Excision of Endometriosis – Laparoscopic and Robotic

MODERATOR
Mohamed Ibrahim, MD

FACULTY
Michelle Nisolle & Tamer A. Seckin, 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

Excision of Endometriosis – Laparoscopic and Robotic
M. Nisolle .................................................................................................................................................... 3

Excision of Endometriosis – Laparoscopic and Robotic
T.A. Seckin .................................................................................................................................................... 15

Cultural and Linguistics Competency ........................................................................................................ 36
Minimally invasive management of endometriosis has been the foundation for the advancement of minimally invasive surgery. When cases of the most severe endometriosis can be managed by operative laparoscopy, almost all other pathologies can be treated with a minimally invasive approach. The limiting factors are surgeon skill, which relies on knowledge of anatomy, and availability of proper instrumentation.

In this course we will share treatment strategies for managing severe cases of endometriosis. These will include utilization of proper instruments, including robotics, in performing posterior cul-de-sac and pelvic side wall dissection. Alternative approaches to excision (ablation and fulguration) will be reviewed along with their indications in certain cases.

Learning Objectives: At the conclusion of this course, the participant will be able to: 1) Recognize subtle and occult endometriosis in distorted anatomy; 2) select proper strategy in the management of severe endometriosis, including new techniques to improve the quality of excision surgery; 3) assess appropriate utilization of new technology; and 4) recognize potential complications and their prevention.
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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Linda Michels, Executive Director, AAGL*
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Andrew I. Sokol*

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).
Mohamed Ibrahim*
Michelle Nisolle*
Tamer Seckin*

Asterisk (*) denotes no financial relationships to disclose.
Excision of endometriosis: laparoscopic and robotic

M Nisolle, MD, PhD
Professor of Gynecology-Obstetrics
Head of Department of Gynecology-Obstetrics
University of Liège, Belgium

I have no financial relationships to disclose.

• To manage severe endometriosis by laparoscopy or by robotics.
• To select proper strategy in the management of severe endometriosis, including new techniques of excision surgery.
• To assess utilization of new technology.
• To keep in mind potential complications and their prevention.

Classification - Evolution

Red  Black  White

Nisolle et al Fertil Steril 1993

Transplantation theory

Table: Preferential localization and types of lesions of endometriosis according to age groups

<table>
<thead>
<tr>
<th>Age group</th>
<th>Localization</th>
<th>Type of lesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescent</td>
<td>Peritoneum</td>
<td>Angiogenesis, cysts</td>
</tr>
<tr>
<td></td>
<td>Ovarian surface</td>
<td>Endometrioma</td>
</tr>
<tr>
<td>Adult</td>
<td>Peritoneum</td>
<td>Typical, adhesions</td>
</tr>
<tr>
<td></td>
<td>Ovary</td>
<td>Endometrioma</td>
</tr>
<tr>
<td></td>
<td>Rectovaginal septum</td>
<td>Deep adenomyoma</td>
</tr>
<tr>
<td>Postmenopausal</td>
<td>Ovary</td>
<td>Endometrioma</td>
</tr>
<tr>
<td></td>
<td>Extirpated</td>
<td>Obstructive</td>
</tr>
</tbody>
</table>

Nisolle et al. Fertil Steril 1993
• Characteristic feature of endometriomas
  – Presence of diffuse, low-level internal echoes
  – Hyperechogenic foci in the wall
  – Kissing ovaries

Ovarian endometriosis is confirmed at laparoscopy and by histologic examination

The surgical approach of ovarian endometriosis has to be chosen:
  • Coagulation of the site of eversion (Brosens et al.)
  • Endometrioma fenestration and vaporization (Donnez et al.; Hemmings et al.; Saleh and Tulandi)
  • Ovarian Cystectomy (Canis et al.)

Cystectomy: Dissection of the cyst wall from the ovarian cortex
Large Endometrioma

1/Adhesiolysis
2/Aspiration of chocolate fluid
3/Vaporization of peritoneal lesions
4/Cystectomy or combined treatment:
   4/Medical therapy
   Second look laparoscopy

Ovarian endometriosis: plasmajet

Risk of Recurrence at 1 year

<table>
<thead>
<tr>
<th>Study</th>
<th>Excision (%)</th>
<th>Coagulation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemmings et al (Retro; 1998)</td>
<td>8 %</td>
<td>12 %</td>
</tr>
<tr>
<td>Berreta et al (RCT; 1998)</td>
<td>6 %</td>
<td>18 %</td>
</tr>
<tr>
<td>Saleh and Tulandi (Retro; 1999)</td>
<td>6.1 %</td>
<td>21.9 %</td>
</tr>
<tr>
<td>Alborzi et al (RCT; 2004)</td>
<td>5.8 %</td>
<td>22.9 %</td>
</tr>
</tbody>
</table>

Cochrane Review

There is some evidence that excisional surgery for endometriomata provides a more favourable outcome than drainage and ablation with regard to the
- recurrence of the endometrioma
- recurrence of symptoms
- subsequent spontaneous pregnancy


Cystectomy:
Risk of removal normal ovarian tissue and ovocytes

Residual ovarian volume after surgery

<p>| Table 1: Residual ovarian volume before surgery and after surgery and recovery |
|-----------------------------|-----------------------------|
| Ovarian tissue before surgery (cm³) | Ovarian tissue after surgery and recovery (cm³) |
| Baseline volume                | Before surgery               |</p>
<table>
<thead>
<tr>
<th>Residual volume after surgery</th>
<th>Residual volume after recovery</th>
</tr>
</thead>
</table>

5
**Deep infiltrating endometriosis**

- **Rectovaginal endometriosis**
  - Upper vagina
  - Rectum
  - Uterosacral ligaments, cervix corpus uteri

- **Aim of management of DIE**
  - Improve quality of life
  - Preserve fertility
  - Low recurrence rate
  - Low complication rate

- Hormonal therapy has been designed to
  - Suppress oestrogen synthesis
  - Atrophy of ectopic endometrial implant

- Recurrence after cessation is high: 50%

- Relative ineffectiveness of medical therapy: fibrotic reaction

Surgery of symptomatic DIE is required

- Surgery is efficacious
  - 2RCT: pain is reduced by surgical removal of endometriotic lesions (Sutton et al 1994; Abbott et al 2004)
  - Pain reduction in >70% of patients after surgical removal of DIE (Angioni et al 2006; Chapron et al 2001; Possover et al 2000; Donnez et al 2004)

- Hysterectomy is not needed for treatment of DIE

  Complete excision is needed

**Conservative surgery for DIE**

- How to be sure that the resection is complete?
- How to avoid complications associated with complex surgery?

  Preoperative assessment
  Multidisciplinary approach in specialised centres

**Table 2. Endometriosis-associated infertility: pregnancy rate according to different treatment strategies**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pregnancy after surgery (%)</th>
<th>Pregnancy after IVF (%)</th>
<th>Total pregnancies</th>
<th>Clinical pregnancy rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (surgery)</td>
<td>162</td>
<td>56</td>
<td>162</td>
<td>56</td>
</tr>
<tr>
<td>Group 2 (surgery + IVF)</td>
<td>162</td>
<td>68</td>
<td>162</td>
<td>68</td>
</tr>
<tr>
<td>Group 3 (IVF only)</td>
<td>242</td>
<td>62</td>
<td>242</td>
<td>62</td>
</tr>
<tr>
<td>Group 4 (no treatment)</td>
<td>242</td>
<td>60</td>
<td>242</td>
<td>60</td>
</tr>
</tbody>
</table>

Barri et al 2010
Rectal endoscopic Sonography
- Distinction between muscularis propia
- submucosa-mucosa

MRI
- Cartography

Bazot et al Hum Reprod 2007
Similar accuracy for diagnosis of rectal involvement when compared to MRI

Deep infiltrating endometriosis

Surgical Techniques
- Redwine (1991) : Laparoscopic resection
- Bailey (1994) : Laparotomy
- Donnez (2004) : Laparoscopy without bowel resection
- Possover (2000) : Vaginal dissection followed by laparoscopy and minilaparotomy
- Chapman (2003) : Laparotomy if positive EER
- Konincke: Laparoscopy – discoid resection
- Keckstein, Wattiez, Canis, Darai, Anaf : Laparoscopy and minilaparotomy
- Possover (2000) : LANN technique
- Landi (2000) : Laparoscopic nerve-sparing complete excision of DIE
- Nezhat (2000) : Robotic-assisted laparoscopy

- Preoperative assessment
- Type of surgical treatment?
  - Excision of the nodular lesion
    - Without bowel resection: shaving technique
    - Uterosacral ligaments infiltration
    - Vaginal infiltration
    - With bowel resection:
      - disoid or segmental bowel resection
      - laparoscopy ; laparotomy ; laparoscopically assisted technique

- « Check list » at the end of the surgery
  - Treatment is complete
  - Haemostasis is achieved
  - Absence of rectal perforation
  - Methylene blue rectal injection
  - Ureteral peristaltism is satisfactory
- Preoperative assessment
- Type of surgical treatment?
  - Excision of the nodular lesion
    - Without bowel resection: shaving technique
    - Uterosacral ligaments infiltration
    - Vaginal infiltration
  - With bowel resection:
    - Discoid or segmental bowel resection
    - Laparoscopy; laparotomy; laparoscopically assisted technique

- Baryum enema: irregularities of anterior rectal – sigmoid wall

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**Digestive complications of colorectal surgery**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Patients</th>
<th>Rectovaginal fistula</th>
<th>Linkage of anastomosis</th>
<th>Secondary ileo-colost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roshat et al. (1999)</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lelley et al. (1999)</td>
<td>26</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Possover et al. (2000)</td>
<td>34</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Dural et al. (2005)</td>
<td>40</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Campagnacci et al. (2005)</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Roberts et al. (2006)</td>
<td>125</td>
<td>2</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>Panel et al. (2006)</td>
<td>21</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Lyons et al. (2006)</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Brouwer and Woods (2007)</td>
<td>213</td>
<td>2</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>Stills et al. (2009)</td>
<td>167</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Minelli et al. (2009)</td>
<td>357</td>
<td>14</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

**TOTAL** 1003 27 (2.7%) 10 (1%) 21 (2.1%)
DIE Excision and Recurrence

<table>
<thead>
<tr>
<th>Recurrence</th>
<th>Pain</th>
<th>Reoperation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fedele et al (2004)</td>
<td>28 %</td>
<td>27 %</td>
</tr>
<tr>
<td>Jatan et al (2006)</td>
<td>5.3 %</td>
<td></td>
</tr>
<tr>
<td>Panel et al (2006)</td>
<td>4.8 %</td>
<td></td>
</tr>
<tr>
<td>Darai et al (2007)</td>
<td>16.4 %</td>
<td></td>
</tr>
<tr>
<td>Vignali et al (2005)</td>
<td>24 %</td>
<td>10 %</td>
</tr>
<tr>
<td>Brouwers &amp; Woods (2007)</td>
<td>4.6 %</td>
<td></td>
</tr>
<tr>
<td>Rectal dissection</td>
<td>22 %</td>
<td></td>
</tr>
<tr>
<td>Anterior excision</td>
<td>5.17 %</td>
<td></td>
</tr>
<tr>
<td>Segmental rectal</td>
<td>2.19 %</td>
<td></td>
</tr>
</tbody>
</table>

Depth of microscopic infiltration of the bowel wall

- DIE : Conclusions
  - Surgery is needed
  - Conservative surgery
  - Preoperative assessment is required
  - Several surgical approaches
    - Absence of bowel infiltration: shaving technique
    - Presence of bowel infiltration: segmental colorectal resection, discoid resection, stapled resection
  - Postoperative results
    - QOL
    - Fertility
    - Recurrence
    - Complications

- Complete removal of the lesion is needed
  - Risk of recurrence
- Appropriate surgical team
  - Risk of complications
- Need for a multidisciplinary approach
  - Diagnosis
  - Surgery

Need for Referral centres
Rectal resection or shaving? Is robotic surgery useful?

Conditions

- Side docking
- Mobilization
  - Uterus: uterine canula
  - Posterior vaginal fornix: sponge
  - Rectum: rectal dilatator
- Adequate energy

Type of energy

- Monopolar scissors
- Bipolar forceps

Laser

Conditions

- Side docking
- Mobilization
  - Uterus: uterine canula
  - Posterior vaginal fornix: sponge
  - Rectum: rectal dilatator
- Adequate energy
- Vaginal examination
  - Absence of tactile feedback
Deep Infiltrating Endometriosis

- Surgical steps
  - Adhesiolysis
  - Ureterolysis
  - Rectal dissection
  - Posterior vaginal fornix excision
  - Vaginal closure
  - Endometriotic lesions ablation

Rectal dissection

Rectal shaving

Vaginal incision and resection

Posterior vaginal fornix incision
Vaginal closure

Robotic Surgery of Endometriosis

- Series of 33 patients
  - Rectovaginal endometriosis: 24 cases
    - Resection of DIE: 24 associated with
      - Vaginal Resection: 19
      - Segmental Sigmoid Resection: 1
  - Ovarian endometriosis: 9 cases
    - Kystectomy: 2
    - Ovariectomy: 3
    - Hysterectomy: 4

Characteristics of Patients

<table>
<thead>
<tr>
<th></th>
<th>Ovarian endometriosis</th>
<th>DIE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 9</td>
<td>n = 24</td>
</tr>
<tr>
<td>Age (y) mean (range)</td>
<td>41.1 (31-52)</td>
<td>30.7 (23-40)</td>
</tr>
<tr>
<td>BMI mean (range)</td>
<td>24.9 (20.7-30.4)</td>
<td>22 (17.3-29)</td>
</tr>
<tr>
<td>Previous surgery for</td>
<td>67 % (6)</td>
<td>46 % (11)</td>
</tr>
</tbody>
</table>

Complications

<table>
<thead>
<tr>
<th></th>
<th>Ovarian endometriosis</th>
<th>DIE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=9</td>
<td>n=24</td>
</tr>
<tr>
<td>Intraoperative</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Rectal perforation</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Postoperative (Hospitalization)</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Headache</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Nausea</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Incisional hematoma</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sepsis (APN)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Hematuria</td>
<td>1</td>
<td></td>
</tr>
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</table>

Clinical Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Ovarian endometriosis</th>
<th>DIE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=9</td>
<td>n=24</td>
</tr>
<tr>
<td>Postoperative outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy</td>
<td>3</td>
<td>1 (after 6 weeks)</td>
</tr>
<tr>
<td>Pelvic pain</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Reoperation</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Bowel resection

Uterosacral lig resection
Conclusions

- Endometriosis surgery is complex
- RAL is safe and feasible
- Robotic platform: offered in patients with complex pelvic dissection
- Advantages for patients
  - To offer complete removal of endometriotic lesions
  - To decrease the recurrence rate and reoperation?
  - To avoid bowel resection?

References

Excision of Endometriosis: Laparoscopic & Robotic Approaches

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Surgery Instructor, Division of Advanced Laparoscopy
Department of Obstetrics & Gynecology
Co-Director, Minimally Invasive Gynecologic Surgery for Women Fellowship Program
Founder & Medical Director, Endometriosis Foundation of America

I have no financial relationships to disclose.

Learning Objectives:

• 1) Recognize subtle and occult endometriosis in normal and distorted anatomy
• 2) select proper strategy in the management of early and severe endometriosis, including new techniques to improve the quality of excision surgery;
• 3) assess appropriate utilization of new technology; and
• 4) recognize potential complications and their prevention.

Excision vs Fulguration/Ablation

Animations and Surgery Videos
Of Excision Procedure

Understanding Endometriosis

Total Pelvic Excision Peritonectomy+ Bowel Resection
3/15 positive for borderline Serous Carcinoma

Neonatal uterine bleeding as antecedent of pelvic endometriosis.


We elaborate on a new theory to explain pelvic endometriosis, including endometriosis in premenarcheal girls, based on the finding that the neonatal endometrium can display secretory activity immediately after birth. The neonatal uterus is therefore capable of shedding its endometrium. Indeed, occult vaginal bleeding occurs in a majority of neonates, although overt bleeding is estimated to occur in only 5% of neonates. This may be due to functional plugging of the endocervical canal in the neonate, which in turn would promote retrograde flux of endometrial cells contained in menstrual debris. Ectopic endometrial implantation in a newborn with hydrometrocolpos has been documented. These data, coupled with the observation of a significantly increased risk of endometriosis in adolescents with menstrual cuffnar obstruction and patent Fallopian tubes, indicate that endometriosis, especially in children and young adolescents, may originate from retrograde uterine bleeding soon after birth.

KEYWORDS: cervical obstruction, fetal uterus, neonatal uterine bleeding, pelvic endometriosis, retrograde menstruation

REFERENCES:
Neonatal uterine bleeding as antecedent of pelvic endometriosis.

Wilkinson, A. Uterus in early infancy: in relation to endometriosis, including endometriosis in premenarcheal girls, based on the finding that the neonatal endometrium can display secretory activity immediately after birth. The neo...
Endometriosis originates from the cellular debris of retrograde menstruation which contains progenitor stem cells of endomyometrial junction.

Is there invisible “Microscopic Endometriosis”

Endometriosis can have very subtle visual appearances. All theories of origin imply some early and presumably tiny form of the disease which potentially cannot be detected by the unaided human eye. A review of the literature indicates that with increasing magnification at surgery, virtually all endometriosis can be visualized. Invisible microscopic endometriosis is an unproven entity which retards intellectual progress in the study of this disease.


from Dan Martin, MD
drseckin@mac.com
Subtle and Occult endometriosis in non-distorted and distorted anatomy

Classic-Typical Lesions

Subtle/Atypical

Occult (due to their size and location)
Endometriosis and angiogenesis.

May K, Becker CM.

Source
Nuffield Department of Obstetrics and Gynecology, University of Oxford, John Radcliffe Hospital, Oxford, UK.

Abstract
Endometriosis is a common gynecological condition, responsible for significant morbidity and social-economic impact. Although the condition has been recognized for many years, the underlying pathophysiology is poorly understood. In turn, this results in inadequate treatment and high recurrence rates. Various theories try to explain the presence of endometrial tissue outside the uterine cavity. However, none of them can explain all disease locations and appearances, and it is unclear how these fragments establish into endometriotic lesions. New research has focused on identifying the role of vascularization in the pathogenesis of endometriosis, by allowing lesions to establish and grow. In this review, the authors outline the basic mechanisms of angiogenesis and vasculogenesis in the human eutopic endometrium, and consider how this data can be applied to endometriotic implants. Furthermore, the authors discuss molecular mechanisms of angiogenesis and vasculogenesis, and how this may be used to therapeutic advantage in the treatment of endometriosis.

PMID: 18547987

Occult Lesions-autofluorescence

Detection of peritoneal endometriotic lesions by autofluorescence laparoscopy.

Buchweitz O, Staebler A, Tio J, Kiesel L.

Source
Department of Obstetrics and Gynaecology, University of Münster, Germany.

Abstract
OBJECTIVE: This study was undertaken to evaluate the feasibility of autofluorescence laparoscopy in the diagnosis of endometriotic lesions.

STUDY DESIGN: A prospective analysis of 83 consecutive patients undergoing laparoscopy for suspected endometriosis under white light illumination and autofluorescence diagnosis. The study measured total number of endometriotic lesions diagnosed under white light illumination and with autofluorescence diagnosis.

RESULTS: The biopsy-based sensitivity of white light diagnosis alone and white light illumination and autofluorescence for detecting nonpigmented peritoneal endometriotic lesions was 65% compared with 92% (1.42-fold increase). The corresponding specificity was 68% as opposed to 84%. Occult areas of endometriosis were discovered using autofluorescence diagnosis. Statistical analysis was performed with chi2 test and McNemar test.

CONCLUSION: Combination of white light illumination and autofluorescence is significantly superior to white light illumination alone in detecting nonpigmented endometriotic lesions. Autofluorescence diagnosis of nonpigmented endometriotic lesions may become an alternative to fluorescence diagnosis after application of 5-aminolevulinic acid, especially because of no side effects.

Recognition of Deep Early Endometriosis

Lesions

Lesions with microscopic Deep invasion

Unrecognised invisible endometriosis lesions

Early Superficial L

Lesions with Deep invasion

Unrecognised invisible endometriosis lesions
Recognition of Stromal Endometriosis Lesions
CD10 is helpful in detecting occult or inconspicuous endometrial stromal cells in cases of presumptive endometriosis.

Groisman GM, Meir A. Department of Pathology, Hillel Yaffe Medical Center, Hadera, Israel. groisman@hillel-yaffe.health.gov.il

**BACKGROUND:**
Previous studies have shown that CD10 is a marker for normal, ectopic, and neoplastic endometrial stromal cells. However, its role in confirming a diagnosis of presumptive endometriosis has not been extensively studied.

**OBJECTIVE:**
To assess the reactivity of CD10 in a series of cases of presumptive endometriosis and to establish the potential usefulness of this antibody in confirming the diagnosis.

**DESIGN:**
We studied hematoxylin-eosin sections and immunoreactivity of CD10 in 20 cases diagnosed as “suspicious for,” “suggestive of,” or “compatible with” endometriosis as well as in 12 cases of lesions that may be confused with endometriosis (3 endosalpingioses, 3 mesothelial hyperplasias, 3 ovarian follicular cysts, and 3 hemorrhagic corpora lutea).

**RESULTS:**
Routine sections from cases of presumptive endometriosis showed glands lacking a distinct cuff of endometrial stromal cells because of atrophy or because of changes secondary to hemorrhage, inflammation, fibrosis, and/or cystic dilatation. In a few cases, the distinction between endometrial and ovarian stroma could not be assessed with certainty. CD10 immunostaining confirmed the diagnosis in 17 (85%) of the cases, as it strongly stained endometrial stromal cells that were not apparent on hematoxylin-eosin sections. All sections from lesions that may simulate endometriosis were CD10-.

**CONCLUSION:**
CD10 is helpful in detecting occult or inconspicuous ectopic endometrial stromal cells and in distinguishing endometriosis from its potential mimickers. We recommend its use to confirm or exclude the presence of endometrial stromal cells in cases of presumptive endometriosis and in lesions that may be mistaken for this entity.
Step One

A near contact examination (Scanning) of the Peritoneal Surface Under Blue Water-Hydro floatation Elimination of light reflection

Red and Yellow Elimination of direct gas pressure on the peritoneal surfaces- surface lesions(projective, vegetative) lesions start to hydro float

Step Two

Retroperitoneal distention with Blue water and creation contrast under peritoneal membrane

Inspection for Superficial collateral pathology - Leopard Spots -

Inspection for Retroperitoneal fibrosis

Inspection for micro endometriosis implants

Cold excision with back up micro bipolar coagulation
Section 5: Blue Dye Excision Technique

• Inspection of Peritoneal Surfaces Under Blue Water (Near Contact Scanning)

Vegetative
Distorted Anatomy - Deep Disease

Occult Endometriosis - Deep

Video
Deep
Parametrial/Obtrator
Occult Endometriosis

Distorted Anatomy

Video
Deep Endometrioma
Hypogastric

Thomas S. Cullen (1914)

The removal of extensive adhesions of the rectovaginal septum (Cullen's disease) is often more difficult than a Walthour hysterectomy for cure of the cervix

Distorted Anatomy Multiorgan Disease

- Peritoneal
- Retroperitoneal
- Ureter
- Neurovascular
- Recto-Sigmoid
- Bladder

What makes Endo surgery difficult is it is a multiple organ disease, needing an experienced multi-specialist team to perform reconstructive and restorative work!
Surgical Management
- Fulguration
- Ablation
- Excision
- Bowel
- Urinary
- Retroperitoneal
- Hysterectomy
- Fertility Sparing/Adnexal Surgery

Techniques
- Visual Identification
- Instruments-(Robotic Assistance?)
- Experience and Skill
  - Dissection
  - Excise
  - Repair/Reconstruct

Severe Endometriosis Strategy
Preop
- Fertility Sparing-Adnexa
- Bowel
- Urinary
- Retroperitoneal
- Hysterectomy
Intraop
- Ureteral Stents
- Bladder Borders
- Sigmoid Mobilization
- Identify Ureters
- Ovarian Mobilization/Suspension
- Pararectal Space
- Recto uterine-vaginal dissection

Ovarian Surgery
- VIDEO
  - Video Cystectomy, Reconstruction, Suspension

Ovarian Surgery/Endometrioma
- Avoid any energy based ablation, fulguration
- Avoid Vascular Damage/Hilum
- Complete Cyst wall removal-Beware of Multiple Endometrioma
- Reconstruct with fine suturing
- Temporary Suspension
- Remove Sidewall -anti ovarian peritoneal pathology

Bladder & Ureter Surgery
- Video
Bowel Disease
• Implants and Nodules
• Disk vs Segmental Resection

Bowel Surgery/ Nodulectomy

Disk Excision

Segmental Resection
Nodulectomy ending with Segmental Resection

Bowel Nodules/Implants

- Multifocality
- Multicentricty
- Both

Vaginal Invasion


Department of Obstetrics and Gynecology, Friedrich Schiller University, Bachstrasse 18, 07740 Jena, Germany.

Location of Bowel Endometriosis vs Number of Excisions

<table>
<thead>
<tr>
<th>Location</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectovaginal</td>
<td>91</td>
</tr>
<tr>
<td>Rectal</td>
<td>224</td>
</tr>
<tr>
<td>Sigmoid</td>
<td>107</td>
</tr>
<tr>
<td>Ileo-cecal</td>
<td>19</td>
</tr>
<tr>
<td>Appendice</td>
<td>35</td>
</tr>
<tr>
<td>Ileum</td>
<td>1</td>
</tr>
</tbody>
</table>


The prospective database of bowel resections maintained at the Department of Surgery of the Ospedale Sacro Cuore-Don Calabria was queried to identify patients who underwent laparoscopic rectal resection for endometriosis of the mid/lower rectum between January 2002 and September 2010.
To avoid the limits and heterogeneity of previous experiences, Ruffo aimed to evaluate perioperative outcomes and postoperative complications in a consecutive cohort of 750 patients who underwent laparoscopic resection of the mid/low rectum for endometriosis at a single, high-volume center by......

<table>
<thead>
<tr>
<th>Fistula Type</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectovaginal fistula</td>
<td>16</td>
<td>2%</td>
</tr>
<tr>
<td>Vesicovaginal fistula</td>
<td>2</td>
<td>0.3%</td>
</tr>
<tr>
<td>Ureteral fistula</td>
<td>3</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Ruffo - Minelli 2009

Laparoscopic rectal resection for severe endometriosis of the mid and low rectum: technique and operative results.


In this series of 750, vagina was opened in 191 patients (25.5%) in order to remove vaginal nodules of endometriosis or to perform hysterectomy. Sixteen patients (2%) developed rectovaginal fistula, and 14 of them required one or more reoperations. It is possible that vaginal surgery may be a risk factor for this complication when low or very low colorectal anastomosis is performed.

Close the vagina before performing bowel surgery, omental flap between the vagina and the anastomosis. Avoid active suction drains between suture lines

Anastomotic leak ..........21.. 3 %
Rectovaginal Fistula 16 .. 2%
Vesicovaginal............. 2... 0.3
Ureteral................... 3 0.4
Patients going reoperation 5.5 %

Ruffo - 2012

Recently a large, population-based study by Karanicolas et al. demonstrated that postoperative outcomes including mortality after colorectal resections for both malignant and benign diseases are significantly correlated with surgeon volume. These data suggest that in Ruffo study the very high volume of laparoscopic rectal resections performed by a single surgeon in the context of a highly specialized center represents the most important determinant of favorable outcomes with no mortality, low morbidity, and very low laparoscopy conversion (1.8%) rates.


Finally, there is strong evidence that complex gastrointestinal surgical procedures, including colorectal resections, are best performed at specialized high-volume centers by high-volume surgeons.


• Previous Surgery is a risk factor for complications such as leakage, acute peritonitis and fistula. This is due to how tissues have exhausted, and lost their microcapillary-vascular collateral network in the previous surgeries. Poor tissue perfusion is caused by excessive use of energy-based techniques and unique fibrotic tissue of endometriosis.
Prevention of Complications

• Single Surgeon
• Specialized Team,
• High Volume Facility/Center
• Standardized Technique

Scrupulous Adherence to Proper Technique

Team-oriented approach to reduce operator fatigue and potential for impaired judgment

Dedicated operating room and Personnel

Complications and Their Prevention—Scrupulous Adherence to Proper Technique

• Second Surgical PAUSE
• Prevention of Complications
  — Hematoma-Abscess
  — ileus-bowel obstruction
  — Fistulas
  — Peritonitis
  — Cuff
  — Compartment Syndrome

Bleeding
Bladder
Ureter
Ureters
Trocars Sites

Complication Videos

• Fistulas
• Rectovesical
• Ureterovaginal
• Vesicovaginal
• Ureterorectal

Video

Scrupulous Adherence to Proper Technique: Bowel

• "Michelin Test" - with air distention under water
• Blue Water Distention to check for translucency, integrity of bowel wall-H Reich
• Avoid manipulation and probing with Rectal probe after suture repair - Seckin
• Direct view w Sigmoidoscopy to evaluate lumen, to rule out stricture and bleeding

Repair in layers
Ischemia free technique
Tension free anastomosis

Avoid suction (active) drains between suture lines of two repaired organs-(No Juxtaposition) of suture lines

Second Surgical Pause Before Closing up Flatten operating table
Dellate PeritoneumRemove uterine manipulator, all inst. 5 minutes recess Cystoscopy., .Urter orifices for Indigo .Re inflate Peritoneum Reexamine Operative field -excision sites -oozing?Check for oozing from small vessels-microbipolar
Suction all blood clots-irigate until crispy clear return
Check trocar sites, defect, bleeding?Bring omentum Down Suction upper Quadrant
Issues with Robotic Enabling/Assistance

- Aggressive Marketing/
  - Advertisement
- Misrepresentation
  - Lack of Evidence
- Cost - Time
- Complications

Injuries May, in fact, be Under-reported

- Researchers at Johns Hopkins found that 174 injuries and 71 deaths were reported to the FDA, but demonstrated other examples of "botched operations" that went unreported, concluding that "robotic surgery complications are vastly under-reported."[1]
- The true extent of complications and injuries which have occurred in actual practice may be unknown
- Reports of suppressed complaints, complications and performance errors
- Little to no oversight/incentives exist for reporting

Data Consistently Demonstrates Increased Cost as Compared to Conventional Laparoscopic Approach in Gyn & GynOnc, yet Equal or Lesser Reimbursement Continues

- JAMA: of 260,000 hysterectomy patients, median hospital cost for robot-assisted surgery was $8,868 as compared to $6,679 for a laparoscopic hysterectomy.[2]
- "It is feasible for robotic hysterectomy to be less expensive than abdominal hysterectomy, but unlikely for robotic hysterectomy to be less expensive than traditional laparoscopy."[3]
- Present review of literature indicates robot-assisted surgery is consistently more expensive than video-laparoscopy, and in many cases open surgery.[4]

Mean complication rates generally do not vary significantly among minimally invasive methods of hysterectomy, but patient costs are significantly influenced by method.[5]

Too Much, Too Soon?

- Use of robotic surgery has grown substantially since 2007 by 400%, with little data to support such growth; surgeons may feel pressured to adopt the technique without adequate training or in the face of concerns that another procedure may be a better option.[6]
- Aggressive marketing lack counterbalance in adequate training; lack of long-term data continues to be a significant issue.[7, 8]
- Data implies that materials provided by hospitals regarding the robot overestimate benefits, largely ignore risks and are strongly influenced by the manufacturer.[9]

Known Disadvantages

- Bulkiness of equipment, inability to use certain tools, lack of tactile feedback, inability to move surgical table, additional set up/breakdown time of robotic equipment
- Significantly longer surgical and anesthesia time, as well as larger trocars are necessary
- Learning Curve – though not as steep as conventional laparoscopy, technology can never replace true skill
- No proven benefit over adhesion formation vs laparotomy or laparoscopy

Aesthetics/Port size:
- 2 port: 5mm to ¼ inch; # of ports 2
- Standard lap: 2 at 5mm, 1 at 10mm to ½ inch, 1 at 12mm to ¾ inch ; # of ports 3-4
- Robotic: 3 at 8 mm, 2 at 12 mm; # of ports 5 (also increases risk of herniation)
Evidence of Advantages Lacking?

- Advantages do exist, particularly where the inexperienced laparoscopic surgeon is concerned during complex procedures; however, further randomized trials are needed.
- May be argued that endometriosis can be equally well visualized with traditional 2D systems via improved HD optics and magnification; new technology may be on par with robotic systems while reducing learning curve and preserving tackle feedback.
- Complex, multidisciplinary surgery for advanced endometriosis is feasible by laparoscopy.
- May be argued that endometriosis can be equally well visualized with traditional 2D systems.
- Advantages do exist, particularly where the inexperienced laparoscopic surgeon is concerned during complex procedures; however, further randomized trials are needed.

Reimbursement/Healthcare Legislation

- Currently no differences in reimbursement to the surgeon between the two operative approaches.
- Speculation implies that the Affordable Care Act will limit the amount paid for procedures and doctors' ability to recommend them.
- Experts note that although hospitals have been willing to absorb higher costs associated with robotic surgery, healthcare overhaul provisions may change such practices.

A Cautionary Tale

- Many women today are falling for the claimed advantages of robotic surgery for hysterectomy, thanks to substantial marketing and advertising.
- Robotic surgery is not only the best minimally invasive approach for hysterectomy, but in the most contrast, it is expected to render the existing type from the reality, where considering the least surgical approach for certain women who would never have been considered for candidates for hysterectomy.
- The use of robotics in minimally invasive hysterectomy, especially for cancer operations that require extensive surgery and removal of large organs, studies have shown that using this expansion technology for routine surgical care does not improve patient outcomes.
- Consequently, there is no good data proving that robotic hysterectomy is even as good as the least invasive minimal surgery, and this is costly, that is, the most minimally invasive.

A Look Ahead...

Though the literature clearly lacks in the area of using robotics for endometriosis; additional studies will reveal benefits; e.g. LAROSE Study

Should we be using the robot in endometriosis? “With appropriate rationale and indications for its use, proper training with subsequent credentialing and privileging, and infrastructure to allow for safe and efficient use of the technology with outcomes tracking.” Arnie Arnold P. Advincula, MD

Thank You!
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.