15th Annual Advanced Workshop on Gynecologic Laparoscopic Anatomy & Minimally Invasive Surgery Including Pelvic Floor Reconstruction

May 17-18, 2013
Louisville, Kentucky

SYLLABUS

Educational Grant
AAGL acknowledges that it has received support in part by educational grants and equipment (in-kind) from the following companies: 3-Dmed, American Medical Systems, Bard Medical, Boston Scientific, Coloplast, Conceptus, CooperSurgical, Covidien, Ethicon Endo-Surgery, Inc., Ethicon Women’s Health & Urology, Karl Storz Endoscopy-America, Inc.
Professional Education Information

Target Audience
Educational activities are developed to meet the needs of surgical gynecologists in practice and in training, as well as, other allied healthcare professionals in the field of gynecology.

Accreditation
AAGL is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The AAGL designates this live activity for a maximum of 15.75 AMA PRA Category 1 Credit(s). Physicians should claim only the credit commensurate with the extent of their participation in the activity.

DISCLOSURE OF RELEVANT FINANCIAL RELATIONSHIPS
As a provider accredited by the Accreditation Council for Continuing Medical Education, AAGL must ensure balance, independence, and objectivity in all CME activities to promote improvements in health care and not proprietary interests of a commercial interest. The provider controls all decisions related to identification of CME needs, determination of educational objectives, selection and presentation of content, selection of all persons and organizations that will be in a position to control the content, selection of educational methods, and evaluation of the activity. Course chairs, planning committee members, presenters, authors, moderators, panel members, and others in a position to control the content of this activity are required to disclose relevant financial relationships with commercial interests related to the subject matter of this educational activity. Learners are able to assess the potential for commercial bias in information when complete disclosure, resolution of conflicts of interest, and acknowledgment of commercial support are provided prior to the activity. Informed learners are the final safeguards in assuring that a CME activity is independent from commercial support. We believe this mechanism contributes to the transparency and accountability of CME.
Table of Contents

Course Description........................................................................................................................................ 1

Disclosure...................................................................................................................................................... 3

Fundamental Laparoscopic Pelvic Anatomy
A.I. Brill ........................................................................................................................................................ 4

Pelvic Sidewall Dissection, Retroperitoneal Anatomy
R.P. Pasic ..................................................................................................................................................... 12

Energy Modalities in Endoscopic Surgery
A.I. Brill ........................................................................................................................................................ 16

Applied Pelvic Anatomy for Management of Endometriosis and Adnexal Disease
G.M. Janik.................................................................................................................................................... 27

Laparoscopic Suturing
J.L. Hudgens ............................................................................................................................................. 40

Laparoscopic Treatment of Apical Prolapse
A. Azadi ....................................................................................................................................................... 50

Back to the Burch, Slings and Things
S. Frances ..................................................................................................................................................... 58

Pearls of Laparoscopic Hysterectomy
S.M. Biscette ............................................................................................................................................... 64

Complications of Laparoscopy and how to Avoid Them
R.P. Pasic ..................................................................................................................................................... 70

Cultural and Linguistic Competency ........................................................................................................ 80
15th Annual Advanced Workshop on Gynecologic Laparoscopic Anatomy & Minimally Invasive Surgery Including Pelvic Floor Reconstruction

Resad P. Pasic, Scientific Program Chair
Shan M. Biscette, Co-Chair

Guest Faculty: Andrew I. Brill, Grace M. Janik, Joseph (Jay) L. Hudgens, Jessica A. Shepherd

Local Faculty: Ali Azadi, Mark W. Dassel, Nicolette Deveneau, Sean Francis, Thomas G. Lang, Ronald L. Levine, Lori L. Warren

Course Description

This course is designed for gynecologists with advanced laparoscopic skills who wish to expand their knowledge of retroperitoneal and Space of Retzius anatomy and the various surgeries performed therein. This extensive two-day course will expose the participants to the knowledge and expertise of world-renowned laparoscopic surgeons who will guide them through didactics and hands on cadaveric sessions utilizing unembalmed female cadavers.

No more than three participants are assigned to each cadaver and are closely supervised by experienced faculty instructors. Each participant will have the opportunity to operate, assist and observe in a rotational format to optimize their learning experience and suturing technique. The course will focus on demonstration of pelvic sidewall dissection, preparation for laparoscopic hysterectomy, uterosacral colposuspension, Burch retro pubic colposuspension and paravaginal defect repairs through the laparoscopic approach.

Pelvic floor reconstructive procedures will be highlighted during breakout sessions to accommodate those with a particular interest in furthering their skills in these procedures.

Course Objectives

At the conclusion of this activity, the participant will be able to: 1) Appraise skills learned to relevant pelvic anatomy and apply them for surgery including laparoscopic hysterectomy and pelvic floor surgery; 2) apply skills learned to pelvic side wall dissection and illustrate retroperitoneal structures; 3) explain the ergonomics, theory and rationale for reproducible laparoscopic suturing; 4) demonstrate measurable improvement in laparoscopic suturing skills; apply principles of electro surgery to fresh tissue cadaver and discriminate between different tissue sealing devices; and 6) identify risk factors for laparoscopic complications and manage treatment of such.

Course Outline

Friday, May 17, 2013

7:45  Welcome, Introduction and Course Overview  R.P. Pasic
8:00  Fundamental Laparoscopic Pelvic Anatomy  A.I. Brill
8:40 Pelvic Sidewall Dissection, Retroperitoneal Anatomy R.P. Pasic
9:20 Questions and Answers
9:30 Refreshment Break
9:40 Energy Modalities in Endoscopic Surgery A.I. Brill
10:20 Applied Pelvic Anatomy for Management of Endometriosis and Adnexal Disease G.M. Janik
11:00 Laparoscopic Suturing J.L. Hudgens
11:40 Questions and Answers All Faculty
12:00 Working Lunch – Video: Laparoscopic Dissection

1:00 – 5:00 pm Hands-On Cadaver Dissection (3 participants per cadaver)
  • Review Surface Anatomy of the Pelvis
  • Anatomy and Technique of Performing Uterosacral Ligament Suspension
  • Retroperitoneal Spaces, Vessels, Nerves Dissection
  • Dissection of Pelvic Sidewall

Saturday, May 18, 2013

8:00 Laparoscopic Treatment of Apical Prolapse A. Azadi
8:30 Back to the Burch, Slings and Things S. Frances
9:00 Pearls of Laparoscopic Hysterectomy S.M. Biscette
9:30 Complications of Laparoscopy and How to Avoid Them R.P. Pasic
10:10 Questions and Answers Faculty
10:30 Refreshment Break
10:45 Hands-On Cadaver Dissection
  • Anatomy and Refined Techniques of Performing Laparoscopic Hysterectomy
  • Dissection of the Space of Retzius
  • Laparoscopic Suturing

12:45 Lunch

1:30 Hands-On Cadaver Dissection – Continued
  • Laparoscopic Repair of Bowel, Bladder and Ureteral Injury, Laparoscopic Sacrocolpopexy
  • Review of Laparoscopic Anatomy
  • Vaginal Pelvic Floor Reconstruction using TVT, Trans Obturator Slings, TVT Secure

5:00 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).
Art Arellano, Professional Education Manager, AAGL*
Viviane F. Connor
Consultant: Conceptus Incorporated
Kimberly A. Kho*
Frank D. Loffer, Executive Vice President/Medical Director, AAGL*
Linda Michels, Executive Director, AAGL*
Jonathan Solnik*
Johnny Yi*

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).
Ali Azadi*
Shan M. Biscette*
Andrew I. Brill
Consultant: CooperSurgical, Ethicon Endo-Surgery, Hologic, Smith & Nephew Endoscopy,
Karl Storz Endoscopy
Speakers Bureau: CooperSurgical, Ethicon Endo-Surgery, Hologic, Smith & Nephew Endoscopy,
Karl Storz Endoscopy
Mark W. Dassel*
Nicolette Deveneau*
Sean Francis
Speakers Bureau: Astellas, Intuitive Surgical, Pfizer
Joseph (Jay) L. Hudgens
Grants/Research: Karl Storz Endoscopy
Consultant: Terumo CVS
Grace M. Janik
Grants/Research: Hologic
Consultant: Karl Storz Endoscopy
Thomas G. Lang*
Ronald L. Levine*
Resad P. Pasic
Speakers Bureau: CooperSurgical, Ethicon Endo-Surgery, Karl Storz Endoscopy
Jessica A. Shepherd*
Lori L. Warren
Consultant: Ethicon Endo-Surgery

Asterisk (*) denotes no financial relationships to disclose.
Fundamental Laparoscopic Pelvic Anatomy

Andrew L. Brill, MD
Director, Minimally Invasive Gynecology
California Pacific Medical Center
San Francisco, CA

Disclosure

• Consultant: CooperSurgical, Ethicon Endo-Surgery, Hologic, Karl Storz, Smith & Nephew Endoscopy

• Speakers Bureau: CooperSurgical, Ethicon Endo-Surgery, Karl Storz, Smith & Nephew Endoscopy

Objectives

Describe the key anatomy of the anterior abdominal wall.
List the 3 surgical layers of the lateral pelvic sidewall
Incorporate surgical techniques and anatomy to reduce risk

Why Master Surgical Anatomy?

✓ More Efficient ➔ Faster
✓ More Effective ➔ Better Results
✓ More Confident ➔ Safer

Can Minimize Complications!

Why Learn Surgical Anatomy?

Fight the tides of inner reality!

- serenity
- versus
- fear & terror!

Bad things can happen!
to err is human
a significant amount of medical errors will be committed!

The Abdominal Wall
- Midline?
- Umbilicus?
- Blood Vessels?

Always think of what’s under the surface
Ideally, Intentional Targeting

External and Internal Target Mismatch

Bump – n – Slide
Left Upper Quadrant

Peritoneal Tenting

LUQ = 3

Superior epigastric vessels (se)

MCL

4-5 FB

Laparoscopic Pelvic Anatomy

is different from

Laparotomic Pelvic Anatomy
Where am I?

Relinquishing the Big Picture

Surface Topography
opportunistic surveillance

3 U’s: Ureter ⇔ Uterosacral ⇔ Uterine a.

Principles of Surgical Dissection
Only cut into structures that are understood and are visible

Anatomy ⇔ Dissection
Presacral neurectomy

All surgical puzzles are solved with Anatomy!

Experienced surgeons seek anatomical cues

Blood Vessels
Lymphatics
Nerves
Dissecting the Lateral Sidewall

Medial Umbilical Ligament: the hypogastric tether

Pelvic Sidewall – 3 Surgical Layers

- Ureter
- Internal iliac vessels
- Cardinal ligament sheath
- External iliac vessels
- Obturator vessels and muscle

Lateral Pelvic Sidewall Milestones

thank you
Pelvic Sidewall Dissection and Retroperitoneal Anatomy

Resad Paya Pasic M.D., Ph.D.
Professor, Department of Obstetrics, Gynecology, & Women’s Health
University of Louisville School of Medicine
Louisville, Kentucky

Disclosure

- Speakers Bureau: CooperSurgical, Ethicon Endo-Surgery, Karl Storz Endoscopy

Where is the operator dissecting?

- Presacral space
- Pelvic brim
- Base of the broad ligament
- Paravesical/paravaginal/retropubic space
- Pelvic sidewall
- Vesicovaginal space
- Pararectal space
- Rectovaginal space

What anatomic Structures are found at the Pelvic Brim?

- Peritoneum
- Ovarian vessels in the infundibulopelvic lig.
- Bifurcation of the common iliac artery
- Ureter
- Common iliac vein
- Obturator vessels & nerve
- Sacroiliac joint

What anatomic Structures are found in the Pelvic Sidewall?

- The THREE Surgical Layers:
  - First -- the Ureter
  - Second -- the Visceral layer of the internal iliac artery and vein and their branches
  - Third -- the Parietal layer of the external iliac and obturator vessels, obturator nerve

Pelvic sidewall
Paravesical/Obturator/Paravaginal Space

- Anterior and inferior to the base of the broad ligament
- Leads to the retropubic space of Retzius
- Medial -- the bladder and anterior vagina
- Lateral -- obturator internus fascia and vessels
- Floor -- fascia endopelvina and ‘white’ line
- Posterior -- internal iliac vessels
- Anterior -- back of pubic bone

Paravaginal space

Space of Retzius

Paravaginal space

What anatomic Structures are found at the base of the Broad Ligament?

- The ureter obliquely crosses underneath the uterine vessels
- 2-3 cm medial and superior to the ischial spine
- Enveloped in multiple sheets of visceral connective tissues that form thicker sheaths
Where is the Ureter?

- Pelvic brim
- Pelvic sidewall
- Knee-bend under the uterine vessels
- Turns anteriorly and medially to course over the anterolateral fornix of the vagina to enter the bladder at the junction of the upper and middle thirds of the vagina

The most common natural predator to the ureter is the gynecologist

- anonymous urologist

Anatomy

- The ureter has three anatomic layers:
  - Transitional epithelium of the lumen.
  - Smooth muscle circular, and spiral fibers
  - Adventitial sheath

- Ureteral length is 25-35cm, and it is divided into abdominal and pelvic components of equal length.
- The ureters receive blood supply from multiple sources, giving them excellent healing capabilities in the event of injury.

Ureteral Injury

- Incidence 0.4%-1.5%
- One of the most serious complications of gynecological surgery
- The average distance from the ureter to the cervix is 2.3 cm (range 0.1 to 5.3 cm).
- Gynecological procedures account for 34% of all ureteral injuries
- Gynecologic disease may involve the ureters directly, or cause their course to deviate significantly.

Sites of Injury

- Cardinal Ligament where the ureter crosses under the uterine artery
- Dorsal to the infundibulopelvic ligament near or at the pelvic brim
- Intramural portion of the ureter that traverses the bladder wall
- Lateral pelvic sidewall above the uterosacral ligament

“Most Commons” of Ureteral Injury

- Most common site: Pelvic brim near IFP
- Most common procedure: TAH, Concurrent prolapse
- Most common type of injury: Obstruction
- Most common “activity” leading to injury: Attempt to obtain hemostasis
- Most common time of diagnosis: None. 50/50 split between intra-op vs. post-op
General Principles of Prevention and Management

1. The surgeon must unequivocally know where the ureter is.
2. Stay outside the adventitial sheath when performing ureteral dissection.
3. When using instruments that transmit energy to tissues, the surgeon must know exactly how broad the zone of thermal injury.

Diagnosing

- Inspection and Await Peristalsis
- Approximately 80% still have peristalsis after injury
- Intraoperative Cystoscopy:
  - Flow from both ureters excludes total obstruction, but not partial obstruction.
  - Ureters that have been devascularized may appear intact, yet develop fistulas later in the postoperative period.
  - Marked delay between drainage from one ureter may suggest partial obstruction.
  - Blood coming from a ureteral orifice suspicious.

Vesicovaginal Space

- Potential space between the bladder and vagina
- Lateral -- bladder pillars/ureters
- Covered by the anterior peritoneal reflection
- Must be dissected for completion of a hysterectomy

Pararectal Space

- Superiorly -- cul-de-sac peritoneum and uterosacral ligaments
- Laterally -- iliococcygeus muscles
- Posteriorly -- rectum -- visceral fascial capsule
- Anteriorly -- vagina -- visceral fascial capsule
- Rectovaginal fascia/septum
Energy Modalities in Endoscopic Surgery

Andrew I. Brill, MD
Director, Minimally Invasive Gynecology & Reparative Surgery
California Pacific Medical Center
San Francisco, CA

Disclosure

- Consultant: CooperSurgical, Ethicon Endo-Surgery, Hologic, Karl Storz, Smith & Nephew Endoscopy
- Speakers Bureau: CooperSurgical, Ethicon Endo-Surgery, Karl Storz, Smith & Nephew Endoscopy

Objectives

- Describe the key differences between cut and coag current
- Explain the genesis of vessel sealing with electrosurgery
- Incorporate techniques to reduce risk during electrosurgery
- List the differences between monopolar and bipolar devices

What is Electrosurgery?

NOT Electrocautery!

Electrosurgery ➔ Resistive Heating
Secondary Thermodynamic Change

60Hz
Greater Voltage

Greater Force

GREATER RISK

So what determines whether cutting or desiccation occurs?

Energy Density
Blood is a ready conductor, diffusing current density.

Energy Density $\sim$ Surface Area

- Large surface area: Low current density, Desiccation/coagulation
- Small surface area: High current density, Desiccation + Cutting

So What Comes Out of The Box?

Always know what's below the surface!
Variations of Current and Voltage in Relation to Time

Voltage

Vaporization / Cut → Sparking

BLEND

CUT > 200 Volts

COAG

Effects of Rising Voltage on Cut Edges

Pelvic Tissues

Vascular Tissue

Dry Tissue Ω

Fatty Tissue Ω

Vital Structures

Monopolar Spark Cutting

cut blend coag

Contact Desiccation-Coagulation

Tissue Effects From ‘Coag’ vs ‘Cut’ Waveforms

Non-contact (NC) convert to Contact (c)
**Bipolar vs Monopolar Electrosurgery**

**Current vs Thermal Tissue Effects**

- **STEAM**

**Conventional Bipolar Electrosurgery**

- Strategies to Limit Thermal Injury
  - Terminate current at end of desiccation
  - Apply current in pulsatile fashion
  - Paint with sides or tips rather than grasp

**Contralateral approach** ➔ minimize surface area ➔ tamponade ➔ desiccate

**Conventional Bipolar Electrosurgery**

- **- generic concerns -**
  - Significant lateral thermal spread
  - Bleeding on vessel transection!
Traditional Bipolar Coagulated Vessel Characteristics

- Relies on tissue shrinking and proximal thrombus for occlusion
- Lumen still anatomically apparent!

Evolution of Advanced Bipolar Devices

- Incorporation of mechanical cutting
- Relatively constant LOW VOLTAGE systems
- Integrated controls matching output to impedance
- Pulsed Technology
  - Rapid on/off cycling allows for tissue cooling
  - Provides the generator with time to read, process and make changes to the delivery of energy

Advanced Bipolar Electrosurgery Promises

- Reduced tissue sticking
- Reduced plume and smoke
- Reduced thermal spread
- More consistent hemostasis

Gyrus PK

current density is greatest around vapor pockets
current off allows egress of steam vapor

tissue cooling

mechanical incision

Vessel wall fusion can be achieved using RF energy to denature collagen and elastin to reform into a permanent seal

Arteries have coiled elastin centrally located (inner layer)

Veins have elastin distributed throughout

Bipolar Vessel Sealing

✓ Intimal layers of vessel walls fused

Energy-Based Vessel Ligation Comparison
Carotid Arteries Longitudinal Sections
uniform, uncompromised compression

Electricity follows the path of least resistance!

ENSEL® Histopathology

ENSEL current pathways

HARMONIC TECHNOLOGY

Ultrasonic frictional forces to Cut and Coagulate

- Lysis of hydrogen bonds
- Denaturation of proteins
- Steam formation
- Cavitation fragmentation
Anatomy of a Harmonic Technology
LCS – Ligating Cutting Shears

55,500 cycles per sec

Ultrasonic Cutting
Linear Propagation
Energy

Avoiding Premature Incision
LCS harmonic technology
- Utilize lower blade excursion (1 or 2)
- Avoid rotation
- Avoid lifting
- Avoid pressure
- Avoid drift
- Observe evolution of tissue changes

Harmonic Technology Ligation
① release tension → ② desiccate → ③ cut
Fundamental Knowledge and Technique

OUTCOME
Applied Pelvic Anatomy for the Management of Endometriosis and Adnexal Disease

GRACE M JANIK, MD.
Clinical Professor
Medical College of Wisconsin
MILWAUKEE INSTITUTE of
MINIMALLY INVASIVE SURGERY

Deep infiltrative endometriosis

Disclosure

- Grants/Research: Hologic
- Consultant: Karl Storz Endoscopy

Radical excision of endometriosis

- Excision of endometriosis until NORMAL tissue seen or palpated
- Clear margins
- INCLUDE bowel, vaginal, bladder, ureter in excision. This may mean having to perform disc excision or anastomosis
- Continuous magnification and access to deep pelvis makes laparoscopy superior
INFILTRATIVE ENDOMETRIOSIS
RADICAL EXCISION
the paradigm shift:
radical surgery for endometriosis is NOT hysterecomy with oophorectomy.
it is the complete removal of deep lesions including on bowel, bladder, ureter, uterosacral/cardinal
TAHBSO then is often unnecessary

Radical laparoscopic excision of endometriosis: what is the risk of adhesion formation?
Rania Bou-Habib¹, Grace Janik², Charles Koh²
¹Department of Obstetrics and Gynecology, University of Montreal, Quebec, Canada
²Reproductive Specialty Center, Medical College of Wisconsin Milwaukee, Wisconsin, USA

Methods
• Retrospective cohort study
• 72 patients
• 144 videotapes reviewed
• 23 sites per pt scored for endometriosis and adhesions

Results
<table>
<thead>
<tr>
<th></th>
<th>OR (99% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesion</td>
<td>None</td>
<td>9.6 (5.1-17.9) &lt;0.0001</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>None</td>
<td>1.9 (1.0-3.6) 0.0450</td>
</tr>
<tr>
<td>Both</td>
<td>None</td>
<td>9.5 (4.7-19.3) &lt;0.0001</td>
</tr>
<tr>
<td>Adhesion</td>
<td>Endometriosis</td>
<td>5.0 (2.3-11.0) &lt;0.0001</td>
</tr>
<tr>
<td>Both</td>
<td>Endometriosis</td>
<td>5.0 (2.4-10.3) &lt;0.0001</td>
</tr>
<tr>
<td>Both</td>
<td>Adhesion</td>
<td>1.0 (0.5-2.1) 0.98</td>
</tr>
</tbody>
</table>

Enbloc peritoneal excision – adhesions?
Conclusions

- Adhesions are highly likely to recur in the same location
- De novo adhesion formation appears to occur much less frequently

Conclusion

Radical laparoscopic excision of endometriosis does NOT significantly increase the odds of adhesion formation

Bladder endometriosis

1 % of ENDOMETRIOSIS CASES INVOLVE THE URINARY TRACT

84 % of these involve the bladder, usually not full thickness

Full thickness bladder endometriosis

RSC = 6

BLADDER REPAIR by laparoscopy

TECHNIQUE AND PRINCIPLES

- Ureteric catheters
- the suture - monocryl, plain catgut, 2/0 or 3/0 SH needle
- the stitch - interrupted, continuous, layer 2 or 3 watertight?
- postoperative care - continuous drainage 7 days, cystoscopy, voiding cystogram, antibiotic
Ureteral endometriosis

WORLD LITERATURE 1974-1995
URETERAL ENDOMETRIOSIS
- cases reported 49
  - bilateral 19
  - intrinsic 4
  - postmenopausal 3
  - recurrence 2

WORLD LITERATURE 1980-1998
URETERAL ENDOMETRIOSIS
- cases reported 125
  - Left-sided 66
  - Right-sided 40
  - Bilateral 19

Prevalence of ureteral endometriosis in patients with rectovaginal nodules

<table>
<thead>
<tr>
<th>Size of nodule</th>
<th># of patients</th>
<th>Prevalence Ureteral endometriosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2 cm</td>
<td>97</td>
<td>0</td>
</tr>
<tr>
<td>2 – 3 cm</td>
<td>156</td>
<td>1 (0.6%)</td>
</tr>
<tr>
<td>&gt; 3 cm</td>
<td>152</td>
<td>17 (11.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>405</td>
<td>18 (4.4%)</td>
</tr>
</tbody>
</table>

prospective IVP study in endometriosis
- subtle abnormalities on IVP have been reported in 15.9% of women with mild and 43% of severe endometriosis.
25 - 46% of patients with ureteral endometriosis have loss of renal function.

Ureteral dissection at laparoscopic surgery is frequently the only way to diagnose the presence and extent of ureteral endometriosis.

URETERIC DISSECTION

- peritoneum
- retroperitoneal areolar tissue
- vasculature
- pelvic ureter
- pelvic brim
- uterine vessels
- line of peritoneal dissection from ureter
Culdesac dissection: Ureterolysis

Steps:
1. Bringing down the sigmoid
2. Find ureter over ext. iliac vessels
3. Exposing the ureter
4. Essential step before ovary can be safely mobilized
Laparoscopic Surgery: Rectovaginal and Bowel Endometriosis

35 year old female. Multiple surgeries for endometriosis
Pelvic Pain
Left hydrenephrosis and hydroureter
Culdesac dissection: entering the rectovaginal space

1. Incise at rectouterine fusion.
2. Enter rectovaginal space.
3. Carry dissection to normal tissue caudad to lesion.

Excision of nodular (palpable) posterior vaginal endometriosis

1. Use of KTP laser or scissors to cut lesion off posterior fornix.
2. Continued vaginal palpation to ensure complete removal.

Posterior Vaginal Repair

1. 2/0 PDS continuously.
2. Transverse closure to avoid narrowing of fornix.

Depth of infiltration:

1. Peritoneal
2. Longitudinal
3. Circular
4. Mucosa
Options
- Partial thickness, skinning, disc, full thickness excision
- <3 cm

Low anterior resection, colectomy, end to end anastomosis

Partial Thickness Bowel Resection

Seromuscularis repair
1. Oversew with 3/0 PDS on SH needle
2. 1 or 2 layers
3. Test for air leakage by rectal proctoscope

FULL THICKNESS BOWEL RESECTION
Failed IVF x 1. Further prolonged down regulation caused rectal bleeding and pain on starting ovarian stimulation

COLECTOMY
Abdominal incisions for laparoscopic excision of endometriosis and colectomy/anastomosis

Complications

- Early
  - Urinary tract infection 2
  - Ileus 2
  - Hematoma 3
  - Rectal perforation requiring colostomy 1

- Late
  - Rectovaginal fistula 1
  - Stricture at operative site 1

Symptom relief

- Resected n = 70
  - Mean time to F/U 3.26 yrs
  - 55 (78%) absence or improvement in symptoms
  - 15 (21%) further surgery
  - 3 (4.2%) repeat bowel surgery

- Unresected n = 9
  - Mean time to F/U 2.53 yrs
  - 2/2 (100%) persistent bowel symptoms
  - Proceed to colectomy
  - 1/7 (14%) new onset bowel symptoms

FURTHER SURGERY

<table>
<thead>
<tr>
<th></th>
<th>Non-bowel surgery</th>
<th>Bowel Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Treatment N=7</td>
<td>0</td>
<td>Partial thickness resection 1</td>
</tr>
<tr>
<td>Vaporization N=2</td>
<td>0</td>
<td>Colectomy 2</td>
</tr>
<tr>
<td>Anterior Disc Resection N=70</td>
<td>Endometrioma-5 Peritoneal endo-3 Adhesions-6</td>
<td>Full thickness resection 1</td>
</tr>
</tbody>
</table>

Laparoscopic colectomy series Symptom Alleviation

- N=21 follow up 3 months – 7 years.
- No pain = 19.
- Adjunctive GnRha, Danazol etc = 0.
- Repeat colectomy : persistent disease = 1.
- New site disease : ileum, rectum = 1.
- Later oophorectomy = 0.
- All concurrent hysterectomies conserved at least 1 ovary.
- Later hysterectomy = 0.
- Pregnancy rate = 30%
Pregnancy

- Partial: 11/20 (55%)
- Full: 2/4 (50%)

Calculated from those pts. Attempting pregnancy.
Excluded: TLH, menopause, not trying

Deep Endometriosis With Rectovaginal Involvement

- Radical excision effective in symptom relief.
- Pregnancy rates up to 50%.
- May improve results for recurrent IVF failures instead of resorting to oocyte donation or surrogate uterus.
- Even with involvement of ureter, bladder, bowel – late hysterectomy or oophorectomy very rare.
- Hysterectomy is not a necessary part of curative endometriosis surgery.

Is radicality necessary for deep endometriosis?

As our ability to surgically deal with complex disease increases, we are less apt to deny its presence

Retroperitoneal Ovary

Etiology - adhesions

- Endometriosis
- Previous Surgery
- PID
- Appendicitis

Retroperitoneal Ovary

- Residual ovarian syndrome
  - Ovary becomes encapsulated by adhesions
    - Post surgical
    - Pathologic process, ie, endometriosis, PID
- Ovarian remnant syndrome
  - Ovarian tissue persists after oopherectomy
    - Incomplete removal
      - At blood supply - IP ligament
      - Residual adherent cortex - revascularization
    - Seeding during removal – fragment reattachment
    - Supernumerary or accessory ovaries
Ovarian remnant syndrome

Symptoms/Physical findings

- Cyclic pelvic pain
- Chronic pelvic pain
- Estrogenization
- Ureteral obstruction (15%)
  - Klutke, J Urol, 1993
- Pelvic Mass
  - 50% pelvic pain and mass
  - 46% pelvic pain
  - 4% mass only

Predisposing factors

- Periovarian adhesions
- Ovarian enlargement
- Surgically difficult oophorectomy
- Multiple previous surgeries
- 50% history endometriosis

Laparotomy Results

- Ovarian remnant recurrence
  - 8 – 20%
- Complication risk
  - 3 – 33%
  - Steege, Ob Gyn 70:64-67, 1987

Laparoscopy Results

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Abu-Rafeh JAAGL 10(1):2003</td>
<td>26</td>
<td>2</td>
<td>1</td>
<td>6 (23%)</td>
<td>0 (33-172)</td>
</tr>
<tr>
<td>Nezhat F&amp;S, 74(5) 2000</td>
<td>19</td>
<td>4.7</td>
<td>2</td>
<td>6 (36%)</td>
<td>Intentional enterotomy 174 (72-375)</td>
</tr>
<tr>
<td>Kamprath F&amp;S, 68(4) 1997</td>
<td>7</td>
<td>2.3</td>
<td>0</td>
<td>0</td>
<td>Ureteral neocystotomy 126 (60-170)</td>
</tr>
</tbody>
</table>

PRESACRAL NEURECTOMY

RANDOMIZED STUDY - Tjaden

<table>
<thead>
<tr>
<th></th>
<th>Pain Free 6 mos</th>
<th>Pain 6 mos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomized</td>
<td>n=4</td>
<td></td>
</tr>
<tr>
<td>PSN</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Control</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Randomized</td>
<td>n=13</td>
<td></td>
</tr>
<tr>
<td>PSN</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Control</td>
<td>0</td>
<td>9</td>
</tr>
</tbody>
</table>

Obst. Gyn. 1990;76:89-91
PRESACRAL NEURECTOMY
RANDOMIZED STUDY-Candiani

N=71
- >1 YEAR FOLLOW UP q 6 mos
- Conclusions:
  - Presacral neurectomy significantly reduced midline pain
  - No significant difference in severity of dysmenorrhea, pelvic pain or dyspareunia

PRESACRAL NEURECTOMY
SUCCESS RATES
RETROSPECTIVE STUDY-Chen
n=655 (527 12 mos follow up)
- Primary dysmenorrhea – 77.1%
- Moderate/Severe endometriosis – 72.8%
- Minimal/Mild – 75%
- Adenomyosis – 52.4%
- Chronic pelvic pain – 62.2%

Obstet Gynecol 1997;90:974-977

PRESACRAL NEURECTOMY
COMPLICATIONS
RETROSPECTIVE STUDY-Chen
n=655 (527 12 mos follow up)
- Right Internal Iliac artery Injury (n=1)
- Chylous ascites (n=3)
- Laceration of middle sacral vein (n=3)
- Constipation (n=485) – 74%

Obstet Gynecol 1997;90:974-977
Laparoscopic Suturing

Jay L. Hudgens, M.D.
Owensboro Health Women’s Center
Owensboro, KY

Gratis Faculty University of Louisville & University of Kentucky
Department of Obstetrics, Gynecology, & Women’s Health

Disclosure

Grant/Research: Karl Storz Endoscopy
Consultant: Terumo CVS

Objectives

Present a SYSTEM for LEARNING Laparoscopic Suturing.

Review Obstacles to Laparoscopic Suturing and how to Overcome them.

How Many Steps?

System

1. Set the Needle
2. Reapproximate
3. Knot Tying

Learn to Learn

Whole – Part – Whole

The Key To Efficient LEARNING = Immediate Accurate Reliable FEEDBACK
Geometry

\[ \text{Geometry} = \text{The Study of Relationships} \]

- Anatomy
- Laparoscope
- Instruments
- Needle

Geometry

1. Set the Needle
2. Reapproximate
3. Knot Tying

Geometry

Triangulation

System

Port Placement
Contralateral
- Ideal Triangulation
- Poor Ergonomics?
- No Assistant

Ipsilateral
- Ergonomics
- Assistant
- One Sided

Suprapubic
- Gravity
- Ergonomics?
- Two Sided

System
1. Set the Needle
2. Reapproximate
3. Knot Tying

Mechanics Produce
Feel Reproduces
Mechanics

- Set Needle \textit{Perpendicular}
- Place Tissue \textit{Parallel}
- Axial Rotation

System

- Set
- Parallel
- Rotate
- Reset

Setting the Needle

- Setting the Needle \textit{A-B-C}
- \textit{A} = 2\text{cm} from Swedge
- \textit{B} = 1/3 from Point
- \textit{C} = 1/3 from Swedge
- Left Hand
- Right Hand

1
2
3
4
### Relationships

- Set
- Parallel
- Rotate
- Reset

### Mechanics Produce System

- Set
- Parallel
- Rotate
- Reset

### Knot Tying

- Set
- Parallel
- Rotate
- Reset

- Inside vs. Out?
  - Interrupted
  - Figure of 8
  - Continuous
Knot Tying

• Prepare
• Throw
• Secure

Extra-corporeal

Intra-corporeal Knot Tying

• Make a Short Tail
• Align Suture Parallel to Right Instrument
• Move Left Hand OVER Knot

There is no place like HOME!

It’s all about the Loop
Contralateral

Ipsilateral Left

Ipsilateral Right

Common Mistakes

Keys For Success

- Short Tail
- Parallel
- Length of Loop

Suture Management

Goal is Control
Suture Management

Right Hand Motion

Novice

Expert

Hiemstra et al JMG 2011 vol. 18, pgs 494-499

Let the Left Hand Work

System

• Set
• Parallel
• Rotate
• Reset

• Set
• Parallel
• Rotate
• Reset

Struggle?

• Parallel?
• Over the Knot?
• Loop Length?
Review

• Geometry Rules
• Mechanics Produce (“Feel” reproduces)
• Keep it Simple

References


Laparoscopic Treatment of Apical Prolapse

Ali Azadi, MD, MSc, FACOG
Assistant Professor
Female Pelvic Medicine & Reconstructive Surgery
Associate Residency Program Director
Department of Obstetrics and Gynecology, Women’s Health
University of Louisville

Disclosure

- I have no financial relationships to disclose.

Objectives

- Evaluation of POP
- Use of mesh for treatment of POP
- Review of surgical treatments: Robotic & Laparoscopic approach

Epidemiology of Prolapse

- Lifetime risk by age 80=11.1%
- Recurrence 29.2%
- Most were postmenopausal, parous and overweight
- Nearly half smokers or former smokers
- Vaginal delivery
- Post hysterectomy

Olsen et al. Obstet Gynecol

Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence.
Clinical Evaluation of Support

Apical Prolapse

- Failure to adequately identify and address vault support will lead to an increase surgical failure.
- Advanced anterior vaginal wall prolapse is highly correlated with apical prolapse.

Indications for Surgical Treatment

- Pelvic pressure
- Sensation of a vaginal mass
- Sexual difficulty
- Voiding difficulty
- Urinary tract infections
- Frequency/Urgency symptoms
- Obstructed Defecation
- Incomplete Bladder Emptying

**** Pain???????
Mesh or No Mesh?

Counseling Consideration
- Type of prolapse
- Severity
- Prior surgeries (especially prolapse)
- Concomitant pelvic symptoms
- Medical co-morbidities
- Age
- Sexual activity
- Physical activity
- Weight
- Job
- Pain

What is the best graft material?

Ideal Mesh
- Monofilament
- Large Pore
- Light-weight PP

Evidence
- Use of Mesh for posterior compartment is not supported by evidence
- Other Compartments:
  - Better anatomical support but not much difference in subjective symptoms
  - *** Consider native tissue repair for primary treatment

Evidence
• Abdominal approach is superior than vaginal approach.


2011 FDA Safety Notification
• 2008 through Dec. 31, 2010
• Complications are not rare
• FDA received 2,874 additional complications associated with surgical mesh devices used to repair POP and SUI
  • POP 1,503
  • SUI 1,371
• The review showed that transvaginal POP repair with mesh does not improve symptomatic results or quality of life over traditional non-mesh repair.

NICE Conclusions- June 2008
• “Too few data reported for any of the efficacy outcomes”
• “Too few data on safety outcomes”
• “No firm conclusions could be drawn about the effectiveness of any of the mesh/graft types compared to no mesh for anterior and/or posterior repair”

FDA Public Health Notification: October 21, 2008
Serious Complications Associated with Transvaginal Placement of Surgical Mesh in Repair of Pelvic Organ Prolapse and Stress Incontinence
http://www.fda.gov/cdrh/safety/102008-surgicalmesh.html

2011 Synopsis
1. Mesh used in transvaginal POP repair introduces risks not present in traditional non-mesh surgery for POP repair.
2. Mesh placed abdominally for POP repair appears to result in lower rates of mesh complications compared to transvaginal POP surgery with mesh.
3. There is no evidence that transvaginal repair to support the top of the vagina (apical repair) or the back wall of the vagina (posterior repair) with mesh provides any added benefit compared to traditional surgery without mesh.
4. While transvaginal surgical repair to correct weakened tissue between the bladder and vagina (anterior repair) with mesh augmentation may provide an anatomic benefit compared to traditional POP repair without mesh, this anatomic benefit may not result in better symptomatic results.
Pelvic organ prolapse vaginal mesh repair should be reserved for high-risk individuals in whom the benefit of mesh placement may justify the risk, such as individuals with recurrent prolapse (particularly of the anterior compartment) or with medical comorbidities that preclude more invasive and lengthier open and endoscopic procedures.

Surgical Options

- Laparoscopic
- Robotic
  - Uterosacral ligament colpopexy
  - Sacral colpopexy
  - Paravaginal repair
  - Hysteropexy

Supravascular vs Total hysterectomy

- Less Erosion
- Sexual Function?
- ACOG recommends total hysterectomy for benign diseases*

*Committee opinion 2007

Positioning and Port Placement

SCP

Walter
- LUQ port
- Side Pouch

**Anatomy**

**Retractors**

**Vesicovaginal dissection**

**Rectovaginal Dissection**

**Dissection over Sacrum**
Dissection over Sacrum

Dissection of peritoneum over Uterosacral Ligament

Dissection of peritoneum over uterosacral ligament

Mesh

Positioning of mesh

Attach mesh to posterior vagina
Attach mesh to anterior vagina

Adjust the tension

Suture to sacrum

Closure of peritoneum

**Uterosacral Ligament Suspension**

- Data available for vaginal approach
- Can be done laparoscopically
- McCall Culdoplasty or high uterosacral bilaterally
- Ureters in Danger
OBJECTIVES

• Epidemiology of urinary incontinence
• Diagnosis
  • ISD vs. SUI
• Treatment options
• Review of sling types
• Mesh/FDA notification
• Laparoscopic Burch
  • Data
  • Anatomy of the Space of Retzius
  • Tips and tricks

DISCLOSURE

• Speakers Bureau: Astellas, Intuitive Surgical, Pfizer

INTRODUCTION

• Urinary Incontinence: involuntary loss of urine
• Prevalence in middle aged and older women 50%
• Cost in $30 billion in direct cost
• Psychosocial impact and Quality of life
• Prevalence of incontinence in general population of females reported in 13 different studies.
  • Young adult, 20% to 30%; Middle age, 30% to 40%; Elderly, 30% to 50%

THE COST OF INCONTINENCE

• Pads protection and laundry 50-75%
• Nursing home admissions 15%
• Treatment 10%
• Complications 5%
• Diagnosis and evaluations 1%

EVALUATION FOR SUI VS. ISD

• History
  • Prior incontinence surgery, SS, pulls
  • Radiation, cancer risk, chronic illness, medications
• Physical
  • External sphincter adequacy (Valsalva)
  • Urogenital hiatus/Anatomy
• Labs
  • UA and PVR
  • Urodynamics
• Def. ISD (Intrinsic Sphincteric Deficiency), Type III SUI
  • Valsalva leak point pressure <60 cmH2O
  • Maximal urethral closure pressure <20 cmH2O
  • Developed after series of failed Burch procedures studied
TREATMENT OPTIONS

- Medications?
  - Alpha adrenergics
  - Beta adrenergics
  - Anti-muscarinics
  - Estrogen (receptors on detrusor and urethra*)
  - SSRI
- Physical therapy
- Surgery
  - Slings
    - Retropubic slings
    - Trans-obturator slings
  - Nerve modulation
  - Stem cell injections
  - Microwave

CHOOSING THE CORRECT SURGERY

- 1. Best SUI surgery is the first surgery
  - Altered surgical planes
  - Higher risk of complications
- 2. Best surgery is one surgeon is most familiar
  - No substitute for surgical experience

HISTORY OF INCONTINENCE SURGERY

- 1914 Anterior Repair
  - Cure rates: 1yr 31-100%, Improvement rates: 1y 65-88%, 3y 70-76%
  - 1949 MMK (2.5% osteitis pubis)
- 1961 Burch
  - Cure rates: 1yr 65-75%, 5yr 90%
  - Laparoscopic Procedures
    - Cure rates: 1yr 90%, 5yr 77%

DATA FROM KEMPE et al. INCONTINENCE, 2012; LEACH GE et al. J UROL. 1997;158:875-880

TVT RANDOMIZED, CONTROLLED TRIALS


MINIMALLY INVASIVE PROCEDURES FOR STRESS INCONTINENCE

<table>
<thead>
<tr>
<th>Brand</th>
<th>Summary</th>
<th>Comparison of Commercial Sling Systems</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVT</td>
<td></td>
<td>1. Transobturator approach</td>
<td>Transobturator</td>
<td>Polypropylene mesh</td>
<td></td>
</tr>
<tr>
<td>Burch</td>
<td></td>
<td>2. Retropubic approach</td>
<td>Retropubic</td>
<td>Polypropylene mesh</td>
<td></td>
</tr>
</tbody>
</table>

SLINGS

- Traditional fascial slings
- Retropubic mesh slings
- Obturator slings
- Mini-slings

Peterson, Lynne, Trends-in-Medicine, September 2003, p.5
TRANS-OBTURATOR SLING

- Introduced by Delorme in 2001
- Novel approach to sling
- Reduce risk of bladder, bowel and vessel injury including irritative symptoms
- Need for cystoscopy
- Thigh pain and neurologic pain

MINI-SLINGS

- Secure
- Mini arc
- Adjust
- Solyx

MINI ARC DATA 69.1-91.4%


WHICH SLING….WHEN?

<table>
<thead>
<tr>
<th>Sling Type</th>
<th>Obese</th>
<th>ISD</th>
<th>SUI, m/ Urethral pressure</th>
<th>Post Radiation</th>
<th>Mesh phobia</th>
<th>Recurrent SUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retropubic</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>?</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Obturator</td>
<td>X</td>
<td></td>
<td>X</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Mini-sling</td>
<td>X</td>
<td></td>
<td>X</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>

SLING COMPLICATIONS

- Retention
- Erosions
- Extrusion
- Bladder perforation (0-3.3%)
- Hematoma (0-1.6%)
- Infection <1%
- Denovo irritative voiding symptoms

LESS LIKELY COMPLICATIONS/MANAGEMENT

• Cystotomy
• Fistula
• Persistent or recurrent incontinence
• Voiding dysfunction and retention
• Erosion into bladder, urethra, vagina
• Urinary tract infections

MESH IN 2013?

LEGAL ASPECTS

FDA WARNING ON MESH USE

• Oct 2008 FDA issued notice of rare but serious complications of mesh use in POP/SUI repairs
• Over 1,000 reports from mesh manufacturers
• Complications
  • Erosion thru vaginal epithelium
  • Infection
  • Pain
  • Urinary problems
  • Recurrence of prolapse and/or incontinence

2011 FDA UPDATE

• 2008 through Dec. 31, 2010
• FDA received 2,874 additional complications associated with surgical mesh devices used to repair POP and SUI
  • POP  1,503
  • SUI  1,371
• The review showed that transvaginal POP repair with mesh does not improve symptomatic results or quality of life over traditional non-mesh repair.

FDA RECOMMENDATIONS TO PHYSICIANS

• Obtain specialized training and be aware of risks
• Be vigilant for possible erosion or infection
• Watch for intraop complications in using tools, ie perforation
• Inform patients that mesh implantation is permanent, and complications may require additional surgery and may not be correctable
• Inform patients about potential for serious complications effecting QOL, dyspareunia, scarring, and narrowing of vagina
• Provide patient with written copy of patient labeling from mesh manufacturer, if available.
Informed surgical consent for a mesh/graft-augmented vaginal repair of pelvic organ prolapse

Consensus of the 2nd IUGA Grafts Roundtable: Optimizing Safety and Appropriateness of Graft Use in Transvaginal Pelvic Reconstructive Surgery

Dennis Miller & Alfredo L. Milani & Suzette E. Sutherland & Bonnie Navin & Rebecca G. Rogers

Consent

Initial each item

_______ I know of plans to use a permanent mesh prosthesis in my prolapse or incontinence surgery.

_______ The mesh/technique to be used is called ____________________

_______ My doctor has obtained specialized training in this technique.

_______ My doctor is aware of all the risks and has told me of these risks.

_______ My doctor has told me that the implantation of surgical mesh is permanent.

_______ My doctor has told me that bowel, bladder, urethra, ureters, rectum or blood vessels may be injured during surgery and that this may require additional surgery now or later.

_______ My doctor has told me that additional surgery could be required if complications develop, such as, infection or erosion of the mesh into the vagina, bladder, ureters, urethra or rectum.

_______ My doctor has told me that surgery for any complications may or may not correct the complication.

_______ My doctor has told me that pain with intercourse may develop, because of scarring and narrowing of the vaginal walls in prolapse repair.

_______ My doctor has given me a copy of the patient labeling from the mesh manufacturer.

Inform patients that implantation of surgical mesh is permanent, and that some complications associated with the implanted mesh may require additional surgery that may or may not correct the complication.

Inform patients about the potential for serious complications and their effect on quality of life, including pain during sexual intercourse, scarring, and narrowing of the vaginal wall (in POP repair).

Options

- Fascial Sling
- Burch
- Evaluation
- Experience
- Anatomy
- Tips & Tricks

Burch Literature

- MC Larsson and JD Cod 2012 (Cochrane)
  • 2 sutures better than 1
  • Burch success rates = TVT & TOT

- ME Albo et al. N. Eng J of Med. 2007
  • Fascial sling vs Burch
  • RCT n= 655
  • 66 vs 49% @24mnths
  • Post op complications < sling
REFERENCES


REF. CONT.

Pearls of Laparoscopic Hysterectomy

- Shan Biscette, M.D. FACOG
- Assistant Professor OB/GYN
- Division of Minimally Invasive Gynecologic Surgery
- University of Louisville

I have no financial relationships to disclose.

Indications
- Abnormal uterine bleeding 20%
  - Menorrhagia/HMB
- Endometriosis and adenomyosis 20%
- Uterine fibroids 30%
- Pelvic pain 10%
- Uterine prolapse 15%
- Chronic pelvic pain 10%
- Cancer 6%

Objectives
- Indications for hysterectomy
- Identify the types of hysterectomy
- Choose a route of hysterectomy
- Review technique for laparoscopic hysterectomy
- Recognize the complications of laparoscopic hysterectomy

Hysterectomy
- First performed vaginally by Soranus of Ephesus 120 A.D.
- Laparoscopic hysterectomy first performed by Harry Reich in 1989.
- Most common procedure performed in women worldwide
- 2nd most common surgical procedure performed in the U.S.
  - 600,000 performed annually
  - $5 billion in healthcare dollars
- Rate of hysterectomy has remained stable worldwide
  - Operative route is changing

Trends
### Trends

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1997</th>
<th>2011*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal</td>
<td>74%</td>
<td>63%</td>
<td>59%</td>
</tr>
<tr>
<td>Vaginal</td>
<td>24%</td>
<td>23%</td>
<td>14%</td>
</tr>
<tr>
<td>Laparoscopic</td>
<td>0.3%</td>
<td>10%</td>
<td>16%</td>
</tr>
<tr>
<td>Robotic</td>
<td></td>
<td></td>
<td>51%</td>
</tr>
</tbody>
</table>

* Inclusive most recent data; discovered postcard counting.

### Types of hysterectomy

- Total abdominal hysterectomy (TAH)
- Total vaginal hysterectomy (TVH)
- Laparoscopic assisted vaginal hysterectomy (LAVH)
- Total Laparoscopic hysterectomy (TLH)
- Supracervical hysterectomy (SH/LSH)

### Laparoscopic hysterectomy

- LAVH
- LSH
- TLH

### Laparoscopic hysterectomy

- Less postoperative pain
- Shorter length of hospitalization
- Quicker recovery
- Better quality of life at 6 weeks postoperatively
- Fewer wound or abdominal wall infections
- Techniques are applicable to a larger number of pathologies
- Surgeons need to learn and apply laparoscopic techniques when considering hysterectomy

### Selecting Hysterectomy Route

- Vaginal access
- Uterine size, myoma size, number and location
- Feasibility of vaginal morcellation
- Uterine mobility and descent
- Concurrent pathologic conditions
  - Previous pelvic surgery
  - Endometriosis
  - Adhesions
- Surgeon’s Skill

### Hysterectomy for Benign Disease

- Uterus accessible transvaginally
  - Yes
  1. > 14 weeks size
  2. Vaginal apex <2 fingers
  3. BMI >30
  4. Immobile uterus
  5. Significant extraterine pathology
    1. Significant adnexal mass
    2. Cul-de-sac inaccessible
    3. Severe adhesions
    4. Severe endometriosis
  - No

- TLH
- LAVH
- TAH
1. BMI > 30
2. HIV positive
3. Small uterus not accessible vaginally because of
   1. Pelvic contracture
   2. Acquired or congenital extremity abnormality that restricts access
4. Not recommended in uterus >24 weeks size

1. Adnexa not accessible at vaginal hysterectomy. Note that this is determined during vaginal hysterectomy, not in advance.
2. Significant unexplained extrauterine pathology with accessible uterus

STEP 1: Preparation and Positioning

- Lithotomy position
- Padded stirrups
- Arms tucked
- Buttocks 1-2 inches off the table
- Antiskid padding
- Foley catheter
- Uterine manipulator

STEP 2: Insertion of uterine manipulator

Current Guidelines for Route of Benign Hysterectomy

- ACOG: Vaginal hysterectomy is the approach of choice whenever feasible, based on well-documented advantages and lower complication rates. Laparoscopic hysterectomy is an alternative to abdominal hysterectomy for those patients in whom a vaginal hysterectomy is not indicated or feasible.

- Cochrane Review: Vaginal hysterectomy should be performed in preference to abdominal hysterectomy. Where vaginal hysterectomy is not possible, laparoscopic hysterectomy has some advantages over abdominal hysterectomy.

Equipment for laparoscopic hysterectomy

- Uterine manipulator/colpotomy laser
- Grasper
- Energy source
- Suction irrigator
- Myoma screw
- Laparoscopic needle-driver
- Knot pusher
- Suture
- Pneumo-occluder

Patient selection

- Few absolute contraindications for laparoscopy
  - Medical conditions affecting anesthesia or positioning
  - Conditions affecting abdominal entry
- Relative circumstances
  - Morbid obesity (BMI >30)
  - Previous abdominal scars
  - Midline incisions
- Uterine size – not a contraindication
  - Fixed uterus is a challenge!

Everything else!
STEP 2: Uterine manipulator/colpotomizer

Insufflation techniques

- Transumbilical
- Direct
- Open laparoscopy
  (Hasson technique)
- Transuterine insufflation
- Subcostal insufflation
  (Palmers point)
- Video on abdominal entry

Rationale:

A 3 kg force applied constantly at 10 mm Hg – depth under umbilicus = 0.6 cm
A 3 kg force applied constantly at 25 mm Hg – depth under umbilicus = 5.6 cm

STEP 3: ABDOMINAL ENTRY AND TROCAR PLACEMENT

Insufflation failures

- Obese patients
- Very thin patients
- Patients with abdominal scars
- Patients with failed insufflations
A Anatomy
   Adnexa

B Broad Ligament
   Blood Vessels
   Bladder

C Cardinal ligament
   Colpotomy
   Cuff Closure

Technique for laparoscopic hysterectomy

A Video of laparoscopic hysterectomy using the ABC technique

- Extraction of specimen
  - Vaginal morcellation
  - Mechanical morcellation

Electromechanical Morcellation

Complications of LH

- Injuries during LH occur at two points:
  - During trocar placement
  - During dissection of the ligaments attaching the uterus to the pelvic cavity

Complications
等多个器官的损伤和并发症。

- Colon：可能由于外科仪器的使用而穿孔。
- Bladder：可能在子宫切除术期间因移动而受损。
- Ureters：可能在解剖卡氏带时损伤。
- Damaged during mobilization：可能在移动期间损伤。
- Ureterotomy，with repair 3 (0.4%) 3 (0.4%)
- Ureter fistula，reimplanted 4 (0.5%) 4 (0.5%)
- Ureter fistula，stented 3 (0.4%) 3 (0.4%)
- Adhesive bowel obstruction 3 (0.4%) 3 (0.4%)
- Hemorrhagic Postoperative pelvic bleed 5 (0.7%) 5 (0.7%)
- Retroperitoneal hematoma 6 (0.8%) 6 (0.8%)
- Vaginal cuff bleed 11 (1.3%) 4 (0.6%) 7 (0.8%)
- Postoperative wound bleed 1 (0.1%) 1 (0.1%)
- Infectious Pelvic cellulitis 9 (1.1%) 9 (1.1%)
- Pelvic seroma 2 (0.3%) 2 (0.3%)
- Pelvic abscess 5 (0.4%) 2 (0.1%) 3 (0.3%)
- Diverticulitis 1 (0.1%) 1 (0.1%)
- Wound Healing 5 mm trocar hernia 4 (0.6%) 4 (0.6%)
- Vaginal dehiscence or injury 5 (0.7%) 2 (0.3%) 3 (0.4%)
- Pelvic suture granuloma 1 (0.1%) 1 (0.1%)
- Retained Surgical Device 1 (0.1%) 1 (0.1%)

**REFERENCES**

Prevention, Recognition and Management of Laparoscopic Complications

Resad Paya Pasic M.D., Ph.D.
Professor
Obstetrics and Gynecology
University of Louisville
School of Medicine
Louisville, Kentucky

DISCLOSURE

Speakers Bureau: CooperSurgical, Ethicon Endo-Surgery, Karl Storz Endoscopy

Learning Objectives

• Review of endoscopic entry techniques and risks associated with laparoscopic entry
• To present the risk and management of vascular complications
• To review the risk and management of bowel injuries
• To present the risk and management of genitourinary injuries.

Chapron C at al.: 2001:

- Multicenter study, 7 centers in France, 9Y
  - 29,966 patients
- Mortality: 3,33/100 000
- Overall complication rate: 4,64/100
- Risk is directly proportional to the complexity of the procedure (p=0,0001)

Chapron C at al.:

- 1 out of 3 complications (34,1%) happened in the early stage of surgery (trocar entry)
- 1 of 4 complications (28,6%) not recognized at the time of surgery
  - Chapron C at al.: 2001:

Surgeons experience has 3 consequences

- Statistically significant decrease in bowel injuries (p=0.0003)
- Statistically significant decrease in serious complications that require laparotomy during standard laparoscopic operations (p=0.01)
- Statistically significant increase in laparoscopic treatment of complications (p=0.0001)
What it takes to become an expert?

Standards from Airline industry
5,000 hours

Risk Factors for Laparoscopic Complications

- Previous abdominal surgery
- Difficulty or complexity of laparoscopic procedure
- Low / High BMI

LAPAROSCOPIC COMPLICATIONS

- Positional
- Equipment
- Insufflation
- Electrical energy
- Trocar placement
- Vascular injury
- Bowel injury
- Genitourinary
- Wound hernia

Positional Complications

- Brachial plexus - arm extension > 90°
- Peroneal nerve - lateral pressure
- Femoral & Sciatic nerve - compression
- Shoulder brace
- Return electrode positioning
- Foley catheter

Time Line for Complications

- Immediate postoperative / first 24 hours
  - Vessel/vascular injury
    - Vital signs H&H
- 48-72 hours postoperative
  - Ureteral injury
    - Creatinine IVP
- Days to weeks
  - Bowel injury
    - Clinical signs
Patients should get better every day

Always Check the Equipment Before Each Surgery!

ELECTRICAL INJURY

Always keep the tips of your instruments in the center of the screen, while applying energy!!

Never use two different power sources in the abdomen at the same time!

Insufflation Failures

- Obese patients
- Thin Patients
- Patients with abdominal scars
- Patients with failed insufflation

Alternative Insufflation Techniques

- Transumbilical
- Direct
- Open laparoscopy (Hasson)
- Transuterine insufflations
- Subcostal insufflations (Palmers point)
Choose the right Insufflation technique

Secondary trocar placement always under direct vision!

Vascular Injury

- Abdominal wall bleeding
  - Inferior epigastric artery

- Intra peritoneal vessel injury
  - Mesentery, ovarian, uterine artery

- Retro peritoneal major vessel injury
  - Iliac, vena cava, aorta
Retro peritoneal vessel injury

- Early recognition is the key to survival
- Direct compression on aorta
- IV fluids
- Do not open the peritoneum over a hematoma!
- Call a vascular or trauma surgeon !!!

WHAT WAS GOING THROUGH MY HEAD AT THAT TIME?

Major Vascular Injuries in Laparoscopy

RESAD PASIC, M.D., PH.D., F. MULLING, M.D., D.R. GABLE, M.D., and R.L. LEVINE, M.D.

ABSTRACT

Laparoscopy is generally a safe and well-tolerated procedure; however, complications and failures sometimes occur. The danger of damage to vascular structures and intrabdominal organs associated with blind insertion of the inflation needle and trocars is always present. Safety shields on disposable cannulas do not prevent vascular accidents if proper insertion techniques are disregarded. If a retroperitoneal hematoma is observed, a laparotomy is required for its assessment. The cases of four patients who sustained vascular injuries during initial trocar insertion at laparoscopy are presented. Recommendations are made for the diagnosis, treatment, and—more importantly—for the prevention of vascular injuries at laparoscopy. (J GYNECOL SURG 14:123, 1998)
**BOWEL INJURY**

- Not from Veress needle
- Injury may not be apparent for 4-5 days
- Any symptoms of peritonitis (sharp abdominal pain, vomiting) must be considered as bowel injury unless proven otherwise!!
- Use bowel prep

**Small bowel injury**

- Bands
- Leukocytes
- C - Reactive Protein $> 100 \text{ MG/L}$

- No antibiotics
- Surgery!

**Brosens et al.**

- Minor operative laparoscopy associated with 0.08% risk of bowel injury
- Major operative laparoscopy associated with 0.33% injuries decrease significantly with experience
- Delayed diagnosis remains major problem; up to 15% of injuries not diagnosed during laparoscopy; one in five cases of delayed diagnosis results in death

Genitourinary complications

- Bladder…………..Indigo carmine
- If <1cm consider Foley catheter for 7-10 days
- If >1cm laparoscopic 2 layer closure + Foley
- Cystoscope

- Ureter……………Trace from pelvic brim
- Small non electrical injury - primary repair over stent
Genito urinary tract Injury Evaluation

- Cysto, Ureteral stents
- Indigo carmine vs. Methilene blue
- Creatinine
- IVP

Bladder injury

Incisional hernia

Incision Hernia
Basic Laparoscopic Contraindications

ABSOLUTE
- Conditions which mitigate against creation of pneumoperitoneum
- Cardiovascular
- Pulmonary

RELATIVE
- Training and experience
- Availability of necessary instrumentation
- Diffuse peritonitis
- Shock or impending shock
- Obesity

“COMPLICATIONS AND LITIGATION IN GYNECOLOGIC ENDOSCOPY”

- “Most medical malpractice lawsuits that involve gynecologic endoscopy and laparoscopy result from either improper prevention, inadequate recognition, or delayed intervention.”

References


Wattiez A et al. JAm Assoc Gynecol Laparosc 9(1):339-345, 2002
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.