Vaginal Cuff Closure: How to Minimize Dehiscence and Prolapse

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FACULTY
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Professional Education Information

Target Audience
This educational activity is developed to meet the needs of residents, fellows and new minimally invasive specialists in the field of gynecology.

Accreditation
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The AAGL designates this live activity for a maximum of 1.75 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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Vaginal Cuff Closure: How to Minimize Dehiscence and Prolapse

Moderator: Stuart R. Hart

Kate O’Hanlan & Michele Vignali

This course provides rich video and didactic learning to overcome one of the strongest deterrents to TLH: confident laparoscopic closure of the vagina. The three key elements of closure that effectively prevent prolapse, as well as hemorrhagic and dehiscence complications, will be reviewed and demonstrated in detailed videos. Even if suture closure of the vagina is already possible, this tutorial can advance your skills to make it consistently reliable and effective.

**Learning Objectives:** At the conclusion of this course, the participant will be able to: 1) Differentiate the reasons why some patients have hemorrhagic, prolapse and dehiscence complications; 2) design a system for learning suture skills outside of the operating rooms; and 3) construct a plan for laparoscopic closure of the vaginal apex when closure cannot be accomplished any other way; 4) differentiate those cases who deserve a prophylactic vaginal vault suspension.
PLANNER DISCLOSURE
The following members of AAGL have been involved in the educational planning of this workshop and have no conflict of interest to disclose (in alphabetical order by last name).
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Kate O’Hanlan
Consultant: Cardinal Health, Medical Products and Services, CONMED Corporation, Covidien
Speakers Bureau: Baxter, CONMED Corporation, Covidien
Other: Medical Director: Laparoscopic Institute for Gynecologic Oncology
Michele Vignali*

Asterisk (*) denotes no financial relationships to disclose.
Vaginal Cuff Closure: How to Minimize Dehiscence and Prolapse

Kate O’Hanlan, MD

Laparoscopic Institute for Gynecologic Oncology

Objectives

• Differentiate reasons risk factors for prolapse or dehiscence complications;
• Design a system for learning suture skills outside of the operating rooms;
• Construct a plan for laparoscopic closure of the vaginal apex when closure cannot be accomplished any other way;
• Differentiate those cases who deserve a prophylactic vaginal vault suspension.

Management of Dehiscence: Sx, when to suture, observe etc

• Risk factors:
  • Sx, when to suture, observe etc

Vaginal cuff dehiscence

• Vaginal .18% (p<0.05)
• Laparoscopic .64%
• Robotic 1.64% (p<0.05)

• Transvaginal suturing can reduce risk after TLH.
• Monopolar no difference.

Uccella et al O&G Sept 2012

• My take: Since you cannot close every patient transvaginally, learn to suture laparoscopically.

Avoiding vaginal dehiscence

• 1-2% in most studies, 77 days post-op.
• Malignancy, diabetes, cigarette smoking, pelvic adhesions, radical hyst greater risk.
• Suture cuff with same standards as open:
  --Stitch every 5-8mm, 5mm deep. Same as diameter.
• Two-layer closure better than single.

Uccella et al O&G Sept 2012

Vaginal dehiscence

- Related to placement of sutures during the vaginal closure.
- Scope or Robot: place the same size stitches in the apex as for open.
- Consider closing the bladder over the apex:
  - May prevent adhesions of small bowel to vaginal raw edges of apex.
  - May prevent though-and-through dehiscence from penetration.

Managing dehiscence

- See immediately if SSx:
  - Copious serous or sanguinous discharge.
  - Pain after intercourse.
- Suture vagina from below, or by scope if:
  - see small bowel. Prep before put back.
  - Opening greater than 2cm.
  - Double antibacterial antibiotics.
  - Pelvic rest another 6 weeks, then recheck.
  - Advise shallow. Consider foam donut for spouse.

“Three to five mattress sutures are inserted through the fascia, which becomes duplicated and shortened, thus strengthening the anterior vaginal wall and holding the bladder.”

“Suture is passed through the vagina and brought through both sacrouterine ligaments without tying. Another suture is passed through the cardinal ligaments...tying these approximates the ligaments to each other and to the vaginal wall.”

Support procedures that even a Gyn Oncologist can do...
Laparoscopic closure of the vaginal apex: when closure cannot be accomplished any other way

Enterocoele resection
- Identify triangle of excess posterior vaginal wall tissue between uterosacral ligaments.
- Identify rectum edge in cul de sac.
- Incise through peritoneum for first 1 cm, then open adventitia between rectum and vagina. (There is no septum, only adventitia.)
- Incise vaginal epithelium down wall to upper end of rectocele.
- Close with JK-10 suture, vertically to apical edge or all the way.
- Expect granulation tissue.

Obstacles to learning in the OR
- Seniors won’t give away critical parts.
  - Newer surgeons take longer. Costs time.
  - Newer surgeons make more mistakes.
- Newest technology and techniques hard to learn on live patient in front of all.
- Surgeons who trained on simulators had greater accuracy in vivo, made fewer mistakes.
- High tech “virtual reality” no better.

Design a system for learning suture skills outside of the operating rooms; pelvic trainers, holiotomy challenge.
Intracorporeal suturing incorporates all basic laparoscopic skills and is a prerequisite because it is needed to manage possible complications or in case of instrument failure. Residents with little or no previous laparoscopic experience are able to perform the task competently after a short training course.

Research Article

Total Laparoscopic Hysterectomy: Evaluation of an Evidence-Based Educational Strategy Using a Novel Simulated Suture and Knot-Tying Challenge, the “Holiotomy”

Kathleen A. O’Heslin,1,2 Kelli R. Beeghly,3 and Suzanne L. Dibble4

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Objective: The purpose of this study was to evaluate perceptions of skills and practice patterns of gynecologists attending a course structured laparoscopic hysterectomy (SLH). This course employed a combination of clinic, simulator, and case-based strategies to accomplish the Holiotomy Challenge. The “Holiotomy Challenge” included suturing two matched pieces with six figure of 8 sutures tied with five square knots each. Residents, 18-25 years old, before entering the clinic and 3 months later. One group studied by guided e-training, 88% of SLH, and 84% of SLH + e-training reported significant improvement in their skills. Significant improvement was noted in the group undergoing e-training. The group attending the clinic and e-training group reported significant improvement in their skills. Significant improvement was noted in the group undergoing e-training. The group attending the clinic and e-training group reported significant improvement in their skills.

Laparoscopic skills

- Performance on trainers significantly improves competency in the OR.
- Practice on trainers improves OR competency.
- At least 5-7 suture repetitions needed till efficacy plateau.
- At least 25 knots till efficacy plateau.
- Self assessment and formal evaluation of skills possible on trainer.

Goff BA, Obstet & Gynecol, 2008.

The Holiotomy™ Challenges

- Complete three holiotomies™:
  - Two with three “figure of N” stitches, each piercing the dots.
  - Close one running.
- Place your holiotomy™ repairs on the board at registration.
- Get certificate!
Comfort performing procedures before and after a surgical course

<table>
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<th>Post</th>
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<td>Appendectomy</td>
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</tbody>
</table>

1 = very comfortable, 2 = somewhat, 3 = neutral, 4 = uncomfortable, 5 = very uncomfortable

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You get a way cool cap!!!!

Patent Pending

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Surgical Tutorial 4
Vaginal Cuff Closure: How to Minimize Dehiscence and Prolapse
Moderator: Stuart R. Hart

I have no financial relationships to disclose.

At the conclusion of this activity, participants will be better able to:

- Differentiate the reasons why some patients have vaginal vault prolapse and dehiscence complications
- Identify those patients at risk who deserve a prophylactic vaginal vault suspension
- Construct a plan for laparoscopic closure of the vaginal apex using different sutures
- Summarize the current literature regarding the diagnosis and management of vaginal vault dehiscence and prolapse.

Part 1 – VAULT DEHISCENCE
Incidence, Reasons and Risk Factors

The first abdominal hysterectomy was performed by Charles Clay in Manchester, England in 1843, but only 1853 that Ellis Burnham from Lowell, Massachusetts achieved the first successful abdominal hysterectomy. Vaginal hysterectomy dates back to ancient times. The procedure was performed by Soranus of Ephesus 120 years A.C., but the first planned, successful vaginal hysterectomy was performed in 1813 by Conrad Langenbeck, although he did not report the case until 1817.
Evisceration occurs in up to 70% of vaginal cuff dehiscence cases.

Vaginal cuff dehiscence is a full thickness separation, partial or total, of the anterior and posterior edges of the vaginal cuff with or without bowel evisceration.
The Mayo Clinic experience from 1970 through 2001 yielded a 0.032% incidence of vaginal eversion after a pelvic operation.

Rupture of the vaginal vault with subsequent extrusion of the peritoneal contents appears to be a rare occurrence, complicating less than one in 1000 hysterectomies. However, it seems that this risk is significantly higher in TLH.

The cumulative incidence of vaginal dehiscence by mode of hysterectomy was 4.93% among TLH, 0.29% among VH, and 0.12% among TAH.

The relative risks of a vaginal cuff dehiscence complication after TLH compared with TVH and TAH were 21.0 and 53.2, respectively. Both were statistically significant.

The time interval between hysterectomy and occurrence of vault dehiscence in the laparoscopic group (8.4±1.2 weeks) was significantly shorter than in the abdominal hysterectomy (112.7±75.1 weeks, p<.01) and in vaginal hysterectomy (136.5±32.2 weeks, p<0.0001) groups, respectively.

34/8635 (0.39%) experienced vaginal eversion. The laparoscopic route was associated with a significantly higher incidence of dehiscence (0.80%).

TLH was associated with a higher incidence of cuff separations, compared with AH (0.64% compared with 0.21%, P=0.003) and VH (0.64% compared with 0.13%, P<.001).
Vaginal cuff dehiscence can occur at any time after a pelvic surgical procedure and has been reported as early as 3 days and as late as 30 years postoperatively.

In retrospective cohort studies and larger case series the mean time to cuff dehiscence varied between 6.1 weeks up to 1.6 years (range 2 weeks to 5.4 years).

Protruding mass in the vagina
Abdominal pain
Vaginal bleeding or discharge
Pelvic or abdominal pain (58-100%)
Vaginal bleeding or watery discharge (33%-90%)
Patients with evisceration of bowel into the vagina often describe feeling a mass or pressure.

Route of hysterectomy
Increased age and hypoestrogenism
Increase in intra-abdominal pressure
Swift return to everyday activities and sexual activity
Way of vaginal cuff closure
The type and size of the suture material used to close the vault
Tissue damage in the vaginal cuff due to electrocautery

In addition, there are the theoretical risks of incomplete full thickness cuff closure or shallow suture placement less than 1 cm from the vaginal cuff edges because of LPS magnification.

The 10-year cumulative incidence of dehiscence after all modes of hysterectomy was 0.24% and 1.35% among total laparoscopic hysterectomies (Total abdominal hysterectomy was 0.38%, and total vaginal hysterectomy was 0.11%).
The pooled incidence of vaginal dehiscence was LOWER for TV cuff closure (0.18%) than for both LPS (0.64%) and robotic (1.64%) colporraphy. LPS cuff closure was associated with a lower risk of dehiscence than robotic closure (OR=0.38).

TRANSVAGINAL colporraphy after TLH is associated with a 3- and 9-fold reduction in risk of vaginal cuff dehiscence compared with LPS and robotic suture, respectively.

Women with a history of abdominal hysterectomy tended to rupture through the vaginal cuff.

...Robotic instruments do not allow exerting enough tension on the knots when cuff closure is performed.

It has been speculated that thermal injury because of electrosurgical energy at the time of colpotomy may account for the observed increased risk of vaginal cuff dehiscence...

Vaginal cuff closure suture was changed to 2-0 glycolide/lactide copolymer (delayed absorbable) and tissue suture placement was increased to at least 1.5 cm.

Use of monopolar energy at the time of colpotomy and reducing the power of monopolar energy from 60 watts to 50 watts when colpotomy was performed at the end of TLH didn't alter the rate of cuff separations.
Careful, full-thickness closure of the vaginal vault with a delayed absorbable suture is recommended at TLH

It may be prudent to advise women undergoing TLH to delay first intercourse postoperatively.

Incidence of vaginal cuff dehiscence: 4.2%.

NO CASES of dehiscence among those who had closure with bidirectional barbed suture (p = .008). Post OP bleeding, presence of granulation tissue, and cellulitis ALL occurred more frequently in patients without barbed suture closure.

No superiority of one of the suturing methods over the other was found. Regardless of the suturing method, the surgical approach towards the colpotomy in TLH in comparison to the abdominal approach, with additional (extensive) application of coagulation, has inherent its specific side effects.

Vaginal Cuff Dehiscence is a rare complication of hysterectomy, but more frequently after TLH (0.4-0.8%).

It is associated to vaginal evisceration in 70% of cases.

It can occur at any time but the mean time varied between 6.1- weeks up to 1.6 years after hysterectomy.

TRANSVAGINAL colporraphy after TLH is associated with a 3- and 9-fold reduction in risk of vaginal cuff dehiscence compared with LPS and robotic suture.

Main symptoms are: protruding mass in the vagina, abdominal pain and vaginal bleeding or discharge.

Discourage swift return to sexual activities.

Prefer delayed absorbable sutures and big bites of tissue.

SUMMARY

Part 2 – VAULT PROLAPSE

Incidence, Reasons and Risk Factors
Pelvic organ prolapse is a common problem, affecting 30% to 50% of women. The overall incidence of prolapse after hysterectomy was reported to be 3.6 per 1,000 women-years (Mant J et al, 1997). The incidence of vault prolapse after hysterectomy varies between 0.2% to 43%, but realistically between 1.8 and 11.6%.

The incidence of vault prolapse after hysterectomy was 1.1 per 1,000 women-years if initial hysterectomy was performed for prolapse, compared with 0.2 per 1,000 women-years if the hysterectomy was performed for other reasons (hazard RR 5.8). The vagina’s lower third fuses with the perineal membrane, levator ani muscles, and perineal body (level III). The upper third of the vagina (level I) is suspended from the pelvic wall by vertical fibers of the paracolpium, which is a continuation of the cardinal ligament. In the middle third of the vagina (level II) the paracolpium attaches the vagina laterally to the arcus tendineus and fascia of the levator ani muscles. Dissection reveals that the paracolpium’s vertical fibers in level I prevented prolapse of the vaginal apex and vaginal eversion.

The mean interval between the two operations was 6.2 yrs (range 0.2 to 21.8 yrs). 32/6214 (0.5%) were reoperated for subsequent vault prolapse. The incidence of vault prolapse requiring surgical correction after hysterectomy was 0.36 per 1,000 women-years.

Risk factors for recurrence of genital prolapse
Stefano Salvatore, Gabriele Sissio and Maurizio Serati

- **Predisposing factors**: growth and development, genetic factors, connective tissue weakness, joint mobility
- **Inciting factors**: childbirth, pelvic surgery
- **Intervening factors**: age-related changes, obesity, constipation, co-morbidities, heavy occupational work, and vigorous physical activity

History of POP at the time of hysterectomy has consistently been shown as a strong and independent predictor of POP recurrence.
The role of **AGE** is still controversial:

- Advanced age is an independent factor
- Younger patients have a higher risk of prolapse recurrence as a consequence of a major expectancy of lasting of the reconstructive procedures

**OBSESE** women are considered a high-risk group for development of POP

BMI is a significant and independent risk factor.

To ensure **durable** apical support regardless of the anchoring site for the vaginal vault suspension, the surgeon should establish continuity of the anterior and posterior vaginal fascia at the vaginal apex.

The purpose of the USL vault suspension is to attach a strong segment of the USL to the rectovaginal and anterior pubocervical fascia.
Three regions of origin: cervix alone (33%), cervix and vagina in the same section (63%), and vagina alone (4%).

Of 259 uterosacral insertion points, 62% overlaid the sacrosinous ligament/coccygeus muscle complex, 7% the sacrum, and 11% the piriformis muscle, the sciatic foramen, or the ischial spine.

Thus, if one does not artificially reattach the vaginal cuff to the US ligaments, more than 2/3 of patients would retain some connections of the vaginal apex to the US ligaments.

During surgery, the ureters may be kinked, tied or injured.

Wieslander et al. found that while placing sutures vaginally within the USL in cadavers, the distal suture was approximately 14 mm from the ureter and 13 mm from the rectal lumen.

The rate of obstruction with high USL suspension was found to be 5.1%.

USL sutures can be placed close to the sacral foramina and injury the sacral plexus (S1-S4).

During surgery, the ureters are identified throughout their course below the pelvic brim and a relaxing incision is placed below the level of the uterine within the peritoneum.

The ischial spines identified by placing tension on the cuff in the contralateral direction.

The USLs are attached to the posterior surface of the vaginal vault.
A) to incorporate the suture through the right USL, then through the anterior and posterior endopelvic fascia across the vaginal vault, and finish by incorporating the left USL. The initial stitch is placed through the mid-portion of the USLs on stretch, and a second and third suture are placed sequentially more proximal through the USLs, with each stitch incorporating both anterior and posterior endopelvic fascia. The suture is tied using extracorporeal knot tying technique.

B) to incorporate the USL stitch through the anterior and posterior endopelvic fascia on each respective side without crossing the midline. The initial stitch is placed through the mid-portion of the USL and then through the anterior and posterior endopelvic fascia on the lateral aspect of the vaginal cuff on each respective side. The next stitch is placed more proximal through the USL and then more medially through the anterior and posterior endopelvic fascia on each respective side, until the midline vaginal cuff is incorporated.

In the anterior, apical, and posterior compartments, the pooled rates for a successful outcome were 81.2%, 98.3%, and 87.4%.

Uterosacral ligament suspension is a highly effective procedure for the restoration of apical vaginal support. A successful outcome (stage 0 or 1) is observed in 98% of women.

A permanent 3-0 suture was placed through the USL and the peritoneum of the cul-de-sac. A second suture was placed in the same way 1 cm above and parallel to the previous stitch. Sutures were kept to be tied after placement of the external suture. The external absorbable 2-0 McCall suture was then placed through the posterior vaginal wall and peritoneum. This suture was then placed through the uterosacral ligaments and then brought back out through the vagina.
Vaginal vault prolapse after hysterectomy varies between 1.8 and 11.6%.

An alteration in the level of the fibers of the paracolpium (level I) which suspend the upper third of the vagina could modify vault suspension.

Risk factors: Genetic or structural factors, previous deliveries or pelvic surgery, co-morbidities, age, BMI and history of prolapse at time of surgery.

USLs suspension is highly effective procedure for the restoration of apical vaginal support with a success rates varying from 82 to 96%.

The rate of ureteral obstruction with high USL suspension was found to be 5.1%.

McCall culdoplasty can be performed laparoscopically in order to correct enterocele and prevent vaginal prolapse.
CULTURAL AND LINGUISTIC COMPETENCY

Governor Arnold Schwarzenegger signed into law **AB 1195** (eff. 7/1/06) requiring local CME providers, such as the AAGL, to assist in enhancing the cultural and linguistic competency of California’s physicians (researchers and doctors without patient contact are exempt). This mandate follows the federal Civil Rights Act of 1964, Executive Order 13166 (2000) and the Dymally-Alatorre Bilingual Services Act (1973), all of which recognize, as confirmed by the US Census Bureau, that substantial numbers of patients possess limited English proficiency (LEP).

**California Business & Professions Code §2190.1(c)(3)** requires a review and explanation of the laws identified above so as to fulfill AAGL’s obligations pursuant to California law. Additional guidance is provided by the Institute for Medical Quality at [http://www.imq.org](http://www.imq.org).

**Title VI of the Civil Rights Act of 1964** prohibits recipients of federal financial assistance from discriminating against or otherwise excluding individuals on the basis of race, color, or national origin in any of their activities. In 1974, the US Supreme Court recognized LEP individuals as potential victims of national origin discrimination. In all situations, federal agencies are required to assess the number or proportion of LEP individuals in the eligible service population, the frequency with which they come into contact with the program, the importance of the services, and the resources available to the recipient, including the mix of oral and written language services. Additional details may be found in the Department of Justice Policy Guidance Document: Enforcement of Title VI of the Civil Rights Act of 1964 [http://www.usdoj.gov/crt/cor/pubs.htm](http://www.usdoj.gov/crt/cor/pubs.htm).

**Executive Order 13166, “Improving Access to Services for Persons with Limited English Proficiency”,** signed by the President on August 11, 2000 [http://www.usdoj.gov/crt/cor/13166.htm](http://www.usdoj.gov/crt/cor/13166.htm) was the genesis of the Guidance Document mentioned above. The Executive Order requires all federal agencies, including those which provide federal financial assistance, to examine the services they provide, identify any need for services to LEP individuals, and develop and implement a system to provide those services so LEP persons can have meaningful access.

**Dymally-Alatorre Bilingual Services Act** (California Government Code §7290 et seq.) requires every California state agency which either provides information to, or has contact with, the public to provide bilingual interpreters as well as translated materials explaining those services whenever the local agency serves LEP members of a group whose numbers exceed 5% of the general population.

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