A Gynecologic Oncologist’s Approach to General Gynecology: Tackling Complex Benign Surgeries with Ease (Didactic)

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A Gynecologic Oncologist’s Approach to General Gynecology: Tackling Complex Benign Surgeries with Ease (Didactic)

Michael F. Frumovitz, Chair
Faculty: David M. Boruta, Jubilee Brown, Pedro F. Escobar, Amanda Nickles Fader, Javier F. Magrina, R. Wendell Naumann, Pedro T. Ramirez

Course Description

This course provides the general gynecologist with the tips and tricks that gynecologic oncologists use to safely perform complex minimally invasive surgery. Using didactics and videos, the course will first provide a comprehensive review of the pelvic anatomy followed by surgical techniques to avoid complications. As we all encounter surgical morbidity, attendees will learn how to manage vascular, bowel, and urologic injuries and when to call for assistance. In the second half of the course, we will start by reviewing the latest literature on the radiologic and hematologic work-up of pelvic masses in both pregnant and non-pregnant women. Then, following the anatomic landmarks learned in the first portion of the course, the audience will see the surgical approaches to safely performing surgery for difficult benign processes such as benign ovarian masses and endometriosis.

Course Objectives

At the conclusion of this course, the participant will be able to: 1) Dissect in the retroperitoneal space; 2) anticipate and avoid bleeding, bowel and ureteral complications; 3) manage complications associated with pelvic surgery; 4) perform appropriate preoperative evaluation of adnexal masses in pregnant and non-pregnant women; and 5) use the learning process to understand the surgical principles to performing complex benign surgery safely.

Course Outline

1:30  Welcome, Introductions and Course Overview  M. Frumovitz
1:35  Pelvic Anatomy for the General Gynecologist  J.F. Magrina
2:00  Identification and Safe Laparoscopic Dissection of the Ureter  M. Frumovitz
2:25  Prevention and Management of Surgical Bleeding  P.T. Ramirez
2:50  Management of Bladder and Bowel Injuries  A. Nickles Fader
3:15  Questions & Answers  All Faculty
3:25  Break
3:40  Work-up of Adnexal Masses – CA125, HE4, OVA1 or None of the Above?  P.F. Escobar
<table>
<thead>
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<th>Time</th>
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<tr>
<td>4:05</td>
<td>Adnexal Masses and Pregnancy</td>
<td>J. Brown</td>
</tr>
<tr>
<td>4:30</td>
<td>A Gynecologic Oncologists Approach to Removing Difficult Adnexal Masses</td>
<td>D.M. Boruta</td>
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<tr>
<td>4:55</td>
<td>A Gynecologic Oncologist’s Approach to Endometriosis</td>
<td>R.W. Naumann</td>
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<tr>
<td>5:20</td>
<td>Questions &amp; Answers</td>
<td>All Faculty</td>
</tr>
<tr>
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The following members of AAGL have been involved in the educational planning of this workshop and have no conflict of interest to disclose (in alphabetical order by last name).
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Viviane F. Connor
Consultant: Conceptus Incorporated
Frank D. Loffer, Executive Vice President/Medical Director, AAGL*
Linda Michels, Executive Director, AAGL*
Jonathan Solnik
Other: Lecturer - Olympus, Lecturer - Karl Storz Endoscopy-America

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David M. Boruta
Consultant: Boston Scientific Corp. Inc.
Jubilee Brown*
Pedro F. Escobar*
Amanda Nickles Fader*
Javier F. Magrina*
R. Wendel Naumann*
Pedro T. Ramirez*

Asterisk (*) denotes no financial relationships to disclose.
Pelvic Anatomy for the generalist

Javier Magrina, MD
Mayo Clinic Arizona

Disclosure
I have no financial relationships to disclose.

Objective
Review retroperitoneal anatomy
Spaces
Vessels

Identify your enemies
• External and common iliac arteries
• Obturator nerve
• Lumbosacral trunk
• Ureters

Internal iliac artery branching
• 9 different types
• 49 different subtypes

Hypogastric artery branching
“...the manner of branching departs so frequently from the so-called standard pattern that it is usually impossible to identify the various vessels without following them for some distance to ascertain their course and destinations”

Ashley FL, Anson BJ. Am J Phys Anthropol 28:381, 1941
Most common aberrant branch of internal iliac artery:

Obturator artery

Practical Internal iliac branching

- Anterior: superior vesical, uterine
- Lateral: int. pudendal, inferior gluteal
- Posterior: superior gluteal

Posterior branch of internal iliac art.

- Distance from common iliac bifurcation: 2.7 cm
- Diameter: 5 mm

Most common: one single vessel (65%) giving iliolumbar lumbosacral and ending in superior gluteal artery*

REFERENCES

- Ashley FL, Anson BJ. Am J Phys Anthropol 28:381, 1941
Identification and Safe Dissection of the Ureter

Michael Frumovitz, MD, MPH
Associate Professor and Fellowship Director
Gynecologic Oncology

Disclosure
I have no financial relationships to disclose.

Ureteral Injury

- 0.4% to 2.5% of benign pelvic surgeries
- As high as 5% in radical hysterectomy
- Only one-third recognized at time of surgery

Bladder/Ureteral Injury

Table 2 Characteristics of delayed diagnoses of lower urinary tract injuries after hysterectomy

<table>
<thead>
<tr>
<th>Variables</th>
<th>n (%)</th>
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<tbody>
<tr>
<td>Incidence: (n = 1413)</td>
<td>11 (0.8)</td>
</tr>
<tr>
<td>Laparoscopy (n = 743)</td>
<td>8 (1.1)</td>
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<tr>
<td>TLH (n = 678)†</td>
<td>5 (0.7)</td>
</tr>
<tr>
<td>LRH (n = 65)‡</td>
<td>3 (4.6)</td>
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<td>Laparotomy (n = 700)</td>
<td>3 (0.4)</td>
</tr>
<tr>
<td>TAH (n = 455)§</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td>RH (n = 245)†</td>
<td>2 (0.8)</td>
</tr>
</tbody>
</table>

Lim et al. 2010

Risk Factors

**Most Common**
- Heavy bleeding
- Endometriosis
- Large ovarian masses
- PID
- Previous pelvic surgery
- Broad ligament fibroids
- Previous pelvic irradiation

**Less common**
- Congenital anomalies
  - Ureter duplication
  - Ectopic kidney
  - Megaureter

The Best Offense is a Good Defense

KNOW THE ANATOMY!!!
Tips for Preventing GU Injuries

- Know anatomy
- Use visual landmarks
- Restore normal anatomy
- Trace path of ureter through pelvis
- Preop stenting/IVP limited value
- Cystoscope every TLH?

Repair of Cystotomy

- Identify ureteral orifices bilaterally
  - Consider stents and Urology if the trigone is involved
- Close in two layers with a non-permanent suture
  - First layer: Closely spaced interrupted sutures
    - Mucosa + muscularis
  - Second layer: Imbricate with continuous or interrupted
    - Serosa and muscularis
- Foley for 10-14 days
Types of Ureteral Injuries

- Puncture
- Ligation/Clipped
- Angulation/Tethering
- Crush
- Thermal
- Laceration
- Transection
- Ischemia
- Resection

“At this time, the AAGL Practice Committee recommends that surgeons and institutions consider routine implementation of cystoscopy at the time of laparoscopic total hysterectomy.”

Bladder/Ureteral Injury

Jelovsek et al. 2007
Principles of Ureteral Repair

1. Meticulous dissection preserving adventitia
2. Tension free
3. Watertight closure with absorbable suture
4. Protect with peritoneum or omentum
5. Drain with closed bulb suction
6. Stent ureter
7. Consider proximal diversion

Ureteroneocystostomy

- Ligate distal ureteral stump
- Mobilize bladder and ureter
- Open bladder
- Spatulate ureter
- Implant into bladder
- Reinforce/protect
- Stent ureter
- Suction drain

Psoas Hitch

- Close bladder vertically
- Secure to psoas tendon
- Be mindful of genitofemoral

Boari Flap

- Oblique flap with wide base
- Preserve blood supply
- Tubularize flap

Ureteroureterotomy

- Mobilize
- Dissect nonviable tissue
- Reanastomose over stent
- Maintain vascularity
- Protect with omentum

Ureteroileocystostomy

- Isolate healthy ileum
- End-to-side ureteroileostomy
- Anastomose end of ileum to dome of bladder
- Suction drain essential
Thank You!
Vascular Complications
Tools for Prevention & Management

Pedro T. Ramirez, M.D.
Professor
Director of Minimally Invasive Research & Education
Department of Gynecologic Oncology & Reproductive Medicine

Objectives

• Incidence of vascular injuries
• Risk factors
• Etiology
• Prevention
• Anatomy
• Management

Iatrogenic operative injuries of abdominal and pelvic veins: A potentially lethal complication

Gustavo S. Obando, MD; Juan M. Perzaneta, MD; Ian Holtz, RN, BSN; Thomas G. Brown, MD; Kenneth J. Cherry, Jr, MD, Timothy Andrus, MD; Anand A. Nessel, MD; Humayn Keba, MD; and Peter Gluckhill, MD. Boston, Mass

N=713 (1985-2002)
Etiology:
Blunt (non-iatrogenic) 178 (25%)
Catheter (iatrogenic) 367 (52%)
Operative (iatrogenic) 166 (23%)

Anterior Abdominal Wall

Mean length of stay 41 days (2-280)

Overall outcomes
- Perioperative mortality 18%
  - Multi-system organ failure
  - Exanguinating hemorrhage
  - Thromboembolic events
- All deaths secondary to venous injury
- Mean length of stay 41 days (2-280)

No Financial Disclosures
Superior Epigastric Arteries

Inferior Epigastric Arteries

Superficial Epigastric Arteries

Umbilicus

Relative to Weight

Caution in Trendelenburg

Avoid Poor Technique
Electrocautery-Associated Vascular Injury During Robotic-Assisted Surgery

Beatrice Cervier, MD, Farah Nizhat, MD, Jason Sterneck, MD, Yukio Sawada, MD, and Mario M. Leitao Jr, MD

VOL. 120, NO. 2, PART 2, AUGUST 2012

N=3
EBL (100-2,000 cc)
Etiology: Arching current
Laceration of protective sheath

Pelvic Vascular Injury

- Treacherous
- Low pressure high flow system
- Difficult access
- Multiple thin walled plexuses
- Associated organs
- Hostile operative field
  - Oncology
  - Re-do operation
  - Radiation

Initial Hemorrhage Control

DON’T PANIC

Management Vascular Injuries
Laparoscopy vs. Laparotomy

- What’s your skill level!? 
- Immediate conversion
- Adequate exposure
- Direct vascular compression
- Role of anesthesia
- Vascular surgeon

Initial Hemorrhage Control

- Goal: STOP blood loss
- Manual compression
- Avoid surgical clamps:
  - Frequently ineffective
  - Damage surrounding structures
  - Partial injury → complete transection
  - Injury to vessel wall
**Initial Hemorrhage Control**

- Ensure adequate exposure
  - Lengthen incision
  - Conversion to open - Midline incision
  - Obtain additional retraction aids
  - Multiple suction devices
- Communicate with anesthesiologist
  - Volume / blood products (warmed)
  - Adequate intravenous access

**Exposure and Control**

**Mobilization of Iliac Vessels**

**Simple Vascular Repair**
Simple Vascular Repair

Patch Angioplasty

End-to-End Repair

Interposition Graft

Fogarty Balloon Catheter
Conclusions

- Vascular injuries are rare but lethal
- Be smart- AVOID the injury
- Know your skill level!!
- Aim for atraumatic control of bleeding
- Prompt Vascular Surgery consultation
- Most patients can be salvaged
- DON’T PANIC!!
Laparoscopic Management of Bladder and Bowel Injuries

Amanda Nickles Fader, MD
Assistant Professor, Gynecologic Oncology
Johns Hopkins Medical Institutions

Objectives
- Review incidence of laparoscopic bowel and bladder injuries in gynecologic surgery
- Discuss patient safety, positioning and entry techniques to prevent visceral injury
- Demonstrate tips and tricks for laparoscopic repair of bowel and bladder injuries

Timing of Laparoscopic Visceral Complications
- Complications of intra-abdominal access
  - Choice of entry method
  - Morbid Obesity
  - Previous abdominal surgery
- Complications of the operative procedure
  - Thermal Energy Devices
  - Serial Cesarean incisions
  - Endometriosis
  - Malignancy

Disclosures
- I have no financial relationships to disclose.

Laparoscopy and Complications
- Laparoscopy affords a safe and less invasive modality for performance of both diagnostic and major operative procedures
- As surgeons expand their laparoscopic skills and increase depth and breadth of complex laparoscopic procedures offered to their patients, important to become familiar with the potential complications that may arise
  - Appreciation of its potential complications is vital to patient care
- Emphasis should be placed on prevention of complications
  - Meticulous surgical technique and appropriate patient selection
  - Recognition and management of complications intraoperatively

Obesity: Gynecologic surgical patients are getting larger
- Prior studies (1970-1980s): approximately 15-40% of women undergoing GYN surgery are obese
- Recent prospective studies (1990-2000s) report that 40-90% of women are obese

Anthropormorphics Are Critical

- BMI does not tell the whole story!
- Central adiposity and pannus: how does it lay when pt supine?
- Waist-hip ratio critical
  - WHR > 0.85 in women correlates with degree of central adiposity
  - "Apple" versus "pear shape"
    - Apples far more challenging and more prevalent
    - Intra-abdominal access very challenging

Preop Considerations for Safe Laparoscopic Entry

- Consider Fleet’s Enema or mechanical bowel prep
  - Especially in morbidly obese women or those with multiple prior laparotomies
  - Randomized controlled trial
  - Yang, Mansuria, Lee, Guido et al, JMG 2011
  - Routine bowel prep vs. NA PO4 enema b/f GYN laparoscopy were equivalent in terms of pelvic exposure, bowel prep more uncomfortable
  - Morbidly obese pts and pts w/ adhesive dz excluded

Surgical Beanbag and Gelpad

Surgical Bean Bag Steep Trendelenberg Immobilizer

Patient Positioning: Legs, Feet and Hips

- Positioning more critical than ever
  - Higher risk of pressure sores and neuropathies in obese
  - Make sure operative bed is fitted for patient
  - May require special bed for extreme morbid obesity
  - Consider Ultrafin stirrups for lithotomy
  - Corporeal padding
  - Padding of fingers, wrists, elbows and shoulders and knees/calves

Tips for Safe Laparoscopic Intra-abdominal Access

- Tuck both arms every time!
  - Pad/support all pressure points, wrap hands/fingers
  - Use sleds or arm extenders

- Position the patient yourself!
  - Low lithotomy
    - Thighs parallel to the floor, knees flexed at no more than 60 degrees, knee in line with contralateral shoulder

Patient Positioning: Arms

Patient Positioning Video

Surgical Access and Pneumoperitoneum

Tips for Safe Laparoscopic Entry

- Take the time to think about the set up before the case
  - Individual patient characteristics
    - BMI and WHR—trocar placement and length/type of ports
    - Previous surgery
    - Informed consent
    - Communicate your needs to OR staff

Alternative Access Techniques for Safe Laparoscopy in Complex Cases

- Consider Open Hasson or Left Upper Quadrant (Palmer's Point) Entry Incisions in:
  - Morbidly obese women
  - Women with multiple prior laparotomies
  - Pelvic infection
  - Staging of gynecologic malignancies

- Remember Capa Blanca!
Laparoscopy in Centrally Obese

- Like Scuba Diving
- Above the water, it may be stormy…but go below and it can be calm and smooth

Cochrane Collaboration Review on Laparoscopic Entry Techniques

Surgical Access: Veress Needle?

- Creation of a pneumoperitoneum is an important step, as most complications occur at this time
- Can be challenging to perform in patients with significant truncal adiposity or reperitoneal fat or previous abdominal
- **Avoid** use of Veress needle in morbidly obese patients or those with prior abdominal surgery

Surgical Access: Open Hasson Technique

Surgical Access: LUQ Approach

- LUQ technique most optimal?
- Palmer’s point
- 2.5 mm long optical trocar
- **DO NOT** elevate the abdominal wall excessively

LUQ Access Video
The pannus and trocar placement

- In patients with a panniculus, anatomic landmarks are distorted
- Old school teaching: panniculus should be pushed cephalad until the umbilicus is 8 cm cephalad to the ASIS prior to umbilical entry
- Contemporary approach: LUQ or supra-umbilical approach with optical trocar
- Position additional trocars more laterally and superiorly (above pannus)

Additional Trocars

- Avoid bladed trocars!!
- Initially increase the insufflation pressure to 20 mmHg to allow a greater distance for trocar placement
- Then reduce the pressure to 10-15 mmHg to prevent CO2 retention and decreased chest wall compliance

Visceral adiposity: optimize exposure and avoid injury

- Fold small bowel out of the pelvis
- Consider a laparoscopic fan
- If RS colon is redundant, a puppeteering stitch with a 36 inch Ethibond or PDS suture can be placed through the RS epiploica and brought through the skin to improve pelvic exposure

Video Puppeteering Stitch

Incidence of bowel injury at laparoscopy

- 0.13% by van der Voort et al
  - Most common location of injury was the small bowel (55.8%), followed by the large intestine (38.6%) and the stomach (3.9%)
- Common signs that a bowel injury has occurred include foul-smelling gas, return of bowel contents, high insufflation pressures, and asymmetric distension
- Early diagnosis critical—morbidity and mortality associated with bowel injuries appear significantly affected by the time at which injury is identified
  - View the initial trocar site through an alternative port if there is concern about anterior wall adhesions

Laparoscopic Bowel Injuries

- Gastrointestinal trauma occurs during creation of pneumoperitoneum or during the operative portion of laparoscopy
- Both types of injuries frequent in the face of previous surgery or prior infection that has resulted in the fixation of the bowel to other structures, particularly to the anterior abdominal wall
- Approximately 40% of bowel injuries are access related and occur with the insufflation needle or with a trocar.
**Bowel Injuries**

- In review by van der Voort et al, of 273 bowel injuries, 3 (1.1%) and 2 (0.7%) occurred with the grasping forceps and scissors, respectively. In contrast, 70 (25.6%) thermal injuries were reported and occurred with either a coagulating instrument or the laser.

  - Multifunctional electrothermal bipolar vessel sealers and ultrasonic coagulating shears superior in achieving hemostasis when compared with older monopolar and bipolar electrocoagulation devices.
  - Also appear to be safer, in that lateral thermal injury is more common in monopolar and bipolar instruments.

**Approach to the Difficult Bladder Dissection**

- The best way to manage visceral complications that occur during laparoscopy is to anticipate and avoid them!
- >50% of visceral injuries occur with intra-abdominal access.
- Proper positioning, patient selection and choice of trocar and abdominal access sites are keys to avoiding trouble.
- Intra-operative recognition of visceral injuries are vital.
- Many visceral complications can be managed laparoscopically if immediately recognized, with minimal increased morbidity to the patient.

**Incidence Bladder Injuries**

- With respect to GYN surgery, the bladder remains the most common site of injury.
- Injury to the bladder and/or ureter during laparoscopic surgery used to be rare.
- However, as laparoscopy has expanded to include more complicated procedures, injuries involving the GU system have also increased.
- Incidence of bladder injury during laparoscopy between 0.02% and 8.3%.
  - Most often involves the bladder dome.
  - The most common laparoscopic procedure associated with bladder injury is laparoscopic-assisted vaginal hysterectomy and most frequently occurs while conducting sharp, electrosurgical dissection.

**Sharp or Thermal Bowel Injuries**

- Sharp (non-thermal) injury to small bowel or colon: repair primarily and laparoscopically with 3-0 delayed absorbable suture; interrupted sutures perpendicular to long axis of bowel.
- Superficial, brief thermal injury: oversew laparoscopically with 3-0 delayed absorbable suture.
- Deeper injury or full thickness thermal energy identified intraop: resect small bowel (laparoscopic if possible) and reanastamose; colon repair primarily beyond site of thermal spread.
- Unrecognized, late perforations may manifest several days to weeks following the surgery. If full-thickness perfor diagnosis delayed, sepsis, multiorgan failure, and even death may occur—requires laparotomy to explore adequately and diversion.

**Conclusions**

- The best way to manage visceral complications that occur during laparoscopy is to anticipate and avoid them!
- >50% of visceral injuries occur with intra-abdominal access.
- Proper positioning, patient selection and choice of trocar and abdominal access sites are keys to avoiding trouble.
- Intra-operative recognition of visceral injuries are vital.
- Many visceral complications can be managed laparoscopically if immediately recognized, with minimal increased morbidity to the patient.

**Prophylactic Cystourethroscopy Post-TLH**

An Ounce of Prevention…

- Ibeanu et al, Obstet Gynecol, 2009
- Jelovsek, JSLS 2007

**Video**
References


Acknowledgments

- Michael Frumovitz, MD
- AAGL
- My patients
Work-up of Adnexal Masses – CA125, HE4, OVA1 or None of the Above?

Pedro F. Escobar, M.D.
Associate Professor of Surgery
Director of Laparoscopy and Robotic Surgery
Department of OB/GYN and Women’s Institute
Cleveland Clinic

Objectives

• Review ovarian cancer epidemiology

• Review appropriate pre-operative assessment of adnexal masses (Imaging, biomarkers, etc.)

• Identify important considerations to be made prior to proceeding with surgery

Ovarian Cancer

Fifth leading cause of female cancer death in the United States

Prevalence: Approx. 22k new cases of ovarian cancer and 15k deaths in 2011

Lifetime risk:

1/71 (1.4%)1,2

Survival Percentage Based Upon <5yrs

<table>
<thead>
<tr>
<th>Stage</th>
<th>Percent of Cases</th>
<th>Survival</th>
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<tbody>
<tr>
<td>I</td>
<td>24%</td>
<td>95%</td>
</tr>
<tr>
<td>II</td>
<td>6%</td>
<td>65%</td>
</tr>
<tr>
<td>III</td>
<td>55%</td>
<td>15%–40%</td>
</tr>
<tr>
<td>IV</td>
<td>15%</td>
<td>0%–20%</td>
</tr>
<tr>
<td>Overall</td>
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Cancer Mortality Rates: 1930 – 2003

Challenge of Adnexal Masses

• There are 110M women >18 yrs in the US

• How common are adnexal masses?

  Premenopausal women
  + 14% annual incidence (13M)
  + 30% prevalence (27M)

  Postmenopausal women
  + 5% annual incidence (1.5M)
  + 16% prevalence (5M)

  + 30% of unilocular & 45% of complex tumors typically persist

I have no financial relationships to disclose.
Ovarian Neoplasms

**Pre Menopausal**
- 15% of ovarian neoplasms in premenopausal women are malignant
- Non-inflammatory ovarian tumors
  - 70% functional cysts
  - 20% neoplastic
  - 10% endometriomas
- Other
  - Inflammatory process, bowel

**Post Menopausal**
- 50% of ovarian neoplasms in postmenopausal women are malignant
- Benign epithelial tumor
- Stromal tumor
  - Granulosa cell
  - Fibroma
  - Thecoma
- Epithelial ovarian cancer
- Metastatic cancer

---

**PREOPERATIVE EVALUATION**

**Standard Approach to Evaluation of Adnexal Mass**

- **Physical Evaluation**
  - Pelvic, abdominal & lymph node survey
- **Biomarkers**
- **Imaging study**
  - TVU
  - MR or CT scan

---

**Pelvic Examination**

- **Detecting Ovarian Tumors**
  - Ovarian detection on pelvic examination is infrequent in women ≥ 55 years old (30%)
  - Ovarian detection is exceedingly difficult in women weighing at least 200 lb. (9%)
  - A large uterus (weight ≥ 200 g) makes ovarian palpation unlikely (16%)

---

**Adnexal Mass Accuracy Of Physical Examination**

<table>
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<tr>
<th>Authors</th>
<th>Pts/Exams</th>
<th>Yrs.</th>
<th>Cancers</th>
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<tbody>
<tr>
<td>Garrett</td>
<td>26,635 / 74,868</td>
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</tr>
<tr>
<td>McFarlane</td>
<td>1319/80,753</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>Andolf</td>
<td>795/878</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
**Pelvic Exam vs. Ultrasound**

<table>
<thead>
<tr>
<th></th>
<th>Pelvic Exam</th>
<th>Ultrasound</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age ≥ 55</td>
<td>0.30</td>
<td>0.74</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Patient wt ≤ 200lb</td>
<td>0.09</td>
<td>0.73</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Uterine wt ≥ 200g</td>
<td>0.16</td>
<td>0.80</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

**So Pelvic Examination...**

“In 74,000 examinations, we have found six cases of symptomless cancer of the ovary. Five of these patients are dead, and one survives. The conclusion is obvious. Vaginal examination as a means of early diagnosis of cancer of the ovary is a waste of time.”


**Adnexal Mass Transvaginal Ultrasound**

- Most widely used imaging modality
- No alternative imaging modality has sufficient superiority to justify its routine use

**Advantages**
- Widespread availability
- Good tolerability
- Reasonable cost-effectiveness

**Limitations**
- Lack of specificity, poor PPV for malignancy, especially in pre-menopausal women

**Ultrasound Characteristics of Ovarian Neoplasms**

**Benign**
- Unilateral
- Simple, unilocular
- Septated (MI<5)
- No ascites
- Resolution

**Malignant**
- Bilateral
- Complex (MI ≥ 5)
  - Solid wall abnormalities
  - Internal papillations
- Ascites
- Persistence or growth
Risk of Malignancy by Ultrasound Findings

- Multiloculated cysts
- Solid areas
- Bilateral lesions
- Ascites
- Evidence of intraabdominal metastases

<table>
<thead>
<tr>
<th>Ultrasound score</th>
<th>Benign (n=290)</th>
<th>Malignant (n=75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>27%</td>
<td>4%</td>
</tr>
<tr>
<td>1</td>
<td>39%</td>
<td>17%</td>
</tr>
<tr>
<td>2-5</td>
<td>34%</td>
<td>79%</td>
</tr>
</tbody>
</table>

What does Color Doppler Add?

- Altered angiogenesis in neoplastic growth
- Vessels lack of muscularis
- A-V shunting with low impedance and high flow velocity
- High diastolic flow suggestive of malignancy

Characteristics of Malignancy:
- PSV >16cm/s
- RI <0.45
- Flow in central mass/papilla

Kentucky Morphology Index

MI ≥ 5

Ultrasound - Kentucky Morphology Index
No Ovarian Tumor Biopsy

- Percutaneous FNA cytology of cystic ovarian tumors has low cancer sensitivity, ranging from 25% - 82%.
- 25% - 50% of aspirated cystic ovarian tumors will recur within 1 year.
- Aspiration of malignant cystic tumor may disseminate the cancer, increase the stage, and worsen the prognosis.

Laparoscopic Management

Adnexal Mass Imaging Modality Comparison

<table>
<thead>
<tr>
<th>Modality</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVUB</td>
<td>91%</td>
<td>91%</td>
</tr>
<tr>
<td>Doppler UB</td>
<td>80%</td>
<td>91%</td>
</tr>
<tr>
<td>CT</td>
<td>90%</td>
<td>75%</td>
</tr>
<tr>
<td>MRI</td>
<td>91%</td>
<td>88%</td>
</tr>
<tr>
<td>PET</td>
<td>87%</td>
<td>79%</td>
</tr>
<tr>
<td>Pelvic exam</td>
<td>45%</td>
<td>90%</td>
</tr>
<tr>
<td>CA-125</td>
<td>78%</td>
<td>78%</td>
</tr>
</tbody>
</table>

Biomarkers

- CEA
  - Mucinous neoplasms
- CA19-9
  - Gastrointestinal (pancreatic)
- LDH*
  - Germ cell tumors (Dysgerminoma)
- β-hCG*
  - Pregnancy
  - Trophoblastic disease
  - Germ cell tumors (choriocarcinoma)
- AFP*
  - Hepatic neoplasms
  - Germ cell tumors (endodermal sinus tumors)

- CA125
  - Antigen derived from:16
    - Coelomic epithelium (pericardium, pleura, peritoneum)
    - Mullerian epithelium (tubal, endometrial, endocervical)
  - Two different assays
    - CA125 ≤ 35 U/mL
    - CA125-II < 20 U/mL
  - Expressed by 80% advanced ovarian cancers:16,17
    - Poorly expressed in ovarian mucinous, clear cell, undifferentiated, sarcomatoid malignancies
  - Expressed by 50% of early stage ovarian cancers:16,17

*Most beneficial in young women with solid tumors
HE4

- Antigen derived from:
  - Human epididymis protein
- Product of the WFDC2 (HE4) gene which is over expressed in patients with ovarian carcinoma\(^\text{18}\)
  - Falsely elevated or depressed values of HE4 may occur in samples containing human anti-mouse antibodies (HAMA)\(^\text{19}\)
- Reference range ≤ 150pM\(^\text{19}\)
- FDA-cleared to monitor cancer treatment with other clinical methods
  - HE4 should not be used for monitoring patients with mucinous or germ cell ovarian cancer\(^\text{19}\)

OvaCheck®

- Proteomic screening test developed by Correlogic Systems, Inc. for the early detection of Epithelial Ovarian Cancer
- July 12, 2004 - FDA states that OvaCheck is a medical device and therefore requires FDA premarket review
  - "In the opinion of SGO, more research is needed to validate the test's effectiveness before offering it to the public"\(^\text{20}\)
- NCCN 2009 Guidelines do not comment on the use of proteomics for the early detection of malignancies
- Currently unavailable in the US

OvaSure™

- Developed by Yale University & commercialized by LabCorp
- 6 protein biomarker panel used to assess the presence of early stage ovarian cancer in high-risk women
- Sept 2008, FDA required additional clinical validation and requested OvaSure be removed from the market
  - "After reviewing OvaSure’s materials, it is our opinion that additional research is needed to validate the test’s effectiveness before offering it to women outside of the context of a research study conducted with appropriate informed consent under the auspices of an institutional review board." Society of Gynecologic Oncologists\(^\text{21}\)
- Currently unavailable in the US

FDA News Release

- For Immediate Release: Sept. 11, 2009
- Media Inquiries: Peper Long, 301-796-4671, mary.long@fda.hhs.gov
  - Consumer Inquiries: 888-INFO-FDA
- FDA Clears a Test for Ovarian Cancer
  - Test can help identify potential malignancies, guide surgical decisions
  - The U.S. Food and Drug Administration today cleared a test that can help identify ovarian cancer in a pelvic mass that is already known to require surgery. The test, called OVA1, can help patients and health care professionals decide what type of surgery should be done and by whom.

Risk of Ovarian Malignancy Algorithm

- Initially submitted ROMA™ to FDA for review by Fujirebio Diagnostics, Inc. in Dec 2008
  - Submission pulled by manufacturer prior to FDA decision
- Resubmitted in Nov 2010 after conducting a new clinical trial - cleared by FDA on Sept 6, 2011\(^\text{22}\)
  - Indicated for women with a pelvic mass who are planned for surgery.
  - High sensitivity limited to EOC and LMP tumors
  - Is not a screening or stand alone test
Multivariate Index Assay

Cancer Clues
A new test measures five proteins that increase or decrease in your blood if you have ovarian cancer:

- Apolipoprotein A1
- β2 Microglobulin
- Transferrin
- CA125
- CA125-II

Multivariate Index Assay - “The OVA1® test”

- Five Biomarkers (Apolipoprotein A1, Transthryretin, β2 Microglobulin, Transferrin, CA125-II)
- Triage tool for surgical decision making
- OVA1 uses a proprietary algorithm to evaluate the five markers and produces a single score from 0-10

<table>
<thead>
<tr>
<th>Test Range 0-10</th>
<th>Premenopausal</th>
<th>Postmenopausal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>&lt; 5.0</td>
<td>&lt; 4.4</td>
</tr>
<tr>
<td>High Risk</td>
<td>≥ 5.0</td>
<td>≥ 4.4</td>
</tr>
</tbody>
</table>

SGO/ACOG Referral Criteria for Women w/ Adnexal Mass to GynOnc

Premenopausal (< 50 yrs)
- CA125 > 200 U/mL
- Ascites
- Evidence of abdominal/distant mets (by exam/imaging study)
- First degree family history of breast/ovarian cancer

Postmenopausal (>50 yrs)
- CA125 > 35 U/mL
- Ascites
- Evidence of abdominal/distant mets (by exam/imaging study)
- First degree family history of breast/ovarian cancer
- Nodular/fixed pelvic mass

June 2011: OVA1 & the College Guidelines

<table>
<thead>
<tr>
<th>Premenopausal (n=235)</th>
<th>Postmenopausal (n=281)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity, %</td>
<td>58</td>
</tr>
<tr>
<td>Specificity, %</td>
<td>77</td>
</tr>
<tr>
<td>PPV, %</td>
<td>38</td>
</tr>
<tr>
<td>NPV, %</td>
<td>89</td>
</tr>
</tbody>
</table>

- When replacing CA125 with OVA1 in the ACOG guidelines >90% of EOC were detected and 80% of all malignancies missed by the current guidelines
- Improved sensitivity (58% - 93%) and NPV (89% - 95%) for premenopausal women
- The OVA1 has much better sensitivity for early stage cancers than CA 125
  - Premenopausal (47% - 88%)
  - Postmenopausal (88% - 100%)

June 2011: OVA1 & Preoperative Assessment

“Effectiveness of a Multivariate Index Assay in the Preoperative Assessment of Ovarian Tumors”

<table>
<thead>
<tr>
<th>Subjects</th>
<th>OVA1</th>
<th>CA125-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>All cancers (n=161)</td>
<td>92.5%</td>
<td>68.9%</td>
</tr>
<tr>
<td>All epithelial ovarian cancers (n=96)</td>
<td>99.0%</td>
<td>82.3%</td>
</tr>
<tr>
<td>Early stage EOC (n=41)</td>
<td>97.6%</td>
<td>65.9%</td>
</tr>
<tr>
<td>Premenopausal women w/ early stage EOC (n=14)</td>
<td>92.9%</td>
<td>35.7%</td>
</tr>
</tbody>
</table>

Overall, the OVA1 detected 76% of malignancies missed by CA125-II. Including all advanced stage malignancies.

March 2011: Updated Committee Opinion

- First update since original publication (Dec 2002)
- “OVA1” May be useful for evaluating women with a pelvic mass
- “OVA1” Appears to improve predictability of ovarian cancer in women with pelvic masses
SGO Statement on OVA1

September, 2009

SGO recognizes the importance of accurate detection of ovarian cancer and referral to gynecologic cancer specialists for women with ovarian masses. The OVA1 test, recently approved by the FDA, measures the levels of five proteins in blood samples from women with a known ovarian mass that have been reported to change when ovarian cancer is present, and may be a useful tool in identifying women who should be referred to a gynecologic oncologist for their ovarian cancer surgery.

As physicians who are expert in the care of women with gynecologic cancers, members of the SGO are supportive of scientific advances such as OVA1 that may help healthcare providers better detect when referral to a gynecologic oncologist is indicated. However, this test has not been approved for use as an ovarian cancer screening tool, nor has it been proven to result in early detection or reduce the risk of death from this disease.

SGO does not formally endorse or promote any specific products or brands as may be implied by the product announcement.

Limitations in Clinical Practice

- Not a screening test!!!
- Not a stand-alone diagnostic test. It should be used in conjunction with clinical evaluation
- A negative test, in the setting of a positive pre-surgical assessment, should not preclude oncology referral!!!
- Triglyceride > 4.5 g/L may interfere with the test
- Not intended to determine whether surgery is necessary!!!
- Incorrect use of the test may risk unnecessary testing, surgery and/or delayed diagnosis

Conclusions

- If you do what you’ve always done, you’re gonna get what you always got.

— Yogi Berra

Case 1

36 y.o. G0 woman with a history of severe endometriosis presents with pelvic pain and irregular bleeding.

P.E. Tender, 6 cm pelvic mass.

Pap smear and endometrial biopsy (-)

F.H. Aunt had ovarian cancer at age 59

Labs WBC = 8

β-hCG (-)

CA125 = 192 U/mL

OVA1 = 6.5 (<5.0)

Pelvic Ultrasound

After participating in this session I will do the following in this situation:

- A. Referred patient to Gynecologic Oncologist or proceed with surgery with GYO back-up
- B. Observation and Repeat U/S in 6-8 weeks
- C. Ordered a CT-Scan
- D. Proceed with surgery with no GYO back-up
Surgery with Gynecologic Oncologist

Stage IIA, grade 2 endometrioid adenocarcinoma of ovary

Case 2

66 y.o. woman presents for routine annual examination. Some urinary frequency and mild cough and SOB. Single episode of spotting 3 months ago.

P.E. 
- Palpable, 8 cm pelvic mass.
- Pap smear and endometrial biopsy (-)

F.H. 
- Aunt had ovarian cancer at age 59

Labs 
- WBC= 8
- CA125= 42 U/mL
- OVA1 - 4.0 (<4.4)

Pelvic Ultrasound
- Ascites

After participating in this session I will do the following in this situation:

A. Referred patient to Gynecologic Oncologist

B. Observation and Repeat U/S in 3-4 weeks

C. Ordered MRI of the pelvis

D. Proceed with a laparotomy or LSC

Surgery with OB/Gyn

Benign ovarian cystadenofibroma and associated Meigs syndrome

References

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Wall Street Journal, Test to Help Determine If Ovarian Masses Are Cancer, Johannes L., Mar 9, 2010
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Society of Gynecologic Oncologists, September 11, 2009
Adnexal Masses and Pregnancy

Jubilee Brown, M.D.
Associate Professor
Department of Gynecologic Oncology

I have no financial relationships to disclose.

Objectives

• Describe the indications for removal of an adnexal mass during pregnancy
• Examine the role of minimally invasive surgery in the removal of the adnexal mass during pregnancy
• Review the safety profile surrounding the use of minimally invasive surgery in pregnancy

Indications for removal of an adnexal mass during pregnancy

Background

• Prevalence of pregnancies complicated by an adnexal mass: 1-4%
• Most are < 5 cm and resolve by 2nd trimester
• 5% are malignant…ovarian cancer is the 5th most common cancer diagnosed during pregnancy
• May present with elevated AFP (germ cell tumors) on triple screen in 1st trimester

— Hasenwitz, Clin Obstet Gynecol 2012

| Table 1. Differential Diagnosis and Frequency for Pelvic Masses in Pregnancy |
|-------|--------|
| History                                    | Percent |
| Benign mass (95%)                          | 17      |
| Corpus luteum                              | 37      |
| Dermoid                                    | 24      |
| Cystadenoma                                | 5       |
| Endometrioma                               | 5       |
| Leiomyoma                                  | 12      |
| Other (parovarian, luteoma, theca-lutein)  |         |
| Malignancy (5%)                            |         |
| Epithelial                                 | 59      |
| Invasive                                   | 33      |
| Low malignant potential                    | 66      |
| Germ cell tumor                            | 30      |
| Stromal/sex cord                           | 20      |

34
**When to operate?**

- Balance risks of surgery to mother and fetus
- Risk of elective surgery is low
  - No association with miscarriage, PTL, PTD, PROM
- Risk of emergent surgery is higher
  - 22% risk of PTL (Lee et al)
- Down side of observation
  - Risk of treatment delay of malignancy
  - Ovarian torsion: 5% of adnexal masses, 20% if 6-8 cm; 60% of time between 10-17 weeks
  - Obstruction of labor or cyst rupture

**Risk of delay**

- 36 year old female with 8 cm complex adnexal mass
- 17 weeks pregnant
- Normal CA-125
- Advised to have surgery; sought second opinion and declined surgery
- Mass grew during pregnancy to 15 cm
- Patient delivered by vaginal delivery at term
- Underwent a laparoscopic USO 8 weeks post delivery. Cyst ruptured.
- Pathology: Clear cell carcinoma
- Outcome: hospitalized with brain mets

**No firm guidelines...best recommendations**

- Persist into second trimester
- > 10 cm, or are symptomatic, or are solid, or are mixed solid/cystic suspicious for malignancy
- Goals:
  - Remove mass to avoid pregnancy complications
  - Obtain a diagnosis
  - Stage or debulk if a cancer is present

**Surgical Goals**

- Peritoneal washings
- Explore the abdomen
- Evaluate the contralateral ovary
- Avoid manipulating the uterus
  - Abruptio, PTL, fetal loss
- Remove the cyst if appears likely to be benign, or involved ovary/tube if excrescences, solid, presence of ascites
- Frozen section

**The role of minimally invasive surgery in the removal of the adnexal mass during pregnancy**

**TO STAGE OR NOT TO STAGE?...**

- Temper enthusiasm with clinical benefit — how are you going to use this information?
  - Germ cell tumor that appears early? Full staging – completely guides therapy – no chemo for Stage IA grade I immature teratoma or dysgerminoma
  - No wedge resection of contralateral ovary
  - +/- benefit of cytoreduction
  - No prospective randomized clinical trial
The safety profile of minimally invasive surgery in pregnancy

- **Early 2nd trimester: 17-19 weeks**
  - Decreased risk of miscarriage
  - Functional cysts resolved, eliminating unnecessary surgery
  - Placenta has taken over progesterone production
  - FHT preop and postop, no evidence for tocolytics

- **Minimally Invasive Surgery**

  **Benefits**
  - Shorter recovery time
  - Decreased operative time
  - Decreased length of stay
  - Lower morbidity
  - Less discomfort

  **Issues**
  - Increased pressures...
  - Decreased venous return...
  - Decreased cardiac output
  - Fetal hypotension/hypoxia/acidosis
  - Potential for injury to uterus

- **Is MIS safe in pregnancy?**

  - 9 women who underwent laparoscopic surgery in first or second trimester for an adnexal mass
  - Cystectomy or oophorectomy performed
  - Mean uterine resistance index and umbilical artery pulsatility index were constant during surgery
  - Fetal heart rate was normal throughout but decreased during the procedure
  - No maternal complications, no miscarriages, no adverse pregnancy outcomes

  - Candiani et al., JMIG 2012

- **Table 4**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>30.3 ± 4.2</td>
</tr>
<tr>
<td>Birth weight (kg)</td>
<td>3.57 ± 0.9</td>
</tr>
<tr>
<td>Gestational age (weeks)</td>
<td>39.5 ± 1.1</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td>Cesarean</td>
</tr>
<tr>
<td>Complications</td>
<td>None</td>
</tr>
</tbody>
</table>

- **Additional benefits**
  - No differences in outcome
    - Preterm labor not significant on multivariate analysis
  - Laparoscopy may be preferable

- **262 women: 174 (66.4%) had laparotomy, 88 (33.6%) had laparoscopy**
- **5 miscarriages, all within 3 weeks of surgery (3/2)**
- **Shorter mean operative time**
  - 68.7 vs 69.7 min, p = 0.002
- **Shorter mean hospital stay**
  - 4.7 vs 6.6 days, p < 0.001

**Minimally Invasive Surgery**

- **Benefits**
  - Shorter mean hospital stay
- **Issues**
  - Increased pressures...
  - Decreased venous return...
  - Decreased cardiac output
  - Fetal hypotension/hypoxia/acidosis
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**The safety profile of minimally invasive surgery in pregnancy**

- Early 2nd trimester: 17-19 weeks
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- **Minimally Invasive Surgery**

  **Benefits**
  - Shorter recovery time
  - Decreased operative time
  - Decreased length of stay
  - Lower morbidity
  - Less discomfort

  **Issues**
  - Increased pressures...
  - Decreased venous return...
  - Decreased cardiac output
  - Fetal hypotension/hypoxia/acidosis
  - Potential for injury to uterus
Is MIS safe in pregnancy?

- Several case series report on feasibility, safety, and potential benefits of MIS
- Cochrane database review: not enough information to make conclusions regarding MIS
- Recommend a randomized trial

Can early ovarian malignancy be adequately managed by laparoscopy?

- Controversial
- Prospective studies best way to address
- Only in guarded circumstances by experienced laparoscopists
- Never with ascites
- Never with advanced disease
- Never if the procedure will be compromised

Thank You!
A Gynecologic Oncologist’s Approach to Removing Difficult Adnexal Masses

David M. Boruta MD
Massachusetts General Hospital

Consultant: Boston Scientific Corp. Inc.

OBJECTIVE

- Recognize the risk of cyst rupture during adnexal surgery.
- Assess the significance of cyst rupture during adnexal surgery.
- Demonstrate minimally invasive techniques for removal of adnexal tumor while avoiding intraperitoneal spillage of cyst contents.

Case 1

- 28 y/o G1 at 13 weeks EGA
- 7.5 cm left ovarian mass, “probable dermoid”

Case 2

- 50 y/o G2P2
- Menopausal
- 10 cm right adnexal cystic mass on exam and ultrasound, relatively simple appearing
- CA-125 200
Does rupture matter?

- Benign
- Malignant

Benign cyst rupture

- Dermoid
  - Pansky et al. 2010
  - 128 laparoscopies, 89.8% cystectomy; 34.4% rupture
  - No chemical peritonitis
  - Known reproductive outcomes, 45 women
    - Spontaneous pregnancy: 100% in rupture and 68.9% in non-rupture patients

Benign cyst rupture

- Mucinous cystadenoma
  - Ben-Ami et al. 2010
  - 42 women, both laparoscopic and laparotomy
  - Rupture rate 23.8%
  - 7.1% recurrence
    - all after cystectomy with rupture
    - all in same ovary

Malignant cyst rupture

- Vergote et al. 2001
  - 1545 women with stage I epithelial ovarian cancer
  - all laparotomy; inconsistent staging
  - 8% rupture rate
  - DFS worse with rupture
    - Preop rupture: HR 2.65 (1.53-4.56)
    - Intraop rupture: HR 1.64 (1.07-2.51)

Malignant cyst rupture

- Bakkum-Gomez et al. 2009:
  - 161 stage I epithelial ovarian cancers
  - all surgically staged with laparotomy
  - 44.7 month follow-up
    - 14% recurrence, 7% death
    - Rupture, positive cytology, and increased stage associated with worse DFS
Malignant cyst rupture

– After controlling for cytology, rupture still significantly worsened DFS
– Worst survival in stage IC with positive cytology and/or surface tumor PLUS rupture
– Although not statistically significant, recurrence and death in ICr (IC due to rupture alone) vs. IA/B was 13.2 vs. 5.4% and 7.9 vs. 1.4%, respectively

Malignant cyst rupture

• Changes therapy:
  – in Bakkum-Gomez et al., chemo delivered in 43% vs. 89% of IA/B vs. IC rupture only patients
  – Recurrence:
    • IA- 5.4%
    • ICr - 13.2%
    • ICr with chemo - 12%

Malignant cyst rupture

• Either:
  – rupture spreads tumor
• Or
  – rupture is reflective of innately aggressive tumor

Risks for rupture

<table>
<thead>
<tr>
<th></th>
<th>Cystectomy (%)</th>
<th>Adnexectomy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pansky et al. 2010</td>
<td>37.4</td>
<td>7.7</td>
</tr>
<tr>
<td>Ben-Ami et al. 2010</td>
<td>35.7</td>
<td>17.9</td>
</tr>
<tr>
<td>Smorgick et al. 2009</td>
<td>29.5</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Preventative measures

• Patient selection to determine approach and procedure
• Endoscopic bag
  – for retrieval
  – for protection
  • Kondo et al. 2010
• "Controlled" drainage
Additional cases

• Case 3
  – 40 y/o G4P1 with abdominal fullness
  – USN and CT show a 6 cm “fatty” left adnexal mass and a 10 x 16 x 22 cm complex cystic mass, likely the right ovary

• Case 4
  – 31 y/o G0 with abdominal pressure
  – 10+ cm complex cystic right ovarian mass, otherwise unremarkable CT scan
  – CA-125 431

Conclusions

• Rupture of malignant ovarian cysts worsens prognosis and may prompt delivery of chemotherapy
• Rupture should be avoided when possible
• Skilled, cautious laparoscopy should continue to be standard surgical approach for adnexal surgery

REFERENCES

A Gynecologic Oncologist’s View of Endometriosis

R. Wendel Naumann, M.D.
Carolinas Medical Center Levine Cancer Institute
Charlotte, NC

Disclosures
• I have no financial disclosures

Objectives
• Review important anatomy
  – Open spaces
  – Find Ureter
• Tips and tricks to remove endometriosis
• Discuss potential complications

Laparoscopic Surgery
• Should NOT be considered “minor” surgery
• Laparoscopic surgery is more difficult!!
• Liability is high
  – Anatomy looks different from open anatomy
  – Complications can be subtle and often overlooked or diagnosis delayed
• Endometriosis surgery is HARDER than cancer surgery

Problems with Endometriosis
• Adhesions
  – previous surgery
  – endometriosis
• Scar tissue
  – loss of tissue planes
  – normal tissue will tear over endometriosis
• Recurrence
  – Best if treated like a CANCER!

Principles
• Identify anatomy
• Open spaces
• Restore normal anatomy
• Excise all tumor!!
• Check for injury
Adhesions

Post Laparoscopy

• POD 1
  - dropped Hb to 7.4
  - Advanced to regular diet
  - No fever but mild abdominal pain
  - Heart rate in the 120s
• POD 3
  - transfusion x 3 u PRBC
  - CT drainage of pelvic hematoma with some improvement
  - no evidence of GI injury
• POD 4
  - Still having tachycardia
  - pain becomes worse and CT scan still shows fluid

Severe Adhesions

Direct Insertion

Warning: The content of this video is graphic in nature and may cause significant nausea and/or discomfort to medical personnel!

Trocar Insertion Injury

• Baggish reported 130 bowel injuries
  - 63% related to trocar insertion
  - 77% small bowel
  - 41% large bowel
• Bhoyrul reported 629 trocar injuries
  - 29% involved bowel injury
  - 73% involved small bowel
  - 12% unrecognized
  - 19% of deaths due to unrecognized bowel injury

Bowel Injury Patterns during Laparoscopy

- Trocar (63%)
- Small Bowel (40%)
- Large Bowel (60%)
- Dissection (37%)
Instruments of Destruction

Abdominal Entry

Laparoscopic Incisions for Severe Adhesions

Bowel Injury

Case #1:
Post Laparoscopy

- 53 yo with extensive LOA for abdominal pain
  - D/C home the same day
- POD 1 - complains of abdominal pain
  - stronger analgesic called in by midlevel provider
- POD 2 - calls with pain and nausea
  - given a Rx for anti-emetics
  - X-ray shows air-fluid levels felt to be ileus/gastroenteritis

What would you do at this point?

Post-op

- POD 3 - presents to the ER in septic shock with sigmoid colon injury and dies
Laparoscopy
• Patients DO WELL after laparoscopy
• Be suspicious if
  – Nausea and vomiting or ileus
  – Tachypnea or tachycardia
  – Fever
  – Confusion
  – Decrease urinary output
  – Significant or worsening pain
• Litigation in these cases is more associated with failure to diagnose the injury than the injury itself

Bowel Injury
• Reasons for delay
  – fails to place intestinal injury at top of list
  – surgical consultant delayed in making correct diagnosis
  – ancillary diagnosis can confuse the picture
    • pleural effusion
    • chest pain
    • tachypnea
    • elevated creatine

Don’t let these be Red Herrings!

Signs of Intestinal Injury

Bowel Injury Timing of Diagnosis

Open the Spaces and Find the Ureter!!

Thank you!
References

CULTURAL AND LINGUISTIC COMPETENCY

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

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

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