

TWO-PORT LAPAROSCOPIC APPENDECTOMY: THE LASSO TECHNIQUE

LAPAROSKOPSKA APENDEKTOMIJA KORIŠTENJEM DVA TROAKARA: LASO TEHNIKA

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Abstract: *We would like to present inovative technique intended to decrease surgical trauma and scar formation in patients undergoing laparoscopic appendectomy. Two-port appendectomy was attempted in 15 consecutive patients. In 3 patients operation was converted to open procedure and in 3 patients the third port was needed. Conclusions: This intracorporeal two-port appendectomy in selected patients does not prolong operation time and further improves the minimal invasiveness and contributes to excellent cosmetic results.*

Key words: *laparoscopic appendectomy, cosmetic results*

Sažetak: *U radu se prikazuje inovativna tehnika u bolesnika podvrgnutih laparoskopskoj apendektomiji s ciljem smanjenja kirurške traume i postoperativnog ožiljka. Laparoskopska apendektomija kroz dva troakara pokušana je u 15 uzastopnih bolesnika. U 3 bolesnika je zahvat je konvertiran u otvoreni postupak a u 3 bolesnika bilo je potrebno uvo enje tre eg troakara. Zaključak: laparoskopska apendektomija s dva troakara u bolesnika ne produžuje vrijeme zahvata, unapre uje minimalno invazivnu tehniku i dodatno poboljšava estetski rezultat.*

Ključne riječi: *laparoskopska apendektomija, estetski rezultat*



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1. Introduction

Today, it could be stated that laparoscopic appendectomy is the gold standard for experienced laparoscopic surgeons. The procedure was introduced in 1983 by gynaecologist Kurt Semm [1]. Several approaches were tried for further minimizing this surgical procedure. Decreased number of ports and decreased port diameter or appendectomy through natural orifices (NOTES) are currently used. Some procedures such as single port (with various modifications and terms) or NOTES (real or hybrid) procedures require technical equipment and trained surgeons which is too expensive especially for smaller hospitals with low budget. Thus we present two-port intracorporeal laparoscopic appendectomy which we termed *Lasso technique* and which can be done with standard laparoscopic equipment.

2. Methodology

In a 15 consecutive patients we started as two-port intracorporeal laparoscopic appendectomy for presumed appendicitis. After induction of general anaesthesia and urinary catheterization, 5-mm umbilical or supraumbilical incision is created and a carbon dioxide (12 mmHg) pneumoperitoneum is induced with a Veress needle. Next, 5-mm trocar is introduced for the placement of laparoscope. A second 12-mm trocar is introduced through the midline (or left paramedian) suprapubic incision (below the pants line) and the peritoneal cavity is inspected. After identification it is grasped for mesoappendix and elevated to the anterior abdominal wall for estimation of adequate exposure of the mesoappendix and appendiceal junction and relative mobility of the cecum. Then the appendix is directed toward 12-mm suprapubic port for easier placing of pre-tied loop ligature. Pre-tied loop ligature is introduced through suprapubic port and tied around the base, 1-2 cm distally from the origin of the appendix, or below the macroscopically changed appendix to minimize the possibility of appendiceal rupture and spillage of its contents. If the appendix cannot be directed toward 12-mm port or there is technical difficulty in seizing the appendix (*Lasso technique*) then the bowel clamp or forceps is introduced through the same port for assistance. The instrument is pulled through endoloop, the appendix is grasped and the endoloop tied down over the instrument. Then the suture grasper is introduced above the appendiceal origin or 1-2 cm cranially to its base. The free end of the pretied loop suture is placed in the suture grasper. Then the appendix is elevated by pulling the endoloop through the skin until the mesoappendix and the base of the appendix are exposed adequately. Ultrasonic cutting device is introduced and used as much times as needed to divide the mesoappendix.

After complete skeletisation of the appendix the 45-mm linear stapler-cutter is introduced and fired at the junction of appendix with the cecum. After division the appendix is hanging on the endoloop. If not bulky the appendix can be exteriorized with the grasper through the 12-mm port. If bulky, plastic bag, Endocatch Gold (Covidien, Autosuture, USA) is introduced. This model is the most suitable because it

does not require the use of other instrument (and another laparoscopic port) for pulling the stripe for closing the bag.

3. Results

Six of 15 operations in the study were not completed as two-port appendectomy. In three male patients operation was converted to open procedure and in 3 patients the third port was needed because of difficulties due to subserosal retrocoecal/retroperitoneal localization. Finally 9 patients were operated with intracorporeal two-port technique. The operative time range for two-port technique was 31-54 min. The postoperative stay ranged from 2 to 4 days. Differences between patients who were operated with two- and three-port appendectomy in terms of length of hospital stay and operating time was not statistically significant. Postoperative median follow-up period was 12 months. There was one early postoperative complication in patients with two-port technique. It included wound infection of suprapubic 12-mm port where gangrenous appendix was extracted. The wound was left open and treated with regular wound and dressing changes. Cosmetic results of the port and needle insertion sites were excellent also confirmed by patients after one and three months. Only supraumbilical incision was slightly visible, and lengthier 12 mm incision was below pants line.

4. Discussion

First laparoscopic appendectomy was performed by Kurt Semm and published in 1983 [1]. Today most surgeons offer laparoscopic appendectomy as first line treatment of acute appendicitis because of its clear advantages including decreased pain, fewer postoperative complications, decreased length of hospitalization, better intra-abdominal visualization, and better cosmesis [2]. The 'classic' laparoscopic technique requires three trocars. Decreased number of ports and decreased port diameter or appendectomy through natural orifices (NOTES) are currently used. Some procedures such as single port (with various modifications and terms) or NOTES (real or hybrid) procedures require technical equipment and trained surgeons which is too expensive especially for smaller hospitals with low budget. Another direction was to hide the incisions below the bikini (pants) line despite of number of ports [3]. The initial report of a two-port appendectomy was described by Schier in 1998 in children [4]. Schier used the first port for a rigid endoscope with a working channel for dissection and transection of the appendix and the second port was for retraction. A similar technique were described in adults [5]. These techniques are termed extracorporeal laparoscopic appendectomies which are performed with exteriorization of the appendix through the largest port.

The procedure is then completed in traditional open technique extracorporeally. Thus these procedures should be termed laparoscopically assisted appendectomies. These methods eliminate the need for the third trocar because skeletisation and division of

appendix are made extracorporeally. Another group of techniques are 'true' two-port laparoscopic appendectomies. These operations include complete performance of appendectomy intracorporeally thus are termed intracorporeal. There are several technical modifications for intracorporeal two-port technique. All these techniques are modifications of one basic principle used during modifications of laparoscopic cholecystectomies [6,7]. One modification included the 'pulley system' [8]. To allow retraction of the appendix without an instrument through a trocar, a 'pulley system' within the abdominal cavity is created with a suture mounted as a loop tied as an air knot to the anterior abdominal wall, just cephalad and lateral of the base of the appendix. This loop is subsequently used as an axle. Then, a pretied suture placed on the appendix is passed through the previously created loop and then through the 12-mm port to the outside of the abdomen. The second technique, similar to ours, was published by Sato et al. but with slightly larger and more visible scar [9]. In this needle loop retractor, a stainless steel wire is placed within a needle having a diameter of 2 mm, and the appendix is grasped by tightening this loop. It is a 'virtual' third port which does not leave any scar. Yeung et al. made the third modification [10]. Intravenous cannula is inserted through abdominal wall; the needle is removed, leaving the plastic cannula in situ as the future knot pusher. Air leak is negligible or the cannula can be capped if needed. One end of a ligature is introduced via the catheter into the peritoneum. The intraperitoneal end is grasped and pulled out through one of ports. A sliding knot is constructed extracorporeally to fashion a suture loop. Pulling gently at the other end will return the loop back into the peritoneum. In the fourth (transabdominal sling suture) technique which is a single port but with 2 channels (one for laparoscope), the appendix is grasped and dissected from the surrounding tissues with a single dissector or grasper and elevated. With a percutaneously inserted suture (with needle) from the right lower quadrant into the peritoneal cavity, the appendix was pulled toward the abdominal wall after passing the suture through the mesoappendix [11]. We used suture passer which is 2 mm or even better endoclose which is 1 mm in diameter as the third 'virtual' port for retraction of the appendix.

There was no air leakage through the virtual port but if it was needed that the grasper and endoloop are placed simultaneously through 12-mm port there was an air leakage. After extraction of the loop there is no visible scar on the abdominal skin because of small puncture site. Use of linear stapler requires a 12-mm port. If 12-mm suprapubic port is used it is below the pants line which is also invisible. The advantage of two-port intracorporeal over extracorporeal technique is lower percentage of wound infections which could be explained by the avoidance of drawing the inflamed appendix through the umbilical wound [12]. The advantage of extracorporeal technique is that it is significantly faster at lower cost (no endoloops, endoclips, or endo-linear cutting stapler). In our small series we completed the technique in 9 (60%). There was no difference of length of hospitalization and operation time between two- and three-port technique. These results cannot be compared statistically because of small number of patients.

5. Conclusion

Our opinion is that this modified intracorporeal two-port technique is a safe and feasible procedure, cosmetically very satisfactory to the patient. This procedure requires only standard laparoscopic equipment.

6. References

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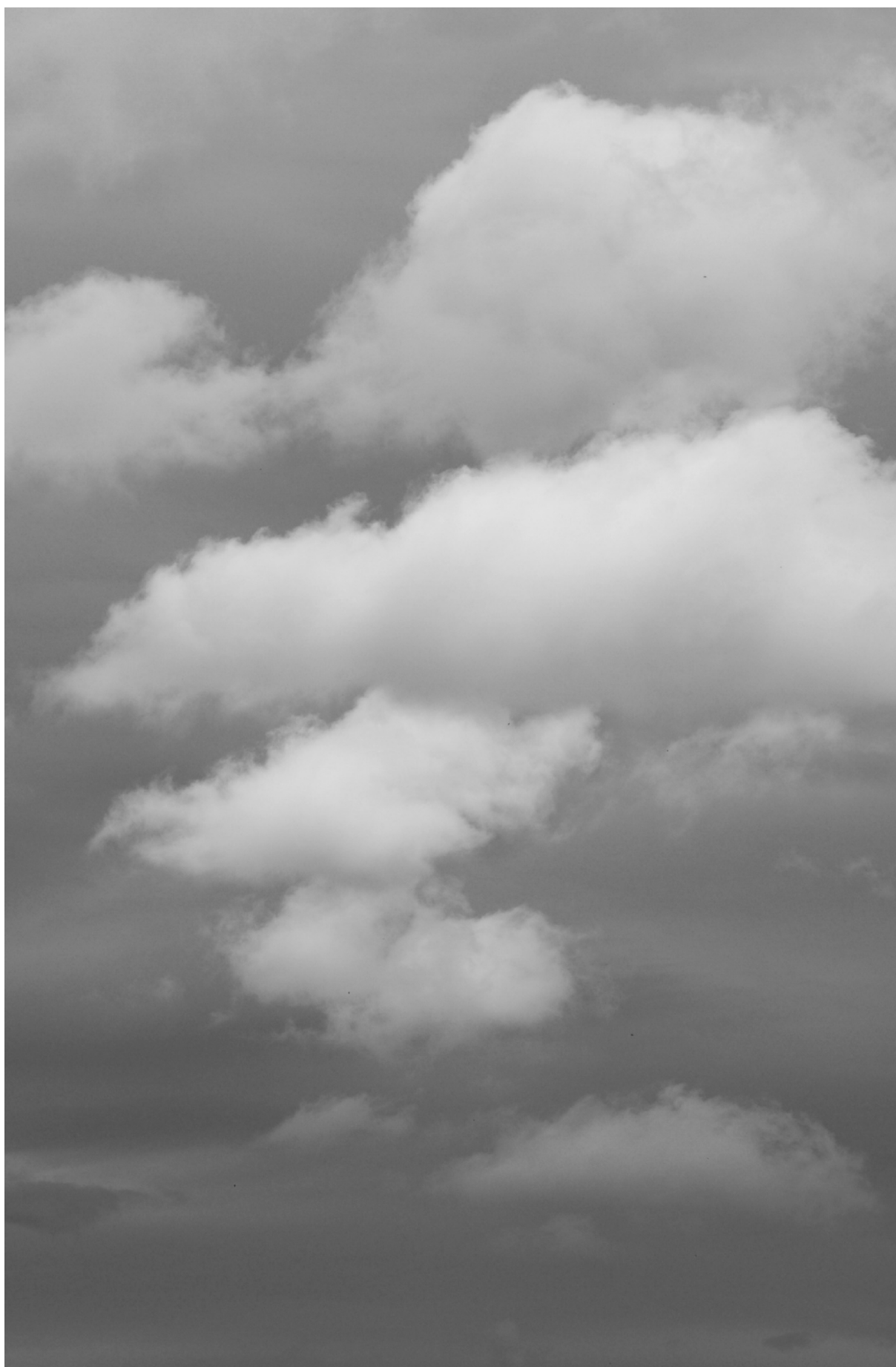


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