Surgical Technique of Laparoscopic Total Hysterectomy

Técnica Cirúrgica de Histerectomia Total Laparoscópica

WILLIAM KONDO[1]; MONICA TESSMANN ZOMER[2]; ANÍBAL WOOD BRANCO[3];
LUCIANO CARNEIRO STUNITZ[4]; ALCIDES JOSÉ BRANCO FILHO[5]; SANDRO NICHELE[6]

[1.] *General Surgeon and Gynecologist, Sugisawa Hospital and Medical Center and Vita Batel Hospital, Curitiba, Paraná;* [2.] *Gynecologist, Dona Helena Hospital, Joinville, Santa Catarina;* [3.] *Urologist, Vita Batel Hospital, Curitiba, Paraná;* [4.] *Urologist, Vita Batel Hospital, Curitiba, Paraná;* [5.] *General Surgeon, Vita Batel Hospital, Curitiba, Paraná ;* [6.] *Urologist, Vita Batel Hospital, Curitiba, Paraná.*

ABSTRACT

Hysterectomy is the most common major gynecologic surgical procedure performed worldwide. Benign diseases (menstrual disorders, myomas, pelvic pain and uterine prolapse) account for more than 70% of the indications for hysterectomy. Hysterectomy has been traditionally performed by open abdominal or vaginal surgery, but recently laparoscopy has become an alternative surgical route with good outcomes. Advantages of the laparoscopic approach compared to open surgery include less intraoperative bleeding, shorter duration of hospitalization, faster convalescence, and lower rates of wound and abdominal wall infections; surgical time, however, seems to be increased. In this article we discuss some technical issues of laparoscopic total hysterectomy.

Key words: Total histerectomy. Laparoscopy. Technique.

INTRODUCTION

Worldwide hysterectomy is the most commonly performed major gynecological surgical procedure. Benign diseases are responsible for more than 70% the indications for hysterectomy and include menstrual disorders, myomas, pelvic pain, and uterine prolapse.[1]

Hysterectomies are usually performed by laparotomy or through a vaginal approach.[2] However, since the description of the surgical technique of a completely laparoscopic hysterectomy in 1989, this minimally invasive approach has been considered an alternative path of access to the traditional techniques of hysterectomy.

Although the vaginal and laparoscopic approaches have advantages over open surgery, the latter remains the most widely used means of access for performing hysterectomies worldwide. In Denmark, 80% of the hysterectomies for benign disease between 1988 e 1998 were performed by laparotomy.[4] During the period from 1988 to 1990, close to 1.7 million were performed in the United States and 75% of these were performed through the abdominal approach.[5] In 2003, the abdominal approach was still the most common (66.1%) in the hysterectomies performed for benign disease in the United States followed by the vaginal approach (21.8%) and by laparoscopic hysterectomies (11.8%).[6] In a transverse multicenter study including 23 French university medical centers, the rates of laparotomy, vaginal hysterectomy, and laparoscopic hysterectomy were 43.4%, 47% and 9.6% respectively, in May 1996.[7] A study carried out between June and December of 2004 including 634 women who underwent hysterectomies for benign disease at twelve French university hospitals showed that there was an important reduction in the rate of laparotomies, with the surgery performed through a vaginal approach in 48.3%, via laparotomy in 24.4%, through a vaginal approach assisted by laparoscopy in 8.2%, and laparoscopically in 19.1%.[8] In Brazil, for the year 2009, 105,054 hysterectomies were performed for benign disease in the public healthcare system (Sistema Único de Saúde), with 89.9% abdominal, 10% vaginal, and only 0.1% laparoscopic.[9]

The advantages of the laparoscopic approach compared to open surgery include less intra-operative

bleeding, shorter hospital stay, a faster recuperation, and a lower rate of infections of the wound and the abdominal wall, with the tradeoff being that surgical time is longer.[10] Although various authors have demonstrated an increased rate of ureteral and bladder lesions with laparoscopic access,[10,11] miniseries published recently including 4505 women who underwent hysterectomy using different approaches (laparoscopic, vaginal and laparotomy) did not show a statistically significant difference in the rates of major complications when the three groups were compared.[12]

In this article we address the technical details of laparoscopic total hysterectomy.

TYPES OF LAPAROSCOPIC HISTERECTOMY

Various laparoscopic hysterectomy techniques have been proposed, reflecting the proportions of procedures performed by laparoscopy and vaginally. The classification of the American Association of Gynecologic Laparoscopists was published in 2000,[13] with the aim of standardizing the terminology of this procedure.

· Type 0 = Laparoscopic preparation for a vaginal hysterectomy, including the release of adhesions and/or the excision of endometriosis.

· Type 1 = Occlusion and sectioning of at least one ovarian pedicle, utero-ovarian or infundibulo-pelvic ligament, but not a uterine artery.

· Type 2 = Type 1 associated with the occlusion and sectioning of one or both of the uterine arteries.

· Type 3 = Type 2 associated with a portion (but not all) of the complex, unilateral or bilateral.

· Type 4 = Total freeing of the cardinal-uterosacral complex, unilateral or bilateral, with or without entering in the vagina. Includes laparoscopic total hysterectomy.

The laparoscopic total hysterectomy is defined as a hysterectomy performed completely by laparoscopy, including the suturing of the vaginal vault. With advances in laparoscopic techniques and expanded training in gynecologic laparoscopy, the portion of type 2 and 4 laparoscopic hysterectomies should increase.[14]

INDICATIONS FOR LAPAROSCOPIC HISTERECTOMY

The indications for laparoscopic hysterectomy are the same as those for a hysterectomy by other routes. The specific indications for laparoscopic access are those cases in which there is a contraindication to vaginal hysterectomy.[10,15] A Cochrane Collaboration systematic review encompassing 27 studies (3643 patients) compared the results of abdominal, vaginal and laparoscopic hysterectomy, and concluded that vaginal access should be preferred in relation to abdominal access, based on the best results. The authors also concluded that when a vaginal hysterectomy was not possible, a laparoscopic hysterectomy could avoid the need for an abdominal hysterectomy, but requires a longer surgical time (mean difference of 25.3 minutes).[10]

Compared with the path of vaginal access, laparoscopy permits the performance of concomitant procedures (appendectomy, adnexal surgery, excision of endometriosis) and the inspection of the peritoneal cavity in search of other disease. In 2005, the American College of Obstetricians and Gynecologists Committee Opinion listed the following indications as appropriate for the use of laparoscopic-assisted vaginal hysterectomy: lysis of adhesions, treatment of endometriosis, management of leiomyomas that make a vaginal hysterectomy more difficult, ligation of the infundibulo-pelvic ligaments to facilitate the removal of difficult ovaries, and the evaluation of the abdomino-pelvic cavity before the hysterectomy.[16]

The eVALuate study[17] compared abdominal hysterectomy (laparoscopic or laparotomic) and a vaginal hysterectomy, and observed that laparoscopy permitted a higher detection of unexpected pathologies such myomas, endometriosis, and adhesions, when compared with vaginal access (16.4% vs. 4.8%; $p < 0.01$) and when compared with an abdominal approach (22.6% vs. 12.7%; $p < 0.01$). There are no data, however, that this detection influenced the performance of additional procedures by the surgeons or would affect the long-term outcome.[17]

CONTRA-INDICATIONS

The contraindications for laparoscopic hysterectomy are the following:[14]

· Medical conditions that contraindicate the establishment and maintenance of pneumoperitoneum.

· Inexperience or inadequate training of the surgeon.

· Malignancy that could require the intact removal of the specimen or special procedures that

cannot be performed due to skill, access, or other circumstances.

· Lack of adequate instrumentation.

INTRA-OPERATIVE CONSIDERATIONS

Randomized trials have demonstrated a decrease in the infection of the surgical site with the use of prophylactic antibiotics in potentially contaminated surgeries and their use is recommended in the case of laparoscopic hysterectomy.[15] Antibiotic prophylaxis should be administered within one hour of the skin incision and should not be continued for more than 24 hours.

SURGICAL TECHNIQUE[18,19]

Positioning
The patient is positioned in dorsal decubitus, under general anesthesia, with oral tracheal intubation. The legs are positioned in 30°flexion; the arms along the body, and the buttocks extending slightly over the edge of the surgical table (Figure 1). The bladder is catheterized.

The surgeon is positioned to the left of the patient, the primary assistant on the right, and the second assistant is responsible for uterine manipulation.

Uterine Cannulation
Uterine cannulation is performed with a specific instrument: the Clermont-Ferrand type Karl Storz uterine manipulator (Figure 2).

Hysterometry is performed, the cervix is dilated to Hegar number 9, and the manipulator is inserted under direct vision into the cervix. The size of the tip to be used varies with the size of the uterus according to hysterometry.

Establishing the Pneumoperiteum
We routinely perform puncture with the Veress needle at Palmer's point (left upper quadrant, about 2 to 3cm below the left costal margin, in the medial midclavicular line) and the pneumoperitoneum is insufflated to a pressure of 12 to 14 mmHg. Before performing the puncture it is important that an orogastric catheter is passed in order to empty the stomach, avoiding inadvertent puncture of this organ.

Positioning the Trocar
Four trocars are positioned: one 10 mm umbilical trocar with a 0° optic and three 5 mm trocars,

with one 2 cm medial to the right superior iliac crest, another 2 cm medial to the left anterior superior iliac crest, and a third in the midline, 8 to 10 cm below the umbilical scar (Figure 3). This last 5 mm trocar can be substituted by a 10 to 15 mm trocar during surgery for the introduction of suture needles for the suturing of the vaginal vault, a morcellator, or a laparoscopic

Figure 1 *- Positioning the patient for the hysterectomy.*

Figure 2 *- The Clermont-Ferrand (Karl Storz) uterine manipulator.*

Figure 3 *- Positioning the trocars for a laparoscopic hysterectomy.*

cold scalpel (in the case of voluminous uteri that need morcellation for the removal of the vaginal route). In the case of very voluminous uteri, the trocars can be positioned more cranially.

After positioning of the first trocar, the patient is placed in Trendelemburg position. The loops of the small intestine are displaced in a cranial direction so that the promontory can be visualized.

The surgeon uses a bipolar cautery in the left hand and scissors in the right hand. The first assistant manipulates the optic with the left hand and uses the grasping forceps with the right hand.

Presentation of Round Ligaments

On the left, the freeing of adhesions between the sigmoid colon and the utero-ovarian ligament permits the correct exposure of the round ligament. The uterus is mobilized by the second assistant and is maintained cranially and anteriorly, so as to be opposite the side that will be operated. The round ligament is secured with traction by the first assistant, making possible its exposure for the start of the surgery.

Coagulation and Section of Round Ligaments

The coagulation of the round ligament is performed about 2 to 3 cm from the pelvic wall using a bipolar cautery and the section is performed with the laparoscopic scissors (Figure 4A). The coagulation of the round ligament near the uterus makes the procedure more difficult since dissection very close to the uterine body results in greater bleeding.

Opening the Anterior Leaflet of the Broad Ligament to the Vesico-Uterine Peritoneal Reflection

The uterus is placed in a horizontal orientation by the second assistant. The interior leaflet of the broad ligament is coagulated with the bipolar forceps and sectioned, from the round ligament to the vesico-uterine peritoneal reflection (Figure 4B).

Fenestration of the Broad Ligament

The capillaries of the posterior leaflet of the broad ligament are coagulated. The visualization of a blue-gray color in peritoneal leaflet indicates that there is no gastrointestinal element behind this structure. The

posterior leaflet of the broad ligament is cut and the opening is enlarged using divergent traction between the bipolar forceps and the scissors of the surgeon in the anterior-posterior direction (Figures 4C and 4D). With this, the adnexa remain pedunculated and the ureter is kept out-of-the-way, since it is mobilized along with the peritoneum.

Coagulation and Section of the Infundibulo-Pelvic Ligament (Total Hysterectomy with Bilateral Adnexectomy) or of the Utero-Ovarian Ligament and the Fallopian Tubes (Inter-Adnexal Total Hysterectomy)

The first assistant should secure the adnexa and apply traction in a direction opposite to the lombo-ovarian ligament. The coagulation-sectioning of the ligament should be progressive, plane to plane (peritoneum, followed by the vessels and connective tissue) (Figures 5A and 5B). When you want to preserve the adnexa, the coagulation-section is performed proximal to the fallopian tubes and the utero-ovarian ligament (Figures 5C and 5D).

Opening the Posterior Leaflet of the Broad Ligament to the Cervix

The dissection continues on the posterior lamina of the broad ligament, avoiding inadvertent injury of the vessels of the uterine pedicle (Figure 6A). The peritoneum is pulled and dissected, coagulated and cut toward the utero-sacral ligaments. Thus the uterine pedicle is isolated and skeletonized. All steps from the coagulation-section of the round ligaments to the opening of the posterior leaflet of the broad ligament are performed in the same way on both sides.

Opening of the Vesico-Vaginal Space

The uterus should be mobilized cranially and posteriorly to expose the bottom of vesico-uterine sac. The assistant uses an atraumatic forceps to grasp the peritoneum and the bladder in the midline, applying vertical and cranial traction. The peritoneum and the adjacent connective tissue are coagulated and sectioned, thus accessing the vesico-vaginal plane. The dissection continues in a caudal direction, initially in the midline and then laterally, performing the coagulation-section of the vesico-uterine ligaments (Figure 6B). The introduction of a valve of the manipulator permits finding the plane and facilitates dissection.
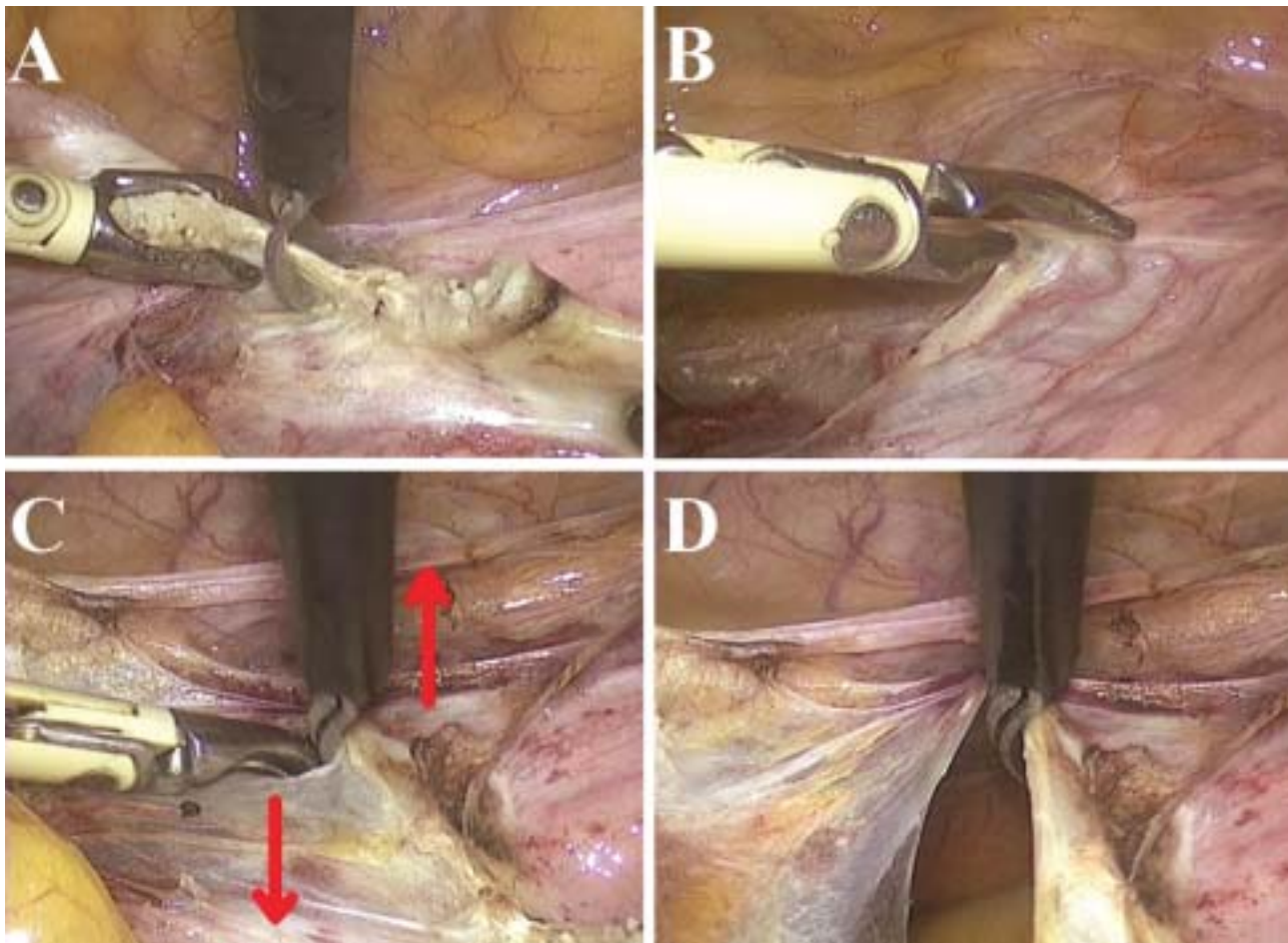
Figure 4 - *(A) Coagulation of the round ligament and section with laparoscopic scissors. (B) Opening of the anterior leaflet of the broad ligament from the round ligament to the anterior peritoneal reflection. (C and D) Fenestration of the broad ligament by divergente anterior-posterior traction of two instruments (scissors and bipolar forceps).*

Coagulation and Section of the Uterine Pedicles

The uterus is again oriented cranially and laterally by the second assistant. The first assistant applies traction to the adnexa or the round ligament cranially and laterally. The pedicles should be very well isolated permit effective bipolar regulation. The coagulation-section of the uterine pedicles, performed on the ascending segment of the uterine artery, should be carried out in a progressive manner. The bipolar forceps is introduced by the lateral trocar, on the same side as the pedicle to be coagulated (Figures 6C e 6D). During the surgical time the assistant will perform the coagulation of the uterine veins on right side.

After the coagulation of the uterine vessels, the pericervical fascia is incised at the same level as the coagulation of the uterine pedicles, in order to enter intra-fascial plane. The cervico-vaginal vessels and the insertion of the uterosacral ligament are coagulated and sectioned.

Vaginal Opening

The system to prevent loss of pneumoperitoneum is inserted into the vagina and the valve of the manipulator is pushed in a cranial direction. Monopolar section is performed across the valve starting at the anterior and median part of the vagina. It continues laterally to the left, then posteriorly. The second assistant helps by successively exposing each part of the vaginal fornix and achieves the rotation of the valve. Generally, we prefer that the surgeon handles the valve of the manipulator. The surgeon grasps the manipulator with the left hand and holds the monopolar cautery in the right hand through the suprapubic trocar. In this way one attains the perfect synchrony between the manipulator valve and monopolar cautery, avoiding thermal injury arising from the monopolar energy. The
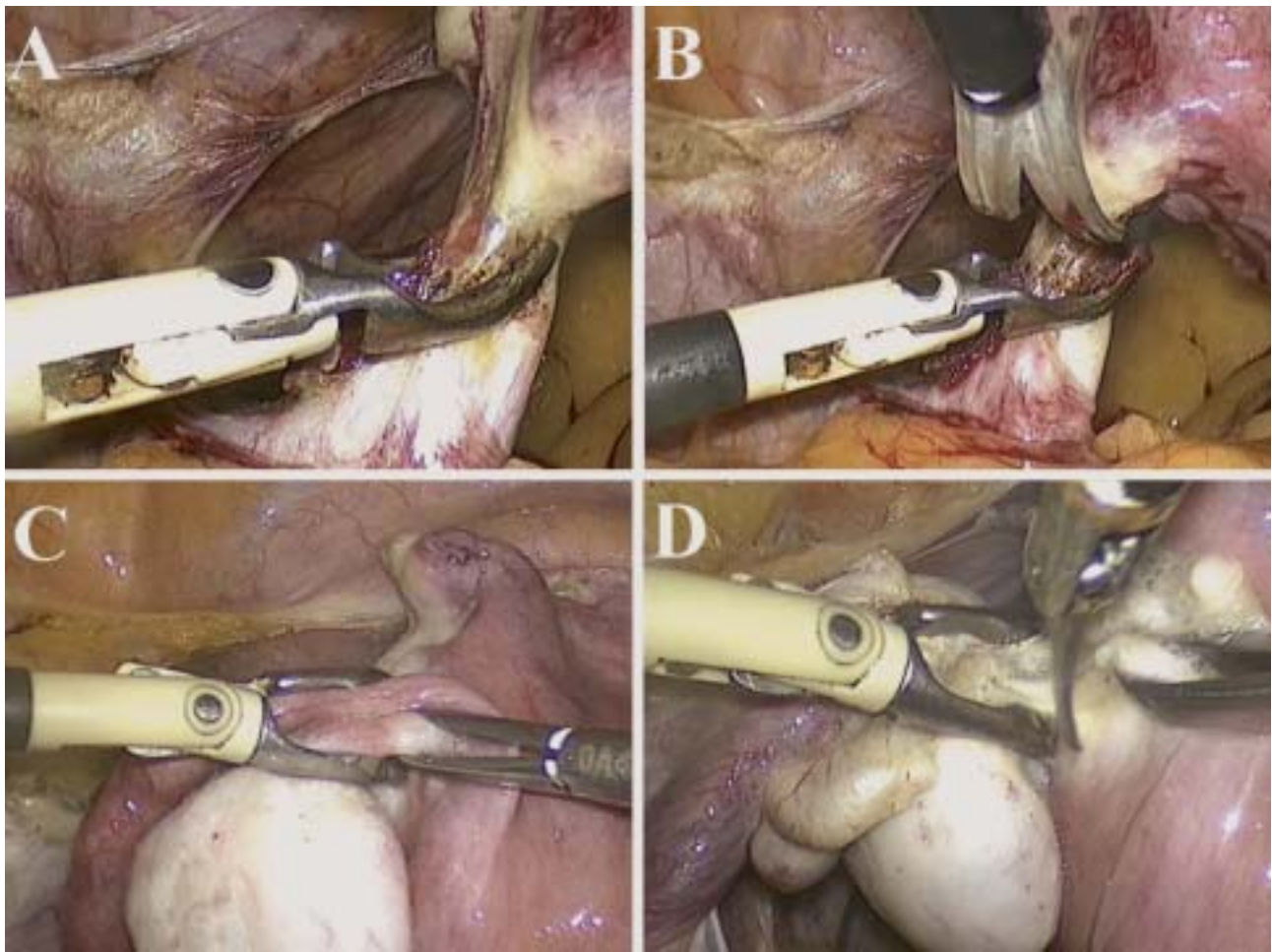
Figure 5 - (A and B) Traction of the left adnexa by surgical assistant followed by progressive bipolar coagulation of the infundibulo-pelvis. (C and D) Coagulation and section of the left fallopian tube and of the left utero-ovarian ligament in a case of adnexal preservation.

opening of the vault proceeds towards the right side and ends posteriorly (Figures 7A and 7B). The first assistant suctions the cautery smoke. Occasionally additional hemostasis with a bipolar forceps is necessary.

Extraction of the Surgical Specimen

The extraction was executed by the vaginal route in the majority of cases. On some occasions uterine morcellation may be necessary, carried out laparoscopically (cold scalpel or electric morcellator) or vaginally (vaginal valves and classic cold scalpel).

Vaginal Suture

We performed the vaginal suture with three X sutures using number 0 absorbable monofilament (Polyglecaprone, Caprofyl®, Ethicon Inc.) (Figure 7C), beginning with the left angle of the vagina, proceeding to the right angle, and then to central region of the vagina.

Adnexal Pexis

In cases of laparoscopic interadnexal total hysterectomy we perform the pexis of the fallopian tubes and the ovary to the ipsilateral round ligament using sutures with polyester thread (Ethibond® 2-0, Ethicon Inc) to prevent post-operative adnexal torsion.[20]

Hemostasis is confirmed (Figure 7D). The aponeurosis of the 10 mm trocar in the midline is sutured with 0 polyglactin 910 thread (Vicryl®, Ethicon Inc.). The pneumoperitoneum is disinsufflated and the skin is sutured with inverted sutures of 3-0 absorbable monofilament (Polyglecaprone 25, Monocryl®, Ethicon Inc).

Alternatives to the Use of Bipolar Energy

There are several technical alternatives to the use of bipolar energy for total laparoscopic hysterectomy. The use of bipolar energy seems to
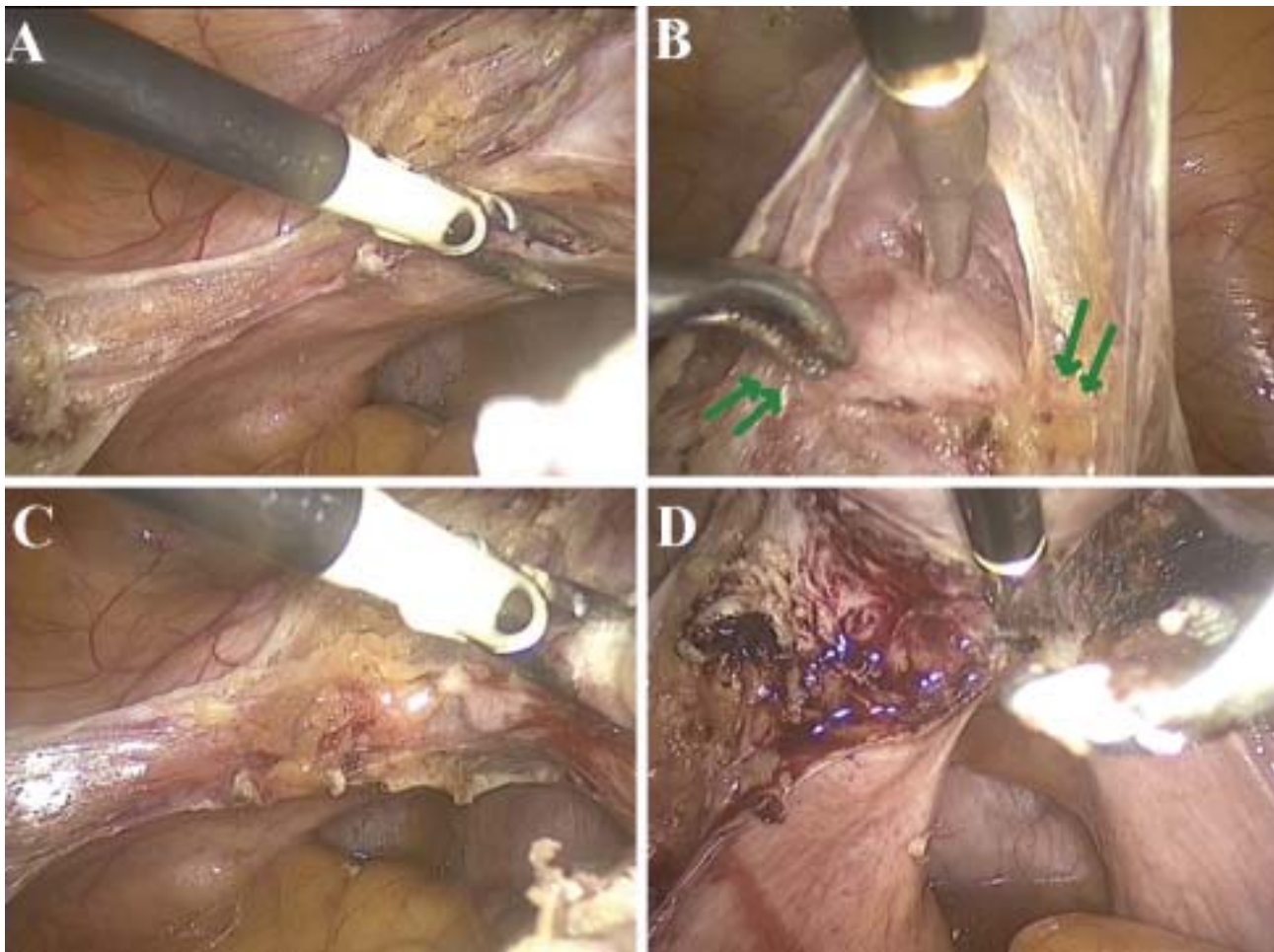
Figure 6 - (A) Opening of the posterior leaflet of the broad ligament to the cervix. (B) Dissection of the vesico-vaginal space. The green arrows indicate the area to be coagulated (vesico-uterine ligaments). (C) Coagulation of the left uterine vessels using bipolar forceps. (D) Intra-fascial plane on the right side.

provide a cost-effective and safe way to have control of the uterine vessels and precision during dissection and sectioning of the structures. However, the use of other disposable laparoscopic instruments can help the surgeon and shorten surgical time a bit. Options include linear cutting endostaplers (Figure 8A), the LigaSure Vessel Sealing® (Valleylab) system of vessel ligation (Figure 8B), the EnSeal® Advanced Tissue Sealing Technology tissue sealing system (Figure 8C) and the Ultracision ® harmonic scalpel (Figure 8D). Each surgeon should develop his own routine and use the available materials and technology to facilitate the surgical procedure.

POST-OPERATIVE CONSIDERATIONS

We usually remove the bladder catheter soon after the end of the surgery or a maximum of two hours after the procedure. For postoperative analgesia we prescribe IV dipyrone q 6 hours and ketoprofen q 12 hours. Additional analgesia with 3 mg of morphine every four hours can be prescribed as needed. Daily subcutaneous Enoxaparin 40mg is given for prophylaxis of deep venous thrombosis and thromboembolism. The patient is kept NPO for six hours after the procedure; when she no longer has nausea or vomiting she may receive a liquid diet. The vast majority of patients are discharged 24 hours after surgery.

COMPLICATIONS

Hysterectomy is a safe procedure, with a low rate of mortality, estimated at 0.12 to 0.34 per 1000 surgeries.[15]

The complications directly related to laparoscopic access include those related to the positioning of the Veress needle and the trocars
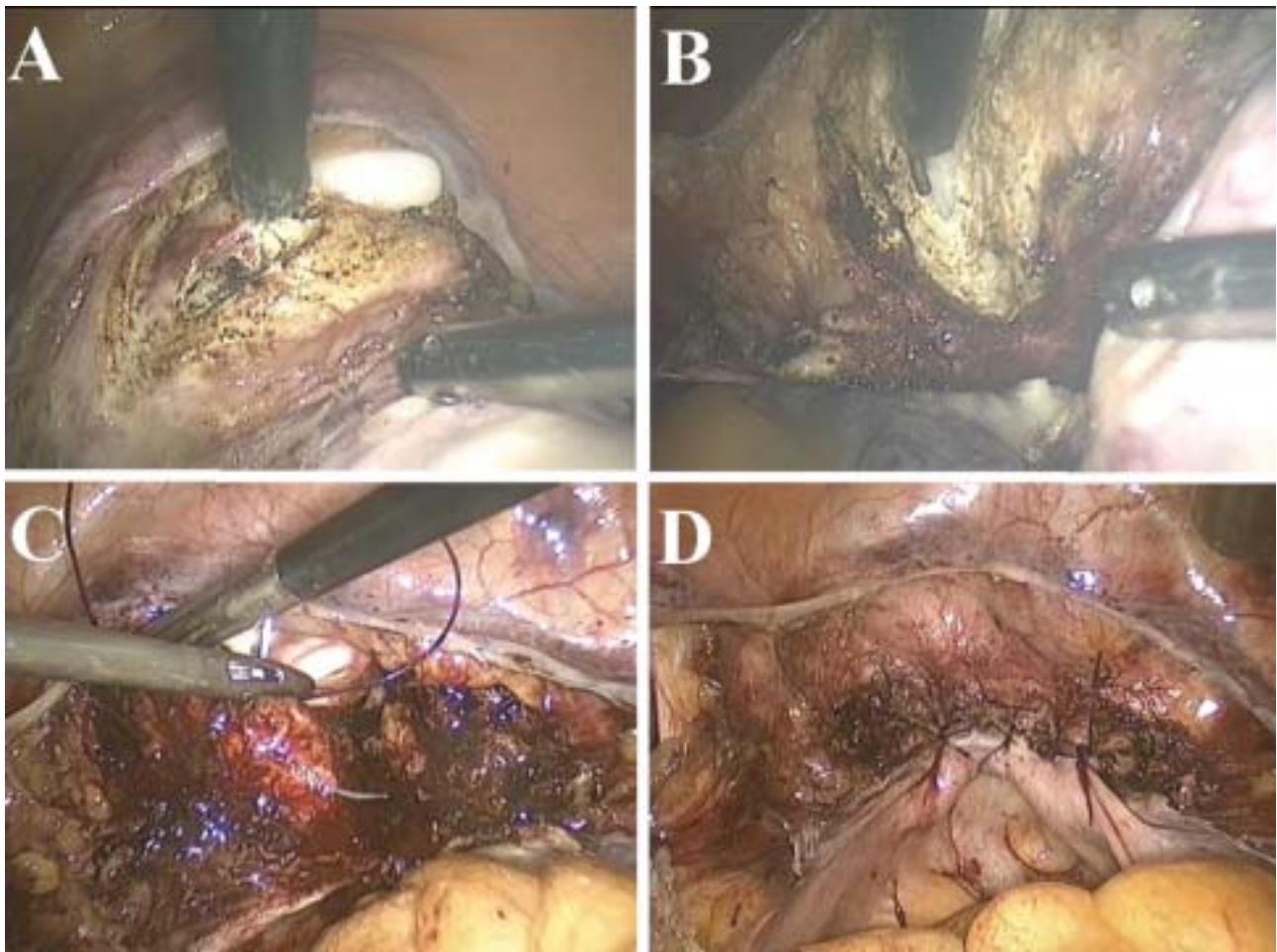
Figure 7 - (A and B) Opening of vaginal vault with monopolar cautery. (C) Closure of the vaginal vault. The assistant places traction on the vagina three X stitches/sutures using 0 caprofil. The figure illustrates the suture in left angle of the vagina, which should include the left utero-sacro ligament. (D) Final view of the vaginal vault after the inspection for hemostasis.

(bleeding, intestinal lesion), those related to pneumoperitoneum, hernia in the orifice of the trocars, and the need to convert to open surgery. Other complications are related to the surgical procedure itself and are basically the same, regardless of the route of access used for the hysterectomy.

The VALUE (Vaginal Abdominal Laparoscopic Uterine Excision) study evaluated the severe complications in 37,295 women who underwent abdominal hysterectomy (64%), vaginal hysterectomy (30%) and laparoscopic guided vaginal hysterectomy (3%).[21] The global rate of severe complications was 3.5%, including visceral lesions, hemorrhage, death, acute myocardial infarction, thromboembolic events, cerebrovascular accidents, and organ failure. The risk was greater in patients who underwent surgery for myomas (OR 1.34), in patients with comorbidities (OR 1.47) and those who underwent laparoscopic surgery (OR 1.92). The laparoscopic procedures doubled risk of operative complications compared with abdominal hysterectomy (6.1% vs. 3.6%).

The eVALuate[22] study consisted of two parallel randomized controlled trials: one comparing laparoscopic with abdominal hysterectomy and the other comparing laparoscopic with vaginal hysterectomy. Laparoscopic hysterectomy was associated with a higher rate of major complications that those performed via laparotomy (11.1% vs. 6.2%; $p = 0.02$). Conversion to laparotomy was included as a major complication; when conversions were excluded, there was no statistically significant difference between the two access routes. When vaginal access and laparoscopic access were compared, there was no difference in terms of complications. The study confirmed some advantages of laparoscopy such as less pain, shorter
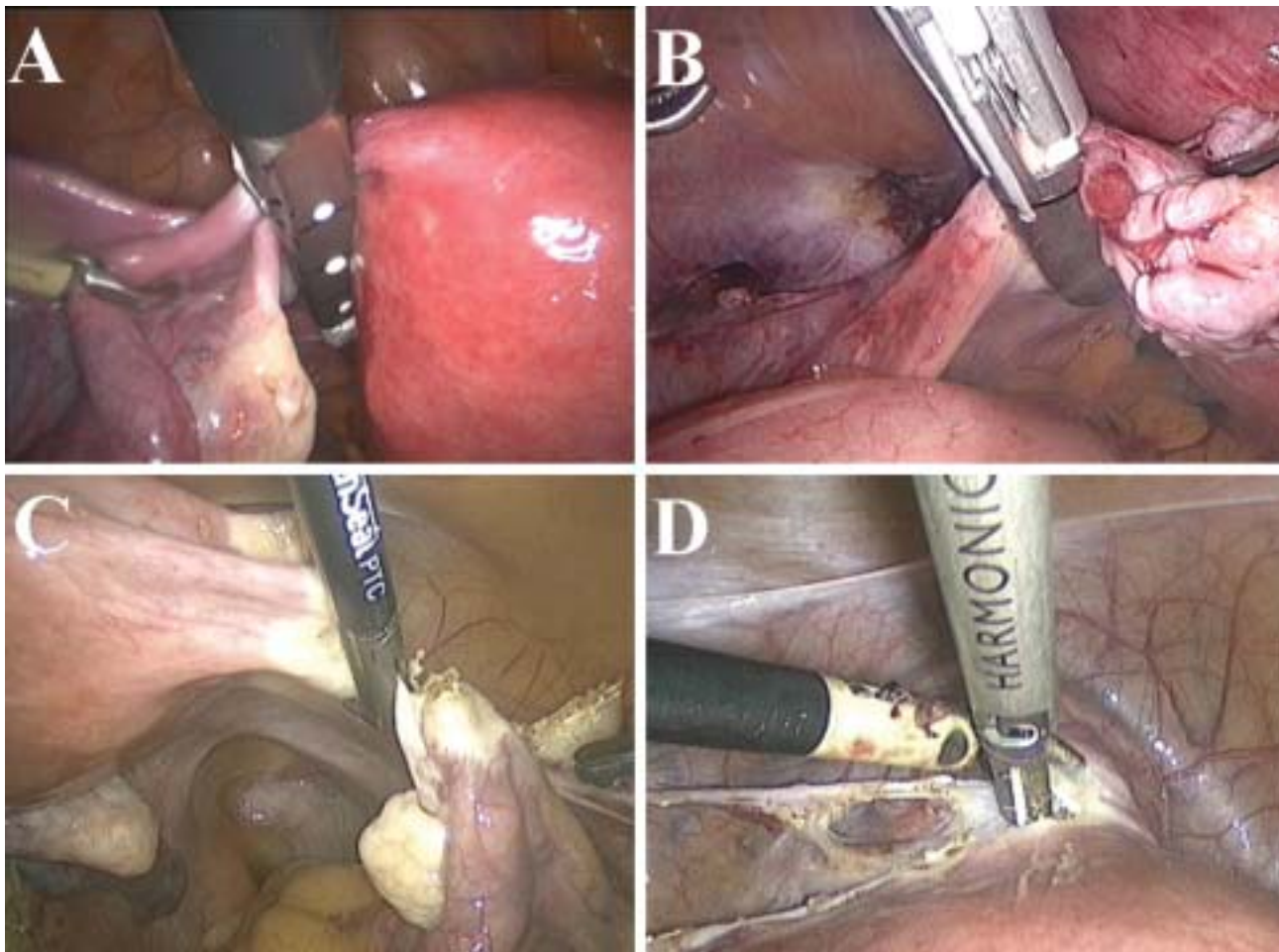
Figure 8 - *(A) Utilization of linear cutting endostaplers in a total laparoscopic hysterectomy. (B) Utilization of Ligasure® for the control of the infundibulo-pelvis a total laparoscopic hysterectomy. (C) Utilization of EnSeal® during the total laparoscopic hysterectomy. (D) Utilization of the Ultracision® harmonic scalpel in a total laparoscopic hysterectomy.*

hospitalization, a faster post-operative recuperation, and a better short-term quality of life when compared with laparotomy. Downsides included longer surgical time and a higher rate of urinary tract lesions.

In a meta-analysis, laparoscopy was associated with an increased risk of urinary tract lesions compared with abdominal hysterectomy (OR 2.61).[23] When ureteral and bladder lesion was separated, there were no increase risk of ureteral lesion with laparoscopy. Laparoscopy was associated with fewer infections (OR 0.32), fewer episodes of fever (OR 0.65), less blood loss (mean difference of 45.3ml) and a smaller drop hemoglobin values (0.55g/L) when compared with abdominal hysterectomy.

Similar findings were noted when comparing a vaginal and abdominal hysterectomy. There were no differences in the frequency of fistula formation, urinary dysfunction, sexual dysfunction or satisfaction of the patient when comparing the paths of access for the hysterectomy. No difference was observed in the need for blood transfusion, the occurrence of pelvic hematoma, vaginal vault infection, urinary tract infection, or thromboembolic events.

A recent series by Donnez et al[12] including 3190 laparoscopic hysterectomy showed that there is no increase in the rate of major complications when a laparoscopic hysterectomy is performed by experienced surgeons. No difference was found in the rate of ureteral lesions after vaginal hysterectomy (0.33%) and laparoscopic hysterectomy (0.25%). Bladder lesions occur in 0.44% of women who underwent a vaginal hysterectomy and in 0.31% of those who underwent a laparoscopic hysterectomy.

Several studies have observed that the incidence of the dehiscence of the vaginal vault after a laparoscopic hysterectomy is greater than after an

abdominal hysterectomy.[24] In the case of a laparoscopic total hysterectomy, the vagina is sutured using absorbable suture. One study that reviewed 7286 hysterectomies found an incidence of dehiscence of the vaginal wall of 4.93% after laparoscopic total hysterectomy, 0.29% after vaginal hysterectomy, and 0.12% after abdominal hysterectomy. The relative risk of vaginal vault dehiscence in laparoscopic total hysterectomy as compared with vaginal and abdominal hysterectomy was 21 and 53.2, respectively, and both were statistically significant.[25] There are no prospective studies comparing the methods of closure of the vaginal wall and in the risk of subsequent dehiscence, in part due to the infrequent occurrence of this complication. In the absence of data that might elucidate these findings, the recommendations for colpotomy and for the closure of the vaginal vault include: minimize the utilization of thermal energy in the vaginal vault, ensure adequate depth at the time of vaginal suturing, and be attentive to meticulous surgical technique, including hemostasis.

Another complication reported after laparoscopic hysterectomy is adnexal torsion. The prevalence of this complication is 7.91 per 1000 and occurs about 2.64 years after the laparoscopic hysterectomy in the study of Mashiach *et al.*[20] To prevent this competition, we routinely performed an adnexopexy at the time of the laparoscopic hysterectomy.

FINAL CONSIDERATIONS

The benefits of minimally invasive hysterectomy (laparoscopic or vaginal) are unquestionable when compared with open surgery. The possibility of exploring the abdominal pelvic cavity and of performing a safe oophorectomy, represent some of the advantages of laparoscopy in relation to the vaginal approach. The specific indications for each surgical technique remain uncertain. Nevertheless, the idea of laparoscopic hysterectomy is not to substitute a vaginal hysterectomy, but to increase the therapeutic arsenal of the gynecologic surgeon to carry out minimally invasive surgeries for a broad range of indications, avoiding the need for an abdominal hysterectomy in the setting of adnexal tumors, tubo-ovarian adhesions, endometriosis, previous pelvic surgeries, voluminous uteri, and obese patients.

RESUMO

A histerectomia é o procedimento cirúrgico ginecológico de grande porte mais comumente realizado em todo o mundo. As doenças benignas (ditúrbios menstruais, miomas, dor pélvica e prolapso uterino) são responsáveis por mais de 70% das indicações de histerectomia. Tradicionalmente, a histerectomia é realizada por laparotomia ou por via vaginal, mas recentemente a laparoscopia tem se tornado uma via de acesso alternativa com bons resultados. As vantagens da abordagem laparoscópica comparadas à cirurgia aberta incluem menor sangramento intra-operatório, menor tempo de permanência hospitalar, recuperação mais rápida e menor taxa de infecções de ferida e de parede abdominal, às custas de um tempo cirúrgico mais prolongado. Neste artigo abordaremos os detalhes técnicos da histerectomia total laparoscópica.

Palavras chave: Histerectomia Total. Laparoscopia. Técnica.

REFERENCES

1. Whiteman MK, Hillis SD, Jamieson DJ, Morrow B, Podgornik MN, Brett KM, et al. Inpatient hysterectomy surveillance in the United States, 2000-2004. Am J Obstet Gynecol 2008; 198: 1-7.

2. Clayton RD. Hysterectomy. Best Pract Res Clin Obstet Gynaecol 2006; 20: 73-87.

3. Reich H, DeCaprio J, McGlynn F. Laparoscopic hysterectomy. J Gynecol Surg 1989; 5: 213-6.

4. Gimbel H, Settnes A, Tabor A. Hysterectomy on benign indication in Denmark 1988-1998. A register based trend analysis. Acta Obstet Gynecol Scand 2001; 80: 267-72.

5. Wilcox LS, Koonin LM, Pokras R, Strauss LT, Xia Z, Peterson HB. Hysterectomy in the United States, 1988-1990. Obstet Gynecol 1994; 83: 549-55.

6. Wu JM, Wechter ME, Geller EJ, Nguyen TV, Visco AG. Hysterectomy rates in the United States, 2003. Obstet Gynecol 2007; 110: 1091-5.

7. Chapron C, Laforest L, Ansquer Y, Fauconnier A, Fernandez B, Bréart G, et al. Hysterectomy techniques used for benign pathologies: results of a French multicentre study. Hum Reprod 1999; 14: 2464-70.

8. David-Montefiore E, Rouzier R, Chapron C, Daraï E; Collegiale d'Obstétrique et Gynécologie de Paris-Ile de France. Surgical routes and complications of hysterectomy for benign

disorders: a prospective observational study in French university hospitals. Hum Reprod 2007; 22: 260-5.

9. Procedimentos hospitalares do SUS - por local de internação – Brasil, Available at URL: http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sih/cnv/qiuf.def

10. Johnson N, Barlow D, Lethaby A, Tavender E, Curr E, Garry R. Surgical approach to hysterectomy for benign gynaecological disease. Cochrane Database Syst Rev 2006; 2:CD003677.

11. Mäkinen J, Johansson J, Tomás C, Tomás E, Heinonen PK, Laatikainen T, et al. Morbidity of 10 110 hysterectomies by type of approach. Hum Reprod 2001; 16: 1473-8.

12. Donnez O, Jadoul P, Squifflet J, Donnez J. A series of 3190 laparoscopic hysterectomies for benign disease from 1990 to 2006: evaluation of complications compared with vaginal and abdominal procedures. BJOG 2009; 116: 492-500.

13. Olive DL, Parker WH, Cooper JM, Levine RL. The AAGL classification system for laparoscopic hysterectomy. Classification committee of the American Association of Gynecologic Laparoscopists. J Am Assoc Gynecol Laparosc 2000; 7: 9-15.

14. Sokol AI, Green IC. Laparoscopic hysterectomy. Clin Obstet Gynecol 2009; 52: 304-12.

15. Falcone T, Walters MD. Hysterectomy for benign disease. Obstet Gynecol 2008; 111: 753-67.

16. American College of Obstetricians and Gynecologists. ACOG Committee Opinion. Number 311, April 2005. Appropriate use of laparoscopically assisted vaginal hysterectomy. Obstet Gynecol 2005; 105: 929-30.

17. Garry R, Fountain J, Brown J, Manca A, Mason S, Sculpher M, et al. EVALUATE hysterectomy trial: a multicentre randomised trial comparing abdominal, vaginal and laparoscopic methods of hysterectomy. Health Technol Assess 2004; 8: 1-154.

18. Bourdel N, Tran X, Botchorhisvili R, Pouly JL, Canis M, Mage G. Laparoscopic hysterectomy in 10 steps. J Chir (Paris) 2009; 146: 483-91.

19. Velemir L, Azuar AS, Botchorishvili R, Canis M, Jardon K, Rabischong B, et al. Optimizing the role of surgeons assistants during a laparoscopic hysterectomy. Gynecol Obstet Fertil 2009; 37: 74-80.

20. Mashiach R, Canis M, Jardon K, Mage G, Pouly JL, Wattiez A. Adnexal torsion after laparoscopic hysterectomy: description of seven cases. J Am Assoc Gynecol Laparosc 2004; 11: 336-9.

21. McPherson K, Metcalfe MA, Herbert A, Maresh M, Casbard A, Hargreaves J, et al. Severe complications of hysterectomy: the VALUE study. BJOG 2004; 111: 688-94.

22. Garry R, Fountain J, Mason S, Hawe J, Napp V, Abbott J, et al. The eVALuate study: two parallel randomised trials, one comparing laparoscopic with abdominal hysterectomy, the other comparing laparoscopic with vaginal hysterectomy. BMJ 2004; 328:129.

23. Johnson N, Barlow D, Lethaby A, Tavender E, Curr L, Garry R. Methods of hysterectomy: systematic review and meta-analysis of randomised controlled trials. BMJ 2005; 330: 1478.

24. Rivlin ME, Meeks GR, May WL. Incidence of vaginal cuff dehiscence after open or laparoscopic hysterectomy: a case report. J Reprod Med 2010; 55: 171-4.

25. Hur HC, Guido RS, Mansuria SM, Hacker MR, Sanfilippo JS, Lee TT. Incidence and patient characteristics of vaginal cuff dehiscence after different modes of hysterectomies. J Minim Invasive Gynecol 2007; 14: 311-7.

Correspondence Address:
WILLIAM KONDO
Avenida Getulio Vargas 3163 Apt. 21
Curitiba, PR, Brazil 80240-041
Telefone: (41) 9222-1065
E-mail: williamkondo@yahoo.com
Site: drwilliamkondo.site.med.br