Endoscopic Management of the Adnexal Mass, from Small to Large, from Benign to Malignant

FACULTY
Robert W. Holloway, MD & Yukio Sonoda, MD

MODERATOR
Ronald L. Levine, MD

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Surgical Tutorial 4:  
Endoscopic Management of the Adnexal Mass, from Small to Large,  
from Benign to Malignant

Faculty: Robert W. Holloway and Yukio Sonoda  
Moderator: Ronald L. Levine

Course Description

The adnexal mass is a common finding that is encountered in women of all ages by the practicing gynecologist. Preoperative work up and the decision of when to surgically intervene are based on a number of factors. This course provides an overview of management of the adnexal mass from initial presentation to intraoperative surgical management. Surgical videos will be used to help illustrate surgical techniques.

Learning Objectives

At the conclusion of this course, the participant will be able to: 1) Explain which patient should undergo surgical assessment of an adnexal mass; Explain which patient should be referred directly to a gynecologic oncologist; 2) identify the key components to intraoperative management of an ovarian malignancy; and 3) identify which patients should and shouldn’t undergo endoscopic management.
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*
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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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Other: Royalties - CooperSurgical
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Grants/Research Support: Ethicon Women’s Health & Urology
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Consultant: Covidien, CareFusion, TransEnterix
Stock Shareholder: TransEnterix
Speaker's Bureau: Covidien, Abbott Laboratories
Other: Proctor - Intuitive Surgical

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).
Robert W. Holloway
Consultant: Intuitive Surgical
Yukio Sonoda*
Ronald L. Levine*
Asterisk (*) denotes no financial relationships to disclose.
Learning Objectives

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

1. Explain which patient should undergo surgical assessment of an adnexal mass.
2. Explain which patient should be referred directly to a gynecologic oncologist.
3. Identify the key components to intraoperative management of an ovarian malignancy.
4. Identify which patients should and shouldn't undergo endoscopic management.

Disclosure

Robert W. Holloway, M.D.
• Consultant: Intuitive Surgical

Yukio Sonoda, M.D.
• I have no financial relationships to disclose.
**Adnexal Surgical History**

- 25th December 1998
  1st oophorectomy
  Epithelial MCDaw
- 1973
  600 hysterectomies
  St. Thomas Spencer White
- 1975
  Concept of debulking
  C. Thomas Guthrie
- 1982
  1st laparoscopic staging
  Danilo Quintero
- 2005
  1st robot assisted laparoscopic staging
  R. Lambret

**Pre-operative Evaluation of the Adnexal Mass**

- Attending Surgeon, Memorial Sloan-Kettering, NYC
- GW Medical School, SUNY Buffalo Residency
- Fellowships: MSK, Centre Oscar Lambret, Hospital Edouard Herriot, France
- Special interests: Advanced laparoscopic surgery, robotic surgery, radical vaginal surgery, fertility sparing radical trachelectomy

Yuko Sonoda, MD

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**How accurate are frozen sections in the evaluation of adnexal masses?**

- Even when pre-op physical exam, radiographic evaluations and serum markers predict benign pathology, it is prudent to visually examine the inner aspects of the tumor in the operating suite to determine the need for frozen section (FS) analysis.

- FS allows a determination for the need to proceed with a staging procedure and/or completion hysterectomy in some circumstances.

**Systematic Reviews of Literature**

- Geomini P, et al, Gynecol Oncol 2005
  18 studies from 1996-2003, retrospective, correlative
  Sensitivity varied between 65% to 97% and specificity 97 to 100%
- Heatly M, Int J Gynecol Pathol 2012
  18 retrospective cohort studies from 2005-2010
  Benign v. cancer had best sensitivity and specificity (>95%)
  Benign v. Borderline suffers with specificity (70.8%)
  Borderline v. Cancer sensitivity and specificity 93.6%/93.1%

**How accurate are frozen sections in the evaluation of adnexal masses?**

- A clearly defined surgical plan must be understood by the patient, the family, and the operating team (and documented).

- Understanding the accuracy and limitations of frozen section analysis is key in this process.

**How accurate are frozen sections in the evaluation of adnexal masses?**

<table>
<thead>
<tr>
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<tr>
<td>k</td>
<td>0.964</td>
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<td>Specificity</td>
<td>95.8</td>
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<tr>
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<td>NPV</td>
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<td>98.2</td>
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</table>

Heatly Mark, Int J Gynecol Pathol, Vol 31, No 2, March 2012
How accurate are frozen sections in the evaluation of adnexal masses?

Accuracy of frozen section diagnosis of borderline tumor
(Shih K, et al, Gynecol Oncol 123, 2011)

- 120 cases, 2000-2010 at MM SK, with FS diagnosis of borderline tumor
- 104 (86.7%) confirmed on final pathology
- 15 (12.5%) reclassified as invasive OC and 1 (0.8%) as benign
- Reclassification was related to endometrioid and clear cell histologies
- Reclassification of serous microinvasive type was 42.8% vs 2.8% serous non-microinvasive type
- Tumor size > 8cm associated with 22.4% cancer vs 3.2% < 8 cm.

Recommendation: Surgically stage borderline OC > 8cm, endometrioid, clear cell, or microinvasive serous histology

What about intra-operative rupture... Is it really an adverse risk factor?

Laparoscopy has been reported to have a higher incidence of cyst rupture than laparotomy (6 to 33% in literature), mostly due to cystectomy procedures.

Gal, D et al, J Gynecol Surg 1995

- 17/21 LS v 2/17 LAP for cystectomy
- 11/11 LS v 3/15 LAP for adnexectomy

Fauvet, R et al, Ann Oncol 2005

- 358 MDP tumors, 42% LS, 28% conversions
- Cyst rupture more common LS (P=0.003)
- Complete staging with LS (P=0.001)
- Recurrence associated with conservative surgery, not surgery type (P=0.001)

What about intra-operative rupture... Is it really an adverse risk factor?


- 2002-2006 retrospective study from Israel, excluding cysts that were intentionally ruptured.
- 256 surgeries
- Inadvertent rupture of cyst
- 16.6% adnexectomy:
  - Cystectomy 29.5% (P<0.001)
  - Cyst size (RR 1.1, 7.6 cm)
  - No correlation with:
    - Surgeon experience, patient age, adhesions

Data on the long-term adverse effects on rupturing a stage-I EOC are conflicting for several reasons: retrospective studies and confounding variables including uses of adjuvant therapies.

Con: Sjovall K et al, Int J Gynecol Cancer 1994

- 1974-1976, Sweden, single hospital, 394 cases stage I EOC
- 27 had preop rupture, 141 intra-operative tumor spill, and 147 no rupture
- No difference in 5-yr survival for intact v. rupture (78 v 85%, P=0.05)
- RR death pre-op rupture/ascites v. intra-op rupture = 2.91
- Adjuvant therapy: 90% of 141 intra-operative rupture 77% 147 intact masses

What about intra-operative rupture... Is it really an adverse risk factor?

Pro: Vergote et al, Lancet 2001

-1,545 patients with Stage I EOC
- Multivariate Risk Analysis for DFS:
  - G2 v G1 (RR 3.1)
  - G3 v G1 (RR 8.9)
  - Cyst rupture prior to surgery (RR 2.6)
  - Cyst rupture during surgery (RR 1.6)
- No correlation with ascites, size, surface growth
What about intra-operative rupture... is it really an adverse risk factor?

**Pro:** Bakkum-Gamez J, et al Obstet and Gynecol 2009
- 161 Stage I EDC: 74 (46%) intact, (-) cytology, (-) surface tumor
  61 (38%) intra-op capsule rupture
  33 (20%) (+) cytology
  22 (14%) surface tumor
- Multivariate analysis for relapse: capsule rupture HR 4.2 (1.1-1.8; 10.3)
  (+) cytology HR 6.4 (2.5-14.0)
- Stage IC rupture had an approximately 50% reduction in 5-year DFS (80% vs. 90%).

How do we decide the surgical approach... Laparotomy v. MIS?

Laparoscopy v. Robotics?

ACOG Practice Bulletin #83, July 2007
Management of Adnexal Masses

"If a mass is suspicious for cancer...laparoscopic surgery is considered contra-indicated, although laparoscopic staging and management of ovarian cancer has been reported".

"...[laparoscopy is associated with] low complication rates from 0 to 10%. Higher complication rates occur when masses are suspicious for cancer. ...the mean conversion rate to laparotomy was 6.4% (range 0-25%)."

Laparoscopic Staging Ovarian Cancer: Literature Review

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Age (yr)</th>
<th>FIGO Stage</th>
<th>CA125</th>
<th>MR</th>
<th>LN</th>
<th>HR</th>
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How do we decide the surgical approach... Laparotomy v. MIS?

Laparoscopy v. Robotics?

Considerations:
- Risk of malignancy (age, radiological findings, tumor markers, exam)
- Size of the mass (Can I bag it? Intra-corporeal vs extra-corporeal drainage?)
- Prior surgical history? (bowel surgery, transplant surgeries, etc)
- Prior history of endometriosis, PID, adhesions?
- Co-morbid medical conditions? (COPD, valvular heart Diz, pulm. HTN)
- How complex could the surgery be? Need to suture, retroperitoneal dissection?
- What’s my back-up plan?...Manage patient expectations!
- OR utilization issues/robotic room considerations

How to Perform a Safe Laparoscopy in a Suspicious Adnexal Mass

1. Surgeons trained and skilled in advanced MIS techniques including oncoligic staging procedures available.
2. Strict pre-operative selection (no metastasis, ascites, fixation on exam)
3. Obtain diaphragm and pelvic washings at the start of procedure.
4. Inspect contralateral ovary and all peritoneal surfaces.
5. Any suspicious areas are biopsied and sent for frozen section.
How to Perform a Safe Laparoscopy in a Suspicious Adnexal Mass

6. Inadvertent capsular rupture should be followed by copious abdominal irrigation.
7. Mass biopsies and morcellation are never recommended; cyst aspiration may occur inside a bag to aid retrieval.
8. If cancer is diagnosed, proceed to staging laparotomy unless the skills of the laparoscopist are advanced and the patient was informed of the possible risks of understaging.
9. Avoid delay of more than 10 days if a secondary staging procedure is elected.

Q and A, Part I
(5 min)

• ? Pre-op work up
  • Radiology W/U
  • Serum Markers
• ? Criteria for surgery
• ? Guidelines for referral
• ? Mass rupture
• ? Frozen sections
• ? Choice of surgical route

Surgical Tutorial for Adnexal Surgery

Traditional Laparoscopy
Dr. Yukio Sonoda

Surgical Tutorial for Adnexal Surgery
Robotic-assisted laparoscopy
Dr. Holloway

Major Surgical Cases-FHCI Gyn Onc
(2006 – 2011)

FHCI Gyn Onc Robotic Case Mix
5/06 – 12/11
n = 2,220

• *includes: Leiomyoma, Ovarian Cystadenoma, Endometrioma, Dermoid Cyst, Ovarian Cyst, etc.
• **includes: Dysplasia, CIS, CIN, BRCA1, BRCA2, Complex Endometrial Hyperplasia, etc.

*Includes laparoscopy, laparotony, robotic, robotic-assisted.
Surgical Tutorial for Adnexal Surgery

Robotic-assisted laparoscopy

- Mature Cystic Teratomas
- Cystadenomas
- Endometriomas/St IV endometriosis
- Early-stage Ovarian Cancer

“3-Port” daVinci Pelvic Surgery

“3-Port” daVinci Hysterectomy

(postoperative week 12)

“3-port” Robotic-assisted Oophorectomy

Ovarian Cystectomy and Reconstruction
Post-hysterectomy Retroperitoneal Adnexal Mass

Stage IV Endometriosis

Robotic-assisted surgery in gynecologic oncology: SGO consensus statement
Clinical Practice Robotics Task Force

• Ovarian Cancer
  – “... only a few isolated cases have been reported using robotic surgery...”
  – “Currently, early-stage disease may be more amendable than more advanced disease to robotic surgery.”

Ramirez PT et al, Gynecologic Oncology 124 (2012) 180-184

Para-aortic Lymphadenectomy in Obese Patient

ROBOTIC-ASSISTED LAPAROSCOPY
Aortic Lymphadenectomy
Port Placement S/Si Model
Robotic-assisted Laparoscopic Staging
FHCI Database 2006-2011 (n=66)

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epithelial ovarian cancer (EOC)</td>
<td>26 (39.4%)</td>
</tr>
<tr>
<td>Low malignant-potential (LMP)</td>
<td>20 (30.3%)</td>
</tr>
<tr>
<td>Fallopian Tube</td>
<td>10 (15.2%)</td>
</tr>
<tr>
<td>Granulosa Cell</td>
<td>19 (13.6%)</td>
</tr>
<tr>
<td>Germ cell</td>
<td>1 (1.5%)</td>
</tr>
</tbody>
</table>

Holloway RW et al, AAGL 2011

Robotic Staging EOC/FTC
n = 31

<table>
<thead>
<tr>
<th>Factors</th>
<th>Mean ± SD or Absolute Number</th>
<th>Range or %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>57 ± 14</td>
<td>19 - 89</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>26 ± 7</td>
<td>19 - 47</td>
</tr>
<tr>
<td>Staging for ovarian cancer diagnosed with prior surgery</td>
<td>12</td>
<td>18.7%</td>
</tr>
<tr>
<td>Pre-op CA-125 level of primary cases (U/mL)</td>
<td>59 ± 77</td>
<td>6 - 299</td>
</tr>
<tr>
<td>Tumor size (cm)</td>
<td>6 ± 3</td>
<td>1 - 12</td>
</tr>
</tbody>
</table>

Holloway RW et al, AAGL 2011

Literature Comparison to Current Series

<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>Prior Oper.</th>
<th>OR Time</th>
<th>Pelvic Node</th>
<th>Aortic Node</th>
<th>% Upstaged</th>
<th>% Lap. Conversion</th>
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<tbody>
<tr>
<td>LPS (12 studies ’94-2005)</td>
<td>25.2</td>
<td>55.9%</td>
<td>243</td>
<td>17.8</td>
<td>11.4</td>
<td>20.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Holloway et al., EOC/FT Robotic Database</td>
<td>31</td>
<td>38.7%</td>
<td>147</td>
<td>14.0 ± 8</td>
<td>10.0 ± 6</td>
<td>62.0</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Retro-peritoneal Anatomy

1. Vena Cava
2. Renal Vein, L & R
3. Gonadal Arteries
4. Inferior Mesenteric Artery
5. Ureter
6. Common Iliac Vein, L & R

Ovarian Cancer Staging

Conclusions

- Robotic-assisted laparoscopic staging of early ovarian cancer in our preliminary analysis is associated with:
  - acceptable OR times, EBL, LOS, node counts
  - few laparotomy conversions (6.5%)
  - 42% upstaging in FT/EOC cases
- Long-term follow-up studies are needed for oncologic outcomes in comparison to laparotomy.
**My Recommendations**

- Robotic MIS for the “pelvic mass” is acceptable practice with careful pre-operative evaluations and informed consent about potential risks and benefits.
- General guidelines for robotic surgery:
  - No ascites, no upper abdominal metastatic disease
  - Complex mass must fit into spleen bag with minimal chance for rupture (12-14 cm max my preference).
  - Complete laparoscopic exam before placing ports and docking to exclude metastatic disease.

**Bibliography**


**Q and A, Part II**

*(5 min)*

- Laparoscopic Adnexal Surgery
- Robotic-assisted Laparoscopic Adnexal Surgery

*Thanks for your attention and attendance!*

**Bibliography**

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.

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](http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2078538).