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CLINICAL ARTICLE

Potential risk of port-site adhesions in patients after laparoscopic myomectomy using radially expanding trocars

Jun Kumakiri *, Iwaho Kikuchi, Mari Kitade, Makoto Jinushi, Azusa Shinjyo, Satoru Takeda

Department of Obstetrics and Gynecology, Juntendo University Faculty of Medicine, Tokyo, Japan

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ABSTRACT

Objective: To investigate the incidence of port-site adhesions following use of radially expanding trocars (RETs) at laparoscopic myomectomy by observation via second-look laparoscopy (SLL). *Methods:* In a retrospective study, data from patients who underwent SLL after laparoscopic myomectomy between January 2007 and June 2012 at Juntendo University Hospital, Tokyo, were assessed for the incidence of port-site adhesions forming below RET incisional scars when fascial and peritoneal defects had not been closed. *Results:* During the study period, 554 patients underwent SLL, and 2176 incisional scars were examined. Adhesions were detected in 15 patients (2.8%); thus, the incidence of port-site adhesions under scars was 0.7% (15/2176). Among these 15 patients, the wounds with adhesions were located as follows: 6 (1.1%) under the umbilical scar, 5 (0.9%) under the right lower abdominal scar, 2 (0.4%) under the left upper abdominal scar, and 2 (0.4%) under the left lower abdominal scar. According to multiple regression analysis, the duration of laparoscopic myomectomy was positively associated with port-site adhesions (odds ratio, 1.79; 95% confidence interval, 1.09–2.94; $P = 0.02$). *Conclusion:* The present data suggest that the incidence of port-site hernias and adhesions under RET incisional scars is low despite the non-closure of fascial and peritoneal defects.

1. Introduction

Laparoscopic myomectomy is a valuable procedure for preserving fertility among women with leiomyomas; however, repeat surgical management is often required because of the recurrence of disease [1]. A problem associated with repeat laparoscopic surgery is the potential damage to adhered organs lying below the previous wound [2]. For women with prior laparoscopic surgery, it is thought that the incidence of port-site hernia and adhesion should be investigated to predict the potential risk of injury to adherent organs at the primary entry point of repeat laparoscopic surgery.

The incidence of port-site hernias after gynecologic laparoscopic surgery is low, ranging from 0.02% to 5% [3–5], and 74% of port-site hernias are reported to be located under the extra umbilical scar [5]. However, the actual incidence of the complication is unknown because patients who have no symptoms may not return for a consultation. By contrast, the incidence of port-site adhesion after laparoscopic surgery—as assessed by direct observation during repeat laparoscopy—is reported to vary from 0% to 21.2% [6–10]. Thus, the safety of repeat laparoscopic surgery for these patients is a concern.

The risks of port-site hernias are associated with the types of incision procedure and the variety and diameter of the trocars applied [5,11]. Radially expanding trocars (RETs) are associated with a low incidence of port-site hernia even when fascial defects, which occur after decannulation, are not closed [12,13]. However, the incidence of adhesions under RET scars has not been evaluated.

At Juntendo University Hospital, Tokyo, a systematic second-look laparoscopy (SLL) is performed for patients who have undergone standardized laparoscopic myomectomy in order to evaluate postoperative uterine and adnexal adhesion formation and to perform adhesiolysis for the benefit of future pregnancy. The incidence of adhesions found during SLL was previously reported [14], and found to be closely associated with various adhesion preventions, the characteristics of the myomas, and uterine wound repair [15,16].

During the course of performing SLL for many women, it was noted that some had an adhesion attached to the previous RET wound. The primary aim of the present study was therefore to determine the incidence of port-site hernias and adhesions, as evaluated by direct SLL observation, among patients who had previously undergone RET laparoscopic myomectomy. A secondary aim was to evaluate associations between the findings obtained during the initial laparoscopic myomectomy and the formation of adhesions in order to predict the potential risk of damage to adherent organs.

2. Materials and methods

In a retrospective study, data were reviewed from patients who underwent laparoscopic myomectomy at Juntendo University Hospital,

* Corresponding author at: Department of Obstetrics and Gynecology, Juntendo University Faculty of Medicine, 2-1-1 Hongo, Bunkyo-ku, Tokyo 113-8421, Japan. Tel.: +81 3813 3111; fax: +81 3 5689 7460.
E-mail address: junkumakiri@gmail.com (J. Kumakiri).

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Tokyo, between January 1, 2007, and June 31, 2012, and had follow-up SLL 6 months later. The ethics review board of the study institution approved the study. No specific approval was required for performing SLL because it is classified as normal medical care and is covered by the Japanese medical insurance as a laparoscopic examination. Patients undergoing SLL provided written informed consent.

Closed techniques were used for all patients as the primary approach for laparoscopic myomectomy. Ropivacaine (5 mL of 0.25% Naropin solution; AstraZeneca, London, UK) was injected under the umbilical skin, and the umbilical rim was grasped and elevated by four Kocher clamps. A 1-cm incision was made vertically into the inferior aspect of the umbilicus, and a Veress needle sheathed by an expandable polymeric sleeve (VersaStep Long Insufflation Needle; Covidien, Mansfield, MA, USA) was inserted in the incision. After inducing a pneumoperitoneum, the Veress needle was removed and an 11-mm laparoscopic trocar (VersaStep) was inserted into the sleeve. During laparoscopic observation, a 12-mm trocar (VersaStep Plus; Covidien) was inserted into the left upper abdomen and 5-mm trocars (VersaStep) were inserted medial to the right and left iliac bones.

Laparoscopic myomectomy proceeded as previously described [3–5]. After completion of the intraperitoneal procedures, the umbilicus and the incision on the upper left abdomen were closed via 2–3 intradermal sutures (Biosyn 3-0 monofilament absorbable thread; Covidien); the fascial and peritoneal defects were not closed. The incision on the right lower abdomen was not sutured, but skin closure tape (Steri-Strip; 3 M, Tokyo, Japan) was used on the superficial dermis. To measure postoperative blood loss, a 15-Fr intraperitoneal low-pressure drain (SBvac; Sumitomo Bakelite, Tokyo, Japan) was placed in the incision on the left lower abdomen, from which the 5-mm trocar had been decannulated. The drain was removed within 24 hours of laparoscopic myomectomy, and the incision was closed by using skin closure tape in the same manner as described for the right lower abdomen.

Second-look laparoscopy was recommended for all patients who wished to become pregnant immediately after laparoscopic myomectomy. The following purposes of SLL were explained to the patients: (1) to evaluate the degree of intra-pelvic adhesions and to perform a tubal patency test by using indigocarmin dye to determine whether or not a future spontaneous pregnancy would be possible; (2) to investigate the presence or absence of dehiscense of the sutured uterine wound to evaluate the possibility of vaginal delivery; (3) to perform adhesiolysis for minimal to mild adhesions. Among patients who had the information necessary to make an informed choice, those who wished to undergo the procedure and who provided written informed consent were scheduled for SLL.

Second-look laparoscopy proceeded as previously described [14–16]. In brief, a 3-mm micro-trocar (Access Needle; Ethicon, Somerville, NJ, USA) with a 3.8-mm diameter metal sleeve and a Veress needle were inserted through the umbilicus for micro-laparoscopy (Olympus, Tokyo, Japan). Two micro-trocars were then inserted 2 cm inside the bilateral iliac bones at the same incision site that was used during laparoscopic myomectomy; this allowed the use of accessory 3-mm instruments, including grasping forceps, scissors, needle probes, and an irrigator-aspirator. During SLL, the abdominal cavity was inspected for the presence of adhesions. When an organ was found to be adhered to a previous incision (Fig. 1), any herniation of the organ to the incisional fascia and peritoneum was assessed by using two of the 3-mm instruments.

All procedures and all operative findings were recorded in a dedicated clinical database immediately after surgery (Microsoft Office Excel; Microsoft, Redmond, WA, USA). If the database information was insufficient for the present study, one researcher (J.K.) reviewed the SLL video recordings.

Statistical analyses were performed via SPSS version 20 (IBM, Armonk, NY, USA). A Kolmogorov–Smirnov test was used to analyze the presence of normality for respective parameters. Unpaired *t* test was used to compare consecutive variables. Fisher exact test was used to compare categorical variables. The data are expressed as mean ± SD or number (percentage).

Attribution analysis of factors influencing adhesion formation was followed by forward stepwise variable selection; logistic regression analysis was performed to eliminate confounding factors. Odds ratios (ORs) and 95% confidence intervals (CIs) were also calculated. A receiver operating characteristic (ROC) curve was used to obtain values for the area under the curve (AUC), and the sensitivity and specificity for the predictive value of postoperative wound adhesion. The highest Youden index (sensitivity + specificity − 1) was considered as the optimal cut-off point for outcome prediction. $P < 0.05$ was considered statistiacally significant.

3. Results

During the study period, 2535 patients underwent laparoscopic myomectomy. Among these, 544 had follow-up SLL 6 months later and were included in the present study. In total, 2176 scars were reviewed.

No complications were observed during the abdominal insertion by RETs at the initial laparoscopic myomectomy. During SLL, 15 patients (2.8%) were found to have a port-site adhesion below previous incisions,

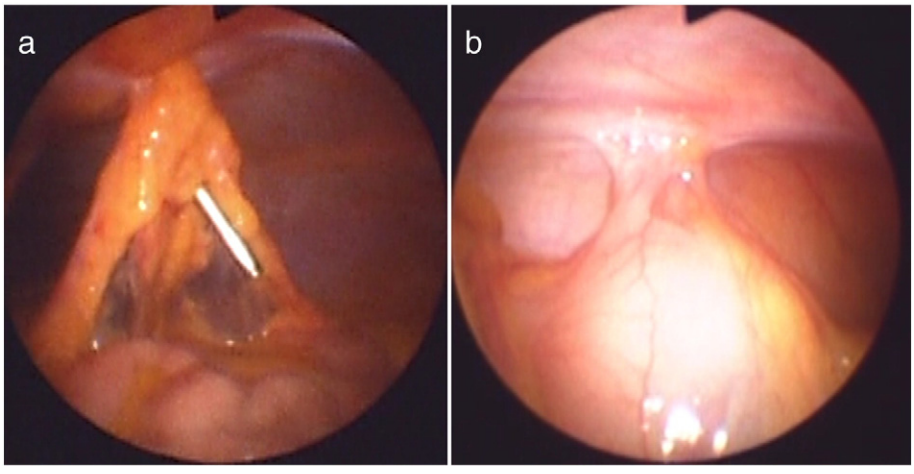

Fig. 1. Appearance of port-site adhesions found during second-look laparoscopy. (a) Omentum was adhered to the umbilicus and injured by the micro-trocar used during the primary approach (patient no. 9). (b) The sigmoid colon was adhered to a scar that had been created at the initial laparoscopic myomectomy (patient no. 2).