Single Incision Laparoscopic Cholecystectomy Using Harmonic Scalpel: A Single Institute Experience

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Abstract: Laparoscopic Cholecystectomy is the gold standard procedure for symptomatic cholelithiasis for years. Laparoscopic cholecystectomy procedure is refined over years to increase its efficacy, decrease complication rates and increase cosmeses. Single incision laparoscopic cholecystectomy being one of them. SILC has some documented advantages in comparison to four ports LC. Use of Harmonic Ace in SILC has further improved the efficiency of this procedure and complications rate has been decreased, thus making SILC a promising surgical technique in treatment of symptomatic cholelithiasis. Methods: Patients of symptomatic cholelithiasis were enrolled in the study and 35 patients underwent harmonic ace assisted single incision laparoscopic cholecystectomy. Results were documented in form of duration of surgery, quantity of CO2 used, intra operative stone spillage, intra operative blood loss, post-operative pain at 6 hour and 24 hour after the surgery, duration of hospital stay, any postoperative complications. Result: Operative time, intra operative blood loss, amount of CO2 used, post-operative pain score at 24 hour, intra operationally stone spillage, all parameters were found to be statistically significant except for post-operative pain score at 6 hours, post-operative complications and conversion into 4 port / 2 port open cholecystectomy which were not statically significant. Conclusion: SILC is emerging as a promising technique for symptomatic cholelithiasis and use of harmonic ace has improved it further in terms of less operative time, less amount of blood loss and CO2 used, less chances of intraoperative stone spillage, less post-operative hospital stay, less pain post operatively.

Keywords: Laparoscopic Cholecystectomy Using Harmonic Scalpel.

INTRODUCTION

In 1882, Carl Langebuch (1846-1901) of Germany performed the first cholecystectomy [1]. In 1985 (103 years later), Prof Dr Erich Mühe of Germany performed the first laparoscopic cholecystectomy (LC). The first reports of SILS cholecystectomy came in 1997 in a letter to the editor in the British Journal of Surgery by Navarra [2], Piskun reported on 10 patients on whom he performed a SILS cholecystectomy by placing two 5-mm trocars through a common umbilical incision and using transabdominal sutures to manipulate the gallbladder [3]. The fascial bridge between the two trocars was then joined and the specimen extracted through this single umbilical incision. The harmonic scalpel was introduced in 1993 (Ethicon Endo-Surgery). It has been shown to be a valuable tool for numerous surgical procedures; including cholecystectomy, bowel resection, and adhesiolysis [4]. The instrument minimizes lateral thermal tissue damage. There is almost no need for instrument changes.

At present, monopolar electrocautery is the main cutting method used for gallbladder dissection from the liver bed. It is associated with local thermal and distant tissue damage, which might cause inadvertent perforation of the gallbladder during gallbladder bed dissection [5]. Ultrasonic dissection generates less thermal injury, produces a smaller zone of tissue damage and more precise dissection, and has been suggested as an alternative to monopolar electrocautery in laparoscopic cholecystectomy [6]. Theoretical benefits for use of harmonic scalpel as dissection technique is –

1. Less operative time
2. Less bleeding
3. Early post-operative recovery
4. Less spillage of stones
5. Less chances of converting into open cholecystectomy
6. Less pain post operatively
7. Less amount of CO2 used.
METHODS

All consecutive patients of symptomatic cholelithiasis confirmed by USG reporting and all patients are operated by same team of surgeons in the Department of General Surgery, IGMC Shimla.

Inclusion criteria for our study were
1. Age between 21 and 80
2. ASA score of <3
3. Symptomatic Gall stones

Patients in one of the following groups were considered as high risk patients and were not included in the study.
1. Patient with BMI >40
2. Patient with choledocholithiasis with cholelithiasis
3. Previous upper abdominal surgery
4. Patient with bleeding disorder
5. Acute cholecystitis
6. Patient on warfarin
7. Patient not willing to participate in Study.

All eligible patients underwent single incision laparoscopic cholecystectomy using harmonic ace by technique as described below-

SILC performed with the help of 2 slings of sutures, which included following steps:
1. Under general anesthesia, a 15-20 mm (approximately) curvilinear skin incision made through the inner margin of the umbilicus. Subcutaneous tunnelling was done on either side to avoid scissoring of instruments.

The following parameters were recorded in each group-
A. Intraoperative Parameters
1. Operative findings including status of gall bladder, presence of adhesions, any intraoperative stone spillage.
2. Operative time calculated (in minutes) for all cases from skin incision to skin closure
3. Bleeding—Assessed through gauge visual analogue method- % saturation of gauge piece
Correlation between Visual and verbal scale

1-3 = mild pain
4-6 = moderate pain
7-10 = severe pain

Data was analysed using Epi – info version 7.2.2. P value <0.05 was considered as statistically significant.

RESULTS

Out of 35 patients, 5 patients were male and 30 were female. All underwent harmonic ace assisted dissection.
AGE DISTRIBUTION

<table>
<thead>
<tr>
<th>PARAMETERS OBSERVED</th>
<th>Mean value with use of H.A</th>
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</thead>
<tbody>
<tr>
<td>Operative Time (min)</td>
<td>33.9</td>
</tr>
<tr>
<td>CO₂ Used (L)</td>
<td>30.2</td>
</tr>
<tr>
<td>Blood loss (ml)</td>
<td>20.96</td>
</tr>
<tr>
<td>Intraoperative stone spillage(no. of cases)</td>
<td>2</td>
</tr>
<tr>
<td>Conversion to four/double port/open cholecystectomy(no. of cases)</td>
<td>0</td>
</tr>
<tr>
<td>Pain score at 6 hour</td>
<td>5.8</td>
</tr>
<tr>
<td>Pain score at 24 hour</td>
<td>2</td>
</tr>
<tr>
<td>Length of hospital stay(days)</td>
<td>0.600</td>
</tr>
<tr>
<td>Post op complication</td>
<td>0</td>
</tr>
</tbody>
</table>

Mean operative time for is 33.9±10.6.
In terms of CO₂ used mean CO₂ used is 30.2±14.9 litres.
Mean blood loss is 20.9±35.6 ml.
Mean stay in hospital is 0.60±0.64 days.
Average pain score at 6 hours and 24 hours is 5.84 and 2 respectively.
In terms of stones spillage, 2 patients had intraoperative stone spillage.
No case was converted to open and there were no post-operative complications noted.

DISCUSSION

Our study is pilot study, so we cannot compare our data with other studies. However different parameters are discussed as follows and data from different studies (four port laparoscopic cholecystectomy based studies) is incorporated. Like our study operating time was significantly less with the use of harmonic in the study conducted by Jain et al. (64.7 ± 13.74 vs. 50 ± 9.36; p = 0.001) and Kadil et al. (61.88 ± 17 16vs. 52.14 ± 9.8; p < 0.0001) [7, 8]. In their studies, Jain et al. and Kadil et al. have observed a significant reduction in blood loss [7, 8]. Huscher et al. [9] and Bessa et al. [10] suggest a significant reduction in blood loss in four port laparoscopic cholecystectomy, by use of harmonic acid like same results in our study. As in our study Kadil et al. showed in their study that the risk of GB perforation was significantly higher with the use of electrocautery but it was significantly reduced with the use of harmonic acid (18.6% vs. 7.1%, respectively; p = 0.04) [8]. Risk of GB perforation was not found significant in the study conducted by Mukes et al. [11]. Mahabaleshwar et al. revealed a 14.23 times greater risk of GB perforation [12]. Mahabaleshwar et al. also concluded that the postoperative pain is less with the use of harmonic acid [12]. As in our study, postoperative pain scores after 24 hours were found to be significantly better in harmonic acid assisted LC by Kadil et al. as well (4.48 ± 1.89 vs. 3.12 ± 1.84; p = 0.000) [8]. Kadil et al. suggest less conversion rate with the use of HA. El Nakeeb et al. Suggest conversion rate was 5% with electrocautery group and 3.3% with HA group (p = 0.65). Guanqun et al. [13] shows mean stay in hospital after surgery as 3.0 ±0.4 with the use of harmonic acid. Gelmini et al. [14] shows mean post-operative hospital stay as 2 days, but in our study post-operative hospital stay was statistically significant. Guanqun et al. Show no significant post-operative complications same as our study.

CONCLUSION

Gall stones are very common now days and are a major burden on health delivering facilities. Large number of surgeries is performed in our centre on daily basis. SILC being performed in our centre on regular basis so operative time is now comparable to four port laparoscopic cholecystectomy, it has got advantage in term of decrease post-operative pain and hospital stay, so burden on health care system is decreased. With the use of harmonic acid SILC has become a safe surgery in comparison to electrocautery assisted dissection. Post-operative hospital stay has decreased to some more extent; there is lesser post-operative pain and fewer chances of post-operative complications. All the above mentioned factors have decreased the morbidity and burden on health care facilities automatically decreased. So harmonic acid use has made SILC a better suited surgery and results are comparable to four port laparoscopic cholecystectomy.

REFERENCES


