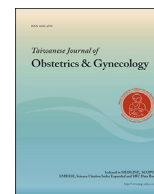




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Original Article

The use of fibrin sealant (Tisseel) in laparoscopic excision of ovarian endometrioma



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ABSTRACT

Objective: To evaluate the use of Tisseel, a 2-component fibrin sealant agent for the control of minor bleeding and repair of the ovarian defect at the end of laparoscopic cystectomy (LC) of endometriomas. **Materials and methods:** From January 2011 to December 2015, an observational study of all patients who underwent LC of endometrioma using Tisseel (group A) was performed. The demographic and operative data, including age, body mass index, operative indications, operative time, estimated blood loss, complications, and postoperative hospital stay duration were recorded. A contemporary cohort of patients, who underwent LC of endometrioma without Tisseel (group B) was also retrospectively compared. **Results:** A total of 274 patients were recruited in this study (53 LCs with Tisseel and 221 LCs without Tisseel, respectively). Complete hemostasis was achieved in all patients. The mean size of main mass was significantly larger in the group A than in the group B (7.8 ± 2.4 cm vs. 7.0 ± 2.3 cm, $p = 0.033$) but the mean operating time, operative blood loss, febrile morbidity, and length of hospitalization were not significantly different between the two groups.

Conclusion: This preliminary series demonstrated the use of Tisseel in LC of endometriomas without any bipolar coagulation and/or suturing of ovarian tissue is clinically safe and feasible.

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Introduction

Conservative management procedures for ovarian endometrioma often include aspiration, fenestration, ablation, cystectomy, and ethanol sclerotherapy [1–3]. The excision of the entire cyst, with laparoscopy, is the most widely accepted approach for ovarian endometrioma management. Although the removal of the endometriotic tissues can improve fertility and reduce pain, studies have also revealed that the laparoscopic stripping procedure can also have other negative side effects [4,5]. The two major side effects of laparoscopic cystectomy are follicular depletion and thermal damage, which were results of cystic wall stripping and electro-surgical coagulation during hemostasis, respectively [5,6]. The careful attention to the surgical principle of not damaging the normal ovarian cortex and vessels (particularly at the hilum) can diminish the aforementioned hazards. However, the precise surgical procedures require skilled and experienced surgeons with ample training [7].

A variety of adhesive substances, such as cyanoacrylate glues, fibrin glue, and thrombin, can be applied during surgery or endoscopy for enhance hemostasis, suture support, and wound healing [8,9]. Fibrin sealant Tisseel (Baxter Healthcare Corporation, Deerfield, IL) is a product that consists of blood coagulation factors fibrinogen, factor XIII, thrombin, aprotinin (antifibrinolytic agent), and calcium chloride. It has been utilized in applications such as gastrointestinal, ophthalmic, urologic, gynecologic, ear, nose and throat surgery, thoracic and vascular procedures, and skin grafts [8–11]. Fibrin sealant can also support vascularization and fibroblast migration to achieve re-epithelialization, and thus augments wound healing [12].

With the beneficial effects reported in literature, the aim of our study is to present our institution's initial experience of using Tisseel in selected patients with laparoscopic cystectomy for ovarian endometriomas (LCOE) and compare the surgical outcomes of these patients with other LCOE patients who underwent bipolar electrocautery and suture.

Materials and methods

This study included 53 women (age range 21–42 years, median 31 years) with symptomatic ovarian endometrioma who

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underwent laparoscopic cystectomy and hemostasis with the aid of Tisseel performed by the authors (C.J. Wang) at Chang Gung Memorial Hospital from January 2011 to December 2015. The indications for surgery in these patients included pelvic pain and infertility. The selection criteria were women between the age of 21–45 years, who had dominant cystic sizes of equal or greater than 3 cm. Patients with suspected ovarian malignancy were excluded. Written informed consent was obtained from all subjects. All of the patients had bowel preparation in the morning of their surgeries. Intravenous cephalosporin prophylaxis was given before the procedure.

The Tisseel cohort was compared, retrospectively, to a contemporary cohort of patients who have underwent LCOE with bipolar electrocautery and suture without the aid of Tisseel. The study endpoints included median operative time, estimated blood loss (EBL), complications, and postoperative hospital stay duration.

The Statistical Package for Social Sciences (SPSS, Chicago, IL, USA) was used to perform all statistical analyses. Descriptive statistics (mean \pm standard deviation) were used to summarize the patient's demographics and operation results. Continuous variables were compared with Student's *t*-test and categorical values with Pearson χ^2 analysis and Fisher's exact test. All probability values were two-sided. Significance level was accepted at probability below 5%. The study was approved by the Institutional Review Board of Chang Gung Memorial Hospital.

Operative procedures

All operations were performed with general endotracheal anesthesia in the dorsolithotomy Trendelenburg position. Both of the patient's legs were protected by elastic bandages, and a Foley catheter was inserted for constant urinary drainage. The LCOE was performed in accordance with the technique described by Yu et al. [7]. The following is a brief description of the procedure. Laparoscopic examination of the pelvis and lower abdomen was performed to determine the accessibility of the surgical field. Three or four trocars were used according to the complexity of the patient's pelvis. Disposable laparoscopic grasper, scissors, and suction-irrigator were used to perform various procedures such as holding, cutting, exploring, and dissecting. A sharp cortical incision was made with unipolar scissors and a cleavage plane was identified. The capsule of the endometrioma was then enucleated and stripped from normal ovarian tissue. At the end of the laparoscopic stripping procedure, the healthy ovarian tissue was carefully examined and was rinsed by saline to identify the bleeding areas. In the electrocautery and suture group, larger bleeders were coagulated using bipolar forceps with an electrocautery bipolar unit (Elmed, Addison, IL). Complete hemostasis and approximation of ovarian defect were achieved using a 3–0 monofilament poligle-caprone 25 suture (Monocryl; Ethicon Inc., Somerville, NJ, USA) with a large curved needle following the principles of laparotomy. In the Tisseel group, Tisseel was applied on the inner ovarian surface defects with a Duploject Spray Set to achieve a uniform coating over the entire ovarian inner surface (Fig. 1). Thereafter, the edges of the ovarian defect were approximated with atraumatic forceps for 3–5 min. When complete hemostasis and approximation of ovarian defect were achieved, the peritoneal cavity was irrigated and lavaged until the purging fluid was clear (Fig. 2). The specimens were then removed from the abdomen using a disposable endobag for the purpose of avoiding contaminating the abdominal wall. All port sites were sutured with 3–0 polyglycolic acid suture at the level of the fascia to prevent herniation. The skin was approximated by sterile adhesive tape.

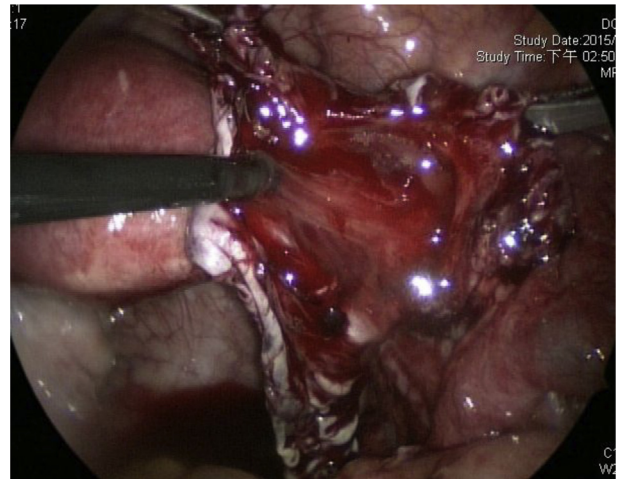


Fig. 1. Tisseel is applied on the inner ovarian surface defects with a Duploject Spray Set.



Fig. 2. Complete hemostasis and approximation of ovarian defect are achieved.

Results

In the study population ($n = 53$), ten ovarian endometrioma were located on the right side, 21 on the left, and 22 on both sides. The mean diameter of the main ovarian mass was 7.8 ± 2.4 cm, with range of 3–13.5 cm. The patient characteristics are summarized in Table 1. Mean operating time and EBL were 100.7 ± 47.5 min (range: 40–260 min) and 85.2 ± 115.2 mL (range: 5–550 mL), respectively. Post-operative hospital stay was 1.9 ± 0.5 days (range: 1–3 days). No major complications including ureter injuries, bladder injury, or bowel injury occurred, and no patient required conversion to laparotomy. Histological examination of the resected tissue showed endometriotic tissue for all patients. One specimen was shown with atypical change, however, no malignant change was observed.

A cohort of patients who have underwent LCOE using bipolar electrocautery and suture during the same period was identified. The baseline demographic and operative data for these patients were extracted. The mean age of the cohort was 34.0 ± 6.0 years (range: 18–45 years). The mean BMI was 21.3 ± 3.1 kg/m² (range: 16.0–34.8 kg/m²). The mean operative time and EBL was 91.0 ± 42.8 min (range: 25–292 min) and 90.0 ± 123.3 mL (range:

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