

# Comparison of Rectus Sparing Mini Cholecystectomy vs Laparoscopic Cholecystectomy in Patients: A Prospective Cohort Study

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## ABSTRACT

**OBJECTIVE:** To evaluate the validity of rectus sparing mini-cholecystectomy (MC) as an alternative to laparoscopic cholecystectomy.

**STUDY DESIGN:** A prospective cohort study.

**PLACE AND DURATION:** From 1<sup>st</sup> Jan 2010 to 31<sup>st</sup> Dec 2012 in Surgical Unit III, at Fauji Foundation Hospital Rawalpindi.

**METHODOLOGY:** A total of 100 patients both males and females were incorporated in this study. Patients having symptomatic gall stones diagnosed on ultrasound were divided into two groups i.e. 50 patients in group I were subjected to laparoscopic cholecystectomy while the remaining 50 patients in group II underwent rectus sparing mini-cholecystectomy at random. Variables like age, sex, perop/postop hemorrhage, biliary injury / bile leakage, post-operative pain, hospital stay, wound infection and outcome were evaluated for both procedures. Also the cost per patient in both groups was compared.

**RESULTS:** In laparoscopic cholecystectomy group 44% participants were discharged on 1<sup>st</sup> postoperative day and 56% patients were discharged on 2<sup>nd</sup> postoperative day while in rectus sparing mini cholecystectomy group 42% patients were discharged on 1<sup>st</sup> postoperative day and 58% were discharged on 2<sup>nd</sup> postoperative day. Superficial surgical site infection ensued in almost 2% of the patients that has gone through Laparoscopic Cholecystectomy and 4% in those patients who underwent Rectus Sparing Mini Cholecystectomy patients. Moreover, In Laparoscopic Cholecystectomy group 94% and in Rectus Sparing Mini Cholecystectomy group 90% patients were satisfied with postoperative pain management.

**CONCLUSION:** The rectus sparing mini-cholecystectomy is better and safe alternative to laparoscopic cholecystectomy if the laparoscopic surgery facilities are not available or it is contraindicated due to any reason.

**KEYWORDS:** Rectus sparing mini-cholecystectomy, laparoscopic cholecystectomy, cholelithiasis.

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## INTRODUCTION

Whether we care or not, we have entered an era of minimally invasive surgery which like spring's rain has infiltrated into all fields of surgery. Scientists and Medical professionals from all around the world feel that we have entered a new era and they feel that the boundaries of general surgery are becoming increasingly blurred. It is a "Now or Never" situation, where young surgeons are gearing up and filled with passion to fill the gaps in this transition period. Emil Theodor Kocher (1841-1917), a Swiss foreign scientist and surgeon was the leading surgeon to be conferred with a Nobel Prize in 1909 in Physiology<sup>1</sup>. His

eventual aim was to ease the gall bladder surgery in all applied ways particularly by initiating subcostal incision methodology.

"To cut is to cure," "The greater the surgeon, the bigger the incision," and "Wound heals from side to side and not top to the bottom" are only a handful of clichés that occupants have been introduced to in the course of their hands-on practical training.

When the concept of minimal invasive surgery came into being, the surgeons started thinking that to minimize post op pain / discomfort, excessive scarring, wound closing time and to promote concept of early return to activity, smaller /restricted incisions should be given. The concept of minimal invasive surgery ultimately led to invention of Laparoscopes.

Laparoscopic cholecystectomy is an beau ideal operation for symptomatic acute and chronic cholelithiasis to get rid of gallstones, gallbladder polyps and other etiological agents for gall bladder cancer.<sup>2,3</sup> Several case studies have confirmed and validated the merits of laparoscopic methodology including but not limited to lesser postoperative wound pain, lesser scarring, relatively shorter hospital stay and a much reduced recovery time along with minimal wounds.<sup>4</sup> With the ever growing admiration of LC, the medical community was very worried about the rise in complications associated with Laparoscopic cholecystectomy due to inflammation, adhesions and anatomical variations, sometimes forcing the surgeons to rely on the traditional surgery to avoid complications, but several

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studies concluded that after gaining proper experience using this method, it is indeed a safe and efficient surgical approach to remove the gallbladder.<sup>5</sup> The open conventional cholecystectomy through an 8-12 cm length muscle cutting incision was used as treatment of gallstone disease. The use of smaller incision with limited muscle cutting, have the advantage over conventional cholecystectomy. Studies have proved that less trauma to abdominal wall, minimizes postoperative pain with rapid recovery and early return to work.<sup>6,7</sup> In this study, rectus sparing mini cholecystectomy was done through 5 cm incision. The results in term of perop/postop hemorrhage, biliary injury / bile leakage, post-operational wound pain, duration of hospitalization, wound scarring/infection and outcome were matched with laparoscopic cholecystectomy.

The focal aim of our cohort study was to find out if there is still a place for rectus sparing mini-cholecystectomy in era of laparoscopic cholecystectomy, especially in countries like Pakistan where facilities of laparoscopic surgery are not available at each hospital and also laparoscopic cholecystectomy is relatively costly.

### METHODOLOGY

This prospective cohort study was carried out at SU III of Fauji Foundation Hospital (FFH) Rawalpindi from 1<sup>st</sup> Jan 2010 to 31<sup>st</sup> Dec 2012. After taking informed consent, 100 patients diagnosed as having symptomatic gall stones by having a close look at their disease history, clinical inspection and ultrasonography were included in our study. They were divided into two groups through non-probability convenient sampling technique. Patients were divided according to their choice of option whether to undergo open or laparoscopic procedure. 50 patients underwent rectus sparing mini-cholecystectomy and 50 patients underwent laparoscopic cholecystectomy. Patients were called on 8<sup>th</sup> post OP day for inspection of wound and removal of stitches. Patients of both sexes of any age with diagnosis of symptomatic cholelithiasis were included in study. Patients having co-morbid like ischemic heart disease, uncontrolled diabetes mellitus, uncontrolled hypertension, deranged LFT (liver function test) and choledocholithiasis were excluded from study. Laparoscopic cholecystectomy was performed by creating pneumo-peritoneum using 10 mm port through umbilicus with open technique. Cholecystectomy was then performed using four port techniques with extraction of gall bladder through the epigastric port. Metal clips were applied across the cystic artery and cystic duct before division and dissection was completed using diathermy. Hemostasis was secured. In ten patients, where there was doubt, drain was placed for monitoring any bleeding or bile leakage. Skin was closed with 2/0 polypropylene.

Rectus sparing mini-cholecystectomy was done through small transverse incision about 5cm using tip of the ninth costal cartilage as a landmark. After cutting the skin the subcutaneous fat is withdrawn by means of the assistance of retractors following which the anterior rectus sheath is slit athwartly and the rectus muscle detached from rectus sheath and retracted laterally. The parietal peritoneum and the posterior rectus

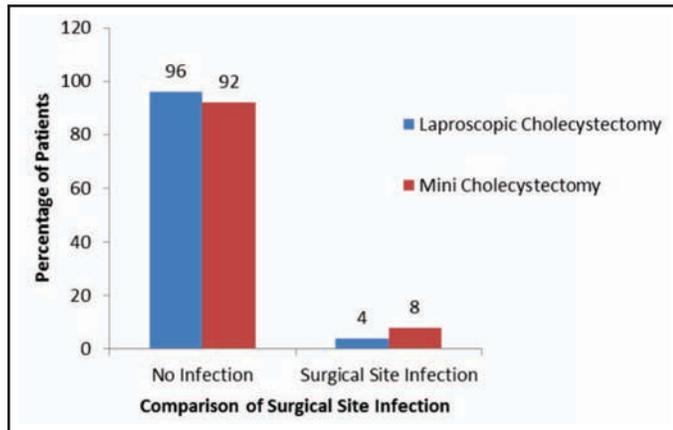
sheath is then lanced, the gall bladder is located and isolated by using abdominal packs. The Calot's triangle is at that point dissected and cystic artery and duct are ligated and divided between ligatures (absorbable suture). Thereafter, the gall bladder is then removed from gall bladder fossa by means of electrocautery. The wound was closed in layers. Skin was closed with subcortical 2/0 polypropylene. Both of the procedures were performed by trained consultant surgeons. Post-operative analgesia was given using Injection ketorolac 30 mg intravenous 8 hourly for 24 hours. After which oral analgesics were given. The severity of pain and demand for analgesics was also compared for both groups. If the patient didn't demand for any additional analgesia, it was taken as satisfactory. In patients who demanded additional analgesia, injection Nalbuphine 0.1 milligram /kg body weight i/m stat was given. The variables like age, sex, postoperative pain, postoperative hospital stay and outcome of procedure i.e. postoperative complications like wound infection, hemorrhage, common bile duct injury were recorded. Variables like pain, hospital stay and outcome were compared among both groups. The expenditures in both procedures per patients were also calculated. A proforma was designed for entering the data and data was analyzed on SPSS version 16.

### RESULTS

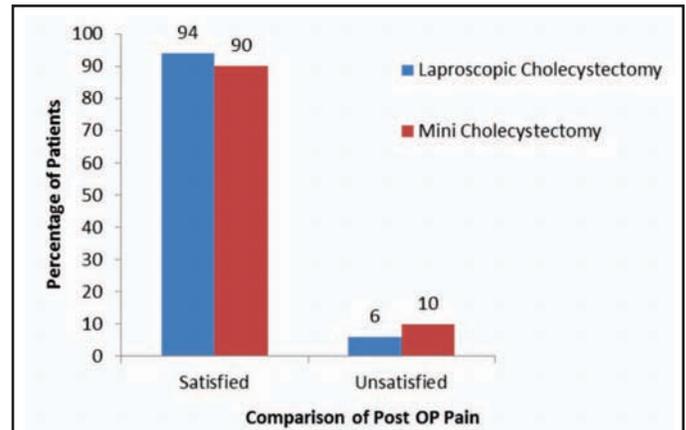
Over-all of 100 patients consisting of 6 males and 94 females were contained within the investigation. Patients age range were from 17 years to 60 years with mean age was 38.3 years. Participants having symptomatic gall stones diagnosed on ultrasound were divided into two groups i.e. 50 patients in group I went through laparoscopic cholecystectomy and remaining 50 group II Patients underwent rectus sparing mini-cholecystectomy at random. All the patients were followed up until the removal of stitches. Not a single case of hemorrhage, CBD injury / Bile leakage and mortality was reported in our study. In laparoscopic cholecystectomy group 56% participants were discharged on 2<sup>nd</sup> postoperative day and 44% patients were discharged on 1<sup>st</sup> postoperative day while in rectus sparing mini cholecystectomy group 58% patients were discharged on 2<sup>nd</sup> postoperative day and 42% were discharged on 1<sup>st</sup> postoperative day. Superficial surgical site infection ensued in almost 2% of the patients that has gone through Laparoscopic Cholecystectomy and 4% in those patients who underwent Rectus Sparing Mini Cholecystectomy patients (Figure 1). Major complications like perop / postop hemorrhage, common bile duct injury or bile leakage did not occurred in any patients. Moreover, In Laparoscopic Cholecystectomy group 94% and in Rectus Sparing Mini Cholecystectomy group 90% patients were satisfied with postoperative pain management (Figure - 2). Only 6% patients in Laparoscopic Cholecystectomy group and 10% in Rectus Sparing Mini Cholecystectomy group asked for additional analgesia. During the course of laparoscopic cholecystectomy, the technique was transformed to conventional open cholecystectomy in three of the patients due to of indistinct make-up of the calot's triangle. These three patients were excluded from the study.

**TABLE – I: AGE OF PATIENTS WHO UNDERWENT LAPAROSCOPIC CHOLECYSTECTOMY AND RECTUS SPARING MINI CHOLECYSTECTOMY (N= 100)**

Operative Procedure	Mean	N	Std. Deviation	Minimum	Maximum
laparoscopic cholecystectomy	37.6800	50	8.41146	22.00	58.00
rectus sparing mini cholecystectomy	38.9200	50	8.89357	17.00	60.00
Total	38.3000	100	8.63456	17.00	60.00



**FIG-1: COMPARISON OF SURGICAL SITE INFECTION (N=100).**



**FIG-2: COMPARISON OF POST OP PAIN (N=100).**

**DISCUSSION**

Cholelithiasis is a common problem in female population in Pakistan.<sup>8</sup> Cholecystectomy is the commonest operation performed by general surgeons.<sup>9</sup> Laparoscopic cholecystectomy is an beau ideal procedure intended for the management of symptomatic cholelithiasis.<sup>2,3</sup> Moreover, LC needs a long learning curve and in countries like Pakistan, equipment of laparoscopic cholecystectomy is still costly and not readily available in every hospital. Also all surgeons are not trained in laparoscopic procedures. While conventional cholecystectomy is a commonly performed procedure and it does not require costly equipment and special training, now conventional cholecystectomy is being replaced by mini cholecystectomy. Research was done worldwide comparing laparoscopic cholecystectomy with mini cholecystectomy with regards to postoperative wound pain, perop / postoperative problems mainly hemorrhage, CBD injury, bleeding, scarring, hospitalization time interval and wound infection. Results of these studies found mini cholecystectomy as an alternative to laparoscopic cholecystectomy.<sup>10,11</sup> In our study we compared the rectus sparing mini cholecystectomy with conventional four port laparoscopic cholecystectomy. Khan *et al* found in their study few complications like post operation bleeding in almost 1% of the circumstances, secondary paralytic ileus in almost 2% of the cases and infection of wounds in nearly 3 % of the cases.<sup>12</sup> Saeed et al had 2% wound infection in their study<sup>13</sup>, while in our study wound infection occurred in 1% in LC and 2% in RSMC patients. A shorter hospital stay, no complications like perop / postop hemorrhage or CBD injury and mortality occurred in our investigation as stated previously by Ahmed *et al* in their investigation.<sup>14</sup> In this study there was no noteworthy difference in post operation wound pain and analgesic necessity in LC and

RSMC groups. Mehrvarz in his study also reported no difference in pain experienced by patients after surgery in both procedures.<sup>5</sup> In another randomized controlled trail carried out by Burkan *et al* on 70 patients, the average hospitalization time was considerably smaller in the LC as compared to the MC group and so was the period of recuperation. Moreover, those belonging to the LC group returned to their normal daily routine nearly 1.7x faster as compared to those in the MC group.<sup>15</sup> In yet another similar study carried out by McGinn *et al* on 310 patients, it was concluded that the duration of hospitalization, the need for post-operation analgesia and the time to return to a normal healthy lifestyle was lower in the LC group vs. the MC group but the complication were higher in the LC group vs. the MC group.<sup>16</sup> Another retrospective study involving 200 patients concluded that the LC was 29% more expensive than the MC procedure.<sup>17</sup> In another study consisting of 66 patients, the authors came to the conclusion that the absolute cost and complications were lesser for patients in the MC group vs. the LC group whereas there was no significant difference in the hospitalization duration.<sup>18</sup> In yet another recent study by Ahmed *et al*, it was concluded that the operation time and theatre expenses were lower in the MC group vs. the LC group. On the other hand these patients had a higher requirement for analgesics after the operation. The time of stay at the hospital was not significantly different in both the LC and MC group.<sup>19</sup> In this study, we converted 3 cases (6%) to open conventional cholecystectomy in laparoscopic group due to unclear anatomy of calot's triangle. Worldwide conversion rate of laparoscopic cholecystectomy to open cholecystectomy is 16% to 30%.<sup>20</sup> Another important aspect is that in countries like Pakistan where laparoscopic surgery is not available everywhere and laparoscopic equipment is also costly, Rectus sparing mini cholecystectomy is a more cost effective procedure.<sup>21</sup> In our

setup, laparoscopic cholecystectomy cost is about 60000-65000 PKR per patient, while rectus sparing cholecystectomy cost is about 45000-50000 PKR per patient. So rectus sparing mini cholecystectomy is a good substitute for laparoscopic cholecystectomy in terms of post-operational wound pain, hospitalization, patient satisfaction and their early return to a healthy life style.

### CONCLUSION

It was concluded that rectus sparing mini-cholecystectomy is better and safe alternative to laparoscopic cholecystectomy if the laparoscopic surgery facilities are not available or it is contraindicated due to any reason.

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#### Contribution of Author:

**Haq NU:** Provoked the main idea of manuscript. He also wrote methodology and conclusion.

**Taimur M:** Wrote abstract, collected data and analyzed the data on spss.

**Imran M:** Wrote introduction and references.

**Jamal AB:** Wrote discussion and collected literature review.

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