

Transumbilical single-incision total laparoscopic hysterectomy: technique and initial experience in Turkey

Całkowita histerektomia laparoskopowa metodą pojedynczego nacięcia pępkowego: technika i pierwsze doświadczenia w Turcji

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Abstract

Objectives: The aim of the study is to determine the results of our initial experience of 32 cases who underwent single incision total laparoscopic hysterectomy.

Materials and Methods: Thirty-two patients who underwent transumbilical single incision total laparoscopic hysterectomy between March 2009 and February 2011 were reviewed retrospectively at the Department of Obstetrics and Gynecology, Ege University Faculty of Medicine, Izmir, Turkey. Articulating and rigid instruments, 30 degrees 10 mm telescope, SILS™ port and advanced bipolar and mechanical energy modalities were used during the procedure. Duration of surgery, length of hospital stay, mean blood loss and postoperative complications were assessed.

Results: Mean age of patients and mean operation time were 48 years (ranged 42-55) and 108 minutes (ranged 80-180), respectively. In all cases vaginal cuffs were closed with either intracorporeal or extracorporeal separate sutures. There were no intraoperative complications. All patients were discharged within 48 hours postoperatively. The mean length of hospital stay and mean blood loss were as 1.6 days (range 1-2) and 45 ml (range 30-100), respectively.

Conclusions: Total laparoscopic hysterectomy performed through transumbilical single incision is technically feasible and safe. Development of advanced flexible instrumentation and visualization platform may facilitate this new operative approach.

Key words: **laparoscopy / hysterectomy / single incision /**

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Streszczenie

Cel pracy: Celem tego badania była ocena wyników naszego pierwszego doświadczenia z 32 pacjentkami, które przeszły całkowitą laparoskopową histerektomię metodą pojedynczego nacięcia.

Materiał i metoda: Przeanalizowano retrospektywnie trzydzieści dwie pacjentki, które przeszły całkowitą laparoskopową histerektomię metodą pojedynczego nacięcia pępkowego pomiędzy marcem 2009 a lutym 2011, w Oddziale Położniczo-Ginekologicznym, Ege University Faculty of Medicine w Turcji. W trakcie procedury użyto instrumentarium giętkiego i sztywnego, endoskopu o kącie widzenia 30°, 10mm, portu SILSTM i zaawansowanych urządzeń bipolarnych oraz energii mechanicznej. Oceniono czas trwania operacji, długość pobytu w szpitalu, średnią utratę krwi i komplikacje pooperacyjne.

Wyniki: Średnia wieku pacjentek wynosiła 48 lat (zakres 42-55), średni czas trwania operacji 108 minut (zakres 80-180). We wszystkich przypadkach mankiet pochwy zeszyto osobnymi szwami wewnątrzbrzusznymi lub zewnątrzbrzusznymi. Nie obserwowano żadnych powikłań w trakcie operacji. Wszystkie pacjentki wypisano do domu w ciągu 48 godzin od operacji. Średni czas pobytu w szpitalu wynosił 1,6 dni (zakres 1-2) a utrata krwi wynosiła 45ml (zakres 30-100).

Wnioski: Całkowita laparoskopowa histerektomia metodą pojedynczego nacięcia pępkowego jest technicznie wykonalna i bezpieczna. Ulepszanie zaawansowanego, elastycznego instrumentarium oraz możliwości wizualizacji ułatwiają to nowe podejście operacyjne.

Słowa kluczowe: laparoscopia / histerektomia / pojedyncze nacięcie /

Introduction

Minimally invasive surgery is one of the most significant surgical advances of the twentieth century and has become the standard treatment for many gynecologic pathologies. In the last decade, numerous studies have demonstrated that laparoscopic approach for various gynecologic benign and malign diseases is feasible and results in shorter hospital stay, improved quality of life, shorter operating time and decreased peri-operative complications when compared to open procedures [1, 2]. However, the quest to develop more minimally invasive surgical techniques in order to enhance the advantages of laparoscopy has prompted surgeons to seek solutions how to minimize the number of incisions or in case of natural orifice surgery to eliminate skin incisions altogether.

Today, the trend in gynecological laparoscopic procedures changes to "single incision laparoscopic surgery" (SILS). Since its introduction in 1992, by Pelosi et al. [3], who performed a single puncture laparoscopic appendectomy and in 1997, by Navarra et al. [4], who performed a laparoscopic cholecystectomy via two transumbilical trocars, single incision laparoscopic surgery has been evolving considerably.

Literature reports SILS has been applied to many procedures in general surgery and urology practice such as appendectomy [3], cholecystectomy [4], nephrectomy [5], adrenalectomy [6] and colorectal surgeries [7]. However, data about gynecologic single incision laparoscopic surgery procedures is very limited [8-10].

While laparoscopy is less morbid than an open surgery, it still requires several incisions, 1-2 cm long. Each incision may result in morbidity from bleeding, hernia and/or internal organ damage, and incrementally decreases cosmetics. An alternative to conventional laparoscopy is the single-incision laparoscopic surgery, in which articulating or bent instrumentation with specialized multi-lumen ports is used. The authors report their initial experience with 32 patients who underwent single incision laparoscopic hysterectomy, all achieved via a single incision laparoscopic surgery technique.

Objectives

To determine the results of our initial experience of 32 cases who underwent single incision total laparoscopic hysterectomy.

Material and Methods

Between March 2009 and February 2011, patients with benign gynecologic disease who underwent single incision laparoscopic surgery at the Department of Obstetrics and Gynecology of Ege University were reviewed.

Patient Selection and Preparation: Patients with a suspicion of gynecologic malignancy due to imaging studies, endometrial histopathology and cervical cytology were considered 'not eligible' for the operation. After obtaining informed written consent from the patients, all operations were performed by the same gynecologic laparoscopist with the assistance of two fellows; one for the scope and the other for uterus manipulation. All patients received prophylactic antibiotics 30 minutes before the procedure and all were placed in the dorsolithotomy position during the operation. (Figure 1).

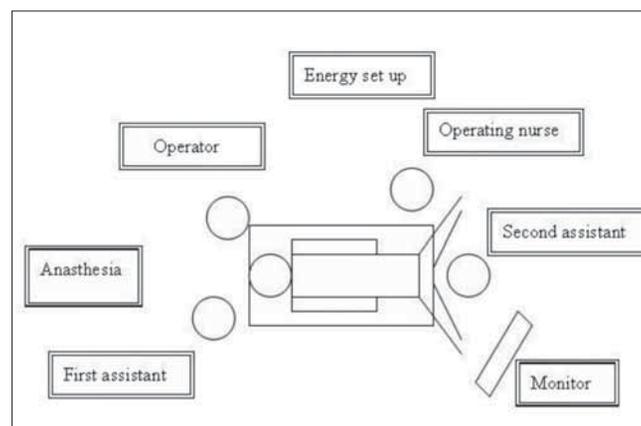


Figure 1. Operating room during laparoscopic hysterectomy with single incision.

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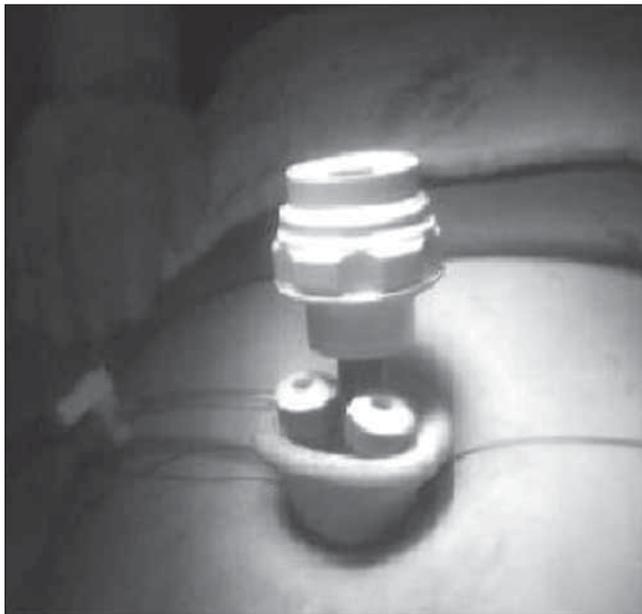


Figure 2. Multi-channel SILSTM Port.

Foley catheter was inserted to drain the bladder. RUMI[®] with Colpotomizer system[™] (Cooper Surgical Inc, Trumbull, CT, USA) was placed for uterus manipulation.

Technique: Two cm umbilical vertical incision was performed and entrance to abdominal cavity was provided by open technique. The SILS[™] Port (Covidien[®], Mansfield, MA), which is a multi-instrument access port that allows up to three laparoscopic instruments (three 5-mm cannulas or two 5-mm and one 10-mm cannula) simultaneously through separate flexible channels, was used. (Figure 2).

The port also has a separate channel for CO₂ insufflation. The abdomen was insufflated to 14 mmHg, ten or five millimeter rigid 30° laparoscopes were used for visualization. After pelvic anatomy was examined under the view of 30° telescope; with help of the articulating instrument, the left infundibulopelvic ligament was stretched and distanced from the ureter. Then the ligament was sealed and cut with 10 mm LigaSure[™] (Covidien[®], Tyco Healthcare, Norwalk, CT). The same procedure was repeated at the right hand side. The bladder peritoneum was dissected with 5-mm Harmonic ACE[®] (Ethicon Endo-Surgery, Cincinnati, USA). The bladder was distanced and the pubocervical fascia was exposed. We could differentiate the vaginal border by feeling the colpotomizer cup in the vaginal fornix at that time. Uterine artery was skeletonized and dissected by 10-mm LigaSure[™]. Anterior and posterior colpotomies were performed with Harmonic ACE[®]. For all stages articulating atraumatic graspers (Covidien[®], Tyco Healthcare, Norwalk, CT) were used. (Figure 3).

Vaginal cuff was closed with either intracorporeal or extracorporeal separate sutures. Extracorporeal sutures were performed by using a Clarke-Reich knot pusher, same as in conventional laparoscopic cuff closure. (Figure 4).

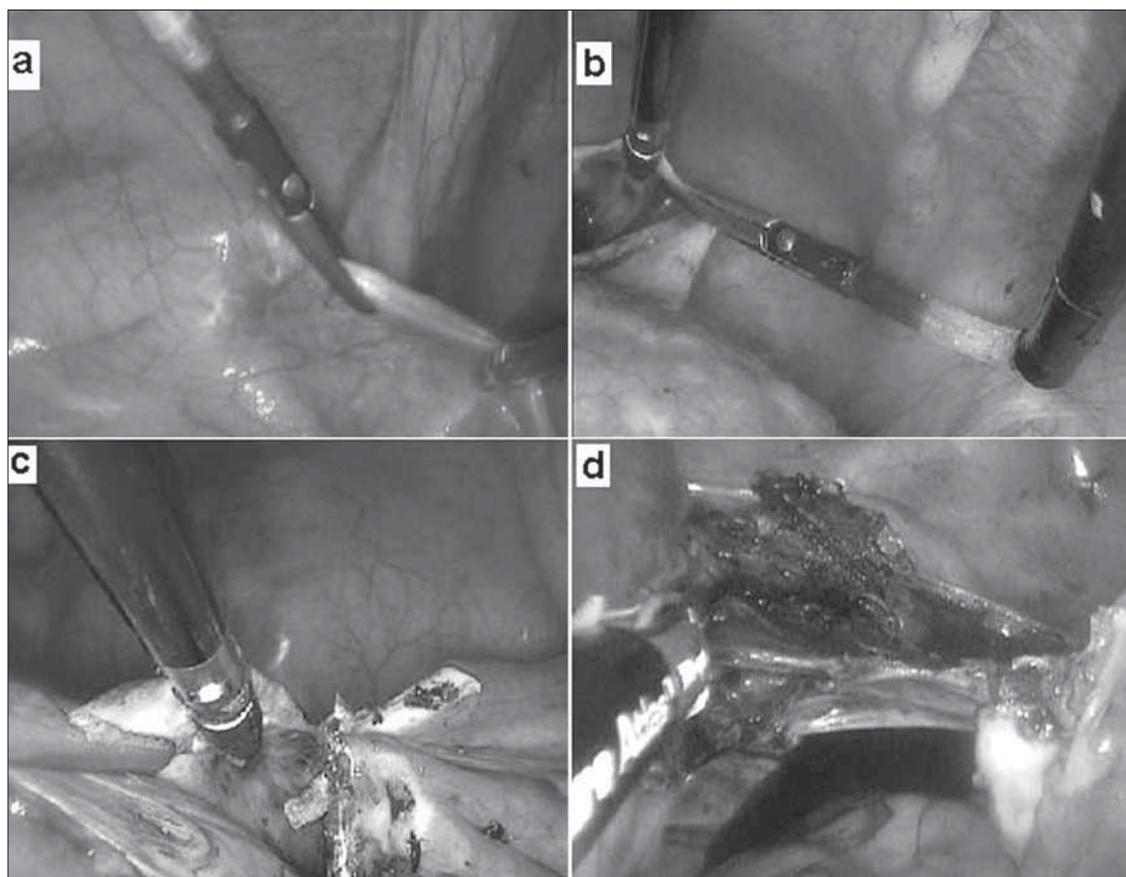


Figure 3. a. Dissecting the left round ligament. b. Identifying the bladder flap. c. Dissecting the broad ligament d. Dissecting the right uterine artery.

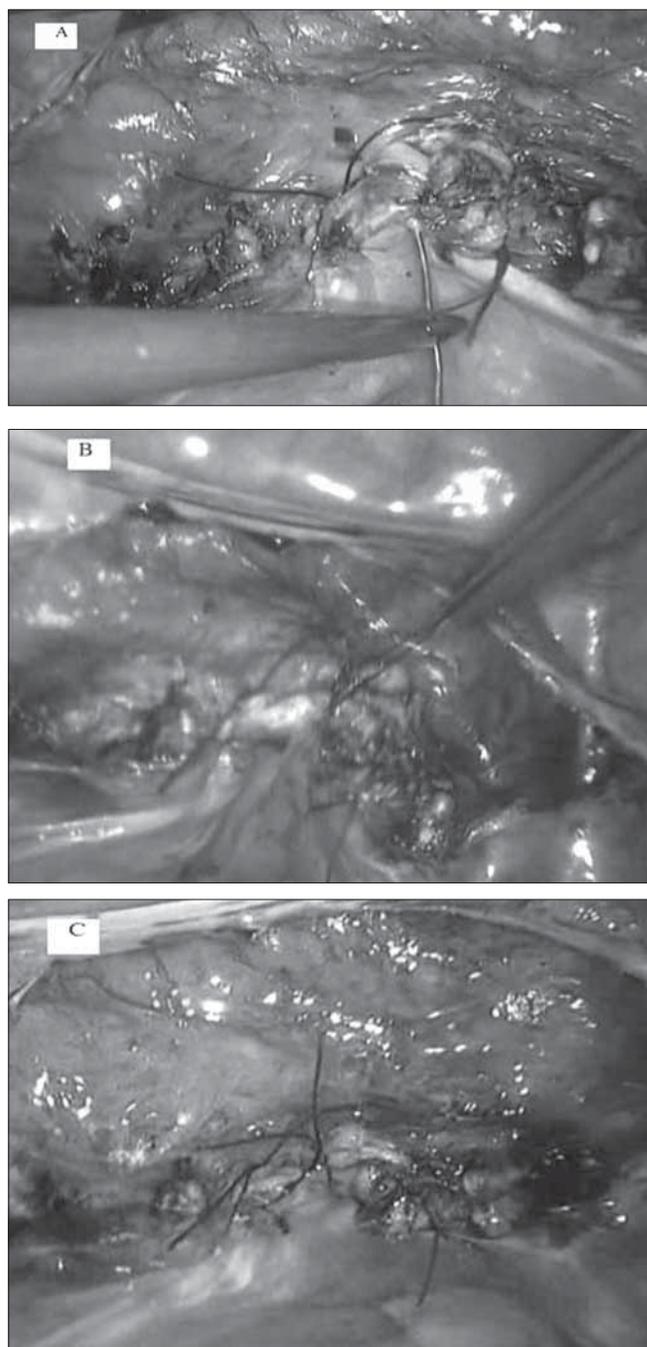


Figure 4.
a. Flattened needle was used during vaginal cuff suturing.
b. Extracorporeal sutures were performed by using a Clarke-Reich knot pusher.
c. Vaginal cuff after closure

Flattened needle, sized 0 vicryl (Ethicon, Piscataway, NJ), was used during suturing. The operation was completed with almost no bleeding after the irrigation of the abdomen and bleeding control. At the end of the operation cystoscopy was performed for all patients, the jet urine flow at both ureteral orifices were seen. The fascia was closed and the skin was sutured subcuticularly.

The levels were expressed in mean \pm standard deviation.

Results

The mean age of patients was 48 ± 4 years, and mean body mass index (BMI) was $28.08 \pm 2.43 \text{ kg/m}^2$.

Table I presents patient characteristics and indications of operations. None of the patients had prior abdominal surgery and mean uterine size correlated with 8 gestational weeks. Mean operation time, mean blood loss, mean hospitalization period and postoperative complications were evaluated.

In table II surgical outcomes of patients are shown. All uteruses were removed intact and morcellation was not required.

LigaSure™ was used in all procedures as energy modality. Although intracorporeal suture technique was used in 12 patients, in 20 patients sutures were tied extracorporeally. No minor complications such as wound infection and no major complications such as cuff dehiscence occurred and none of the patients required transfusion during or after the procedures. All patients were discharged within two days. Figure 5 shows one of the patient's umbilicus 4 weeks after surgery.

Table I. Patient demographics.

Variables (n=32)	Mean \pm SD
Mean age (years)	48 ± 4
Mean BMI (kg/m ²)	28.08 ± 2.43
Indications (n)	
– Uterine fibroid	12
– Dysfunctional uterine bleeding	12
– Simple endometrial hyperplasia	8

The results were expressed in mean \pm standard deviation.

Table II. Surgical outcomes The results were expressed in mean \pm standard deviation.

Variables (n=32)	Mean \pm SD
Mean operation time (minutes)	108 ± 29.4
Mean hospitalization stay (days)	1.6 ± 0.49
Mean blood loss (ml)	45 ± 23.1
Postoperative complications	0/32
Conversion to multiple port approach or laparotomy	0/32

Discussion

The new trend toward scarless surgery has generated a lot of excitement both in the lay and medical community. However, the true benefit over standard laparoscopic approaches has not been clearly defined. Potential advantages of SILS over conventional multi-port laparoscopy include better cosmetic results from a relatively hidden umbilical scar and the need for fewer trocar incisions, a possible decrease in morbidity related to visceral and vascular injury during trocar placement as well as risk reduction and elimination of multiple trocar site closure [8-10].

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Figure 5. Incision scar in postoperative fourth week.

A 2-cm incision at the umbilicus also allows for easier specimen extraction than conventional laparoscopy. Another potential benefit may be the reduction of postoperative pain and narcotic use, although there have been no randomized control trials about this subject in the literature yet.

The disadvantages of SILS include the need for special instrumentation, surgeon ergonomics, difficult learning curve and long operation time. Due to our experience, two major factors effect the operation time:

- 1) Operator's experience,
- 2) Instrumentation.

Based on our experience, the learning curve with SILS is more difficult when comparing with conventional laparoscopy. Literature states that 15-30 cases are needed to assume competency, and 30-50 cases are needed to achieve a specific procedure [11]. Especially in initial cases, vaginal cuff suturing takes much more time when compared with conventional technique, as the movement ability of the instruments is more limited. New suture materials such as barbed sutures that let the operator continue suturing without knot tying will shorten the operation time.

Instrumentation also takes special place in this novel technique. Instruments such as multi-channel SILS™ port, articulating graspers, flexible endoscopes, advanced 'all-in-one' bipolar energy modalities which allow vessel sealing, spot coagulation and endoscissor functions are needed.

As all instruments are in the same port through the umbilicus, to avoid challenging ergonomic positions, the assistant and the operator have to work consistently. This challenging positions can be avoided by using longer endoscopes that will allow the assistant's hand to be positioned a little bit further away from the operator's. Three hands and three instruments (endoscope, articulating instrument, bipolar energy source) in a very small area make the procedure more difficult and the operation time longer. Instrument crowding also results in need for advanced surgical skills.

Conclusion

In conclusion, the authors present their first SILS-hysterectomy cases. SILS seems to be feasible and safe in hysterectomy and has good cosmetic outcomes. On the other hand, further studies are necessary to better define surgical

results obtained from this novel surgical approach and to assess the relative benefits of SILS compared with more conventional minimally invasive approaches.

The authors declare no conflict of interest.

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