

A Therapeutic Comparison of Robotic Vs Open Vs Laparoscopic Hysterectomy in Patients Diagnosed with Endometrial Cancer

Hamilton Miranda Valdez¹, Diana Cecilia Miranda Torres², Daisy Janeth Cano Desilos³, Carlos Andres Lopez Martinez⁴, Miguel Leonardo Garzón Pérez⁵

^{1,2,5}Universidad Autónoma de Guadalajara

³Universidad Autónoma de Tamaulipas

⁴Universidad Autónoma de Ciudad Juárez

ABSTRACT

The American Cancer Society estimates that 60,050 cases of endometrial cancer will be diagnosed in 2016 and that 10,470 will die from endometrial cancer during 2016. Since 1988, incidence rates have increased by 1.3 per cent per year for women under 50 and by 1.9 per cent per year. In women age 50 and older, uterine cancers are usually treated with surgery, radiation, hormones, and/or chemotherapy. Uterine cancer is the most common form of gynecologic cancer. Surgery is the mainstay for staging and optimizing treatment for women with endometrial carcinoma. The surgical approach has evolved rapidly since the late 1980s with the introduction of laparoscopy in the surgical staging of endometrial cancer. An alternative to conventional laparoscopy or robotic surgery is single-port Laparoendoscopic 3-incision surgery which further enhances the cosmetic benefits of minimally invasive surgery, avoiding the potential morbidity associated with multiple incisions. Since it has been observed that it offers greater visibility and accuracy of the area of operation. Although most of the advantages are in cases, such as patients with previous abdominal surgeries and obesity.

ARTICLE DETAILS

Published On:
11 November 2022

Available on:
<https://ijmscr.org/>

INTRODUCTION

Endometrial cancer is a malignant glandular neoplasm that its origin is usually related to a constant stimulation of estrogens chronically of the endometrium, through a source of endogenous or exogenous estrogens.

Uterine cancer is the most common form of gynecologic cancer in the United States in 2013. It is known from a gynecological neoplasm more frequent worldwide. Surgery is the mainstay for staging and optimizing treatment for women with endometrial carcinoma.

It has an incidence almost 6 times higher in developed countries than in non-developed ones, its prognosis in the early stages is favorable with a survival of 80%. There are still no methods for the timely detection of endometrial cancer. The most important risk factors for endometrial cancer are postmenopausal status, a body mass index (BMI) of 25 mg/m² or more, excessive fat consumption, nulliparity, anovulation, and estrogen use without progestational opposition. However, up to 50% of patients with endometrial cancer present without these factors. Obesity seems to act through multiple mechanisms involving hormonal alterations

both in pre-menopausal women (insulin-resistance, excess ovarian androgens, anovulation and chronic progesterone deficiency) and in postmenopausal women (peripheral conversion of androgens to estrogens). Physical inactivity, caloric intake, blood pressure above 140/90, and high glucose concentrations are additional independent predictors of BMI.

The form of clinical presentation is characteristic with abnormal transvaginal bleeding, up to 75%.

The primary treatment is surgical and surgical staging allows to obtain complete pathological information and prognostic data on which decisions for adjuvant treatment are based.

The surgical staging procedure that is necessary to determine the stage of the disease depends on the preoperative and intraoperative evaluation, performed by a team with experience in imaging, pathological anatomy and gynecologic oncology

The surgical approach has evolved rapidly since the late 1980s with the introduction of laparoscopy in the surgical staging of endometrial cancer.

A Therapeutic Comparison of Robotic Vs Open Vs Laparoscopic Hysterectomy in Patients Diagnosed with Endometrial Cancer

Within the surgical treatment in 2010 for uterine cancer, 48% had an abdominal hysterectomy, 15% were laparoscopic and 35% were robotic.

Among the procedures performed are the open, laparoscopic, Robotic. One of the objectives of this literature review is to determine the one with the greatest benefit for patients, who are already susceptible to diagnosis, being able to have a much faster improvement in the postoperative period and without added complications.

THEORETICAL FRAMEWORK

Endometrial carcinoma is globally the sixth most common cancer in women, with 320,000 new cases a year. The highest incidence rates are found in North and North America and Western Europe. The lowest incidences are low in Central Asia and in the largest in Africa. In developed countries, endometrial cancer is often diagnosed (80%) to the International Federation of Gynecology and Obstetrics stage I and can therefore be cured by surgery.

The primary treatment for endometrial cancer is total hysterectomy, bilateral salpingo-oophorectomy, and surgical staging. Over the past 20 years, laparotomy has been replaced by minimally invasive laparoscopic techniques, of which robotic-assisted surgery has lately become increasingly popular.

The da Vinci robotic system has indications that include different pathologies (benign and malignant) in many different specialties, including urology, gynecology, cardiothoracic surgery, otolaryngology, gastrointestinal oncology and others. According to a recent survey of members of the Society of Gynecological Oncology, the rate of use of robotic surgery to treat gynecological neoplasms has increased from 27% in 2007 to 97% in 2012. The robot allows the surgeon to overcome some technical problems such as avoiding tremors, offering a 3-dimensional vision and instruments that can be moved accurately in a full 360°. Otherwise multi-port robot technique produces optimal surgical results, but leaves patients with multiple scars.

The advantages of robotic-assisted surgery compared to conventional laparoscopy have been described in retrospective and observational studies. Since it offers a better view in 3 dimensions, greater visibility and accuracy of the operating area, in addition to the fatigue-resistant properties of the robot's hands, as well as the best mobility and the greater amplitude of movement of the instrument.

Instead, in a study by Shao-Hui Chen and colleagues, they mention that the advantages of laparoscopic surgery are considered a preferred alternative to laparotomy due to less blood loss and blood transfusion, shorter hospitalization, and better cosmetic outcomes. However, the minimally invasive approach to treating endometrial cancer has been limited due

to the two-dimensional visualization and the strict demand of expert and experienced surgeons.

Nezhat F and colleagues in 2016 showed that laparoscopic surgery is feasible and safe. The mean operative time was significantly higher in the conventional laparoscopy (CLS) group, however, the length of stay was significantly shorter compared to laparotomy.

A study was conducted in 2016 where they analyzed the preoperative results of robotic-assisted laparoscopic surgery (ADR) compared to conventional laparoscopic surgery (IC) and the results showed that RAL presented few complications, such as less blood loss. These advantages of RAL could be attributed to the following factors: 1.- the robotic device has allowed a better detection of large and small vessels; 2.- the improvement of hemostasis and the clear identification of small vessels contributed to reduce the rates of blood transfusion in ADR; 3.- RAL could provide important advantages for endometrial cancer patients with obesity and other complex conditions, such as anterior abdominal surgery with severe adherence, by reducing conversion rates; and 4.- Robotic surgery has drastically decreased musculoskeletal fatigue over time in surgeons and perhaps improves the overall productivity and longevity of the practice.

In another 2016 study by Park D.A. et al., they compared the use of traditional openotomy hysterectomy (OH), robotically assisted hysterectomy (HR), and laparoscopic hysterectomy (LH) and demonstrated that the reported intraoperative complications were urinary tract lesions and cystotomy were significantly lower in HR. Patient-reported results showed a trend in favour of HR. Overall, intraoperative and postoperative complications showed statistically significant differences compared to OH and compared to LH, as the latter showed a tendency to reduce complications, HR was found to be associated with shorter hospitalization than for OH or LH (about 2.9 and 0.5 days, respectively). Similarly, this same situation was analyzed in obese populations and it was concluded that hospitalization for HR was shorter in 2.3 and 2.9 days than that for OH. Within the same study, it was found that HR was associated with less blood loss compared to LH and OH and that HR was associated with a longer surgical time compared to those of OH and LH, despite the data found, no significant difference was demonstrated between the groups regarding recovery time, use of pain medications, pain score, duration of pain medication use, time to return to a full diet, time back to work, which are considered important aspects of patients' quality of life.

However, Taylor B and her colleagues found that robotic surgery was associated with lower postoperative pain scores only during the 12 to 24 hour interval after surgery. The use of narcotics was higher in transabdominal laparoscopy.

A Therapeutic Comparison of Robotic Vs Open Vs Laparoscopic Hysterectomy in Patients Diagnosed with Endometrial Cancer

David E. Cohn et. al. developed a prospective study, where endometrial cancer patients who received robotic-assisted surgical staging had significantly lower opioid use in the first 24 hours after surgery compared to patients who underwent laparotomy, despite not pooling pain differences on the first postoperative day (POD). Patients in the laparotomy group had a mean opioid intake of 132 mg morphine equivalent, with a minimum dose of 40 to 435 mg, compared with 77 mg morphine equivalent (minimum dose, 0.00-220 mg) in the robotic group.

Although the present study did not include standard paroscopic staging, at the institution where the study was conducted, minimally invasive endometrial cancer surgery is performed robotically almost exclusively, so conducting a study that includes laparoscopy would not have been feasible.

Robotic-assisted surgical treatment in patients with endometrial cancer provided better quality of life and lower opioid use compared to patients who were treated with laparotomy. Prospective evaluation of the impact of this surgical modality on quality of life, cost-effectiveness and safety compared to standard laparoscopy and/or laparotomy in this patient population is warranted.

It is quite clear that most patients benefit from minimally invasive surgery such as laparoscopy, but the conventional laparoscopic technique has its limitations in more difficult procedures and areas such as lymphadenectomy, which has been facilitated by the introduction of robotic surgery. Several studies present a robotic-assisted laparoscopic surgical outcome, but few compare patient satisfaction, recovery time with active daily life (ADL), or the absence of severe sequelae. A short recovery time from normal ADL is important for quality of life, and because women with endometrial carcinoma are usually elderly, a minimum of surgical trauma increases the chance of shortening the recovery period.

All intraoperative complications were detected and managed during surgery. One patient in the robotic-assisted laparoscopy group had a deep bleed on postoperative day 1, which required a second surgery. This patient had a coagulation deficiency and a history of bleeding after previous surgery. Another patient in the robotic-assisted laparoscopy group had a preoperative bladder injury, which was repaired during surgery. This patient had a urinary tract infection 10 days after the operation and was being treated with antibiotics. A month after surgery, the patient developed a vesicovaginal fistula. She was readmitted for corrective surgery, which was successfully performed 3 months after surgery. None of the postoperative complications generated symptoms or long-term permanent sequelae in either group. There were no statistically significant differences in intraoperative or postoperative complications.

For open procedures, postoperative complications included desaturation, dyspnea, tachycardia, nausea and vomiting, need for ventilation, wound drainage, anemia, hypotension with low urine production, hypovolemic shock, ileus and chest tightness. As for the laparoscopic procedure, complications included angrado and dyspnea. For robotic procedures, complications included internal drainage, lymphedema, cellulitis, fascial surgery, seizures, urinary tract infection, and wound infection. Giacomo Corrado pointed out that surgical scars should not be considered as an "aesthetic problem", but a reflection of the image of the body impact has on the patient constantly reminding them of the cancer. Single-site access ("free surgery scar") really provides the solution to this problem by proposing a minimal incision through the navel access.

This study shows that robotic-assisted laparoscopy for women with endometrial carcinoma undergoing hysterectomy, BSOE, and pelvic lymphadenectomy is associated with significantly shorter operative time and hospital stay, as well as lower EBL and faster recovery to normal ADL without a higher total cost compared to Laparotomy. Robotic-assisted laparoscopy is a feasible and cost-effective surgical technique in women with endometrial carcinoma compared to laparotomy.

SURGICAL TECHNIQUE

1) Robotic Single-Site Hysterectomy (RSSH)

A 2 cm long incision over the lower edge of the navel, up to the level of the fascia was made after lubrication of the single-site port (Surgical Intuitive) by immersing it in a sterile solution (e.g. saline or water). Using an atraumatic clamp, the one-site port was grasped just above the bottom edge. The leading edge of the folded port was inserted into the incision with a downward movement, while the counter-traction was provided by retractors inside the incision. Insufflation was initiated to reach a pneumoperitoneum of approximately 12 mm Hg. Afterwards, the table was placed in the Trendelenburg position (30°). A da Vinci Si 8.5 mm 30° endoscope was inserted vertically and used throughout the course of surgery. Afterwards, a curved 5 x 250 mm cannula (arm 2) was lubricated and inserted through the designated lumen while the outer edge of the hole was retained by the assistant to prevent displacement. The cannula was guided near the uterus and then stopped to allow coupling. This was done by keeping the cannula still in one hand while the other hand carries and mounts the arm to the second curved 5 x 250 mm cannula (Arm 1). Finally, the instruments were introduced: a monopolar spatula on Arm 2 and a bipolar Maryland on Arm 1. The assistant's 5 mm accessory cannula, with which the assistant holds and moves a suction/irrigator instrument or a 5 mm endo-clip instrument, was inserted the last of all. Class A and bilateral RSSH salpingo-oophorectomy according to the Querleu and Morrow classification.

A Therapeutic Comparison of Robotic Vs Open Vs Laparoscopic Hysterectomy in Patients Diagnosed with Endometrial Cancer

2) Robotic Multiport Hysterectomy (RMPH)

Patients were placed in the lithotomy position with their arms bent on each side. After the creation of a pneumoperitoneum at 12 mm Hg with a transumbilical Veress needle, a trocar of 12 mm to 5 cm of skull was placed at the umbilical level. Three 8 mm trocars were placed, specific for the da Vinci (Intuitive Surgical) robotic systems: one (Arm 1) on the right side of the abdominal, medial and cranial wall to the right anterior superior iliac spine and two on the left side of the abdominal wall. The first (Arm 2) in the lower left rib and the second (Arm 3) medial and cranial to the left anterior superior iliac spine in the same line of the right trocar and is attached to the robotic arms. An auxiliary trocar of 10 mm was placed on the right side of the abdominal wall, 7 to 10 cm laterally, from the supraumbilical trocar. After obtaining the Trendelenburg position (grade 30), the da Vinci robotic spine was placed near the operating table between the patient's feet and coupled. The instruments were introduced: a bipolar clamp and a PK clamp in the left robotic trocars (Arms 2 and 3, respectively), and monopolar scissors in the right robotic trocar (Arm 1). An intuitive 30-degree endoscope was used during all operations. Class A plus bilateral SALOPINGO-Oophorectomy RMPH according to the Classification of Querleu and Morrow.

Operating room costs were higher in the RSSH than in the RMPH group. This difference was due to the increase in operating time spent in the RSSH group. The costs associated with robotic-assisted laparoscopy have been the subject of intense debate. Some studies report increased costs, compared to laparotomy and traditional laparoscopy, indicating that robotic-assisted laparoscopy is not justifiable from an economic perspective. It has also been shown in some studies that robotic-assisted laparoscopy is slower than laparotomy, contributing to increased costs. In addition, it has recently been shown in a benign environment that robotic surgery is more expensive than laparoscopy. However, the cost decreases with the increase in the volume of the procedure suggesting that the skills and experience of surgeons are important.

DISCUSSION

In Mexico, GLOBOCAN 2008 reports an incidence of 2,606 cases (4%) and a mortality of 1,142 cases (3%). The RHNM 2003 reported an incidence of 1,731 cases (12% gynecological tumors). INEGI4 reported 74,685 cancer deaths in 2010 (13% of deaths in Mexico) of which 1,142 (14% of gynecological tumors) are from endometrial cancer (EC). In our service, 48% were classified as CE I while 14% as CE II with an average age of 57 years. But globally it is the sixth most common cancer in women.

As for robotic laparoscopy vs robotic hysterectomy for endometrial cancer, we see that single-port surgery like 3-incision Laparoendoscopic further enhances the cosmetic

benefits of minimally invasive surgery, avoiding the potential morbidity associated with multiple incisions. Since the robot allows the surgeon to overcome some technical problems, such as avoiding tremors, offering a 3-dimensional vision in addition to the instruments can be moved accurately in 360 °.

In another article we were told about robotic laparoscopy, conventional laparoscopic and open hysterectomy for endometrial cancer. Which had some of the following complications:

For conventional laparoscopy, complications included bleeding and dyspnea. For robotic procedures, complications include incisional drainage, lymphedema, cellulitis, facial dehiscence, seizures, urinary tract infection, and wound infection.

For cases of open hysterectomy, readmissions were due to UTI, gastrointestinal bleeding, wound infection, pelvic abscess, fever, wound drainage, abdominal pain, ascites, and leukocytosis.

Although it was reported that the operating times for laparoscopic procedures were the longest, followed by robotization and laparotomy. There was less estimated blood loss for robotics compared to conventional or open laparoscopic procedures.

In the case of robotic-assisted laparoscopic surgery vs traditional laparoscopic surgery for endometrial cancer. In addition to the advantages mentioned above in this article, they emphasize that it is faster than in conventional laparoscopy; for example, the endoscopic suture technique can be adopted faster. Although as expected there were also complications, but not significantly, in the robotic group of surgery (18 vs 10). But according to a recent study, which compares robotic-assisted surgery to laparotomy for endometrial cancer, hernia formation was a problem only in the laparotomy group.

In another article we were told about preoperative results in robotic-assisted treatment vs conventional laparoscopic treatment of endometrial cancer. In which the challenge was patients with previous abdominal surgeries, obesity or severe adhesive disease. It was mentioned that there are few data comparing the results of robotic-assisted laparoscopy (RAL) to conventional laparoscopy (CL) for the treatment of endometrial cancer. But when the study was finished noted given the high incidence of obesity in endometrial cancer, future studies should focus on determining which minimally invasive technique is most beneficial in this subgroup of patients. To date, studies comparing minimally invasive techniques in obese patients showed better results in RALS compared to CLS. In the current study, when stratified by BMI, it was observed that class III obese patients undergoing minimally invasive surgery have more postoperative complications than their non-obese counterparts, 6 (18%) vs. 1 (2%).

A Therapeutic Comparison of Robotic Vs Open Vs Laparoscopic Hysterectomy in Patients Diagnosed with Endometrial Cancer

In the following study, assisted by robot vs conventional laparoscopic surgery for the staging of endometrial cancer. It was observed that the benefits of robotic-assisted laparoscopic surgery (RAL) exceeded the limits of conventional laparoscopic surgery (IC). It is associated with a shorter hospital stay, a lower overall complication rate, and fewer blood transfusions. In addition, it has shortened the transition time of patients to normal social life and improved their quality of life as well. However, studies comparing ADR with CL in the staging of endometrial cancer remain limited. Although what is clear are the advantages of RAL could be attributed to the following factors: 1.- the robotic device allowed a better detection of large and small vessels; 2.- the improvement of hemostasis and the clear identification of small vessels contributed to reduce the rates of blood transfusion in ADR; 3.- RAL could provide important advantages for endometrial cancer patients with obesity and other complex conditions, such as anterior abdominal surgery with severe adherence, by reducing conversion rates; and 4.- Robotic surgery has drastically decreased musculoskeletal fatigue over time in surgeons and perhaps improves the overall productivity and longevity of the practice.

These approaches can ultimately help determine whether RAL is a safe and effective alternative to CL for endometrial cancer staging surgery.

CONCLUSIONS

It is known that 90% of endometrial cancers are sporadic but approximately 10% have hereditary bases.

The endometrial cancer studied occurs mainly in stage I, with a moderate increase in stages II and III. It occurs mainly in people over 50 years of age, whose main symptom is postmenopausal metrorrhagia. It presents a favorable evolution, especially when diagnosed in stages I and II.

Most of the patients received surgical treatment and about half underwent lymphadenectomy with few complications. It is concluded that in the comparison that was made in the bibliographic review. It has fewer postoperative complications through laparoscopy and robotics, in addition to an improvement in the aesthetics in terms of the incision compared to the open technique. It should be noted that a higher percentage of patients with depressive symptoms and sleep disturbances were found when the open technique was performed.

It is concluded that the main histological lineage is still the endometrioid variety.

We must make efforts to reach a diagnosis and treatment in a timely manner, in such a way as to avoid the delays observed between the diagnosis and the performance of surgery or adjuvant treatment.

Most cases are diagnosed at an early stage and are amenable to treatment with surgery alone. However, patients with

pathological features that predict a high rate of relapse and patients with extrauterine metastases at the time of diagnosis have a high relapse rate even after receiving adjuvant therapy. It is known that 90% of endometrial cancers are sporadic but approximately 10% have hereditary bases.

The endometrial cancer studied occurs mainly in stage I, with a moderate increase in stages II and III. It occurs mainly in people over 50 years of age, whose main symptom is postmenopausal metrorrhagia. It presents a favorable evolution, especially when diagnosed in stages I and II.

Most of the patients received surgical treatment and about half underwent lymphadenectomy with few complications. It is concluded that in the comparison that was made in the bibliographic review. It has fewer postoperative complications through laparoscopy and robotics, in addition to an improvement in the aesthetics in terms of the incision compared to the open technique. It should be noted that a higher percentage of patients with depressive symptoms and sleep disturbances were found when the open technique was performed.

It is concluded that the main histological lineage is still the endometrioid variety.

We must make efforts to reach a diagnosis and treatment in a timely manner, in such a way as to avoid the delays observed between the diagnosis and the performance of surgery or adjuvant treatment.

Most cases are diagnosed at an early stage and are amenable to treatment with surgery alone. However, patients with pathological features that predict a high rate of relapse and patients with extrauterine metastases at the time of diagnosis have a high relapse rate even after receiving adjuvant therapy.

REFERENCES

- I. Minna M. Mäenpää, MD; Kari Nieminen, PhD; Eija I. Tomás, PhD; Marita Laurila, MD; Tiina H. Luukkaala, MSc; Johanna U. Mäenpää, PhD. Robotic-assisted vs traditional laparoscopic surgery for endometrial cancer: a randomized controlled trial. *Am J Obstet Gynecol* 2016; 215: 588.e1-7.
- II. Papadakis a. maxine, stephen j. mcphoe. *Current. cmdt. Medical diagnosis and treatment.* Elsevier. mcgraw-hill. 2015.
- III. Townsend m. courtney. *Surgery treaty.* 19th ed. Mexico. Elsevier. 2014.
- IV. Brunicardi charles f. schwartz principles of surgery. 10th ed. Mexico. mcgraw-hill. 2015.
- V. Ran L, Jin J, Xu Y, Bu Y, Song F. Comparison of Robotic Surgery with Laparoscopy and Laparotomy for Treatment of Endometrial Cancer: A Meta-Analysis. *PLoS ONE* 9(9): e108361.
- VI. Lynette Johnson, W. Douglas Bunn. *Clinical comparison of robotic, laparoscopic, and open*

A Therapeutic Comparison of Robotic Vs Open Vs Laparoscopic Hysterectomy in Patients Diagnosed with Endometrial Cancer

- hysterectomy procedures for endometrial cancer patients. *J Robotic Surg.* 2016.
- VII. Nezhad F. Perioperative Outcomes in Robotic-Assisted Versus Conventional Laparoscopic Treatment of Endometrial Cancer. *J. Adenocarcinoma* 2016, 1:1.
- VIII. Shao-Hui Chen, Zhao-Ai Li, Rui Huang, Hui-Qin Xue. Robot-assisted versus conventional laparoscopic surgery for endometrial cancer staging: A meta-analysis. *Taiwanese Journal of Obstetrics & Gynecology* 55 (2016) 488e494.
- IX. Cohn D, Castellon-Larios K, Huffman L, Salani R, Fowler J, Copeland L et al. A Prospective, Comparative Study for the Evaluation of Postoperative Pain and Quality of Recovery in Patients Undergoing Robotic Versus Open Hysterectomy for Staging of Endometrial Cancer. *Journal of Minimally Invasive Gynecology.* 2016; 23 (3):429-434.
- X. Eklind S, Lindfors A, Sjöli P, Dahm-Kähler P. A Prospective, Comparative Study on Robotic Versus Open-Surgery Hysterectomy and Pelvic Lymphadenectomy for Endometrial Carcinoma. *International Journal of Gynecological Cancer.* 2015; 25(2):250-256.
- XI. Corrado G, Cutillo G, Mancini E, Baiocco E, Patrizi L, Saltari M et al. Robotic single site versus robotic multiport hysterectomy in early endometrial cancer: a case control study. *Journal of Gynecologic Oncology.* 2016; 27(4).
- XII. D.A. Park et al. Comparative safety and effectiveness of robot-assisted laparoscopic hysterectomy versus conventional laparoscopy and laparotomy for endometrial cancer: A systematic review and meta-analysis. *EJSO* 42 (2016) 1303e1314.
- XIII. Taylor B, Turner MD, Ashraf S, Fleming, et al. Postoperative Pain Scores and Narcotic Use in Robotic-assisted Versus Laparoscopic Hysterectomy for Endometrial Cancer Staging. *Journal of Minimally Invasive Gynecology, Vol 22, No 6, September/October 2015.*