Single port access (SPA) robot-assisted laparoscopic posterior pelvic exenteration for patients with advanced and recurrent ovarian cancer: Farghaly's technique

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Introduction

Pelvic exenteration is the most extensive surgery performed for treatment of advanced and recurrent gynecological cancers. It was first reported in 1948 [1]. It has been performed for recurrent gynecologic malignancies limited to the pelvis, specifically for recurrent cervical cancer. The procedure involves en bloc resection of the uterus, cervix, vagina, adnexa, lower urinary tract (anterior pelvic exenteration), and rectosigmoid colon (posterior pelvic exenteration). Urinary conduit and an end colostomy are created at the end of these procedures. These procedures come with significant risks, morbidity and impact on quality of life. The related mortality in these procedures is approximately 3–5%, and morbidity could approach 60% [2-13]. Posterior exenteration has been described for treatment of cancers of the cervix, uterus, ovary, and rectum [14-17]. The complexity of the surgery has been a deterrent for performing it, but this has changed with the adoption of minimally invasive methods of exenteration. However, there are a few case reports of minimally invasive techniques being used [18–20].

Materials and Methods

Patients and Surgical Characteristics:

Patients with advanced and recurrent ovarian cancer would undergo preoperative lab work, imaging studies (e.g., chest X-ray and abdominal and pelvic cross-sectional and PET imaging. Positron emission tomography (PET) scan is valuable in the diagnosis of advanced and recurrent ovarian cancer. Those patients who present with malignant deposits on the rectum and confirmed with magnetic resonance imaging (MRI), computed tomography (CT), and proctoscopy were selected for this surgical technique.

Instruments

Da Vinci® si advanced 3D HD Surgical System was used. It has a magnified 3D high-definition vision system with small wristed instruments that bend and rotate more efficiently than the human wrist. Five-lumen port which provides access for two single-site instruments: the 8.5 mm 3DHD endoscope, a 5/10 mm accessory port and insufflation adaptor, is used. Curved five-mm cannula was used to optimize triangulation toward the target anatomy and provide an unobstructed view of the surgical field, separate the instrument arms outside the body wall, maximizing range of motion, and minimizing potential internal and external crowding. A five-mm semi-rigid instruments were used to go through curved cannula. Also, a blunt five-mm trocar, and a five-mm 30-degree laparoscope were used. In addition, mono and bipolar cautery, the Harmonic TM ACE, PK dissecting forceps, suture cut needle driver, intuitive surgical's hot shears monopolar curved scissors, and curved retractors were used. The instruments and camera cross within the single-site port and the center technology of the system allow avoidance of cannula collisions, arm interferences and port-site movement. The system software automatically detects and re-associates surgeon's hands with the instrument tips to create intuitive movement through crossed cannulas. Three trocars, standard five-mm grasping instruments with 70-degree freedom, and a five-mm 30-degree laparoscope with a flexible tip were used. For ligation and dissection, the Ligasure Advanced TM was used to promote greater spacing and control of instruments. EEA stapler for the proximal bowel and a V-care uterine manipulator for tissue manipulation were also used.

Technique

All patients underwent bowel preparation, and a single dose of prophylactic antibiotics preoperatively, with additional antibiotics administered postoperatively when required. Administration of subcutaneous heparin was routinely used.

Once the patient was anesthetized, she was placed in a modified Lyoid-Davis position in yellow fine stirrups and her arms tucked at her side. The patient was then placed in the steep trendelenberg position and the da Vinci system was docked between her legs. After prepping and draping the patient, a standard V-care uterine manipulator was placed in the vagina, and a foley catheter was inserted into the urinary bladder. The Applied Medical Gelpoint was placed and was utilized for both the transperitoneal and the extraperitoneal approaches. The surgeon was positioned to the left of the patient, and the assistant was placed to

Revised manuscript accepted for publication September 30, 2013

Eur. J. Gynaec. Oncol. - ISSN: 0392-2936
XXXV, n. 2, 2014
doi: 10.12892/ejgo25392014

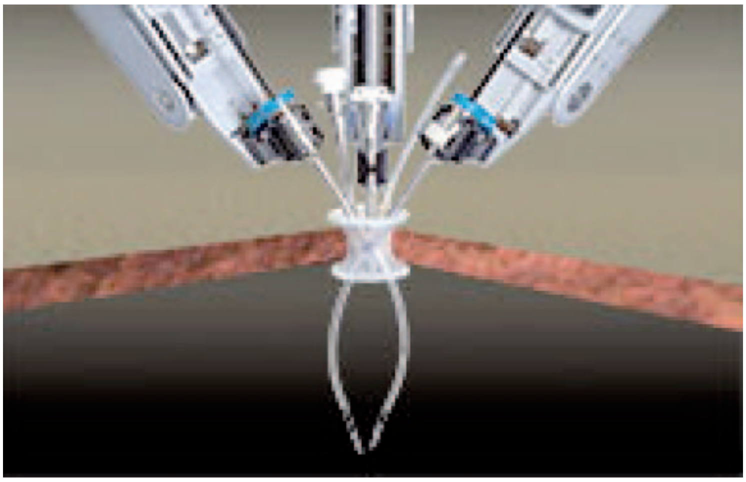

Figure 1. — Single port access for robot-assisted laparoscopic abdomino-pelvic Surgery.

the left of the patient and the surgeon's left. The assistant periodically placed an endoscopic suction device directly through the port. A 2.0-cm vertical incision was made through the umbilicus. The skin, subcutaneous fat, and fascia were opened along the same oblique axis. The anterior-lateral abdominal muscles were divided. Twelve mm Hg of carbon dioxide gas is insufflated through a separate cannula on the single port device. The laparoscope (10-mm, 0-degree) was placed into the most cephalad channel. Rigid straight dissection forceps were introduced into the caudal trocar, and the Harmonic scalpel into the lateral trocar. Tissue dissection was performed utilizing monopolar cautery. In cases of advanced ovarian cancer, a radical hysterectomy, including removal of the ovaries, tubes, and para-aortic and pelvic lymph adenectomy and ultraradical cytoreductive surgery were performed. Cancerous tissues and loco-regional metastases were debulked to residual tumor less than two mm in diameter. In cases of recurrent ovarian cancer, only ultraradical cytoreductive surgery for cancerous tissues was performed as above. Following that, the inferior mesenteric pedicle was identified and ligated. The sigmoid colon was divided with the endo-GIA stapler at the level of the pelvic brim after creating a mesenteric window. The mesenteric blood supply of the sigmoid colon was divided using the Harmonic scalpel. The retrorectal space was developed followed by dissection of the mesorectum along anococcygeal ligament to the level of the posterior levator hiatus. The proximal rectum was divided at a level with adequate proximal surgical margin. Laterally, pararectal spaces on both sides were entered. The pararectal spaces were dissected to expose the levator ani on the lateral aspects. The ureters were visualized, dissected, and freed up to urinary the bladder. The next step, the urinary bladder was dissected of the vaginal wall and was exposed. Then, an incision was made around the vagina, perineal body, and around the anus. Colpotomy was performed anteriorly; extending posterolaterally. The rectum was transacted distal to the tumor involvement. This cut was extended anteriorly to join the colpotomy, and the surgical specimen was retrieved through the vagina. The proximal colon was brought out through the anal canal and a coloanal anastomosis was performed from below. A temporary proximal loop transverse colostomy was performed to protect the anastomosis in right upper quadrant. Pelvic drain was introduced through the single port, and the port was removed under vision. The vagina was closed with 2-0 vicryl. The fascia was closed using 0 vicryl suture and the skin was closed with running 4-0 monocryl subcuticular stitch. The perineal wound was then closed with Tisseel, virus-inactivated, 2-component fibrin sealant that contains thrombin and fibrinogen made from pooled human plasma. The advantage of this component is to reduce bruising, swelling, drainage, and hematoma formation. Estimated operative time was 210 minutes and average blood loss of 230 ml. Postoperative management included positive pressure ventilation, continuous enteral nutrition from the first postoperative day, and epidural analgesia. The pelvic drain was kept for 24-48 hours depending on the drainage. Hospital stay was about four to five days.

Discussion

Pelvic exenteration has been performed for recurrent gynecologic malignancies limited to the pelvis. It was first described by Brunschwig in 1948, and the procedure has undergone changes in modifications and indications [21-22]. Advances in laparoscopic evaluation, and laparoscopic assisted exenterations have been described [23-25]. Obesity and an aging may influence surgical and survival outcomes of pelvic exenteration [26-27]. Patients usually selected to undergo the procedure have considerable local symptoms including tenesmus, constipation, pain, and foul-smelling discharge. In addition, technologies such as PET scan, laparoscopic evaluation, and fine needle aspiration have enabled surgeons to accurately assess the extent of disease preoperatively, and refining candidates for exenteration. Moreover, robot-assisted laparoscopic surgery for patients with advanced and recurrent ovarian cancer has been shown to be safe and effective alternative to laparoscopic and laparotomy surgery. It has the advantage of three-dimensional vision, ergonomic, intuitive control, and wristed instrument that approximates the motion of the human hand. It can decrease the incidence of intraoperative complications and postoperative wound complications without significantly increasing operative time or blood loss [28]. The advantage of using the robotic system is that it assists the surgeon to dissect tissues in a narrow pelvic floor. There is also improved visualization with the binocular optics generating 3-D stereoscopic vision. The Harmonic scalpel allows for control of the pelvic sidewall vessels and transection of the ligamentous attachments circumferentially around the extirpated pelvic structures. The articulating wristed robotic instrument allows for fine sewing. The SPA has been shown to be safe and effective approach in several surgical specialties, leading to decreasing postoperative pain, better cosmesis and decreased hospital stay, and offering minimal scar [29]. The most important step in the procedure is the identification of the presacral plane to enable en bloc mesorectal excision and anterior dissection of the urinary bladder from the uterus and upper vagina. In addition, the low colpotomy enables visualization of the distal rectum once the posterior vaginal cuff is cut, allowing stapler insertion and transection. In general, posterior pelvic exenteration is an effective technique to obtain an optimal result in patients with advanced-stage disease with extensive involvement of the pelvic organs [30-34]. It is worth noting that the anterior resections of rectum are being performed by the Natural Orifice Translumenal Endoscopic Surgery [35], and Natural Orifice Specimen Extraction [36] techniques. Farghaly's technique uses a similar technique for posterior pelvic exenteration in patients with advanced and recurrent ovarian cancer. The proximal colon after transection was anastomosed to the anal canal. Thus, the patient had no laparotomy incision. The oncological clearance is adequate, and the postoperative recovery is faster. In the absence of scar, further adjuvant treatment could be offered early.

Conclusion

Farghaly's technique of single port access robot- assisted laparoscopic surgery for posterior pelvic exenteration in women with advanced and recurrent ovarian cancer is feasible and has the advantage of decreasing morbidity, short hospital stay, and is cost effective.

Acknowledgment

The topic of this manuscript was presented at the 40th American Association of Gynecological Laparoscopists Annual Meeting on Minimally Invasive Gynecology, Hollywood, Florida (USA) in November 2011.

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