Tissue Extraction and Morcellation

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FACULTY
Mauro Busacca, MD & Kimberly A. Kho, 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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# Table of Contents

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

Disclosure ...................................................................................................................................................... 2

Tissue Extraction by Vaginal Route  
M Busacca ........................................................................................................................................... 3

Tissue Extraction and Morcellation  
M Busacca, K.A. Kho.............................................................................................................................. 10

Cultural and Linguistics Competency ................................................................. 14
Surgical Tutorial 1
Tissue Extraction and Morcellation

Moderator: George Pados
Mauro Busacca & Kimberly A. Kho

This surgical tutorial will cover various methods of tissue extraction during minimally invasive gynecologic surgery. We will discuss the use of various types of laparoscopic morcellators currently on the market and their respective advantages and disadvantages. We will also review various methods of morcellation, including traditional laparoscopic techniques as well as transcervical coring and transcervical morcellation, an alternative approach to extirpation of tissue that avoids enlarging any of the laparoscopic port sites. We will review the removal of masses vaginally through colpotomy incisions. Avoidance of complications will be discussed, including prevention of unintended parasitic myomas and seeding of the abdominal cavity with endometriosis and malignant tissue. Videos of various methods of tissue extraction, laparoscopic and hysteroscopic morcellation techniques will be presented.

Learning Objectives: At the conclusion of this course, the participant will be able to: 1) Compare the various morcellators on the market in terms of the advantages and disadvantages of each system; 2) assess the risks of laparoscopic morcellation and discuss strategies to reduce the likelihood of complications; and 3) choose which methods of tissue extraction to perform in a variety of clinical scenarios.
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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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).
Mauro Busacca*
Kimberly A. Kho*
George Pados*

Asterisk (*) denotes no financial relationships to disclose.
Tissue extraction by vaginal route

- MAURO BUSACCA M.D.
- DEPARTMENT OF OBSTETRICS AND GYNECOLOGY
- UNIVERSITY OF MILAN, ITALY

OBJECTIVE

- TO THINK TO THE VAGINAL ROUTE AS A NATURAL LESS INVASIVE WAY FOR TISSUE EXTRACTION IN VARIOUS CLINICAL SCENARIOS

Specimen Retrieval Following Laparoscopic Surgery

- Wound Complications:
  - Bleeding
  - Vascular injuries
  - Nerve injuries
  - Pain

Disclosure

- NO FINANCIAL RELATIONSHIP TO DISCLOSE
Enlargement of an ancillary port

840 trocar site hernias

- > 10 mm: 86.3%
- 8-10 mm: 2.7%
- < 8 mm: 10.9%

INSCISIONAL HERNIA:
Port ≥ 10 mm = 1%
Port <10 mm = 0.056%

Specimen Retrieval Following Laparoscopic Surgery

Transumbilical Specimen Retrieval

Transumbilical surgical specimen retrieval: a viable refinement of laparoscopic surgery for pelvic masses 2008

Specimen

- Ovarian cyst: 488 (33.4%)
- Adnexa: 282 (19.7%)
- Fallopian tube: 44 (3.0%)
- Para-aortic lymph nodes: 12 (0.8%)
- Ovarian: 7 (0.5%)
- Appendix: 11 (0.8%)
- Endometriotic nodule: 17 (1.2%)
- Myoma: 17 (1.2%)

No complication related to specimen retrieval
No trocar site hernias

- Para-aortic lymph nodes: 12 (0.8%)
- Ovarian: 7 (0.5%)
- Appendix: 11 (0.8%)
- Endometriotic nodule: 17 (1.2%)
- Myoma: 17 (1.2%)

Specimen Retrieval Following Laparoscopic Surgery
Transumbilical vs. Transvaginal Specimen Retrieval

Transumbilical versus transvaginal retrieval of surgical specimens at laparoscopy: a randomized trial

<table>
<thead>
<tr>
<th>Patients' characteristics</th>
<th>TU retrieval (n = 32)</th>
<th>TV retrieval (n = 34)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y</td>
<td>42.5 ± 12.5</td>
<td>47.1 ± 12.9</td>
<td>.11</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>24.1 ± 3.9</td>
<td>23.0 ± 3.6</td>
<td>.24</td>
</tr>
<tr>
<td>Glucose</td>
<td>3.0 (2.0-6.7)</td>
<td>3.1 (2.9-6.7)</td>
<td>.67</td>
</tr>
<tr>
<td>Previous abdominal surgery</td>
<td>5 (2.9-6.7)</td>
<td>7 (2.9-6.7)</td>
<td>.75</td>
</tr>
<tr>
<td>Nulliparous</td>
<td>17 (23.1%)</td>
<td>19 (55.9%)</td>
<td>1.0</td>
</tr>
<tr>
<td>Adverse mass index, cm</td>
<td>5 (3-10)</td>
<td>6 (3-21)</td>
<td>.51</td>
</tr>
</tbody>
</table>

Pain scores on a 10-cm visual analog scale

<table>
<thead>
<tr>
<th>Procedure</th>
<th>VAS score</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative time, h</td>
<td>2.4 ± 2.0</td>
<td>.02</td>
</tr>
<tr>
<td>3</td>
<td>2.4 ± 2.0</td>
<td>.02</td>
</tr>
<tr>
<td>24</td>
<td>1.2 ± 2.0</td>
<td>.02</td>
</tr>
</tbody>
</table>

Transvaginal Specimen Retrieval: Criticism

The paradox

Partial gastrectomy using NOTES (natural orifice transluminal endoscopic surgery) for gas in humans

Transvaginal specimen retrieval in obstetric surgery: current state of the art
The paradox

Transvaginal route has been increasingly used by non-gynecologic laparoscopists!

Transvaginal Specimen Retrieval: Our Experience 220 procedure

700 gynecological procedure (1990–2011)
1 (0.1%) complication related to extraction was recorded

Transvaginal Specimen Retrieval

Safety of Transvaginal Surgery

Uccella S, Obstet Gynecol, 2011

Uccella S, Obstet Gynecol, 2012

Teng, Obstet Gynecol 1997

META-ANALYSIS: 13,010 cases included

Am J Obstet Gynecol, 2011

Vaginal Cuff Dehiscence in a Series of 12,398 Hysterectomies: Effect of Different Types of Colpotomy and Vaginal Closure


Obstet Gynecol, 2012
Safety of Transvaginal Surgery

Evaluation of bacterial contamination after "pure" (totally) transvaginal NOTES® diagnostic peritoneoscopy with biopsies in swine: a comparative study with laparoscopy

LIMITATIONS

- Virgo patients
- Frozen pelvis

Particular cases

Large Cysts and Possible Malignancy
Large Cysts and Possible Malignancy

186 cases
Ovarian masses > 10 cm

8 cases: LMP tumors 4.3%
17 cases: malignancy 9.1%

Ghezzi et al. BJOG 2008

To prevent spillage

Particular cases

Evidence

Myomas

TRANSVAGINAL EXTRACTION

Ghezzi F, Surg Endosc, 2002
Surgical Tutorial: Tissue Extraction and Morcellation

Kimberly Kho, MD, MPH
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Learning Objectives

• Describe various methods for tissue extraction
• Assess the risks of laparoscopic morcellation and discuss strategies to reduce the likelihood of complications
• Describe techniques for transvaginal tissue removal
• Choose which methods of tissue extraction to perform in a variety of clinical scenarios.

mor-cell-la-tion
noun ˌmōr-sə-ˈlā-shən\ to break into small pieces prior to removal

• Transabdominal
• Transvaginal
• In situ
• Hysteroscopic

Laparoscopic morcellation

• Laparoscopic assisted myomectomy
• Electric/power morcellators
• Transcervical morcellation

Hand-assisted laparoscopy

• Laparoscopic assisted myomectomy/hysterectomy allows for open morcellation
• Useful for:
  – concern for malignancy
  – multiple myomas for removal
  – extensive myometrial repair
• Port placement
  – Allow triangulation for laparoscopy
  – Consider possible need for conversion
Electric morcellation

- Disposable / reusable
- Electromechanical / bipolar

Ideal requirements of a morcellator

- Handling, ergonomatics, insertion, and cleaning:
  - lightweight with minimal parts
  - easy to clean and sterilize
- Improvement of the system and safety aspects:
  - Rotating knife must be visible during the entire morcellation procedure
  - the surgeon using the handpiece must be responsible for its activation
- Maintenance of pneumoperitoneum:
  - pneumoperitoneum must be as constant as possible throughout the entire morcellation procedure, including during removal of the morcellated tissue via the sleeve
- Performance of morcellator:
  - more efficient with improved cutting properties enabling tissue masses weighing several hundred grams to be removed in a very short space of time,
  - to shorten the operation time
  - to decrease operator effort

Complications of Morcellation

- Review of literature for 10 years (1992-2002)
  - No reports of visceral injury in published literature
- FDA Database
  - 17 cases identified
  - 3 excluded 2’ trivial nature of event (instrument malfunction)
  - 14 visceral injuries
    - small and large bowel (11)
    - kidney (2)
    - pancreas [1]
    - major vascular structures (3)
  - 3 Deaths

Complications of morcellation

- Retained tissue
  - Increasing reports of parasitic myomas and disseminated leiomyomatosis
  - Dissemination of endometriosis, sarcoma, cervical tissue, adenomyosis
  - Abscess formation, peritonitis, intestinal obstruction

Port Placement

- Location
  - Umbilical or sub-xiphoid
  - Suprapubic
- Size
  - Midline 12 mm for morcellator
- Closure
  - Fascial closure device

Avoidance of morcellator complications

- Minimize trendelenburg
- Maintain pneumoperitoneum
- Visualize blade at all times
  - Ensure blade always in center of view
  - Keep blade anterior
- Move specimen, not blade
- Vary blade speed with slower speed or bursts to avoid fragmentation
- Ensure surgeon is activating blade
- Removal all fragments of tissue
  - Inspection
  - Hydroflotation
Tips for Morcellator Use

- Peeling
- In Situ Morcellation

Incorrect Use of Morcellator

- Lack of Control
- Poor Orientation

Iatrogenic Myomas

- Strong association with prior morcellation
  - Uterine
  - Myoma
- Theory: tissue fragments are left behind and implant
- Electric morcellation may spray fragments to any part of peritoneal cavity
- Need for meticulous survey and removal of tissue
- Possible formation after Lupron
  - Potential for development after UAE

Iatrogenic Parastic Myomas

Preventing Long-term Complications

- Avoid iatrogenic seeding
  - Awareness
  - Morcellation techniques
  - Systematic survey
    - Copious irrigation
    - Upper abdomen
    - Port sites
- Avoid morcellating ovary/cysts
  - Possible ORS
  - Ovarian cancer seeding

In Situ Morcellation

- Video of transcervical morcellation
Transvaginal morcellation

- Use of anterior and posterior retractors
- When bivalving, use tenaculums to maintain specimen orientation
- When coring or wedge resecting, stay within boundaries of uterine serosa

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.