SURVEY REPORT

Scar Pain, Cosmesis and Patient Satisfaction in Laparoscopic and Open Cholecystectomy

Muhammad Salman Rafiq and Mah Muneer Khan

ABSTRACT

Objective: To compare patient-satisfaction, scar-pain and cosmesis between laparoscopic and open-cholecystectomy.
Study Design: Cross-sectional survey.
Place and Duration of Study: Khyber Teaching Hospital, Peshawar, from August 2012 to May 2014.
Methodology: A total of 400 patients, who had undergone open or laparoscopic cholecystectomy in all units of the Surgical Department, were included. Data was collected on questionnaires given and read to the patients along with counselling and information regarding scar-pain using visual analog score, and satisfaction and cosmesis on a 0 - 10 scale, by a medical professional in the patients' native language. This was done postoperatively on patients' follow-up visits at 1 and 4 weeks.
Results: Mean scar pain score at 1 and 4 weeks postoperatively was higher for open-cholecystectomy; 4.96 ±1 and 0.96 ±1, compared to 2.24 ±0.6 and 0, respectively for laparoscopic-cholecystectomy ($p < 0.001$ and < 0.001). Cosmesis was higher for laparoscopic-group; 8.6 ±1.2 vs. 6.2 ±1.46 for open-cholecystectomy ($p < 0.001$). Patient-satisfaction was higher for laparoscopic-cholecystectomy; 9.28 ±1.5 vs. 8.32 ±2.3 for open-cholecystectomy ($p < 0.001$). Mean-cosmesis score was higher for laparoscopic-cholecystectomy for those younger than 40, females and unmarried. Mean patient-satisfaction score was higher for those older than 40 years who had undergone open-cholecystectomy, women who had undergone laparoscopic-cholecystectomy and for unmarried patients who had laparoscopic-cholecystectomy.
Conclusion: Overall patient-satisfaction and cosmesis scoring was higher for laparoscopic-cholecystectomy especially among females, unmarried and younger than 40 years. Patients of 40 years and older had greater satisfaction scoring for open-cholecystectomy. Therefore, laparoscopic-cholecystectomy should be favoured in females and unmarried patients and those younger than 40 years.

Key Words: *Surgical audit. Patient-satisfaction. Laparoscopic cholecystectomy. Conventional cholecystectomy.*

INTRODUCTION

Cholelithiasis and cholecystitis requiring surgery is a common pathology of the hepato-biliary tract.[1] Cholelithiasis is related to dietary habits, obesity, metabolic syndrome, diabetes and excessive consumption of meat among others.[2] It has an annual prevalence of 10% and incidence of 0.5%.[3] Of these, 35% patients have a lifetime risk of complications or recurrent symptoms.[4] Approximately 1 - 2% of these asymptomatic cholelithiasis patients go on to develop biliary colic each year; 2.2 per thousand population.[5] Of them, 0.5% present with these symptoms.[6] The most common complication of symptomatic cholelithiasis is acute cholecystitis, occurring in 15-26% of cases.[3]

The definitive treatment for symptomatic calculous cholecystitis is cholecystectomy.[3] The first open or open cholecystectomy performed on 15th July 1882 by Carl Langenbuch (1846 - 1901) remained the gold standard technique for more than a century.[7] In 1987, Philippe Mouret, in Lyon, France, performed the first laparoscopic cholecystectomy.[8] Laparoscopic cholecystectomy offered many advantages including short hospital stay, early return of mobilization and the ability to perform cholecystectomy as an outpatient procedure.[9] Today, more than 700,000 laparoscopic cholecystectomies are performed annually in the United States alone.[10]

Many studies have been carried out to assess the various characteristics of both open and laparoscopic cholecystectomy. These studies discuss surgical technique, antibiotics and peri-operative care. Very few studies, however, have been conducted on what might be one of the most important factors, i.e. patient satisfaction and cosmesis. This study was carried out to assess and compare patient satisfaction, scar pain and cosmesis between open and laparoscopic cholecystectomies.

METHODOLOGY

This study was performed at the Surgical Department of Khyber Teaching Hospital, Peshawar, Pakistan from August 2012 to May 2014. A total of 400 consecutive patients were included in the study from all the units of the Surgical Department with 200 patients each in the open and laparoscopic cholecystectomy groups,

Department of Surgery, Surgical D Unit, Khyber Teaching Hospital, Peshawar.

Correspondence: Dr. Muhammad Salman Rafiq, Surgical D Unit, Khyber Teaching Hospital, Peshawar.
E-mail: drsalmanrafiq@hotmail.com

Received: June 27, 2014; Accepted: December 09, 2015.

respectively. Approval of the Research and Ethical Committees was taken.

Inclusion criteria included all elective patients aged between 18 to 60 years of both genders with symptomatic cholelithiasis diagnosed and with calculous cholecystitis, requiring cholecystectomy. Exclusion criteria included patients with complicated gallstone disease like empyema, mucocoele and/or porcelain gallbladder. Cases of choledocholithiasis diagnosed pre- or postoperatively were also excluded. Additionally, patients with immune compromisation, septicaemia, pregnancy and medical comorbidities except for well controlled diabetes mellitus were also excluded. In all instances patients underwent elective cholecystectomy. Cases operated shortly after the acute episode of cholecystitis on the next list from their admission were also excluded.

The standard indications for both open and laparoscopic cholecystectomies with an additional emphasis on patient preference due to local and patient beliefs were followed.[11] Allotment of patients to either group was determined by the standard surgical indications for open and laparoscopic cholecystectomies except in cases where the patients insisted or preferred open cholecystectomy. In all cases, extensive counselling was done with each patient, providing them with thorough information about both types of surgeries, their advantages and disadvantages, the possible outcome and complications and step-by-step explanation of the proforma. Uniform guidelines of management were applied in all cases. Standard surgical technique of 4-port for laparoscopic cholecystectomy and Kocher's incision for open cholecystectomy were performed in all cases under aseptic conditions. Standard peri-operative care including intra-venous antibiotics was provided to all patients.

Postoperatively patients of both groups were advised the same generic drugs and dosage for home treatment including oral pain killers and antibiotics. Patients of both groups were advised the same method of daily wound dressing. Analgesics were advised for seven days after discharge in both groups and to be taken additionally if and when pain was felt thereafter. Therefore, patients had completed their advised home treatment by the time of their first follow-up visit at 1 week postoperatively. Patients were advised to skip the analgesic doses if they were taking any on the morning of their follow-up visits at 1 and 4 weeks postoperatively for proper assessment and data collection.

Both groups of patients were given questionnaires on their follow-up visits at 1 and 4 weeks postoperatively. They read the questionnaire themselves and additionally it was read to them by a medical professional in their native languages. Explanation of medical terms, the proforma and counselling about the two procedures were also provided. An arbitrary analogue scale from 0 - 10 was used.[12] Information was collected about scar pain at 1 and 4 weeks postoperative. Pain scoring was: 0 for no pain to 10 for very painful. Information about cosmesis: 0 for very unsightly to 10 for very beautiful and information regarding satisfaction with surgery: 0 for not satisfied to 10 for very satisfied, were collected at 4 weeks postoperative visit.

All calculations were done in SPSS 20 and MedCalc 12.5. A p-value < 0.05 was considered statistically significant with a confidence interval of 95% and confidence level of 5%. Demographic data was compared. Nominal data was compared with chi-square test. Comparison of interval data between the groups was done with t-test and non-parametric data with Mann-Whitney U test as for example for scar pain, cosmesis and patient-satisfaction. Results were expressed in terms of mean ±SD (standard deviation), frequency and percentages. For Mann-Whitney U test, the test value, p-value and descriptive statistics i.e. median and Inter Quartile Range (IQR), were also expressed. Questionnaire data was analysed dichotomously according to the surgical method, i.e. open and laparoscopic cholecystectomies. All analyses were two-tailed.

RESULTS

Comparison of the demographic data is given in Table I. The open cholecystectomy group had longer operating time but smaller BMI and weight and tended to be younger than the laparoscopic group. Statistically significant findings between the groups were of greater values in the laparoscopic group for mean age (40.36 ±10.95 years, p=0.002), weight (69.68 ±6.88 Kg, p=0.003), and BMI (25.74 ±2.67 Kg/m^2, p=0.001). Statistically significant findings for the open group was a longer duration of surgery (68 ±8.99 minutes, p < 0.001).

Table II shows the comparison of scar pain at 1 and 4 weeks, cosmesis and patient-satisfaction with surgery. In the open group, statistically significant findings were

Table I: Open and Laparoscopic Cholecystectomy demographic comparison.

	OC[a] group	LC[b] group	p-value
Number of patients	200	200	
Males : Females	64 (32%) : 136 (68%)	60 (30%) : 140 (70%)	0.665
Male: female ratio	1 : 2.125	1 : 2.333	
Age (years)	37.24 ± 9.481	40.36 ± 10.951	0.002
Marital status (single: married)	64 (32%) : 136 (68%)	52 (26%) : 148 (74%)	0.186
Weight (kg[c])	67.64 ± 6.62	69.68 ± 6.88	0.003
Height (m[d])	1.652 ± 0.07	1.647 ± 0.07	0.523
BMI[e] (Kg/m^2)	24.845 ± 2.61	25.74 ± 2.67	<0.001
Surgery duration (minutes[f])	68 ± 8.99	46.87 ± 6.51	<0.001

Footnote: a; Open Cholecystectomy, b; Laparoscopic, c; Kilogram, d; Meters, e; Body Mass Index, f; Minutes.

Table II: Comparison of Scar pain, Cosmesis and Patient satisfaction with surgery.

Measures	Mean ± Standard Deviation		Median (IQRc)			
	OC[a] group	LC[b] group	OC[a] group	LC[b] group	U Test[d]	p[e]
Scar-pain at 1 week	4.96 ±1	2.24 ±0.6	4.00(2)	2.00(0)	1248	<0.001
Scar-pain at 4 weeks	0.96 ±1	0	0.00(2)	-	10400	<0.001
Cosmesis	6.2 ±1.46	8.6 ±1.2	6.00(2)	8.00(2)	5216	<0.001
Patient satisfaction	8.32 ±2.3	9.28 ±1.5	10.00(4)	10.00(0)	16144	<0.001

Footnote: a; Open cholecystectomy, b; Laparoscopic cholecystectomy, c; Inter quartile range, d; Mann-Whitney U test, e; p-value.

found with greater values for postoperative scar pain at 1 week (mean scar pain score 4.96 ±1, mean rank 294.26, $p < 0.001$) and at 4 weeks (mean scar pain score 0.96 ±1, mean rank 248.5, $p < 0.001$), respectively. This shows that patient scoring for scar pain was greater and statistically significant in the open group. In the laparoscopic group, statistically significant findings were of greater values for cosmesis (mean cosmesis score 6.2 ±1.46, mean rank 274.42, $p < 0.001$) and patient-satisfaction with surgery (mean score 8.32 ±2.3, mean rank 219.78, $p < 0.001$), respectively. This shows that patient scoring for cosmesis and satisfaction was greater and statistically significant in the laparoscopic group. Median and Inter Quartile Range (IQR) for open and laparoscopic cholecystectomies are given in Table II.

DISCUSSION

Open cholecystectomy has been replaced by laparoscopic cholecystectomy as the gold standard treatment for cholecystitis throughout the world. Various studies have praised the procedure for its superior cosmesis, pain of surgery and scar, and patient-satisfaction.[5,13,14] However, in these studies scar pain, cosmesis and patient-satisfaction were not objectively studied, especially in a Third World setup. In countries like Pakistan, the choice of operative treatment is also dictated by factors other than superior surgical technique. In fact, validated studies regarding satisfaction of patients with surgery and scar after abdominal surgeries are lacking.[12,15] However, Park and colleagues comprehensively studied cosmesis outcomes after urologic surgeries of kidney.[16] A recent study by Inoue *et al*. compared these features for laparoscopic adrenalectomies.[12]

Despite adequate counselling and information given to patients regarding the superiority of laparoscopic cholecystectomy in terms of overall morbidity, hospital stay and treatment costs, patients in Pakistan, especially those belonging to rural areas, do not prefer the laparoscopic approach. Laparoscopic cholecystectomy in local language is referred to as laser surgery which is a misnomer as laser is not used. This patient's preference for open cholecystectomy has to do with local beliefs. These include failure of laparoscopic cholecystectomy compared to success of the open approach in all patients, recurrence of the same symptoms if laparoscopic approach is used, morbidity and numerous complications caused by laparoscopic cholecystectomy that can even result in death. These are, however, without basis in scientific fact or data. Various factors can be attributed to the spread of these beliefs. These include a general lack of laparoscopic expertise, unregulated surgeries performed by non-surgeons such as paramedical personnel and quacks, customer booking through false information by agents of surgeons lacking in laparoscopic expertise, and a general lack of education and awareness of the patients and their attendants.

With regard to the same beliefs or myths, patients especially from rural areas prefer open cholecystectomy and are satisfied with their wounds despite relatively large scars, not complaining of pain even when in some cases the wounds were infected or had stitch sinus. At the same time, patients undergoing laparoscopic cholecystectomy, especially females, have been observed with pain, severe in some cases at the port sites, especially umbilical. However, assessment of these patients do not reveal wound infection, port site herniation (on ultrasonography) or other organic causes. The authors, therefore, surmise that patient beliefs, which are not founded in scientific fact, have a considerable effect on such findings.

Regarding scar pain, Inoue *et al*. found no significant difference between their two laparoscopic groups (0.67 vs. 0.57, $p = 0.393$). In addition, there were neither any significant difference in cosmesis in these groups (8.58 vs. 8.00, $p = 0.487$) nor difference regarding satisfaction (8.92 vs. 8.46, $p = 0.453$), respectively.[12] This study, however, compared only laparoscopic groups. Chen *et al*. in their comparative study of laparoscopic vs. open cholecystectomy using the Gastro Intestinal Quality of Life Index (GIQLI) showed that though there were no significant statistical differences between the two groups preoperatively, the GIQLI score did improve to significant levels more rapidly in the laparoscopic group (5 - 16 weeks) than in the open group (16 weeks).[13] In addition, the laparoscopic group had a better overall GIQLI score compared to the open group. Mehrvarz *et al*. in their comparative study between laparoscopic and small incision cholecystectomy showed that there was no significant difference in pain (4.6 ±1.6 vs. 4.6 ±1.9, p=1.0), nausea, and vomiting between the two groups.[14]

In this study, the authors found higher overall values in the open cholecystectomy group for pain, i.e. 4.96 ±1 at 1 week and 0.96 ±1 at 4 weeks postoperatively compared to the laparoscopic cholecystectomy group, i.e. 2.24 ±0.6 at 1 week and 0 at 4 weeks postoperative, respectively. Pain scores at 1 and 4 weeks, therefore, yielded p-values < 0.001 and < 0.001, respectively. The overall cosmesis scores were higher for the laparoscopic cholecystectomy group; 8.6 ±1.2, as compared to 6.2 ±1.46 in the open cholecystectomy group, p < 0.001, respectively. The satisfaction with surgery score was also overall higher for the laparoscopic cholecystectomy group; 9.28 ±1.5 vs. 8.32 ±2.3 for the open cholecystectomy group, p < 0.001, respectively.

Stratification for cosmesis and satisfaction revealed similar results. The mean overall score for cosmesis was higher in the laparoscopic group. Cosmesis score for females was 8.9 in the laparoscopic group compared to 5.3 in the open group, respectively. For men, the mean cosmesis score was higher in the open group at 8 compared to 7.8 in the other group. For unmarried patients, mean cosmesis scores were higher in the laparoscopic group at 8.9 compared to 4.7 in the open group.

Stratification for patient satisfaction was also analyzed. Patients older than 40 years were more satisfied with open cholecystectomy at a mean score of 9.6 compared to laparoscopic cholecystectomy at 8.4. In this subset, there were 65 patients aged 40 years and above who underwent open cholecystectomy and selected a satisfaction score of 10, with 39 of them being females. All patients in this subset were married. Females were more satisfied with laparoscopic cholecystectomy at a mean score of 9 compared to 7.7 for open cholecystectomy. For male patients, there was almost no difference in regard to satisfaction with surgery with mean satisfaction score of 10 for laparoscopic cholecystectomy and 9.5 for the open group. Unmarried patients preferred laparoscopic cholecystectomy with a mean satisfaction score of 10 compared to 5.1 for open cholecystectomy.

CONCLUSION

The present study showed that laparoscopic cholecystectomy should be the preferred operative management in patients who are female, younger than 40 years and unmarried. Older patients, especially if married, usually prefer open cholecystectomy. Further studies are needed to be carried out in this regard, especially as to the social and psychological reasons behind patient preference. In addition to the surgical decision of the best operative technique, patients' preference should also be considered, especially in the subgroups as mentioned above.

REFERENCES

1. Jaraari AM, Jagannadharao P, Patil TN, Hai A, Awamy HA, El Saeity SO, *et al*. Quantitative analysis of gallstones in Libyan patients. *Libyan J Med* 2010; **5**:4627-33.
2. Hussain SM, Al-Jashamy KA. Determination of chemical composition of gallbladder stones and their association with induction of cholangiocarcinoma. *Asian Pac J Cancer Prev* 2013; **14**:6257-60.
3. Barcelo M, Cruz-Santamaria DM, Alba-Lopez C, Devesa-Medina MJ, Diaz-Rubio M, Rey E. Advantages of early cholecystectomy in clinical practice of a tertiary care center. *Hepatobiliary Pancreat Dis* Int 2013; **12**:87-93.
4. Schirmer BD, Winters KL, Edlich RF. Cholelithiasis & cholecystitis. *J Long Term Eff Med Implants* 2005; **15**:329-38.
5. Naraynsingh V, Singh Y, Remy T, Hariharan S, Dan D. Minilaparotomy cholecystectomy: an appropriate alternative to laparoscopic cholecystectomy in developing nations. *Trop Gastroenterol* 2010; **31**:312-6.
6. Strasberg SM. Acute calculous cholecystitis. *N Engl J Med* 2008; **358**:2804-11.
7. Utpal De. Evolution of cholecystectomy: a tribute to Carl August langenbuch. *Indian J Surg* 2004; **66**:97-100.
8. Mouret P. How I developed laparoscopic cholecystectomy. *Ann Acad Med Singapore* 1996; **25**:744-7.
9. Polychronidis A, Laftsidis P, Bounovas A, Simopoulos C. Twenty years of laparoscopic cholecystectomy: Philippe Mouret-March 17, 1987. *JSLS* 2008; **12**:109-11.
10. Vollmer CM Jr, Callery MP. Biliary injury following laparoscopic cholecystectomy: why still a problem? *Gastroenterology* 2007; **133**:1039-41.
11. Cuschieri A. Disorders of the biliary tract. In: Cuschieri A, Hanna GB editors. Essential surgical practice. 5th ed. Boca Raton: CRC Press; 2015 p. 671-756.
12. Inoue S, Ikeda K, Kobayashi K, Kajiwara M, Teishima J, Matsubara A. Patient-reported satisfaction and cosmesis outcomes following laparoscopic adrenalectomy: Laparo-endoscopic single-site adrenalectomy vs. conventional laparoscopic adrenalectomy. *Can Urol Assoc J* 2014; **8**:E20-5.
13. Chen L, Tao SF, Xu Y, Fang F, Peng SY. Patients' quality of life after laparoscopic or open cholecystectomy. *J Zhejiang Univ Sci B* 2005; **6**:678-81.
14. Mehrvarz S, Mohebi HA, Kalantar Motamedi MH. Laparoscopic cholecystectomy versus small incision cholecystectomy in symptomatic gallstones disease. *J Coll Physicians Surg Pak* 2012; **22**:627-31.
15. Durani P, McGrouther DA, Ferguson MW. Current scales for assessing human scarring: A review. *J Plast Reconstr Aesthet Surg* 2009; **62**:713-20.
16. Park SK, Olweny EO, Best SL, Tracy CR, Mir SA, Cadeddu JA. Patient-reported body image and cosmesis outcomes following kidney surgery: Comparison of laparoendoscopic single-site, laparoscopic and open surgery. *Eur Urol* 2011; **60**:1097-104.