FULL DAY Didactic (Live Cadaveric Demo) and Simulation Lab: Vaginal Hysterectomy: The True Natural Orifice Minimal Access Surgery

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AAGL acknowledges that it has received support in part by educational grants and equipment (in-kind) from the following companies:
3-Dmed, Baxter HealthCare, CONMED Corporation, CooperSurgical, Covidien, Inc., Ethicon US, LLC, Marina Medical, Karl Storz Endoscopy-America, Inc., Symmetry Surgical, Welmed

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AAGL
Advancing Minimally Invasive Gynecology Worldwide
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**
AAGL is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The AAGL designates this live activity for a maximum of 6.5 *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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The recent evolution of minimally invasive gynecologic surgery has focused on laparoscopic techniques for performing hysterectomy, neglecting the original minimally invasive technique of vaginal hysterectomy. The surgical skills for the two approaches are complimentary, but the trans-vaginal approach could become a dying art due to the lack of forums for surgical skill development. This course will provide such a forum where participants will develop and hone surgical skills for a practical approach to trans-vaginal hysterectomy. Patient selection and techniques for dissection and exposure as well as management of the adnexa and cuff will be discussed. This intensive full day course will provide a morning session with evidence-based didactics and practical tips using surgical videos. The accompanying afternoon workshop will include a live cadaveric demonstration from the experts and a simulation lab with pelvic trainers for an interactive hands-on learning opportunity.

**Learning Objectives:** At the conclusion of this course, the clinician will be able to: 1) Assess patient characteristics predictive of a successful vaginal hysterectomy; 2) develop the surgical planes to expose the uterine vasculature and utilize techniques to maximize exposure while taking pedicles; 3) remove tubes and or ovaries following hysterectomy; and 4) re-establish normal apical support and insure the integrity of the lower urinary tract.

**Course Outline**

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<th>Session</th>
<th>Speaker(s)</th>
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</thead>
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<tr>
<td>7:00</td>
<td>Welcome, Introductions and Course Overview</td>
<td>G.W. Cundiff</td>
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<tr>
<td>7:10</td>
<td>Patient Selection and Outpatient Hysterectomy Protocol</td>
<td>R.M. Kho</td>
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<tr>
<td>7:30</td>
<td>Surgical Planes and Hemostasis</td>
<td>D. Miyazaki, B.D. Skinner</td>
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<tr>
<td></td>
<td>Suturing and Knot-Tying (15min)</td>
<td>D. Miyazaki</td>
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<tr>
<td></td>
<td>Use of Vessel-Sealing Device (15min)</td>
<td>B.D. Skinner</td>
</tr>
<tr>
<td>8:00</td>
<td>Maximizing Exposure</td>
<td>G.W. Cundiff</td>
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<tr>
<td>8:30</td>
<td>Morcellation</td>
<td>A. Walter, R.M. Kho</td>
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<tr>
<td>9:00</td>
<td>Faculty Panel</td>
<td>All Faculty</td>
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<tr>
<td>9:15</td>
<td>Break</td>
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<tr>
<td>9:40</td>
<td>Addressing the Adnexa: Salpingectomy and Oophorectomy</td>
<td>R.M. Kho</td>
</tr>
<tr>
<td>10:00</td>
<td>Faculty Panel</td>
<td>All Faculty</td>
</tr>
<tr>
<td>10:20</td>
<td>Re-Supporting the Vaginal Cuff</td>
<td>A. Walter</td>
</tr>
</tbody>
</table>
10:50  Cystoscopy                      B.D. Skinner
11:05  Faculty Panel                  All Faculty
11:15  Lunch Break
12:30  Live Cadaveric Demonstration   All Faculty
       Set-Up and Use of the Magrina-Bookwalter Vaginal Retractor System  A. Walter
       Entry into Anterior and Posterior Cul-de-Sacs                        G.W. Cundiff
       Securing Pedicles with Clamp/Cut/Tie Technique                       D. Miyazaki
       Use of Vessel-Sealing Device                                          B.D. Skinner
       Uterine Morcellation                                                   R.M. Kho
       Adnexectomy/Round Ligament Technique                                  R.M. Kho, A. Walter
       Support of the Vaginal Cuff                                            A. Walter
       Cystoscopy                                                              B.D. Skinner
1:30   Divide Participants into 3 groups. Each group will rotate through 3 stations for 45 minutes:

       Station 1: Cadaver                                      R.M. Kho
       Vessel Sealing                                           
       Apical Support                                          
       Magrina-Bookwalter Retractor Set-Up                     
       Cystoscopy Set-Up and Technique                         

       Station 2: Pelvic Trainer Simulation                    Miyazaki, Walter, Skinner
       Complete hysterectomy in groups of 3-4                  

       Station 3: Videos                                       G.W. Cundiff
       Vaginal Hysterectomy                                     G.W. Cundiff
       Morcellation                                             R.M. Kho
       Prophylactic McCalls                                     R.M. Kho
       Adnexectomy                                              R.M. Kho
       Salpingectomy                                            R.M. Kho

4:30   Adjourn
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).
Art Arellano, Professional Education Manager, AAGL*
Viviane F. Connor*
Kimberly A. Kho*
Frank D. Loffer, Medical Director, AAGL*
Linda Michels, Executive Director, AAGL*
M. Jonathon Solnik*
Johnny Yi*

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FACULTY DISCLOSURE
The following have agreed to provide verbal disclosure of their relationships prior to their presentations. They have also agreed to support their presentations and clinical recommendations with the “best available evidence” from medical literature (in alphabetical order by last name).
Geoffrey W. Cundiff*
Rosanne M. Kho*
Doug Miyazaki
Speakers Bureau: American Medical Systems
Grants/Research: Boston Scientific Corp. Inc.
Regina Montero*
Bethany D. Skinner*
Andrew Walter*

Asterisk (*) denotes no financial relationships to disclose.
Objectives

- Define the possible advantages of outpatient hysterectomy
- Describe the outpatient hysterectomy protocol

Enhanced Recovery (ERAS)

- Challenges traditional peri-operative paradigms
- Proven to hasten post-operative recovery in colorectal surgery
- Multi-disciplinary team required: anesthesiologists, gynecologists, pharmacists, nursing staff
- Limited data in outpatient gynecologic surgery patients


Enhanced Recovery in Gynecologic Surgery – Mayo Clinic Rochester

**Results**
- 241 patients under enhanced recovery pathway
- 81 cytoreduction, 84 staging, 76 vaginal surgery
- Cytoreduction group: PCA use decreased from 98.7% to 33.3% and overall opioid use decreased by 80% in first 48 hours
- 4-day reduction in hospital stay
- Stable readmission rates
- 30-day cost saving > $7,600 per pt
- No diff in complication rate

**Conclusion**
- Implementation of enhanced recovery was associated with acceptable pain management with reduced opioids, reduced length of stay, stable readmission, good patient satisfaction, substantial cost reductions.

---

Mayo Clinic, Arizona Protocol

**Day before surgery**
- Eat usual breakfast, lunch, dinner
- No solid foods after midnight
- Clear liquids up to 4 hours before procedure
- No mechanical bowel preparation; rectal enemas only if necessary

**Immediately pre-operatively**
- LR 1000 ml IV at 30 ml/hr
- Celecoxib 400 mg orally once
- Acetaminophen 100 mg orally once
- Gabapentin 600 mg orally once
- +/- dexamethasone 4 mg IV once 30 minutes prior to incision

**Intra-operatively**
- Maintain euvolemia
- IV opioids per anesthesiologist
- Ketorolac 15 – 30 mg IV at the end of the procedure if possible

**Post-operative**
- Advance diet as tolerated
- Ambulate 2 hours after surgery
- Outpatient hysterectomy patients are observed 4 hours post-operatively
- Anti-emetics: Zofran 4 mg every 4 and scopolamine patch a needed
- Oral opioids: Oxycodone 5 – 10 mg every 4 hrs as needed
- Breakthrough pain: 0.4 mg IV Hydromorphone
- Scheduled acetaminophen 1000 mg every 6 hrs
- Scheduled NSAIDs every 6 hours
Mayo AZ
Outpatient Hysterectomy protocol (Kho, Magrina et al. oral, AUGS 2010)

- Development: Gyn, Anes, recovery team
- Hysterectomy: vag, lscp, robotic
- Pre-emptive analgesia
- Pain control
- Intra-operative cystoscopy
- 4 h recovery

Mayo AZ
Outpatient Hyst protocol

- Patient selection
- Healthy
- Responsible adult caretaker

Mayo Clinic AZ
Outpatient hyst protocol

- Enhanced Recovery protocol
- Local analgesia ‘cocktail’

Uterosacral “cocktail”

- 20cc of:
  - 0.5% bupivacaine
  - 1: 200,000 epinephrine

- 10 cc before incision
- 10 cc after cuff closure

Results

- Mean visual analog scale score for pain among patients treated with preemptive local analgesia (solid) or placebo (open).

- Mean cumulative dose of narcotic among patients treated with preemptive local analgesia (solid) or placebo (open).
Outpatient Hysterectomy Protocol

- Intraoperative cystoscopy
- 200 cc left in bladder
- Recovery Room
- 4 hours
- Voiding trial
- Oral narcotics
- Follow up
  - Phone call the following am
  - Routine 6 week visit

Intraoperative cystoscopy

- Urinary tract injury: 5% overall rate:
  - Ureteral injuries: 8.8/1000 procedures
  - LH (highest)= 17.3/1000
  - Level of uterine artery
  - Bladder injuries: 16.3/1000 procedures
  - LH (highest): 29/1000

- Vakili et al. AJOG 2005;192:1599
- N= 471
- Ureter injury: up to 2.5%
  - Only 12.5% detected pre-cystoscopy
- Bladder injury: up to 5%
  - Only 35% detected pre-cystoscopy

- Ibeanu et al. ObGyn 2009:113:6-10
- Prospective. 8 yrs. N=839, multicentre
- Urinary tract injury: 4.3%

<table>
<thead>
<tr>
<th>Injuries</th>
<th>Bladder %</th>
<th>Ureter %</th>
</tr>
</thead>
<tbody>
<tr>
<td>VH/midvaginal</td>
<td>2.6</td>
<td>1.7</td>
</tr>
<tr>
<td>VH</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>TAH</td>
<td>2.3</td>
<td>1.7</td>
</tr>
<tr>
<td>LH</td>
<td>3.3</td>
<td></td>
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</tbody>
</table>

- Only 25% detected pre-cystoscopy
- Cystoscopy detected 94.7% of injuries
- Not perfect, but effective and cost is justifiable.

Intraoperative cystoscopy

- Technique
  - 70 ° rigid cystoscope
  - 3-5 cc of intravenous indigo 15 minutes prior
  - Efflux of urine from each ureteral orifice
  - Bladder survey
  - Suspect injury:
    - Peristalsis but no efflux of urine
Conclusion

- Patient selection (in addition to meticulous surgical technique) is KEY for success.
- ERAS protocol can be helpful for outpatient hysterectomy protocol.
- Intra-operative cystoscopy should be performed.
Surgical Planes and Hemostasis
Douglas Miyazaki MD
Womancare, Novant Health
Clinical Instructor, Wake Forest University

Disclosures
- Speakers Bureau: American Medical Systems
- Grants/Research: Boston Scientific Corp. Inc.

Learning Objectives
- Appreciate the surgical planes essential for a successful Vaginal Hysterectomy
- Reacquaint yourself with vaginal surgery fundamentals for excellent hemostasis

Surgical Planes
- Anterior cul de sac
- Posterior cul de sac
- Follow the path… of the patient’s anatomy

Bladder Identification
1. Gebhart MD, Occhino MD, OBG Management

Anterior cul de sac
1. Gebhart MD, Occhino MD, OBG Management
Anterior cul de sac

Posterior cul de sac

- Keep scissor tips perpendicular axis to cervix
- If not into peritoneal cavity, be patient, hug posterior uterus and clamp, cut, and tie.
- Increase your exposure of planes over the posterior cul de sac
- Avoid excessive finger dissection (no finger pushing allowed)

Got Hemostasis???
Back to the Basics

Suturing

- Traction, Counter-Traction
- Cut tissue against the clamp and to the tip of the clamp
- Needle tip place behind the tip of the clamp, come out perpendicular to the pedicle
- Rotate clamp up slightly to bring the needle into your view, curved needle drivers are helpful

Knot Tying

- Vicryl or equivalent, surgeons knot especially for residents
- Keep tension on one strand
- Alternate throws for square knots
- TIE DOWN “TO” THE PEDICLE

Knot tying

- Keep your assistants awake
- Traction-Counter Traction, stretches and thins tissue, helps protect other adjacent organs
- Clamp release, reposition clamp as it was placed before release, to keep the pedicle perpendicular to the knot when being tied down
References


Vaginal Hysterectomy: Use of Vessel-Sealing Devices

Bethany Skinner MD
Minimally Invasive Gynecologic Surgery
Obstetrics and Gynecology
University of Michigan Medical Center
Ann Arbor, Michigan

Objectives

• At the conclusion of this activity, the participant will be able to:
  1. Describe potential benefits of using vessel-sealing devices in vaginal hysterectomy
  2. Describe risks of using vessel-sealing devices in vaginal hysterectomy
  3. Describe techniques to ensure patient safety while using vessel-sealing devices in vaginal hysterectomy

A brief review of vessel-sealing devices

• Many devices on the market
• 2 devices reported in the literature used during vaginal hysterectomy
  • Bipolar energy
  • Seals vessels up to 7 mm
  • Lateral thermal spread 2 mm or less

Review of literature

• Kroft 2011
• Review and meta-analysis of vessel-sealing devices in vaginal hysterectomy
• Included 7 RCT’s (n = 622) comparing vessel-sealing vs traditional suturing

Review of literature

• Vessel-sealing devices associated with:
  • Shorter operative time (- 17.2 min)
  • Lower EBL (-47.7 mL)
  • Less hemoglobin drop postoperatively (+ 0.3 g/dL)
  • Shorter hospital stay (- 0.25 days)
  • Lower VAS pain score postoperatively (-1.25)
  • No change in complications, though rates were low across included studies
  • No evidence on patient satisfaction, QOL, cost, mortality

Disclosures

• I have no financial relationships to disclose
Review of literature

• Lakeman 2012
• RCT of vessel-sealing vs suturing in vaginal hysterectomy
• Goal 100 participants, only followed 75
• Vessel-sealing associated with:
  • Lower pain score POD#0 only (-1.2/10)
  • No subsequent difference in pain
  • Decreased operative time (-11 min)
  • No change in EBL, hospital stay, cost, micturition symptoms, or defecation symptoms

Tips for use and safety

• Consider dividing and ligating uterosacral ligaments traditionally
  • Tag for later identification and suspension
  • Not desiccated
• To avoid thermal injury:
  • Good retraction
  • Press instrument tip into uterus
  • Visualize jaws of bipolar device throughout use
  • Suction plume
• Examine pedicles for complete seal after specimen removal

References


Questions
Maximizing Exposure During Vaginal Hysterectomy.

Learning Objectives:
At the conclusion the physician should be able to discuss a variety of techniques to achieve surgical exposure during vaginal hysterectomy:

- Discuss the role of retractors, including self-supporting retractors
- Describe optimal use of assistants
- Recognize the ergonomics of surgical technique to maximize exposure and space
- Describe techniques to visualize the upper pedicles
- Discuss methods for safe morcellation

Potential Conflict of Interest:
I have no financial relationships to disclose.
Retractors

- Hand Held Retractors
- Self Supporting Retractors
  - Mechanical
  - Tension
  - Table mounted

Standard Vaginal Retractors

Lighted Retractors

Self Supporting Retractors: Brantly Scott

Self Supporting Retractors: Lone Star

Lone Star Retractor
My Vaginal Retractors

Use of Retractors

- Open anterior and posterior cul-de-sacs
- Ipsilateral assistant holds anterior and lateral retractor
- Posterior retractor held by gravity
- Contralateral assistant assists surgeon
  - Use of sucker
Video of Retraction with Sucker

Maximizing Space Through Good Technique

- Ambidexterity
  - Place clamps with ipsilateral hand
  - Tie sutures with contralateral hand
Visualization of Upper Pedicles

- Compression of uterovarian and round ligament pedicle
- Posterior Delivery of the Fundus
- Morcellation

Video of Tying Suture

Video of Passing suture

Posterior Delivery of the Fundus

Video of Morcellation

Vaginal Morcellation

AAGL Vancouver 2014
Rosanne M Kho MD
Co-Director, MIGS Fellowship Program
Head, Division of Urogynecology and FPMRS
Columbia University Medical Center

Objectives

- Identify appropriate patients for vaginal morcellation
- Define the surgical principles for safe and efficient morcellation during vaginal hysterectomy

Criteria to determine route:
Level of suspicion for Malignancy

- Uterine leiomyosarcoma:
  - Currently, no reliable way to detect pre-operatively
  - Protocol: ???
  - MRI w/ gadolinium
    - Contrast enhancement at 60 sec after administration of Gd-DTPA
  - Elevated Total LDH
  - Elevated LDH isoenzyme type 3

“Surgeons should prioritize vaginal hysterectomy (where) morcellation ...can occur in the vagina with the use of a scalpel. However, we note that the assumption that the ...techniques actually minimizes uterine tissue spread has not been examined rigorously.”
Mayo AZ 2000-2013

- N = 2011 patients underwent VH + BSO
- Uterine wt range: 18 – 2418 g
- Conversion rate: 0.94% (19/2011)
  - 4/19: advanced endometrial cancer requiring staging
  - 0/19: leiomyosarcoma
  - 15/19:
    - excessive bleeding
    - inability to complete morcellation

Principles

- Achieving adequate exposure
- Prevent injury bowel, bladder and vagina
- Maximizing efficiency

Maximize exposure

- Candy-cane stirrups
- Magrina-Bookwalter vaginal retractor system
- Alexis wound retractor
- ‘elongate’ circumferential incision

Overcoming Challenges:

- Exposure: Magrina-Bookwalter Vaginal Retractor

Proper Use of the Magrina Retractor System

Rosanne M. Kho, MD
Mayo Clinic Arizona
Principles

• Achieving adequate exposure
• Prevent injury bowel, bladder and vagina
  — Alexis (Applied Medical) wound retractor
  — Retract bladder - (blade below), and rectum – (blade above)
  — Long vaginal pack to push the loops of bowel out of the way
• Maximizing efficiency

Conclusion

• Patients with abnormal uterine bleeding should be appropriately worked up
• Patients with a high index of suspicion for malignancy are not candidates for vaginal morcellation
• Surgical principles during vaginal morcellation should be followed for safety and efficiency
Vaginal Morcellation Made Ridiculously Simple

Andrew J. Walter MD
Chief of Urogynecology and Chronic Pelvic Pain
TPMG – North Valley

Disclosures

- I have no financial relationships to disclose.

Objectives

1. Understand the rationale for vaginal morcellation to facilitate vaginal hysterectomy
2. Describe the techniques for vaginal morcellation
3. Understand the risks associated with vaginal morcellation

Steps of Hysterectomy

1. Circumferential Incision
2. Identification of Anterior cul-de-sac / bladder pillars
3. Ligation of uterosacral pedicles
4. Anterior colpotomy
5. Ligation of uterovarian pedicles
6. Exteriorization of fundus
7. Ligation of cardinal pedicles
8. Cuff support / closure

Benefits of Vaginal Morcellation

- First formal report in 1970
- Allows removal of an enlarged uterus thru a small (colpotomy) incision


If the uterus is too large for step 8 (delivery of the fundus), then proceed with morcellation
Vaginal Morcellation

- FDA notification pertains to power morcellation
- Limited data suggests increased recurrence risk with vaginal morcellation as well
- Limitations
  1. Risk of undetected malignancy is low (range 1:200 to 1:5000)
  2. Sarcoma has a poor prognosis regardless of method of tumor extraction
  3. Risk/benefit profile favors vaginal morcellation
  4. Consent?

Park JY et al 2011, Senapati S et al 2014

Vaginal morcellation

- RCTs (VH vs AH) involving Large Uteri
  1. 240 patients
  2. Size: 200-1300g (mean 400-800g)
  3. No unusual selection criteria
  4. 2.5% conversions (1400 - 1700g uteri)
  5. Benefits of VH maintained

Hwang et al 2002, Benassi et al 2002

Ligation of the uterine arteries

Once this is done, morcellation can start

Morcellation techniques

Coring

RCT comparing techniques

- Nazah I et al 2003
  1. RCT of 30 patients undergoing VH
  2. Reduced rate of successful completion and increased risk of postoperative fever with coring versus bivalving
  3. “narrow” cervix associated with failure of coring

Uterine Morcellation

Bivalving (preferred)

If unable to exteriorize the fundus due to uterine size or lack of access
  1. Place Jacobs tenaculum at the 0300/0900 position of the cervix
  2. Bivalve uterus until the bulk of the fundus is reached (do not completely go thru the uterus)
  3. Remove uterine segments (posterior / anterior then repeat) with myomectomy when indicated to reduce central uterine bulk
  4. Clamp utero-ovarian ligament once fundus delivers
Uterine Morcellation
Bivalving (preferred)

Conclusion
- Morcellation techniques allow for safe extraction of large uteri during VH
- Bivalving preferred
- Increased use of morcellation during VH will substantially reduce morbidity, inpatient service utilization and overall costs and minimize or eliminate the need for the robotic/laparoscopic hysterectomy for benign disease

References
3. Park JY et al. Gynecol Oncol. 2011;122:255

Questions?
Addressing the Adnexa Vaginally: BSO and Salpingectomy
Rosanne M Kho, MD
Head, Division of Urogyn and FPMRS
Co-Director, MIGS Fellowship Program
Columbia University Medical Center
New York
Updated: Sept 2014
DSL#11-1305.RMK

Objectives
- Describe challenges and limitations to the traditional approach to vaginal adnexectomy
- Demonstrate round ligament technique to BSO
- Round ligament and mesosalpinx technique to salpingectomy

Technical Challenges to VH
- Salpingo-oophorectomy in hysterectomy
  - Abdominal: 54%
  - Laparoscopy: 50%
  - Vaginal: 17%

Financial Disclosure
I have no financial relationships to disclose.

Technical Challenges to VH
- Women with adnexectomy were
  - More likely to undergo AH or LH
  - Odds: ↓ 29% for lscp
  - 6x less likely to undergo VH

Surgeon’s choice
- Factors that may affect choice of route of hysterectomy
  - Level of comfort/training
  - Lack of assistance
  - Poor exposure w/ vaginal approach
### Vaginal BSO

<table>
<thead>
<tr>
<th>Year</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td>1977</td>
<td>75</td>
</tr>
<tr>
<td>1996</td>
<td>84</td>
</tr>
<tr>
<td>1999</td>
<td>98</td>
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</tbody>
</table>


- N = 1026 VH ± BSO
- No increased complications with BSO
- Mean additional time for BSO = 11.4 min


### Vaginal BSO

- N = 1725 patients
- Post-op bleeding (ovarian vessels) = 0.1%


### Traditional: Mesosalpinx-mesoovarium (one pedicle) technique

- Limitations:
  - Thick pedicle
  - Retraction of ov vv
  - Incomplete removal
  - Up against the pelvic side wall: risk to ureters

### Pathologic findings and outcomes of a minimally invasive approach to ovarian remnant syndrome

**Objective:** To review operative and pathologic findings of a minimally invasive approach to ovarian remnant syndrome.

**Design:** Data were obtained from medical records documenting bilateral salpingo-oophorectomy and subsequent treatment between 1996 and 2006 for pathologically confirmed ovarian remnant tumors. Follow-up was by mailed questionnaires and telephone interviews.

**Setting:** Tertiary care academic medical institution.

**Patients:** Ninety patients (mean age 46 years) receiving treatment for ovarian remnant tumors after prior bilateral salpingo-oophorectomy.

**Results:**
- No patients required 46 years receiving treatment for ovarian remnant tumors after prior bilateral salpingo-oophorectomy. (no patients required conversion to laparotomy and who vs. laparoscopy for removal of ovarian remnant tissue.

**Main Outcome Measures:** Postoperative complications and recurrence.

**Results:** Sixteen patients had ovarian remnant syndrome (17.7%). Eleven patients underwent further laparoscopic surgery alone to excise the remnant ovarian tissue. Eight patients (50%) required excision of both ovaries (16.7%). One patient had a repeat operation for recurrent ovarian tissue. Postoperative complications included nausea (1 case), fever (1 case), and no recurrence.

1996 - Jan 2006

<table>
<thead>
<tr>
<th>Route BSO</th>
<th>laparotomy</th>
<th>55%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>laparoscopy</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>vaginal</td>
<td>10%</td>
</tr>
</tbody>
</table>
Ovarian Remnant Syndrome

- Ovarian stroma extends microscopically up to 1.5 cm beyond gross margins

- Gyn Onc 2009;114:61

Technical Challenges to VH

- High adnexae:
  - Mobilize & skeletonize the IP lig – Round ligament technique
  - Endo-loop
  - Extra long deaver

Risk-reducing/prophylactic salpingectomy

- Fallopian tube: site of origin of pelvic serous cancer
- BRCA 1 and 2:
- BSO after completion of childbearing
- If opt for delay, consider prophylactic salpingectomy


SGO Clinical Practice Statement: Salpingectomy for Ovarian Cancer Prevention

November 2013

Salpingectomy may be appropriate and feasible as a strategy for ovarian cancer risk reduction.

A paradigm shift in our understanding of pelvic serous carcinomas suggests that the site of origin may be the fallopian tube. A recent study identified in the fallopian tube and ovaries has been demonstrated to reduce the risk of developing and dying from ovarian cancer. Recognition that occult lesions are usually identified in the fallopian tube, salpingectomy has been identified as an important step in ovarian cancer risk reduction and in women at high risk. However, approximately 30% of women who are BRCA mutation carriers choose not to undergo salpingectomy prophylactically for fear of delaying the surgery to avoid the risk of breast cancer associated with preventive salpingectomy. Physicians of such patients should counsel them regarding the benefits of salpingectomy after tubal ligation followed by somatostatin analogs or other agents. Strategies for risk-reducing salpingectomy include:

- A bilateral prophylactic salpingectomy should be considered in women at high risk for ovarian cancer.

- For women at average risk of ovarian cancer, risk-reducing salpingectomy should be considered after completion of childbearing.

“...For women at average risk of ovarian cancer, risk-reducing salpingectomy should also be discussed and considered with patients at the time of abdominal or pelvic surgery, hysterectomy or in lieu of tubal ligation.”


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Conclusions

- Vaginal adnexectomy
- Feasible. Safe
- Round ligament technique
- High adnexae
- Complete removal of tubes and ovary
- Facilitating devices and techniques
Vaginal Cuff Closure at the Time of Vaginal Hysterectomy

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Conflicts of Interest Disclosure

I have no financial relationships to disclose.

Objectives

1. Describe techniques for vaginal cuff closure
2. Describe impact of vaginal cuff closure on vaginal length and support
3. Describe how to manage complications associated with vaginal cuff closure

Introduction

1. Circumferential Incision
2. Identification of Anterior cul-de-sac / bladder pillars
3. Posterior colpotomy
4. Ligation of uterosacral pedicles
5. Anterior colpotomy
6. Ligation of cardinal pedicles
7. Exteriorization of fundus
8. Ligation of uterovarian pedicles
9. Oophorectomy / Salpingectomy
10. Cuff support / closure

Time for step 10 should equal step 1-9

Closure techniques

- Horizontal versus vertical cuff closure
- McCall's versus uterosacral suspension of the cuff
- Dehiscence risk
- Management of complications

Vertical versus Horizontal

- Vertical cuff closure results in greater preservation of vaginal length
- No difference in functional outcomes (e.g. sexual function) between closure groups
- Horizontal closure easier to combine with McCall's / USL suspension techniques (my opinion)

McCalls versus USL suspension
- Both procedures reattach proximal uterosacral ligaments to the vaginal cuff
- Limited data and "common sense" anatomic considerations that this reduces risk of vault prolapse
- No data comparing USL to McCall for "prophylactic" cuff suspension at the time of hysterectomy
- Similar outcomes when used for treatment of prolapse (<6% recurrence at 1-12 yr f/u)
- My opinion - I prefer USL for both treatment and prophylaxis (less pain issues)


Prophylactic Uterosacral Suspension-Techniques
1. Exposure
2. Initial Surgical Approach
3. “Zone of Safety”
4. USL suture placement
5. Cuff Closure / suspension
6. Management of complications

Initial Surgical Approach
1. Once complete with Hysterectomy / BSO
   - Leave USL tags for identification
   - Adequate bowel packing

Self retaining retractor

Zone of Safety
Zone of Safety

1. Accurate suture placement reduces risk of rectal and ureteral injury

2. Borders:
   • Anterior / Superior: Distal USL tag
   • Posterior / Inferior: Right angle clamp deflected slightly off center (depresses rectum)

USL Suture Placement

1. 1-2 suture per side
2. Typically braided or monofilament delayed absorbable suture
3. Posterior and Medial to the spines
4. Deep bite with CT-1 / GS 21 needle to incorporate:
   • +/- peritoneum
   • USL
   • Levator fascia
   • Care to avoid too dorsal / posterior placement
5. Rectal examination

Cuff Closure/Suspension

1. Attach anterior arms of USL sutures to the anterior cuff and posterior arms to the posterior cuff
2. Suspension sutures generally close cuff
3. May need additional interrupted sutures to ensure midline closed
4. Hold cuff flush with proximal sutures
5. Tie midline then USL sutures
Cuff Closure/Suspension

Uterosacral Suspension - Complications

- Complications
  1. Ureteral injury: 1.8% (0-11%)
  2. Neuropathic pain: < 1%
  3. Significant rectal injury: <1%

Management of Complications

- Ureteral Obstruction
  1. Dual cystoscopy
     - Post hysterectomy
     - Post USL suspension
  2. Deligation
  3. Stenting / Reimplantation
     - Bloody efflux
     - Retroperitoneal leak
     - Persistent non-efflux

- Rectal Injury
  1. Rectal examination
     - Suture placement
     - Posterior cuff suspension
  2. Suture removal / replacement
  3. Repair if rectotomy occurs

Management of Complications

- Post-operative Pain Syndromes
  - Local versus radicular buttock / posterior thigh pain
  - Due to sacral nerve root compression (S2-4 branches) from too dorsal / posterior suture arc
  - Management
    1. Deligation
    2. Trigger point injection
    3. Physical therapy
Cuff Dehiscence
- Reduced risk of dehiscence with VH compared to laparoscopic approaches
- Case series with risk as high as 4% with laparoscopic approaches
- Population study from Italy
  - LH: 0.64% (23/3573)
  - AH: 0.23% (9/4291)
  - VH: 0.13% (6/4534)
- Likely due to reduced use of diathermy and open suturing techniques

Management of Cuff Dehiscence
- I am not sure... I have never seen it
- Ask a laparoscopic or robotic surgeon I guess!!

Conclusion
- Cuff closure – vertical or horizontal
- Suspension – reattached USL ligaments
- Check for complications (ureteral / rectal)

References
Vaginal Hysterectomy: Use of Cystoscopy
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Disclosures
I have no financial relationships to disclose.

Objectives
• At the conclusion of this activity, the participant will be able to:
  1. Describe the rate of urinary tract injury associated with vaginal hysterectomy
  2. Describe the pros and cons of universal cystoscopy after hysterectomy
  3. Describe key components of cystoscopy after hysterectomy

Lower urinary tract injury and gynecologic surgery
• National Hospital Discharge Survey data
  - Injury due to inpatient gynecologic procedures 24.9 → 11.8: 1000
  - Bladder injury highest in LAVH (13.8: 1000) and VH (13.1: 1000)
  - Ureteral injury highest in radical hysterectomy (7.7: 1000)
• Declining injury rates correspond with declining rates of inpatient gynecologic procedures

Risk factors for lower urinary tract injury at hysterectomy

BLADDER INJURY:
• Pelvic organ prolapse #1 associated diagnosis
  - Vaginal hysterectomy higher risk if concomitant pelvic organ prolapse surgery
• Adhesions

URETERAL INJURY:
• Malignancy #1 associated diagnosis
  - Endometriosis #2, pelvic organ prolapse #3
• Low volume surgeons
• Laparoscopic or robotic approach

Risk factors for lower urinary tract injury at hysterectomy

OVERALL INJURY:
• EBL > 800 mL
• Lower BMI
• Increased uterine size
• Increased operative time
### Role of intraoperative cystoscopy

- **Gilmour 2006**: Meta-analysis of 47 studies of lower urinary tract injury at hysterectomy, 17 studies included universal cystoscopy
  - Highest risk of ureteral injury with LH (7.9 : 1000)
  - Highest risk of bladder injury with urogyn surgery (11.2 : 1000)
  - Overall, only 3-25% of ureteral injuries and 22-96% of bladder injuries detected intraoperatively
  - With routine cystoscopy, 88-100% of ureteral injuries and 80-96% of bladder injuries detected intraoperatively

- **Vakili 2005**: Prospective study of 471 women undergoing universal cystoscopy after hysterectomy
  - Overall injury rate = 4.8%
  - 1.7% ureteral and 3.6% bladder (2 had both)
  - Ureteral injury associated with prolapse surgery
  - Bladder injury associated with anti-incontinence surgery
  - 96% of injuries recognized intraoperatively with use of cystoscopy
  - Only 12.5% of ureteral injuries and 35.3% of bladder injuries detected prior to cystoscopy
  - Peristalsis unreliable indicator (seen with 5/6 ureteral injuries at AH)

### In support of universal cystoscopy

- **Ibeanu 2009**: Prospective study of universal cystoscopy
  - 839 women undergoing hysterectomy for benign indications
  - 4.3% lower urinary tract injury
  - 2.9% bladder injury
  - 1.8% ureteral injury
  - 3 both
  - 97.4% detected with cystoscopy
  - Visual inspection identified only 25.6% of injuries
  - Only 6.7% (1/15) ureteral injuries and 37.5% (9/24) bladder injuries
  - 2.4% of cases with slow efflux → no injury

### In opposition to universal cystoscopy

- **Sandberg 2012**: Retrospective cohort study
  - 1982 women undergoing hysterectomy for benign and malignant indications
  - 251 (12.7%) had intraoperative cystoscopy
  - 14 (0.71%) bladder injury
  - 10 directly visualized intraop
  - 4 diagnosed postop – 2 had normal intraop cysto and 2 did not have cysto
  - 5 (0.25%) ureteral injury
  - All diagnosed postop, none had intraop cysto
  - Normal cysto does not negate possibility of lower urinary tract injury

### Key components of cystoscopy after hysterectomy

- Use of a 70-degree cystoscope for complete visualization
- Identify bubble at dome and perform 360-degree assessment
- 0-degree cystoscope helpful if urethral injury suspected
- Evaluation for penetrating injury
  - Stitches, trocar perforation
- Evaluation for blunt injury
  - Ecchymosis, hematoma
- Evaluation for bilateral ureteral jets
  - Indigo carmine IV or pyridium PO (administered preoperatively) can be helpful
- Incidental findings
  - Other bladder pathology, duplicated ureteral orifices, stones

### What do you do if there’s no spill?

- You complete an uncomplicated vaginal hysterectomy, and upon postoperative cystoscopy, there is no spill from the left ureteral orifice. What do you do?
  - Wait
  - If indigo carmine is usually excreted 5-10 minutes after IV administration
  - If you’ve waited > 20 minutes, must investigate further
  - IV fluid bolus
  - Furosemide
  - Release offending stitch (if suspect kinked or encircled ureter)
  - Stent (Urology)
  - Retrograde ureteropyelogram concurrently
References

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

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.

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 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.

If you add staff to assist with LEP patients, confirm their translation skills, not just their language skills. A 2007 Northern California study from Sutter Health confirmed that being bilingual does not guarantee competence as a medical interpreter. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2078538.