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Review Article

Robotic Surgery in Women With Ovarian Cancer: Surgical Technique and Evidence of Clinical Outcomes

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ABSTRACT Robotic surgery is a new technology that has been progressively implemented to treat endometrial and cervical cancer. However, the use of robotic surgery for ovarian cancer is limited to a few series of cases and comparative studies with laparoscopy or laparotomy. The technical issues concerning robotic surgery, as well as clinical evidence, are described in this review. Robotic surgery in early stage, advanced stage, and relapsed ovarian cancer is discussed separately. In conclusion, evidence regarding the use of robotic-assisted surgical treatment for women with ovarian cancer is still scarce, but its use is progressively growing. Robotic-assisted staging in selected patients with early stage disease has an important role in referral institutions when well-trained gynecologists perform surgeries. However, minimally invasive surgery in patients with advanced stage or relapsed ovarian cancer requires further investigation, even in selected cases. Journal of Minimally Invasive Gynecology (2015) ■, ■–■ © 2015 AAGL. All rights reserved.

Keywords: Advanced stage; Early stage; Ovarian cancer; Robotic surgery; Surgical staging

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It is estimated that approximately 15% to 20% of women with ovarian cancer will be diagnosed at early stages, when tumors are localized in or both ovaries without evidence of local or distant spread [1]. The recommended treatment by the International Federation of Gynecology and Obstetrics consists of surgical staging based on hysterectomy, bilateral adnexectomy, omentectomy, pelvic and aortic lymphadenectomy, and multiple peritoneal biopsies, as well as appendectomy (for mucinous histology) [2]. These procedures have been traditionally performed via laparotomy with an extended midline incision [3]. However, over the past few decades, laparoscopic surgery has become integrated into standard surgical practice. The main advantages include shorter hospital stay, reduced postoperative pain, and a lower incidence of postoperative complications [4]. Nevertheless, it has not been adopted worldwide because of the long surgical learning curve and technical difficulties. Thus, the evidence of laparoscopic management of early stage ovarian cancer is still limited and is based on case series [5–8] or a few comparative studies with laparotomy [4,9,10].

In the past 10 years, surgical performance of laparoscopic surgery has been improved by robotic technology using the da Vinci system (da Vinci Surgical System; Intuitive Surgical Inc., CA), which allows surgeons to increase accuracy with tremor removal, and therefore, requires a shorter learning curve [11]. To date, data supporting the role of robotic surgery in ovarian cancer are limited to case reports and case series for staging patients in the early stages [12–15] and surgical debulking in patients with advanced stage and recurrent disease [16–20].

Thus, the evidence and technical aspects of robotic-assisted surgery to treat patients with ovarian cancer at different stages of their disease are discussed in the present review.

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Methods

A literature search in PubMed was performed using the following criteria: "ovarian neoplasms" (MeSH Terms) OR "ovarian" (All Fields) AND "neoplasms" (All Fields) OR "ovarian neoplasms" (All Fields) OR "ovarian" (All Fields) AND "cancer" (All Fields) OR "ovarian cancer" (All Fields) AND "J Robot Surg" (Journal) OR "robotic" (All Fields) AND "surgery" (All Fields) OR "robotic surgery" (All Fields) AND "2000/05/01" (Date of Publication): "2015/09/14" (Date of Publication). Studies were included if: (1) the robotic surgery was performed in women with ovarian cancer at any stage of disease; (2) the study included a comparison group, such as laparoscopy and or open surgery; and (3) the study analyzed clinical outcomes with or without oncological results.

Early Stage Disease: Immediate Staging After an Intraoperative Diagnosis

This procedure is a 2-step surgery: pelvic and abdominal approaches. After placing the umbilicus trocar, 8-mm robotic trocars are introduced (Fig. 1). To suction the fluid or to seal the vessels, is performed by an additional 10-mm laparoscopic assistant trocar. The surgeon placed at the operating console starts with the procedure after the robotic arms are docked and placed between the patient's legs and attached to the ports.

Unilateral or bilateral adnexectomy is initially performed to obtain an intraoperative diagnosis. If ovarian cancer is diagnosed, total simple hysterectomy and bilateral pelvic lymph node dissection is performed, unless conservative surgery for fertility preservation has been previously discussed with young nulliparous patients. The uterus is removed through the vagina, and the vaginal cuff is then closed. After hemostasis completion, the robotic arms are undocked, and the operating room table is rotated 180° [13]. This step is always cumbersome and can be stressful for the operating room personnel and the anesthesiologists. Therefore, the procedure should be well planned in advance Another possibility, based in the rotation of the robotic column instead of the patient, has been described by Magrina et al [13]. It seems to be a less stressful procedure for the anesthesiologists; the maneuver takes more or less the same time as rotating the operating table if personnel are well trained [21].

Figure 2 shows the localization of additional port access for the second part of the surgery. At this point, the robotic column is re-docked at the patient's head or at the right shoulder according to the surgeon's preference.

The second part of the surgery begins by performing infracolic omentectomy, appendectomy (for mucinous histology), and infrarenal aortic transperitoneal lymphadenectomy. Other authors have proposed performing the entire surgical staging without undocking and re-docking the robotic column [22]. Thus, the port camera is placed in the midline at 23 to 25 cm from the pubic bone, at 6 to 8 cm above the umbilicus. The other ports are placed in the same way used to perform pelvic surgery.

Fig. 1

Trocars' distribution for pelvic approach. The robotic column is docked to the patient's leg. The 10-mm access is a laparoscopic port (assistant trocar).

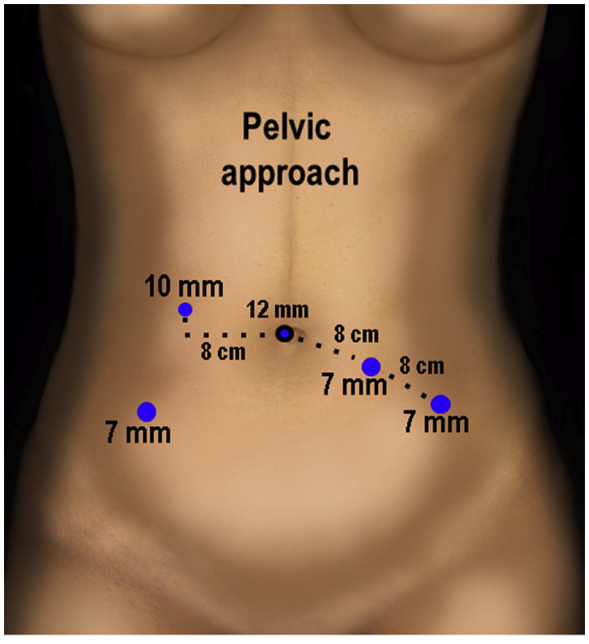
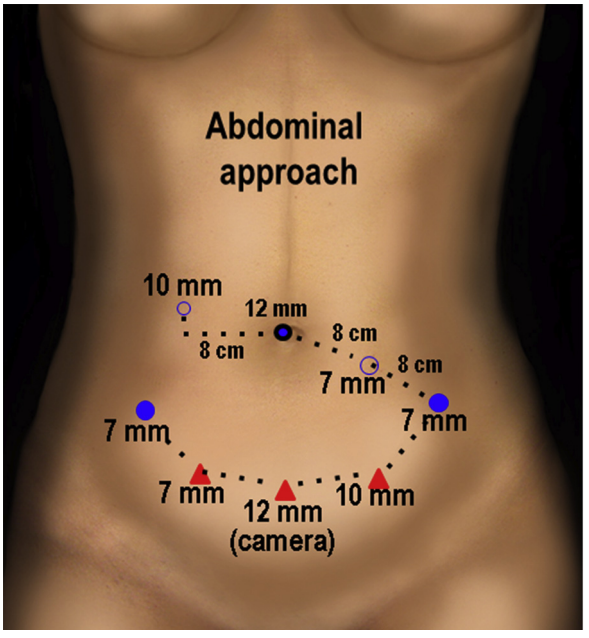


Fig. 2

Trocars' distribution for the abdominal approach. The robotic column is docked next to the patient's head or right shoulder according with surgeons' preference. The 10-mm access is a laparoscopic port (assistant trocar). Trocars in *triangle* are the additional access.



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