Prospective Study of Single Incision Laparoscopic Cholecystectomy with Conventional Instruments

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ABSTRACT

INTRODUCTION: As in the modern era of laparoscopic surgery the moving trend has been towards performing less and less invasive techniques. Single incision laparoscopic cholecystectomy (SILC) is a simple and reliable technique in selected cases and with experience hands in advanced laparoscopic surgery. The greatest advantage of this technique is cosmesis and less post-operative pain. AIMS & OBJECTIVE: To share our initial experience in the field of single incision laparoscopic surgery in terms of feasibility, safety and potential benefits with regards to cosmetics, postoperative pain and over all patient satisfaction MATERIALS & METHODS: We studied 25 patients with chronic cholecystitis to underwent SILC over the period of 1 ½ year at our institute using conventional laparoscopic instruments with exclusion of acute cholecystitis, obese patient (BMI >40 KG/M2), Previous upper gastrointestinal tract surgery, shrunken gall bladder on USG, Poor cardio-pulmonary reserve, Suspicion of carcinoma gallbladder, CBD pathology which warranted open surgery. OBSERVATIONS & RESULTS: 1 out of 25 patient required addition of one port. Rest all the patients had benefits of less postoperative pain (less than 3 VAS), less postoperative analgesia (less than two doses) and short hospital stay (less than 24 hour) and better cosmetic outcome. CONCLUSION: Our initial experience with SILC demonstrates its feasibility and supports the promise of minimizing further the access of laparoscopic surgery in selected cases and with experience hands in advanced laparoscopic surgery. The clear advantage is its cosmetic benefit.

Key words: Single incision surgery, Laparoscopic cholecystectomy, SILC, cholecystitis

INTRODUCTION

Laparoscopic cholecystectomy has replaced open cholecystectomy as the gold standard surgical procedure for majority of patients with gallstone disease. Conventional laparoscopic cholecystectomy is done using four ports. With an effort to minimize the number of ports, single-incision laparoscopic surgery (SILS) has come into practice. SILS is a rapidly evolving method that is complementing traditional laparoscopy in selected fields and patients. It has also been suggested as a bridge between traditional laparoscopy and Natural Orifice Transluminal Endoscopic Surgery (NOTES) 5. Single incision laparoscopic cholecystectomy (SILC) is perhaps the most common SILS procedure, used to treat patients with gall stone disease. It is being considered as no-scar surgery because the incision is placed within the umbilical scar that is not visible. Single incision laparoscopic cholecystectomy (SILC) has been projected to have better cosmetic outcome compared with conventional laparoscopic cholecystectomy (CLC).

METHOS AND MATERIALS

A prospective study of 25 cases Single Incision Laparoscopic Cholecystectomy (SILC) from July 2011 to May 2013. Patients with symptomatic gall bladder stone were examined, detailed history was taken and appropriate investigations were carried out in each case. Patients were selected according inclusion and exclusion criteria.

Inclusion criteria: Symptomatic patients having biliary colic, chronic cholecystits cholelithiasis.

Exclusion criteria: In our study, due to initial learning curve of SILC patients presumed to have difficult cholecystectomy were selectively excluded.

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1) acute cholecystitis
2) obese patient (BMI >40 KG/M²)
3) Previous upper gastrointestinal tract surgery
4) Shrunken gall bladder on USG.
5) Poor cardio-pulmonary reserve
6) Suspicion of carcinoma gallbladder.
7) Unwilling for laparoscopic procedure and giving consent for SILC.
8) CBD pathology which warranted open surgery.

Written informed consent was taken and all patients underwent single incision laparoscopic cholecystectomy using conventional instruments. Intra operative complication, duration of surgery, postoperative pain score, duration of hospital stay and postoperative complication were recorded in profoma. Follow examination were carried out at 1 week, 1 month and 3 month. All patients were examined and asked regarding relief of symptoms, cosmesis, any port site complain and overall satisfaction. All patient were under went same technique (two port at umbilicus with trans abdominal traction sutures). Only conventional laparoscopic instruments were used. No special ports or instruments were used.

Position of patient: The patient is positioned supine on the operating table with the legs split apart and strapped firmly to the leg boards. Both arms of the patient are placed on arm boards at an angle less than 90° to the torso.

Procedure:
- An infra umbilical horizontal incision of length 1.5-2 cm is made and. This is deepened through the fat and the flaps are undermined to expose the fascia over a distance of 2-2.5 cm. Fascial stab incision is made. CO2 pneumoperitoneum is induced and maintained at 12 mm hg
- Use a strand of 1-0 monofilament nylon on a 60-mm straight needle for placing the traction sutures. The needle is introduced laterally through one of the intercostal spaces above the level of the costal margin. The needle is then re grasped at its midpoint, a bite of the fundus of the gallbladder is taken and the needle is driven out through the same intercostal space. The needle is retrieved using an open needle holder, and the suture is pulled out leaving two ends of 5-6 cm. Haemostat is applied to both ends close to the skin, resulting in elevation of the gallbladder fundus. (fig-2)
- The second traction suture placed on the Hartmann’s pouch area as close to its junction with the cystic duct as possible. The straight needle is introduced high up in the epigastrum just to the right of the falciform ligament, grasped with the laparoscopic needle holder and driven through the Hartmann’s pouch. The needle is retrieved and a second pass is made to form a loop on the gallbladder. The needle and the suture are then passed through the loop and pulled. This locks the loop on the gallbladder. The needle exits the abdominal wall laterally. (fig -3)
- Hemostats are placed on both ends of the suture. The gallbladder is now “suspended” on a length of suture, allowing its medial and lateral rotation in a manner identical to that during a multi-port cholecystectomy. The surgeon is thus able to carry out a two-handed dissection.
- Sterile, inexpensive plastic pouch used for gall bladder retrieval.
- Fascia closed using two or more figure-of-eight sutures of a non-absorbable suture material such as no 1 or 1-0 polypropylene. Skin is approximated with a running subcuticular suture.

OBSERVATION AND RESULTS
Selected Patients with symptomatic gall bladder stone were underwent single incision laparoscopic cholecystectomy using conventional instruments.
- The age of patients included in our study was ranged from 19 years to 69 years
with mean age was 32.72 years. There were 5 males (20%) and 20 females (80%). The female to male ratio in both groups was 4:1. BMI ranged from 18 to 30 kg/m² with mean BMI of 20.04 Kg/m².

- Two patients out of twenty five patients (8%) developed intra operative complication. One of the 25 patients (4%) who underwent SILC had gall bladder perforation due to thick adhesions around calot’s triangle and difficulty in achieving critical view of safety and one another patients had bleeding from cystic artery.
- One patient out of 25 patients required additional of port while procedure to control bleeding from cystic artery. Another patient required conversion to standard laparoscopic cholecystectomy due to difficult calot’s triangle dissection due to thick adhesion in order to achieve critical view of safety.
- Mean duration of surgery was 109.6 minutes.
- At 12 hours mean pain score was 3.8 on Visual analogue scale.
- During postoperative period none of the patient from SILC group had wound infection. There was no postoperative bleeding, biliary leak and peritonitis, port site hernia.
- The mean hospital stay was 1.28 days.
- Most patients were satisfied with an almost scar less procedure and less pain after operation. There was no readmission after discharge. Most patients were satisfied with overall results and the aesthetic results.

<table>
<thead>
<tr>
<th>Studies</th>
<th>Type (No of Trocar)</th>
<th>No of Cases</th>
<th>Conversion or Addition of port No of patients (%)</th>
<th>Complication No of patients (%)</th>
<th>Complication(s)</th>
<th>Average Operating Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roland Raakow et al</td>
<td>Tri port</td>
<td>220</td>
<td>5 (2.72%)</td>
<td>11 (5%)</td>
<td>Wound haematoma</td>
<td>62</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wound seroma</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Incisional hernia</td>
<td></td>
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<tr>
<td>Rivas et al</td>
<td>SILS port (1)</td>
<td>100</td>
<td></td>
<td>0</td>
<td>None</td>
<td>Not reported</td>
</tr>
<tr>
<td>Rawling et al</td>
<td>Multiport (3)</td>
<td>54</td>
<td>6 (11.1%)</td>
<td>2 (3.7)</td>
<td>Wound infection</td>
<td>113.1</td>
</tr>
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<td>Cuesta et al</td>
<td>Multiport (2)</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>None</td>
<td>70</td>
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<tr>
<td>Zhu et al</td>
<td>Multiport (2)</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>None</td>
<td>30-150</td>
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<td>Palanivelu et al</td>
<td>Multiport (2)</td>
<td>10</td>
<td>4 (40%)</td>
<td>1 (10%)</td>
<td>Cystic artery bleed</td>
<td>148</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Difficult dissection</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bile leak</td>
<td></td>
</tr>
<tr>
<td>Navarra et al</td>
<td>Multiport (2)</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>None</td>
<td>Not reported</td>
</tr>
<tr>
<td>Piskun et al</td>
<td>Multiport(2)</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>None</td>
<td>Not reported</td>
</tr>
<tr>
<td>WU ji et al</td>
<td>Multiport(2)</td>
<td>22</td>
<td>1 (5%)</td>
<td>1 (5%)</td>
<td>Cystic artery bleeding</td>
<td>56.5</td>
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<tr>
<td>Deepraj et al</td>
<td>Multiport(2)</td>
<td>110</td>
<td>5(4.5%)</td>
<td>0</td>
<td>Difficult dissection</td>
<td>Not reported.</td>
</tr>
<tr>
<td>Our study</td>
<td>Multiport(2)</td>
<td>25</td>
<td>1</td>
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<td>Difficult dissection</td>
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</table>

**DISCUSSION**

The ultimate goal of surgery has always been providing the best and most effective procedure with the least amount of postoperative complications, pain and the best possible aesthetic results. Surgery of the biliary tract by no means the exception. Today, laparoscopic cholecystectomy is the gold standard for gallbladder removal and the most common laparoscopic surgical procedure in the world. Numerous reports have provided overwhelming evidence that laparoscopy provides better cosmetic results, less postoperative pain, and shorter recovery time when compared with open cholecystectomy. However, the quest to develop even more minimally invasive surgical techniques in order to enhance the advantages of laparoscopy remains robust. This quest has led surgeons to seek to minimize the number and the size of incisions, or in the case of natural orifice transluminal endoscopic surgery (NOTES) to eliminate skin incision(s) altogether. The hope of these more minimally invasive procedures is that they will also lead to minimal or no post-procedural pain while improving cost-effectiveness and patient safety. While totally incision less surgery remains an impossible idea at present, NOTES, initially performed in animal models, is now a clinically relevant idea with anecdotal procedures having
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been performed on human subjects worldwide. As a bridge between traditional laparoscopy and NOTES, recent focus has been on the development of single-incision laparoscopic surgery (SILS) to further minimize the invasiveness of laparoscopy by reducing the number of incisions, and hopefully the pain and complication(s) associated with them. In SILS the entire procedure is accomplished through one incision instead of multiple incisions required in traditional (multiport) laparoscopic surgery with conventional laparoscopic instruments.

CONCLUSION

SILC using conventional laparoscopic instruments is safe & feasible and is an effective alternative to standard four-incision laparoscopic cholecystectomy in selected patients in experienced hands. The Primary benefit of SILC here appears to be improved cosmetic outcomes, postoperative pain, intraoperative and postoperative complications and hospital stay. In our study number of patients is less, follow up is relatively short; therefore some long term complications as port site herniation may be underestimated. Large randomized controlled trials will be necessary to further establish its safety.

FIGURES

Figure1: position & Placement Of Port

Figure2: fundal Retraction Suture

Figure3: hartman Retraction Suture

REFERENCES