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Skin closure methods after single port laparoscopic surgery: a randomized clinical trial

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ABSTRACT

Objective: To compare postoperative cosmetic outcomes according to different umbilical closure methods after single port laparoscopic surgery (SP-LS).
Study design: A total of 138 women who were scheduled to receive elective SP-LS were randomized to undergo closure of the umbilical incision with either a subcutaneous suture only without subcuticular skin suture (case group, $n = 68$) or both a subcutaneous suture and subcuticular skin suture (control group, $n = 70$) after fascial closure. At postoperative months 1 and 3, the umbilical scar was evaluated using the Vancouver scar scale (VSS), the patient and observer scar assessment scale, and a visual analog scale (VAS). Overall satisfaction with scar cosmesis and surgery was assessed with the VAS.
Results: There was no significant difference in the clinical characteristics and operative data between the groups. The objective and subjective scar assessments and the overall satisfaction with scar cosmesis were not different between the groups. In the control group, four (5.7%) women experienced wound discharge and were treated with conservative treatments and delayed closure. In women who completed the first and second assessments, the changes in the scar assessment and overall satisfaction with the scar according to time after surgery were not different in either group, but the patient scar assessment scale in both groups and the VSS in the case group improved.
Conclusions: After SP-LS, the approximation of the fascia and subcutaneous layer seems to be enough for the closure of an umbilical incision. Skin closure with subcuticular sutures did not improve the postoperative cosmetic outcomes and might lead to impaired wound healing. However, large randomized trials with various closure techniques and materials are needed to confirm this finding.

Introduction

In various diseases in the gynecologic field, many studies on single port laparoscopic surgery (SP-LS) have been reported [1–3]. SP-LS has some theoretical advantages, including better cosmetic outcome, less postoperative pain, shorter hospital stays, and improved recovery time [4,5]. Of these advantages, the most noticeable benefit of SP-LS might be the cosmetic improvement via a hidden umbilical incision [1,3]. Postoperative scar cosmesis is a critical issue for women, especially young women, because the scars can induce chronic symptoms associated with the wound (such as pain, tenderness, and itching). The negative impact of scars can also have psychological consequences [6,7].

The final appearance and function of postoperative scars are decided by three factors: patient factors, wound factors, and technical factors. Technical factors are completely within the control of the surgeon and are influenced by the closure material and technique of skin apposition [8].

To our knowledge, however, there have been no studies on the standard closure method of umbilical incisions to maximize the cosmetic benefit of SP-LS. Therefore, to provide laparoscopists with evidence-based guidance on the optimal closure method for transumbilical incision, we designed this randomized trial to compare the cosmetic outcome of the umbilical scar according to different closure methods (subcutaneous suture without subcuticular skin suture versus subcutaneous suture with subcuticular skin suture). The primary outcome was to compare the

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cosmetic outcomes using standardized and validated scar assessment tools, and the secondary outcome was to evaluate the wound complication rate associated with these skin closure methods.

Materials and methods

This prospective randomized study was carried out in women who were scheduled to receive elective SP-LS from August 2012 to March 2013 at Kangbuk Samsung Hospital in Seoul, Republic of Korea. This study was approved by our Institutional Review Board, and all participants provided informed consent.

The inclusion criteria were women (age between 18 and 70 years) who had undergone surgery for a benign gynecological disease with a uterus ≤16 weeks gestational size and/or adnexal mass ≤8 cm in size, and carcinoma in situ or micro-invasive carcinoma of the uterine cervix. The exclusion criteria included psychiatric disorders, an American Society of Anesthesiologist (ASA) classification above 3, malignant diseases, tattoos and piercing in the umbilicus, history of keloid scarring, previous umbilicus scar, hypersensitivity to the nylon suture material, or medical conditions that could affect wound healing, such as diabetes mellitus, severe malnutrition, and diseases requiring chronic corticosteroid use.

Operative technique

The port placement system of SP-LS was established as described in our previous reports (Fig. 1) [1–3]. SP-LS was performed using a trans-umbilical GelPoint (Applied Medical, Rancho Santa Margarita, CA, USA) and articulating instruments. After the main operations, the fascia layer of the umbilical incision was approximated by continuous interlocking sutures with 0 absorbable multifilament suture material (Vicryl®, EthiconEthicon Inc., Somerville, NJ), and the subcutaneous layer was approximated by several interrupted sutures with 2-0 absorbable multifilament suture material (Polysorb®, Syneture, Mansfield, MA). The participating patients were randomized to undergo skin closure of their umbilical incision with either subcutaneous suture only without subcuticular skin suture (case group) or both subcutaneous suture and subcuticular skin suture (control group). Only the control group underwent continuous subcuticular suture for skin closure with 3-0 non-absorbable monofilament suture (Nylon®, Woori, Seoul), and the case group did

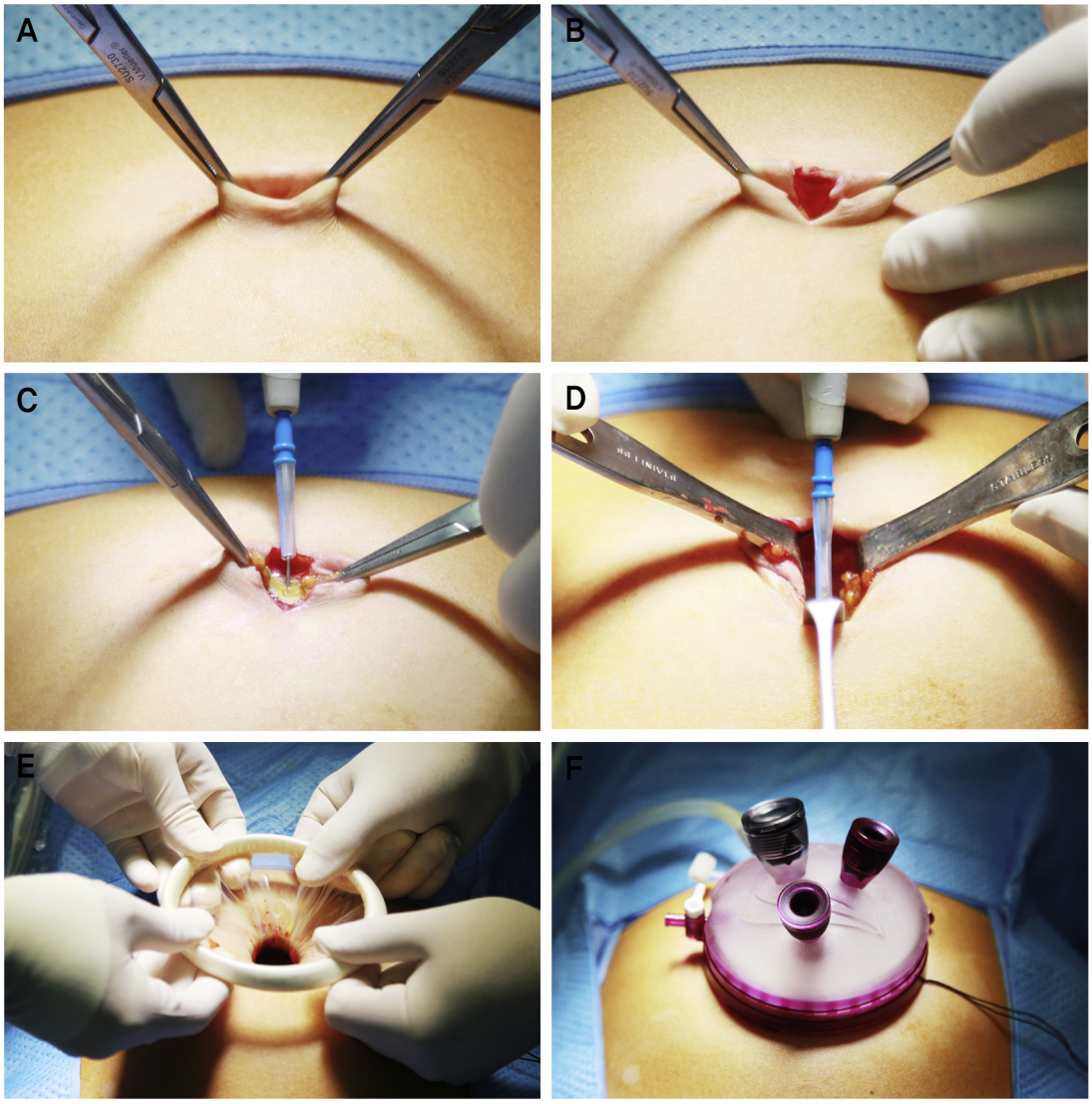

Fig. 1. (A) Bilateral borders of the umbilicus were clamped and elevated using hemostatic forceps. (B) A 15–20 mm vertical transumbilical skin incision was made by a scalpel. (C) Incision was extended to the peritoneum using a monopolar coagulator. (D) The abdominal wall was lifted using Army–Navy retractors and the incision of the fascia layer was extended caudally and cephalically. (E) The wound retractor of the GelPoint (Applied Medical, Rancho Santa Margarita, CA) was introduced and positioned. (F) The GelPort platform was latched to the retractor.