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Single Incision Laparoscopic Cholecystectomy – A New Advantage of Gallbladder Surgery

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A B S T R A C T

In this study is demonstrated our experience in single incision laparoscopic cholecystectomy (SILS), compared to standard laparoscopic cholecystectomy. There were 48 single incision laparoscopic cholecystectomies (SILS) performed during one-year period (A group) and results have been compared with a group of 50 patients who underwent standard laparoscopic cholecystectomy (B group). Outcome measures included operative time, need for conversion, complications, additional analgesia for pain control after procedure, hospital stay and cosmetic outcome. The mean operative time was 46+/–3.5 min in A group, and 43+/–4 min in B patients group. Early postoperative complications were not detected. The mean hospitalization period was 2 days in both groups. Our experience suggests that SILS cholecystectomy can be performed with outcome similar to standard laparoscopic surgery while affording better cosmesis.

Key words: *single incision laparoscopic cholecystectomy, surgical technique*

Introduction

Laparoscopic cholecystectomy (three or four trocars) is known to be a gold standard for cholecystectomy[1,2].

As a result of development surgical technique and highly sophisticated technologies, surgical approach to gallbladder has tendency to become less invasive by reducing number and size of operative ports and instruments[1,3–12]; with intention of less postoperative pain, shorter hospitalization time and better cosmetic results. Single-incision laparoscopic (SILS) cholecystecomy is a step toward to these objectives, because it cannot be overstated that every incision and trocar placement poses a risk of bleeding, organ damage and incisional hernia.

In this retrospective study is demonstrated our initial experience with relatively new single incision laparoscopic cholecystectomy[7–12].

Materials and Methods

Between October 2008 and October 2009, 98 patients with gallstones were randomly selected and randomly divided into two groups (A group and B group). Randomization in groups was generated preoperatively by a computer in blocks of 10. 58 patients were women and 40 patients were man, median age 44+/–6 years (range 35–50 years), body mass index less then 35 kg/m^2.

Gallstones were preoperatively detected by standard abdominal ultrasound exam. All patients didn't have signs of inflammation or acutisation of cholecystitis (normal levels of CRP <10 mg/L), leukocyte (3.4~9.7) 10^9/L and body temperature(< 37 °C) within last two months.

Preoperatively all patients got antitrombotic prophylaxis dose of low molecular heparin sc., according to their mass, and one dose of cefazoline (2g i.v.). All the patients had been informed about surgical technique and possible complications and provided written informed consent.

The 48 patient underwent SILS cholecystectomy (A group) and 50 patients standard laparoscopic cholecystectomy (B group).

Operations were performed by the same surgical team at »Sveti Duh« General hospital, Zagreb, Croatia form October 2008 till October 2009.

Outcome measures included operative time, need for conversion (either to standard laparoscopy or open inci-

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sion), complications, additional analgesia for pain control after procedure, hospital stay and cosmetic outcome.

Operative technique

Anesthesia was induced with propofol (2.5 mg/kg), fentanyl (2 μg/kg) and rocuronium bromide (0.6 mg/kg), and maintained with isoflurane (0.8%–1.5%), nitrous oxide in 40% oxygen. A temporary nasogastric tube had been placed to promote emptying of gastric content. Cefazoline 2 g had been given intravenously to all patients 1 h before procedures.

Postoperative analgesia was provided with a combination of metamizol 1.25 g and tramadol hydrochloride 100 mg in 100 mL 0.9% NaCl over 20 min i.v.

After the operative field had been prepared and draped, patients were placed in reverse Trendelenburg position. The surgeon stood between the patient's legs and the assistant on the left side.

A single incision 12 mm length was made above the umbilicus as an approach to abdominal cavity.

Pneumoperitoneum was created with the Veress needle. Gas insufflation was performed by automatic insufflators (Electronic-Laparoflator Model 264300 200, Storz, Tuttlingen, Germany) at a rate of 2 L/min until the intra-abdominal pressure reached 12–15 mm Hg.

A 10 mm trocar(30103 MP, Karl Storz Endoscopy, Inc. (KSEA) Culver City, California, USA) was induced supraumbilicaly and used as a camera port (26003 AA, HOPKINS® II Straight Forward Telescope 0°, Karl Storz Endoscopy, Inc. (KSEA) Culver City, California, USA). The abdominal cavity was explored. Two 5-mm trocars (KSEA) Culver City, California, USA) were then inserted into the abdominal cavity, each placed laterally from the 10-mm trocar (Figure 1). Through those, smaller trocars roticular instruments (Roticulator (Covidien 150 Glover Avenue Norwalk CT, USA) were used. After the visualization of gallbladder, we used a retrograde technique of laparoscopic cholecystectomy without additional fixative suture of gallbladder fundusŠ10Ć and crossing of the instruments within abdominal cavity. Gallblader was removed through supraumbilical inicision. (Figure 2). Finally skin incision was adapted (Figure 3) (A group).

Fig. 1. Supraumbilical incision and trocars position (10-mm trocar in centre and two 5-mm trocars on the left and right side of the 10 mm trocar placed through the same skin and fascia incision).

Fig. 2. Gallbladder extraction.

In B group, standard 3-port laparoscopic cholecystecomy was performed[2].

Clinical status of the patients, need for analgesia, body temperature and hospitalization period were observed postoperatively.

Patients were observed by surgeon during regular control exams every fourteenth day during one month and resumed with oral diet.

The statistical analysis of our results was performed by Mann–Whitney U test. P-value <0.5 was considered significant. Data are presented as median, $\overline{X}$±SD.

Results

The mean operative time was 46+/–3.5 min (range 35–58 min) in A group, and 43 min +/–4 min (range 33–60 min) in B group (P-value <0.5).

In one A group patient, we had to ad 1 additional trocar away from the umbilicus to able adequately delineate the anatomy of Callot's triangle. There were not any conversions laparoscopic to open cholecystectomy. No intraoperative adverse events or perioperative complications were reported.

Fig. 3. Postoperative cosmetic result.

TABLE 1
COMPARISON OF PATIENTS UNDERGOING SILS CHOLECYSTECOMY *VS.* STANDARD THREE PORT LAPAROSCOPIC CHOLECYSTECTOMY. P-VALUE <0.5 WAS CONSIDERED SIGNIFICANT

$\overline{X}$ +/– SD	SILS cholecystectomy	Standard lap. cholecystectomy	p-value
Number of patients (N)	48	50	
Age (years)	44+/–6	44+/–5.7	NS
Gender			
Male	22	18	NS
Female	26	32	NS
BMI (kg/m^2)	27+/–4	27+/–4	NS
Length of operation (min)	46 +/–3.5	43 +/–4	NS
Aditional analgesia for pain control (N)	1	3	NS
Hospitalisation period (day)	2 +/– 0.6	2+/– 0.5	NS

Postoperatively, one patient in A group and 3 patients in B group got additional analgesia to control pain.

During hospitalization, the body temperature was within normal range in both group patients. No postoperative complications were reported. Median time of hospitalization was 2+/–0.6 days range 1–4 days in patients undergoing SILS cholecystectomy *vs.* 2+/–0.5 days range 1–4 for those undergoing standard laparoscopic cholecystectomy (p-value <0.5).

Inflamation and herniation of the supraumbilical incision were not reported during the hospitalization and regular exams. All patients undergoing SILS cholecystectomy had better cosmetics results (one, 20 mm long scar) compared to patients undergoing standard laparoscopic cholecystectomy (one scar 15–20 mm long, two scars 0.8 mm long). All patients were very pleased with the cosmetic outcome.

Discussion

Laparoscopic cholecystectomy (three or four trocars) has become a gold standard for the gallbladder surgery[1,2]. As a result of development surgical technique and highly sophisticated technologies new surgical approaches to gallbladder are tested, e.g. transvaginal[3–5], transgastrical[5,6] approach), with a purpose of better cosmetic postoperative result, less postoperative pain, shorter hospitalization period, but with the same efficacy and safety as standard laparoscopic cholecystectomy.

Each of those approaches has its own difficulties and possible complications, which are disadvantages to a standard or cosmetic laparoscopic cholecystectomy. Surgeons have started to develop a single incision laparoscopic surgery, recently, as a novelty of gallbladder surgery[1,7–12].

Single incision laparoscopic cholecystectomy is improvement in laparoscopy, less invasive and enhances the cosmetic defect, but does not add new risks to standard laparoscopic cholecystectomy[1,7–12].

Early minimal access surgery, such as laparoscopy was attempt to lessen the scarring, pain, and recovery time associated with large incisions. Single incision laparoscopic surgery is an evolution of this concept that aims to completely eliminate visible scaring from abdominal procedures. Also, it cannot be overstated that every incision and trocar placement poses a risk of bleeding, organ damage and incisional hernia.

Our experience described in this study suggest that SILS cholecystectomy is safe and feasible technique with short learning curve and can be performed with outcome similar to standard laparoscopic surgery while affording better cosmesis, however, a larger series in necessary to determine if there are any benefits in pain or recovery.

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LAPAROSKOPSKA KOLECISTEKTOMIJA KROZ JEDNU INCIZIJU – NOVI IZAZOV KIRURGIJE ŽUČNJAKA

S A Ž E T A K

Kao posljedica težnje smanjivanju invazivnosti tradicionalne laparoskopske kirurgije razvijena je laparoskopska kolecistektomija kroz jednu inciziju. U ovom radu su prikazani naša iskustva i rezultati s laparoskopskom kolecistektomijom kroz jednu inciziju, koje smo usporedili s uobičajenom laparoskopskom kolecistektomijom. U razdoblju od godine dana učinili smo 48 laparoskopskih kolecistektomija kroz jednu inciziju (A grupa) te smo usporedili naše rezultate s 50 bolesnika kojima je učinjena uobičajena laparoskopska kolecistektomija (B grupa). U studiji je sudjelovalo 58 žena te 40 muškaraca, srednje dobi oko 44 godine, body mass indeksa manjeg od 35 kg/m^2. Pratili smo vrijeme trajanja operacije, potrebu za konverzijom u otvorenu kolecistektomiju, postoperacijske rezultate, količinu potrebne analgezije, vrijeme hospitalizacije i krajnji kozmetski učinak. Srednje vrijeme trajanja operacije je iznosilo 46 +/–3,5 min u A skupini te 43 +/–4 min u B skupini bolesnika. Kod jednog bolesnika iz A skupine tijekom operacije dodan je još jedan troakar. Kod ostalih bolesnika iz A skupine nije bilo potrebe za konverzijom na uobičajenu tehniku laparoskopske kolecistektomije ili na otvorenu kolecistektomiju. Kod niti jednog operiranog bolesnika (A i B skupine) nisu uočene postoperacijske komplikacije. Srednje vrijeme hospitalizacije bilo je 2 dana u obje grupe bolesnika. Prema našem dosadašnjem iskustvu možemo zaključiti da laparoskopska kolecistektomija kroz jednu inciziju daje slične rezultate uobičajenoj laparoskopskoj kolecistektomiji ali s boljim kozmetskim rezultatima.