Transvaginal Hysterectomy (TVH) Resident Training Curriculum

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Formal TVH Curriculum

**Summary:**

The TVH curriculum has been developed with input from the Urogynecology and Pelvic Reconstructive Surgery Division and approved by the UAB Transvaginal Hysterectomy (TVH) Curriculum Committee. The TVH model and this curriculum were developed because of an identified need to better educate our residents on the indications for and techniques associated with the performance of TVH. Additionally, this curriculum will comply with the ACGME “Gynecology Technical Skills Milestone” to document competency in vaginal surgery. This program will better prepare residents for the OR by enabling a more rapid development and evaluation of competency in an important surgical procedure. Ultimately, completion of this curriculum will lead to certification of resident competency.

**ACGME Competencies Addressed by the TVH Curriculum:**

- Medical Knowledge
- Patient Care

**Course Goal:**
To provide OB/GYN residents with the knowledge and skills, through hands-on training, to become competent, credentialed gynecologic surgeons in transvaginal hysterectomy.

**Educational Objectives:**

Upon completion of this course, the resident will be able to:

1. Identify pertinent anatomical landmarks
2. List the standardized TVH steps using the simulated model
3. Document the TVH procedure (dictation)
4. Describe current problems associated with planning a TV approach to hysterectomy, performing a TVH, and proposed solutions with regard to TVH training
5. List the benefits of TVH
6. List the indications/contraindications for TVH
7. Describe the challenges of long-term vaginal vault and pelvic floor support
8. Discuss all complications encountered with TVH and understand means of avoidance and management
**Resident Assessment:**
- Residents will be assessed through direct observation with immediate feedback by faculty throughout the course. Self-reported resident confidence assessments will be utilized.
- Dictation of a “TVH Operative Note” is required and proficiency demonstrated.
- Residents will be formally assessed on TVH procedures by faculty using the “Vaginal Surgical Skills Index (VSSI”).

**Structure of TVH Curriculum and requirements for each year:**
- **PGY1**
  1. “Resident Self-Confidence Survey PRE”
  2. Watch International Academy of Pelvic Surgery (IAPS) TVH procedure video (http://www.academyofpelvicsurgery.com)
  3. Review standardized “TVH Technique and Teaching Points”
  4. Work with simulated model to learn the procedural steps and terminology
  5. “Resident Self-Confidence Survey POST”
- **PGY2**
  1. “Resident Self-Confidence Survey PRE”
  2. Review IAPS TVH procedure video (http://www.academyofpelvicsurgery.com) if it has not been incorporated into Tuesday morning UroGyn lecture every 7 weeks.
  3. Review standardized “TVH Technique and Teaching Points”
  4. Work with simulated model to learn the procedural steps and terminology
  5. Perform a simulated TVH, receive feedback and assessment from faculty
  6. Complete a TVH dictation (achieving 80% of required elements)
  7. Attend Boston Scientific “Cadaveric TVH” session
  8. “Resident Self-Confidence Survey POST”
- **PGY3**
  1. “Resident Self-Confidence Survey PRE”
  2. Perform TVH in OR, receive feedback and assessment from faculty using the VSSI
  3. Attend Boston Scientific “Cadaveric TVH” session
  4. “Resident Self-Confidence Survey POST”
- **PGY4**
  1. “Resident Self-Confidence Survey PRE”
  2. Perform TVH in OR, receive feedback and assessment from faculty using the VSSI
  3. Attend Boston Scientific “Cadaveric TVH” session
  4. “Resident Self-Confidence Survey POST”

**Program Evaluation:**
- The program will be evaluated by the residents through a program evaluation form.
- The program will be reviewed annually by the TVH Curriculum Committee using the outcome measures as well as the resident completed program evaluations collected to ensure the course is meeting the outlined objectives.
TVH Technique and Teaching Points

I. Preparation
   a. Time out
   b. SCDs/DVT prophylaxis
   c. Preoperative single dose antibiotics: include choice and when second dose is indicated
   d. Positioning: Preferably in Allen stirrups. No more than 90° flexion of hips, knees, and ankles. Minimize abduction of hips. Abduction of arms/arm boards should be <90 degrees. No pressure points should be allowed and padding applied if needed.
   e. Exam under anesthesia
   f. Prep/decompress bladder
   g. Drape: self adherent surgical drape
   h. Operative exposure
      o Lighting: 2 beam lights optimal for vaginal view. Headlight and lighted retractors helpful.
      o Retractors: Assess the need for a weighted vaginal speculum followed by placement of anterior and posterior right angle retractors. Adjust lateral retractor tension depending on need for exposure, and release lateral tension when tying pedicle knots or when using other means for hemostasis to avoid lateral retraction of potentially bleeding vessel.

II. Procedure
   a. Mark planned incision with marking pen or with pickups with teeth
   b. Inject vasoconstriction agent- 10 cc of 1% lidocaine with epinephrine when not contraindicated- inject circumferentially around the marked cervix.
   c. Incise circumferentially keeping the knife perpendicular to the cervix, attempting to cut through the mucosal and submucosal layers without entering the vessel containing endopelvic connective tissue (CT).
   d. Posterior colpotomy: Identify uterosacral ligaments by palpation. Enter cul-de-sac between the ligaments where “bulge” is seen with knife or scissors. Preferably do not use a push and spread technique with scissors to avoid the release of the peritoneal layers from the posterior vaginal fornix. The peritoneum is much more easily entered when it is attached to the paravaginal tissue. If the cervix is elongated and there is no bulge posteriorly (no obvious cul-de-sac), perform intraoperative rectal exam to better exclude the possibility of proximal rectal or sigmoid adherence to posterior cervix. Carefully dissected cephalad and anteriorly, but posterior to cervical stroma to a point where peritoneum is entered. Clamping, cutting, and suturing the uterosacral ligaments prior to the anterior dissection may be helpful to better identify the cervical axis and vascular supply with a finger placed adjacent to the posterior cervix.
   e. Cervico-vaginal incision: Preferably just outside the junction of the vaginal epithelium to the cervix with the depth of the incision through the vaginal submucosa to the first apparent area of thinner CT or to where there is an
obvious tissue plane between the musculo-connective tissue of the vaginal wall and that of the cervix. If a portion of the vaginal wall is particularly short, long, or incorporated in scar, the position of the incision should be adjusted to optimize vaginal length.

f. Entering the anterior vesico-cervico-uterine space: Incise pre-cervical tissue to the point that a smooth (not fibrous) tissue layer is encountered. Use scissors to push and spread to dissect the vesico-cervical space. If such dissection requires cutting, you’re probably not in the right plane or space. Occasionally the lateral connection of the anterior vaginal wall to the cervix just lateral to the dissection space (the bladder pillars) will need to be cut immediately adjacent to the cervix. Once the peritoneum is clearly visualized, 2 Long Stille or Kelly clamps can be utilized to expose the peritoneum in a vertical or horizontal fashion. Metzenbaum scissors can then be used to create an anterior window by cutting through the elevated peritoneal edges. Intraperitoneal location is confirmed by visualization of bowel loops. Place right angle retractor/curved Deaver to elevate the bladder anterior to the uterus. Pushing the peritoneum off the anterior uterine surface with excessive blunt dissection may impede one’s ability to enter the peritoneal cavity.

g. Uterine support detachment: Identify uterosacral and cardinal ligaments visually or with gentle palpation. Place curved Heaney-Ballentine clamp on uterosacral ligament, divide pedicle (technique described below), place Heaney stitch (described below), and tag sutures for later use in vaginal cuff attachment or culdoplasty. Repeat on contralateral side. Place Heaney-Ballentine clamp on cardinal ligament, divide pedicle, place Heaney stitch, and cut suture (no tag).
   o The exclusion of the cardinal ligament from the first bite may decrease the likelihood of ureteral kinking. If the cardinal ligament is included in the first bite, the result is a very large cardinal/uterosacral pedicle and may alter recognition of a uterosacral ligament per se for cuff suspension if needed. Clamp angle may be adjusted for short uterosacral ligament.

h. Division of broad ligament- March up the broad ligament medial to each successive pedicle in a clamp, cut, and tie fashion until the utero-ovarian ligament is reached. If an oophorectomy is planned, identification of the round ligament is helpful. After clamping, dividing and suturing this ligament, the infundibulopelvic ligament can be skeletonized and clamped more easily.

i. Division of the utero-ovarian ligament: The utero-ovarian ligament should be doubly clamped, cut free from the cornua, and secured twice (first with a free tie behind the lateral clamp and then a transfixation stitch around the medial clamp).

j. Remove uterus
   o In some cases consider flipping the fundus anteriorly or posteriorly prior to clamping uteroovarian vessels and round ligaments. After all pedicals are divided, uterus is removed through vagina.
   o If the uterus is large, consider bivalve, intra-myometrial coring, or morcellation. This is usually performed progressively after the uterine vessels have been divided.
k. Clamp and tie technique suggestions:
   o Clamp Type: Heaney-Ballentine clamps recommended because of the longitudinal grooves that allow for less tissue slippage from clamp when traction is applied
   o Clamp placement: With traction on the cervix, place clamp between 45 and 90 degrees towards the cervix preferably with incorporation of both anterior and posterior peritoneum and an adequate amount of parametrial tissue. Avoid placing clamps parallel to the axis of the cervix prior to taking the uterine vessels to avoid ureteral kinking or injury. Open clamps widely and slide off cervix/lateral uterine surface before clamping down in an effort to be inclusive of vascular collaterals. Incorporation of the anterior peritoneum in the first clamps/bites is usually not possible. Ensure that the heel of each clamp is swung just medial to the previous pedicle.
   o Suture placement: always Heaney stitch (vs. simple stitch) each pedicle if at all possible, particularly when suture is to be tagged for later exposure or if the pedicle is large or on tension.
   o Knot tying: Use opposing forces on the two ends of the suture (one cephalad and one caudad) to the point of the knot in order for the knot to go down with its loop at right angles to the axis of the vessel without applying traction. Typically, the index finger contralateral to the pedicle should be pushing one strand of the suture cephalad to the pedicle and posterior to the uterus, while the ipsilateral fingers are applying opposing traction on the other strand in a caudad direction. Unnecessary applied traction might pull the knot off the pedicle medially or push the pedicle out of the knot laterally by pushing on the lateral vaginal wall or parametrium. Consider two granny knots (2 half hitches) to allow the 2\textsuperscript{nd} throw to cinch down the 1\textsuperscript{st} one if that knot slips. Then follow with 2 reverse throws producing square knots to secure it.
   o When cutting tissue pedicle medial to clamp, leave enough tissue with clamp making it less likely to slip out. When dividing the pedicle, cut almost to the end of the clamp. Suture at least to the level of tissue incision or tip of clamp to avoid missing a vessel that might be at or near clamp tip. \textbf{We do not recommend cutting around the tip of the clamp, as occasionally tying a knot may predispose to tearing, and thus extending the incision laterally.}

l. Evaluate the pedicles and surrounding tissue using a sponge on ring forceps applied gently. Mild contralateral (medial) traction on the uterosacral and uteroovarian suture tags allows for better visualization but traction should be released to better evaluate for bleeding sites.

m. Close the vaginal cuff
   o Use O-Vicryl in a running-locking fashion from right to midline and then from left to midline
   o Consider McCall’s culdoplasty. This procedure is another means of supporting the vaginal cuff during transvaginal hysterectomy. It
incorporates the uterosacral and cardinal ligaments to the peritoneal surface. The sutures are attached so that when tied, the uterosacral-cardinal ligaments are drawn toward the midline, thereby helping to close off the cul-de-sac. In addition, when the suture is tied, it draws the posterior vaginal apex up to the supporting structures, elevating it to a normal position. This maneuver can be performed with one or more sutures. The only drawback to this type of culdoplasty is a possible increased incidence of kinking or ligating the ureter, because it is so close to the uterosacral ligament.

- Incorporate uterosacral ligaments into cuff both posteriorly and anteriorly to re-establish suspensory aspect of vagina (so that enterocele and vagina vault prolapse is less likely to occur)
- As indicated, especially at the time of a tough hysterectomy, would consider cystoscopy to ensure no evidence of bladder or ureteral injury

- Catheter placement **before** vaginal packing is inserted (vaginal packing placed in cases with associated colporrhaphies)

- Other Potential considerations:
  - Addressing the ovaries: After the uterus is removed, the ovary and tube can be grasped simultaneously with a babcock clamp and two Heaney clamps placed across the infundibulopelvic ligament. It is cut and doubly tied with absorbable suture (first with a free tie behind the lateral clamp and then a transfixation stitch around the medial clamp).
  - Use of Bookwalter: Vaginal Bookwalter may avoid the need for 2 assistants, but may put lateral tension on structures allowing pedicles or vessels to retract out of tip or tear lateral to clamps.

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**References:**
1. ACOG Simulations Consortium- Vaginal Hysterectomy Learning Objectives, Oz Harmanli, MD, Director, Urogynecology and Pelvic Surgery, Baystate Medical Center, Associate Professor of Obstetrics and Gynecology, Tufts University School of Medicine, July 2013.
