Preliminary report

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Laparoscopic approach is today the standard treatment for benign and malignant gynecological pathologies. To traditional laparoscopic surgery in the last 10 years we can add the possibility to use a robotic platform. The adoption of this system allows undoubted advantages as the three-dimensional vision, the absence of the physiological tremor with enhanced ergonomics and possibility of using articulable tools. In this study we analyzed the results of 18 patients with endometrial cancer (Stage I) treated with robotic approach. The results were compared with a selected sample of 26 patients, with the same characteristics, treated with traditional laparoscopic approach in the same period by the same surgical team. The mean total operative time was significantly longer for robotic than laparoscopic group (125.6 min vs 102.3 min). However, if to this operative time we remove the time of preparation (docking time) we obtain the following results: 102.5 min for robotic group and 95.7 min for the laparoscopic control group. Intra-operative blood loss are significantly lower in the robotic group than in laparoscopic group. The robotic treatment of gynecological cancer is a safe and feasible technique. The oncological results are also equivalent to those of traditional laparoscopic surgery with advantages in terms of precision and reduction of intraoperative bleeding. Additional clinical studies on larger samples and heterogeneous patients are necessary in order to clarify the real advantages of robotic treatment.

Key words: Robotic surgery - Robotic hysterectomy - Laparoscopy - Hysterectomy. 
Isterectomia robotica - Chirurgia robotica - Laparosopia - Ginecologia oncologica.
Introduction

The laparoscopic approach is now the standard treatment for benign and malignant gynecological diseases (1). From initial experiences with executions of hysterectomies for benign diseases it has gradually passed to the treatment of malignant neoplasms with pelvic and lumbo-aortic lymphadenectomy. The diffusion of this technique is related on one side to the multiple benefits of minimally invasive approach with reduced post-operative pain and hospital stay, and on the other side the development of increasingly complex technologies with better technical performance (2, 3).

The use of robotic surgery has rapidly increased in the last 10 years. Robotic surgery in gynaecological oncology allows improved surgical field visualization, superior ergonomics, instrument articulation, decreased tremor and shortened learning curve (4). However, at least in the initial experiences such technology was connected to an increase of costs and mean operative time. In 2005 Reynolds et al. (5) reported on a preliminary series of 7 robotic total hysterectomies with bilateral salpingo-oophorectomy and pelvic lymphadenopathy for endometrial cancer.

The results of many studies indicating a shorter hospital stay, decreased blood loss, lower transfusion rate and lower conversion to laparotomy rate, adequacy of surgical staging (6).

Consequently, interest in robotics for the management of gynaecologic cancer expanded. With this background, we developed a retrospective study analyzing the data from our initial experience in the robotic treatment of endometrial cancer. We compared the results with a control laparoscopic group using χ² test e Student’s t test with statistical significance (p) of < 0.05 and a 95% confidence interval.

Materials and methods

This retrospective study is based on the analysis of data collected between June 2015 and December 2015 at University Hospital Policlinico “P. Giaccone” and Ospedali Riuniti Villa Sofia – Cervello, Palermo. We used DaVinci Surgical System (Intuitive Surgical Inc., Sunnyvale, California, USA) with Maryland Bipolar forceps and monopolar hook. We used three robotic arms, a 12-mm trocar at the umbilicus for the camera, two 8-mm lateral robotic trocars at each lower quadrant of the abdomen, and a 5-mm conventional laparoscopic trocar between the umbilicus and the left robotic arm for the bedside assistant for suction, irrigation, retraction of tissues.

Robotic approach

All robotic procedures were performed using DaVinci Surgical System (Intuitive Surgical Inc., Sunnyvale, California, USA) with Maryland Bipolar forceps and monopolar hook. We used three robotic arms, a 12-mm trocar at the umbilicus for the camera, two 8-mm lateral robotic trocars at each lower quadrant of the abdomen, and a 5-mm conventional laparoscopic trocar between the umbilicus and the left robotic arm for the bedside assistant for suction, irrigation, retraction of tissues.

Laparoscopic approach

In these procedures, we placed a 10-mm trocar at the umbilicus for the camera and other three 5-mm trocars at each lower quadrant of the abdomen and in sovrapubic region. The surgeon was on the left side of the patient and the first assistant on the right side (14).

We used endo-bag for intraperitoneal lymph node storage during lymphadenectomy. Lymph nodes were removed transvaginally altogether after the completion of hysterectomy without spillage into the trocars or in the peritoneal cavity.
Results

A comparison of two series is presented in Table 1. The data are comparable in terms of mean age and BMI. In all cases we performed hystero-salpingooophorectomy with bilateral pelvic lymph node dissection. The mean time taken to perform surgery was longer in the robotic group, 125.6 min compared to 102.3 min in the laparoscopic group. However if we consider only real operative time without docking time, we obtain the following results: 102.5 min in the robotic group and 95.7 min in the laparoscopic control group. The numbers in this initial analysis were small and do not allow for statistical analysis. Blood loss were significantly lower for the robotic group (about 50 ml) compared to laparoscopic group (about 150 ml). There was no conversion to the open surgery in either arm and we did not register intraoperative complications. The mean hospital stay was 2.3 days in both treatment groups. We did not observe readmissions within 30 days of the procedure.

Discussion

The present results showed comparable surgical outcomes of robotic approach to that of conventional laparoscopic approach in the treatment of Stage I endometrial cancer. The clinical impact of robotic surgery in gynaecologic field is growing widely, as suggested by a recent consensus statement made by the Society of Gynecologic Oncology (15). However, the cost is still a potential barrier to the widespread acceptance of robotic surgery.

Recently, Lönnefors et al. (16) published a randomized prospective study comparing robotic versus standard laparoscopic hysterectomy with no significant cost difference.

The introduction of any new technology requires a variable learning curve. Studies in the literature show that the use of the robotic system with three-dimensional vision and articulating instruments facilitates the surgical learning and potentially the spread of such technology. This process would also be favored by the experience in laparoscopic surgery. Our results show the advantages of robotic treatment with shorter real operative time. The longer operative time therefore is related to the docking procedure that is reduced progressively with the experience of the team (Figure 1).

Povolotskaya et al. (17) reported that the discrepancy between the complication rate in robotic and laparoscopic group could be explained by the variable hemostatic abilities and tissue damage caused by different energy devices: Harmonic Ace® and Ligasure® for laparoscopic surgery and monopolar and standard bipolar diathermy in robotic group.

In our experience, a reduction in blood loss in robotic arm is not to be attributed to the use of different

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energy technologies, but to the three-dimensional vision, image magnification and more accurate movements. This study, however, is based on an initial experience, and therefore suffers from some biases. First of all the small number of patients treated is affected by the natural learning curve and does not allow to obtain statistically significant results as regard for example the mean real operative time. The absence of intraoperative complications and conversions to open surgery in the two groups would to be justified from selected sample of patients undergoing robotic treatment and consequently from the selected group of control that has the same characteristics.

From literature is known as uterine size (greater than 500 g), BMI and previous surgery are factors that can significantly affect the surgical results (18).

In our series we also report equivalent hospital stay in both two groups.

Other Authors show a shorter hospital stay in robotic group. The difference could be explained by the less abdominal distension used due to the possibility to perform the surgery with lower intra-abdominal pressure (19). In addition, it could be possible that as robotic surgery was a new procedure to the hospital and there was a focus on the early discharge (17).

Another important point of discussion is the perception that robotic surgery is “one man” surgery.

Zullo et al. (20) report that only the communication and collaboration between the different members of the team allows you to make a safe procedure.

In this study we did not take into consideration the levels of communication between the medical and technical staff in the operating room while using the robotic platform, however, the progressive reduction of the docking time could be an indirect evidence of better communication.

Conclusion

This retrospective analysis carried at our constitution shows as the robotic treatment of gynecological cancer is a safe and feasible technique. The oncological results are also similar to those of traditional laparoscopic surgery with advantages in terms of precision and reduction of intraoperative bleeding. Further clinical studies on larger samples and heterogeneous patients are necessary in order to clarify the real advantages of robotic treatment and eventually expanding the indications.

References

Endometrial cancer: robotic versus laparoscopic treatment. Preliminary report


