Robotic single site sentinel lymph node fluorescence detection

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Abstract: In the last decades, new technologies such as robotics, single-site surgery, and near infrared fluorescence sentinel lymph node mapping has reduced invasiveness in the surgical management of oncological cancer patients. We present our surgical technique to treat low risk endometrial cancer with total hysterectomy and fluorescence sentinel lymph node mapping using robotic single site approach. The Da Vinci® Si System Single port platform, with 3D 8.5 mm firefly endoscope, semi rigid monopolar hook, bipolar forceps and wristed needle holder, has been used. Robotic single-site approach with sentinel lymph node fluorescence detection is feasible and applicable for the treatment of low-risk endometrial cancer.

Keywords: Sentinel lymph node; endometrial cancer; robotic single site; indocyanine green

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Introduction

For gynecologists, minimally invasive surgery has become the standard of care for the treatment of endometrial cancer (1,2). Minimally invasive surgery results in fewer intra and postoperative complications, shorter hospital stay, reduced pain, faster recovery and better cosmetic results as compared to laparotomy (3). The subsequent introduction of robotic-assisted surgery has brought additional advantages to conventional laparoscopy, as short learning curve and comfortable ergonomics, improved surgical precision by using tremor-eliminating software, wristed instruments ameliorating dexterity, 3-dimensional vision (4).

Surgeons and patients have benefited from the introduction of robotics for the surgical treatment of endometrial cancer, with an increase in the number of patients undergoing minimally invasive approach and a significantly reduced risk of severe complications (5).

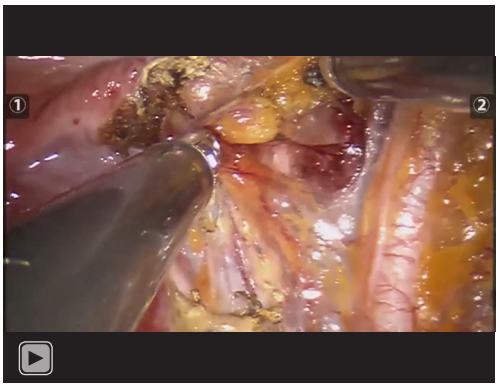
The development of a robotic single site platform has been shown to offer advantages compared with traditional robotic surgery for the treatment of selected patients, such as decreased parietal trauma, improved cosmesis and reduced costs (6-9). In the last three years different studies have evaluated the safety, feasibility and reproducibility of robotic single site approach for the treatment of endometrial cancer, showing the possibility to perform both pelvic lymphadenectomy and sentinel lymph node (SLN) mapping (9-17).

Operative technique

Following we describe our surgical technique to perform total hysterectomy and sentinel lymph node mapping for the treatment of low risk endometrial cancer using Da Vinci robotic single site device.

Patient had antibiotic prophylaxis and postoperative low molecular weight heparin. After general anesthesia, Foley catheter was placed in the bladder and Hole intrauterine manipulator was placed in place after coagulation of tubes, 4 milliliters of indocyanine green (2.5 mg/mL) was injected into the cervix at 3 and 9 o'clock.

A 2.5 cm intra umbilical incision was made to access into the peritoneal cavity. The single-site port was inserted into the abdominal cavity. The pneumoperitoneum was inflated at a pressure of 12 mmHg. Four specific trocars were introduced in the port: two 250 mm-long curved 5 mm trocars for robotic instruments, one 8.5 mm toca for the high-definition three-dimensional endoscope, and one 5 mm straight trocar for standard laparoscopic instrument. The Trendelenburg position was applied, till sufficient exposition of the pelvic surgical field. The Da Vinci® Si System was docked between the patient's legs. 3D 8.5 mm firefly endoscope, monopolar



Video 1 Robotic single site sentinel lymph node mapping.

hook and bipolar forceps were used on. Total hysterectomy, bilateral salpingo-oophorectomy and SLN mapping, were performed following the technique previous described (15) and shown in the *Video 1*. Uterus with manipulator, adnexa, and SLNs in endobag were extracted through the vagina. The vaginal cuff was internally sutured using a snaked 5 mm robotic needle-holder with number 0 Vicryl. Hence the robot was undocked, the single-site port removed and the umbilical incision was sutured in planes with number 1 Vicryl on the fascia aponeurosis, and Monocryl 3–0 on the skin.

Comments

The combination of laparoscopy, robotics, single access and sentinel lymph node mapping makes possible to minimize surgery improving peri-operative outcomes.

Robotic single-site approach with SLN fluorescence detection is feasible and applicable for the treatment of low-risk endometrial cancer.

Further studies are needed to demonstrate the applicability of the SLN algorithm and to compare different minimally invasive surgical techniques of the management of endometrial cancer.

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