Total Laparoscopic Hysterectomy for Female-to-Male Transsexuals

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OBJECTIVE: To compare the results of laparoscopic hysterectomy, salpingo-oophorectomy, and incidental appendectomy for female-to-male transsexuals with those of female patients.

METHODS: Retrospective chart abstraction of all patients undergoing total laparoscopic hysterectomy, bilateral salpingo-oophorectomy, and appendectomy since September 1996. Significance from analysis of covariance or χ^2 was set at .05.

RESULTS: Five hundred ninety-three patients underwent total laparoscopic hysterectomy, oophorectomy, and appendectomy. Forty-one were identified as transsexual, 552 as females. The transsexuals were significantly younger (mean 32 years compared with 51 years, median 32 years compared with 49 years, $P<.001$), with lower parity (mean 0.05 pregnancies compared with 1.34 pregnancies, median 0 pregnancies compared with 1 pregnancy, $P<.001$), yet had similar body mass index and height. Transsexuals' surgeries had shorter operating times (mean 74 minutes compared with 120 minutes, median 57.5 minutes compared with 116 minutes, $P<.001$), with less blood loss (mean 27 mL compared with 107 mL, median 20 mL compared with 50 mL, $P<.001$) and lower uterine weight (mean 118 g compared with 167 g, median 89 g compared with 140.5 g, $P<.001$). The total complication rates (12.2% compared with 8.3%), as well as the reoperative complication rates (4.9% compared with 4.3%) were not significantly different.

CONCLUSION: Total laparoscopic hysterectomy offers appropriate surgical outcomes for those patients identifying themselves as transsexual.

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Transsexuals are individuals who believe that their gender identity does not match their birth sex. Gynecologists are asked to provide routine gynecologic care for female-to-male transsexuals or to address their gynecologic problems, such as chronic pelvic pain, dysmenorrhea, pelvic mass, symptomatic leiomyomata, or cancer. Hysterectomy with bilateral salpingo-oophorectomy is the most definitive treatment for many gynecologic symptoms for those transsexuals who do not desire fertility.

Neither vaginal hysterectomy nor laparoscopically assisted vaginal hysterectomy (LAVH) can be offered routinely to transsexual patients because most transsexuals are nulliparous and have been using testosterone for many years, with resultant small, noncompliant, and atrophic vaginal walls.[1] Total laparoscopic hysterectomy, performed entirely through four 5-mm trocars, can offer the benefits of minimally invasive surgery to this population. Laparoscopically assisted vaginal hysterectomy and total laparoscopic hysterectomy have been reported in the cases of nine transsexuals as a portion of their complete surgical sex reassignment, and not as an independent, gynecologically indicated procedure.[2,3] This report describes the presenting complaints, demographics, surgical–pathologic data, and outcomes of transsexuals undergoing total laparoscopic hysterectomy. The objective of this study is to compare the results of laparoscopic hysterectomy, salpingo-oophorectomy, and incidental appendectomy for female-to-male transsexuals with those of female patients.

MATERIALS AND METHODS

Cases were identified from the computerized billing lists in the private practice of the first author using the Current Procedural Terminology codes for hysterectomy. Sequoia Hospital (Redwood City, California) Institutional Review Board approval has been maintained with yearly updates for the office and hospital

chart abstraction and anonymous tabulation of data. All sequential cases of total laparoscopic hysterectomy, oophorectomy, appendectomy, simple lysis of adhesions, fulguration of endometriosis, cystoscopy, or uterosacral ligament plication were included. Cases considered noncomparable were excluded, for example, those performed in conjunction with other extensive or prolonged procedures, such as lymphadenectomy, omentectomy, cholecystectomy, separate pelvic support procedures, and extensive morcellations of uteri that were greater than 800 g. In this practice, a total laparoscopic hysterectomy was routinely offered whenever hysterectomy was indicated unless patients had documented severe adhesions from prior surgeries.[4] Every surgery was performed by the first author from September 5, 1996, to June 30, 2007. All surgeries were assisted by an accredited resident obstetrician–gynecologist from a tertiary teaching center, by a board-certified obstetrician–gynecologist attending, or by a board-certified general surgeon.

Descriptive statistics were generated related to sample characteristics and other variables of interest. Comparisons between the variables used t tests, analysis of variance or analysis of covariance, χ^2, or logistic regressions, as appropriate for the level of data. Significance was preset at $<.05$.

RESULTS

Charts were abstracted for 593 patients who underwent total laparoscopic hysterectomy, with or without bilateral salpingo-oophorectomy, with or without incidental appendectomy, and cystoscopy. Forty-one identified themselves as transsexual and 552 as females. Table 1 contains the demographic comparisons between the two groups. Transsexuals were significantly younger and had fewer children than the comparison females. Therefore, these variables were

Table 1. Demographic Comparisons by Transsexual Status

Variable	Transsexuals (n=41)	Women (n=552)	P
Age (y)*	31.76 (32)±7.4	50.75 (49)±10.5	<.001
Number of children*	0.05 (0)±0.2	1.34 (1)±1.3	<.001
Body mass index*	27.36 (26.2)±5.8	28.03 (25.8)±7.6	.585
Height (in)*	64.85 (65)±2.7	64.56 (64)±2.6	.485
Parity† [n (%)]	2 (4.9)	347 (62.9)	<.001

Data are expressed as mean (median)±standard deviation except where otherwise indicated.
* Compared with independent sample t tests.
† Compared with χ^2 test including continuity correction.

Table 2. Patient Diagnoses Admitted for Review

Preoperative Diagnosis	n	%
Leiomyoma	146	24.6
Pelvic mass (benign)	142	23.9
Pelvic pain	72	12.1
Endometrial carcinoma	53	8.9
Familial breast/ovary carcinoma	44	7.4
Gender identity disorder	41	6.9
Adenomyosis	28	4.7
Endometrial hyperplasia	23	3.8
Cervical dysplasia	17	2.9
Prolapse	14	2.4
Cervical carcinoma	5	0.8
Low malignant ovary carcinoma	4	0.7
Endometrial polyps	2	0.3
Choriocarcinoma	1	0.2
Menorrhagia	1	0.2

controlled in all analyses. There were no significant differences in height or body mass index between the two groups.

The frequencies of the primary preoperative diagnoses are shown in Table 2. Many of the 41 transsexuals had other gynecologic complaints, such as pelvic pain (n=23, 56%), leiomyomata (n=1, 2.4%), or pelvic mass (n=1, 2.4%). Transsexuals had significantly shorter operating times, with less blood loss and smaller uterine weight, length, width, and depth. They also had more frequent appendectomies and fewer cystoscopies (Table 3).

Both reoperative and total complication rates and types were similar between groups (Table 3). A detailed analysis of the complications of the entire series has been reported elsewhere.[4] Although the complication rates were not statistically significantly different between the two groups, we did not have the statistical power to determine whether the rates were different between the groups. The power analysis revealed that we had only 11% power to detect the difference in complications between the group 1 proportion of 0.122 for the female-to-male transsexuals and a group 2 proportion of 0.083 for the females (odds ratio 0.651) when the sample sizes were 41 and 552, respectively.

No complications sustained by the transsexuals were unique to their status as transsexuals, and all transsexuals' complications were also observed among women patients. Nonreoperative complications among the transsexuals included pelvic cellulitis in two individuals treated with oral antibiotics to resolution and vaginal cuff bleeding in two patients at 7 and 12 days managed in the office. Reoperative complications occurred in two transsexual patients: one with vaginal bleeding at 20 days, who was sutured at a remote

Table 3. Procedure Comparisons by Transsexual Status

	n=41	n=593	P
Blood loss (mL)*	26.88 (20)±27.7	107.14 (50)±147.5	.001
Duration of surgery (min)*	74.08 (57.5)±35.4	120.18 (116)±45.5	<.001
Uterine weight (g)*	118.02 (89)±115.6	167.13 (140.5)±108.4	.001
Uterine length (cm)*	8.13 (8)±1.7	9.08 (9)±2.4	<.001
Uterine width (cm)*	5.03 (5)±1.4	6.22 (6)±2.0	<.001
Uterine depth (cm)*	3.49 (3.5)±1.0	5.42 (4.4)±21.6	.27
Length of hospitalization (d)*	1.07 (1)±0.3	1.36 (1)±0.8	.08
Appendectomy done[†] [n (%)]			.024
Yes	20 (48.8)	367 (33.5)	
No	21 (51.2)	185 (66.5)	
Cystoscopy done[†] [n (%)]			.009
Yes	8 (19.5)	291 (52.7)	
No	33 (80.5)	261 (47.3)	
Complications[†] [n (%)]			.395
Yes	5 (12.2)	46 (8.3)	
No	36 (87.8)	506 (91.7)	
Complications requiring reoperation[†] [n (%)]			.873
Yes	2 (4.9)	24 (4.3)	
No	39 (95.1)	528 (95.4)	
Transfusions[†] [n (%)]			.385
Yes	0 (0)	10 (1.8)	
No	41 (100)	542 (98.1)	

Data are expressed as mean (median)±standard deviation except where otherwise indicated.
* Analysis of covariance used for comparison with age and parity as covariates.
[†] Logistic regression used for the comparison with age and parity as covariates.

hospital and subsequently had a negative workup for a clotting disorder, and one patient who had immediate take-back to the operating room for suture of hymeneal ring laceration due to removal of the uterus through a small hymen. One transsexual had conversion to open laparotomy for observation of a 6-cm retroperitoneal hematoma, thought to be due to blunt trauma from umbilical trocar entry. Although none of the transsexuals required transfusions, this was not significantly different from the 1.8% of women patients who were transfused.

DISCUSSION

Culturally appropriate gynecologic care of transsexual patients has been identified as an important goal by the American College of Obstetricians and Gynecologists in *Special Issues in Women's Health.*[5] There are no government surveys providing an accurate count of the number of transsexual individuals. Many transsexuals, because of the stigma and potential discrimination, do not present themselves for routine medical or gynecologic care, but transsexuals may be identified by the gynecologist and need referral for help in their transition toward making their outward appearance and life match their inner identity. Standards of care for transitioning from female to male have been established by the World Professional Association for Transgender Health.[2] Typically, the diagnosis of gender identity disorder is established by a psychotherapist in ongoing therapy, which is essential to managing the stress of transition and in maintaining relations with family, career, and community.[6] Hormonal therapy is typically started with self-administered intramuscular testosterone cypionate 100 mg every 14 days.[7,8] This gradually results in development of male secondary sexual characteristics, such as a masculine escutcheon, lower-pitched voice, and gradual enlargement of the glans clitoris to the appearance of a small phallus.[6] Hormone therapy is encouraged because transsexuals who do not take androgens in their transition have lower quality-of-life indices.[9] To facilitate their presentation as male, most will have bilateral mastectomy with transposition of the nipple-areolar complex.[8] In this series, 68% of transsexuals were on testosterone replacement for a mean of 49.6 months (median 38 months, range 6–168 months), and 71% had undergone elective mastectomy 34 months previously (median 24 months, range 2–132 months).

Some transsexuals will consult a gynecologist for benign gynecologic conditions, such as pelvic pain or leiomyomata, even after testosterone injections have begun. Rarely, ovulation can continue, with persistence of any prior menstrual symptomatology such as dysmenorrhea or menorrhagia.[1] Oral contraceptives are contraindicated with ongoing testosterone injec-

tions. Depoleuprolide would be a temporary consideration but not a permanent solution to either pain or symptomatic leiomyomata. For transsexuals on testosterone injections who have no desire for future fertility, hysterectomy with oophorectomy offers a high likelihood of enduring symptom amelioration.

Some transsexuals seek hysterectomy with oophorectomy specifically to align their internal anatomy with their external identity and to avoid gynecologic problems as well as the catastrophic possibility of gynecologic cancers. The prevalence of these cancers has not been studied in this population, but there are reports that raise the concern that testosterone use may increase cancer risk and that cancer screening use may be low. Androgen therapy has been reported to cause polycystic changes in the ovaries, increased uterine weight and endometrial thickness, adenomyosis, stimulation of the endometrium,[10] and mucometra,[10,11] mediated by up-regulation and stimulation of both androgen and estrogen receptors.[12] In this series, the uteri were significantly smaller in the transsexuals taking testosterone. Androgen receptors have also been identified in increasing concentrations in endometrial hyperplasias and cancers in comparison with normal endometrium.[13] In one report, ovarian cancer cells harvested from a transsexual taking long-term testosterone contained a rich concentration of androgen receptors, leading to a recommendation that transsexuals undergoing genital reconstruction surgery always have a hysterectomy and oophorectomy.[14]

The World Professional Association for Transgender Health Standards of Care confirms the usefulness of hysterectomy with oophorectomy in patients who are transitioning under counseling with an experienced psychotherapist. Transsexual patients should have fertility counseling from the gynecologist as well. At any time during the reproductive years, testosterone can be discontinued with likely resumption of ovulation for potential fertility. However, before hysterectomy and oophorectomy, all transsexuals should be counseled about permanent loss of fertility.

Young age is a relative contraindication for hysterectomy and oophorectomy. However, youth are identifying their gender identity at earlier ages than in the past.[15] The World Professional Association for Transgender Health allows for hormonal and surgical therapy for postpubertal candidates who are following the guidelines. Transsexuals who were diagnosed with gender identity disorder in their early teens were reported to "pass" undetected much more easily as members of the opposite sex if their secondary sex characteristics were reversibly suppressed until their diagnosis was firmly established in their later teens.[16]

The youngest transsexual patient in this series was 15 years old and postpubertal and had been taking testosterone for 2 years. He had the appearance and carriage of a teenage male and was accompanied by both of his supportive parents for his intake examination and throughout his surgery. His school counselor and his personal therapist each wrote letters of support for his surgery.

The American Association of Gynecologic Laparoscopists classifies this total laparoscopic hysterectomy procedure as a type IVE, total laparoscopic hysterectomy, because the entire surgery is performed only through the four 5-mm ports.[17] Type IVE total laparoscopic hysterectomy has been reviewed extensively and confirmed to offer small incisions, minimal pain, short hospital stays and disability, minimal blood loss, and reasonable complications. In the transsexual population, this procedure allows for maximal abdominal visualization and access critical for pelvic pain cases, those in which endometriosis is suspected, or for large leiomyomata where vaginal hysterectomy would be difficult to impossible. Because of their nulliparous, atrophic vaginal anatomy, it would have been impossible to perform even an LAVH on most of the transsexual patients. The total laparoscopic hysterectomy does not depend on any vaginal capacity or laxity as the LAVH does and is thus available to transsexuals, 94% of whom were nulligravid. Additionally, the total laparoscopic hysterectomy incisions can be well hidden by the transsexual or ascribed to the appendectomy that was incidentally performed. The intraumbilical incision is made in the apical scar, and the suprapubic incision is placed in the pubic hair. Finally, the two lateral 5-mm incisions were placed asymmetrically around the anterior superior ileac crests to escape detection as surgical incisions. Most importantly, none of these incisions interrupted the inferior epigastric or circumflex ileac circulation, potentially important for future genital reassignment surgeries.

Appendectomy is offered to all of our patients undergoing surgery and is especially encouraged for younger patients because the age-adjusted risk of appendicitis remains high until age 40 years, at about 200 cases per 100,000 population, and then approximates the age-adjusted incidence of ovarian cancer after age 40 years, at about 30 cases per 100,000. In a recently published series of 270 incidental appendectomies performed during total laparoscopic hysterectomies, 5% of appendices demonstrated pathology, and three cases (1%) had carcinoid tumors, of which two had to have a subsequent staging ileoascending colectomy. (O'Hanlan K, Fisher D, O'Holleran M. 199 incedental appendectomies during total laparoscopic hysterectomy. JSLS in press).

Given that the American College of Obstetricians and Gynecologists has identified transsexuals as an underserved population, deserving culturally competent care, it is useful to briefly review the relevant sociodemographic issues that can facilitate a good doctor-patient relationship. There are case reports of nine patients having LAVH[2] or total laparoscopic hysterectomy[3] incidental to genital reconstruction surgery, but this series is the only published data set on surgical issues that gynecologists face in caring for transsexuals. There are cautions about the interpretation of the data in this article. A detailed analysis of outcomes of the entire series of 830 cases is presented elsewhere in the literature.[4] The long observational period of nearly 11 years is a drawback to interpreting these data regarding total laparoscopic hysterectomy outcomes as surgical acumen and skill evolved. However, the technique has been the same over the 11 years, whereas blood loss, durations of surgeries, and complication rates did decrease over time. Another drawback is the small number of transsexuals in this report, but their number is notably rare, and this is the largest series reported to date. Gynecologists may be asked to provide preventive, medical, or surgical care for transsexuals in their practices.

Most transsexuals live a satisfying sexual life with the enlarged, functional glans induced by testosterone.[18] Only a few transsexuals will seek genital reassignment surgery, typically by either phalloplasty or metoidioplasty. Phalloplasty is the construction of a neophallus from forearm or lower abdominal skin using vascular supply from the deep and superficial circumflex ileac vascular systems.[10] Testicular implants are placed in the labia majora to create a scrotum. Although the appearance of the neophallus resembles a penis, there is no sensation from it. Metoidioplasty consists of constructing a phallus from the existing testosterone-enlarged glans clitoris using surrounding vulvar and vaginal skin.[11] Although this technique makes for a smaller phallus, it is still sensate because the clitoral nerves remain intact. Complications and variability in function and sensation are still major problems for both surgeries, and the cost is high. Only one of our patients had previously undergone a phalloplasty, and none had a metoidioplasty. All of the transsexuals taking testosterone had variably enlarged clitorises with a phallic appearance, quite consistent with their mutual ontologies.

The American College of Obstetricians and Gynecologists has identified this population as having many economic and social barriers to quality care, including surgical care.[5] Transgendered persons frequently experience social and economic marginalization once they begin transition,[9] but after their transition, most transsexuals typically establish and maintain partnerships and have a stable socioeconomic status.[13] The World Professional Association for Transgender Health Standards of Care state that the "goal of psychotherapeutic, endocrine, or surgical therapy for persons with gender identity disorders is lasting personal comfort with the gendered self to maximize overall psychological well-being and self-fulfillment . . .."[8] This goal having been achieved, psychotherapy, for many, is no longer indicated. However, transitioning within World Professional Association for Transgender Health standards requires ongoing psychotherapy, which is costly. The hormone injections essential to quality of life are also costly.[9] All surgeries and medicines used for gender identity disorder are specifically excluded from insurance coverage by an amendment to the Americans with Disabilities Act,[19] even though they have been repeatedly proven to improve the quality of life for transsexuals.[19] Although most transsexuals in this series were excluded from insurance coverage because their only diagnosis was gender identity disorder, some had standard general gynecologic diagnoses indicating hysterectomy as our patients did and were still initially refused coverage.

From this review, it can be concluded that total laparoscopic hysterectomy/bilateral salpingoophorectomy has a role in the gynecologic care of female-to-male transsexuals, even those at a very young age, if they are following the established Standards of Care.[8] These procedures may facilitate their progress to a more satisfying and healthy life.

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