Surgical Reduction of a Large Uterus –
Laparoscopic and Robotic Myomectomy

MODERATOR
Liselotte Mettler, MD

FACULTY
Tommaso Falcone, MD & William H. Parker, MD
Professional Education Information

Target Audience
This educational activity is developed to meet the needs of residents, fellows and new minimally invasive specialists in the field of gynecology.

Accreditation
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Laparoscopic or robotic myomectomy for the large uterus presents a technical challenge. This course will provide information about surgical planning based on MRI, preoperative preparation, methods to reduce blood loss during surgery including use of the cell saver and surgical techniques to help avoid conversion to laparotomy.

**Learning Objectives:** At the conclusion of this course, the participant will be able to: 1) Identify appropriate candidates for laparoscopic/robotic myomectomy who have a large uterus; 2) discuss how to control and manage blood loss should it occur; and 3) plan appropriate port placement and surgical technique to help avoid conversion to laparotomy.
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).
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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).
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Liselotte Mettler*
William H. Parker
Grants/Research: Ethicon Women’s Health & Urology

Asterisk (*) denotes no financial relationships to disclose.
Surgical Reduction of a Large Uterus – Laparoscopic and Robotic Myomectomy

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Financial Disclosure
• I have no financial relationships to disclose.

At the conclusion of this lecture, the participant will be able to
• 1) Identify appropriate candidates robotic myomectomy
• 2) discuss how to control and manage blood loss should it occur
• 3) plan appropriate port placement and surgical technique

Myomectomy: Refuted reasons
ASRM practice committee 2008
• Size (>12 weeks)
• Cannot palpate the adnexae
• Symptoms will develop
• Surgery could be more difficult if surgery delayed
• Possible leiomyosarcoma
  – Sarcoma does not relate to size or rate of growth and more related to age (median age is over 60)

Fibroids and Pregnancy loss
• Saravelos et al Hum Reprod 2011
  – 8% prevalence in patients with RPL (n=966)
  – Cavity distorting fibroid-Resection
    • Early loss- no change
    • Mid-trimester losses- reduced significantly-Live birth 52%
  – Non-cavity distorting fibroids-no surgery & unexplained RPL
    • Live birth rate was 70%

Impact of Subserosal Fibroids on Fertility outcome
• Systematic Review – Pritts, Parker and Olive F&S 2009
• Uniquely Subserosal fibroids have no impact on fertility or spontaneous abortion rates
Cavity Distorting Intramural Myomas

- Systematic Review – Pritts, Parker and Olive F&S 2009
  - Clinical Pregnancy rate/ Implantation rate/ongoing pregnancy rate/live birth rate- decreased
  - Spontaneous abortion rate is increased
  - Myomectomy vs. women with no fibroids
    - Clinical pregnancy rate is similar

Systematic Review – Fibroids and Fertility

- Pritts, Parker and Olive 2009
  - Effect on fertility – no intracavitary involvement
    - Unclear
  - Myomectomy for intramural fibroids (controls-fibroids in situ) (non-cavity distorting)
    - Pregnancy rate (2 studies): RR 3.7 (4.7-30)
    - Live-birth rate (1 study): RR .75 (0.9-1.9)

Myomas & Pregnancy

- Growth of Myomas during pregnancy
  - 49-60% no change
  - 22-32% increase in size
  - 8-27% decrease in size
  - Most of the growth is in the first trimester
  - Mean increase is 12%
  - 90% of women with fibroids detected in the first trimester will have regression of volume postpartum

Odds Ratio vs Prevalence

<table>
<thead>
<tr>
<th>Study</th>
<th>Fibroids</th>
<th>No Fibroids</th>
<th>P value</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>34% (38/110)</td>
<td>10% (0/100)</td>
<td>&lt;0.001</td>
<td>3.7 (3.3-6.0)</td>
</tr>
<tr>
<td>Teenagers</td>
<td>13% (4/30)</td>
<td>4% (0/100)</td>
<td>&lt;0.001</td>
<td>3.5 (2.3-5.3)</td>
</tr>
<tr>
<td>Teenagers</td>
<td>7% (2/29)</td>
<td>3% (0/100)</td>
<td>&lt;0.001</td>
<td>2.6 (0.2-2.7)</td>
</tr>
<tr>
<td>Adolescent</td>
<td>2% (0/15)</td>
<td>1% (0/100)</td>
<td>&lt;0.001</td>
<td>1.8 (0.4-8.9)</td>
</tr>
<tr>
<td>Pregnant</td>
<td>3% (1/30)</td>
<td>0% (0/100)</td>
<td>&lt;0.001</td>
<td>13.1 (3.9-103)</td>
</tr>
<tr>
<td>Infertility</td>
<td>1% (1/108)</td>
<td>0% (0/100)</td>
<td>&lt;0.001</td>
<td>2.3 (0.3-2.7)</td>
</tr>
<tr>
<td>Menstrual abnormalities</td>
<td>6.7% (7/108)</td>
<td>0.7% (0/100)</td>
<td>&lt;0.001</td>
<td>10.5 (3.3-36.3)</td>
</tr>
<tr>
<td>Ovarian cysts</td>
<td>11.3% (12/108)</td>
<td>2.1% (0/100)</td>
<td>&lt;0.001</td>
<td>3.7 (1.1-12.7)</td>
</tr>
<tr>
<td>Menstrual abnormalities</td>
<td>6.0% (3/50)</td>
<td>10.0% (5/50)</td>
<td>&lt;0.001</td>
<td>1.0 (0.3-3.7)</td>
</tr>
<tr>
<td>Menstrual cramps</td>
<td>1.5% (30/1998)</td>
<td>0.8% (9/1134)</td>
<td>&lt;0.001</td>
<td>2.3 (1.7-3.0)</td>
</tr>
<tr>
<td>Total hysterectomy</td>
<td>4.7% (40/850)</td>
<td>7.8% (66/861)</td>
<td>&lt;0.001</td>
<td>3.6 (2.4-5.7)</td>
</tr>
<tr>
<td>Postmenopausal bleeding</td>
<td>3.0% (15/499)</td>
<td>0.0% (0/100)</td>
<td>&lt;0.001</td>
<td>3.2 (1.5-6.6)</td>
</tr>
<tr>
<td>TRIM</td>
<td>6.0% (31/517)</td>
<td>12.0% (64/534)</td>
<td>&lt;0.001</td>
<td>3.9 (2.8-5.4)</td>
</tr>
<tr>
<td>TRIM vs. PROG</td>
<td>6.3% (21/331)</td>
<td>12.0% (44/367)</td>
<td>&lt;0.001</td>
<td>3.9 (2.8-5.4)</td>
</tr>
</tbody>
</table>

Where do you put the incision?
Where do you put the incision?

Incisions

- Improper plane of dissection
- Multiple uterine incisions vs. tunneling your way to all myomas

Preoperative GnRH agonist

- Lethaby A, Vollenhoven B, Sowter MC
  - Preoperative GnRH analogue therapy before hysterectomy or myomectomy for uterine fibroids. Cochrane database 2011 CD 000547
  - Effect size: 67 ml (95% CI -90, -44)
  - No difference in rate of transfusion

Preoperative Treatment with GnRH agonists

- Agonist and iron treatment increases preoperative hemoglobin
- Doesn’t seem to improve blood loss at surgery
  - Campo et al Hum Reprod 1999
  - Fibroids 107 were intramural & 67 were subserosal; mean diameter 4.7 cm; blood loss about 200ml

Interventions to reduce hemorrhage during myomectomy

- Cochrane review-Kongnyuy EJ, Wiysonge CS
  - Cochrane database Syst Rev 2011 CD005355 2011
- Bupivacaine plus epinephrine vs. placebo- not clinically different
- Oxytocin no difference
- No data on normal saline alone

Cochrane review

- Misoprostol versus placebo
  - Significant reduction in blood loss; no effect on blood transfusion rate. 400mcg 1 hr before the procedure
- Kalogiannidis et al 2011
- Laparoscopic myomectomy
  - EBL placebo- 217 ml vs. 126 mL
Cochrane review

- IV bolus of tranexamic acid (1000mg)
- Gelatin thrombin matrix (ex. FloSeal)
  - Significantly reduced blood loss at myomectomy and need for transfusion

Vasopressin

- Cochrane review: Compared with placebo 2 trials significant reduction in blood loss
- Antidiuretic Hormone Analog; Hormone, Posterior Pituitary
  - Approved for central diabetes insipidus
- Pitressin*: 20 units/mL (1 mL)
- Half-life elimination: Nasal: 15 minutes; Parenteral: 10-20 minutes
- I.V. infiltration: May lead to severe vasoconstriction and localized tissue necrosis.
- Water intoxication

Use of barbed suture

- Alessandri et al JMIG 2010- reduced blood loss (drop of hgb of 0.6 versus 0.9; no blood transfusion)
- Einarsson et al showed no difference in blood loss

Can the robot make a difference in Surgical Outcome?

Gargiulo et al 2012

- OR time: 118 minutes (laparoscopy) vs. 195 minutes (robot)
- Robot case had a higher odds of admission to hospital and having a longer than 1 day hospital stay
- Risk of complications were the same-but note that transfusion rate was 0.9% in the scope myomectomy group vs. 5.7% in the robot group
Cleveland Clinic- Obstet Gynecol 2011

<table>
<thead>
<tr>
<th></th>
<th>Abdominal (n=393)</th>
<th>Laparoscopic (n=93)</th>
<th>Robotic (n=89)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age years</td>
<td>36.93 ( 5.61)</td>
<td>39.57 ( 9.17)</td>
<td>36.62 ( 5.18)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Weight Kg</td>
<td>75.5 (62.8,90.7)</td>
<td>64.8 (59.1, 76.66)</td>
<td>68.04 ( 57.6, 82.5)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Height cm</td>
<td>163.92 (13.17)</td>
<td>164.02 ( 6.19)</td>
<td>163.63 ( 6.62)</td>
<td>0.97</td>
</tr>
<tr>
<td>BMI kg/m2</td>
<td>27(23,32)</td>
<td>24.1 (22, 28.1)</td>
<td>25.1 (22.1, 29.4)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Weight of the Resected Myomas (in grams) by Surgical Approach

Overall P < 0.001
RM vs LM < 0.001

General technical observations

- Mean distance from symphysis pubis to the umbilicus less than 16 cm - so many patients require a port placement above the umbilicus.
- 8-10 cm between the endoscope and the top of the elevated uterus
- Uterine manipulator- limited value with large uterus but important for injecting contrast
- Accurate myoma “mapping”
  – No tactile feedback

Port placement

- Should we use the third arm?
  – Usually not cost effective
- Where do we put the accessory port?
Side Docking – 4 arm
Main Worry during dissection

• Is missing entry into the cavity
• Intracavitary adhesion formation is a major problem for fertility
  – Recognize
  – Suture with 3-0 PDS- don’t put suture into the cavity
Cost analysis

- Advincula et al JMG-2007
- Hospital charges Robot-$30,000 versus $13,000 for laparotomy
- Behera et al JMG 2012-
  - Cost- AM $4937/ LM $6219 and RM $7299
- Reimbursement
  - What will we get in the future
  - Keep costs down

Conclusion

- Robotic Surgery may have some advantage over conventional laparoscopic surgery for some surgeons.
- Robotics may help the suturing task
- There is a learning curve
- Robotic times are longer
- Costs?
References

Surgical Reduction of a Large Uterus
Laparoscopic Myomectomy

William H. Parker, MD
UCLA School of Medicine
Los Angeles, CA

Objectives

1) Identify appropriate candidates for laparoscopic/robotic myomectomy who have a large uterus.

2) Control and manage blood loss should it occur.

3) Plan appropriate port placement and surgical technique to help avoid conversion to laparotomy.

Use of MRI to Evaluate Large Uterus

Comparison of Imaging Techniques

106 women scheduled for hysterectomy

Preoperative (different, blinded observers)
- Transvaginal Sonography
- Saline-infusion Sonography
- Hysteroscopy
- MRI

Compared to gross pathology findings

# myomas missed

MRI v. TVS


Disclosure

• Grants/Research Support: Ethicon Women’s Health & Urology
Submucous Myomas Detection

- MRI –
  - 100% sensitivity, 91% specificity
- Transvaginal Sonography
  - 83% sensitivity, 90% specificity
- Saline-infusion Sonography
  - 90% sensitivity, 89% specificity
- Hysteroscopy
  - 82% sensitivity, 87% specificity


Imaging Costs

- TV-UTZ = $425
- Saline Infusion Sono = $840
- Hysteroscopy (office) = $900
- MRI (limited) = $800
- CT abdomen (contrast) = $925

Magnetic Resonance Imaging

- Most complete evaluation of submucous, intramural, and subserosal myomas (sizes, positions, number)
- Directs appropriate treatment
- Defines what can be expected at surgery
- Avoid missing significant myomas during surgery
- Diagnosis of adenomyosis
- Diagnosis of sarcoma

Patient - LD

45 y/o, known fibroids for 18 months
Increased abdominal girth, bladder pressure
UTZ – 13 cm fundal fibroid
Rec: abdominal hysterectomy X 2

My exam – 17 weeks uterus, ~ 15 cm mobile fibroid
Patient - ID

- 56 y/o menopausal, on bio-identical hormones
- Menorrhagia – 1 pad/hr X 1 day/month
- Exam – 12 weeks uterus, neg EMB
- UTZ– transmural fibroid
- Rec: abdominal myomectomy

LSH

MRI - SJ

SIS - SJ

Surgery - SJ

Laparoscopic myomectomy
Sarcoma - Diagnosis

- Gadolinium-enhanced dynamic MRI (@ 60 s)
- LDH → Total ↑ iso-enzyme 3 ( > 30% )
  - 87 pts - fibroids
  - 130 pts - degenerating fibroids
  - 10 pts - LMS

PPV = 100%
NPV = 100%


Laparoscopic Tourniquet Placement

- Red Robinson urinary catheter
- Placed around large pedicle or cervix
- Tighten
- Locking grasper clamped on catheter

Laparoscopic Use of Cell Saver

- Cut end of cell saver tubing
- Attach to 10 mm pool suction
- Valve or kink tubing to control flow
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

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.