Didactic/Simulation Lab:
Hysteroscopy 360° Beyond the Basics – Maximize Treatment, Minimize Failures

PROGRAM CHAIR
Aarathi Cholkeri-Singh, MD

Stefano Bettocchi, MD
Scott G. Chudnoff, MD, MS
Gretchen E.H. Makai, MD
Kirsten J. Sasaki, MD
Maria Teresa Tam, MD

Amber Bradshaw, MD
Amy L. Garcia, MD
Stephanie N. Morris, MD
S. Sony Singh, MD, FRCSC, FACOG
Kelly N. Wright, MD

Angela Chaudhari, MD
Matthew R. Hopkins, MD
Nigel Pereira, MD, FACOG
Courtney Steller, DO

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This educational activity is developed to meet the needs of surgical gynecologists in practice and in training, as well as other healthcare professionals in the field of gynecology.

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Hysteroscopy is an important skill for all gynecologists. It is a skill that continues to evolve due to improving optics, instrumentation and fluid monitoring systems. It can be a straightforward surgical solution to diagnose and treat pathology, thus improving patients’ quality of life. However, anticipated as well as unexpected clinical situations can arise, and the outcome of your case and your patient’s experience may depend on your ability to manage these events. What can we, as surgeons, do to ensure completion of our hysteroscopic cases and improve patient outcomes? In this course, a combination of didactics and hands-on simulation will allow the participant to expand their knowledge beyond the basics of hysteroscopy. The participant will apply prevention and management techniques to overcome intraoperative difficulties in order to minimize short-term risks and long-term complications that can occur in every day practice.

**Learning Objectives:** At the conclusion of this course, the clinician will be able to: 1) Identify difficult case scenarios and implement strategies to achieve optimal surgical outcomes; 2) prevent and manage complications; and 3) compare and identify best utilization of various instrumentation.

**Course Outline**

12:30 Welcome, Introductions and Course Overview

12:35 Hysteroscopy Overview: Indications and Instrumentation

12:50 Approaching Difficult Anatomy, Minimizing False Tracts

1:05 Tips and Tricks for Difficult Essure Placement and Removal

1:25 Endometrial Ablation and Long-Term Outcomes

1:45 Managing Large Intracavitary Fibroids

2:00 Hysteroscopy Complications: Prevention, Recognition and Management

2:20 Questions & Answers

2:35 Hands-on Lab Introduction

2:40 **LAB I: Hysteroscopy Ergonomics**
   • Perform diagnostic hysteroscopy
• Perform operative hysteroscopy with scissors and graspers for polypectomy and septum transection models
• Perform tubal occlusion with Essure placement

LAB II: Hysteroscopic Morcellators  K.J. Sasaki, M.T. Tam, K.N. Wright
• Perform operative hysteroscopy for polyps, fibroids, retained products of conception and visual D&C utilizing hysteroscopic morcellators

• Review proper ergonomics of resectoscopy to perform myoma resection or endometrial ablation
• Review role of 5 FR electrodes
• Review principles of electrosurgery

LAB IV: Endometrial Ablation  A. Bradshaw, M.R. Hopkins
• Proper use of endometrial ablation devices; reinforcing indications and contraindications

4:25  Questions & Answers  All Faculty
4:30  Adjourn
PLANNER DISCLOSURE
The following members of AAGL have been involved in the educational planning of this workshop (listed in alphabetical order by last name).
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R. Edward Betcher*
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Speakers Bureau: Myriad Genetics Lab
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Consultant: Olympus
Erica Dun*
Joseph (Jay) L. Hudgens
Contracted Research: Gynesonics
Frank D. Loffer, Medical Director, AAGL*
Suketu Mansuria
Speakers Bureau: Covidien
Linda Michels, Executive Director, AAGL*
Karen C. Wang*
Johnny Yi*

SCIENTIFIC PROGRAM COMMITTEE
Sawsan As-Sanie
Consultant: Myriad Genetics Lab
Jubilee Brown*
Aarathi Cholkeri-Singh
Consultant: Smith & Nephew Endoscopy
Speakers Bureau: Bayer Healthcare Corp., DySIS Medical, Hologic
Other: Advisory Board: Bayer Healthcare Corp., Hologic
Jon I. Einarsson*
Suketu Mansuria
Speakers Bureau: Covidien
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FACULTY DISCLOSURE
The following have agreed to provide verbal disclosure of their relationships prior to their presentations. They have also agreed to support their presentations and clinical recommendations with the “best available evidence” from medical literature (in alphabetical order by last name).
Stefano Bettocchi
Consultant: Karl Storz
Amber Bradshaw
Speaker Bureau: Myriad Genetics Lab
Other: Proctor: Intuitive Surgical
Angela Chaudhari*
Aarathi Cholkeri-Singh
Consultant: Smith & Nephew Endoscopy
Speakers Bureau: Bayer Healthcare Corp., DySIS Medical, Hologic
Other: Advisory Board: Bayer Healthcare Corp., Hologic
Scott G. Chudnoff*
Amy L. Garcia
Consultant: Gynesonics, Minerva Surgical, NVision
Matthew R. Hopkins*
Gretchen E.H. Makai*
Stephanie N. Morris*
Nigel Pereira*
Kirsten J. Sasaki*
S. Sony Singh
Speakers Bureau: AbbVie, Allergan, Bayer Healthcare Corp.
Courtney Steller*
Maria Teresa Tam
Consultant: Bayer Healthcare Corp.
Contracted Research: Smith & Nephew Endoscopy
Other: Clinical Trainer: Merck
Kelly N. Wright
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OBJECTIVE

Explain diagnostic and operative hysteroscopy and instrumentation.

HYSTEROSCOPY INDICATIONS

- Vaginal or Cervical examination
- Evaluation of abnormal uterine bleeding
- Infertility evaluations
- Pre- and post-surgical evaluation
- Surgical procedures

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- Vaginal or Cervical examination
- Evaluation of abnormal uterine bleeding
- Infertility evaluations
- Pre- and post-surgical evaluation
- Surgical procedures

VAGINAL OR CERVICAL EXAMINATION

- Diagnostic
  - Inadequate speculum exam – pediatric, obese, postmenopausal with severe atrophy
  - Vaginal endometriosis
  - Pelvic floor mesh erosions
  - Vaginal fistula
  - Cervical pathology
- Operative
  - Excision of vaginal or cervical lesions
  - Vaginal septum
HYSTEROSCOPY INDICATIONS

- Vaginal or Cervical examination
- Evaluation of abnormal uterine bleeding
- Infertility evaluations
- Pre- and post-surgical evaluation
- Surgical procedures

ETIOLOGY OF AUB

- Pregnancy
- Infection
- Hormonal
- Hematologic
- Structural
- Retained products of conception
- Fibroids
- Polyps
- Adenomyosis
- Endometritis
- Hyperplasia
- Cancer

HYSTEROSCOPY INDICATIONS

- Vaginal or Cervical examination
- Evaluation of abnormal uterine bleeding
- Infertility evaluations
- Pre- and post-surgical evaluation
- Surgical procedures

CONDITIONS OF THE UTERINE CAVITY AFFECTING FERTILITY

- Endometrial polyps
- Uterine fibroids
- Intrauterine synechia
- Congenital defects

PREOPERATIVE PLANNING


- Type 0 – 100% within cavity
- Type I – > 50% within cavity
- Type II – < 50% within cavity

- 2 surgeries may be required for Type II or larger fibroids
- Avoid resecting opposing fibroids
HYSTEROSCOPY INDICATIONS
- Vaginal or Cervical examination
- Evaluation of abnormal uterine bleeding
- Infertility evaluations
- Pre- and post-surgical evaluation
- Surgical procedures

SURGICAL PROCEDURES
- Biopsy/D&C
- Retrieval of foreign body/IUD
- Insertion of tubal occlusion device
- Metroplasty
- Adhesiolysis

POLYPECTOMY
- Myomectomy
- Ablation
- Evacuation of retained products of conception
- Embryoscopy

CONTRAINDICATIONS
- Viable intrauterine pregnancy
- Active pelvic infection
- Known cervical or uterine cancer

INSTRUMENTATION
- Flexible Hysteroscope
- Fiber-optic
- 0° lens with 240° range of visual field
- Single channel
- 3-4 mm diameter
- IV tubing/cysto tubing or syringe
DIAGNOSTIC Hysteroscopy

- Rigid
  - Rod lens - 12°, 25°, 30°
  - Single-flow
- OD - 2.8 mm, 4.1 mm, or 5.2 mm
  - Can perform vaginoscopy to avoid use of speculum and tenaculum
- Continuous flow
  - OD - 3.6 mm, 4.5 mm, or 6.2 mm
  - Able to proactively flush the uterine cavity

OPERATIVE Hysteroscopy

- Rigid scope
  - Rod lens
    - 0°, 12°, 25°, 30°
  - Single sheath
  - OD - 5.5 mm
  - Can perform vaginoscopy to avoid use of speculum and tenaculum
- 5-7Fr instrument channel
- Continuous flow

OPERATIVE HYSTEROSCOPY

- Operative Instruments
  - 5-7 Fr
  - 35 cm in length
  - Semirigid
  - Greater stability for direction and cutting

HYSTEROSCOPY GENERAL PEARLS

- Open inflow and outflow valves with insertion of hysteroscope. The saline flow will aid insertion and assist in achieving good visualization quickly. The fluid will flush blood and clots and assist in the exchange of fluid.
- Consider vaginoscopy aka No Touch hysteroscopy
- Insert the hysteroscope sheath with the obturator in place for larger scopes (curved edge – less cervical trauma)
- Increasing uterine pressure setting at start of procedure will aid in achieving good visualization rapidly but then uterine pressure can be reduced.
- Maintain pressure at the lowest setting that maintains adequate distention and provides good visualization. Lower pressure, lower intravasation.
- Pressure to open tubal ostia > 75 mmHg

OPERATIVE HYSTEROSCOPY

- Bipolar electrodes
  - 5 Fr
  - 40 cm in length
  - Flexible
  - Vaporization, Cut and Desiccation
  - Normal saline distension medium

OPERATIVE HYSTEROSCOPY

- Electrosurgical Resectoscope
RESECTOSCOPY ADVANTAGES

- Long experience
- Suitable for pedunculated and sessile abnormalities
- Suitable for endometrial ablation
- Coagulation
- Histology specimen available

RESECTOSCOPY CHALLENGES

- Difficult
- Time consuming tissue removal
- Perforation risk
- Long learning curve
- Multiple insertions
- Visibility disturbing elements
  - Cervical mucus
  - Gas bubbles
  - Tissue fragments
  - Blood clots

RESECTOSCOPE ELECTRODES

RESECTOSCOPY PEARLS

- Activate electrode before contact
- Never extend an activated electrode
- Allow spark to generate energy
- If bubbles obscure field, increase outflow to remove

VAPORIZATION

DESICATION
HYSTEROSCOPIC MORCELLATORS

- Continuous flow hysteroscopy
- Use of saline
- Regulation of intrauterine pressure and liquid flow
- Cutting device with suction
- Mechanical tissue removal – instant
- Shorter learning curve
- Less risk of perforation

HYSTEROSCOPIC MORCELLATOR PROCEDURES

- Polypectomies
- Myomectomies
- Retained Products of Conception (RPOC) Evacuation
- Diagnostic Visual Dilatation & Curettage (D&C)
- Hysteroscopic Adhesiolysis
- Endometrial Biopsy

HYSTEROSCOPIC MORCELLATORS

- Instructions
  - Two handed technique: hold the hand piece in your dominant hand and scope in the other hand
  - May try holding scope & handpiece in vertical vs. horizontal position
  - Position the scope close to the intracavitary lesion to clearly visualize
  - Move the scope and device as one; activate footswitch while maintaining good contact with tissue

HYSTEROSCOPIC MORCELLATORS

- Confirm the cutting window has a good "bite" of tissue inside
  - If you can see inside the inner tube, you are only resecting fluid out of the uterine cavity
HYSTEROSCOPIC MORCELLATORS

- Running the morcellator in open cavity for a short time will aid in clearing visual field of debris. Remove clots by activating morcellator.
- Keep pathology between morcellator blade opening (black line on morcellator is in line with blade opening) and optics of camera.
- When morcellizing pathology, work from the periphery to the base.

DISTENSION MEDIA

- Diagnostic hysteroscopy
  - CO2 gas
  - Normal saline
- Operative non-electrosurgical hysteroscopy
  - Normal saline
- Resectoscopy
  - Bipolar - Normal Saline
  - Monopolar – Glycine, Sorbitol or Mannitol

FLUID MANAGEMENT

- Diagram of fluid management system with labels and connections.
Objective

Describe how to approach difficult anatomy

The most difficult part of the procedure...?

TO GET INTO THE UTERINE CAVITY...!!
Challenging the cervix: strategies to overcome the anatomic impediments to hysteroscopy: analysis of 31,052 office hysteroscopies

18 years in 2 Italian University Centers

CLASSIFICATION
- Type 1: Stenosis of the E.C.O.
- Type 2: Combined stenosis of distal third of the cervical canal and I.C.O.
- Type 3: Stenosis of the I.C.O.
- Type 4: Combined stenosis of E.C.O. & I.C.O.

STRATEGIES FOR OVERCOMING STENOSIS
- TECHNIQUE #1: Adhesiolysis with the tip of the hysteroscope
- TECHNIQUE #2: Adhesiolysis with 5Fr grasping forceps with teeth (grasp & rotate)
STRATEGIES FOR OVERCOMING STENOSIS

• TECHNIQUE #2: Adhesiolysis with 5Fr grasping forceps with teeth (grasp & rotate)

THE LIMITS OF OFFICE “MECHANICAL” SURGERY WITHOUT ANESTHESIA or ANALGESIA (4,863 cases)
JAAGL, Febr. 2004

STRATEGIES FOR OVERCOMING STENOSIS

• TECHNIQUE #3: Adhesiolysis with 5Fr scissors

THE LIMITS OF OFFICE “MECHANICAL” SURGERY WITHOUT ANESTHESIA or ANALGESIA (4,863 cases)
JAAGL, Febr. 2004

I.U.O. Anatomical Impediments

MOST OF THE IMPEDIMENT TO THE CORRECT EXECUTION OF THE HYSTEROSCOPIC PROCEDURE CAN BE SOLVED IN THE OFFICE

STRATEGIES FOR OVERCOMING STENOSIS

• TECHNIQUE #4: Adhesiolysis with 5Fr bipolar electrodes
RESULTS

10.156 Cervical Stenosis over 31.052 procedures (32.7%)

- Type 4 stenosis the most common one (44.3% - p<.001)
- All the CS more frequent in menopausal patients (70.1% - p<.001), except Type 1 (64.6% - p<.001)

TREATMENT

10.004 C.S. (98.5%)
MANAGED SUCCESSFULLY

- Successful: 8.724 procedures, 85.9%
- Incomplete: 1.280 procedures, 12.6%
- Failed: 152 procedures, 1.5%

TREATMENT

10.004 C.S. (98.5%)
MANAGED SUCCESSFULLY

- Successful: when access to and visualization of the entire uterine cavity (including both tubal ostia) was possible during the same procedure
- Incomplete: when access to uterine cavity was possible, but the entire uterine cavity could not be examined due to patient’s reaction or anatomical problems. The uterine cavity was then visualized during a second access, days or weeks after
- Failed: when access to uterine cavity was not possible. Failed hysteroscopies were then referred for an ultrasound-guided hysteroscopy under loco-regional or general anaesthesia

TREATMENT

10.004 C.S. (98.5%)
MANAGED SUCCESSFULLY

- Technique #1 the more used strategy to overpass all CS (39.8% - p<.001)
- Bipolar electrode more used in Type 1 & Type 4 CS (39.7% - p<.001)

WE PERFORMED A SURGICAL ACT BEFORE BEING DIAGNOSTIC

CAN WE WORK BETTER AND FASTER? CAN WE IMPROVE THE RESULTS?

- Measurement of the I.U.P.
- Size of the Hysteroscopes
- New Energies
THANK YOU!
Tips and Tricks for Difficult Essure Placement and Removal
Amy Garcia, MD
AAGL/SRS Fellowship-Trained in MIGS
Director, Center for Women’s Surgery
Clinical Assistant Professor, University of New Mexico
Department of Obstetrics and Gynecology
Albuquerque, New Mexico

Disclosure

• Consultant: Gynesonics, Minerva Surgical, NVision

Objectives

» Identifying the difficult procedure
» Observe video demonstration difficult procedures management
» Incorporate troubleshooting techniques for successful outcomes

Change Entry Angle

* Video presentations of difficult Essure procedures with troubleshooting techniques

2011 ACOG Update Clinical Data Bulletin Hysteroscopic Sterilization

“Now that a less complicated and more effective method has been established, our credo as obstetricians and gynecologists to optimize outcome by reducing risk and maximizing efficacy, really compels our specialty to critically re-examine the laparoscopic paradigm for tubal sterilization.”

Dr. Andrew Brill
September 2015 Advisory Committee to discuss Essure Safety and Effectiveness

The FDA has been examining safety concerns about Essure raised by patients and cited in Medical Device Reports (MDR). We convened a meeting of the Obstetrics and Gynecology Devices Panel of the Medical Devices Advisory Committee on September 24, 2015 to:

- discuss currently available scientific data pertaining to Essure’s safety and effectiveness,
- hear expert scientific and clinical opinions on the risks and benefits of the device, and
- hear concerns and experiences of women implanted with Essure.

Meeting participants and the panel also discussed recommendations for:

- Additional prospective clinical data collection to better understand adverse events such as allergic reaction and autoimmune response, persistent pain, device removal, migration, perforation or fragmentation and bleeding;
- Improved physician training and education;
- Improved patient counseling and education to facilitate informed decision-making; and
- Labeling modifications.

The Advisory Committee meeting provided valuable information and perspectives the FDA considered to inform our next steps.

http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/ImplantsandProsthetics/EssurePermanentBirthControl/ucm452254.htm

2016 JMIG

Special Article

AAIG Advisory Statement: Essure Hysteroscopic Sterilization

AAIG: Advancing Minimally Invasive Gynecology Worldwide

Conclusion

Women must be fully informed of the risks, benefits, indications, and alternatives to hysteroscopic sterilization and be able to maintain their right to choose. With appropriate selection and a thorough preoperative workup, hysteroscopic sterilization offers women a less invasive alternative with clear advantages over traditional sterilization techniques including no incision or abdominal entry, no requirement for general anesthesia, and the ability to be performed in an office-based setting [11]. After hysteroscopic sterilization, women
Endometrial Ablation and Long Term Outcomes

Matthew R Hopkins, MD
Chair of Education – OB/GYN
Assistant Professor OB/GYN
Mayo Clinic, Rochester MN

Disclosure
• I have no financial relationships to disclose

Objectives
• Define heavy menstrual bleeding
• Discuss treatment indications for endometrial ablation
• Discuss rates and reasons for treatment failure of endometrial ablation
• Review and manage common sequelae of endometrial ablation

Outline
• Indication
• Goal of Treatment
• Device Selection
• Patient Selection
• Post Ablation Events

Treatment Indication
• Heavy Menstrual Bleeding
  • “for clinical purposes, heavy menstrual blood loss (HMB) should be defined as excessive menstrual blood loss which interferes with the woman’s physical, emotional, social and material quality of life”
• Not
  • Irregular Bleeding
  • Dysmenorrhea
  • PMDD

What is Heavy Menstrual Bleeding?

Review of the confusion in current and historical terminology and definitions for disturbances of menstrual bleeding

NICE clinical guideline 44, January 2007
### Comparison of Non-resectoscopic Endometrial Ablation Devices

<table>
<thead>
<tr>
<th>Device</th>
<th>Delivery System</th>
<th>Trade Name</th>
<th>Device Diameter (mm)</th>
<th>Single Use (S) / Reusable (R)</th>
<th>Pre-treatment Max Uterine Sound Length (cm)</th>
<th>Submucous Myomas Allowed?</th>
<th>Myoma Size / Type‡</th>
<th>Endpoint Determination Device</th>
<th>Surgeon Endpoint</th>
<th>Typical Treatment Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heated fluid (balloon)</td>
<td>Mechanical</td>
<td>ThermaChoice 5.5 S</td>
<td>Medical</td>
<td>Mechanical or medical</td>
<td>10</td>
<td>Yes</td>
<td>≤ 3 cm / type II</td>
<td>D8 .0</td>
<td>Surgeon</td>
<td>10</td>
</tr>
<tr>
<td>Cryogenic</td>
<td>Option</td>
<td>Cryo Option 4.5 S</td>
<td>Medical</td>
<td>Medical</td>
<td>10</td>
<td>No</td>
<td>N/A</td>
<td>S 10</td>
<td>Surgeon</td>
<td>10</td>
</tr>
<tr>
<td>Microwave</td>
<td>Medical</td>
<td>MEA 8.0 R/S</td>
<td>Medical</td>
<td>Medical</td>
<td>14</td>
<td>Yes</td>
<td>≤ 3 cm / type II; selected type I</td>
<td>Surgeon</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>RF*</td>
<td>Bipolar</td>
<td>NovaSure 7.2 S</td>
<td>None</td>
<td>None</td>
<td>10</td>
<td>Yes++</td>
<td>≤ 2 cm</td>
<td>1.5</td>
<td>Surgeon</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*RF = radiofrequency alternating current.

‡ Type O myomas are entirely intracavitary, on a stalk; type I are sessile but have a 50% or more of their maximum circumference within the endometrial cavity; type II myomas have less than 50% of their maximum circumference within the endometrial cavity.

+ There is insufficient data to determine the type and dimension of myomas treatable with HTA.

++ Myomas 2 cm or less allowed, but no data available regarding clinical outcomes at this time.

Adopted from: Munro MG. Clin Obstet Gynecol 49;4:736-766

---

### By treating HMB with endometrial ablation......

**What are we trying to accomplish?**
- Reduce menstrual blood flow
- Improve quality of life
- Improved utilization of resources

Initially, GEA has similar efficacy compared to Hysterectomy with lower cost and complication rates

These favorable outcomes diminish with time because 30% of patients required hysterectomy within 4 years after ablation.
**Data Synthesis**

- Despite knowledge of the prognostic factors, the outcome of endometrial ablation cannot be predicted for an individual.

**Are there predictors of failure of endometrial ablation?**


**What are the reported predictors of failure?**

- Young age
- Retroverted Uterus
- Endometrial Thickness >4mm
- Prolonged duration of menstruation
- Dysmenorrhea
- Atypical Pain
- Previous Tubal Ligation
- Large Uterus
- Hormonal Pretreatment
- Uterine Polyp
- Submucous Leiomyoma
- Cesarean Section

**Previous Tubal Ligation Is a Risk Factor for Hysterectomy After Endometrial Ablation**

- Mall A et al. Obstet Gynecol 2002;100:638-64

**Age as a Risk Factor for Hysterectomy After Endometrial Ablation**

- Mall A et al. Obstet Gynecol 2002;100:638-64

**Fig. 1.** Probability of hysterectomy by endometrial ablation technique: life-table method. Log rank test, P>.63.


Longinotti MK et al. Obstet Gynecol 2008;112:1214-20
Preoperative Dysmenorrhea Is a Risk Factor for Treatment Failure

Pre-treatment predictors of treatment failure

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Univariate HR</th>
<th>P value</th>
<th>Multivariate HR</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt; 45 years</td>
<td>2.6 (0.8, 7.1)</td>
<td>0.034</td>
<td>2.4 (0.3, 2.1)</td>
<td>0.885</td>
</tr>
<tr>
<td>Parity ≥ 5</td>
<td>4.8 (2.4, 9.9)</td>
<td>&lt;0.001</td>
<td>6.0 (2.5, 14.8)</td>
<td>0.015</td>
</tr>
<tr>
<td>BMI ≥ 30 kg/m²</td>
<td>0.8 (0.3, 1.5)</td>
<td>0.208</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous CS</td>
<td>0.7 (0.3, 1.6)</td>
<td>0.400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tubal ligation</td>
<td>2.5 (1.6, 4.6)</td>
<td>0.001</td>
<td>2.2 (1.2, 4.0)</td>
<td>0.011</td>
</tr>
<tr>
<td>Accordion (yes)</td>
<td>1.8 (0.9, 3.5)</td>
<td>0.100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myomectomy</td>
<td>1.5 (0.8, 2.7)</td>
<td>0.180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-op dysmenorrhea</td>
<td>3.9 (1.7, 8.7)</td>
<td>0.004</td>
<td>2.1 (1.2, 4.0)</td>
<td>0.014</td>
</tr>
<tr>
<td>Uterine length &gt; 9 cm</td>
<td>1.0 (0.5, 1.6)</td>
<td>0.940</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retroverted/oblique</td>
<td>1.0 (0.3, 3.3)</td>
<td>0.970</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemoglobin ≥ 12 g/dL</td>
<td>1.8 (0.9, 3.6)</td>
<td>0.084</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endo. thick ≥ 24 mm</td>
<td>0.8 (0.3, 2.4)</td>
<td>0.730</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine polyp</td>
<td>0.6 (0.3, 1.4)</td>
<td>0.220</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submucous fibroid</td>
<td>1.0 (0.3, 3.1)</td>
<td>0.940</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TBA (yes/FA)</td>
<td>1.5 (0.8, 2.9)</td>
<td>0.240</td>
<td>1.5 (0.8, 2.9)</td>
<td>0.240</td>
</tr>
</tbody>
</table>

† Univariate P<0.2 ‡ Previously reported in the literature

The final multivariate Cox proportional hazards model for the predictors of treatment failure after GEA*

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Adjusted HR</th>
<th>95% CI</th>
<th>P value**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt; 45 years</td>
<td>2.6 (1.3, 5.1)</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td>Parity ≥ 5</td>
<td>6.0 (2.5, 14.8)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Tubal ligation</td>
<td>2.2 (1.2, 4.0)</td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td>Dysmenorrhea</td>
<td>3.7 (1.6, 8.5)</td>
<td>0.003</td>
<td></td>
</tr>
</tbody>
</table>

* Adjusted for the type of the ablation procedure ** The C-statistics of this model is 0.755

Table 6. Examples of the expected probability of treatment failure based on pretreatment variables*

<table>
<thead>
<tr>
<th>Age &lt; 45 Dysmenorrhea Tubal ligat</th>
<th>1 year</th>
<th>3 years</th>
<th>5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>1% (0.2)</td>
<td>3% (1.5)</td>
<td>5% (1.8)</td>
</tr>
<tr>
<td>+</td>
<td>3% (1.5)</td>
<td>7% (2.12)</td>
<td>10% (3.17)</td>
</tr>
<tr>
<td>+</td>
<td>3% (1.5)</td>
<td>5% (4.12)</td>
<td>12% (6.18)</td>
</tr>
<tr>
<td>+</td>
<td>9% (0.10)</td>
<td>11% (0.22)</td>
<td>17% (0.31)</td>
</tr>
<tr>
<td>+</td>
<td>7% (3.12)</td>
<td>17% (8.24)</td>
<td>24% (12.35)</td>
</tr>
<tr>
<td>+</td>
<td>10% (0.20)</td>
<td>23% (1.40)</td>
<td>32% (2.54)</td>
</tr>
<tr>
<td>+</td>
<td>12% (1.2)</td>
<td>26% (3.44)</td>
<td>37% (4.59)</td>
</tr>
<tr>
<td>+</td>
<td>24% (4.4)</td>
<td>45% (12.76)</td>
<td>64% (14.84)</td>
</tr>
</tbody>
</table>

Probabilities of failure are presented with their 95%CI based on Cox regression Modeling * Excluding those who are para 5
Criteria for Patient Selection

- Pivotal Trial Criteria
  - Age 30 upwards
  - Childbearing is complete
  - Normal sized uterus

- Outcomes Data
  - Age 40 or older
  - History of tubal ligation
  - Premenstrual dysmenorrhea

...and... low risk for developing endometrial hyperplasia...and... treatment aligns with patient expectation

Postablation Events

- Treatment Failure
  - "Late Onset Endometrial Ablation Failure*"
  - Bleeding +/- Pain
- Postablation Uterine Synechiae
- Subsequent Evaluation
- Post Ablation-Tubal Ligation Syn.
- Post GEA cancer
- Post GEA pregnancy

Indications for Hysterectomy After Endometrial Ablation

<table>
<thead>
<tr>
<th>Indication</th>
<th>N (234)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal bleeding</td>
<td>389</td>
<td>51.6</td>
</tr>
<tr>
<td>Pelvic pain</td>
<td>166</td>
<td>22</td>
</tr>
<tr>
<td>Pain and bleeding</td>
<td>153</td>
<td>20.3</td>
</tr>
<tr>
<td>其他</td>
<td>77</td>
<td>6.1</td>
</tr>
</tbody>
</table>

*Wortman M, Cholkeri A et al. JMIG 2015
Case Presentation

- 31yo G2P2 (LTCS, BTL) presented with heavy menstrual bleeding, "significant" dysmenorrhea that required ibuprofen every 6 hours for 4 days, monthly. Despite counseling, she requested endometrial ablation stating her neighbor had one and loved it.

Case Presentation

- Pelvic examination was normal, as was pelvic ultrasound
- RF ablation; uterine sound 9cm, global ablation documented

Case Presentation

- 3 years post ablation, presented with worsening cyclic pelvic pain, amenorrhea. Managed with NSAID
- 6 months later, no improvement, pain 8/10, now constant
- Pelvic US ordered

Post Ablation Synechiae

- Cornual Hematomata
- Central Hematomata
- Adenomyosis

Post-Ablation Tubal Sterilization Syndrome

DUANE e. Townsend, MD; VANCE McCausland, ARTHUR McCausland, GARY FIELDS, MD; and KEVIN KAUFFMAN, RN

Objective: To determine the cause of unilateral or bilateral pelvic pain associated with vaginal spotting in women who had previously undergone tubal ligation followed by rollerball endometrial ablation.

Methods: Women who had undergone previous tubal sterilization followed by rollerball endometrial ablation were evaluated laparoscopically and hysteroscopically when they presented with symptoms consistent of peritoneal irritation, suggestive of an ectopic pregnancy.

Results: During a 1.5-year observation period, six women with the symptom complex had laparoscopy and hysteroscopy. In all cases, marked endometrial scarring was noted. In every case, the proximal portions of either one or both fallopian tubes were swollen, and two cases had the appearance of an early ectopic pregnancy. In the remaining cases, the fallopian tubes were swollen and supplied by a much as twice normal size. Symptoms in five of six patients subsided after laparoscopic removal of the oviduct.

Conclusion: It appears that women who have had a tubal sterilization followed by endometrial ablation are at risk of developing an ectopic-like symptom complex. Salpingectomy appears to be effective in relieving symptoms. Whether this represents a new syndrome or just an unusual association between tubal sterilization and endometrial ablation remains to be seen.
Partial rollerball endometrial ablation: A modification of total ablation to treat menorrhagia without causing complications from intrauterine adhesions

Arthur M. McCausland, MD and Vance M. McCausland, MD
Sawrmen and Eva, Angeles, California

OBJECTIVE: Our purpose was to demonstrate that intrauterine adhesions and menometra do not occur after a partial rollerball endometrial ablation and that menorrhagia can be successfully treated by this procedure for patients without deep adhesions.

METHODS: The patients with hypometrorrhea were randomly assigned to two treatment groups (without or with local anesthesia). One group was treated with rollerball endometrial ablation and the other group was treated with balloon catheterization. The data were analyzed with the Student t-test.

RESULTS: No complications were observed in either group. The patients treated with rollerball endometrial ablation had significantly lower hemoglobin levels and required fewer days of hospitalization compared to the patients treated with balloon catheterization.

CONCLUSION: Partial rollerball endometrial ablation can successfully treat menorrhagia in patients without deep adhesions. It does not cause intrauterine adhesions, which may lead to hemostasis and potentially delay the diagnosis of endometrial cancer.

Key words: Endometrial ablation, menorrhagia, hemorrhage, rollerball.
Post Endometrial Ablation Pain

- Other causes
  - Leiomyoma
  - Adenomyosis
  - Pelvic floor myalgia
  - Endometrial cancer

**Other causes**
- Leiomyoma
- Adenomyosis
- Pelvic floor myalgia
- Endometrial cancer

Pathologic Characteristics of Hysterectomy Specimens in Women Undergoing Hysterectomy after Global Endometrial Ablation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Bleeding n &gt; 34</th>
<th>Pain n &gt; 15</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uterine weight</td>
<td>145 (65.6)</td>
<td>173.2 (139.6)</td>
<td></td>
</tr>
<tr>
<td>Endometrial finding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proliferative</td>
<td>17 (50)</td>
<td>7 (37)</td>
<td></td>
</tr>
<tr>
<td>Secretory</td>
<td>11 (32)</td>
<td>3 (16)</td>
<td></td>
</tr>
<tr>
<td>Atrophic</td>
<td>4 (12)</td>
<td>4 (21)</td>
<td></td>
</tr>
<tr>
<td>Ablative necrosis</td>
<td>2 (6)</td>
<td>4 (21)</td>
<td></td>
</tr>
<tr>
<td>Adenomyosis</td>
<td>10 (29)</td>
<td>6 (32)</td>
<td>.87</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>4 (12)</td>
<td>2 (11)</td>
<td>.49</td>
</tr>
<tr>
<td>Endosalpingiosis</td>
<td>1 (3)</td>
<td>5 (26)</td>
<td>.03</td>
</tr>
<tr>
<td>Ablative necrosis</td>
<td>18 (53)</td>
<td>15 (51)</td>
<td>.96</td>
</tr>
<tr>
<td>Leiomyoma</td>
<td>18 (53)</td>
<td>10 (32)</td>
<td></td>
</tr>
<tr>
<td>Leiomyoma + Adenomyosis</td>
<td>163</td>
<td>22.4</td>
<td></td>
</tr>
<tr>
<td>Cancer/Pre cancer</td>
<td>12</td>
<td>1.6</td>
<td></td>
</tr>
</tbody>
</table>

Pathologic Findings of Hysterectomy Specimens After Endometrial Ablation

<table>
<thead>
<tr>
<th>N (728)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leiomyoma</td>
<td>243</td>
</tr>
<tr>
<td>Adenomyosis</td>
<td>172</td>
</tr>
<tr>
<td>Leiomyoma + Adenomyosis</td>
<td>163</td>
</tr>
<tr>
<td>Cancer/Pre cancer</td>
<td>12</td>
</tr>
</tbody>
</table>

**Case Presentation**

- 47yo G2P2 with a history of hypertension and obesity (BMI 36kg/m²) presented with vaginal spotting of 6 months duration. She RF ablation 5 years ago, with complete cessation of menses. Endometrial biopsy was benign at the time of ablation.

**Treatment Options**

- Symptom relief
- Endometrial suppression
- Endometrial recanalization
  - “reoperative hysteroscopic surgery”*
- Bilateral salpingectomy
- Hysterectomy


**What to do Next?**

1. Reassure, bleeding sometimes resumes after EA
2. Draw FSH to ascertain postmenopausal status
3. Order pelvic US
4. Attempt office biopsy with hysteroscopy
5. Schedule for a hysterectomy
Case Presentation

- ORIGINAL REPORT - 08-Dec-2009 18:47:00
- Slightly heterogeneous echotexture of the myometrium which may be due to small fibroids. Endometrial stripe measures 3mm. Nabothian gland cyst: 1.8 x 2.0 x 2.2cm simple cyst in the right ovary. Left ovary looks normal with some very small follicles.

What to do Next?

1. Reassure, US showed normal ES 3mm
2. Attempt office biopsy with hysteroscopy
3. Schedule for a hysterectomy

Office Hysteroscopy and Biopsy

The patient was placed in the dorsal lithotomy position. The cervix was prepped with Betadine. A 3-mm flexible hysteroscope was introduced through the cervical os into the endometrial cavity. The endometrial cavity was inspected and normal appearing. At the point where one would expect the lower uterine segment, there was some contraction of the cavity. We were able to gently probe this area with the hysteroscope, and it did open up into a small cavity. We were only able to advance the hysteroscope to approximately 5 cm. The endometrial biopsy catheter was inserted to 4.5 cm. Endometrial biopsy was performed. A large amount of tissue was obtained. The hysteroscope was withdrawn. The endometrium was evaluated. A large amount of tissue was obtained. The endometrial cavity was normal. Frozen section demonstrated a minimal complex hyperplasia. They felt there was likely a grade 1 endometrial adenocarcinoma present but are going to hold on until the permanent sections before making the diagnosis.

Case Presentation

Vaginal Bleeding After Endometrial Ablation

- Avoid ablating patients at high risk for endometrial cancer
- Intramural leiomyoma
- Investigate any interval bleeding or change in pattern

Case Presentation

Vaginal Bleeding After Endometrial Ablation

- Office Hysteroscopy
- Endometrial Biopsy
- Sonohysterogram
  - Ultrasound indeterminate*
- Must evaluate endometrial cavity
- Assess the adequacy of evaluation
- Low threshold for hysterectomy

*AlHilli MM et al. Ultrasound Quarterly 2012

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Post-Ablation Endometrial Cancer

- Retrospective Cancer Registry Cohort Study
- 509 post ablation patients
- 2 cases of EC vs. 1.66 expected


Endometrial Cancer After Endometrial Ablation; A Systematic Review

<table>
<thead>
<tr>
<th>N (17)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk for EC</td>
<td>14</td>
</tr>
<tr>
<td>Bleeding as PC</td>
<td>13</td>
</tr>
<tr>
<td>Stage I @ Diagnosis</td>
<td>13</td>
</tr>
<tr>
<td>Endometrial Bx</td>
<td>11</td>
</tr>
<tr>
<td>Not performed</td>
<td>3</td>
</tr>
<tr>
<td>Bx not possible</td>
<td>2</td>
</tr>
<tr>
<td>Abnormal pap</td>
<td>1</td>
</tr>
</tbody>
</table>


Pregnancy Following Endometrial Ablation

- 70 pregnancies
  - 31 Viable
  - Perinatal mortality 12.9%
  - Preterm delivery 42%
  - Placenta accreta 26%


Pregnancy After Endometrial Ablation

- Poor obstetric outcomes
  - Spontaneous miscarriage
  - Ectopic pregnancy
  - Antepartum hemorrhage
  - IUGR
  - PPROM
  - Placenta accreta
  - Fetal anomalies (Synechia)

Pregnancy After Endometrial Ablation

Contraceptive information after endometrial ablation

We reviewed the records of the patients considered “fertile” in a consecutive series of 206 patients treated by intrauterine balloon ablation for dysfunctional uterine bleeding, and three pregnancies were observed among 58 patients (5.2%), with two spontaneous abortions and a placenta accreta at 26 weeks. These findings lead us to conclude that balloon ablation is not contraceptive and that use of a supplemental contraceptive method should be planned.

Hysteroscopic endometrial ablation and nonhysteroscopic endometrial thermal ablation are the first-line conservative surgical treatments for dysfunctional uterine bleeding. Their use reduces the rate of hysterectomies for this common problem. Because of their effects on the endometrium and uterine cavity (synechiae), these treatments are indicated only for patients who do not wish to remain fertile. (Fertil Steril® 2005;84:1746-7. ©2005 by American Society for Reproductive Medicine)


Pregnancy After Endometrial Ablation

Table 1. Pregnancy longer than 26 weeks

<table>
<thead>
<tr>
<th>Reference</th>
<th>Gestational age</th>
<th>Method of ablation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24 weeks</td>
<td>Hysteroscopic</td>
</tr>
<tr>
<td>2</td>
<td>26 weeks</td>
<td>Thermal</td>
</tr>
<tr>
<td>3</td>
<td>28 weeks</td>
<td>Hysteroscopic</td>
</tr>
</tbody>
</table>

Table 2. Pregnancy less than 26 weeks

<table>
<thead>
<tr>
<th>Reference</th>
<th>Gestational age</th>
<th>Method of ablation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>20 weeks</td>
<td>Laparoscopic</td>
</tr>
<tr>
<td>5</td>
<td>22 weeks</td>
<td>Hysteroscopic</td>
</tr>
<tr>
<td>6</td>
<td>24 weeks</td>
<td>Thermal</td>
</tr>
</tbody>
</table>

Gervaise et al Fertil Steril 2005;84:1746-7
Pregnancy After Endometrial Ablation

- Counsel for additional contraception
- Permanent sterilization
- Avoid concomitant hysteroscopic sterilization (FDA, ACOG)

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Aberdeen Endometrial Ablation Trials Group, Br J Obstet Gynaecol 1999

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Dickersin et al, Obstet Gynecol. 2007

Aberdeen Endometrial Ablation Trials Group, Br J Obstet Gynaecol 1999
OBJECTIVES
At the conclusion of this activity, participants will be better able to:

- Identify the “Large” Intracavitary Fibroid
- Apply an approach to minimizing risk and maximizing benefit at Hysteroscopic Myomectomy
- Recognize red flags for surgical risks and how to prepare for them

** SYLLABUS Materials are provided for reference and may not be covered during the presentation***

3 QUESTIONS

- How to Optimally Prepare for Hysteroscopic Myomectomy?
- Are there intraoperative tips/suggestions for increasing success while reducing morbidity?
- Do I need to consider postoperative follow up?

WHAT IS “LARGE”?

31 Oz

IT’S WHAT’S INSIDE THAT COUNTS...
WHAT IS LARGE?
- Type I fibroids > 5-6cm
- Type II Fibroids > 4-5cm
- Alternative Definitions?

Di Spiezio et al 2008

What is the Calculation for the Volume of an Elipsoid?

Volume = \( \frac{4}{3} \pi abc \)

Fibroid Volume

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Volume (m(^3))</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 cm</td>
<td>14.1 cm(^3)</td>
</tr>
<tr>
<td>5 cm</td>
<td>65.5 cm(^3)</td>
</tr>
<tr>
<td>10 cm</td>
<td>523.6 cm(^3)</td>
</tr>
</tbody>
</table>

APPROACHES TO “LARGE” UTERINE FIBROIDS

US, SIS, MRI

Hysteroscopy
Laparoscopy
Open

Normal Uterine Size Does Not Preclude an Intrauterine Lesion: Cavity Assessment

Hysterectomy for Failed Medical Management of Bleeding
Intrauterine Type 0 Fibroid Found After Surgery

PALM-COEIN Classification of AUB

PALM = Visually objective structural criteria
COEI = unrelated to structural anomalies
N = entities not yet classified

Pituitary: Congenital
d Adenomyosis: Oralatory Dysfunction
Leiomyoma: Malignancy & Hyperplasia
Endometrial: Extragenic
Not Yet Classified

Leiomyoma Subclassification System

PALM = visually objective structural criteria
COEI = unrelated to structural anomalies
N = entities not yet classified

M - Submucosal
1: Submucosa endometrium
2: Submucosa anterior, 100% intramural
3: Submucosa posterior, 50% intramural
4: Submucosa posterior, 50% extramural
5: Submucosa anterior, 50% intramural
6: Submucosa posterior, 50% extramural
7: Submucosa outwardly
8: Other (specify eg. cervical, parasite)

M - Subserosal
1: Subserosal intramural
2: Subserosal anterior, 100% intramural
3: Subserosal posterior, 50% intramural
4: Subserosal posterior, 50% extramural
5: Subserosal anterior, 50% intramural
6: Subserosal posterior, 50% extramural
7: Subserosal outwardly
8: Other (specify eg. cervical, parasite)

M - Intrauterine
1: Intrauterine 100% intramural
2: Intrauterine anterior, 50% intramural
3: Intrauterine posterior, 50% extramural
4: Intrauterine anterior, 50% extramural
5: Intrauterine posterior, 50% intramural
6: Intrauterine anterior, 50% extramural
7: Intrauterine posterior, 50% intramural
8: Other (specify eg. cervical, parasite)
Hysteroscopic Fibroid Classification

ESH Classification


European Society of Hysteroscopy

Serosa to Fibroid Distance!

---

SCORING TO PREDICT SUCCESS/RISK OF HYSTEROSCOPIC MYOMECTOMY

**Table I:** Lasmar’s pre-surgical classification of submucous myomas

<table>
<thead>
<tr>
<th>Points</th>
<th>Penetration Size, cm Base</th>
<th>Third Lateral Wall (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>&lt;50%</td>
<td>1/3</td>
</tr>
<tr>
<td>2</td>
<td>&gt;50%</td>
<td>2/3</td>
</tr>
</tbody>
</table>

Score: + + + + +

---

TECHNIQUE DECISION

Hysteroscopy

Optimize

Hysteroscopy Alone + Laparoscopy + Ultrasound

---

Factors Affecting Myomectomy

- Surgeon Experience
- Pathology
- Equipment Availability
- Patient Factors
- Patient Preference

---

Medical Preoperative Optimization

**Heavy Menstrual Bleeding/Anemia**
- Amenorrhea
- Reduced need for transfusion

**Fibroid Shrinkage**
- Improve access, may allow minimally invasive surgery
- Reduce blood flow, less intraoperative blood loss

**Pelvic Pain/Pressure Symptoms**
- Improve QoL
- Treatment while waiting for surgery
Donnez et al. (1995) have described the effects of GnRHa and UPA on fibroid volume reduction. The median change in fibroid volume (% of baseline) for each treatment group is shown in the table below.

### MEDICAL OPTIMIZATION OPTIONS

- **GnRHa**
- **Vol Reduction**
- **UPA**
- **Other (Danazol)**

### UPA vs GnRHa: Reduction in Fibroid Volume

<table>
<thead>
<tr>
<th>Treatment Course</th>
<th>GnRHa (%).</th>
<th>UPA (%).</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-10.3</td>
<td>-10.5</td>
</tr>
<tr>
<td>2</td>
<td>-10.0</td>
<td>-10.0</td>
</tr>
<tr>
<td>3</td>
<td>-10.0</td>
<td>-10.0</td>
</tr>
<tr>
<td>4</td>
<td>-10.0</td>
<td>-10.0</td>
</tr>
<tr>
<td>5</td>
<td>-10.0</td>
<td>-10.0</td>
</tr>
</tbody>
</table>

The table above shows the median change in fibroid volume (%) after each treatment course. The treatment courses are as follows:

- **UPA (n = 3)**
- **GnRHa (n = 3)**
- **UPA (n = 3)**
- **GnRHa (n = 3)**

### ENDOMETRIUM PREPARATION

- **GnRHa**
- **Progestins**
- **Other (Danazol)**

Endometrium Preparation can be achieved through various methods, including GnRHa, Progestins, and Other (Danazol) treatments.
Hysteroscopic Myomectomy

What’s your practice?

Emerging data on pre-surgical use of ulipristal acetate

- Design: 3 months of UPA vs. no medical treatment prior to hysteroscopic myomectomy (retrospective analysis)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>UPA pre-tx (n=25)</th>
<th>No pre-tx (n=25)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete resection</td>
<td>92%</td>
<td>68%</td>
<td>0.034</td>
</tr>
<tr>
<td>Operative time (mean ± SD)</td>
<td>28.6 ± 11.0 min</td>
<td>37.4 ± 17.6 min</td>
<td>0.048</td>
</tr>
<tr>
<td>Fluid infused (mean ± SD)</td>
<td>15116 ± 4103ml</td>
<td>14300 ± 5113ml</td>
<td>NS</td>
</tr>
<tr>
<td>Fluid absorbed (mean ± SD)</td>
<td>498 ± 329ml</td>
<td>637 ± 483ml</td>
<td>NS</td>
</tr>
<tr>
<td>Patient satisfaction 3 months post-op</td>
<td>81%</td>
<td>50%</td>
<td>0.041</td>
</tr>
</tbody>
</table>


- "The subjective opinion of the three surgeons was that feasibility was similar in both groups."
- "No serious complications were reported in either group."

Sancho et al. EJOG/EB 2016

Systematic Review

GnRH agonist versus nothing...

- "Inadequate evidence to support routine use of preoperative GnRH analogues before Hysteroscopic resection of Submucosal fibroids"
- Only 2 trials with 86 women!

Kamath et al. 2014

Complete Resection and Time

Fluid absorption

Kamath et al. 2014
Hysteroscopic Myomectomy Optimization

- Surgical optimization day of procedure
  - Reduce fluid absorption
  - Thin the endometrium and improve visualization
  - Reduce bleeding
- Submucosal fibroids > 3.0 cm
  - Consider 3 months GnRH agonist to maximize volume reduction (reduction in volume 30% to 60%) and thin endometrial lining
- < 3.0 cm - 1 month (4 weeks preoperation)

GnRH Agonists and/or SPRMs for Fibroids?

- Benefit of reduced fluid absorption at hysteroscopy and visualization
- Suggestion (expert consensus opinion)
  - Start UPA for immediate symptom relief and anemia correction
  - Prior to hysteroscopy utilize GnRH agonists for optimal intraoperative harm reduction
- 2014 Systematic Review: insufficient evidence to recommend GnRHa for routine use

PATIENT BLOOD MANAGEMENT

- Amenorrhea
  - Continuous OCP
  - Progestins
  - GnRHa
  - UPA
- Iron replacement
  - Oral
  - IV
  - CHECK FERRITIN!

Preoperative Anemia Contributes to Increased Mortality and Morbidity in Women Undergoing Gynecological Surgery
**SOGC Guidelines: Correction of Anemia Prior to Surgery**

Anemia should be corrected prior to proceeding with elective surgery. (II-2A). Selective progesterone receptor modulators and gonadotropin-releasing hormone analogues are effective at correcting anemia and should be considered preoperatively in anemic patients. (I-A)

**INTRAOPERATIVE RISK REDUCTION - BLEEDING**

- Tranexamic Acid IV
- PGE1 analog
- Vasopressin*

**INTRAOPERATIVE RISK REDUCTION**

- ULTRASOUND*
- LAPAROSCOPY
- FLUID BALANCE
- KNOW WHEN TO STOP

**Hysteroscopic Myomectomy**

- Complete fibroid excision of SUBMUCOSAL fibroids
  - Avoid “just the surface”
- Single versus multiple steps?
  - Timing
- Tools
  - Resectoscope versus hysteroscopic morcellators?
  - Bipolar versus monopolar
- Cold Loop (Mazzon)
- OPPluM Technique (Cicinelli E et al)
- Multiple Slicing 1 Step (Zayed et al)

**TECHNIQUES**

Slicing technique to treat totally intracavitary and partially intramural submucous fibroid in office setting with 5Fr bipolar electrodes. ‘a’ refers to the first half-sphere and ‘b’ to the second.

(A) The rectangular loop is inserted into the plane between the fibroid and myometrium to progressively dissect it from the myometrial wall (B) Connective bridges which join the fibroid and the adjacent myometrium are hooked by the single tooth cold loop (Images by I. Mazzon).

COMPLICATIONS

- Uterine Perforation
- Intravasation and electrolyte imbalance
- Intrauterine adhesions
- Risk of Uterine Rupture (?)

POSTOPERATIVE CHECK ALWAYS!
OBJECTIVES

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

▶ Identify the “Large” Intracavitary Fibroid

▶ Apply an approach to minimizing risk and maximizing benefit at Hysteroscopic Myomectomy

▶ Recognize red flags for surgical risks and how to prepare for them

REFERENCES

Objective
Discuss complications of hysteroscopy.

Complications of Hysteroscopy - Early
- Cervical trauma
- Uterine perforation
- Hemorrhage
- Distension media complication
- Air or gas embolism

Complications of Hysteroscopy - Late
- Adhesion formation
- Infection
- Hematomata
- Nerve injuries

Disclosure
- Consultant: Smith & Nephew Endoscopy
- Speakers Bureau: Bayer Healthcare Corp., DySIS Medical, Hologic
- Other: Advisory Board: Bayer Healthcare Corp., Hologic
Cervical Laceration & Uterine Perforation - Prevention

- EUA with an empty bladder
- Adequate cervical dilation
- Gentle insertion of instruments
- Introduce under direct visualization or palpation
- Advance only during unobstructed view

Cervical Laceration & Uterine Perforation - Prevention

- Misoprostol – 200-400mcg buccal or vaginally prior to procedure
- Dilute Vasopressin – 20 units in 100ml saline inject 20mL total

Cervical Laceration & Uterine Perforation - Prevention

- Misoprostol
  - Greater initial cervical dilation
  - Dilation required less often
  - Less time required for dilation
  - Less cervical laceration
- Abd cramps, diarrhea, bleeding, fever

Cervical Laceration & Uterine Perforation - Prevention

- Vasopressin
  - RCT – double blinded
  - Dilute vasopressin vs placebo into the cervical stroma at 4 and 8 o’clock
  - Peak linear force was measured
  - Mean total peak was 1 vs 2 lbs, P<0.001
  - “Definitive explanation of the mechanism awaits further investigation.”

Uterine Perforation

- Most common complication (~1%)
- Occurs most often during cervical dilation
- Highest risk patients –
  - Ashermans and cervical stenosis

Uterine Perforation - Risk Factors

- Cervical stenosis
- Acutely flexed uterus
- Postmenopausal atrophy
- Lower segment myoma
- Intrauterine adhesions
- Uterine anomaly
UTERINE PERFORATION = TERMINATION!

Uterine Perforation - Management
- Fundal perforation without RF energy
  - Discontinue case and observe
- Fundal with RF energy
  - Laparoscope to inspect for visceral injury
- Lateral perforation
  - Laparoscope to assess for broad ligament hematoma
- Anterior perforation
  - Cystoscopy

Complications of Hysteroscopy - Early
- Cervical trauma
- Uterine perforation
- Hemorrhage
- Distension media complication
- Air or gas embolism

Hemorrhage
- Foley catheter
  - 25cc saline-filled balloon
  - Leave in cavity for 4-6 hours, deflate 50%, observe, and then remove if no bleeding
  - If bleeds on deflation, re-inflate and leave in cavity for 24 hours with appropriate antibiotic coverage
  - Consider repeat hysteroscopic examination with directed coagulation if bleeding persists
- Intrauterine vasopressin soaked in gauze
- Laparoscopic/Laparotomic evaluation with repair of perforation
- Uterine artery ligation
- Embolization
- Hysterectomy

Complications of Hysteroscopy - Early
- Cervical trauma
- Uterine perforation
- Hemorrhage
- Distension media complication
- Air or gas embolism
Distension Media Complications - *Intravasation*

- **Factors**
  - Intrauterine pressure
  - Mean arterial pressure
  - Depth of myometrial invasion
  - Partial perforation
  - Length of surgery

- **Intravasation**
  - Intrauterine pressure
    - Distension – 60-75 mmHg
  - Venous sinuses
    - Submucous myomata
    - Deep myometrial resection
  - Minimal protective effects of MAP
  - *Goal to maximize vision & minimize intravasation*

Distension Media Complications - *Intravasation*

- ** Vasopressin**
  - RCT – double blinded
  - Decreased blood loss
  - Decreased intravasation (448 vs 819 mL)
  - Decreased OR time
  - *Avoiding cervical trauma may decrease intravasation*

Uterine Distension Media Complications - *Nonviscous solutions*

- **Electrolyte-containing media**
  - Saline, LR - Isotonic

- **Electrolyte-free media**
  - 1.5% glycine - Hypotonic
  - 3% sorbitol - Hypotonic
  - Mannitol - Isotonic

Distension Media Complications

- **Electrolyte-containing media**
  - Pulmonary edema and CHF

- **Electrolyte-free media, non-conductive**
  - Free water intoxication
  - Hyponatremia
  - Cerebral edema
  - Death

Fluid Deficit Monitoring

- Automated fluid management highly desirable
  - Removes the human factor
  - Allows for early warning of excess deficit
  - Provides the relative rate of intravasation

- If mechanical monitoring is unavailable, a dedicated person should tally deficit

- Both anesthesiologist and surgeon should be aware of deficit on a frequent basis

Distension Media Complications - Prevention

- Electrolyte-free media parameters
  - 750 mL deficit (1000 mL with NS)
    - Signals impending need to complete the procedure
  - 1000 mL deficit
    - Check lytes in PACU, consider 10mg Lasix
  - 1500 mL deficit (2500 mL with NS)
    - Stop surgery
  - Communicate deficit regularly

Distension Media Complications - Prevention

- Control of Intrauterine pressure
- Avoid excessive operating time
- Anesthesia to closely monitor / limit IVF's
- Chill distension media
- GnRH agonist?

Complications of Hysteroscopy - Early

- Cervical trauma
- Uterine perforation
- Hemorrhage
- Distension media complication
- Air or gas embolism

Air / Gas embolism - Pathophysiology

- Enter venous circulation and either equilibrate with pulmonary clearance or exceed pulmonary clearance
- Gas diffuses in the alveoli and is exhaled
- A large bolus of air can cause an airlock in the right heart, outflow obstruction, and decreased pulmonary venous return with decreased left ventricular preload and cardiac output

Air/Gas Embolism - Predisposing Factors

- Unpurged fluid in-flow line
- Use of rigid bottle for distention medium
- Inadequate uterine flushing of bubbles
- Piston-like action of repetitive insertions
- Excessive intrauterine pressure

- Size of instruments
- Trendelenburg position
- Presence of large intramural venous channels (e.g., vascular myoma)
- Penetration into the myometrium
- Disruption and exposure of vasculature
- Excessive operating times

Gas Embolism with Electrosurgery

- No clinically significant difference in gas produced by monopolar or bipolar
- Composition – soluble: H+, CO, CO2, & O2
- Gas diffuses in the alveoli and is exhaled


- Prospective observational study
- Intraop echo performed to detect bubble formation in IVC, hepatic veins, & right heart
- All with gas bubble entrainment
- One patient had transient drop in CO2


Air / Gas Embolism - Prevention

- Purge and prevent entry of air
- Minimize intrauterine pressure
- Keep outflow port continuously open
- Avoid Trendelenburg position
- Avoid deep myometrial resection
- Minimize reinsertion of instruments
- Ensure awareness by anesthesiologist
- Avoid nitrous oxide anesthesia

Air / Gas Embolism - Detection

- Awareness – early detection and intervention are crucial
  - End title CO2
  - O2 saturation
  - Hypotension or dysrhythmia
  - Heart murmur

Air / Gas Embolism - Treatment
- Stop case – cessation of further air entry
- Cessation of nitrous oxide - prevent bubble expansion
- Left lateral decubitus – prevents air lock in the right heart
- Evacuate embolized air in through CVP or PA line
- Maintenance of cardiac output – raise BP and push air out
- Closed chest cardiac message / respiratory care

Complications of Hysteroscopy - Late
- Adhesion formation
- Infection
- Hematometra
- Nerve injuries

Postoperative Adhesions
- Do not resect two opposing fibroids
- Consider post op est/prog supplementation
- Consider stent/IUD

Infection
- Postoperative endometritis (0.01-1.42%)
- Pain, discharge, fever, tenderness, WBCs
- ACOG does not recommend routine use of prophylactic antibiotics for hysteroscopic procedures

Hematometra
- Due to intrauterine synechiae or cervical stenosis
- Cyclic pelvic pain
- TVUS or MRI diagnosis
- Treat with cervical dilation or hysteroscopically, consider ultrasound guidance

Nerve injuries
- Risk to any patient in lithotomy position
- Femoral nerve compression from overflexion of the hip, abduction, and external rotation
- Sciatic and peroneal nerves stretch injury as a result of flexion at the hip with the knee straight or extreme external rotation
- Peroneal nerve compression at the head of the fibula
Thanks!

References


References


Question

Which statements are correct? Select all that apply.

1. With a fundal perforation without RF energy, discontinue case and observe
2. With a lateral perforation, discontinue case and observe
3. With a fundal perforation with RF energy, perform laparoscopy to inspect for visceral injury
4. With an anterior perforation, perform cystoscopy

Answers: 1, 3, and 4
CULTURAL AND LINGUISTIC COMPETENCY

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

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

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

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

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

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