LAPAROSCOPY AND AN APPROACH TO THE ADNEXAL MASS

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KAISER PERMANENTE
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OBJECTIVES

- Examine some of the diagnostic strategies to help determine whether or not an adnexal mass is benign or malignant
- Review some of the endoscopic equipment and surgical techniques to help laparoscopically manage adnexal masses
- Present case video illustrations highlighting laparoscopic removal of adnexal masses

IN THE INTEREST OF TIME…

- What won’t be discussed today
  - The juvenile adnexal mass
  - Adnexal masses and pregnancy
  - Laparoscopic staging for gynecologic malignancy

DISCLOSURE

- I do not have any financial relationship with commercial interests.
  Michael Traynor
THE ADNEXAL MASS

- As many as 5-10% of women in the US will have surgery for an adnexal mass in their lifetime
- Prevalence of general population
  - 0.17% to 5.9% in asymptomatic women
  - 7.1% to 12% in symptomatic women
- Most adnexal masses are managed by general ob/gyns

LAPAROSCOPY VS LAPAROTOMY

- With low suspicion for malignancy, laparoscopy offers significant advantages over laparotomy
- Randomized trial of laparoscopy versus laparotomy in 102 patients (97 premenopausal) with ovarian masses not suspected to be malignant
- Laparoscopy was associated with significant reduction in operative morbidity, postoperative pain, and length of hospital stay and recovery without increasing the risk of spillage of the cyst contents.

THE KEY

- To preoperatively discriminate between benign and malignant ovarian tumors
- First priority when considering surgery should be what is in the best interest of the patient

DIAGNOSTIC STRATEGIES FOR DISTINGUISHING BENIGN FROM MALIGNANT ADNEXAL MASSES

<table>
<thead>
<tr>
<th>DIAGNOSTIC TOOL</th>
<th>SENSITIVITY</th>
<th>SPECIFICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bimanual Exam</td>
<td>45%</td>
<td>90%</td>
</tr>
<tr>
<td>Ultrasound Morphology</td>
<td>86% to 91%</td>
<td>68% to 83%</td>
</tr>
<tr>
<td>MRI</td>
<td>91%</td>
<td>87%</td>
</tr>
<tr>
<td>CT</td>
<td>90%</td>
<td>75%</td>
</tr>
<tr>
<td>PET Scanning</td>
<td>67%</td>
<td>79%</td>
</tr>
<tr>
<td>CA-125 (&gt;35 U/ml)</td>
<td>78%</td>
<td>78%</td>
</tr>
</tbody>
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Myers ER et al. AHRQ, February 2006
THE “ASYMPTOMATIC” PELVIC MASS AND THE CONCERN FOR OVARIAN CANCER

- Only 25% of women are diagnosed with disease limited to the ovaries
- However
  - In a prospective study of postmenopausal women, 90% of women with ovarian cancer had symptoms while women with benign tumors had symptoms in 57% of the cases
  - Another study found that 93% of women with ovarian cancers had some kind of symptomatology compared with 42% of controls

CA-125 (normal <35 U/ml)

- Elevated in 80% of women with ovarian cancer
- Sensitivity of 50% for stage I and 90% for stage II
- Can fluctuate during menstrual cycle; rarely greater than 100-200 in patients with benign conditions

CA-125 AND OVARIAN CA (normal <35 U/ml)

- Premenopausal women
  - Sensitivity is 50% to 74%
  - Specificity is 26% to 92%
  - Positive predictive value is 5% to 67%
- Postmenopausal women
  - Sensitivity is 69% to 87%
  - Specificity is 81% to 100%
  - Positive predictive value is 73% to 100%

ELEVATED CA-125

<table>
<thead>
<tr>
<th>Nongynecologic Conditions</th>
<th>Benign Gynecologic Conditions</th>
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<tbody>
<tr>
<td>Liver disease and cirrhosis,</td>
<td>Adenomyosis, Endometriosis,</td>
</tr>
<tr>
<td>Diabetes, Heart disease,</td>
<td>Pregnancy, Benign ovarian neoplasms,</td>
</tr>
<tr>
<td>Peritoneal, Polyarteritis nodosa,</td>
<td>Functional ovarian cysts, Menorrhagia,</td>
</tr>
<tr>
<td>Postoperative period, Ulcer,</td>
<td>Pelvic inflammation, Leiomyomata,</td>
</tr>
<tr>
<td>Renal failure, Sarcoidosis,</td>
<td>Meigs’ syndrome,</td>
</tr>
<tr>
<td>Pleural effusion, Ascites,</td>
<td>Ovarian hyperstimulation</td>
</tr>
<tr>
<td>Previous irradiation, Tuberculosis,</td>
<td></td>
</tr>
<tr>
<td>Malignant, CHF</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Nongynecologic Cancers</th>
<th>Gynecologic Malignancies</th>
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<tbody>
<tr>
<td>Breast, Lung</td>
<td>Endometrial cancers,</td>
</tr>
<tr>
<td>Colon, Pancreas</td>
<td>Epithelial ovarian &amp; endometrial cancers,</td>
</tr>
<tr>
<td></td>
<td>Fallopian tube cancers &amp; germ cell tumors</td>
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<tr>
<td></td>
<td>Adenocarcinoma of the cervix,</td>
</tr>
<tr>
<td></td>
<td>Serous-Lynder cell tumor of the ovary</td>
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ULTRASOUND? YOU MAKE THE CALL

- Series of 173 consecutive cases or women scheduled for surgery because of a pelvic mass
  - Specific diagnosis could not be made: 51% (88/173)
  - Correct specific diagnosis was made: 42% (72/173)
  - Incorrect specific diagnosis was made: 7% (13/173)
- Endometrioma
  - 92% sensitivity, 97% specificity
- Dermoid cyst
  - 80% sensitivity, 98% specificity


ULTRASONOGRAPHIC FEATURES

- Unilocular, anechoic cysts
  - Risk of malignancy <1% in premenopausal
  - Risk of malignancy 0.1-10% in postmenopausal
  - Zero to Six percent of cysts with diameter 3-5 cm were malignant
- Multilocular cysts
  - 8% multilocular were malignant vs 0.3% of unilocular


- Solid parts, semisolid, mixed tumors
  - Premenopausal
    - Malignancy in 2-17%
  - Postmenopausal
    - Malignancy in 62% of cysts with cystic solid parts
    - Malignancy in 74% of solid tumors
- Papillary formations
  - Risk of malignancy increased from 1.6% to 10% if unilocular cyst contained solid parts or papillary formations


- Echogenicity
  - Cannot discriminate between benign or malignant cysts
- Diameter of cyst
  - Positively correlated to the risk of malignancy
- Bilaterality
  - Increases risk of malignancy 2.8-fold in a mixed population of pre- and post-menopausal women

REFERRAL GUIDELINES FOR NEWLY DIAGNOSED PELVIC MASS

- ACOG/SGO Joint Opinion
  - Premenopausal women
    - Very elevated CA-125 (>200 U/ml)
    - Ascites
    - Evidence of abdominal or distant metastasis
    - Family history of breast or ovarian cancer (in a first degree relative)


REFERRAL GUIDELINES FOR NEWLY DIAGNOSED PELVIC MASS

- ACOG/SGO Joint Opinion
  - Postmenopausal women
    - CA-125 >35 U/ml
    - Ascites
    - Nodular or fixed pelvic mass
    - Evidence of abdominal or distant metastasis
    - Family history of breast or ovarian cancer (in a first degree relative)


HOW DO THE GUIDELINES STACK UP?

- Identified ovarian cancers
  - 70% in a premenopausal age group
  - 94% in a postmenopausal age group
- Negative predictive value
  - 90% for both groups
- Positive predictive value
  - 33.8% for the premenopausal group
  - 59.5% for the postmenopausal group


CONCERNS FOR LAPAROSCOPIC MANAGEMENT OF ADNEXAL MASSES

- Failure to diagnose ovarian malignancies
- Tumor spillage
- Inability to proceed immediately with a staging procedure
WHY NOT LAPAROSCOPY?

- Incidence of unexpected ovarian cancer is low
- Adnexal masses at high and low risk for cancer can be approached laparoscopically if there is an established and appropriate plan in place
- Pathology, especially frozen, is critical to appropriate management

Uh oh…..

- Incidence of finding unexpected malignancies during laparoscopy
  - 0.4-2.9%¹
- Retrospective study of 5307 women with ovarian lesion²
  - 78 malignant (1.4%)
    - 60 LMP
    - 18 invasive ovarian cancers

²Canis M et al. Semin Surg Oncol 2000

“HIGER RISK” POPULATION

- 160 pre- and postmenopausal women underwent laparoscopic evaluation for an adnexal mass
- Benign pathology discovered in 139 patients (87%)
- Borderline tumors found in 8 patients (5%)
- Ovarian cancers in 9 patients (6%)
- Nongynecologic cancers in 4 patients (3%)

One hundred forty one patients were successfully managed laparoscopically
- Nineteen patients required laparotomy
  - Nine (6%) were converted at the discretion of the operating surgeon
  - Five (3%) were converted d/t operative complications
  - Five (3%) were converted d/t frozen section reports indicating malignancy which required either staging laparotomy or cytoreduction

Dottino PR et al. Obstet & Gynecol 1999;93(2):223-228
Dottino PR et al. Obstet & Gynecol 1999;93(2):223-228
PATIENT SELECTION & EXCLUSION CRITERIA?

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N = 160</th>
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<tbody>
<tr>
<td>Age (y)</td>
<td>52.2 ± 13.1</td>
</tr>
<tr>
<td>White race</td>
<td>546 (91%)</td>
</tr>
<tr>
<td>Nulliparous</td>
<td>44 (28%)</td>
</tr>
<tr>
<td>Postmenopausal</td>
<td>85 (53%)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>24.7 ± 4.4</td>
</tr>
<tr>
<td>Previous abdominal surgery</td>
<td>85 (53%)</td>
</tr>
<tr>
<td>None</td>
<td>82 (52%)</td>
</tr>
<tr>
<td>One</td>
<td>48 (30%)</td>
</tr>
<tr>
<td>Two or more</td>
<td>29 (18%)</td>
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TUMOR SPILLAGE

- 500 cases of stage I epithelial ovarian cancer
- Tumor grade, dense adhesions, and large-volume ascites were predictors of relapse, but intraoperative cyst rupture did not affect prognosis
- 60 patients with stage I epithelial ovarian cancer rupture of tumor during surgery
- Rupture of tumor during surgery had no influence on survival rates
- Intraoperative rupture of tumor capsules did not adversely affect survival, but preoperative rupture or ascites did negatively influence outcomes

SOME PRACTICAL TIPS AND CASE PRESENTATIONS

- Equipment
- Trocar placement
- Video illustrations

- Rate of cyst rupture with laparoscopy is 6% to 27%, depending on the study
- Rate of mass rupture and spillage with laparoscopic adnexectomy is minimal and equivalent to that for laparotomy

EQUIPMENT

- Successful, complete, and intact removal of specimen
  - 10 mm endocatch
    - Requires 12 mm trocar
    - Inlet diameter ~6 x 6 cm
    - Volume ~150-250 cc
  - 15 mm endocatch
    - Requires 15 mm trocar
    - Inlet diameter ~13 x 13 cm
    - Volume ~1,200-1,400 cc
TROCAR PLACEMENT

- Where is the operative field?
- Angle of approach?

TROCAR PLACEMENT

- Where is the operative field?
TROCAR PLACEMENT

- Where is the operative field?
- Angle of approach?
- Pathology?

- 12 mm umbilical site
- Ancillary ports
  - Lateral is better than medial; higher is better than lower
TROCAR PLACEMENT

- 12 mm umbilical site
- Ancillary ports
  - Lateral is better than medial; higher is better than lower

- Lower lateral port may offer advantage with large cyst or mass
- ...or with endometriosis
- Lower lateral ports may be needed on both sides
CASE #1: A.B.

- 37 yo G1P0010 presented to ER with severe, sudden onset of pelvic pain associated with nausea and dizziness
- Outside ultrasound showed a complex 8.7 cm adnexal mass; multicystic with walls of varying thickness containing some blood flow

CASE #1: A.B.

- Official ultrasound
  - “Large, complex cystic mass anterior to the uterus. It measures 8.7 x 8.4 x 7.2 cm. It contains multiple internal cystic foci with the walls of varying thickness. There does appear to be blood flow within these walls. The fluid is heterogeneous and contains low-level debris”
  - “Right ovary contains a 3.3 x 1.2 cm simple cyst”

CASE #1: A.B.

- Pelvic MRI
  - …large complex mass occupying the central pelvis anterior to the uterus. This measures ~8.8 x 7.7 x 8.3 cm. It contains numerous internal septations producing structures internally, which appear like clusters of grapes….does not have signal characteristic consistent with an endometrioma or dermoid….small focus of solid tissue or possibly dependent debris. If this is solid, it would be suspicious for papillary formation.”

CASE #1: A.B.

- Gyn Onc consult
  - Level of suspicion for malignancy is low. Could represent LMP of the ovary or very, very early adenocarcinoma of the ovary
  - CA-125 = 45 U/ml (<35)
CASE #1 VIDEO

CASE #1: A.B.
- Pathology, frozen
  - Mucinous cystadenoma with few areas concerning for borderline mucinous tumor, pending permanent sections
- Pathology, final
  - Mucinous tumor of low malignant potential
  - Pathologic stage: T1a

CASE #2: M.P.
- 76 YO G0P000 noted to have incidental mass after work up with CT for microscopic hematuria
- Pt denies abdominal pain, bloating, abdominal changes, GI or GU symptoms
- Pelvic Ultrasound
  - “Right adnexal mass which extends posterior to the uterus into the cul-de-sac. It measures 7.1 x 5.9 x 3.0 cm. It is composed predominantly of a homogeneous hypoechoic area with an appearance similar to an endometrioma…has several small peripheral simple cysts. Solid heterogenous tissue is seen around the simple cysts”
  - CA 125 = 24 U/ml (<35)
CASE #2: M.P.
- Pathology, frozen
- Neoplasm, favor borderline
- Pathology, permanent
  - Mucinous borderline tumor
  - Fallopian tube with no pathological diagnosis
  - TMN staging PT1a

CASE #3: M.G.
- 21 yo G0 with recent outside ultrasound done for possible egg donation for IVF
- Recalls acute episode of RLQ/pelvic pain ~1 year ago while traveling in Argentina; admits to pain with some positional changes; occasional episodes that “double her over” in pain

CASE #3: M.G.
- Outside ultrasound
  - “The right ovary measures 5.6 x 3.9 x 4.7 and contains a complex 49 x 35 mm cyst. The cyst is characterized by a moderate amount of debris within it as well as calcifications within the wall. It appears to have the morphology of a dermoid cyst…”
CASE #3: M.G.

- Pathology
- Benign mucinous cystadenoma

CASE #4: M.K.

- 62 yo G3P3003 PM female c/o increasing LLQ pains in recent months
- Pelvic ultrasound
  - “Pelvis is dominated by a 13.4 x 12.8 x 12.0 cystic structure with low level echoes and extensive mural nodularity. The largest mural nodule is 3 x 2 x 4 cm. The appearance is consistent with a large endometrioma”
- CA-125 = 7 U/ml (<35)

- Pelvic ultrasound, 2001
  - “…previously noted left adnexal mass again demonstrates a hypoechoic left adnexal mass which appears filled with fairly uniform low level echoes, measuring 3.8 x 2.4 x 2.6 cm… No significant interval change in appearance of sonographically complex left adnexal mass, quite likely representing an endometrioma as previously suggested.”
- CA-125 = 33 U/ml (<35)
- Dx LSC, attempted LOA in 2001
  - “4.5 cm complex left ovarian mass, which was deep in the cul-de-sac with extensive scarring”
CASE #4 VIDEO

CASE #4: M.K.
- Pathology
  - Initially diagnosed as papillary serous carcinoma, but upon review, final diagnosis of invasive clear cell carcinoma
  - Pelvic washings negative, lymph nodes negative

CASE #5: C.M.
- 42 yo G2P1001 w/ painful menses, dyspareunia
- Pelvic ultrasound
  - “Right ovary measures 8.4 cm x 7.0 cm x 3.5 cm in overall size. It contains a complex cystic mass measuring 7.6 x 6.3 x 2.9 in size. This could be benign such as a cyst adenoma or malignant such as a cyst adenocarcinoma. The mass contains several slightly thick irregular septations
- CA-125 = 139 U/ml (<35)
- Gyn Onc Consult
  - Risk of malignancy is not high and that initial minimally invasive surgical approach by laparoscopy was feasible with gyn onc on back-up
SUMMARY

- No single diagnostic strategy is perfect when it comes to determining whether or not an adnexal mass is benign or malignant.
- However, the incidence of finding unexpected malignancy is low.
- Adnexal masses can be managed laparoscopically as long as there is a detailed plan in place, including careful removal, proper pathologic diagnosis, and oncologic management and staging if necessary.