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Original article

Vaginal vault drainage after complicated single-port access laparoscopic-assisted vaginal hysterectomy

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ABSTRACT

Study objective: To evaluate the feasibility and safety of vaginal vault drainage after complicated single-port access laparoscopic-assisted vaginal hysterectomy (SPA-LAVH).
Design: Retrospective cohort study.
Setting: Ulsan University Hospital (tertiary teaching hospital), South Korea.
Patients: A total of 359 women underwent SPA-LAVH for the following conditions: benign uterine tumor, preinvasive uterine lesion, and microinvasive cervical cancer.
Interventions: The participants included 124 women with vault drains and 235 women without drains.
Measurements: Surgical outcomes, perioperative complications and morbidity, postoperative febrile morbidity.
Results: There were no differences in background features between drain and no-drain groups. In surgical outcomes, mean uterine weight (364.2 ± 184.9 g vs. 263.7 ± 138.6 g; $p < 0.001$), operation time (87.4 ± 21.5 min vs. 73.0 ± 17.6 min; $p < 0.001$), blood loss (225.3 ± 122.2 mL vs. 150.4 ± 95.2 mL; $p < 0.001$), and hemoglobin decline (1.97 ± 0.96 g/dL vs. 1.42 ± 0.89 g/dL; $p < 0.001$) were significantly larger for the drain group compared with the no-drain group. However, with regard to postoperative morbidity and complications, there were no group differences in the transfusion rates (6.5% vs. 3.8%; $p = 0.300$), intraoperative complications (2.4% vs. 1.3%; $p = 0.420$), perioperative complications (2.4% vs. 0.9%; $p = 0.345$), and febrile morbidity $\geq 37.5^{\circ}C$ (8.9% vs. 11.5%; $p = 0.477$), although the drain group was more prone to the development of pelvic fluid collection and febrile morbidity than the no-drain group.
Conclusion: Vaginal vault drainage could be a safe alternative that allows for the management of postoperative morbidity and retains the advantages of minimally invasive surgery after complicated SPA-LAVH.

Introduction

Advances in laparoscopic techniques have resulted in minimally invasive hysterectomy surgery using a single-port access (SPA) system, also referred to as laparoendoscopic single site.[1–3] Similar to the complications for other hysterectomy procedures, SPA laparoscopic-assisted vaginal hysterectomy (SPA-LAVH) can result in residual pelvic fluid collection, which is a possible cause of febrile morbidity. The reported incidence of pelvic fluid collection ranges between 25% and 98%.[4,5]

Traditionally, after gynecologic laparoscopy, pelvic drains were used to reduce postoperative morbidity by evacuating pelvic fluid and to allow the evaluation of fluid consistency without the need for more invasive procedures. Additionally, drainage may be beneficial if intraoperative oozing or a pelvic abscess might result after the dissection of a wide area during a complicated laparoscopic hysterectomy. Conservative measures, including systemic

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antibiotics, may not be successful for preventing or treating large-volume fluid collection, especially if an infection develops.[6]

The role of a drain in the abdominal approach is well known,[7] and several studies have examined the insertion of a drain through an abdominal port site after LAVH.[8,9] SPA procedures seem ideally suited for LAVH because the vagina is a natural orifice for transluminal endoscopic surgery (NOTES). The vagina can also serve as a route for hysterectomy using the pouch of Douglas, and a uterine manipulator can be applied through the vagina and used as another grasper.[10] Additionally, the vagina can serve as a drainage route to reduce postoperative morbidity without compromising the cosmetic advantage of SPA-LAVH. However, no formal study focusing on the methodology and safety of vaginal vault drainage in SPA-LAVH has been performed.

Therefore, we describe the methodology of closed-suction drainage (Jackson Pratt, or JP, drain) through the vaginal vault for complicated SPA-LAVH to prevent pelvic fluid collection and postoperative febrile morbidity. To show the feasibility and safety of vault drainage after SPA-LAVH, we also compare the operative outcomes and postoperative morbidity of patients with and without drains.

Materials and methods

A total of 359 women who underwent SPA-LAVH were included from April 2010 to August 2014. We compared 124 women who received a vaginal vault drain (the drain group) and 235 women who did not receive a drain (the no-drain group) after SPA-LAVH.

All women who were candidates for conventional LAVH underwent the SPA-LAVH procedure. The inclusion criteria were: (1) uterine size below 20 gestational weeks and without definite pelvic adhesions on pelvic examination; (2) a main diagnosis of uterine fibroids, preinvasive cervical lesion, endometrial hyperplasia, or microinvasive cervical cancer; (3) no suspected uterine or adnexal malignancy, previous abdominal surgery for malignancies, or suspected endometriosis; and (4) appropriate medical status for laparoscopic surgery (American Society of Anesthesiologists Physical Status Classification I-II). All of the women were informed that the conventional laparoscopic approach or laparotomy would be performed if unexpected difficulties were encountered during the SPA procedures.

Allocation to the vault drain or no-drain group was based on the surgeon's decision. The general inclusion criteria for vault drain insertion after SPA-LAVH specified patients with blood coagulation defects, a wide dissection area, intraoperative oozing, intraoperative blood loss, and coexisting pelvic lesions that could increase the possibility of large-volume residual pelvic fluid collection and subsequent pelvic infection. The vault drain was removed within 48 hours after surgery if the drainage volume was < 100 mL/24 hours and/or the pelvic fluid had a hemoserous consistency. When there were infected or large-volume fluid collections or > 100 mL of fresh blood was observed in the drain bulb, the drain was not removed unless the abnormal pelvic fluid completely ceased and/or the volume was < 100 mL/24 hours and the patient was hemodynamically stable with stable hemoglobin (no decrease > 1 g/dL). The vault drain was always removed transvaginally by cutting the fixation suture material. The removal site spontaneously healed in a few days without any intervention.

Operative time was defined as the length of time from the umbilical skin incision to closure, including the time of vaginal vault closure, SPA introduction, and vaginal JP insertion. Blood loss was estimated based on the suction bottle volume and gauze count. Uterine weight was measured immediately after specimen retrieval in the operating room. Postoperative febrile morbidity was defined as a body temperature $\geq 37.5^{\circ}$C, a definition that has been used previously in a number of studies assessing postoperative infectious morbidity.[11,12] Temperature was measured every 4 hours in the postoperative ward, excluding the 1st day after surgery. If a body temperature $\geq 37.5^{\circ}$C was noted on any postoperative day, we confirmed febrile status by checking the temperature hourly two times and appropriately controlling the fever. The postoperative hemoglobin level was determined on postoperative Day 1.

All of the women were managed with the standard hospital protocol. The women underwent vaginal preparation on the day of the SPA-LAVH and received cefotetan 2 g intravenously after the induction of general anesthesia. A Foley catheter was maintained for 24 hours for bladder drainage. Postoperative cefotetan 2 g every 12 hours was given to the women until postoperative Day 1 if there was no infectious morbidity.

Operative techniques

Surgical procedures of SPA-LAVH

All SPA procedures were performed using a homemade single-port platform, as previously described.[10] After laparoscopic examination using a rigid 0° 5-mm video laparoscope, a uterine manipulator (Acorn uterine manipulator, Richard Wolf GmbH, Knittlingen, Germany) was inserted to facilitate visualization and accessibility in the surgical field. We used articulating instruments such as Realhand (Novare Surgical System, Cupertino, CA, USA) or Roticulator (Covidien, Norwalk, CT, USA) to avoid the clashing of instruments and to allow fine dissection (Figure 1). Each SPA hysterectomy procedure was similar to conventional LAVH. Briefly, after the patient was put into the deep Trendelenburg position, the uterus was deviated to one side with a uterine manipulator. Either the infundibulopelvic ligament or the utero-ovarian ligament was secured and divided following transection of the round ligament. The broad ligament was opened up to the vesicouterine fold, and the bladder was mobilized by blunt and sharp dissection from the anterior vagina. The uterine vessels were skeletonized with partial cutting of the uterosacral ligament. Following the laparoscopic procedures of SPA-LAVH, anterior and posterior colpotomy was performed transvaginally. The uterosacral ligament and uterine vessels were secured with sutures, and the uterus was extracted through the vagina. Vaginal vault closure was performed transvaginally with a single-layer technique, using a running 1-0 polyglactin 910 suture.

Surgical technique of closed suction drain (JP) insertion through the vaginal vault after complicated SPA-LAVH

Once the vault was closed, a laparoscope was used to check the pelvis for hemostasis and any abnormal lesion. If we found the patients with the risk of large volume residual pelvic fluid collection, and subsequent pelvic infection in the surgical field, we decided on the insertion of vault drainage. A JP drain was inserted through the vault, and intraperitoneal placement of the drain in the pouch of Douglas was performed under laparoscopic visualization. First, the tip of the JP drain was sutured using 2-0 polyglactin 910, and the suture material was grasped with a Fascial suture instrument (B. BraunMelsungen AG, Melsungen, Germany). After the vault was downwardly grasped with Allis forceps, the fascial suture instrument with the sutured JP drain was inserted through the apex of the vault into the peritoneal cavity under the guidance of laparoscopy. Then, the delivered suture material was pulled intracorporeally using flexible grasping forceps. After the tip of the JP drain was identified, it was moved upward into the pouch of Douglas. The JP drain was fixed to the posterior vaginal vault to prevent it from falling out of the vagina (Figure 2). The suture material of the JP drain was delivered extracorporeally through the SPA system, and removed from the drain.