stay, morbidity and mortality.*

Material and Method: *It is a prospective randomized study of 300 Patients of cholelithiasis aged between 20 years to 70 years operated during 2013-2016 at Government Medical College, Bettiah & associated MJK hospital. They were divided into open and laparoscopic Cholecystectomy groups 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.*

Results: *The median (range) operation time for laparoscopic cholecystectomy was 55-170 min (mean=105 min) and 38-92 min (mean=70 min) for open cholecystectomy ($p<0.001$). The use of parenteral analgesics in case of laparoscopic cholecystectomy (Mean no. of days=1.7) is considerably less than open cholecystectomy (Mean no. of days=3.7). Conversion rate in literature in laparoscopic cholecystectomy ranges from 3% to 15% in well trained hands. In our series it was 8 %.*

Conclusion: *Laparoscopic cholecystectomy is better than open cholecystectomy in terms of post-operative pain, analgesic requirement and early return to work. However, open cholecystectomy is preferable for Surgeons in training and in cases of complicated cholecystectomy.*

Keywords: *Cholelithiasis; Cholecystitis; Minimally invasive surgery; Laparoscopic cholecystectomy; Open cholecystectomy; Bile duct injury.*

Introduction

Gallstones (GS) are a common occurrence in the Indo-Gangetic belt. However, this trend is now showing pan India presence probably because of migration and mixing of cultures. As many as 16% and 29% of women above the age of 40-49 years and 50-59 years, respectively, had gall stones [1]. For every patient with symptomatic gallstones there are many more with asymptomatic gallstones. Various studies suggest that most of the gallstones are asymptomatic. In a study of 9,332 post-mortem reports performed over 10 years, only 14% of those with GS had undergone cholecystectomy, indicating that up to 86% were asymptomatic. Karl langenbuch in 1882 quoted. "The gallbladder should be removed, not because it contains stones, but because it forms them"[2,3]. Many alternative methods for treatment of gallstones have been developed but none have been satisfactory. Open cholecystectomy has been the gold standard surgical treatment of cholelithiasis. With the advent of laparoscopic cholecystectomy the surgical management of cholelithiasis has undergone a dramatic change. Theoretical benefits of laparoscopic approach included decreased hospital stay and cost, decreased pain, avoidance of large incision with improved cosmetic result and reduced post-operative recovery time with an early return to work. Although it showed early promising results, recent trials show an increase in the incidence of operative complications, especially common bile duct injury [4]. The limitations of minimally invasive technique include expensive instruments, specialized training and long learning curve. This has led to a lot of debate and numerous works comparing the merits and demerits of laparoscopic vis-à-vis open cholecystectomy. Minimal access surgery has touched every field of surgical specialty [5]. The non-operative methods for the treatment of cholelithiasis in the form oral bile acid (Chenodexycholic acid and Ursodexycholic acid) and Extracorporeal Shock Wave Lithotripsy (ESWL) have not shown promising results [6-8].

Aims and Objective

To compare laparoscopic Cholecystectomy vs. open Cholecystectomy in patients of cholelithiasis by measuring parameters such as use of Post-operative analgesia, Operative Time, Post-operative hospital stay, morbidity and mortality.

Materials and Methods

This study is prospective randomized study of 300 Patients of cholelithiasis aged between 20 years to 70 years operated during 2013-2016 at Government Medical College, Bettiah & associated MJK hospital. 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 20 years to 70 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 20 years and more than 70 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 Ultrasono-graphy 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 our 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.

Results

Out of 300 patients included in the study 208 patients were diagnosed on Ultrasonography for vague abdominal symptoms, like epigastric fullness and early satiety. 50 Patients had presented with features suggestive of acute cholecystitis and 42 had already been diagnosed earlier and had few episodes of acute cholecystitis in the past.

The mean operation time for Laparoscopic cholecystectomy was significantly longer than for Open cholecystectomy. The median (range) operation time for laparoscopic cholecystectomy was 55-170 min (mean=105 min) and 38-92 min (mean=70 min) for open cholecystectomy ($p<0.001$). (Table 1).

Table 1: Operating time (in minutes).

Nature of operation	operation time (Min)	Mean operation time (Min)
Laparoscopic cholecystectomy	55-170 min	105 min
Open cholecystectomy	38-92 min	70 min

It was seen that duration of post-operative pain and analgesia required were significantly less in laparoscopic cholecystectomy group than open cholecystectomy group (Table 2)

Table 2: Pain duration for both open and laparoscopic cholecystectomy groups are as follows

Nature of operation	pain duration in days	Pain duration in days (mean)
Laparoscopic cholecystectomy	1-4 days	1.7 days
Open cholecystectomy	2-8 days	3.7 days

The mean post-operative hospital stay was 2.7 days after laparoscopic cholecystectomy and 4.4 days after open cholecystectomy. Therefore, Open cholecystectomy group had significantly less hospital stay than laparoscopic cholecystectomy group ($p<0.001$)

Conversion of laparoscopic to open cholecystectomy occurred in (11) of the one hundred forty (140) patients i.e. 8% of initially scheduled to undergo laparoscopic cholecystectomy. Two cases of laparoscopic cholecystectomy were converted to open surgery due to common bile duct injury and five due to intra operative hemorrhage, and four 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=7) which significantly higher as compared with laparoscopic cholecystectomy (n= 02). Postoperative ileus was present in 5 patients of open cholecystectomy group necessitated the need for continuation of nasogastric decompression. Four patient from open group

developed chest infection post operatively (Table 3)

Table 3: Complications of open and laparoscopic surgery.

Complications	Open cholecystectomy	Laparoscopic cholecystectomy
Wound infection	7	2 (Difficult laparoscopic cholecystectomy cases).
Intra operative bleeding	0	5
Wound dehiscence	1	0
Abdominal infection	2	0
Bile duct injury	0	2
Pancreatitis	0	0
Postoperative ileus	5	3
Chest infection	4	1
Cardiac problems	0	0
Death	0	0

Discussion

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 [9,10]. Conversion rates in laparoscopic cholecystectomy ranges from 3% to 15%. In our series conversion rate is 8%; only 2 cases were converted to open because of common bile duct injury and 5 due to intraoperative hemorrhage. The frequency of bile duct injury is 0.1% to 0.2% for open cholecystectomy and 0.3% to 0.6% 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 [24,25].

In our 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 [26,27]. The wound infection rate is more in and the hospital stay is longer in open cholecystectomy as compared to laparoscopic cholecystectomy.

Conclusion

Numerous works comparing laparoscopic cholecystectomy and open cholecystectomy with results favoring of laparoscopic cholecystectomy have been published. Laparoscopic cholecystectomy is better than open cholecystectomy in terms of post-operative pain, analgesic requirement and early return to work.

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