

Accepted Manuscript

Laparoscopic Vaginal-Assisted Hysterectomy with Complete Vaginectomy for Female-to-Male Genital Reassignment Surgery

Ana Gomes da Costa, MD, Alexandre Valentim-Lourenço, MD, Samuel Santos-Ribeiro, MD, Maria Carvalho Afonso, MD, Alexandra Henriques, MD, Ana Luísa Ribeirinho, MD, João Décio Ferreira, MD

PII: S1553-4650(16)00002-9

DOI: [10.1016/j.jmig.2015.12.014](https://doi.org/10.1016/j.jmig.2015.12.014)

Reference: JMIG 2746

To appear in: *The Journal of Minimally Invasive Gynecology*

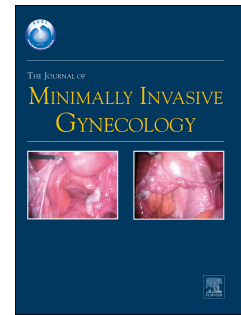
Received Date: 27 October 2015

Revised Date: 9 December 2015

Accepted Date: 30 December 2015

Please cite this article as: Gomes da Costa A, Valentim-Lourenço A, Santos-Ribeiro S, Carvalho Afonso M, Henriques A, Ribeirinho AL, Décio Ferreira J, Laparoscopic Vaginal-Assisted Hysterectomy with Complete Vaginectomy for Female-to-Male Genital Reassignment Surgery, *The Journal of Minimally Invasive Gynecology* (2016), doi: 10.1016/j.jmig.2015.12.014.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



**Laparoscopic Vaginal-Assisted Hysterectomy with Complete
Vaginectomy for Female-to-Male Genital Reassignment Surgery**

Clinical Article

Ana Gomes da Costa, MD^a

Alexandre Valentim-Lourenço, MD^{a, b}

Samuel Santos-Ribeiro, MD^a

Maria Carvalho Afonso, MD^a

Alexandra Henriques, MD^a

Ana Luísa Ribeirinho, MD^a

João Décio Ferreira, MD

^aDepartment of Obstetrics and Gynecology

Centro Hospitalar Lisboa Norte

Hospital de Santa Maria, Lisbon, Portugal

^bFaculty of Medicine of Lisbon University

Centro Académico de Medicina de Lisboa, Lisbon, Portugal

Corresponding author contact information: Ana Gomes da Costa MD

Department of Obstetrics and Gynecology

Centro Hospitalar Lisboa Norte, Hospital de Santa Maria

Av. Prof. Egas Moniz, 1649-035 Lisbon, Portugal.

Tel: +351 217805578 ; Fax: +351 217805621

ana.ofgc@gmail.com

The authors report no financial interests or financial support.

The authors have no disclosure to report.

Keywords: Vaginectomy, laparoscopic, genital reassignment surgery

Abstract

Introduction: Total hysterectomy with bilateral salpingo-oophorectomy and vaginectomy for genital reassignment surgery is a complex procedure, usually performed with a combined vaginal and abdominal approach. The aim of this study was to describe the feasibility of laparoscopic vaginectomy in sex reassignment surgery.

Methods: We reviewed the relevant medical history, intra/post-operative complications and surgical results of all patients diagnosed with gender dysphoria and submitted to totally laparoscopic gender confirmation surgery in our Department between January 2007 and March 2015. In total, twenty-three patients underwent total hysterectomy with bilateral salpingo-oophorectomy and vaginectomy in a single intervention. The vaginal mucosa was conserved to be used for the penile neo-urethra during the subsequent phalloplasty.

Results: The surgeries had an average operating time of 155 ± 42 minutes. No intraoperative complications were registered. In all patients the vagina was totally removed and, in most cases ($n=20$), we were able to remove laparoscopically more than 50% of the vagina. Three patients had postoperative complications. One patient presented with hemoperitoneum on the second postoperative day; another with prolonged urinary retention and a third patient developed a perineal hematoma one month after surgery. Patients were discharged less than 72 hours after surgery, except the patient who developed a postoperative hemoperitoneum. For all patients, we obtained an adequate specimen of vaginal mucosa to reconstruct the penile neo-urethra, for the subsequent phalloplasty.

Conclusion: This study suggests the feasibility of laparoscopic vaginectomy in genital reassignment surgery. The procedure can be executed as continuation of the hysterectomy with the potential advantage of the laparoscopy providing better exposure of the anatomic structures while remaining with low blood losses (less than 500 mL) and few complications. Furthermore, using this approach, adequate sized vaginal mucosa flaps were obtained for the urethral reconstruction.

Introduction

Gender dysphoria is a medical condition where patients have the conviction that their gender is different from the one they were phenotypically assigned at birth. Its prevalence varies between 1:30 400 to 1:200 000, although a higher prevalence has been reported in more recent studies (1,2,3). The management of gender dysphoria is individualized and may include both hormonal therapy and surgery. Following the evaluation of a multidisciplinary team, which includes psychiatrists, psychologists, endocrinologists, gynecologists and plastic surgeons, patients can be assigned for genital surgery, a rare and complex procedure (1,2,3).

Although there may be variations to the procedures sought by patients, genital reassignment surgery generally requires several invasive operations, which may include a hysterectomy with bilateral adnexectomy, vaginectomy, reconstruction of the penile urethra, scrotoplasty and phalloplasty or metoidioplasty (1). The neo-phallus should be functional (to enable micturition in a standing position and sexual function) and cosmetically acceptable. Usually, the total hysterectomy, bilateral salpingo-oophorectomy and vaginectomy are performed with a combined laparoscopic and vaginal approach (4,5).

A vaginectomy is a difficult surgery with a high risk of post-operative bleeding. This procedure is typically performed by vaginal approach, which can hinder the control of hemorrhaging due to the limited access. Following removal, the mucosal lining of the vaginal cavity may be used for the reconstruction of the neo-urethra (1,6). Although a variety of flaps are available, the vaginal mucosa may be one of the best materials for urethral reconstruction in a total phalloplasty since its non-keratinized stratified squamous epithelium is highly similar to the urethra (1,2,4,5).

A laparoscopic approach for the vaginectomy may have several advantages when compared to the vaginal approach, which include better visualization of the tissues, anatomical access and control of the haemorrhage. This may be helpful to obtain adequate sized flaps of vaginal mucosa, for the penile urethral reconstruction. To our knowledge, total laparoscopic vaginectomy has

34 only been reported for oncologic surgery and has not been described in
35 gender reassignment surgery (7-9).

36 The aim of this study was to describe the feasibility of laparoscopic
37 vaginectomy during genital reassignment surgery and its influence on the
38 reconstruction of the neo-urethra using the vaginal mucosa in a second-stage
39 phalloplasty.

40

Materials and Methods

Study Design

We present a case series of all patients who underwent genital reassignment surgery between January 2007 and March 2015 at our tertiary university center.

For all patients, the indication for surgery was gender dysphoria, according to the ICD-10 classification. All patients were evaluated by a multidisciplinary team, which included two psychiatrists, a psychologist, an endocrinologist, a gynecologist and a plastic surgeon. Ultimately, reassignment surgery was approved by the Portuguese Medical Association in all instances.

All patients were taking hormonal therapy for at least one year and were already living as a male (Testoviron Depot®, 250mg, IM, every 2-4 weeks).

The clinical files of the patients and all surgical reports were reviewed. Demographic and surgical data were collected, including the patient's age, duration of the hormone replacement therapy, preoperative and postoperative hemoglobin, length of surgery, extension of the vagina removed laparoscopically and intra/post-operative and postoperative complications.

All patients provided a written consent for the surgery and the use of clinical data for study purposes, as required by the Hospital's Ethics Committee.

Surgical Technique

A two-stage genital reassignment surgery was performed. The first intervention included a laparoscopic hysterectomy with bilateral adnexectomy and total vaginectomy. During this phase, a tubed vaginal mucosal graft was also created and placed in the circumflex iliac artery groin area. The second-stage included the phalloplasty, in which the vaginal mucosa graft was used to reconstruct the neo-urethra.

Both a senior gynecologist and plastic surgeon were present in the operation theatre during all the procedures and the same medical team performed all surgeries.

Patients were placed in the gynecological (lithotomy) position. A Foley catheter was inserted in the bladder and four-ports were used for the laparoscopy; one 11-mm trocar was placed in the umbilicus and three 5-mm

trocars were placed under laparoscopic guidance: one in each (left and right) iliac fossa and one in the midline, above the symphysis. The patients were then placed in the Trendelenburg position. The surgeries were performed using ultrasonic energy - Harmonic® Scalpel (Ethicon Endo-Surgery, Cincinnati, USA). Bipolar energy (Karl Storz, Tuttlingen, Germany) was used if additional coagulation was needed. The abdomen was explored prior to commencing the reassignment surgery procedure and in case of adhesions adhesiolysis was performed first.

The surgery was performed according to the following steps:

1. The anterior leave of the broad ligament was opened and dissected towards the posterior leave, just below the iliac vessels, and the ureter and the internal iliac artery were identified in the retroperitoneal space [supplementary video 1 – In this surgery, ureteral-illuminating catheters were used to minimize the risk of iatrogenic lesions (Bush DL™ Ureteral Illuminating Catheter Set, Stents Cook Medical®, Bloomington, Indiana)].
2. The vesicouterine peritoneal fold was identified and the dissection continued anteriorly to mobilize the bladder off the lower uterine segment and the superior third of the vagina.
3. The round ligaments of the uterus, the infundibulopelvic ligaments and the uterosacral ligaments were cauterized and sectioned, followed by the dissection of the posterior leave of the broad ligament towards the rectovaginal space.
4. The uterine vessels were identified and ligated at the level of the crossing with the ureter, and the cardinal ligaments were cauterized and cut. The bladder pillars and the rectal pillars were identified and ligated at the level of the cervix.
5. To perform the vaginectomy, the vesicovaginal and the rectovaginal spaces were identified and dissected. The paravaginal planes were isolated bilaterally and the paracolpos were sectioned. An adequate hemostasis was achieved by identifying the vaginal arteries followed by careful ligation. If necessary, a hemostatic agent was used (FloSeal®; Baxter Inc, Deerfield, IL, USA).

- 68 6. After dissecting the largest possible length of the vagina, and
 69 successfully separating the vagina from the bladder, a Clermont-
 70 Ferrant uterine manipulator (Karl Storz, Tuttlingen, Germany) was
 71 inserted and a circumferential vaginal incision around the cuff was
 72 made, using ultrasonic energy. The uterus and vagina were then
 73 carefully extracted, to avoid damaging the vaginal mucosa (Fig 1, 2).
- 74 7. Then, the remainder of the vagina was removed by a vaginal approach
 75 and a pelvic floor reconstruction was performed according to the
 76 DeLancey levels (10-11). The DeLancey level I apex support was
 77 repaired laparoscopically with Vicryl 0. The uterosacral ligaments and
 78 the remaining fibers of the cardinal ligaments were attached to each
 79 other in order to provide an anatomic support to the pelvic structures
 80 (bladder and bowel). The second DeLancey level was reconstructed by
 81 a combined laparoscopic and vaginal approach. The rectovaginal and
 82 endopelvic fascia were attached providing additional anatomic support.
 83 The third level (perineal body and genital hiatus) was repaired and
 84 closed vaginally at the hymenal ring. Furthermore, a perineoplasty and
 85 closure of the genital hiatus was also performed.
- 86 8. After extracting the uterus, adnexa and vagina, the plastic surgeon
 87 dissected the vaginal mucosa and rolled it over a catheter to construct
 88 the neo-urethra (Fig. 3). Then, the plastic surgeon delineated a
 89 rectangular flap with 10-11 cm width and 15-18 cm length on the area
 90 of the groin irrigated by the circumflex iliac artery. The tubed graft with
 91 the vaginal mucosa was introduced along a subcutaneous tunnel,
 92 within the circumflex iliac artery groin flap area, and fixed in place. Both
 93 extremities were sutured to the skin. Three months latter, in the
 94 second-stage procedure, this graft, along with the prefabricated neo-
 95 urethra was used for the phallic reconstruction (Fig. 4).

96
 97 The total blood loss was estimated from the contents of the suction devices
 98 and the sterilized gauzes and only registered if over 500 mL. The extension of
 99 the vaginectomy performed by laparoscopy was subjectively evaluated
 100 through the comparison to the remainder of the vagina removed by the
 101 vaginal approach.

A cephalosporin was administered prior to the beginning of the surgery (usually cefoxitin, 2g, ev). Venous thromboembolic prophylactic measures included mechanical prophylaxis with elastic stockings, early ambulation and low-molecular-weight heparin. The Foley-catheter was usually removed in the second or third post-operative day, to minimize the risk of urinary retention.

SPSS software version 20.0 (SPSS Inc., Chicago, IL, USA) was used for the descriptive analysis. Continuous data are presented as mean \pm standard deviation, while categorical data is presented as proportions.

Results

During the study period, 23 patients underwent genital reassignment surgery at our Department.

The mean age of the patients was 31.8 ± 8 years. All patients had previously undergone mastectomy and were taking hormonal therapy for at least one year. The average operative time for laparoscopic hysterectomy, bilateral salpingo-oophorectomy and vaginectomy was 155 ± 42 min. In all cases, the total blood loss did not exceed 500mL. There were no operative complications and no need for blood transfusions.

The extension of the vagina removed by the laparoscopic approach was evaluated subjectively. Three patients had less than 50% of the vagina removed laparoscopically, while 13 patients had between half and three-quarters. In 6 patients, we were able to remove 75-90% of the vagina and in one patient almost the whole vagina was removed by laparoscopy. The surgical team verified that, between 2007 and 2015, a progressively larger extension of vagina was removed by laparoscopy (Fig. 5).

In the first post-operative day, one patient had a clinical suspicion of pulmonary thromboembolism and was medicated with low-molecular weight heparin in therapeutic doses. In the second postoperative day, the patient presented with a hemoperitoneum. A second-look laparoscopy was performed and bleeding from small pelvic vessels was controlled using bipolar coagulation (grade IIIa complication, according to the Clavien complications grade [17]). Except the above patient, all patients were discharged less than 72 hours after surgery (8 patients were discharged in the second post-operative day).

We registered two grade II complications. One of the patients developed a 5-cm perineal hematoma that infected, treated expectantly with prophylactic antibiotics. Another patient developed immediate urinary retention which warranted urinary catheterization and resolved within one week after surgery.

For all patients, adequate vaginal flaps were obtained for the reconstruction of the neo-urethra for the subsequent phalloplasty.

All patients were followed for the first 2 months after surgery (usually with just one follow-up appointment) and after 3 months, the plastic surgeon performed

35 the phallic reconstruction. To date, only 10 patients underwent the second
36 stage phallic reconstruction and we did not have any case of neourethra-
37 vaginal fistulae or stricture.

Discussion

Laparoscopic vaginectomy seemed to have presented several advantages over the vaginal approach. It provided a better exposure of the tissues and vessels, which also allowed an improvement in haemostasis during the surgery. With the presented surgical technique, the round ligaments were not ligated at the beginning of surgery. This provided uterine support, as we did not use any uterine manipulator during the hysterectomy. We were able to access the retroperitoneal space and better identify and isolate the ureter on its terminal pathway to the bladder. Therefore, we could safely access the parametrium, the paracolpos and the vaginal vessels. The vaginal approach in these patients, who had no sexual intercourse and were under therapy with testosterone, may lead to fragmented vaginal flaps more prone to urethra-cutaneous fistulas, stenosis and strictures (2,6,12).

Genital reassignment surgery refers to numerous procedures in which a vaginectomy may be included. Total vaginectomy is a complex surgery that may present several advantages to these patients. Firstly, it avoids posterior vaginal cyst formation or neourethra-vaginal fistulae. Furthermore, future genital complaints associated with the presence of atrophic changes of the vaginal lining (such as pruritus or burning) are also prevented. The vaginal mucosa is a good choice for the reconstruction of the penile neo-urethra, as it resembles the urethral epithelium more closely than the forearm skin, with low rates of urethral fistula and stricture (6).

The size of the neo-urethra should be 15 cm and for the urethral reconstruction, the plastic surgeon used the vaginal mucosa that was rolled over a catheter. Since the vaginal mucosa was totally removed, there was always enough tissue available for the reconstruction. Furthermore, since the operative piece was removed in one large block, better vaginal flaps were obtained.

According to our series, laparoscopic hysterectomy with bilateral adnexectomy and total vaginectomy, in genital reassignment surgery, appears to be a safe procedure, with an estimated blood loss below 500 mL and a low rate of post-operative complications. A previous study, regarding laparoscopic assisted vaginal hysterectomy, bilateral adnexectomy and total vaginectomy,

reported an average operative time of 2h and 20min (Table 1) (13). With this technique there was no need for blood transfusions and the operative time was not increased.

In a second-stage procedure, the plastic surgeon used the circumflex iliac artery groin flap for the phallic reconstruction, which provided an adequate vascular pedicle and a large amount of soft tissue for a suitable neo-phallus with a functional neo-urethra. The free graft in the circumflex iliac artery area favours a good revascularization of the vaginal mucosa and an adequate specimen for the phalloplasty. Also, the free flap appears to be less prone to stenosis and fistulae. With the extensive use of laparoscopy, injuries to the structures essential for the phalloplasty may be prevented (12,13,14).

The only studies previously published on laparoscopic vaginectomy report the use of this technique in the treatment of gynaecologic cancers. In general, the authors present similar advantages and report low surgical morbidity, as the intra-operative blood loss and post-operative complications are minimal (7-9). As with radical hysterectomy, we isolated and dissected both ureters from all the surrounding tissues and the uterine artery. The bladder was anteriorly dissected, and then, the bladder and ureters were pushed further away from the vagina (15,16).

To the best of our knowledge, this study is the first to evaluate the outcomes of this technique outside the field of gynecological oncology, specifically in genital reassignment surgery (8, 9). The surgical team and technique were always the same, which enabled us not only to obtain a progressively larger specimen of vaginal mucosa for the subsequent phalloplasty, but also to minimize the potential for confounding factors in interpreting the outcomes for this study. Furthermore, the group of patients included in the study is homogenous, as only patients diagnosed with gender dysphoria were included. The sample size (n=23) is also another of the strengths of our study. As this is a one-armed case series, the main limitation of our study is the impossibility to compare our surgical results to the ones arising from the vaginal approach. Furthermore, an objective evaluation of the size of the vaginal flap laparoscopically removed was not always obtained, which does not allow us to objectively present these results.

Although this is not the focus of our article, the free graft technique appeared to be a safe technique with good outcomes. However, future studies should be conducted to evaluate the potential advantages of applying this technique. We present a new laparoscopic technique in genital reassignment surgeries, which has several advantages for the phallic reconstruction. Our results are important since they suggest the feasibility and safety of the laparoscopic vaginectomy in this surgery. The surgery may be performed as a continuous procedure and the pelvic structures are better visualized. It is also an appropriate method for patients with vaginal atrophy, such as those using testosterone (9). Furthermore, adequate haemostasis may be obtained easier than when compared with the vaginal approach. According to our experience, the laparoscopic approach for vaginectomy allows for a better and longer specimen of vaginal mucosa to construct the penile neo-urethra, for the second-stage phalloplasty.

Figure Legends

Fig. 1, 2

The surgical piece excised in block that includes the vagina, the uterus, the tubes and the ovaries.

Fig. 3

Construction of the penile urethra using the vaginal mucosa. Tubulisation around catheter.

Fig. 4

Phalloplasty using the circumflex iliac artery groin flap.

Figure 5

Size of vagina excised by laparoscopy from 2007-2015.

Data are presented as percentage.

References

1. Monstrey SJ, Ceulemans P, Hoebeke P. Sex Reassignment Surgery in the Female-to-Male Transsexual. *Semin Plast Surg.* 2011; 25(3):229-44.
2. Selvaggi G, Bellringer J. Gender reassignment surgery: an overview. *Nat Rev Urol.* 2011;8(5):274-82.
3. Coleman E, Bockting W, Botzer M, et al. Standards of care for the health of transsexual, transgender and gender-nonconforming people, version 7. *Int J Transgenderism.* 2012;13:165-232.
4. Trombetta C, Liguori G, Pascone M, et al. Total sex-reassignment surgery in female-to-male transsexuals: a one-stage technique. *BJU Int.* 2002; 90(7):754-7.
5. Meyer R, Daverio PJ. One-stage phalloplasty without sensory deprivation in female transsexuals. *World J Urol* 1987;5:9-13.
6. Zhang YF, Liu CY, Qu CY, et al. Is vaginal mucosal graft the excellent substitute material for urethral reconstruction in female-to-male transsexuals? *World J Urol.* 2015 April 26. [Epub ahead of print].
7. Nezhat F, Hayes MP, Peiretti M, et al. Laparoscopic Radical parametromy and partial vaginectomy for recurrent endometrial cancer. *Gynecol Oncol.* 2007; 104(2):494-6.
8. Li Y, Chen Y, Xu H, et al. Laparoscopic nerve-sparing radical vaginectomy in patients with vaginal carcinoma: surgical technique and operative outcomes. *J Minim Invasive Gynecol.* 2012;19(5):593-7.
9. Choi YJ, Hur SY, Park JS, et al. Laparoscopic upper vaginectomy for post-hysterectomy high risk vaginal intraepithelial neoplasia and superficially invasive vaginal carcinoma. *World J Surg Oncol.* 2013;11:126.
10. Julian T. Pelvic-support defects: a guide to anatomy and physiology. *OBG Management* 2002;14(11):71-81.
11. Herschorn S. Female pelvic floor anatomy: the pelvic floor, supporting structures, and pelvic organs. *Rev Urol.* 2004;6(5):2-10.
12. Trum HW, Hoebeke P, Gooren LJ. Sex reassignment of transsexual people from a gynecologist's and urologist's perspective. *Acta Obstet Gynecol Scand.* 2015;94(6):563-7.
13. Ergeneli MH, Duran EH, Ozcan G, et al. Vaginectomy and laparoscopically assisted vaginal hysterectomy as adjunctive surgery for female-to-male transsexual reassignment: preliminary report. *Eur J Obstet Gynecol Reprod Biol.* 1999;87(1):35-7.
14. Felici N, Felici A. A new phalloplasty technique: the free anterolateral thigh flap phalloplasty. *J Plast Reconstr Aesthet Surg.* 2006;59(2):153-7.
15. Suh DH, Cho H-Y, Kim K, et al. Matched-Case Comparisons in a Single Institution to

- Determine Critical Points for Inexperienced Surgeons' Successful Performances of Laparoscopic Radical Hysterectomy versus Abdominal Radical Hysterectomy in Stage IA2-IIA Cervical Cancer. PLoS ONE 10(6): e0131170.
16. Ditto A, Martinelli F, Bogani G, et al. Implementation of laparoscopic approach for type B radical hysterectomy: a comparison with open surgical operations. Eur J Surg Oncol. 2015;41(1):34-9.
17. Dindo D, Demartines N, Clavien PA. Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. Ann Surg. 2004;240(2):205-13.
18. Ott J, van Trotsenburg M, Kaufmann U, Schrögender K, Haslik W, Huber JC, Wenzl R. Combined hysterectomy/salpingo-oophorectomy and mastectomy is a safe and valuable procedure for female-to-male transsexuals. J Sex Med. 2010 Jun;7(6):2130-8.
19. O'Hanlan KA, Dibble SL, Young-Spint M. Total laparoscopic hysterectomy for female-to-male transsexuals. Obstet Gynecol 2007;110:1096–101.
20. Weyers S, Monstrey S, Hoebeke P, De Cuypere G, Gerris J. Laparoscopic hysterectomy as the method of choice for hysterectomy in female-to-male gender dysphoric individuals. Gynecological Surgery 2008; 5(4):269-73.

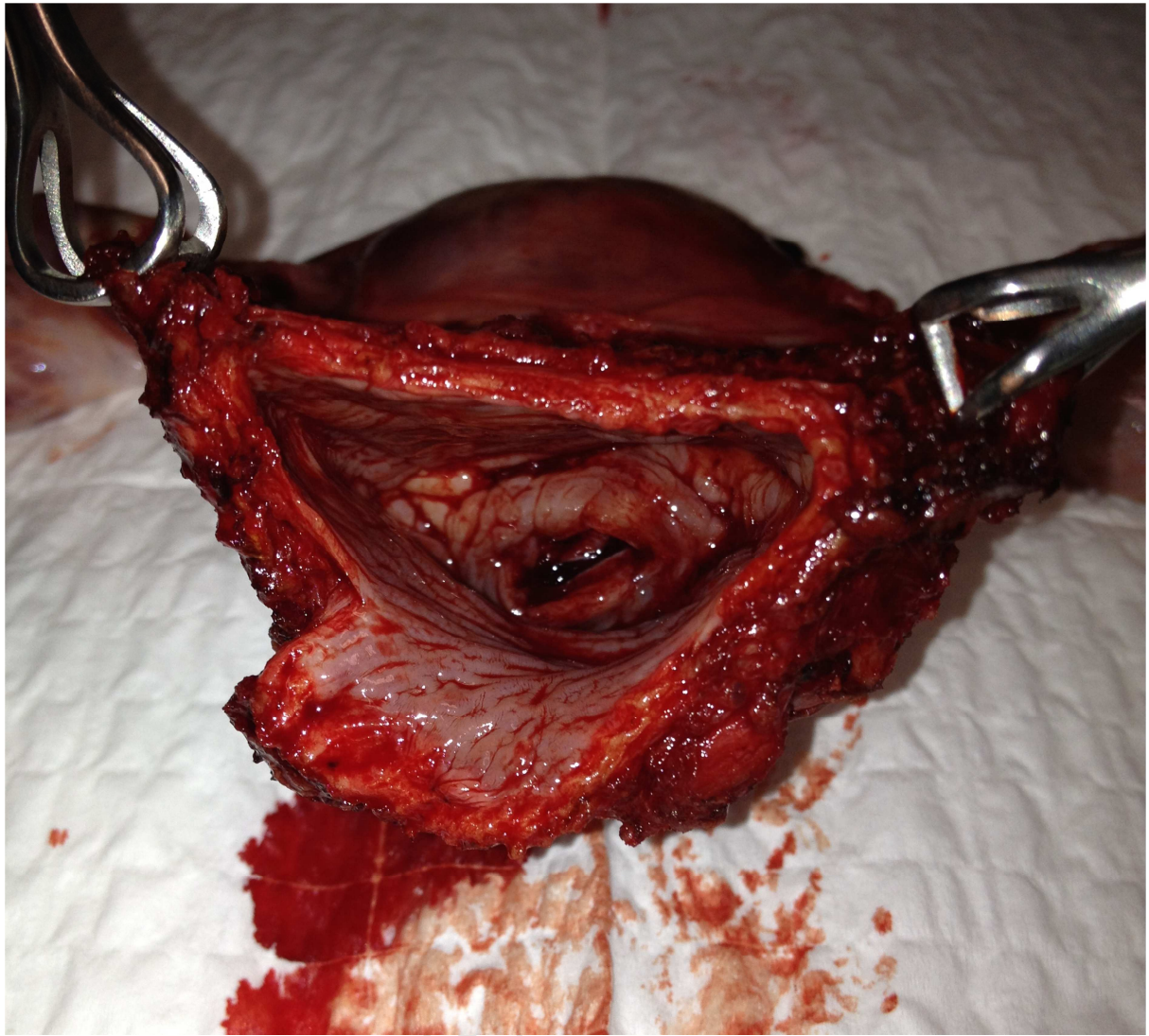
Table 1 - Summary of cases of laparoscopic hysterectomy and bilateral salpingo-oophorectomy, with or without vaginectomy, in genital reassignment surgery

Authors	Number of cases	Procedure	Operative time	Operative complication rate	Blood loss (mL)	Postoperative stay (days)
Ergeneli ¹³	8	Vaginectomy, laparoscopically assisted vaginal hysterectomy and bilateral salpingo-oophorectomy	140 min	1/8	250 ± 100*	-
Ott ¹⁸	31	Laparoscopic hysterectomy and bilateral salpingo-oophorectomy	222.25 min [IQR] 190-270 minutes	1 conversion to laparotomy	No need for transfusion	8 [7-9]
O'Hanlan ¹⁹	41	Laparoscopic hysterectomy, bilateral salpingo-oophorectomy, and incidental appendectomy	74.08 ± 35.4*	5/41	26.88 ± 27.7*	1.07 ± 0.3*
Weyers ²⁰	83	Laparoscopic hysterectomy and bilateral salpingo-oophorectomy	64 (30–150) min	3/83	86 (25–600)	-

IQR – Interquartile rate

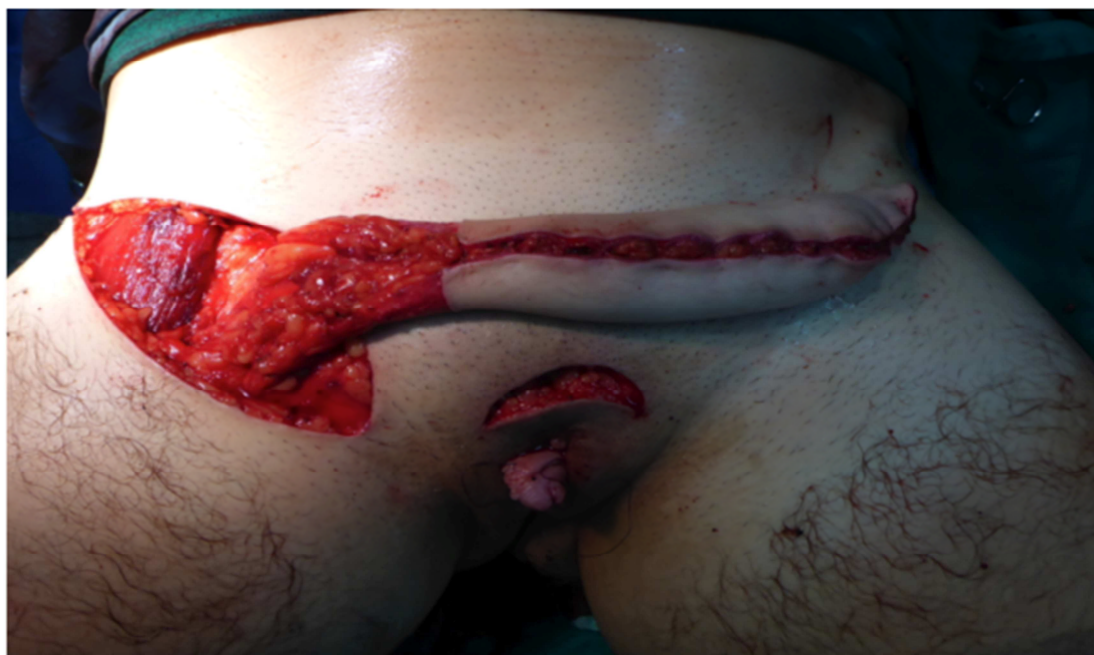
* Data are expressed as mean ± standard deviation



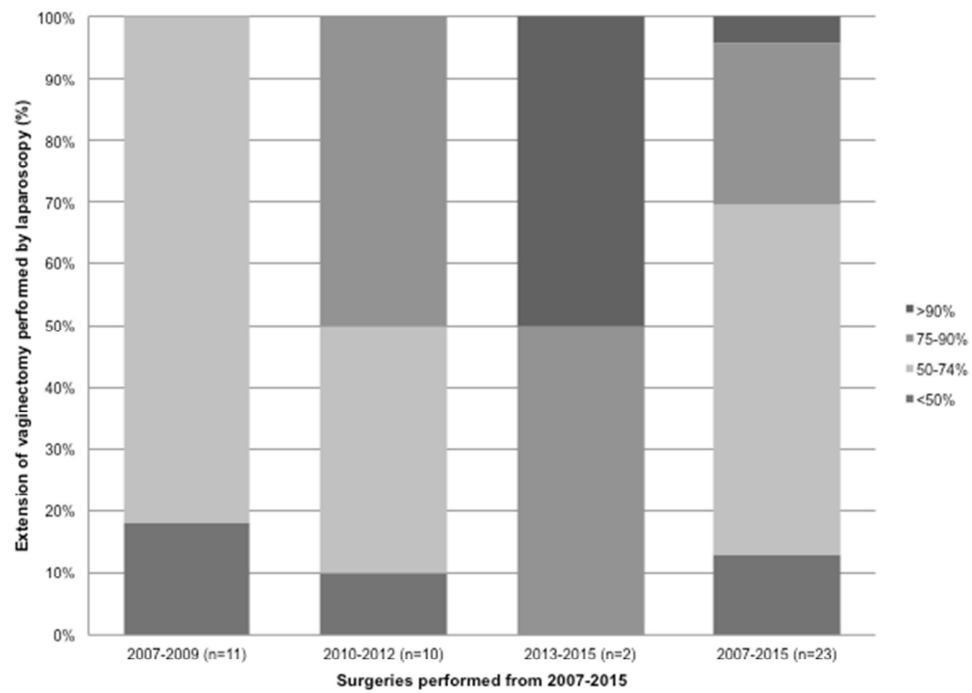


ACCEPTED





ACCEPTED MANUSCRIPT



Laparoscopic Vaginal-Assisted Hysterectomy with Complete Vaginectomy for Female-to-Male Genital Reassignment Surgery

Précis

This study suggests the feasibility of laparoscopic vaginectomy in genital reassignment surgery, which provides better exposure of the anatomic structures and has the advantages associated to a laparoscopic approach.