การผ่าตัดถุงน้ำดีผ่านกล้องวีดิทัศน์โดยเจาะรูที่ผิวหนังเพียง 1 รูเพื่อผลลัพธ์ที่สวยงาม

(One-incision Laparoscopic Cholecystectomy: Excellent Result)

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บทคัดย่อ

นิ่วในถุงน้ำดีจัดเป็นโรคที่พบบ่อย การรักษามาตรฐานในปัจจุบันคือการผ่าตัดถุงน้ำดีผ่านกล้องวีดิทัศน์ ซึ่งทำได้โดยการสอดกล้องผ่านแผลขนาดเล็กบริเวณสะดือ โดยความก้าวหน้าทางการรักษาในปัจจุบันทำให้มีการออกแบบวิธีผ่าตัดใหม่ๆ เพื่อให้มีแผลผ่าตัดที่ขนาดเล็กลงจำนวนแผลน้อยลง ซึ่งทำให้สังเกตได้ยากขึ้นเพื่อส่งผลให้ผู้ป่วยพึงพอใจในความสวยงาม และโดยวิธีผ่าตัดดังกล่าวทำให้ผู้ป่วยมีระยะพักฟื้นสั้นลง สามารถกลับไปทำงานตามปกติได้เร็วขึ้น

การศึกษานี้มีเป้าประสงค์เพื่อที่จะนำเสนอวิธีการผ่าตัดถุงน้ำดีแบบใหม่ที่เรียกว่าการผ่าตัดถุงน้ำดีผ่านกล้องวีดีทัศน์ โดยวิธีเจาะรูที่ผิวหนังบริเวณสะดือเพียง 1 รู เพื่อจะได้มีจำนวนแผลน้อยที่สุด และสังเกตแผลได้ยาก โดยศึกษาในระหว่างมิถุนายน 2549 ถึงพฤษภาคม 2550 มีผู้ป่วยในการศึกษานี้ 33 คน ผลการศึกษาพบว่าผู้ป่วยทั้งหมดสามารถเข้ารับการผ่าตัดด้วยความปลอดภัย ไม่มีภาวะแทรกซ้อนภายหลังการผ่าตัด ใช้เวลาผ่าตัดเฉลี่ย 62.1 (21-144) นาที และผู้ป่วยทุกคนพึงพอใจในผลการรักษา

Abstract

Background & Aims:

Laparoscopic cholecystectomy (LC) is the “gold standard” in the treatment of benign gall bladder diseases which gained widespread acceptance among

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surgeons. Various refinements of the technique have been developed in order to achieve better cosmetic effects and more rapid recovery. The aims of this study performing one-incision laparoscopic cholecystectomy (OILC) were to avoid any surgical injuries in upper abdomen, to get the lowest abdominal injury having only one small wound under the umbilicus which leads to difficult wound observation and better cosmetic results, and to evaluate the feasibility, characteristics, duration, complication and length of hospital stay in the patients.

Methods:

33 patients indicated for elective LC were recruited to perform OILC. A u-shaped incision was made under the umbilicus resulting in one hidden scar.

Results:

OILC was performed in 33 patients, 10 males and 23 females. All 33 operations were successful, with no conversion to standard laparoscopic or open cholecystectomy. The mean operative time was 62.1 min. There were no serious intraoperative or postoperative complications. All patients reported excellent postoperative cosmetic results.

Conclusions:

In these small case series, OILC could be done safely, with no observable prolonged surgical time, no adverse complication and getting excellent cosmetic results. However, larger case series are required to ascertain the safety of this technique.

Key words: Laparoscopy; cholecystectomy; one -incision, one wound, one-incision laparoscopic cholecystectomy.

Introduction

Laparoscopic cholecystectomy (LC) is the "gold standard" in the treatment of benign gall bladder diseases. After being first performed in 1985[1], LC has achieved widespread acceptance among surgeons[2, 3] and various refinements of the technique have been developed. LC is performed by surgeons using 4 ports, 3 ports and even 2 ports[4]. Surgeons have tried to further improve LC techniques in order to achieve better cosmetic effects and more rapid recovery[5-7]. Many attempts have been made to reach these goals. In 1996, one-wound LC was developed by Navarra G. et al[5]. For this technique, two skin incisions in the upper part of the umbilicus were created and three straight needles were used, puncturing through the abdominal wall in the right upper quadrant (RUQ) to raise the gallbladder and expose Calot's triangle. While this technique has only one wound, many injuries including RUQ injuries still occurred. Further progress in cosmetic minilaparoscopic cholecystectomy has been developed by Leggett et al.[6, 7]. Although they used three ports, they moved two trocars to either side of the midline at the level of the pubic hairline instead

of placing them in the subxiphoid and subcostal positions. The outcome revealed one hidden umbilicus scar, with two other scars located below the bikini line. Furthermore, in 2006, Zoran CGala et al.[8] reported the technique which can improve cosmetic in LC. They moved two trocars below the pubic hairline which was able to reduce wounds in the RUQ area. However, for both these techniques, three wounds have been created and a large operative field is needed. The aims of this study performing one-incision laparoscopic cholecystectomy (OILC) were to avoid any surgical injuries in upper abdomen, to get the lowest abdominal injury having only one small wound under the umbilicus which leads to difficult wound observation and better cosmetic results, and to evaluate the feasibility, characteristics, duration, complication and length of hospital stay in the patients. We hypothesized that OILC, performed by well trained surgeons in this innovative technique, can be done with safety, no observable prolonged surgical time, no adverse complication and getting excellent cosmetic results.

Patients and methods

The ethics of this research study including the technique were approved by the Phichit Hospital ethics committee. From June 2006 to May 2007, 33 patients indicated for elective LC were recruited in this study to perform OILC at the Department of Surgery, Phichit Hospital, Phichit Province, Thailand. Exclusion criteria were patients who had severe medical illness, acute cholecystitis, coagulopathy and malignancy.

Patients were admitted to the hospital 1-2 days prior to the surgery to perform blood tests including complete blood count (CBC), liver function test (LFT), blood urea nitrogen (BUN), serum creatinine, serum amylase, prothrombin time (PT), partial thromboplastin time (PTT), international normalized ratio (INR), urinalysis, chest xray, electrocardiography (age>35) and hepato-biliary system ultrasonography. Informed consent was obtained from all patients after all procedures were explained including surgical procedures, complication, advantages, disadvantages, correction methods in case of OILC failure, post-operative care and follow up process.

A complete blood count was performed and pethidine requirement was recorded postsurgery. All patients were asked to stay in the hospital for at least 3 days after surgery to check LFT and serum amylase. Outcome assessments included conversion, operating time, anesthetic time, gall bladder dissecting time, gall bladder removal time, incision length, postoperative analgesia, length of hospital stay, complications and

patient satisfaction score. Patients were followed up 1 week, 3 weeks and 3 months after operation.

Operative technique

After general anesthesia was established and the operative field was prepped and draped, the patient was placed in the supine position. After a u-shaped incision was made under the umbilicus, a 10-mm trocar (Pyramidal tip, 30103M, Karl Storz Endoscopy, Tupplingen, Germany) was placed into the abdominal cavity caudal to the bottom of the incision 1-2 cm by open technique with port's valve and gas pipe line pointed into the same direction (Fig.1). After a figure-of-eight suture was established at rectus sheath with Vicyl No.1, the abdomen was insufflated by electronic endoflator (264305 20, Karl Storz Endoscopy, Tupplingen, Germany) to 15-20 mmHg, and a 0° 10-mm laparoscope (Hopkins II Telescope 0° Straight Forward, 26033 APA, Karl Storz) was introduced. A survey of the abdomen was performed to confirm proper entry into the abdominal cavity. With the surgeon standing on the patient's left side, another 5-mm two trocars (Short Pyramidal tip, 1005-2, Omnimed) were placed at the left and right angle of the u-shaped incision (same skin incision) (Fig 1).

A 5-mm grasper (5DSG, Ethicon Endo-surgery) was inserted through the 5-mm trocar placed in the left side of the incision (right side of the patient) and was held in the surgeon's left hand. On the right angle of the u-shaped incision, other instruments such as Roticulator endodissecter, dissecting forceps, hook electrode, monopolar electrocautery, clip applicator, or suction/irrigator probe were inserted and these instruments were held in the surgeon's right hand. The important or key instrument for OILC is a 5-mm Roticulator endodissecter (174213, Tyco), which can be extended, hinged and angled 0-80° liked a human wrist joint (Fig.2).

The grasper in the surgeon's left hand was used to retract Hartmann's pouch to expose the hepatobiliary triangle from the medial side. When Hartmann's pouch was pushed medially and lifted up, the hepatobiliary triangle was exposed from its lateral side. After the surrounding tissue in the hepatoduodenal ligament was dissected from the cystic duct and artery, the cystic duct–common bile duct junction was identified. The cystic duct was dissected through the neck of the gall bladder setting the gall bladder free from gallbladder base. Once the cystic artery and duct were dissected and exposed, a 5-mm endoscopic rotating multiple clip applier (AL326, Ethicon Endo-Surgery) was introduced through the right port. The cystic duct and artery were clipped with two metallic clips proximally, one distally, and then divided. The gallbladder was extracted with the grasper through the left port and

was removed from the abdomen via the 10-mm port. In the case of large stones, the gall bladder and the stones were put into a plastic bag, then the stones were crushed by an arterial clamp and were gradually removed from the abdomen. Subsequently, the plastic bag and the remaining contents were removed via the 10-mm port. After the gallbladder had been removed, the abdominal cavity was desufflated and the trocars were removed. The skin incision was closed by Maxon 4/0 subcuticularly.

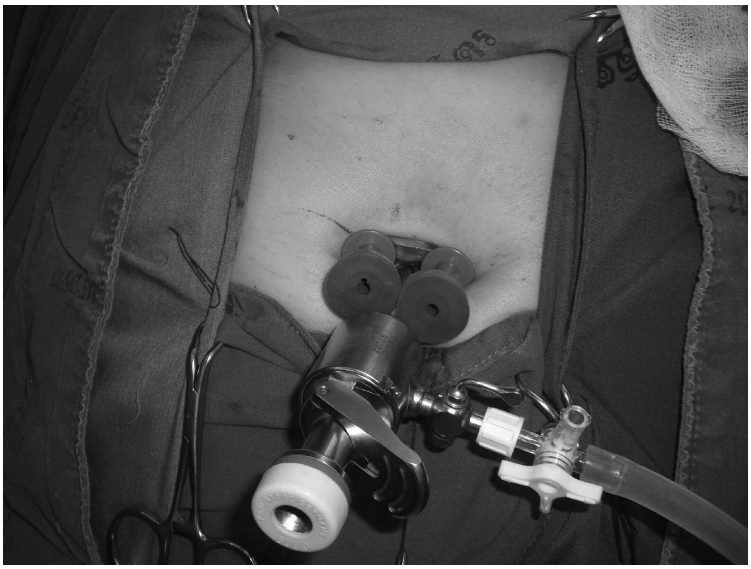


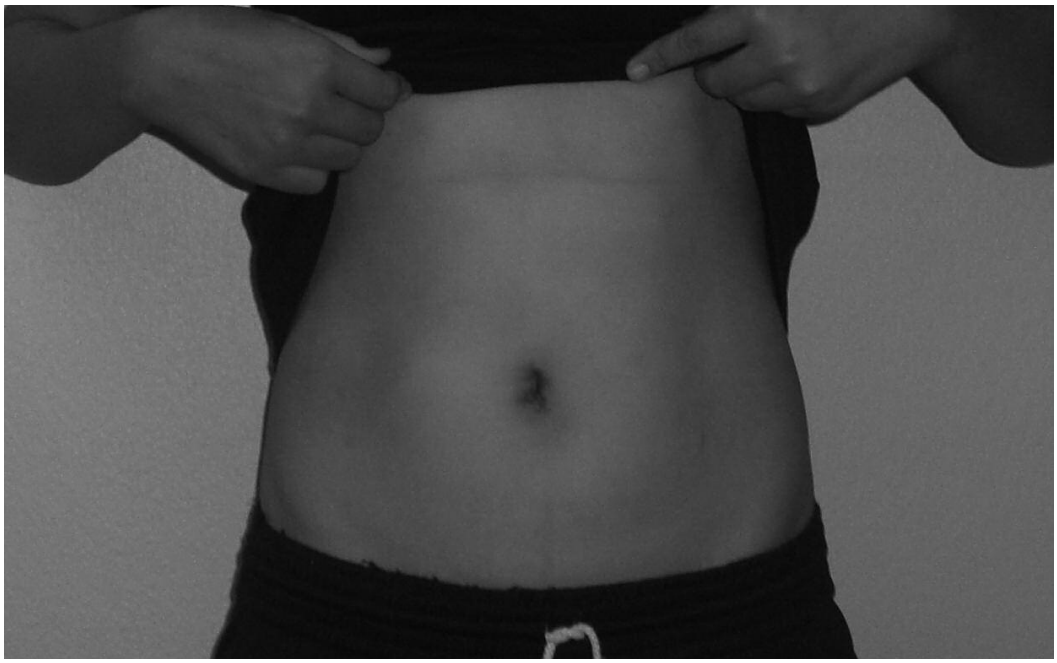
Fig. 1. The placement of ports. The 10-mm port is placed caudal to the bottom of the u-shaped incision 1-2 cm with port's valve and gas pipe line pointed into the same direction and other two ports are placed at the angle of the u-shaped incision. 745x558mm (96 x 96 DPI)

Fig. 2. Laparoscopic view showing the Roticulator endodissecter which can be extended, hinged and angled 0-80° like a human wrist joint. 281x211mm (96 x 96 DPI)

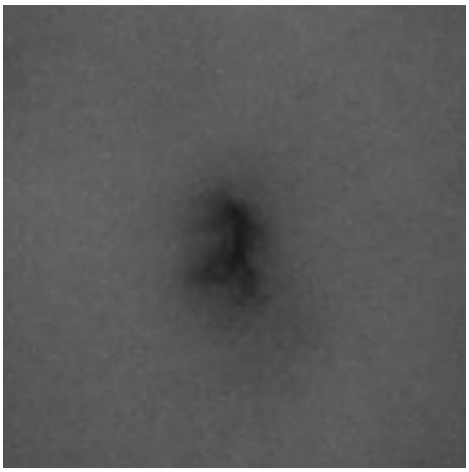
Fig. 3. Postoperative view 3 months after OILC with an excellent cosmetic result.

3A1. Whole abdomen of an obese man. 685x514mm (96 x 96 DPI)

3A2. Wound under the umbilicus of an obese man. 83x78mm (96 x 96 DPI)



3B1. Whole abdomen of an average-build woman. 329x205mm (96 x 96 DPI)



3B2. Wound under the umbilicus of an average-build woman. 61x61mm (96 x 96 DPI)

Results

OILC was performed in 33 patients, 10 males and 23 females, from June 2006 to May 2007 at the Department of Surgery, Phichit Hospital, Phichit Province, Thailand. The average age was 51 years (range, 17-78 years) and the average body mass index was 26.3 (range, 17.6-36.1). A total of 32 patients, were diagnosed with symptomatic gall stones; the other was chronic cholecystitis with gall bladder polyp. A number of patients had underlying diseases, 7 had hypertension, 4 diabetes mellitus, 5 dyslipidemia, 3 cirrhosis, 2 thalassemia and 4 had experienced a previous operation (hysterectomy, tubal resection, cardiac septal wall repair and laparoscopic diagnosis from a gynecological condition).

All 33 operations were successful with no conversion to a standard laparoscopic or open cholecystectomy. The mean operative time measured from the first incision to removal of the gall bladder was 62.1 min (range, 21-144 min) and the mean anesthetic time was 92.9 min (range, 58-145 min). Instrument preparation time had an average of 17.24 min (range, 10-30 min). The average gall bladder dissecting time measured from the first skin incision to complete dissection of the gall bladder from gall bladder base was 52.18 min (range, 19-96 min). The mean gall bladder removal time, calculated when the gall bladder was free from gall bladder base until it was removed from the abdomen, was 9.9 min (range, 2-48 min). Gall stone diameter varied from 0.2-2.5 cm. The mean incision length was 2.55 cm . (range, 1.8-3.5 cm).

There were no intraoperative or postoperative complications, except one patient had seroma at the operative wound. The average postoperative hospital stay was 3.9 days (range, 3–6 days) due to our protocol to evaluate LFT and serum amylase. Postoperative follow-up assessments done at 1 week, 3 weeks and 3 months revealed no complications and the patients' symptoms had resolved.

All patients reported 10/10 cosmetic score at the day of discharge, 1 week, 3 weeks and 3 months after discharge. (Fig. 3A1, 3A2, 3B1, 3B2).

A tissue biopsy was done, and pathologic evaluation of the specimens revealed 20 with chronic cholecystitis, 12 chronic active cholecystitis, and 2 cholesterolosis.

Discussion

LC is considered to be the gold standard procedure for cholecystectomy; however, more and more techniques have been developed to further accomplish better cosmetic effects and more rapid recovery results, with patients' safety being the most important issue. This study revealed the possibility of improving LC results by creating only one skin incision under the umbilicus in order to reduce and hide the surgical wound.

Although the incision length is a little bit longer than the traditional technique, the wound located under the umbilicus is difficult to observe and almost undetectable appearing like no surgical wound resulting in better cosmetic effects.

In these small case series, this study has shown that OILC is a safe procedure, with no conversion to open operation or traditional LC, better cosmetic results and no observable increase in the complication rate, mean operative time and mean gall bladder removal time. However, this study involved only a small number of cases; all the safety issues could not be concluded and further consideration is required. Larger case series and a longer follow up period are needed to ascertain the safety of this innovative technique. The length of hospital stay for this study, which was 4 days, was quite long because of our regimen in asking the patients to stay in the hospital for at least 3 days post-surgery to perform LFT and serum amylase blood testing. Because patients' safety is the most important concern for the newly developed technique, and due to the difficulty of acquiring a complete record if they are allowed to go home, we decided to do such a regimen to ensure their safety. In fact, almost all patients could go home on the operative day, and it would be possible to perform this technique as one day surgery in order to decrease cost and length of hospital stay.

The important points of successful OILC are the direction of the 10-mm port's valve and the gas pipe line and the properties of Roticulator endodissecter. The 10-mm port's valve has to point to the same direction with the gas pipe line in order to increase the angle of movement which helps prevent moving against each other. The endodissecter, a very important instrument for OILC, which can be extended, hinged and angled 0-80° like a human wrist joint, allows the performance of OILC without difficulty with the limited space and narrow angle. Furthermore, by the property of having a cautery at

the back of the dissector, the dissector can be freely moved without knocking against other devices. A plastic bag helps to prevent contamination of the abdomen from the bile and crushed stones and enables the removal of large gall stones from a small hole. By using all of these techniques, OILC can be performed successfully with safety and better cosmetic effects.

Conclusion

OILC demonstrates a further progress in the improvement of LC. This study showed this technique can be done safely, no serious complications and excellent cosmetic results. However, more case series and longer patient follow up are required to ascertain the safety of this technique. In addition, we hope that this technique can be modified and further developed in order to perform other operations in the near future with the intention of getting better results together with high patient safety and no complications.

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