

Comparison of Patient Response to Laparoscopic versus Open Cholecystectomy: A study From A Rural Center in India

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Abstract- Introduction- Laparoscopic cholecystectomy is now gold standard for the treatment of gall stone diseases. Studies have compared various parameters to prove its superiority over open cholecystectomy.

Aim- The aim of this study was to prove the superiority of any of the two procedures over the other in terms of above parameters in our patients from rural background.

Materials and Methods- The study included 81 patients which were randomized in two groups; A- Laparoscopic B- Open Cholecystectomy group.

Observations and Results- We observed a statistically significant difference between the two groups in terms of high level of CRP post operatively, average VAS score on post operative day 1 and 2 and the incidence of surgical site infections.

Conclusion- The results of this study supports that Laparoscopic cholecystectomy appears to consist the merits to be the gold standard procedure for symptomatic gall stone diseases in rural population as well.

Index Terms- Laparoscopic, Open, Cholecystectomy, CRP, VAS, SSI

I. INTRODUCTION

The invention of laparoscopic surgery has definitely brought a paradigm shift in the traditional surgical practice. This is rather a new way of thinking and has motivated surgeons to think of doing possibly every operation by a minimally invasive way. History of first cholecystectomy dates back to 1882, when Carl Langebuch of Germany performed the first cholecystectomy [1]. Prof Dr Erich Mühe of Germany performed the first laparoscopic cholecystectomy (LC) in 1985. [1] The first laparoscopic cholecystectomy in India was performed in 1990 at the JJ Hospital, Mumbai, followed a few months later in Pune by Dr. Jyotsna Kulkarni. [2].

Laparoscopic cholecystectomy (LC) is now the gold standard treatment of symptomatic gallstones and the indications for laparoscopic cholecystectomy are same as that of open cholecystectomy.[3] Various workers in randomized control trials have claimed laparoscopic cholecystectomy to be better as compared with the open technique due to earlier return of bowel motility, less post-operative pain, better cosmetic result and shorter hospital stay resulting in equal or lower hospital costs, as documented by various. [4-7]

There have been many studies which have compared both the procedures in term of hospitalization, analgesia required; sick leave, stress response etc and results have been varied. [4] We did a randomized control trial to evaluate the response of our patients (which are mainly from rural background) to laparoscopic versus open cholecystectomy to ascertain that laparoscopic cholecystectomy possesses the capability of being more an acceptable procedure than open; in our patients as well.

II. AIM

The current study has compared the response of our patients to laparoscopic versus open cholecystectomy in terms of percentage change in total leukocyte count (preoperative to post operative), post operative serum level of C Reactive Proteins, post operative ultrasound abdomen, pain as measured on Visual Analogue Scale after 24 hrs and 48 hrs of surgery and surgical site infections up to the end of one week of surgery. Thus the aim of this study was to prove the superiority of any of the two procedures over the other in terms of above parameters in our patients.

III. MATERIALS AND METHODS

This study was performed in a Rural Post Graduate Institute of Medical Science & Research in North India. The study was approved from the Institutional Ethical Committee. The diagnosed gall stone patients been admitted to a single unit in Surgery department of Institute for elective cholecystectomy between January 2013 to January 2015, were included in the study. The exclusion criteria being patients more than 60 years of age, having higher ASA grades (≥ 3), patients having diabetes mellitus and/or diagnosed cardiac illness and patients unwilling to participate in the study. A detailed history and clinical examination of all the patients was done and all the patients were investigated as per protocol. Patients were randomized in two groups according to their will after explaining the procedures and study to be done. Group A was having patients undergoing elective laparoscopic cholecystectomy and Group B having patients undergoing elective open cholecystectomy. The patients were operated by any of surgeons from a single surgical unit as per the availability. All the patients in both the groups received single shot of Inj. Ceftriaxone 1 gram I.V. after sensitivity test, at the time of induction of anesthesia.

Group A patients underwent classical 4 port cholecystectomy and Group B patients underwent open cholecystectomy with right subcostal incision. All the patients were operated under general anesthesia with endotracheal intubation. All the patients were advised for I.V. antibiotics and analgesics at least up to 24 hours after surgery. Post operatively all the patients were investigated on next morning for total leukocyte count, serum C reactive protein level and ultrasound of abdomen. Pain was recorded by a non surgeon observer unaware of the procedure performed on the patient. Pain recording was done on Visual Analogue Scale on morning next to day of surgery (post operative day 1) and on the next morning (post operative day 2). The occurrence of surgical site infections was recorded up to one week after surgery.

Statistical analysis was done using unpaired t test and Fischer Exact Test. P value less than 0.05 was considered to be statistically significant.

IV. OBSERVATIONS AND RESULTS

Total 102 patients were enrolled in the study but finally 81 patients were included as 21 patients were excluded from study because of one or more reasons. Out of 81 patients, 42 patients were in group A (Laparoscopic cholecystectomy group) and 39 patients were in group B (Open Cholecystectomy group).

There were total 12 male patients and 69 female patients. Group A had 5 males and 37 females whereas Group B had 7 males and 32 females. The mean age of patients in group A was 37.3 years while it was 43.2 years in group B; which was not carrying any statistical significance. [Table 1]

The average change in total leukocyte count (post operatively as compared to pre operative value) in group A was 23.4 and in group B was 33.8. This data was also not bearing any statistical significance. [Table 1]

Post operatively high level of serum C reactive protein was noted in 42.9 % patients in group A while it was high in 53.8 % in group B. This difference was found to be statistically significant. [Table 1]

Average VAS score for assessment of pain post operatively was 4.7 on day one and 1.8 on day after surgery in group A while it was respectively 8.3 and 5.6 in group B. This difference in average VAS score between two groups on post operative day 1 and 2 was statistically significant. [Table 1]

The incidence of surgical site infections in group A was 7.1 % while it was 23.1 % in group B. This difference again was statistically significant. [Table 1]

Hence we observed a statistically significant difference between the two groups in terms of high level of CRP post operatively, average VAS score on post operative day 1 and 2 and the incidence of surgical site infections.

V. DISCUSSION

Laparoscopic cholecystectomy has definitely revolutionized the treatment of patients of gall stone diseases. This is no doubt a surgical procedure which has very rapidly replaced the pre-existing in form of open cholecystectomy and has been widely accepted worldwide. Udwardia TE stated that there can be no

doubt that MAS is the most compelling and dynamic force driving surgical progress and endeavour in the current era. [2]

Berggren U et al in their study titled Laparoscopic versus open cholecystectomy: hospitalization, sick leave, analgesia and trauma responses; concluded that though laparoscopic cholecystectomy has rapidly become established as the treatment of choice for cholecystolithiasis, there is very little evidence, however, to support the claimed benefit to patients. They found that urinary adrenaline and cortisol levels as well as those of plasma glucose, C-reactive protein and interleukin 6 were increased after surgery in both groups of patients, but without any significant difference between them. The mean duration of postoperative hospital stay and sick leave was significantly longer with open than laparoscopic cholecystectomy. The findings demonstrate obvious advantages of laparoscopic surgery as regards postoperative pain and convalescence, although factors reflecting the magnitude of trauma did not differ. [4]

Ortega AE et al have performed a prospective randomized comparison of the metabolic and stress hormonal responses of laparoscopic and open cholecystectomy and concluded that elective laparoscopic and open cholecystectomy for uncomplicated cholelithiasis result in similar degrees of perioperative hormonal stimulation. The different hormonal responses in the immediate and later postoperative periods after laparoscopic and open cholecystectomy suggest differential stressful stimuli between the two procedures. [8]

An overview of Cochrane HepatoBiliary Group reviews by Keus F et al titled Open, small incision, or laparoscopic cholecystectomy for patients with symptomatic cholecystolithiasis also concluded that No statistically significant differences in the outcome measures of mortality and complications have been found among open, small incision, and laparoscopic cholecystectomy. There were no data on symptom relief. Complications in elective cholecystectomy are high. The quicker recovery of both laparoscopic and small incision cholecystectomy patients compared with patients on open cholecystectomy justifies the existing preferences for both minimal invasive techniques over open cholecystectomy. Laparoscopic and small incision cholecystectomies seem to be comparable, but the latter has a significantly shorter operative time, and seems to be less costly. [9]

Tariq Saeed et al performed a Comparative study of laparoscopic versus open cholecystectomy and concluded that Laparoscopic cholecystectomy is associated with short stay in hospital, early mobilization and return to work, good cosmetic results and good media coverage. Laparoscopic cholecystectomy has proven to be a safe procedure with low morbidity and an equal mortality rate as compared to open cholecystectomy. [10]

Sagheer Ahmed et al also did a study titled Open cholecystectomy versus laparoscopic cholecystectomy: a Comparative study. They have concluded that laparoscopic cholecystectomy is a safe and justified replacement for open cholecystectomy. There is a definite learning curve for surgeons who are newly exposed. The complication rates reduced as the surgeons become more experienced in this procedure to a level comparable with that of open cholecystectomy. [11]

Rooh-ul-Muqim et al also concluded that laparoscopic cholecystectomy is associated with speedy recovery, less

requirement of post operative analgesia and early resumption to work. [12]

Haque Z studied Metabolic and stress responses of the body to trauma: produced by the laparoscopic and open cholecystectomy. They observed that blood glucose and stress hormones (cortisol, adrenaline, nor adrenaline) and C-reactive protein all were found significantly raised in the postoperative period in open cholecystectomy than laparoscopic cholecystectomy group. The postoperative recovery was also prolonged in the open group. The obvious clinical advantages of laparoscopic cholecystectomy over open cholecystectomy are mainly because of less metabolic and stress response. [13]

Thus the advantages of laparoscopic cholecystectomy appear to be beyond discussion. However we tried in our study to look into the response of our patients to laparoscopic cholecystectomy as compared to open cholecystectomy. Our study group included the patients from rural background where the acceptability of minimal access procedures as such is not that obvious as in urban population. In both the groups following procedure, we studied percentage increase in total leukocyte count, high level of serum C reactive proteins, pain on VAS on post operative day 1 and 2 and the incidence of surgical site infection. The increase in post operative total leukocyte count was lesser as compared to open cholecystectomy group but this difference was not statistically significant. We found that laparoscopic cholecystectomy group was having lesser incidence of high serum C reactive proteins levels post operative. Moreover pain as measured on VAS on post operative day 1 and 2 was also less in laparoscopic cholecystectomy groups. Laparoscopic cholecystectomy group was also having lesser incidence of surgical site infections. All these differences were statistically significant (<0.05).

VI. CONCLUSION

We hereby conclude that patient response as measured by us in terms of high level of serum CRP, pain score and incidence of surgical site infection; are less in laparoscopic cholecystectomy as compared to open cholecystectomy. Laparoscopic cholecystectomy thus appears to consist the merits to be the gold standard procedure for symptomatic gall stone diseases in rural population as well.

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Table 1- Comparison of various parameters in both groups

| Parameter | Group A | Group B | P value |
|-------------------------------------|----------------|----------------|----------------|
| Mean Age (years) | 37.3 | 43.2 | 0.1287 |
| Average increase in TLC (%) | 23.4 | 33.8 | 0.2655 |
| High Serum CRP level (%) | 42.9 | 53.8 | 0.0009 |
| Average VAS score on POD1 | 4.7 | 8.3 | 0.0001 |
| Average VAS Score on POD2 | 1.8 | 5.6 | 0.0001 |
| Surgical Site Infections (%) | 7.1 | 23.1 | 0.0288 |