

Laparoscopic trachelectomy for persistent pelvic pain and endometriosis after supracervical hysterectomy

Ceana H. Nezhat, M.D.*†‡§ Daniel S. Seidman, M.D.*
Farr Nezhat, M.D.*†‡ Camran Nezhat, M.D.*†‡||
Michael Roemisch, M.D.†

Stanford University School of Medicine, Stanford, and Nezhat Institute for Special Surgery, Palo Alto, California, and Center for Special Pelvic Surgery, Atlanta, Georgia

Objectives: To discuss the safety of laparoscopic removal of the cervical stump after supracervical hysterectomy.

Design: Retrospective review of six cases.

Setting: Center for Special Pelvic Surgery, a tertiary referral center.

Patient(s): Between August 1993 and December 1995, six patients underwent laparoscopic removal of the cervical stump. Their mean age was 43.1 years (range 32 to 56 years). All women had pelvic pain, and one had abnormal bleeding. Three patients had histories of severe endometriosis only, one had extensive endometriosis with adhesions, one had severe adhesions and leiomyomas, and one had all three conditions at hysterectomy.

Intervention(s): Laparoscopic trachelectomy.

Main Outcome Measure(s): Laparoscopic findings and intraoperative and postoperative complications.

Result(s): The mean blood loss was 100 mL (range 50 to 200 mL). There were no major intraoperative or postoperative complications.

Conclusion(s): Cervical stump removal can be accomplished laparoscopically by an experienced surgeon. Fertil Steril® 1996;66:925-8

Key Words: Endometriosis, trachelectomy, pain, laparoscopy, cervical stump

Until the 1960s, supracervical amputation of the uterus was the standard hysterectomy technique for benign pelvic lesions. Before that time, removal of the cervix at total abdominal hysterectomy was associated with considerable morbidity. Improvements in anesthesia and postoperative care reduced this morbidity, and it was believed that the risk of cervical cancer justified removal of the cervix in most cases (1).

Because few supracervical hysterectomies are per-

formed now, the number of patients requiring excision of the cervical stump has decreased (2). However, as a result of the possible negative side effects of total hysterectomy (3, 4), the interest in performing supracervical hysterectomies has increased recently (5-10).

Some women with cervixes may require cervical stump removal because of prolapse, abnormal cervical cytology, cancer, or recurrent abnormal uterine bleeding (11-14). Our experience with the laparoscopic removal of the cervical stump after supracervical hysterectomy in six women follows.

MATERIALS AND METHODS

This study was a retrospective chart review of six women who underwent laparoscopic removal of the cervical stump between August 1993 and December 1995. The mean age was 43.1 years (range 32 to 56 years). All had pelvic pain, and one had abnormal bleeding. Three patients had severe endometriosis,

Received March 26, 1996; revised and accepted June 26, 1996.

* Department of Gynecology and Obstetrics, Stanford University School of Medicine.

† Center for Special Pelvic Surgery.

‡ Stanford Endoscopy Center for Training and Technology, Stanford University School of Medicine.

§ Reprint requests: Ceana Nezhat, M.D., Stanford Endoscopy Center for Training and Technology, 900 Welch Road, Suite 403, Palo Alto, California 94304 (FAX: 415-327-2794).

|| Department of Surgery, Stanford University School of Medicine.

one had extensive endometriosis with adhesions, one had severe adhesions and leiomyomas, and one woman had all three at hysterectomy. Supracervical hysterectomy was accomplished abdominally in five patients and laparoscopically in one. In all cases, the cervical stump was left because severe endometriosis and/or adhesions were present in the posterior cul-de-sac between the rectum or uterosacral ligaments and cervix. Further, one woman expressed a desire to preserve her cervix.

Preoperative evaluation included history, physical examination, sonography, cervical Papanicolaou smear, and blood workup. Based on specific indications, additional radiodiagnostic tests were performed. Two women had computerized tomography scans in an attempt to locate an ovarian remnant and assess the genitourinary and intestinal systems in their workup for pain, and one had an IV pyelogram and barium enema because of suspected endometriosis involving the ureter and bowel. All women had outpatient bowel preparation (15) and, after consultation, appropriate consent was obtained. All patients received prophylactic perioperative antibiotics.

After the induction of general anesthesia with endotracheal intubation, the patients were placed in a low dorsolithotomy position with their legs in Allen universal stirrups (Allen Universal, Inc., Cleveland, OH). A Foley catheter was inserted in the bladder. A Cohen cannula (Karl Storz, Inc., Culver City, CA) attached to a cervical clamp was used to manipulate the cervix.

A 10-mm trocar was inserted into the peritoneal cavity through an infraumbilical incision with or without pneumoperitoneum for the introduction of the videolaparoscope with subsequent placement of three suprapubic 5-mm trocars (15). A suction irrigator probe was inserted on the surgeon's side, grasping forceps on the opposite side, and bipolar forceps in the middle. The CO₂ laser (UltraPulse 5000L; Coherent, Palo Alto, CA) was placed through the operative channel of the laparoscope (15, 16). Inspection of the abdomen to detect any abnormalities revealed severe adhesions in all patients, especially intestinal and omental attachments to the vaginal apex and adjacent structures. After adhesiolysis and removal of endometriosis, oophorectomy was performed in two patients (15).

Once the peritoneum over the cervical stump was incised transversely at the apex between the bladder and rectum, the latter were mobilized gradually. Because the anatomy was distorted, ureteral catheters were placed in three patients either at the beginning or during the procedure for better identification of the ureters. We performed complete bilateral ureterolysis from the pelvic brim down to or close to the

bladder in all women to ensure complete treatment of endometriosis and to reduce the chance of ureteral injury while desiccating and separating the uterosacral cardinal ligament complex from the cervical stump. To identify urinary tract injuries, 5 mL IV indigo carmine was administered at crucial steps during the operation. It was necessary in the four patients with severe endometriosis of the posterior cul-de-sac to enter the pararectal and rectocervical-rectovaginal spaces to dissect the rectum from the back of the cervix and to be sure all lesions were resected. To rule out rectosigmoid colon injury, examination underwater was performed by filling the posterior cul-de-sac with lactated Ringer's and injecting air into the rectum with a sigmoidoscope. To create a plane between the rectum, cervix, and vagina, one assistant performed rectovaginal examination to facilitate their proper identification.

The bladder then was dissected from the cervix using the CO₂ laser, blunt dissection, and hydrodissection. When delineation of the bladder was difficult, it was filled temporarily with water during dissection. Meticulous hemostasis during these steps was essential to maintain a clear operating field. After sufficient separation, a blackened right angle retractor was inserted into the vagina to mark the anterior and posterior fornix before colpotomy was performed. While observing the ureters, the colpotomies were connected by desiccation and transection of the remnant cardinal-uterosacral ligament complex, and the cervical stump was removed vaginally. A glove filled with two sponges and air was placed in the vagina to maintain pneumoperitoneum. The vaginal cuff was closed with several interrupted 0 polyglactin sutures using extracorporeal knot tying. To achieve good suspension and prevent prolapse of the vaginal vault, the cuff also was anchored to the uterosacral cardinal ligament complex on each side. Two patients with deep pelvic wells had modified Moschowitz procedures, and one had a Burch procedure to treat urinary incontinence. Sigmoidoscopy and cystoscopy were performed to rule out injury to the ureters, bladder, or bowel. The pneumoperitoneum was decreased and surgical sites were evaluated to assure hemostasis. All instruments and trocars were removed and the skin incisions were closed.

RESULTS

The mean duration of the procedure was 225 minutes (range 155 to 320 minutes). This time was largely dependent on the treatment of associated adhesions and endometriosis. The actual removal of the cervical stump took ≤ 45 minutes. Mean blood loss was 100 mL (range 50 to 200 mL). There were no

major intraoperative or postoperative complications. One woman had minimal vaginal spotting from granulation tissue formation in the cuff, which was treated locally. Pathologic examination of the cervix demonstrated squamous and glandular epithelium with signs of reactive chronic inflammation and metaplasia in all cases. Four women had complete pain relief and one had partial relief after a follow-up of 6 to 34 months. The other patient was lost to follow-up, but was pain free at 6 weeks postoperatively.

DISCUSSION

A number of important lessons can be learned from this series of patients who had subtotal hysterectomy because severe endometriosis and adhesions impeded the removal of the cervix. The surgical approach to trachelectomy should be determined by the underlying disease. An extraperitoneal vaginal approach is usually preferable to an abdominal or laparoscopic one and does not require separation of the bladder and rectum. However, the indications for removal of the cervix in these six women were very different compared with previous reports, in which most procedures were performed vaginally for prophylaxis, pelvic relaxation, or cervical dysplasia. In this series, the cervical stump removal was secondary to the treatment of endometriosis or adhesions, both of which contraindicated a vaginal approach. Because of the risk of injury to adjacent organs, the stump could not be mobilized safely transvaginally. Further, a vaginal approach would not have allowed treatment of endometriosis, which commonly involved the rectosigmoid colon, and it is unlikely that pain relief would be adequate. Five women had extensive pelvic endometriosis despite having had supracervical hysterectomy. Four of the five also had previous bilateral salpingo-oophorectomy. In these five cases, considerable dissection and resection of the lesions were required. In Pratt's series of 262 trachelectomies, 40 of 47 women who had pelvic mass or pain underwent abdominal surgery (13).

The major concern related to the resection of such a severely adherent cervix is the high risk of injury to the ureter, rectum, or bladder. As stated by Elkins et al. (17), when performing pelvic surgery on difficult cases, appropriate preoperative, intraoperative, and postoperative issues should be considered. This includes hormonal suppressive therapy, mechanical and antibiotic bowel preparation, intestinal and urologic evaluation, and appropriate consultation with a urologist and colorectal surgeon. The most common site of ureteric damage is at the level of the uterosacral ligaments (18). The bladder and rectum are used

at supracervical hysterectomy to retroperitonealize the remaining uterine cervix. This may explain the risk of injury to the bladder or rectum, which are complications of vaginal and abdominal cervix removal (11, 13).

As a precaution, we inserted ureteral catheters in three women and performed ureterolysis in all six. This greatly facilitated identification of the ureters and treatment of adjacent endometriosis and adhesions.

There were no intraoperative complications. Postoperatively, one woman experienced spotting due to the formation of granulation tissue in the vaginal cuff. Prophylactic antibiotics were used in all cases and no patients had postoperative fever, abscess, or cuff cellulitis. The patients all enjoyed the brief hospitalization and rapid recovery period characteristic for laparoscopic operations (15, 19). The longer operating times mostly were due to associated pelvic endometriosis and adhesions.

Advances in operative laparoscopy have led to a renewed interest in supracervical hysterectomy (5–10). It has been suggested that the margin of safety is increased by performing supracervical hysterectomy at laparoscopy because the risks of bladder and ureter injuries associated with vaginal surgery are reduced (5–10). However, the merits of this procedure remain controversial (20), and the selection criteria should be narrow. Patients should understand that a second operation may be required to remove the cervix because of continued menstruation and pelvic pain. In previous reports, 10% of women who had laparoscopic supracervical hysterectomy experienced menstrual bleeding (21, 22). We do not intend to contribute to the present discussion of planned supracervical hysterectomy. However, women whose cervix is involved with severe endometriosis and adhesions should be advised preoperatively regarding their risk of persistent pelvic pain and the possible necessity for a second procedure.

REFERENCES

1. Nielsen K. Carcinoma of the cervix following supracervical hysterectomy. *Acta Radiol* 1952;37:335–40.
2. Stern E, Misczynski M, Greenland S, Damus K, Coulson A. PAP testing and hysterectomy prevalence: a survey of communities with high and low cervical cancer rates. *Am J Epidemiol* 1977;106:296–305.
3. Kilkku P. Supravaginal uterine amputation v. hysterectomy with reference to subjective bladder symptoms and incontinence. *Acta Obstet Gynecol Scand* 1985;64:375–9.
4. Kilkku P. Supravaginal uterine amputation v. hysterectomy: effects on coital frequency and dyspareunia. *Acta Obstet Gynecol Scand* 1983;63:141–5.
5. Schwartz RO. Laparoscopic hysterectomy. Supracervical versus assisted vaginal. *J Reprod Med* 1994;39:625–30.
6. Vietz PF, Ahn TS. A new approach to hysterectomy without colpotomy: pelviscopic intrafascial hysterectomy. *Am J Obstet Gynecol* 1994;170:609–13.

7. Semm K. Hysterectomy via laparotomy or pelviscopy: a new CASH method without colpotomy. *Geburtshilfe Frauenheilkd* 1991;51:996-1003.
8. Ewen SP, Sutton CJG. Initial experience with supracervical laparoscopic hysterectomy and removal of the cervical transformation zone. *Br J Obstet Gynaecol* 1994;101:225-8.
9. Pelosi MA, Pelosi MA III. Laparoscopic supracervical hysterectomy using a single umbilical puncture (mini-laparoscopy). *J Reprod Med* 1992;37:777-84.
10. Lyons TL. Laparoscopic supracervical hysterectomy. A comparison of morbidity and mortality results with laparoscopically assisted vaginal hysterectomy. *J Reprod Med* 1993;38:763-7.
11. Planas MV. Cervicectomy following supravaginal hysterectomy. *Am J Obstet Gynecol* 1960;79:480-5.
12. Riva HL, Hefner JD, Marchetti AA, Padovano LA. Prophylactic trachelectomy of cervical stump: 212 cases. *South Med J* 1961;45:1082-4.
13. Pratt JH, Jeffries JA. The retained cervical stump: a 25-year experience. *Obstet Gynecol* 1976;48:711-5.
14. Pasley WW. Trachelectomy: a review of fifty-five cases. *Am J Obstet Gynecol* 1988;159:228-32.
15. Nezhat C, Nezhat F, Luciano A, Siegler A, Metzger D, Nezhat CH, editors. *Operative gynecologic laparoscopy: principles and techniques*. New York: McGraw-Hill, 1995.
16. Nezhat F, Nezhat CH, Admon D, Gordon S, Nezhat C. Complications and results of 361 hysterectomies performed at laparoscopy. *J Am Coll Surg* 1995;180:307-16.
17. Elkins TE, Stocker RJ, Key D, McGuire EJ, Roberts JA. Surgery for ovarian remnant syndrome: lessons learned from difficult cases. *J Reprod Med* 1994;39:446-8.
18. Thompson JD. Operative injuries to the ureter: prevention, recognition, and management. In: Thompson JD, Rock JA, editors. *TeLinde's operative gynecology*. 7th ed. Philadelphia: JB Lippincott, 1992:749-83.
19. Rankin GL. Laparoscopically assisted vaginal hysterectomy (letter). *Lancet* 1992;339:501.
20. Drife J. Conserving the cervix at hysterectomy. *Br J Obstet Gynaecol* 1994;101:563-4.
21. Schwartz R. Complications of laparoscopic hysterectomy. *Obstet Gynecol* 1993;81:1022-4.
22. Richards SR, Simpkins S. Laparoscopic supracervical hysterectomy versus laparoscopic-assisted vaginal hysterectomy. *J Am Assoc Gynecol Laparosc* 1995;2:431-5.

"gospel of science" should refrain from adopting a specific "safe number" for the number of times a donor can be used. Such a number is only a rosy misrepresentation of the problem and can be misleading. Instead, committees can pass on the responsibility of calculating that number to the "local yokels" who can take advantage of the statistical model developed by de Boer and his Dutch colleagues.

Paul G. McDonough, M.D., Editor, Letters

REFERENCES

1. de Boer A, Oosterwijk JC, Rigtters-Aris CAE. Determination of a maximum number of artificial inseminations by donor children per sperm donor. *Fertil Steril* 1995;63:419-21.
2. Curie-Cohen M. The frequency of consanguineous matings due to multiple use of donors in artificial insemination. *Am J Hum Genet* 1980;32:589-600.
3. Practice Committee of the American Fertility Society. Guidelines for gamete donation: 1993. *Fertil Steril* 1993;59(2) Suppl 1.

Subtotal Hysterectomy in Patients With Endometriosis—An Option?

To the Editor (Letter 1 of 2):

In the article by Nezhat et al. in *Fertility and Sterility*® December 1996 on laparoscopic trachelectomy, the authors indicate supracervical hysterectomy as a substandard approach to endometriosis and state that the indications for this type of hysterectomy should be "narrow" (1). The findings in the article on the other hand suggest that the group of patients that they considered had no endometriosis of the cervical stump but did respond to aggressive excision of rectovaginal disease and adhesiolysis. The assumption that removal of the cervix without this same aggressive excision would have prevented the need for further surgery is certainly not warranted. Therefore, it would seem that the authors have concluded guilt by association. In fact, we have demonstrated in a recent article (2) that supracervical hysterectomy can be used to treat invasive endometriosis with success. It should be noted, however, that patients with this type of disease historically have been shown to have multiple surgical encounters. Further, it remains somewhat irresponsible to use this argument as a segue to suggest that subtotal hysterectomy was the cause for these patients' second surgery. The selection of two recent articles (3, 4) with small numbers of patients and questionable, variable techniques to purport that the rate of vaginal bleeding after supracervical hysterectomy is 10% is equally suspect. In the largest series of subtotal hysterectomies studied by Cutler et al. (5), this rate was less than 1%. Finally, in no description of supra-

cervical hysterectomy that I have read is the description of using the rectum and bladder to cover the cervical stump reported and I would like this referenced, if possible. The Nezhat article does make excellent points in that the laparoscopic approach to trachelectomy is a good one, particularly in cases in which difficult dissection is anticipated as this does offer a superior visualization of the structures involved and ureterolysis is facilitated. We would concur with this conclusion, but we cannot agree with the editors' decision to allow the latitude of assumption without the proof that was suggested in the discussion of this piece.

Thomas L. Lyons, M.D., M.S., F.A.C.O.G.
Center for Women's Care
and Reproductive Surgery
Atlanta, Georgia
December 11, 1996

REFERENCES

1. Nezhat CH, Nezhat F, Roemisch M, Seidman, Nezhat C. Laparoscopic trachelectomy for persistent pelvic pain and endometriosis after supracervical hysterectomy. *Fertil Steril* 1996;66:925-8.
2. Lyons TL. Laparoscopic resection of rectovaginal endometriosis using the contact Nd:YAG laser and primary closure with suturing techniques. *J Pelvic Surg* 1996;2:8-11.
3. Schwartz R. Complications of laparoscopic hysterectomy. *Obstet Gynecol* 1993;81:1022-4.
4. Richards SR, Simpkins S. Laparoscopic supracervical hysterectomy versus laparoscopic-assisted vaginal hysterectomy. *J Am Assoc Gynecol Laparosc* 1995;2:431-5.
5. Cutler EC, Zollinger RM. Atlas of surgical operations. New York: Macmillan and Co., 1949.

To the Editor (Letter 2 of 2):

We read with interest the manuscript written by Nezhat et al. about the laparoscopic removal of the cervical stump after supracervical hysterectomy (1). We understand the high risk of injury to the ureter, rectum, or bladder when removing the cervical stump after supracervical hysterectomy, but several points have to be clarified.

The first laparoscopic subtotal hysterectomy was performed in 1990 in our department and the first series, published in 1993, was not mentioned in the reference list (2). Our results of a series of 500 laparoscopic subtotal hysterectomy will be published very soon (3).

Firstly, concerning the technique itself, we do not recommend using the bladder and rectum to re-peritonealize the remaining uterine cervix because peritonealization occurs spontaneously.

Secondly, the indications for laparoscopic subtotal hysterectomy rarely included severe endometriosis

and in our series of 500 laparoscopic subtotal hysterectomy, removal of the uterine cervix was never necessary for pain or cyclical bleeding (3). Indeed, only 2.4% of cyclical bleeding was observed in our series, although this percentage was found to be higher in the series of Drife (4) and Schwartz (5). This high rate of cyclical bleeding can only be explained either by an inappropriate surgical technique, leaving in place the "isthmic" portion of the uterus with endometrium, or by an inappropriate section of the upper part of the cervix.

Thirdly, the cervix is rarely responsible for pain, especially after a laparoscopic subtotal hysterectomy procedure. In the series of Nezhat et al., postoperative pain was explained by the persistence of endometriosis in the posterior cul-de-sac between the rectum or uterosacral ligaments and cervix. So, it must be emphasized that laparoscopic subtotal hysterectomy is not the right surgery for pelvic pain and that, if a hysterectomy is planned for severe endometriosis, the cervix and the endometriotic nodules should be removed during the surgical procedure.

In conclusion, the paper by Nezhat et al. can suggest that subtotal or supracervical hysterectomy is not a good surgical procedure, although laparoscopic subtotal hysterectomy has been demonstrated as the optimal procedure if the correct indications are respected.

*Michelle Nisolle, M.D., Ph.D.
Jacques Donnez, M.D., Ph.D.
Department of Gynecology
Catholic University of Louvain
Cliniques Universitaires St Luc
Avenue Hippocrate, 10
1200 Brussels, Belgium
January 15, 1997*

REFERENCES

1. Nezhat CH, Nezhat F, Roemisch M, Seidman DS, Nezhat C. Laparoscopic trachelectomy for persistent pelvic pain and endometriosis after supracervical hysterectomy. *Fertil Steril* 1996;66:925-8.
2. Donnez J, Nisolle M. LASH: laparoscopic supracervical (subtotal) hysterectomy. *J Gynaecol Surg* 1993;9:91-4.
3. Donnez J, Nisolle M, Smets M, Polet R, Bassil S. LASH: laparoscopic supracervical (subtotal) hysterectomy. A first series of 500 cases. *Gynecol Endos*. In press.
4. Drife J. Conserving the cervix after hysterectomy. *Br J Obstet Gynaecol* 1994;101:563-4.
5. Schwartz R. Complications of laparoscopic hysterectomy. *Obstet Gynecol* 1993;81:1022-4.

Reply of the Authors:

We would like to thank Dr. Lyons for his interest in our article. The concerns noted are best addressed

in the objectives and final paragraph of our report on laparoscopic trachelectomy (1). As noted in our paper, the removal of the cervical stump can be successfully undertaken in most cases by the vaginal approach. The need for the more complex laparoscopic technique in patients with advanced endometriosis reflects the high incidence of fibrotic adhesions involving adjacent structures, such as the rectum and bladder. We, therefore, felt compelled to draw attention to this observation which may imply that patients with endometriosis are at greater risk for additional surgery if they undergo subtotal hysterectomy. While Dr. Lyon criticizes our reference to two recent, though admittedly small, trials of laparoscopic supracervical hysterectomy, he presents alternative data from a study of supracervical hysterectomy by laparotomy published almost 50 years ago! His own paper, published after the submission of our data, is mostly a feasibility study on three cases with a maximum follow-up of only 1 year. The need for further research and the lack of controlled randomized trial on a larger series is apparent. Proof regarding the adequacy of subtotal hysterectomy for all patients, and specifically for patients with endometriosis, will only be resolved by randomized trials with sufficient population size.

Our reported findings merely suggest that women with severe endometriosis and pelvic pain who are considering subtotal hysterectomy should be advised regarding the limited data currently available on the pros and cons of this procedure, the likelihood that they will require further procedures, and the potential difficulties that may arise. All of the patients in our study underwent partial hysterectomy for pain associated with severe endometriosis or adhesions. In our study, five patients underwent subtotal hysterectomy abdominally, and one who desired to preserve her cervix had a laparoscopic procedure. In all cases, the cervical stump was left due to severe endometriosis and/or adhesions in the posterior cul-de-sac between the rectum or uterosacral ligaments and cervix.

Dr. Lyons correctly stated that "patients with this type of disease historically have been shown to have multiple surgical encounters." Therefore, we believe that the need for such multiple surgical encounters increases with residual endometriosis and that the removal of the cervix allows better treatment of endometriosis and a smaller chance of residual disease when the uterosacral ligaments and cervix are involved with endometriosis.

Additionally, the cervix is anatomically surrounded by the bladder and rectum. The peritonization of the cervical stump is carried out by suturing the edge of the bladder peritoneum to the cul-de-sac peritoneum as has been described in Te Linde's

Operative Gynecology book (2). This, especially in patients with endometriosis, leaves these two organs adhered to the cervix as it was noted in our patients and other reported series (3, 4).

We also thank Drs. Nisolle and Donnez for their interest and supportive comments. We are sorry that the paper of Drs. Donnez and Nisolle was not referenced in our article. However, since *The Journal of Gynecologic Surgery* is not in *Index Medicus*, it was not identified when we performed a MEDLINE literature search. We look forward to the upcoming publication including their large series experience.

Finally, regarding the merits of supracervical versus total hysterectomy, we recommend the excellent recent article by Malcolm G. Munro (5).

Ceana Nezhat, M.D.
Farr Nezhat, M.D.
Department of Gynecology and Obstetrics
Stanford Endoscopy Center for Training
and Technology
Stanford University School of Medicine
Stanford, California
and
Nezhat Institute for Special Pelvic Surgery
Palo Alto, California
and
Center for Special Pelvic Surgery
Atlanta, Georgia

Camran Nezhat, M.D.
Department of Surgery
Department of Gynecology and Obstetrics

Stanford Endoscopy Center for Training
and Technology
Stanford University School of Medicine
Stanford, California
and
Nezhat Institute for Special Pelvic Surgery
Palo Alto, California
and
Center for Special Pelvic Surgery
Atlanta, Georgia
Michael Roemisch, M.D.
Center for Special Pelvic Surgery
Atlanta, Georgia
Daniel Seidman, M.D.
Department of Gynecology and Obstetrics
Stanford Endoscopy Center for Training
and Technology
Stanford University School of Medicine
Stanford, California
January 31, 1997

REFERENCES

1. Nezhat CH, Nezhat F, Roemisch M, Seidman DS, Nezhat C. Laparoscopic trachelectomy for persistent pelvic pain and endometriosis after supracervical hysterectomy. *Fertil Steril* 1996;66(6):925-8.
2. Thompson, JD. Hysterectomy. In: Thompson JD, Rock JA, editors. *Te Linde's Operative Gynecology*, 7th ed. Philadelphia: J.P. Lippincott, 1992:706-24.
3. Planas MV. Cervicectomy following supravaginal hysterectomy. *Am J Obstet Gynecol* 1960;79:480-5.
4. Pratt JH, Jeffries JA. The retained cervical stump: a 25-year experience. *Obstet Gynecol* 1976;48:711-5.
5. Munro M. Supracervical hysterectomy: a time for reappraisal. *Obstet Gynecol* 1997;89(1):133-9.