Didactic: Vaginal Hysterectomy:
The Technique That Touches All Bases: Safe, Efficient, and Frugal, with Superior Cosmesis

PROGRAM CHAIR
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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.

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Vaginal hysterectomy is the procedure for the connoisseur, as it touches all bases. It is safe, efficient and frugal with superior cosmesis, and has proven to be one of the best ways to extirpate the uterus. With the current controversy raging around uterine morcellation, the vaginal approach should be strongly considered as it avoids hazardous intra-abdominal morcellation. Mastering the vaginal hysterectomy technique will empower the surgeon to address both the issue of morcellation and cost containment. Experienced experts will teach advanced surgical techniques including safe morcellation, and demonstrate innovative technology to simplify the procedure. Concomitant adnexal and prolapse surgery will be addressed and the participant will be made fully aware of how to manage potential complications.

**Learning Objectives:** At the conclusion of this course, the clinician will be able to: 1) Describe the advantages of vaginal hysterectomy compared to other procedures, especially in the current environment which encourages frugality and vaginal morcellation; 2) describe the required steps to complete a successful vaginal procedure, including adnexectomy, oophorectomy, and uterine morcellation for the enlarged uterus; 3) manage concomitant procedures like genital prolapse correction and vaginal apex support; and 4) demonstrate techniques to prevent, recognize, and manage complications associated with vaginal hysterectomy.

**Course Outline**

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<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
<th>Speaker</th>
</tr>
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<tr>
<td>7:00</td>
<td>Welcome, Introductions and Course Overview</td>
<td>J. van der Wat</td>
</tr>
<tr>
<td>7:05</td>
<td>Vaginal Hysterectomy – Safe, Efficient and Frugal: The Evidence and Current Status</td>
<td>J. van der Wat</td>
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<td>7:30</td>
<td>Step-by-Step Simplified Technique for Vaginal Hysterectomy</td>
<td>M.A. Pelosi</td>
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<td>7:55</td>
<td>Vaginal Hysterectomy and Repair – A European Approach</td>
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<td>8:20</td>
<td>Essential Pelvic Anatomy – Prolapse Correction and Apical Support during Vaginal Hysterectomy</td>
<td>M.D. Moen</td>
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<tr>
<td>8:45</td>
<td>Questions &amp; Answers</td>
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<td>8:55</td>
<td>Break</td>
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<td>9:10</td>
<td>Recognition and Management of Complications and Rescue Technique for the Failed Vaginal Hysterectomy</td>
<td>M.A. Pelosi</td>
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<td>9:35</td>
<td>Current Surgical Technology and Innovations to Overcome Challenges in Difficult Cases</td>
<td>R.J. Reilly</td>
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<td>10:00</td>
<td>Same-Day Discharge: Essential Protocols and Management</td>
<td>M.D. Moen</td>
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<tr>
<td>10:25</td>
<td>Dealing with a Large Uterus: Vaginal Morcellation and Debulking</td>
<td>M.A. Pelosi</td>
</tr>
</tbody>
</table>
10:50  Questions & Answers
11:00  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).
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Other: Proctor: Intuitive Surgical
Erica Dun*
Frank D. Loffer, Medical Director, AAGL*
Linda Michels, Executive Director, AAGL*
Johnny Yi*

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Other: Faculty for PACE Surgical Courses: Covidien

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).
Michael D. Moen*
Marco A. Pelosi, II*
Raymond J. Reilly*
Johan van der Wat*

Asterisk (*) denotes no financial relationships to disclose.
Vaginal Hysterectomy
Safe, Efficient and Frugal:
The Evidence and Current Status

JOHAN VAN DER WAT
MBBCh FCOG
University of the Witwatersrand, Johannesburg

I have no financial relationships to disclose

Discuss:
• current status
• safety (complications)
• efficiency (short stay)
• frugality (cost containment),
• the future

Historical Perspective
AD 120  Soranus – contemplated the removal of the uterus through the vagina
1507  Benengarius of Bolgna – First authenticated description of removal of uterus through the vagina.
1813  Langebuck – Father of modern day vaginal hysterectomy
1846  Dubourg – New Orleans, First Vaginal Hysterectomy published in the US
1892  150 VH with acceptable mortality of 7.6%
1938  2 Large series of 348 and 311 cases – no deaths and low morbidity, both authors concluded that Vaginal Hysterectomy should be the operation of choice whenever possible.
2009  Position statement of ACOG, AAGL and Cochran Data Base. Vaginal Hysterectomy should be the operation of choice whenever possible.

CURRENT STATUS
• 600 000 US cases per annum
• 5 Billion Health Care $
CURRENT TRENDS

SAFETY

• Condition of being protected from, or unlikely to cause danger, risk or injury.

<table>
<thead>
<tr>
<th>Complication</th>
<th>ABO Hyst</th>
<th>VAG Hyst</th>
<th>LH Hyst</th>
<th>Robotic Hyst</th>
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<tr>
<td>Febrile Disease</td>
<td>10%</td>
<td>12%</td>
<td>9%</td>
<td></td>
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<tr>
<td>VT (Clinical)</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>VT (Special Inv.)</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td></td>
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<tr>
<td>GU Tract</td>
<td>1-2%</td>
<td>1-2%</td>
<td>2.5-3.4%</td>
<td></td>
</tr>
<tr>
<td>UTI</td>
<td>7.4%</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urinary</td>
<td>&lt;0.1%</td>
<td>0.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GI Tract</td>
<td>0.1-1%</td>
<td>0.1-1%</td>
<td>0.1-1%</td>
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<td>Haemorrhage</td>
<td>236-660ml</td>
<td>215-287ml</td>
<td>156-388ml</td>
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<tr>
<td>Cuff deflux</td>
<td>0.55%</td>
<td>0.08%</td>
<td>7.1%</td>
<td>0.35%</td>
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<td>LMAH</td>
<td>51%</td>
<td>28%</td>
<td>1.5%</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1 Hour</td>
<td>54 min</td>
<td>1 Hour +</td>
<td></td>
</tr>
<tr>
<td>Mortality</td>
<td>0.18%</td>
<td>0.03%</td>
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</table>
EFFICIENCY
Performing or functioning in the best possible manner with the least waste of time and effort, having and using requisite knowledge, skill and industry.

SAME DAY DISCHARGE

SAME DAY DISCHARGE
ERAS – Enhanced Recovery After Surgery
LEVY BS YOONG

- N = 1,162 cases, Median age 46
- 1,029 (96%) discharged the same day after surgery.
- Median operative time = 34 min (range 17-210 minutes)
- Estimated blood loss = 45 mL (range 5-800 mL)
- Median uterine weight = 160 g (range 25-1,380 g)
- 193 patients (18%) nulliparous
- 218 (20%) prior pelvic surgery.
- 5 patients (0.5%) readmission rate within 30 days.

FRUGALITY
Frugality is the mental approach we each take when considering our resource allocations, it includes time, money, convenience and other factors depending on circumstances.

- Avoiding unnecessary expenditure
- Economical in use or expenditure
- Using money or supplies in a very careful way
- Careful about spending money or using things you do not need.
- Antonym: Wasteful, extravagant.

COST COMPARISONS

<table>
<thead>
<tr>
<th>Year</th>
<th>Robot</th>
<th>LAVH + Staples</th>
<th>LH</th>
<th>ABD Hyst</th>
<th>Vag Hyst</th>
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<tbody>
<tr>
<td>1994</td>
<td>$9 526</td>
<td>$7 161.66</td>
<td>$11 739</td>
<td>$4 926.80</td>
<td>$4 868.06</td>
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<tr>
<td>2009</td>
<td>$13 429</td>
<td>$12 031</td>
<td>$43 622</td>
<td>$9 426</td>
<td>$7 627</td>
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<tr>
<td>2012</td>
<td>$7 154</td>
<td>$32 000*</td>
<td>$11 558</td>
<td>$38 312</td>
<td>$31 934</td>
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<tr>
<td>2014</td>
<td>$13 579</td>
<td>$50 000</td>
<td>$7 059</td>
<td>$7 903</td>
<td>$4 579</td>
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<tr>
<td>2015</td>
<td>$51 000</td>
<td>$328 230</td>
<td></td>
<td></td>
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</tbody>
</table>

Hospital Income VH + $1 260 / LH - $4 049 / ROBOTIC - $4 564

Cost Drivers

The FACTS – Medicines are not a Cost Driver
Impact Of Medicines Costs On The LARGEST Open Medical Scheme

Despite SEP Increases, Medicine Expenditure is Negative Within the Largest Medical Scheme, which is a Leading Market Indicator.
If Gynecologists can’t do the right thing for their patients, and their professional society ACOG cannot persuade them, it is not surprising that insurance companies are stepping in to point them in the right direction.

We needed to do more on behalf of our members to ensure that they would get the safest and most cost effective method of hysterectomy. We consistently review our guidelines to make sure we are following evidence based guidelines.

In April of this year, one of the largest healthcare insurance providers in the US began requiring prior authorization for certain hysterectomy procedures, however vaginal hysterectomies done on an outpatient basis did not require that process. This new initiative was instituted in part to align with ACOG’s statement that the vaginal approach is associated with better patient outcomes and fewer complications than abdominal hysterectomy. This renewed emphasis on vaginal hysterectomy highlighted the fact that there is a low population of gynaecologic surgeons incorporating the vaginal approach.

To help bridge this gap and continue the mission to provide relevant, quality education to gynaecologic surgeons, AAGL has produced an intensive multi-part ‘Master Course’ webinar series on vaginal hysterectomy.

The vaginal route is the most cost-effective approach and has been shown to be effective in a variety of indications.

The Society of Pelvic Reconstructive Surgeons estimate a potential saving of US$1,184,000 for every 1000 hysterectomies performed via the vaginal route.

A reduction in complications of approximately 20%, with the sub sequential indirect economical benefits (e.g., hospital stay and early work incorporation)

The role of laparoscopic hysterectomy (LH) in current gynecological practice has yet to be defined. Two distinct groups doing laparoscopic hysterectomy exist: a very large cluster doing it instead of vaginal hysterectomy (VH) and a much smaller elitist segment doing it when vaginal hysterectomy is not possible. It is accepted that its role is to decrease the incidence of abdominal hysterectomies (AHs), not vaginal hysterectomies. The introduction of LH into current gynaecologic training and practice also serves to increase familiarity and skill of surgeons with the vaginal procedure, thus potentially converting even more abdominal procedures to a vaginal route. Reasons why the procedure has not been easily assimilated into routine gynaecological practice are discussed and trends are reviewed.
REFERENCES

4. Celine Lomerfors, Petur Reynisson, Jan Pernason. A Randomized Trial Comparing Vaginal and Laparoscopic Hysterectomy vs Robot – Assisted Hysterectomy. JMIG, January 2015, Volume 22, Number 1 pg. 78-86
5. Yanhong Guo, Xiaoyu Tian, Leina Wang. Laparoscopically – Assisted Vaginal Hysterectomy vs Vaginal Hysterectomy: Meta Analysis. JMIG, Jan/Feb 2013, Volume 20, Number 1 pg. 15 – 21
10. Allison Louise Fial-Gerald, Jason Tan et al. Comparison of Ultrasonic Shears and Traditional Suturing Ligature for Vaginal Hysterectomy: Randomized Controlled Trial. JMIG, Nov/Dec 2013, Volume 20, Number 6 pg. 853-867
Step-by-Step Simplified Technique For Vaginal Hysterectomy

Marco A. Pelosi II, MD, FACOG, FACS, FICS, FAAC
Director, Pelosi Medical Center, Bayonne, NJ
Director, OC/LDH, Bayonne Medical Center
President and Founder, One Kilo Club
President and Founder, International Society of Cosmetogynecology (ISCG)
President, American Society of Liposuction Surgery
Board of Trustees, American Academy of Cosmetic Surgery (AACS)

Disclosure:
I have no financial relationships to disclose

Marco A. Pelosi II, MD, FACOG, FACS, FICS, FAAC

Pelosi Simplified Technique of Vaginal Hysterectomy for the Non-prolapsed uterus

Marco A. Pelosi II, MD, FACOG, FACS, FICS, FAAC
Director, Pelosi Medical Center, Bayonne, NJ
Director, OC/LDH, Bayonne Medical Center
President and Founder, One Kilo Club
President and Founder, International Society of Cosmetogynecology (ISCG)
President, American Society of Liposuction Surgery
Board of Trustees, American Academy of Cosmetic Surgery (AACS)

Objectives
Discuss the proper selection of patients for VH.
Discuss newer techniques of VH.
Discuss newer strategies for safe and effective VH in the absence of prolapse and in situations with limited vaginal exposure.

Vaginal Hysterectomy

- It is well established that whenever feasible, vaginal hysterectomy is the procedure of choice to remove the uterus
- Advantages:
  - Fewer complications
  - Easier and shorter convalescence
  - Avoids abdominal scars
  - Less costly
- Most traditional contraindications to VH remain unproven:
  - Large fibroid uterus
  - Absence of uterine prolapse
  - Nulliparous
  - Previous pelvic surgery

A glimpse of the past
- In the late 1800’s and early 1900’s VH was performed with significant less mortality than abdominal hysterectomy (35%) despite of lack of antibiotics, blood transfusion, sterility and primitive anesthesia.
Efficient surgical tables, cystoscopy, and heated OR tables were available since the early 1900’s.

Operative illumination devices and lighted vaginal retractors were already in use as early as 1900.

Comprehensive instrument sets for vaginal hysterectomy were readily available.

Contraindications to Vaginal Hysterectomy

• Lack of uterine mobility – Best assessed under anesthesia by a combination of bimanual and instrumental manipulation with a uterine mobilizer.

• Suboptimal vaginal exposure
  - Vagina < 2 fingerbreadths in width, especially at the apex
  - Subpubic arch < 90°
  - Bituberous diameter < 9cm
  - Massive thighs/protruberant buttocks

• Evidence of significant benign extrauterine disease
  – Adnexal pathology
  – Endometriosis
  – Significant adhesions
  – PID
  – Unexplained chronic pelvic pain

• Malignancy

• Severe disorders of the hip and spine that cannot allow the lithotomy position.
Vaginal Hysterectomy Pelosi Technique

• The traditional Heaney VH technique and its variations are only suited for conditions that involve uterovaginal prolapse and generous vaginal exposure.

• These methods are inefficient for the difficult vaginal hysterectomy and has been the barrier to the use of VH by most current trained GYN surgeons.

• In order to overcome the limitations of the traditional techniques of VH, we have developed a modified procedure for situations associated with limited vaginal exposure, non-prolapse uterus and big uteri.

• Our further experience with this approach has also shown that it is simpler, faster, more efficient and versatile than conventional Heaney technique for less demanding cases.

Preoperative Steps

• Prophylactic antibiotics
• In patient with severe bleeding and anemia the use of gonadotropin-releasing agonists to create amenorrhea and to correct preoperative anemia is recommended.
• In patients with very large uterus (>18 week’s gestation) who are not bleeding or anemic, the use of gonadotropin-releasing agonists to decrease uterine size and blood transfusions offers little benefit.

• DVT prevention
• Cell saver
• Blood availability

Instrumentation

• Retraction instruments: Brisky-Navratil retractors; Scherback-type (2-piece retractors); Steiner-Auvard weighted speculum
• Traction instruments: Strong clamps with teeth are essential to morcellation
• Cutting instruments: long-handled stout scissors; long, broad scalpel handles; heavy scalpel blades
• Clamping instruments: Curved and straight, heavy-toothed crushing hysterectomy clamps; Heaney-Ballantine type
• Lighted suction devices

Disposable Vaginal Retractors

Ergonomically shaped and Light Weight Blade Perforations provide tissue traction
Proprietary “Z” shaped handles keeps hands away from the field.
Reduces fatigue and shoulder strain

Motivated and experienced surgical team
• Immediate laparoscopy/laparotomy availability
• General/regional anesthesia
• Adequate instrumentation
• Lithotomy position with moderate Trendelenburg:
  – Buttocks slightly hanging over the end of the table
  – Multipositional stirrups
  – Thighs bent at an angle of at least 90° with lower legs extended
Pelosi Fibrotome for Uterine Morcellation

Pelosi Triple Curvature Needle Holder

Pelosi Atraumatic Blunt Dissecting Scissors with Curved Tip

Pelosi Paddle Blunt Dissector

Vessel – Sealing Devices

LigaSure V
Gyrus PK
Harmonic Scalpel
EnSeal

Vaginal Hysterectomy

OR Set-up

• Position of OR Team: OR table level with assistant’s elbows; surgeon sits with shoulder level with operative field, scrub nurse stands behind (right-handed) surgeon’s right shoulder

Vaginal Hysterectomy Pelosi Technique

1. Hemostatic Liquid Tourniquet

Circumferential infiltration of the vaginal mucosa, uterosacral ligament complex and cervix using a solution of 20 units of vasopressin in 100ml of saline. The goal is to achieve an area of circumferential blanching around the cervix approximately 4 cm wide and along the visible length of the uterosacral ligaments.
Tumescent Anesthesia

In the author’s practice, for the last fifteen years tumescent local anesthesia combined with oral antianxiety, pain medication and with or without conscious sedation has replaced all traditional methods for the performance of cosmetic and gynecologic office surgical procedures at the Pelosi Medical Center.

Lipoabdominoplasty
Breast Augmentation
Mammoplasty – Mastopexy
Face Lifts
Thighplasty
Brachioplasty
Body Lift

Conventional GYN Surgery:
Anterior-Posterior Repairs
Slings
Vaginal Hysterectomy

Cosmetic Genital Surgery:
Labiaplasty
Vaginal Rejuvenation
Monoplasty
Labia Majora Reduction-enhancement

Vaginal Hysterectomy Pelosi Technique

2. Posterior Cervicocolpotomy
A full thickness division of the posterior cervical wall is initiated in the midline using heavy scissors with one blade inserted into the cervical canal.

The incision is continued simultaneously dividing the overlying vaginal epithelium until the peritoneum of the cul-de-sac is entered.

A retractor is placed in the opened cul-de-sac

Advantages of Posterior Cervicocolpotomy
Safe and affective in absence of prolapse and restrictive exposure
The midline of the vagina can always be reached without difficulty regardless of anatomical distortion or restricted exposure.
Peritoneal entry is anterior and away from the anterior rectal wall

Conventional Posterior Colpotomy
In the absence of uterine descensus cul-de-sac entry can be difficult, time consuming and bloody.

When exposure is limited, at least three vaginal retractors and an aggressive surgical assistance are needed.

Cul-de-sac distortion and restricted exposure usually results in bloody stripping of tissue planes and extensive lateral dissection.
Vaginal Hysterectomy Pelosi Technique

3. Anterior Colpotomy
With proper traction the cervix is pulled downward.
Incision is made on the vaginal epithelium below the bladder reflection from 3 o’clock to 10 o’clock.
Clamps are placed to grasp the upper and lower vaginal wound edges.
Lifting and tension of the upper wound edge identifies the fibers of the septum.

Vaginal Hysterectomy Pelosi Technique

4. Creation of the Vaginal Pillars
The bladder and rectum are retracted away from the cervix with retractors placed through the anterior and posterior colpotomies.
This maneuver creates a right and left vaginal pillars between the colpotomies. The pillars are composed of intact vaginal epithelium, pericervical tissue and the uterosacral-cardinal ligament complex.

Vaginal Hysterectomy Pelosi Technique

Sutureless division of the vaginal pillars (Uterosacral – Cardinal Ligament Complex)
• The division requires minimal exposure and scissors.
• Conventional clamping, cutting and ligation of the ligaments requires twelve instrument exchanges, placement of four knots and continuous adjustment of anterior and lateral retractors. Ligated stumps distort and condense tissue into bundles reducing the caliber and exposure of the vaginal cuff.
• Sutureless division does not deform or constrict the vaginal cuff.

Vaginal Hysterectomy Pelosi Technique

5. Division and Suture of the Uterine Vessels
At the conclusion of the sutureless division of the pillars, the fully exposed uterine arteries are the first structures to be clamped, cut and ligated.
• The bloodless uterosacral-cardinal ligament and the vaginal cuff will be sutured later, after the uterus has been removed – when surgical exposure is better.
6. Division of Upper Uterine Attachments

Following division of the Uterine vessels the remaining broad ligament attachments are divided and ligated.

7. Uterine Removal

The uteroovarian ligaments are clamped and disconnected from the uterus.

The ligaments are suture - ligated after removal of the uterus.

Adnexectomy

- On occasion, the removal of the ovaries and tubes may require separating the round ligament from the infundibulopelvic ligament while holding the uteroovarian ligament.
- The isolated infundibulopelvic ligament containing the ovary and tube is placed under tension, clamped and ligated.

8. Vaginal Cuff Closure

- At end of surgery the vaginal cuff is more fully exposed and undistorted than that typically viewed after conventional techniques because of absence of uterosacral and cardinal ligaments ligated stump.
- As the vaginal epithelium has not been stripped from the uterosacral/cardinal ligament complex, these structures are easily found at the lateral edges of the vaginal cuff.
- On the edges of the vaginal cuff hemostatic and supportive sutures are placed.
- Vaginal cuff is closed in transverse or vertical fashion.
- Conventional internal and external McCall-type culdoplasties are performed
- Routine bladder catheterization and vaginal packing are not required.

Uterine Bisection

Uterine bisection is frequently used to expose the uteroovarian pedicle and to expedite the removal of the uterus when exposure is limited or when the uterus fails to descend after division of the uterine vessels.

Adnexectomy

Long retractors, displacement of the bowels with laparotomy pads, and good lighting remove the challenge so often attributed to this rather simple procedure.

The removal of the ovaries and tubes is easily performed with clamping, cutting and suturing of the infundibulopelvic ligament.
Vaginal Hysterectomy Pelosi Technique

Conclusions
In our personal experience with 5,003 hysterectomies for non-prolapsed uteri, vaginal hysterectomy was successfully completed in 85% of the patients without laparoscopic assistance or conversion to laparotomy.

Vaginal hysterectomy for mobile, moderately enlarged uteri in the presence of adequate surgical exposure avoids laparotomy and does not require laparoscopic assistance.

Vaginal hysterectomy is the safest and cheapest approach and can be performed comfortably while sitting down.

The technique presented is safe, effective, inexpensive, reproducible and with few limitations given adequate motivation and average surgical skills.

Robotics do not have an application in the vaginal approach.

References
Vaginal Hysterectomy & Repair
(An unusual approach – European)

Raymond Reilly MB, BCH, BAO
Associate Clinical Professor of Obstetrics & Gynecology
Harvard Medical School

Director of Pelvic Surgery
Brigham & Women’s Hospital
Boston, Massachusetts

Disclosure:

I have no financial relationship to disclose.

Objectives:

• Compare the advantage of this method of vaginal surgery to other methods.
• Discuss simplified alternative procedure of performing a Vaginal Hysterectomy, Anterior Repair, Enterocele Repair, High Rectocele Repair & Perniorrhaphy

INSERT VIDEO
Essential Pelvic Anatomy: Prolapse Correction and Apical Support during Vaginal Hysterectomy

Michael Moen, MD, FACOG, FACS

Professor of Obstetrics and Gynecology
Chicago Medical School/Rosalind Franklin University

Bioidentical Vaginal Repair
The Safe, Natural Way to Restore Vaginal Health

Michael Moen, MD, FACOG, FACS

Professor of Obstetrics and Gynecology
Chicago Medical School/Rosalind Franklin University

Objectives

- Review anatomic factors associated with surgery for pelvic organ prolapse
- Demonstrate techniques for native tissue surgical repair of apical, anterior and posterior compartments
- Compare native tissue repairs to other options for surgical management of pelvic organ prolapse

I have no financial relationships to disclose

Pelvic Anatomy - Normal Support

Pelvic Support - Connective Tissue
Pelvic Support – Levels of support

I – Apex/Vault: uterosacral/cardinal
II – Mid/Lateral: arcus tendineus
III – Distal: endopelvic connective tissue (pubocervical “fascia”) (rectovaginal “fascia”)

POP - Principles of Surgical repair

• Reposition upper vagina upon levator plate
  – Reestablish ligamentous/connective tissue attachments at apex
• Repair/reconstruct weakened endopelvic connective tissue layers of lower vagina
  – Anterior vaginal wall
  – Posterior vaginal wall

Apex - Culdoplasty (McCall)

Apex - Sacrospinous ligament fixation

Apex - Uterosacral ligament suspension
Surgery for Apical Prolapse

Alternatives to NT repair

- Abdominally placed mesh
  - Sacro-colpopexy/cervicopexy/hysteropexy
    - Open, Lsc, Robotic
- Vaginally placed mesh
  - Anterior, Posterior, TVM
  - Trocars, Direct attachment, Custom
- Vaginally placed biologic grafts

Comparative Literature

ASC vs. SSLF - 3 RCTs

Table 2. RCTs comparing abdominal versus vaginal approaches to POP surgery

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>lush (or)</th>
<th>outcome</th>
<th>Success</th>
<th>Adverse events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarnan 1996</td>
<td>25a</td>
<td>20 mm (12.1-18)</td>
<td>Operative</td>
<td>213% (24%)</td>
<td>121% (20%)</td>
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<td>25c</td>
<td>20 mm (12.1-18)</td>
<td>Operative</td>
<td>213% (24%)</td>
<td>121% (20%)</td>
</tr>
</tbody>
</table>

Total of 293 patients operated by 3 surgeons

Current practice: 200,000 prolapse cases annually in U.S. alone

Comparative Literature

USLS Vs. SSLF - 1 RCT

Conclusions and Relevance. Two years after surgical repair for prolapse and stress urinary incontinence, neither USLS or SSLF was significantly superior to the other for anatomic, functional, or Kreinkin outcomes. Perioperative (PDA) did not improve urinary symptoms at 6 months or prolapse outcomes at 2 years.
Summary of Comparative Literature

- **Apex**
  - Open ASC “better” than SSLF (3 RCTs)
  - USLS similar to SSLF (1 RCT)
- **Anterior**
  - Vaginal mesh
    - better - anatomic outcomes (multiple RCTs)
    - no difference - QOL, satisfaction (multiple RCTs)
    - added risk of mesh-related complications
  - No data supporting use of biologic grafts
- **Posterior**
  - No data supporting use of mesh/biologic grafts

Conclusions

- Native tissue repairs should be the primary approach to surgical repair
- Apical support is a key factor in maintaining lower compartment (anterior and posterior) support
- More high-quality data is needed to compare long-term outcomes of NT repairs and other options for POP surgery

References

- Maher CF, Qatawneh AM, Dwyer PI et al. Am J Obstet Gynecol 2004;190:20–26
Recognition and Management of Complications and Rescue Technique for the Failed Vaginal Hysterectomy

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Board of Trustees, American Academy of Cosmetic Surgery (AACS)

Disclosure
I have no financial relationships to disclose.

Objectives
Discuss prevention of complications during VH.
Discuss recognizing complications during VH.
Discuss management of complications during VH.
Discuss rescue techniques for the failed VH.

Intraoperative Complications of Vaginal Hysterectomy

Significant intraoperative complications are an infrequent occurrence during vaginal hysterectomy.
With proper attention to detail, most complications can be recognized and effectively managed transvaginally.

INTRAOPERATIVE COMPLICATIONS (24,921 PATIENTS)

- Bladder injury: .35%
- Rectal injury: .37%
- Bleeding requiring laparotomy: .05%
- Ureteral injury: .005%
- Other intestinal injury: .005%

Bladder Injury
Most frequent during attempts to gain entry into the anterior cul-de-sac.
The laceration is usually small, midline and in the posterior fundus of the bladder above the interureteric ridge.
The ureteral orifices are usually a reasonable safe distance from the laceration.
When the injury is recognized intraoperatively it can be repaired with minimal subsequent morbidity and a high rate of success.
Intraoperative Complications of Vaginal Hysterectomy

**Bladder Injury**

**Recognition**
- Suspect bladder injury if dissection of the anterior cul-de-sac has been misdirected or unusually difficult (prior cesarean, endometriosis, PID, myomas)
- Suspect bladder injury if the urine becomes grossly bloody during vaginal hysterectomy

An incidental entry into the bladder may result in the escape of urine into the operative field

When bladder entry is suspected, instillation of sterile milk, indigo carmine dye or methylene blue solution into the Foley catheter can be helpful in identifying the entry site

Lack of recognition of an intraoperative bladder injury leads almost invariably to a vesicovaginal fistula

**Management**
- The repair is generally simple and straightforward
- The most important step in the repair is adequate and complete exposure of the laceration
- A multilayer repair using absorbable sutures is performed
- The initial layer starts and ends beyond the corners of the laceration
- Imbricating the first layer
- To ensure a watertight closure, 150ml of sterile milk or methylene blue solution is instilled through the catheter

If ureteric injury is suspected, 5 ml of indigo carmine dye is given IV and cystoscopy is performed.

If the laceration is seen to be clear of the trigone and the dye can be seen flowing from both ureteral orifices, the surgeon is assured that the ureters are uninjured.

After surgery, a Foley catheter/suprapubic is kept for 10 days. Irrigate the catheter to prevent clot formation that may lead to catheter obstruction, bladder distention and suture line disruption

**INADVERTENT STITCH PENETRATION OF THE BLADDER**

Inadvertent stitch penetration of the bladder at VH will result in early postoperative hematuria.

Cystoscopy may reveal clots adhered to the stitches that have been placed through the bladder wall. The stitches may be difficult to identify. The sutures should be cut through the cystoscope and attempts made to remove them.

Leaving them may result in cystitis and eventual stone formation

Intraoperative Complications of Vaginal Hysterectomy

**Urethral Injury**

Intraoperative injuries to the urethra are infrequent due to its easy identification with a Foley catheter in place.

If injury occurs, immediate repair should be undertaken to prevent postoperative fistula, stricture, or diverticula formation

Interrupted or running sutures of fine absorbable material should be used to close the mucosal defect

A separate interrupted layer should be placed to reapproximate the periurethral fascia

The vaginal wall should be advanced over the repair

Injury to the ureter during VH is uncommon. Injury is more likely to occur during VH for severe prolapse, anterior colporrhaphy or culdoplasty

Ureteral injury is unlikely to be recognized as an intraoperative complication

The ureter can be injured in many different ways: it can be ligated, transected, crushed, cauterized, or devascularized

Most ureteral injuries involve the lowest 3 cm between the ureteric vessels and the bladder
Intraoperative Complications of Vaginal Hysterectomy

Ureteral Injury

When the possibility is suspected, the intraoperative status of the ureters can be evaluated by: cystoscopic observation of indigo carmine exiting from the ureteral orifices, retrograde ureterography or intravenous pyelogram.

Management of ureteric injuries depends on the time of recognition, site and nature of the injury.

All injuries discovered intraoperatively should be repaired immediately.

If cystoscopy reveals absence of efflux from one ureter, an attempt should be made to pass a catheter up that ureter.

If an obstruction is demonstrated, the catheter is left in place while the ureter is dissected free to localize the obstruction.

If a suture is found adjacent to a kinked ureter, the suture is removed and the catheter can be passed beyond the ureteral obstruction. These patients may be managed conservatively.

If a suture is found tied around the ureter or passed through the ureter and tied, deligation should be performed.

Simple deligation should not be relied upon.

If there seems to be significant injury or transection of the ureter the damaged ureteral tissue should be removed and a ureteroneocystotomy performed.

An accidental ureter clamping should be relieved immediately.

If the ureter returns to its normal peristaltic activity and color remains normal, a stent should be placed and IVP checked in 10 days. If the system appears normal the stent can be removed.

When the clamp has been placed across the ureter and allowed to stay in place for 30 minutes or longer, the damaged tissue will lead to necrosis, ureteral stricture or fistula formation.

When the injury occurs above the midpelvis, there may not be enough proximal ureter to reach the bladder for reimplantation, an end-to-end anastomosis becomes the best option.

Transureteroureterostomy

Ureteroileocystostomy

Rectal Injury

Laceration of the rectum is an infrequent complication of vaginal hysterectomy.

Prevention is based on presurgical evaluation, good preoperative bowel preparation and proper intraoperative identification of the bowel.

Occurs most frequent during attempts to gain entry into the posterior cul-de-sac. Endometriosis or PID may obliterate the pouch of Douglas.

Suspect rectal injury if the cul-de-sac dissection has been difficult or apparently misdirected.
Intraoperative Complications of Vaginal Hysterectomy

Rectal Injury

**MANAGEMENT**

A rectal examination can demonstrate the injury and demarcate its borders.

Atraumatic clamps should be placed at each of the corners of the injury. Adequate and complete exposure of the laceration is needed.

A multilayer watertight closure is performed. The full thickness of the injury is approximated with a running sitch 3-0 absorbable suture.

A second and possibly even third imbricating layer of approximating sutures are placed in the muscular wall and serosa of the rectum.

The area should be copiously irrigated with antiseptic solution.

If the peritoneal cavity was not entered when the rectum was lacerated during colpotomy attempts, the VH should be postponed to prevent contamination and to allow healing of the injury site.

If the peritoneal cavity has been entered and the injury is relatively minor and without apparent contamination of stool through the wound, the surgeon may consider proceeding with the VH.

If there has been gross fecal contamination, the hysterectomy should probably be postponed to prevent contamination of the peritoneal cavity.

The rectum is repaired, the colpotomy is closed, copious irrigation performed and IV antibiotics given for 3-5 days.

Enemas, suppositories, and rectal examinations should be avoided during the early postoperative period.

Unrecognized or poorly repaired rectal injuries leads almost invariably to a rectovaginal fistula.

Sigmoid Colon and Small Bowel Injuries

**SIGMOID COLON:**

Injury to the sigmoid colon and small bowel is rare during VH.

Dissection of the pouch of Douglas may injury the lower portion of the sigmoid colon.

If the injury is small and clean with no significant fecal contamination and exposure is adequate, the laceration may be repaired transvaginally. Otherwise the injury should be managed transabdominally.

Seromuscular injuries without entrance into the lumen should be closed with interrupted sutures.

Small injuries on the antimesenteric border with minimal tissue destruction and peritoneal soilage, should be closed in two layers with interrupted sutures. Antibiotics are initiated and maintained for 3-5 days.

More serious injuries require bowel resection.

**SMALL BOWEL:**

Horizontal tears are best closed in the same plane. Vertical or diagonal tears, if they are long and through the full thickness of the bowel wall, are closed in the horizontal plane to avoid constriction of the lumen.

More serious injuries require bowel resection.
Intraoperative Complications of Vaginal Hysterectomy

**Sigmoid Colon and Small Bowel Injuries**

**SMALL BOWEL:**

Unexpected clamping of small bowel during VH may occur during division of the utero-ovarian or infundibulopelvic ligaments. If the inadvertent clamping goes unrecognized for more than 10 minutes the area of bowel that has been crushed will devitalize and necrose and may result in perforation 24 to 48 hours later.

A simple choice is to remove the clamp and dissect the attachments between the small bowel and the adnexa. The clamp is then reapplied to the pedicle and ligated. The damaged portion of the bowel is then inverted using several interrupted sutures through the seromuscular layers of the normal bowel.

**Hemorrhage**

Uterine or ovarian vessels are responsible for most cases of bleeding during VH. Intraoperative hemorrhage during VH can be controlled with judicious use of electrocoagulation, and/or suture ligatures.

Bleeding from a lost infundibulopelvic ligament is the most difficult to control. With careful placement of retractors and good lighting, the pedicle is visualized and grasped with a long atraumatic clamp. A long right-angle clamp is then placed above the atraumatic clamp. The proximity of the ureter must be kept in mind during clamping.

**Hemorrhage**

The Fallopian tube or ovary may be traumatized during the division/ligation of the utero-ovarian pedicles and result in significant bleeding. Bleeding from the Fallopian tube can be controlled with pressure, ligature and cautery.

Bleeding from the ovary is more difficult to stop. Cautery or suturing may exacerbate the problem. Simple observation or pressure frequently stop the bleeding. Otherwise cystectomy or oophorectomy may be necessary.

**Hemorrhage**

If at the completion of the VH multiple sites of significant bleeding are still present, a running-lock stitch can be placed circumferentially which includes the vaginal edge, a superficial portion of intervening tissue and the peritoneal edge in each bite.

**Abdominal Conversion**

**HYPOGASTRIC LIGATION:**

If it is apparent that bleeding during or immediately after completion of the VH cannot be controlled, a transabdominal approach should be promptly performed. At laparotomy bleeding sites are identified and hemostasis is obtained with clips, cautery, and sutures.

Full knowledge of the location of the ureters is important during these maneuvers.
**Intraoperative Complications of Vaginal Hysterectomy**

**Hemorrhage**

**Abdominal Conversion**

**Embolization:**
Transcatheter embolization of the pelvic arteries is an effective alternative, but only if the patient is not in shock and the radiological team has a window of 2 hours to perform the embolization.

**Tamponeade/Packing:**
If the previous strategies fail, uncontrolled hemorrhage can be treated by tamponade and packing. This strategy may be life-saving.
- Press the palm of your hand against the Aorta.
- Take a deep breath.
- Do not panic!
- Call for surgical assistance.
- If available, call for the O.R. hemorrhage team.
- Hands, clamps, sutures, and other instruments should not be used blindly in a pool of blood not knowing what tissue is grasped, pinched or sealed.

**Umbrella Packing:**
A large plastic sheet is positioned. An anterior intraperitoneal retractor is placed behind the veil. A gauze packing is pressed into the peritoneal cavity taking the central portion of the veil along with it.
When the packing is completed, the vein is fed through the center of a rubber ring or pessary and traction is applied to compress the packing against the pelvis and the source of the bleeding.
The ring and clamp are removed in 12 hours. The packing may be left in place for several days. Gradual removal usually starts 1 day after insertion.

**Abdominal Megapacking:**
When massive hemorrhage cannot be controlled, hypovolemic shock and dilutional coagulopathy with bleeding from other sites will develop. Further attempts at vascular control are useless.
Megapacking of the abdomen can be life-saving. The abdomen is packed tightly using large packs.
To prevent compartment syndrome in closing the abdomen the rectus fascia is not approximated. The skin is closed with towel clips.
Patient is transferred to ICU, intubated and a mechanical respirator used.
After stabilization, the patient is brought back to OR. The clamps and the packing are carefully removed.
Frequently, little bleeding will be found. Hemostasis can be properly controlled at this time.

**Late Hemorrhage**

If bleeding is noted during the first 24 hours a gauze packing of the vagina should be inserted after speculum examination.
If the bleeding is heavy or if it is persistent, the patient is evaluated in the OR.
Bladder is emptied, vaginal sutures are cut, all clots are evacuated and the stumps are prophylactically resutured.
**Hemorrhage after the first 24 hours** is rare and due to exaggeration of the healing process, formation of granulation tissue or infection.
Management is by vaginal packing and antibiotics.

**Broken Needle**

Breakage of surgical needles can be avoided by proper needle selection and proper use of needle holders.
Needles bent before they brake, all needles that are bent should be discarded, never to be straightened and reused.
Immediately following the telltale "clack" of a broken needle, the surgeon should not withdraw the needle holder, nor should he avert his gaze from the surgical field. Good retraction and assistance is paramount.
A radiopaque marker, such as a hemostatic clip should be placed at the entry point of the needle. A different size clip can mark the expected exit site of the needle. Once the field is marked the surgeon can gently probe the wound so as not to advance the broken tip any deeper into the tissue.
Often, a small incision made perpendicular to the expected course of the needle will reveal the retained part.
Intraoperative Complications of Vaginal Hysterectomy

Broken Needle

If the probing or incision fails to reveal the needle there are several alternatives. A sterile STRONG MAGNET can be used to retrieve the broken needle.

A small hand-held ELECTRONIC INSTRUMENT that is used in ophthalmologic surgery for localization of metallic foreign objects may be useful.

ULTRASONIC localization of retained metallic fragments is also an alternative.

The most available technique to demonstrate a broken needle is RADIOGRAPHY. Intraoperative fluoroscopy with a c-arm device is the preferred radiographic technique.

When the broken needle is found, it should be grasped with a needle holder, then ‘backed out’ or advanced along the tract of prior anticipated passage. Do not pull it straight out from its imbedded site.

Intraoperative Complications of Vaginal Hysterectomy

Missing Sponge

THE SURGEON MUST BELIEVE THE SPONGE COUNT! There is a missing sponge until every possibility of error is eliminated.

If a sponge is missing, the pathology specimen is first checked, the space around the operating table is checked, the shoe soles of the personnel in the OR are checked, and a recount is made.

If the sponge is still missing, an x-ray of the abdomen is mandatory. During the time that the x-ray of the abdomen is being ordered and taken a recheck of the count is made.

Do not take down sutures or open the peritoneum until the flat plate of the abdomen is available and examined in the OR.

When the sponge is located, it is retrieved by the simplest method possible. Remember that a blood soaked sponge or pad more or less assumes the color of the operative environment making it more difficult to spot.

In the obese patient it may be necessary to make a second film of greater intensity.

Intraoperative Complications of Vaginal Hysterectomy

Complications Due To Lithotomy Position

Neurophaties

Proper patient positioning can help avoid neurovascular complications. Gentle positioning with use of padded lithotomy props and avoidance of excessive pressure or tension to the lower extremities can prevent problems.

Treatment of all neurophaties is by physiotherapy using massage with galvanic electric stimulation of the nerves. Recovery from these injuries is usually spontaneous, but may take several weeks to months.

PERONEAL NERVE INJURY

Direct pressure from stirrups on the calf, where the peroneal nerve crosses the fibula, can occur even with short duration surgery.

SCIATIC NERVE INJURY

Proper positioning requires flexion of knee and hip and to ensure minimal external rotation of the hips.

FEMORAL NEUROPATHY

It may follow excessive external rotation of the thighs with legs in “candy cane” stirrups for longer than 1.5 hours.

ACUTE COMPARTMENT SYNDROME

It may occur after prolonged surgery in the lithotomy position due to external pressure to the fascial compartments of the leg (4).

The tough walls of the fascia cannot easily expand, and compartment pressure rises preventing adequate blood supply to the tissues contained in the compartment (blood vessels, nerves, muscles).

The pressure ischemia also creates edema which further compresses the contained tissues. Irreversible damage and death of the tissues within the compartment with loss of function can result.

TREATMENT:

Is a medical emergency requiring immediate surgical treatment (fasciotomy) to allow the pressure to return to normal. Fasciotomy is done to release all 4 compartments of the leg. The procedure should be performed within the first 12 hours.

Prognosis for recovery is good if permanent nerve and muscular damage has not occurred. Recovery may take several weeks.

Severe neuromuscular damage can be suspected if the patient develops foot drop.

ACUTE COMPARTMENT SYNDROME

CLINICAL DIAGNOSIS:

Classically, there are 6 “P”s associated with compartment syndrome:

- Pain (out of proportion to what is expected based on the physical exam)
- Paresthesia
- Pallor
- Pulselessness (Late sign)
- Polikinesia

The first signs of compartment syndrome are numbness, tingling and paresthesia. Syndromes progress to paralysis of the limb and foot drop. The leg feels very tense and firm. Tense and swollen shiny skin and bruising are also found.

The clinical diagnosis is confirmed by muscle pressure measurements (more than 30 mmHg).
Late Complications of Vaginal Hysterectomy

Intestinal obstruction  Vaginal vault prolapse
Fecal impaction  Evisceration
Rectovaginal fistula  Prolapse of Fallopian tube
Vesicovaginal Fistula  Postoperative infection
Forgotten foreign bodies  Enterocoele
Thromboembolic complications  Dyspareunia
Vaginal Stenosis

Intraoperative Complications of Vaginal Hysterectomy

References

Pelosi Minilaparotomy Rescue Technique for Failed Vaginal Hysterectomy

- A trial of vaginal hysterectomy that becomes inefficient or fails requiring conversion is not a complication.

Thank You
Pelosi Minilaparotomy Rescue Technique for Failed Vaginal Hysterectomy

VH for a large fibroid uterus was attempted. Completion of the anterior and posterior colpotomies and division of the uterosacral and cardinal ligaments was completed, but the uterine vessels could not be reached for their ligation.

• Modified lithotomy position
• Placement of Pelosi Uterine Manipulator

The patient is repositioned in the sky position. The Pelosi Uterine manipulator is placed transvaginally.

Pelosi Minilaparotomy Rescue Technique for Failed Vaginal Hysterectomy

• Cruciate minilaparotomy incision

A transverse incision of the skin and subcutaneous tissue is made. The anterior rectus fascia is exposed and incised vertically. The peritoneum is entered and extended vertically.

• Placement of soft, self-retaining abdominal retractor (Mobius)

It consists of a flexible plastic inner ring and firmer outer rim connected by a soft plastic sleeve. The inner ring is squeezed into the abdomen allowing it to spring open. The outer ring is placed under tension and rolled into the sleeve until it fits firmly against the skin.

Pelosi Minilaparotomy Rescue Technique for Failed Vaginal Hysterectomy

• Completion of hysterectomy

The Uterus is pushed upward with the uterine manipulator and the uterine fundus or the largest myoma is grasped, placed on traction and partially delivered through the incision. The stretching capabilities of the retractor allows delivery of a big uterus with a diameter much larger than the retractor. The hysterectomy is then easily completed.

Pelosi Minilaparotomy Rescue Technique for Failed Vaginal Hysterectomy

• Completion of hysterectomy

The removed 950 grams “Cannonball” uterus and the 4cm incision are shown! Patient was discharged in 12 hours.
Pelosi Minilaparotomy Morcellation Advantages

- The plastic sleeve protects the wound edges from potential infectious contamination, implantation of malignant cells and possibility of reimplantation spread and growth of endometrial tissue or fibroids at the incision edges.
- Avoids the risk of dissemination of tissue that can occur during the grinding and pulverizing effects of laparoscopic power morcellation and iatrogenic sharp tool tissue injuries.
- Extraperitoneal morcellation using a specimen bag is a simple procedure. Laparoscopic techniques that use bag morcellation are acrobatic exercises plagued with technical difficulties, time consuming and expensive.

- There is no room for the inadvertent fall of myomas or uterine tissue into the abdomen during the debulking process because a tight sealing is created between the fibroid uterus and the edges of the incision.
- The morcellation is performed under direct vision, is quick, inexpensive, simple to perform and requires only traditional tools. (scalpel, scissors and toothed clamps)
- The procedure requires only a single small suprapubic incision.
- The stretching capabilities of the retractor allows the delivery of large uterus and fibroids with a diameter much larger than the retractor.
Current Surgical Technology & Innovation To Overcome Challenges In Difficult Cases

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Disclosure:

I have no financial relationship to disclose.

Learning Objectives:

Discuss innovations to deal more easily with difficult Vaginal Hysterectomies. Simple methods of reducing larger uteri, performing Bilateral Salpingectomy and Bilateral Salpingooophorectomy with the use of simple methods and new technologies.

What Makes Difficult Vaginal Hysterectomies Easier?

Most importantly - Uterine mobility.

What Makes Difficult Vaginal Hysterectomies Easier?

Pubic Arch >90%.
What Makes Difficult Vaginal Hysterectomies Easier?

Positioning of the patient.
What Makes Difficult Vaginal Hysterectomies Easier?

Positioning of the patient.

What Makes Difficult Vaginal Hysterectomies Easier?

Uterine size.

What Makes Difficult Vaginal Hysterectomies Easier?

Instrumentation.

What Makes Difficult Vaginal Hysterectomies Easier?

Instrumentation.

What Makes Difficult Vaginal Hysterectomies Easier?

Instrumentation.
Difficult Vaginal Hysterectomy Tips:

- Use of Episiotomy.
- I never empty the bladder.
- Massage Utero-Sacral-Cardinal Complex.
- Prior C-Sections (usually no problem)
Difficult Vaginal Hysterectomy Tips:
Try to get V/S Cardinal Complex in one bite of a Glenner clamp.

Difficult Vaginal Hysterectomy Tips:
Use of vessel sealing device.

Difficult Vaginal Hysterectomy Tips:
Morcellation.

When to Consider Converting to Laparoscopy:
• Losing a vessel which has retracted and is bleeding heavily.

When to Consider Converting to Laparoscopy:
• Losing a vessel which has retracted and is bleeding heavily.
• When the uterus is so large that you cannot get to the uterine vessels prior to morcellating.
**When to Consider Converting to Laparoscopy:**

- Losing a vessel which has retracted and is bleeding heavily.
- When the uterus is so large that you cannot get to the uterine vessels prior to morcellating.
- It’s all about controlling blood loss and visualization.

**Bilateral Salpingectomy or Bilateral Salpingo-Ophorectomy:**

New technology helps in these situations:

- Vessel sealing device.
- Endoloops.

*INSERT SHORT VIDEO Demonstration*
Same-Day Discharge: Essential Protocols and Management

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Chicago Medical School/Rosalind Franklin University

I have no financial relationships to disclose

Objectives
- Discuss key concepts related to Fast-Track and Enhanced Recovery protocols
- Review literature supporting pre-op, intra-op and post-op components of outpatient care
- Compare specific outpatient protocols related to vaginal hysterectomy

Enhanced Recovery After Surgery
- Multimodal perioperative care pathway designed to achieve early recovery for patients undergoing major surgery
- Started in 1990s in Denmark for colorectal surgery
- Focus on causes of prolonged hospitalization
  - IV opiates; ileus; decreased mobility; pain
  - Pain management is major issue

Enhanced Recovery After Surgery
- Multiple specialties:
  - Colorectal surgery
  - Orthopedic surgery (Spine, Hip)
  - Breast surgery
- Abdominal Hysterectomy

ERAS for Abdominal Hysterectomy
- Pre-op components
  - Education about ERAS concept
  - Normal diet until midnight, then allowed to drink clear liquids until 2 hours before surgery
  - 400 ml clear carbohydrate drink (200kcal) given 2 hours before surgery
  - 1g Acetaminophen given PO 2 hrs before surgery
ERAS for Abdominal Hysterectomy

- **Intra-op components**
  - Goal of 2-4 ml/Kg/hr of IV fluid during surgery
  - Maintain normal body temp with hot air blanket
  - 0.625mg IV droperidol for nausea prevention
  - 4 mg betamethasone added for high-risk patients
  - 40 mg IV parecoxib (Cox-2 inhibitor) just before awakening

- **Post-op components**
  - Morphine PCA
  - Scheduled oral pain meds
    - Acetaminophen and Voltaren every 8 hours
  - Regular food offered from 2 hours after surgery
  - Ketobemidone (opioid) PO/IV prn post-op day 1
  - Foley removed 0800 first day post-op
  - Ambulate 2 hrs on day of surgery; 8 hrs POD 1

“TLC” protocol

- Tylenol (Acetaminophen)
  - 1000 mg PO
- Lyrica (Pregabalin)
  - 150 mg PO
- Celebrex (Celecoxib)
  - 200 mg PO

  given 2 hours pre-op

Pre-emptive local analgesia

- Paracervical block with 0.5% bupivacaine with 1:200,000 epinephrine
- Paracervical block with 20 ml of 0.5% bupivacaine with 1:200,000 epinephrine
  - Long et al. Int Urogynecol J 2009;20:5-10

Use of vessel sealing technology

- Energy-based vessel sealing devices decrease operating time, blood loss, and hospital stay
- Visual analog scale postoperative pain score decreased by 1.25 when energy-based vessel sealing was used (4 RCTs)

Post-op pain management

- **Multimodal approach**
  - IV medications
    - Narcotics: Dilaudid better than morphine?
    - NSAIDs: ketorolac (Toradol)
    - Acetaminophen (Tylenol)
  - PO medications
    - PRN Narcotics: hydrocodone, oxycodone, codeine
    - Scheduled NSAIDs: ibuprofen 600 mg q 6 hrs
    - Tramadol (Ultram) – 50 mg PO q 6 hrs
Adjunctive treatments

- Nausea management
  - Ondansetron (Zofran) – 4-8 mg SL
  - Metoclopramide (Reglan) – IV or PO
- Muscle relaxants
  - Cyclobenzaprine (Flexiril) – 5-10 mg PO TID
- Others
  - Melatonin, chewing gum, listening to music

Outpatient Vaginal Hysterectomy

References

- Long et al. Int Urogynecol J 2009;20:5-10
- Zakaria et al. Obstet Gynecol 2012;120:1355-61
Dealing with a Large Uterus: Vaginal Morcellation and Debunking

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Dealing with a large Uterus: Vaginal Morcellation and Debunking

Objectives:
Discuss surgical strategies for safe and effective transvaginal uterine morcellation.
Enhanced knowledge of indications and contraindications for the performance of transvaginal uterine morcellation.

Vaginal Hysterectomy for the Large Uterus

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What defines a “Large Uterus”?
Standard definition:
More than 12 weeks gestation / 280 grams

Vaginalista definition:
More than 16 weeks gestational size
Anything smaller unworthy of debate and uniformly treated by VH.

Vaginal Hysterectomy for the Large Uterus

• It is well established that whenever feasible, vaginal hysterectomy is the procedure of choice to remove the uterus
• Advantages:
Fewer complications
Easier and shorter convalescence
Avoids abdominal scars
Less costly
• Most traditional contraindications to VH remain unproven:
Absence of uterine prolapse
Nulliparous pelvic surgery
Oophorectomy

What defines a “Large Uterus”?
Our experience and that of others shows that, when feasible, VH is a safe, reproducible and effective option for removal of uteri up to 20 weeks in size.

A glimpse of the past

A systematic approach for the removal of the large uterus can be found as early as 1906

E. Wertheim, MD Leipzig, 1906

A glimpse of the past

The vaginal removal of large ovarian cysts was also routinely performed

E. Wertheim, MD Leipzig, 1906

A glimpse of the past

Eugene Doyen 1859-1916 (Paris, France), was probably the greatest vaginal surgeon who ever lived.

He simplified the operation for VH for the big uterus; in fact, there are few techniques of VH which do not bear the stamp of his genius.

He was a first class handyman and forged and turned himself many of the instruments which he invented.

He was among the first to use photographic images and motion pictures of his operations.

A glimpse of the past

Doyen created several techniques for the performance of transvaginal uterine morcellation
A glimpse of the past

Doyen created several techniques for the performance of transvaginal uterine morcellation.

Dr. Pelosi's preferred minilaparotomy morcellation technique for the megaluterus.

The successful removal of large uteri weighing more than 1 kg by VH has been reported by several authors in modern literature.

The One Kilo Club was founded in 1996 (125 members worldwide).

Membership requires the removal of a uterus that weighs 1 kg or more without a laparotomy.

The 2 Kg Vaginal Hysterectomy Barrier

In 1998 Pelosi and Pelosi reported the first vaginal hysterectomy for a uterus weighing in excess of 2 kg (2003 g).

The 2 Kg Vaginal Hysterectomy Barrier

Since then Pelosi & Pelosi have successfully removed four additional uteri weighing more than 2 kg. The largest weighing 2.083 kg.

Dr. Javier Magrina from Scottsdale, AZ (One Kilo Club member) removed 2 uteri weighing 2,083 g and 2,421 g.

Dr. Carl Zimmerman from Nashville, TN (One Kilo Club member) also broke the 2 kg barrier.

Dr. Octacilio Figueiredo from Londrina, Brazil (One Kilo Club member) has successfully removed four uteri weighing over 2kg.

Dr. Ricardo Pereyra from Londrina, Brazil (One Kilo Club member) has removed two uteri over 2kg.
Contraindications to Vaginal Hysterectomy for the Large Uterus

- Lack of uterine mobility – Best assessed under anesthesia by a combination of bimanual and instrumental manipulation with a uterine mobilizer.
- Suboptimal vaginal exposure
  - Vagina < 2 fingerbreadths in width, especially at the apex
  - Subpubic arch < 90°
  - Bituberous diameter < 9cm
  - Massive thighs/protruberant buttocks

Contraindications to Vaginal Hysterectomy for the Large Uterus

- Malignancy
- Severe disorders of the hip and spine that cannot allow the lithotomy position.

Contraindications to Morcellation

suspected uterine malignancy

- Cervical Cytology, Endometrial biopsy, pelvic imaging, tumor markers.
- History Tamoxifen use
- Pelvic radiation
- Increased genetic risk for malignancy.

Morcellation Risks

- Inadvertent trauma to surrounding tissues.
- Disruption of the surgical specimen.
- Dispersion of tissue:
  - Acute complications: Peritonitis, intraabdominal abscesses, intestinal obstruction.
  - Chronic: Disseminated fibroids, endometriosis, adenomyosis, malignancy.

Uterine Sarcomas:

- Rare, less than 1% of all GYN cancers.
- Difficult to diagnose preoperatively.
- Poor Prognosis, even in the early stage disease.
- After power morcellation, 1 in 500 will have a postoperative diagnosis of uterine sarcoma (ACOG 2014)
- Some reports indicate up staging of sarcoma secondary to peritoneal spread after morcellation.
The Impact of Uterine Shape and Size

• Preoperative imaging (US, CT scan, MRI) in addition to determining the likelihood of significant extrauterine pathology provides useful information regarding the size, location, number, and consistency of the myomas.

• Large uteri with multiple individual myomas are relatively easy to remove.

The “Cannonball” Uterus

• In big uteri access and reach to the uterine arteries and upper uterine attachments are simple when the angle between the lateral cervical and uterine borders is greater than 140°.

• The cannonball uterus is a large, round, solid and homogeneous uterus perched on top of a short cervix.

Vaginal Hysterectomy for the Large Uterus: Preoperative Steps

• Prophylactic antibiotics
• In patient with severe bleeding and anemia the use of gonadotropin-releasing agonists to create amenorrhea and to correct preoperative anemia is recommended.
• In patients with very large uteri (>18 week’s gestation) who are not bleeding or anemic, the use of gonadotropin-releasing agonists to decrease uterine size and blood transfusions offers little benefit.
• DVT prevention
• Cell saver
• Blood availability

The Impact of Uterine Shape and Size

• Large uteri homogeneous and solid in nature possessing minimal or no individual myomas are very challenging for vaginal removal.
• Large intraligamentary myomas require preoperative determination of the course of the ureter and typically predicts poor uterine mobility.

Vaginal Hysterectomy for the Large Uterus: OR Set-up

• Motivated and experienced surgical team
• Immediate laparoscopy/laparotomy availability
• General/regional anesthesia
• Adequate instrumentation
• Lithotomy position with moderate Trendelenburg:
  – Buttocks slightly hanging over the end of the table
  – Multipositional stirrups
  – Thighs bent at an angle of at least 90° with lower legs extended
Vaginal Hysterectomy for the Large Uterus: OR Set-up

- Position of OR Team: OR table level with assistant’s elbows; surgeon sits with shoulder level with operative field; scrub nurse stands behind (right-handed) surgeon’s right shoulder.

Vaginal Hysterectomy for the Large Uterus: Pelosi Technique

- The traditional Heaney VH technique and its variations are only suited for conditions that involve uterovaginal prolapse and generous vaginal exposure.
- These methods are inefficient for the difficult vaginal hysterectomy and has been the barrier to the use of VH by most current trained GYN surgeons.
- In order to overcome the limitations of the traditional techniques of VH, we have developed a modified procedure for large uterus lacking prolapse and situations associated with limited vaginal exposure.

Hemostatic Liquid Tourniquet

Circumferential infiltration of the vaginal mucosa, uterosacral ligament complex and cervix using a solution of 20 units of vasopressin in 100ml of saline. The goal is to achieve an area of circumferential blanching around the cervix approximately 4 cm wide and along the visible length of the uterosacral ligaments.

Posterior Cervicocolpotomy

- A full thickness division of the posterior cervical wall is initiated in the midline using heavy scissors with one blade inserted into the cervical canal.
- The incision is continued simultaneously dividing the overlying vaginal mucosa until the peritoneum of the cul-de-sac is entered.

Anterior Colpotomy

- With proper traction the cervix is pulled downward.
- Incision is made from 2 o’clock to 10 o’clock positions.
- A clamp is placed to grasp the upper vaginal wound edge.
- This strategy improves identification of the supravaginal septum.

Supravaginal septum is divided with scissors.

Division of supravaginal septum allows entrance into vesicocervical space.

Vesicouterine peritoneum is not entered at this stage unless it is well exposed.
Vaginal Hysterectomy for the Large Uterus: Pelosi Technique

**Sutureless Division of the Uterosacral-Cardinal Ligament Complex**

- The bladder and rectum are retracted away from the cervix with retractors placed through the anterior and posterior colpotomies.
- This maneuver creates a surgical pillar composed of the intact vaginal epithelium and the uterosacral-cardinal ligament complex.

Vaginal Hysterectomy for the Large Uterus: Pelosi Technique

**Division and Suture of the Uterine Vessels**

- The continuing effect of the liquid tourniquet maintains hemostasis. The uterosacral-cardinal ligament complex is not sutured until the uterus has been removed – when exposure is much greater.
- At the conclusion of this step, the fully exposed uterine arteries are the first structures to be clamped, cut and ligated.
- The anterior peritoneum is then opened and the bladder emptied.

Vaginal Hysterectomy for the Large Uterus: Pelosi Technique

- Using heavy scissors a full-thickness division of the pillar including the vaginal epithelium is carried out.
- The procedure is repeated contralaterally.
- Minimal dissection of residual tissue exposes the uterine arteries.

Uterine Debulking

- Offers a safe and efficient means to complete VH for the large uterus.
- Should be attempted only after the uterine arteries are severed (with some exceptions).
- Contraindications: Suspected uterine malignancy; irreducible limited vaginal exposure; lack of uterine mobility and inability to bring the partially debulked uterus towards the surgeon.

Uterine Debulking

**Instrumentation**

- Retraction instruments: Brisky-Navratil retractors; Scherback-type (2-piece retractors); Steiner-Auvard weighted speculum.
- Clamping instruments: Strong clamps with teeth are essential to morbidity.
- Cutting instruments: long-handled stout scissors; long, broad scalpel handles; heavy scalpel blades.
- crushing instruments: Curved and straight, heavy-toothed crushing hysterectomy clamps; Heaney-Ballantine type.
- Lighted suction devices.

Uterine Debulking Techniques

**Hemisection (Bivalving)**

The cervix is seized with clamps at the 3 and 9 o’clock positions and traction is applied while the uterus is in line with the midline anteriorly and posteriorly. Myomas in the line of incision are bisected together with the uterus or enucleated and removed separately. Internalizing one-half upon completion of the division facilitates exposure and ligation of the contralateral upper pedicles.
Uterine Debulking Techniques

Hemisection (Bivalving)
Internalizing one half upon completion of the division facilitates exposure and ligation of the contralateral upper pedicles.

Intramyometrial Coring
Best suited for removal of smoothly enlarged globular uterus with strong cervical traction. Coring is initiated in the isthmic area. Outer myometrium immediately beneath the uterine serosa is circumferentially incised with scalpel or scissors. As this maneuver is continued, the enlarged uterine fundus delivers as an elongated, sausage-shaped mass caused by inversion of the serosa and fundus: “peeling a banana.”

Wedge Morcellation
• Technique of choice for grossly enlarged uterus & when coring and hemisection fail.
• Central uterine mass is grasped and incised bilaterally with scalpel and clamps to create oval or triangular wedges of tissue, which are then removed from the midline.
• Efforts should be made to effect debulking symmetrically about midline of the uterus.

Posterior Fundal Morcellation
The technique is useful when there is ample exposure posteriorly, but the uterine corpus cannot be delivered by simple traction. Cervix is pulled upwards and the posterior uterine body or fundus drawn flush with introitus. Wedges of tissue are excised from posterior fundus until specimen delivers by traction.

Removal of Large Pedunculated Myomas
If feasible, they can be removed attached to the uterus following the hysterectomy or independently after their division from the uterus.
Uterine Debulking Techniques

- Cervical amputation may be required when progress can be made only by removing the cervix.
- A gynecologic episiotomy provides increased exposure when the lower third of the vagina outlet is constricted posteriorly.

Control of Upper Uterine Attachments

- During the process of morcellation a critical point in the reduction of uterine mass is reached at which the uterine fundus will deliver with traction and rotation.
- At this point, traction on the exteriorized specimen must be minimized to avoid tearing and avulsion of the upper uterine attachments.
- Exposure must be generated laterally to clamp the remaining broad ligament and proximal adnexal attachments under direct vision.

Vaginal Hysterectomy for the Large Uterus: Pelosi Technique

Adnexectomy
- Long retraction, displacement of the bowels with a laparotomy pad, and good lighting remove the challenge so often attributed to this rather simple procedure.
- A clamp can be placed on the infundibulopelvic ligament or meso-ovarium.
- Removal of ovaries/tubes is expedited by separating the round ligament from infundibulopelvic ligament.
- We found of little value the use of endoloops or laparoscopic instruments to accomplish adnexectomy of little value.

Vaginal Cuff Closure
- At end of surgery the vaginal cuff is more fully exposed and undistorted than that typically viewed after conventional techniques because of absence of uterosacral and cardinal ligaments ligated stumps.
- On the edges of the vaginal cuff hemostatic and supportive sutures are placed.
- Vaginal cuff is closed in transverse or vertical fashion.
- Conventional McCall type culdoplasty is performed.
- Routine bladder catheterization and vaginal packing are not required.

Vaginal Hysterectomy for the Large Uterus

- Experience with our last 100 consecutive vaginal hysterectomies for uteri 16 weeks gestational size or larger revealed successful completion of VH in 93 patients.
- No blood transfusions were required.
- No intraoperative/postoperative complications.
- 7 failed VH procedures required conversion to minilaparotomy.

Pelosi Minilaparotomy Rescue Technique for Failed Vaginal Hysterectomy

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Pelosi Minilaparotomy Rescue Technique for Failed Vaginal Hysterectomy

- A trial of vaginal hysterectomy that becomes inefficient or fails requiring conversion is not a complication.

In situations where VH fails, the Pelosi Minilaparotomy technique can successfully avoid the need for a large laparotomy incision and its associated morbidity, or a time-consuming, frustrating, and expensive laparoscopic rescue attempt.

VH for a large fibroid uterus was attempted. Completion of the anterior and posterior colpotomies and division of the uterosacral and cardinal ligaments was completed, but the uterine vessels could not be reached for their ligation.

A transverse incision of the skin and subcutaneous tissue is made. The anterior rectus fascia is exposed and incised vertically. The peritoneum is entered and extended vertically.

The patient is repositioned in the sky position. The Pelosi Uterine manipulator is placed transcervically.

A cruciate minilaparotomy incision is made. A transverse incision of the skin and subcutaneous tissue is made. The anterior rectus fascia is exposed and incised vertically. The peritoneum is opened and extended vertically.

It consists of a flexible plastic inner ring and firmer outer rim connected by a soft plastic sleeve. The inner ring is squeezed into the abdomen allowing it to spring open. The outer ring is placed under tension and rolled into the sleeve until it fits firmly against the skin.
Pelosi Minilaparotomy Rescue Technique for Failed Vaginal Hysterectomy

- Completion of hysterectomy

The Uterus is pushed upward with the uterine manipulator and the uterine fundus or the largest myoma is grasped, placed on traction and partially delivered through the incision.

The stretching capabilities of the retractor allows delivery of a big uterus with a diameter much larger than the retractor.

The hysterectomy is then easily completed.

Pelosi Minilaparotomy Morcellation Advantages

- The plastic sleeve protects the wound edges from potential infectious contamination, implantation of malignant cells and possibility of reimplantation spread and growth of endometrial tissue or fibroids at the incision edges.

- Avoids the risk of dissemination of tissue that can occur during the grinding and pulverizing effects of laparoscopic power morcellation and iatrogenic sharp tool tissue injuries.

- Extraperitoneal morcellation using a specimen bag is a simple procedure. Laparoscopic techniques that use bag morcellation are arduous exercises plagued with technical difficulties, time consuming and expensive.

Pelosi Minilaparotomy Morcellation Advantages

- There is no room for the inadvertent fall of myomas or uterus tissue into the abdomen during the debulking process because a tight sealing is created between the fibroid uterus and the edges of the incision.

- The morcellation is performed under direct vision, is quick, inexpensive, simple to perform and requires only traditional tools (scalpel, scissors and toothed clamps)

- The procedure requires only a single small suprapubic incision.

- The stretching capabilities of the retractor allows the delivery of large uterus and fibroids with a diameter much larger than the retractor.

Vaginal Hysterectomy for Large Uterus

- Gynecologists proficient in art of vaginal surgery already have the necessary skills to perform VH for the large uterus

- VH for mobile, large uteri in presence of adequate surgical exposure avoids laparotomy and does not require laparoscopic assistance

- The approach is feasible and reproducible with few limitations given adequate motivation and experienced surgical team

- Minilaparotomy is a logical alternative to laparoscopy and laparotomy for a failed vaginal hysterectomy

References
Contraindicated Vaginal Hysterectomy for the Big Uterus

The Pelosi minilaparotomy hysterectomy offers the technical simplicity and economics of laparotomy and the convalescent advantages of laparoscopy in terms of postoperative pain, cosmetic results and return to normal activities.
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.