

Complications of laparoscopic total hysterectomy in patients of a high specialty hospital

Complicaciones de la histerectomía total laparoscópica en pacientes de un hospital de alta especialidad

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Abstract

Objective: Describe the intraoperative and postoperative complications in patients undergoing total laparoscopic hysterectomy (TLH). **Method:** Cases series carried out in the gynecology service of Hospital de Gineco-Obstetricia No. 3, Centro Médico Nacional La Raza, Instituto Mexicano del Seguro Social, of all patients undergoing total laparoscopic hysterectomy from December 2015 to December 2018. Uterine weight, body mass index, age, comorbidities, CO₂ use, and complications were documented. Frequencies, proportions, central tendency, and dispersion measures were used. **Results:** 79 patients are reported. Mean age was 44.2 ± 7.5 years. Surgery time was 104.3 ± 32.7 minutes, and bleeding 102.8 ± 62.3 mL. Six (7.6%) had intraoperative complications: two (2.5%) bladder injury, one (1.3%) bowel injury, one (1.3%) stump hemorrhage, and two (2.6%) were converted to exploratory laparotomy: one for uterine size > 14 cm, and one because malignant ovarian tumor was suspected. Seven patients (8.8%) had postoperative complications: four (5.1%) were re-operated: 3 due to hemorrhage and 1 due to vaginal dome dehiscence; three (3.7%) had vaginal collection. **Conclusions:** The rate of perioperative complications reported in this series coincides with that reported in other studies. Surgery time and bleeding were slightly minor regardless of program's youth.

Keywords: Hysterectomy. Laparoscopy. Complications.

Resumen

Objetivo: Describir las complicaciones transoperatorias y posoperatorias en pacientes operadas de histerectomía total laparoscópica. **Método:** Serie de casos del servicio de ginecología de la Unidad Médica de Alta Especialidad Hospital de Gineco-Obstetricia No. 3 del Centro Médico Nacional La Raza, del Instituto Mexicano del Seguro Social, de las pacientes sometidas a histerectomía total laparoscópica de diciembre de 2015 a diciembre de 2018. Se documentaron el peso uterino, el índice de masa corporal, la edad, la comorbilidad, el uso de dióxido de carbono y las complicaciones. Se usaron frecuencias, proporciones, medidas de tendencia central y dispersión. **Resultados:** Se reportan 79 pacientes de 44.2 ± 7.5 años, tiempo de cirugía de 104.3 ± 32.7 minutos y promedio de sangrado 102.8 ± 62.3 ml. Presentaron complicaciones transoperatorias seis (7.6%): dos (2.5%) lesión vesical, una (1.3%) lesión intestinal, una (1.3%) hemorragia de muñón y dos (2.5%) más conversión

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a laparotomía exploradora (una por tamaño uterino > 14 cm y otra por hallazgo de tumor ovárico de aspecto maligno). Siete pacientes (8.8%) tuvieron complicaciones posoperatorias: cuatro (5.1%) fueron reintervenidas (tres por hemorragia y una por dehiscencia de cúpula vaginal) y tres (3.7%) tuvieron colección vaginal. **Conclusiones:** La tasa de complicaciones perioperatorias en esta serie coincide con la reportada en otros estudios. El tiempo quirúrgico y el sangrado fueron ligeramente menores, pese al poco tiempo de madurez del programa.

Palabras clave: Histerectomía. Laparoscopia. Complicaciones.

Introduction

Hysterectomy is the most frequently performed gynecological surgery worldwide, with millions of procedures carried out every year¹. In our country, it is not possible to accurately estimate the total number, let alone the preferred approach route². The first one to associate laparoscopy and hysterectomy was Semm, in 1984, but the first total laparoscopic hysterectomy (TLH) was published in 1989 by Harry Reich³.

This procedure is indicated for both benign and malignant disease⁴. In a study carried out at the National Institute of Perinatology in 2009, 555 hysterectomies were reviewed, out of which 226 were laparoscopic, with the most common indication being uterine myomatosis (58.6%), followed by abnormal uterine hemorrhage (23.2%) and adenomyosis (18.2%)⁵, with these data being consistent with those reported in a study in Spain, in which other less frequently reported indications were endometriosis, abnormal uterine hemorrhage, persistent type III cervical intraepithelial neoplasia and hyperplasia with atypia⁶.

For TLH informed consent, complete information must be provided to patients, with particular emphasis on the benefits, as well as factors that might increase the risk of complications during and after the surgical procedure⁷. Preoperative risk assessment serves as a basis for proper patient counseling and postoperative outcomes⁸. It is important to consider several factors that may affect intraoperative and postoperative outcomes, such as uterine size and weight^{9,10}, body mass index¹¹, age, and presence of comorbidities¹². Contraindications to TLH so far are a subject of discussion. Pathologies with highly suggestive data of malignant process, with suspected advanced clinical stage, make for a patient not to be a candidate for TLH. Beyond these circumstances, there is no absolute contraindication. Currently, the main limiting factor of TLH is surgeons inexperience or lack of adequate technological resources for carrying it out¹³.

TLH main advantages include an approach with smaller incisions, less postoperative pain, less intraoperative blood loss than with the approach via laparotomy, and therefore less drop of hemoglobin, hospital stay reduction, lower risk of wound or abdominal wall infections, less immune aggression, lower incidence of hernias and, consequently, faster return to daily activities^{10,14}.

The main disadvantage is the need for longer surgical time. To make the times of TLH and abdominal hysterectomy comparable, average surgical time should be below 100 minutes. This is achieved as the number of cases increases, and surgical team experience grows¹⁵. Complications, according to the surgical time they occur at, can be classified into intraoperative and postoperative complications.

Intraoperative complications can be divided, according to the moment they occur with regard to the surgical event, into those that occur after the trocars introduction and those that occur, strictly speaking, during the rest of the procedure. The former include extraperitoneal carbon dioxide insufflation, while the latter are related to vascular, intestinal, bladder, recto-vaginal or ureteral injuries^{16,17}, and to conversion to laparotomy, usually secondary to massive hemorrhage, difficulty in tissue manipulation, as well as technical problems with the instruments or biomedical equipment used, among others¹⁶⁻¹⁸.

Postoperative complications can be general (all those that may occur on any surgical procedure) or TLH-specific, such as intra-abdominal collection mainly caused by bleeding, hematoma formation in the surgical area, dehiscence of any of the approached tissues, pelvic abscess formation, vaginal dome prolapse and formation of fistulas¹⁹.

TLH is one of the surgeries that has shown excellent benefits in comparison with the open option^{20,21}. It is a technique of recent introduction in our hospital (in 2015), which is why it was necessary for us to evaluate the benefits and the main complications in our patients, as well as trying to recognize the main associated risk factors in order to identify areas of

opportunity to improve even patient preoperative preparation and thereby reduce complications.

The purpose of this study was to describe intraoperative and postoperative complications in patients who underwent THL in a high-specialty hospital.

Method

After institutional registration number was obtained by the Local Research Committee, an observational, descriptive, longitudinal study was carried out at the gynecology department of the High Specialty Medical Unit Dr. Víctor Manuel Espinosa de Los Reyes Sánchez No. 3 Obstetrics and Gynecology Hospital, from La Raza National Medical Center, of patients who underwent TLH surgery between December 2015 and December 2018. Information was obtained from medical records on preoperative indication, age, body mass index, uterine weight, comorbidity, number and type of previous abdominal surgeries, extraperitoneal carbon dioxide insufflation, injury to blood vessels, intestine, bladder, ureters or rectal-vaginal, abdominal or vaginal dome collection, vaginal dome prolapse, dehiscence, fistulas, surgical wound infection, conversion to exploratory laparotomy (ELAP), days of hospital stay, bleeding, surgical time and amount of gas used. Frequencies and proportions, means with standard deviations or medians with interquartile ranges and intervals are described.

This research is considered risk-free. The procedures comply with international ethical standards, the Regulations of the General Health Law on health research and the Declaration of Helsinki and its amendments. The risk-benefit balance was adequate. At all times, participants' information confidentiality will be preserved; neither the databases nor the data collection forms contain information that could help identify them, and such information will be kept on separate records by the principal investigator under lock and key.

Ninety percent of the surgeries were carried out by the same surgical team. The surgical technique used for TLH in our patients was as follows: patient in gynecological position, under general anesthesia, with abdominal and genital region antisepsis, placement of Foley's catheter and Apollo-type (HGO4) uterine mobilizer, sterile fields placement and transumbilical incision performance, 12-mm trocar placement by direct technique, pneumoperitoneum with carbon dioxide at 12 mmHg, entry site visualization, abdominal cavity 360° visualization with no data consistent with lesions

or abdominal alterations; Trendelenburg position, auxiliary trocars introduction, two on the left side, on left iliac fossa, of 12 mm, and another of 5 mm ipsilateral paraumbilical (all under direct visualization), introduction of a 5-mm trocar on right iliac fossa, uterosacral ligaments fulguration with Ligasure® vessel sealing clamp, performance of posterior colpotomy with monopolar hook, left salpinx localization, fulguration and sectioning with Ligasure®, uterus-ovarian ligament localization, fulguration and cutting, round ligament localization, fulguration and cutting, vesico-uterine fold dissection and cutting with Ligasure® and monopolar hook, bladder descent, broad ligament posterior leaf dissection, uterine artery location, fulguration and sectioning with Ligasure® clamp; lateral colpotomy with monopolar hook was completed, same contralateral technique, surgical specimen vaginal extraction, extracorporeal laparoscopic Aldridge stitches with absorbable synthetic suture (polyglycolic acid Vy-cril® 1), where two stitches were usually sufficient to close the vaginal dome and, if necessary, a third one was applied, hemostasis and vaginal dome integrity verification by gentle pelvic examination by the second assistant. Tissue washing with saline and aspiration were then carried to verify hemostasis and for removing blood contents. Trocar removal under direct vision, pneumoperitoneum removal and abdominal wall closure were performed as usual. The region was cleansed and the procedure was concluded.

Results

The medical records of 79 patients aged 44.2 ± 7.5 years were studied. Average body mass index was 25.7 ± 3.5 . The main indication for TLH was uterine myomatosis in 28 cases (35.9%), followed by abnormal uterine bleeding with 17 cases (21.8%), and by 11 cases of endometrial hyperplasia (14.1%). Two patients had cervical cancer as indication for TLH, one with abnormal uterine bleeding as well. Surgical time was 104.3 ± 32.7 minutes, average amount of carbon dioxide for pneumoperitoneum per surgery was 127.5 ± 63.5 L, and average amount of bleeding was 102.8 ± 62.3 mL. As for average uterine size, it was 9.76 ± 2.0 cm. Average hospital length of stay was 3.1 ± 1.3 days. There were only five cases of conversion to laparotomy due to injury to a neighboring organ (bowel and bladder).

There were six intraoperative complications, with the main one being conversion to ELAP, which was necessary in five cases (6.3%). Out of these, one was

Table 1. Patients with intraoperative complications

Patient	BMI	Uterine weight (g)	Age (years)	Morbidity	Previous abdominal surgeries	Type of previous surgeries	Other factor
1 Conversion to ELAP*	28.3	240	43	None	0	-	None
2 Conversion to ELAP†	22.4	100	37	Breast cancer	0	-	None
3 Conversion to ELAP and bowel injury‡	31.2	100	49	T2DM, CHT, CRF	1	BTO	Uterine myomatosis
4 Conversion to ELAP§	51.8	160	45	None	1	Appendectomy	None
5 Conversion to LAP and bladder injury	25.7	150	43	Breast cancer	3	Cesarean section (2) and ELAP (1)	None
6 Bladder injury	22.1	220	47	Obstructive uropathy	4	Cesarean section (1) and nephrostomies (3)	Uterine myomatosis

BMI: body mass index; BTO: bilateral tubal occlusion; CHT: chronic hypertension; CRF: chronic renal failure; ELAP: exploratory laparotomy; T2DM: type 2 diabetes mellitus.

*Due to incidental finding of bilateral ovarian tumor of malignant appearance.

†Due to hemorrhage.

‡For intestinal serous membrane repair.

§Due to large uterine size.

secondary to bladder injury, another due to colon injury (both with conversion to ELAP for repair), one due to pedicle hemorrhage (since the vessel sealing clamp failed to mitigate the bleeding), one due to a uterine size > 14 cm and one due to surgical finding of an apparently malignant ovarian tumor. In addition, there was a bladder injury that was repaired during the same laparoscopic procedure (Table 1). Of the six patients who had intraoperative complications, only one had chronic hypertension, type 2 diabetes mellitus, and chronic renal failure; the rest of the patients had no comorbidities.

Seven patients (8.8%) had some postoperative complication, out of whom four required reoperation: three due to hemorrhage and one due to vaginal dome dehiscence. In the other three patients, the complication was vaginal collection (Table 2).

During follow-up, once the patients were discharged, vaginal dome collections were detected in three of them, which were drained vaginally. Among the four patients who required reoperation, in three of them the indication was myomatosis, and in one, it was abnormal uterine bleeding.

Discussion

In a study carried out by Morgan et al.¹⁵ in 87 patients operated from 2003 to 2006, the most common indication for hysterectomy was abnormal uterine bleeding, in 79.3%, followed by uterine myomatosis in 63.7%, endometrial hyperplasia in 10.1%, chronic

pelvic pain in 10.3%, adnexal tumor in 6.8% and high-grade squamous intraepithelial lesion of the cervix in 3.4%, which barely differs from what was observed in our study, in which the main indication for TLH was the presence of uterine myomatosis followed by abnormal uterine bleeding. Furthermore, our results are similar to those reported by Maryland in 5,660 patients, where 65.9% of patients had the indication of hysterectomy due to fibromas, and 57.5%, to uterine bleeding¹².

Surgical time largely depends on experience and on the number of laparoscopic surgeries performed per year, which are classified according to the International Society of Gynecological Endoscopy⁸ into shorter than 100, between 100 and 200, and longer than 200 minutes. In our group, with barely 79 performed surgeries, we achieved an average surgical time of 104.3 minutes, slightly shorter than in the studies by Morgan et al.¹⁵, in which a mean of 123.0 minutes is reported, and Ayala et al.⁵, with 139.3 minutes.

In our study, blood loss was lower than that reported in other studies, with a mean of 102.8 mL, in comparison with a mean of 151.0 mL reported by Morgan et al.¹⁵ and 119.7 mL by Ayala et al.⁵, but uterine size in our study was 9.76 cm on average, lower than that reported in other studies of 14.54 cm¹⁵ and 12.4 cm²². On the other hand, average hospital stay was 3.1 days, similar to that reported in other studies^{15,23}. A Cochrane review that examined 47 randomized controlled trials showed that minimally-invasive hysterectomy performed for benign indications resulted in a faster

Table 2. Patients with postoperative complications

Patient and complication	BMI	Uterine weight (g)	Age (years)	Morbidity	Previous abdominal surgeries	Type of previous surgeries	Other factor
1 Hematoma formation	34.1	90	46	None	0	None	Cervical cancer
2 Hematoma formation	24.6	100	34	None	2	Cesarean sections	Cervical cancer
3 Vaginal dome abscess	24.8	120	54	None	2	BTO, cholecystectomy	Uterine myomatosis
4 Reoperation*	24.0	180	49	None	0	None	Uterine myomatosis
5 Reoperation†	22.1	220	47	None	4	Cesarean section (1) and nephrostomies (3)	Uterine myomatosis
6 Reoperation‡	21.8	80	31	APS	1	Cesarean section	Uterine myomatosis
Reoperation§	31.2	100	49	T2DM, CHT, CRF	1	BTO	Uterine myomatosis

APS: antiphospholipid syndrome; BMI, body mass index; BTO: bilateral tubal occlusion; CHT: chronic hypertension; CRF: chronic renal failure; T2DM: type 2 diabetes mellitus.

*Due to vaginal dome and right infundibulopelvic ligament hemorrhage.

†Due to desiccant hematoma.

‡Due to vaginal dome total dehiscence.

§Due to left pedicle hemorrhage.

return to normal activities for patients in comparison with abdominal hysterectomy.²⁴

The frequency of perioperative complications found in our study was 16.4%, out of which 7.5% corresponded to intraoperative complications and 8.8% to postoperative complications. The results are very similar to those reported by De los Ríos et al.¹⁴ in 2009, in whose study, overall frequency of complications was 12.5%, out of which 11.4% corresponded to intraoperative and 1.1% to postoperative complications, and were slightly higher than those reported by Argüello et al.²⁵ in 2012, who found an overall frequency of complications of 5.6%, out of which 0.5% corresponded to intraoperative and 5.1% to postoperative complications.

The main intraoperative complications in our study were bladder injury and conversion to laparotomy, with a frequency of 2.5% and 6.3%, respectively. In both cases, the indication for TLH was uterine myomatosis (on uterine anterior aspect) and there was previous history of cesarean sections. Corvalán et al.²⁶, in 2004, reported a rate of conversion to laparotomy similar to ours. In our study, the causes of conversion to laparotomy were hemorrhage and neighboring organ injury (bladder and bowel).

In the same study by Corvalán et al.²⁶, out of 139 patients who underwent TLH, 48.9% had previous

surgeries, out of which 15.3% corresponded to cesarean sections, 15.1% to gynecological surgeries and 18.5% non-gynecological surgeries, which is relevant to the results of TLH due to the possibility of finding adhesions that hinder the technique. However, the complications associated with this factor during the laparoscopic procedure were not relevant in this series, except for patients who had bladder injury and had a history of cesarean sections. In our study, a history of previous surgeries, mostly cesarean sections, was frequently observed.

In another study, Murillo et al.²², at the Spanish Hospital of Mexico, performed 3,924 hysterectomies over a period of 10 years. Out of these, 83.1% (n = 3260) were carried out by laparotomy, 7.3% (n = 288), vaginally, and 9.5% (n = 376), via laparoscopy. The group with the highest percentage of previous cesarean sections was that of laparoscopic supracervical hysterectomy (55.5%), in comparison with the laparoscopic hysterectomy (49%) and laparoscopy-assisted vaginal hysterectomy (41.5%) groups, which confirms that the procedures are possible even in these patients and, therefore, the laparoscopic approach also benefits them.

With regard to bladder injuries, genitourinary tract injuries are estimated to occur in 1-2% of all major gynecological surgeries, with 75% of these injuries

being estimated to occur during hysterectomy²⁶. Previous abdominal surgeries and the presence of cervical myomas increased the risk of urinary tract injuries^{22,28,29}.

In our series, there were two cases of bladder injury and one case of bowel injury, which were recognized and repaired without intraoperative complications and with no sequelae. A study by Cipullo et al.²⁹ carried out in 2008 highlights the large variability between different hospital centers, with a frequency of urological complications of between 0.4% and 4%. Bladder dome injuries are not exclusive to TLH and also occur frequently in abdominal hysterectomy, although the frequency is much higher in TLH (2 vs. 0.8%).

The aforementioned Maryland study reports that the identified comorbidity is significantly associated with hospital mortality, and includes acute and chronic conditions¹². In our study, of the six patients who experienced intraoperative complications, only one had chronic hypertension, type 2 diabetes mellitus and chronic renal failure; the rest had no comorbidities. Consequently, it is not possible to conclude if patient comorbidity was a significant risk factor for the presence of intraoperative complications.

The main postoperative complications that occurred in our study were vaginal collection formation and reoperations. The estimated incidence of abscesses after hysterectomy ranges from 19.4% to 90%²⁷. In our study there were only three cases of vaginal collection formation: one of them was a vaginal dome abscess and two were cases of vaginal dome hematoma formation, which were favorably resolved. The second most common postoperative complication in this study was reoperation, carried out in four patients, three of them for acute abdomen secondary to hemorrhage and one for vaginal dome dehiscence, requiring reinforcement of pedicles and vaginal dome closure in a second surgical time by laparotomy; fortunately, the patients continued postoperative recovery without further complications. It should be mentioned that the same patient with a history of type 2 diabetes mellitus, nephropathy and chronic hypertension had several complications (perioperative bleeding, conversion to ELAP due to bowel injury and reoperation for postoperative bleeding). The Maryland study reported a postoperative bleeding rate of 0.8%, which is lower than that observed in our study^{12,14}.

In our study, only two of the seven patients with postoperative complications had comorbidities: one of them suffered from antiphospholipid syndrome, and

the other one had hypertension, type 2 diabetes mellitus, and chronic renal failure.

The number of previous surgeries is a constant risk factor for complications, both intraoperative and postoperative. We observed five cases of postoperative complications in patients with more than one previous surgery, with cesarean sections and uterine myomatosis being the factors that were found most often in those patients who required reoperation.

We consider important to highlight that, in our study, there was less bleeding and shorter surgical time than in the rest of the reviewed studies, which can be explained by the fact that all surgeries were carried out by the same surgical team (surgeon and assistant). We believe that this allows us to make an analysis of the experience in this surgical technique.

Conclusions

Although, by definition, we are a hospital center with less than 100 laparoscopic surgeries per year, the rate of perioperative complications in this study is consistent with that reported by other authors.

The factors that were most frequently associated with intraoperative complications, such as injury to a neighboring organ (bladder and intestine) and with the need for conversion to laparotomy, were previous abdominal surgeries and uterine myomatosis.

The most common postoperative complication was cul-de-sac collection, with three cases; in two of them, the indication for THL was cervical cancer, and in the other case, it was abnormal uterine bleeding.

Furthermore, an excellent result was observed in comparison with studies carried out in other institutions, with a shorter surgical time and less intraoperative bleeding, as well as a lower rate of perioperative complications. This may be due to the fact that all reported surgeries were carried out by the same team from the hospital gynecology department.

Ethical disclosures

Protection of human and animal subjects. The authors declare that the procedures that were followed adhered to the ethical standards of the responsible committee for experimentation on human beings and were in agreement with the World Medical Association and the Declaration of Helsinki.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

Conflicts of interest

The authors declare that they have no conflicts of interest relevant to this manuscript.

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