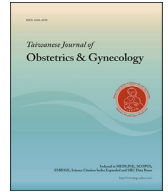




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Original Article

The effectiveness of laparoendoscopic single-site surgery (LESS) compared with conventional laparoscopic surgery for ectopic pregnancy with hemoperitoneum



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ABSTRACT

Objective: The purpose of this study was to compare clinical outcomes of conventional laparoscopic surgery and laparoendoscopic single-site surgery (LESS) in the surgical treatment of tubal ectopic pregnancy.

Material and methods: A total of 156 patients were diagnosed with ectopic pregnancies by ultrasonography and serum β -human chorionic gonadotrophin (β -hCG) levels at Pusan National University Yangsan Hospital from January 2009 through December 2013. We excluded 28 patients who only received medical treatment, 15 patients who underwent surgery by laparotomy for severe hypovolemic shock, and 30 patients who presented with less than 1 L of hemoperitoneum. Of the 83 patients with massive hemoperitoneum, 38 patients had LESS performed while the remaining 45 patients underwent conventional laparoscopic surgery.

Results: In this study, there were no statistically significant differences in clinical outcomes in either surgical method except for operative time. Operative time of LESS was significantly shorter than conventional surgery for patients with more than 500 mL of hemoperitoneum.

Conclusion: LESS is a safe and feasible surgical approach in the treatment of tubal ectopic pregnancy. At the same time, LESS has been shown to be more effective than conventional laparoscopic surgery in handling massive hemoperitoneum of more than 1 L, which is a common complication of ectopic pregnancy.

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Introduction

Ectopic pregnancy is an acute complication of pregnancy in which the embryo implants outside the uterine cavity. Currently, medical termination of pregnancy is an evidence-based practice and the American Society for Reproductive Medicine provides guidelines for the indication of methotrexate in the medical treatment of ectopic pregnancy [1,2].

Regardless of the medical treatments, approximately 18% of the patients are admitted to emergency departments with

hypovolemic shock due to massive hemoperitoneum from ruptured ectopic pregnancy [3].

Surgery for ectopic pregnancy was first performed in 1883 by Tait RL [4] and after witnessing drastic improvement in mortality rate by Dubuisson et al [5], laparoscopic salpingectomy has been favored as the treatment of choice for tubal ectopic pregnancies. Laparoscopic instruments and surgical techniques have improved since then to enable experienced surgeons to substitute open surgery with laparoscopic surgery in various gynecologic surgeries including ectopic pregnancy [6–10]. Ghezzi et al [11] treated a total of 10 ectopic pregnancies with a single-port technique in 2005. While traditionally two ancillary trocars were needed for laparoscopic salpingectomy, they showed a one-trocar technique as a feasible and safe approach for ectopic pregnancy [11]. And many other studies have been carried out to prove the safety and

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feasibility of surgical procedures using single-port access for ectopic pregnancy [12–15].

Laparoendoscopic single-site surgery (LESS) has a range of benefits for surgical management in ectopic pregnancy for causing less pain, facilitating early recovery and leaving fewer scars, in other words, better cosmetic effect [7,14]. However, this procedure is more technically demanding than conventional surgery and hence results in prolonged operative time. Surgeons may also experience difficulty when trying to control intraoperative bleeding by suture techniques. Though its feasibility and safety have been discussed vigorously and have been proven to be a reasonable option for conventional laparoscopy, there are still not enough comparative studies.

We analyzed cases of ectopic pregnancy diagnosed in our university teaching hospital and hereby report a comparison of clinical outcomes between LESS and conventional laparoscopic surgery in the surgical treatment of tubal ectopic pregnancy. We especially focused on the efficaciousness of LESS in handling massive hemoperitoneum of more than 1 L that is caused by ruptured ectopic pregnancy.

Materials and methods

Patients

The study was approved by the institutional review board at the Pusan National University Yangsan Hospital (Yangsan, Korea). From January 2009 to December 2013; we treated 156 patients diagnosed with ectopic pregnancy. Of the total patients, 28 patients were excluded from this study since they were indicated for medical termination of pregnancy using methotrexate. We also excluded 15 patients who underwent surgery by laparotomy for severe hypovolemic shock and 30 patients who presented with less than 1 L of hemoperitoneum. Since this study was designed as a comparison model, we set a criterion for 1 L of hemoperitoneum based upon our experience, to compare hematoma evacuation capacity of each approach by counting operative time. Of the 83 patients with massive hemoperitoneum, 38 patients had LESS performed while the remaining 45 patients underwent conventional laparoscopic surgery. Difference of adhesion condition between two groups was not clinically significant. At enrollment, a thorough medical history was obtained from every patient and physical examination was performed including pelvic examination and ultrasonography was also checked. Diagnosis of ectopic pregnancy was made through a combination of clinical examination, the findings of ultrasonography and serum β -human chorionic gonadotrophin (β -hCG) level. Surgical specimen confirmed the diagnosis of tubal ectopic pregnancy. All surgery was performed by a single experienced gynecologic surgeon.

Operative technique

LESS

Under general anesthesia and with endotracheal intubation, the patient was placed in the dorsal lithotomy position with both arms fastened at the arm-board. A foley catheter was inserted and a uterine manipulator was installed in the uterus. A 2–2.5 cm single vertical incision was made on the umbilicus. The abdominal wall was elevated sufficiently using a retractor to avoid traumatic intra-abdominal injuries at the time of incision.

Octoport, a multichannel access device from Dalimurgnet (Seoul, Korea), was fitted into the umbilical incision and CO₂ was instilled to maintain intra-abdominal pressure at 10–12 mmHg.

The operator stood at the left side of the patient facing the first assistant who handled the scope (Figure 1). The second assistant



Figure 1. Octoport (Dalimurgnet, Seoul, Korea) system with operator and first assistant; note the multi-channelled single-port site system.

was positioned between the patient's two legs and manipulated the uterine elevator. A 30-degree laparoscope was used for visualization in order to minimize interference between instruments; in conventional laparoscopic surgery a 0 degree laparoscope was applied. As for laparoscopic instruments, conventional rigid straight instruments were used.

Ligasure (Covidien, Medtronic, Massachusetts, USA) facilitated easier cutting of the fallopian tube (Figure 2). The tube contacting the gestational sac was extracted together with the intra-abdominal hematoma using an Endo bag (Covidien, Medtronic, Massachusetts, USA) through the open Octoport (Dalimurgnet, Seoul, Korea) cap. After displacement of the Octoport, the fascia was sutured with 1-0 Vicryl (Ethicon Inc., Johnson & Johnson, New Jersey, USA) and the subcutaneous tissue was approximated with 3-0 Vicryl sutures, followed by skin closure Histoacryl (Tissueeal, B. Braun, Melsungen, Germany) glue or Steri-strips (3M, Minnesota, USA).

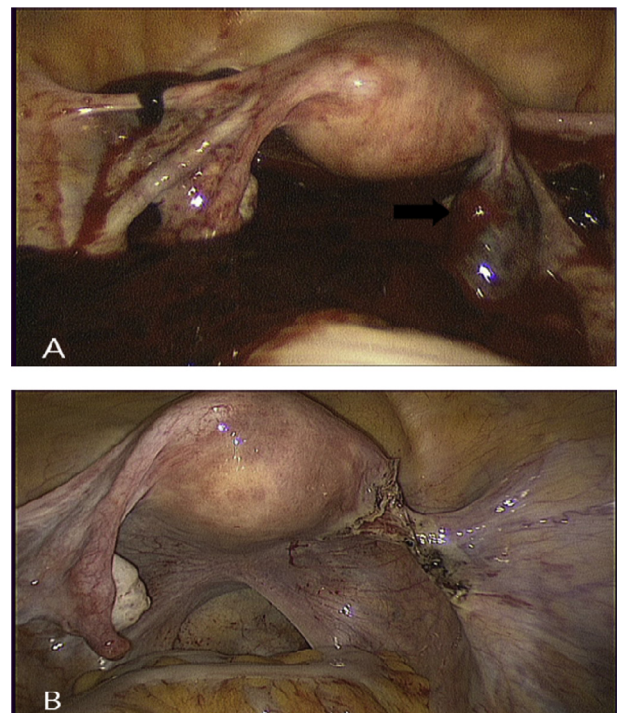


Figure 2. Intraoperative view of transumbilical single port laparoscopic salpingectomy. (A) Right tubal pregnancy and hemoperitoneum, Arrow indicates rupture of right tubal pregnancy. (B) The left salpinx was surgically resected and the hematoma was evacuated.

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