How to Manage Your Minimally Invasive Complications without Conversion (Didactic)

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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
AAGL is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

The AAGL designates this live activity for a maximum of 3.75 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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Laparoscopic surgery has advanced considerably in the field of gynecology. Various complex gynecologic and oncological procedures are being done laparoscopically. This has brought to light a newer set of complications due to two-dimensional vision and extensive use of energy sources. Laparoscopy has resulted in anatomy being redefined. Thus, when one wants to progress to advanced laparoscopy, the complications should be known and predictable. Predictability prevents complications. The main focus of this course is to address the various complications and to help surgeons understand the causes of complications during laparoscopic gynecologic surgery. Well-known experts in this field will share their experience and give their advice on recognition and management of complications of advanced laparoscopy, and the steps to be taken to prevent complications. All of the presentations will be accompanied by illustrative videos for easy understanding.

Learning Objectives: At the conclusion of this activity, the clinician will be able to: 1) Review the laparoscopic anatomy relevant to surgical dissection; 2) review the pathophysiology of complications and the various situations where complications often take place; 3) explain how to prevent inadvertent complications of advanced laparoscopy; 4) recognize complications; 5) discuss the management of complications laparoscopically; and 6) apply the guidelines to using energy sources.

Course Outline

1:30    Welcome, Introductions and Course Overview    S.P. Puntambekar
1:35    Complications during Radical Gynecological Procedures for Endometriosis    A. Wattiez
2:00    Complications during Myomectomy (Simple and Complex Myomas)    A. Moors
2:25    Complications During Laparoscopic Pelvic Reconstructive Surgery    A.M. Lam
2:50    Complications during Laparoscopic and Robotic Gynecologic Oncology    S.P. Puntambekar
3:15    Questions & Answers    All Faculty
3:25    Break
3:40    Knowing Your Energy Sources    S. Jeffery
4:05    Prevention and Management of Laparoscopic Complications    S.P. Puntambekar
4:30    Laparoscopic Pelvic Anatomy: The Necessary Weapon    S. Becker
5:20    Questions & Answers    All Faculty
5:30    Course Evaluation/Adjourn
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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Consultant: Conceptus Incorporated
Kimberly A. Kho*
Frank D. Loffer, Executive Vice President/Medical Director, AAGL*
Linda Michels, Executive Director, AAGL*
M. Jonathan Solnik*
Johnny Yi*

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Consultant: Karl Storz
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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).
Sven Becker*
Stephen Jeffery*
Alan M. Lam
Consultant: American Medical Systems, Johnson & Johnson
Adam Moors*
Shailesh P. Puntambekar*
Arnaud Wattiez
Consultant: Karl Storz

Asterisk (*) denotes no financial relationships to disclose.
Endometriosis Complications

A Wattiez

...the data

- Low number of reports
- Terminology: injuries, complications
- Rates & denominator: General, DIE, Bowel endometriosis, Bowel resection
- Related to the technique
- Short follow up
- Lack of RCT

Limited information!

Global rate: 6.9/1000

...incidence increases with the complexity

Table 1. Complications of gynecological laparoscopic surgery

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper endometrial curettage</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Minor surgery</td>
<td>0.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Major surgery</td>
<td>4.9</td>
<td>3.6</td>
</tr>
<tr>
<td>Advanced Surgery</td>
<td>4.5</td>
<td>2.2</td>
</tr>
</tbody>
</table>

17,521 laparoscopies 1987-1991
12,485 laparoscopies 1992-1995

Disclosure

- Consultant: Karl Storz

...the data


Major Complications in Laparoscopy

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Diagnostic LPC</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Minor Surgery</td>
<td>0.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Major Surgery</td>
<td>4.9</td>
<td>3.6</td>
</tr>
<tr>
<td>Advanced Surgery</td>
<td>4.5</td>
<td>2.2</td>
</tr>
</tbody>
</table>
| **Total**                | **5 (0.3)**       | **22 (0.5)**     | **69 (6.0)**

17,521 laparoscopies 1987-1991
12,485 laparoscopies 1992-1995

...the data
**Risk Factors**

Previous surgery or Advanced procedures: 70%

- Previous surgery: x10 times
- Lapt: 68% of access related
- Advanced procedure: Endometriosis, PID, large tumor
- 65% of procedure related

Chi IC et al. 1982, Chapron C. 2001/ ISGE 2001

**Surgeon’s Experience**

Table V. Details of complications according to the study period

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Vascular injuries</td>
<td>17</td>
<td>32</td>
<td>28</td>
</tr>
<tr>
<td>Bowel injuries</td>
<td>27</td>
<td>51</td>
<td>17</td>
</tr>
<tr>
<td>Urological injuries</td>
<td>7</td>
<td>13</td>
<td>31</td>
</tr>
</tbody>
</table>

NS = not significant.

**Risk Factors**

- Incidence of Mayor complications: 6/1000
- Increase incidence
- High complex procedure: 22/1000
- Previous surgeries
- Advanced surgery
- Lack of experience
- Most frequent bowel, urinary & vascular

Endometriosis?

**Experience**

- Unexperienced surgeon x 3-5 times
- No assistant or less x 8-5 times

Coelman Am JOG 2002

**Postoperative?**

Laparoscopic conservative surgery for stage IV symptomatic endometriosis: short-term surgical complications

Objective: To study severe endometriosis as a cause of pelvic pain, which represents one of the most challenging disorders in gynecology.

Design: Prospective study.

Setting: University Hospital.

Study Population: Patients with severe endometriosis (radiologic stage IV) who underwent laparoscopic surgery at our center between January 2004 and December 2007 were enrolled.

Main Outcome Measures: Clinical and surgical data were obtained and compared according to the extent of surgery performed, including adhesiolysis, excision, electrocautery, laser, and clips closure; endometriosis radiologic stage; and complications.

Results: A total of 262 patients underwent laparoscopic surgery for stage IV endometriosis; 1363 minor complications were documented in 213 patients (33.6%). The most frequent postoperative complications were bowel surgery (27%), vesical perforation (26%), and bowel surgery (14%).

Conclusion: We report the safety and efficacy of laparoscopic treatment of severe endometriosis in a teaching center. (J Minim Access Surg 2010; 6(4): 145-150.)

**Postoperative complication:**

- Bowel surgery
- Vesical perforation
- Bowel surgery

---

**Bowel perforation:***

- Bowel surgery
- Vesical perforation
- Bowel surgery

---

**Postoperative complication:**

- Bowel surgery
- Vesical perforation
- Bowel surgery
Complications, pregnancy and recurrence in a prospective series of 500 patients operated on by the shaving technique for deep rectovaginal endometriotic nodules

Jacques Donnez* and Jean Squifflet

POPULATION CHARACTERISTICS

n = 220 operations in 3 a years period

medium age 32

63% PREVIOUS SURGERY

PARITY

PREVIOUS SURGICAL HISTORY

2% Mayor Intraoperative
16% Postoperative
4% Requiring Reintervention

POSTOPERATIVE complications

Complications requiring Reintervention

Recto-vaginal fistula (2)
Peri-rectal (2)
Ureteral fistula (1)
Komppenenten (2)
Vaginal infection and necrosis (1)

BOWEL
General facts

15 - 50% were unrecognized for at least 24hrs
High Mortality rate: 3.6%

Mortality
3.6%
delayed diagnosis: 21%!

Endometriosis?

• Major Bowel complications: 0 to 16% in DIE
• In Bowel Segmental Resection
  • recto-vaginal fistulas (0%-14%)
  • anastomotic leaks (0%-10%)
  • pelvic abscesses (0.5%-4.2%)

mechanism

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Occurrence</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setup</td>
<td>18</td>
<td>32.1</td>
</tr>
<tr>
<td>Autoclave</td>
<td>6</td>
<td>10.3</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>9</td>
<td>16.1</td>
</tr>
<tr>
<td>Accessory</td>
<td>3</td>
<td>5.2</td>
</tr>
<tr>
<td>Operative procedure</td>
<td>32</td>
<td>57.1</td>
</tr>
<tr>
<td>Sharp dissection</td>
<td>26</td>
<td>46.5</td>
</tr>
<tr>
<td>Unknown</td>
<td>6</td>
<td>10.7</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Access related

Operative procedure

Mechanical
Operative procedure

Thermal small bowel

Post Operative
Debeisence Fistule

Prevention
Diagnosis Repair management

Prevention
• “tailor” the first entrance
• vision
• 3 instruments in the screen
• adequate instrumental use & selection
• knowledge of electrosurgery
  safety test

Prevention
Safety Test

Prevention

**Diagnosis**

Ideally intra-op!

Mean time interval for diagnosis: 4d \(\pm\) 5.4 (0-23)

- Mechanical injuries: 1.3 days (0-4)
- By coagulation: 10.4 days (0-38)

Chapron et al 1999

---

**Post-op**

- Pain ++++
- Illeus in absence of bowel surgery
- Inflammatory symptoms
- Images: Rx, Eco, CT (40% > 2 cm air day 1 post-op)

---

**Post-op**

- Easy second look +++
- Management by specialized team
- Laparoscopic exploration if.....
  - Experienced team
  - Early Dg
- If not laparotomy (80%)

---

Early laparoscopic exploration

---

**Repair**
Bowel Injuries

WHAT TO DO?

1. Suture or observation
2. Resection & Anastomosis
3. Colostomie (HARTMANN?)
4. Lavage +/- Drainage

LPC v/s LPT?

Bowel Injuries

WHAT TO DO?

......depends
• intra vs post-op
• mechanism
• surgeon experience
• patient

never is too late to ask for help!

Vascular

&

Hemorrhage

Bowel & Vascular: 76% of all injuries
75% of MVI during set-up
• 2 factors to consider
  • BMI
  • Previous LPC

never accelerate!
During the procedure
- Under-register: Middle rectal artery, uterine, vesical.
- Evaluated with: post op Hb, transfusion, reoperations
- Increase with the complexity

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Radical surgery (no bowel)</th>
<th>Normal surgery</th>
<th>Radical with colorectal surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>225 ± 79</td>
<td>102 ± 58</td>
<td>428 ± 176</td>
</tr>
<tr>
<td>Complications (rate/year)</td>
<td>23/100 (L)</td>
<td>23/100 (L)</td>
<td>47/100 (L)</td>
</tr>
<tr>
<td>Ureteral &amp; Vaginal Fistula</td>
<td>32/100 (L)</td>
<td>42/100 (L)</td>
<td>47/100 (L)</td>
</tr>
<tr>
<td>Uterus</td>
<td>52/100 (L)</td>
<td>42/100 (L)</td>
<td>47/100 (L)</td>
</tr>
<tr>
<td>Cysts</td>
<td>53/100 (L)</td>
<td>42/100 (L)</td>
<td>47/100 (L)</td>
</tr>
<tr>
<td>Hemorrhage</td>
<td>20/100 (L)</td>
<td>10/100 (L)</td>
<td>14/100 (L)</td>
</tr>
<tr>
<td>Rate</td>
<td>38/100 (L)</td>
<td>42/100 (L)</td>
<td>47/100 (L)</td>
</tr>
</tbody>
</table>

**URETERIC Complications in Endometriosis**

- First with Bowel in more advanced procedures
- Up to 70% are unrecognized during surgery
- Endometriosis??

**Ureteral Injuries**

**Mechanism**
- Direct
  - Mechanical
  - Thermal
- Indirect
  - Ischemia
  - Mixed

- 1 ureterovaginal Fistula (thermal injury): Resection & Anastomosis by LPC
- Small vesicovaginal fistula: Foley Catheter
- Bowel perforation: Sigmoid resection & Ileostomy
management
Prevention
Diagnosis Repair

TECHNIQUES: respect the rules

Key Point
Preserve the adventice
Non devascularizate

Specific Strategy: Stenosis
Resection & Anastomosis

Key Points
T inverted incision
≥ 4/0 Monofilament
4 stitches
No tension

Ischemia?
In case of important devascularization after ureterolysis

Double J stent for 6-8 w
Jmentoplasty
Resection??
Neoplantation??

Prevention?

97.4% ureteral injuries are diagnosed using Intraop Cystoscopy
O.A. Ibeanu et al, 2009
**Ureteral Endometriosis**

Post-op care

- Evolution must be Uneventful!
- Easy 2ª look LPC
- Double J Catheter left in place for 6-8 weeks

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**Ureteral Fistula**

- Stable, no infection, low inflammatory respond
  - Conservative management
  - Double J & reevaluation 8 weeks
  - If not: fistule resection, and anastomosis or neoimplantation

---

**Bladder Injuries**

- Bladder injuries can be more frequent than ureteral
- The incidence varies from less than 1% to 2.3% in all procedures
- More frequently identified intra-op
Prevention

• Bladder empty prior surgery
• 2º trocars under direct visualization
• dissection = adequate technique
• Knowledge Electrosurgery

Prevention

• Consider Mucosal Skinning
• Double J if close to the ureteral os
• Respect the trigone
• Suture: reabsorbable (Monocryl), 2-3/0, intracorporeal knotting,
• Safety test: methylene blue

Mucosal Skinning

Partial Cystectomy

Safety tests

Methilen Blue

Post-op Cystoscopy
Bladder Endometriosis

Post-op care

- Bladder catheter left in place for 10 - 14 days
- Radiology control: Cystography
- Double J Catheter retrieval?
  - Immediate or with foley
  - 6-8 weeks if ureteric resection
- In cases of small vesicle fistule: Foley catheter

CONCLUSION

It can happen to you

It Will happen to you!

BE prepared!!

.....never is too late to call for help!

Thank you for your attention!
Objectives

- This lecture examines the indications for and disadvantages associated with laparoscopic myomectomy to enhance fertility.

Effect of fibroids on fertility: all locations

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of studies</th>
<th>Relative risk</th>
<th>95% confidence interval</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical pregnancy rate</td>
<td>18</td>
<td>0.849</td>
<td>0.744-0.943</td>
<td>P = .029</td>
</tr>
<tr>
<td>Implantation rate</td>
<td>14</td>
<td>0.821</td>
<td>0.722-0.932</td>
<td>P &lt; .002</td>
</tr>
<tr>
<td>Ongoing pregnancy/live birth rate</td>
<td>17</td>
<td>0.687</td>
<td>0.589-0.826</td>
<td>P &lt; .001</td>
</tr>
<tr>
<td>Spontaneous abortion rate</td>
<td>18</td>
<td>1.678</td>
<td>1.373-2.051</td>
<td>P &lt; .001</td>
</tr>
<tr>
<td>Preterm delivery rate</td>
<td>3</td>
<td>1.357</td>
<td>0.607-3.036</td>
<td>Not significant</td>
</tr>
</tbody>
</table>

Effect of fibroids on fertility: submucous fibroids

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of studies</th>
<th>Relative risk</th>
<th>95% confidence interval</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical pregnancy rate</td>
<td>4</td>
<td>0.363</td>
<td>0.179-0.737</td>
<td>P &lt; .005</td>
</tr>
<tr>
<td>Implantation rate</td>
<td>2</td>
<td>0.283</td>
<td>0.123-0.649</td>
<td>P &lt; .003</td>
</tr>
<tr>
<td>Ongoing pregnancy/live birth rate</td>
<td>2</td>
<td>0.318</td>
<td>0.119-0.850</td>
<td>P &lt; .001</td>
</tr>
<tr>
<td>Spontaneous abortion rate</td>
<td>2</td>
<td>1.678</td>
<td>1.373-2.051</td>
<td>P &lt; .001</td>
</tr>
<tr>
<td>Preterm delivery rate</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
**Effect of fibroids on fertility: intramural fibroids**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of studies</th>
<th>Relative risk</th>
<th>95% confidence interval</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical pregnancy rate</td>
<td>12</td>
<td>0.810</td>
<td>0.696-0.941</td>
<td>P = .006</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>0.84</td>
<td>0.74-0.95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>0.8</td>
<td>0.6-0.9</td>
<td></td>
</tr>
<tr>
<td>Implantation rate</td>
<td>7</td>
<td>0.684</td>
<td>0.587-0.796</td>
<td>P = .001</td>
</tr>
<tr>
<td>Ongoing pregnancy/live birth rate</td>
<td>8</td>
<td>0.701</td>
<td>0.583-0.848</td>
<td>P = .001</td>
</tr>
<tr>
<td></td>
<td>7 (VF)</td>
<td>0.7</td>
<td>0.5-0.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11 (VF)</td>
<td>0.79</td>
<td>0.70-0.88</td>
<td></td>
</tr>
<tr>
<td>Spontaneous abortion rate</td>
<td>1</td>
<td>1.747</td>
<td>1.226-2.489</td>
<td>P = .002</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>1.34</td>
<td>1.04-1.65</td>
<td>Not significant</td>
</tr>
<tr>
<td></td>
<td>14 (VF)</td>
<td>1.24</td>
<td>0.99-1.57</td>
<td></td>
</tr>
<tr>
<td>Preterm delivery rate</td>
<td>1</td>
<td>6.000</td>
<td>3.09-118.6</td>
<td>Not significant</td>
</tr>
</tbody>
</table>

**Effect of myomectomy on fertility for submucous fibroids compared with leaving fibroids in situ**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number of studies</th>
<th>Relative risk</th>
<th>95% confidence interval</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical pregnancy rate</td>
<td>2</td>
<td>2.034</td>
<td>1.081-3.826</td>
<td>P = .028</td>
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<tr>
<td>Implantation rate</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ongoing pregnancy/live birth rate</td>
<td>1</td>
<td>2.654</td>
<td>0.920-7.658</td>
<td>Not significant</td>
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<tr>
<td>Spontaneous abortion rate</td>
<td>1</td>
<td>0.771</td>
<td>0.359-1.658</td>
<td>Not significant</td>
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<tr>
<td>Preterm delivery rate</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**“Non-Surgical Alternatives to Myomectomy”**

- Uterine artery embolisation
- Unilateral uterine artery embolisation or Embolight
- Selective fibroid embolisation
- MR-guided focused ultrasound
- Fibroid myolysis
- Radiofrequency thermal ablation
Uterine artery embolisation, fibroids and fertility

Indications?
- Previous myomectomy
- Surgery too hazardous, risk of hysterectomy high
- Huge fibroid/s
- Multiple large fibroids

Ovarian Artery Supply
Incomplete fibroid infarction

Case presentation
38yr old. Heavy menorrhagia and pressure symptoms. Just married and fertility wishes. Myomectomy considered but referred for UFE
- Solitary Rt sided fibroid 10x10x8.8cm (440ml)
- Hypervascular. Myomectomy considered. Transmural fibroid. Abdominal myomectomy would open cavity and not insignificant risk for hysterectomy. RtUA >Lt UA

Planned Unilateral Embolisation
- Pain free
- Discharged same day
- No attempt at LT UA cannulation
- Back to normal in 2-3 days

Planned myomectomy

5 months post Rt UAE. 100% fibroid devascularization.
Fibroid 7.3x7.2x8cm (210ml- 50% volume reduction)
Planned myomectomy
Unilateral UAE

**Bratby and Walker** *(CVR 2008;31:254-258)*
- Elective 30 pts, Technical failure 12pts
- 86% symptomatic improvement if planned
- 58% further intervention if unplanned

**Stall et al** *(Georgetown Op-SR 2010)*
- Elective 28 pts, Technical failure 47pts
- 92% complete infarction if planned
- Significantly less pain than bilateral UAE

Consider when unilateral fibroids and/or absent UA on MRA and angio.

Myomectomy vs UFE

**Myomectomy**
- 63 women
  - 40 women trying
  - 33 pregnancies (80%)
  - 19 labours
  - 6 abortions (<20%)

**UFE**
- 58 women
  - 26 women trying
  - 17 pregnancies (65%)
  - 5 labours
  - 9 abortions (50%)

First RCT comparing Myomectomy vs UFE
No difference in obstetric or neonatal factors
Similar clinical outcomes
Faster recovery after UFE.


Pregnancy following UFE

- 400 pts 1996-99, prospective
- 139 desired fertility (52 under 40 yrs)
- 17 pregnancies in 14 women (30%)
- 5 spontaneous abortions (30%)
- 10 normal deliveries, 2 still pregnant
- 4 premature menopause (<45 yrs)
- 2 hysterectomies from complications
- 'Similar' pregnancy rates to myomectomy

Miscarriage after UAE

**Homer et Saridogan** *(Fertil Steril 2010)*
- 227 completed pregnancies identified
- Miscarriage rates higher after UAE (13.2%) vs. fibroid-containing pregnancies matched for age and fibroid location (16.5%)
- C Section more likely after UAE (66% vs. 48.3%)
- PPH more likely (13.9% vs. 2.5%)
- Pre term delivery, IUGR and malpresentation similar in two groups

**Conclusion:**
- Risk of miscarriage, C section and PPH increased in UAE group with no increase risk of IUGR or malpresentation

Laparoscopic UA Ligation vs UAE

**Hald et al, JVIR 2009**
- 58 patients treated following randomization to UAE (26) or bilateral Laparoscopic UA ligation (32)
- Median FU 48 months
- 48% clinical failure after Lap UA occlusion
- 17% clinical failure after UAE (P<0.02)
- Hysterectomy in 2 post UAE and 8 after Lap
- Uterine Volume reduced by 51% post UAE and 33% post Laparoscopy (P=0.001) Complete fibroid infarction in all 26, but only 5/32 post Lap (P=0.001)

**Conclusion:** Recurrence rate lower after UAE with larger volume reduction and more complete devascularization.
REST Trial. Ananthakrishnan et al., CVIR. 36.3 Jun 2013 676-681

- 157 patients randomised to UAE or surgery (Hysterectomy or myomectomy)
- Re-evaluation at 5 years with MRI
- 99 UAE, 8 myomectomy

Fibroid Infarction at 6/12

Complete 35%  Almost complete 29%  Partial 36%
Re-intervention 19%  10%  33%

New fibroid formation: 60% in myomectomy group, 7% in UAE group

Interventions to Reduce Haemorrhage During Myomectomy for Fibroids

- Intra-myometrial vasopressin (2 RCTs)
- Dinoprostone PG E2 (1 RCT)
- Peri-cervical tourniquet (2 RCTs)
- Laparoscopic temporary clip occlusion (1 RCT)
- Bupivacaine plus epinephrine (1 RCT)
- Tranexamic acid (1 RCT)
- Fibrin sealant (Tisseel) (1 RCT)
- Oxytocin. No benefit

The Cochrane Database of Systematic Reviews Jul 8; 2009

Esmya® modulates progesterone effect primarily by targeting fibroids, endometrium and the pituitary

Esmya® acts on the pituitary, inducing amenorrhea by inhibiting ovulation and maintaining mid-follicular phase levels of oestradiol

Esmya® exerts a direct effect on the endometrium and stops uterine bleeding, resulting in benign and reversible changes in the endometrial tissue termed “Progesterone Receptor Modulator Associated Endometrial Changes” (PRAC)

Esmya® acts direct action on fibroids, reducing their size through the inhibition of cell proliferation and induction of apoptosis

PEARL II

TIME TO CONTROL OF BLEEDING

PBAC<75

UPA normalised bleeding faster than GnRHa (7 days vs 30 days)

UPA 5 mg
UPA 10 mg
Placebo 6.75 mg

PEARL I. Time to control of bleeding

UPA controlled bleeding within 7 days

PBAC<75

Bleeding was controlled 7 days from treatment initiation, in 75.3% of UPA 5 mg patients
PEARL II

Effect on fibroid volume reduction

**WEEK 13**

<table>
<thead>
<tr>
<th></th>
<th>Lupron</th>
<th>UPA 5 mg</th>
<th>UPA 10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median % reduction in total fibroid volume (%)</td>
<td>45.1%</td>
<td>43.8%</td>
<td>40.6%</td>
</tr>
</tbody>
</table>

Change from baseline at Week 13 (% of population)

- No significant difference between Griffita and UPA

PEARL II

Efficacy on Myoma Size Reduction

**Median change from screening (%)**

- There was no difference with NETA compared with placebo following UPA treatment

PEARL II

**Safety: treatment related aEs**

<table>
<thead>
<tr>
<th>AEs occurring at ≥5% in any treatment group during treatment</th>
<th>Placebo</th>
<th>NETA</th>
<th>UPA 5 mg</th>
<th>UPA 10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>0.0%</td>
<td>1.0%</td>
<td>2.5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Pain</td>
<td>0.0%</td>
<td>2.5%</td>
<td>4.0%</td>
<td>2.9%</td>
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<tr>
<td>Abdominal pain</td>
<td>0.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Nausea</td>
<td>3.1%</td>
<td>3.9%</td>
<td>4.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Headache</td>
<td>1.0%</td>
<td>1.0%</td>
<td>2.9%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Hot flushes</td>
<td>0.0%</td>
<td>1.0%</td>
<td>3.9%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Myalgia</td>
<td>0.0%</td>
<td>1.0%</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Hypercholesterolaemia</td>
<td>3.1%</td>
<td>0.0%</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>4.1%</td>
<td>3.9%</td>
<td>3.0%</td>
<td>3.0%</td>
</tr>
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<td>3.0%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

* p ≤ 0.05 UPA 5 mg vs Lupron

References

- Kongray EJ, Wuong CN, Shey CJ Interventions to reduce haemorrhage during myomectomy for Fibroids. The Cochrane Database of Systematic Reviews Nov 2011; 11
Complications during laparoscopic pelvic reconstructive surgery

Alan Lam
Associate Professor
Centre for Advanced Reproductive Endosurgery (CARE)
Royal North Shore Hospital
Sydney, Australia

Learning objectives
• Detailed knowledge of pelvic floor anatomy
• Appropriate energy selection for haemostatic dissection
• Careful consideration to minimise the risk of adhesiolysis
• Excellent suturing skills are required for laparoscopic pelvic reconstructive surgery
• Expert teamwork is essential to minimise all intra-operative risks during pelvic reconstructive surgery

Presentation outline
• Surgical management options for pelvic organ prolapse
• Pelvic and vaginal anatomy and pelvic floor support
• Surgical options for POP: vaginal, laparoscopic, abdominal
• Principles and techniques laparoscopic sacrocolpopexy
• Principles and techniques laparoscopic suture pelvic floor repair
• Management and prevention of complications related to POP surgery

Background
• We are practising in a complex medico-legal climate marked by myriad of surgical techniques, rapid technological changes, lack of high-quality evidence, diverse and conflicting opinions, unmet expectations of perfect outcomes from surgical intervention

Surgical options
A myriad of surgical repair techniques

Disclosure
Consultant: American Medical Systems, Johnson & Johnson
The wide variety of surgical treatments available for prolapse indicates the lack of consensus as to the optimal treatment. The use of mesh or graft inlays at the time of anterior vaginal repair reduces the risk of recurrent vaginal prolapse. Abdominal sacral colpopexy was associated with a lower rate of recurrent vault prolapse and dyspareunia than with vaginal sacrospinous colpopexy. No data exist on efficacy or otherwise of polypropylene mesh in the posterior vaginal compartment. Adequately powered RCTs are urgently needed on a variety of issues and particularly need to include women’s perceptions of prolapse symptoms.

Potential complications of POP Surgery

- Anaesthetic problems
- Bleeding
- Injury of the bladder, bowel
- Surgical site infection
- Bladder infections
- Buttock and groin pain
- Nerve injury

How to manage complications during pelvic reconstructive surgery without conversion

- Anatomy
- Energy source
- Suturing skills
- Direction
- Complication Management
- Mesh exposure, erosion, infection, contraction
Essential Anatomy

- Pelvic floor anatomy
- Pelvic viscera
- Surgical spaces
- Endopelvic fascia
- Ureter
- Pelvic sidewall

Perineal body

- the ‘central tendon of the perineum’-
  - convergence of the bulbospongious, superficial and deep transverse perinei, perineal membrane, external anal sphincter, posterior vagina, and insertion of pubococcygeus and pubococcygeus muscles
  - P.B. is attached to the inferior pubic rami and the ischial tuberosities through the perineal membrane and superficial transverse perineal muscles
  - Posteriorly, P.B is indirectly attached to the coccyx by the external anal sphincter

Posterior Triangle

- Ischiorectal fossa lies between the pelvic walls and the levator ani muscles
  - It has an anterior recess that lies above the perineal membrane
  - It is bounded medially by the levator ani, anterolaterally by the obturator internus, and a posterior portion that extends above the gluteus maximus
  - Traversing this region is the pudendal neurovascular trunk

Perineum

- Divided into 2 compartments (superficial and deep) by the perineal membrane
  - The motor and sensory innervation of the perineum is via the pudendal nerve
  - The pudendal nerve originates from S2-S4, exits the pelvis through the greater sciatic foramen, passes on the ischial spine, travels along the medial surface of the obturator internus, through the ischiorectal fossa and Innervates levator ani muscles
  - It divides into 3 branches: ditital, perineal, inferior rectal
  - Blood supply follows the pudendal nerve

Pelvic diaphragm

- Consists of the levator ani and the coccygeus muscles
  - Is stretched hammock-like between the pubis in front, the coccyx behind, and is attached along the lateral pelvic sidewalls to the sacrotuberous ligaments (S.T.L.R.)
  - Pubococcygeus (and puborectalis, originate from the posterior inferior pubic rami and S.T.L.R., form a sling around vagina, rectum and perineal body, and contribute to fecal continence
  - Esoctococcygeus – inserts on the anococcygeal raphe to form the levator plate
  - Coccygeus – originates from ischial spine, overlies the sacrospinous ligament and inserts on the lateral lower sacrum and coccyx
The rectovaginal septum revisited: its relationship to rectocoele and its importance in rectocoele repair.

Richardson C. Obstet Gynecol 1993; 36:976‐983

- Rectovaginal fascia
  - Courses along the posterior vaginal wall
  - Cranially merges with uterosacral ligaments and adheres to the cul-de‐sac peritoneum
  - Laterally merges into the fascial covering of the iliococcygeus and pubococcygeus muscles
  - Distally merges into the perineal body

Prevesical space (space of Retzius)

Sacrospinous ligament

- Sacrospinous ligament lies on the dorsal aspect of coccyx
- The rectal pillars separate it from the rectovaginal space
- In its medial portion, it fuses with the sacrotesine ligament and is only distinct laterally
- Sacral pleura lies immediately next to the SSL on its cephalic border, and comes to lie on its lateral surface as it passes through the greater sciatic foramen
- Pudendal nerve and vessels pass lateral to the SSL at its attachment to the ischial spine
- The nerve to the levator ani lies on the inner surface of the coccygeus in its midportion
- Pelvic venous plexus of the internal iliac veins and the middle rectal vessels may be injured during dissection to access the SSL

Anatomic aspects of vaginal support


- Level I Suspension
  - Upper paracolpium
  - Suspends apex to pelvic walls
  - Prolapse of vaginal apex

- Level II Attachment
  - Lower paracolpium
  - Pubocervical fascia
  - Rectovaginal fascia
  - Supports bladder and vesical neck
  - Prevents anterior expansion of rectum
  - Cystocoele, urethrocoele, rectocoele

- Level III Fusion
  - To perineal membrane, perineal body, levator ani
  - Fixes vagina to adjacent structures
  - Urethrocoele or deficient perineal body

Sacral plexus

- Lies below the bifurcation of the aorta
- Bounded laterally by internal iliac arteries
- Lying directly on the sacrum are the middle sacral artery and vein, which originate from the dorsal aspect of the aorta and vena cava
Pelvic autonomic nervous system

- Structure consists of a single ganglionic midline plexus overlying the aorta (superior hypogastric plexus)
- that splits into 2 trunks (hypogastric nerves)
- each of which connects with a plexus of nerves and ganglia lateral to the pelvic viscera (inferior hypogastric plexus)
- Pelvic ANS is divided into parasympathetic (craniosacral - cholinergic) and sympathetic (thoracolumbar - adrenergic)

Complications during Laparoscopic sacrocolpopexy

- Bowel
- Ureter
- Bladder
- Vessel
- Nerve

Complications during Laparoscopic suture pelvic floor repair

- Ureter
- Rectum
- Bladder

Complications associated with intra-abdominal adhesions

Laparoscopic removal of mid-urethral sling
Complications during Laparoscopic and Robotic Gynecologic Oncology

Shailesh Puntambekar
Galaxy Laparoscopy Institute, Pune, India

I have no financial relationships to disclose.

- To review the pathophysiology of complications
- To learn the various situations where complications often take place
- To be able recognize complications

Oncological surgeries
- Radical hysterectomy
- Radical nerve sparing hysterectomy
- Exenteration procedures - Anterior Posterior Total
- Single port surgeries

OBJECTIVES
Accidents can happen to the best

Good surgical decisions come with experience.........

Experience comes with complications

A good knowledge of anatomy is very important before embarking on advanced laparoscopy

Complications can be attributed to
- Surgeon
- Site
- Stage

Disadvantages of laparoscopy
- Limited View
- Energy sources- Heat transmission
- Team work- Lack in training
- Complications cannot be hidden
Vascular Injuries

Causes:
- Incomplete knowledge of vascular anatomy
- Instrument injury
- Callous attitude

Video of internal iliac A. bleed
Internal iliac V. bleed

Azygous vein tear

Inferior vena cava tear

Lymph node dissection bleed

Secondary Hemorrhage

External iliac bleeding
Urological Injuries

- **Bladder**
  - Immediate
  - Delayed

- **Ureteric**
  - Immediate
  - Delayed

Common causes of bladder injury
- Previous surgical, caesarean section
- Involvement by tumour

Common causes of Ureter Injury
- Post Chemotherapy or post radiation patients
- Adhesions
- Callous use of energy sources

Mechanism of Injury
1. **Directly by Instrumental Trauma**
   - Introduction of trocars
   - Pneumoperitoneum
   - During dissection & adhesiolysis

2. **Indirectly by Vascular Occlusion**
   - Disruption of longitudinal ureteric vessels during dissection
   - Wrong site of bowel resection vis a vis mesenteric vascular ligation
Mechanism of Injury

3. Cautery Injuries
- Direct Burns due to sparking
- Necrosis due to lateral spread
- Capacitance injuries

Diagnosis of Bladder Injuries
Immediate
- Pnumaturia – Bag filled with CO2
- Hematuria
- Visible cystostomy
- Leakage of urine or coloured saline filled into bladder retrograde

Immediate
- Stormy surgery
- Extensive Dissection close to ureter
- Bleeding controlled with excessive current
- Leakage of urine or methylene blue or indigo carmine dye.
- Visible injury

Bowel Injury
• Parking of Bowel
• Traumatic Instruments
• Handling of Distended bowel
• Adhesiolysis
• Inadvertent Devascularisation

Oncological complications

• Entry into tumour
• Missed lesion
• Incomplete resection
• Port site metastases

Robotic related Complications

• Energy sources
• Docking and undocking
• Conversion

Main problem in robotics
• Loss of haptic sensation
• Surgeon away from the patient
• Complications related to the procedure
• Large tumours
• Vascular tumors
• Previous surgeries
• Advanced surgery- Exenteration

Thank you
Knowing your energy sources

Dr Stephen Jeffery
FCOG (SA)
University of Cape Town
South Africa

Disclosures

I have no financial relationships to disclose.

Objectives

To have a safe and practical understanding of energy sources used in laparoscopic surgery

Table 1

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Tissue Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monopolar electrosurgery</td>
<td>VapORIZATION (tissue transaction), fulguration, desiccation, coaptation*</td>
</tr>
<tr>
<td>Conventional bipolar electrosurgery</td>
<td>Desiccation, coaptation</td>
</tr>
<tr>
<td>Advanced bipolar technology¹</td>
<td>Desiccation, coaptation, tissue transaction¹</td>
</tr>
<tr>
<td>Ultrasonic/technology²</td>
<td>Desiccation, coaptation, mechanical tissue transaction</td>
</tr>
</tbody>
</table>

* Vessel sealing achieved with coagulation and compression.
¹ Activation time limited by tissue-respense feedback.
² Transaction with incorporated blade or bipolar energy.
### Mono and bipolar

### Important formulas

- Voltage = current \( \times \) resistance
- Energy = \( \frac{\text{current}}{\text{cross-sectional area}} \) \( \times \) resistance \( \times \) time

### Tissue effects

- Thermal energy causes the cytoplasm temperature to rise
- \(<45^\circ C\) - reversible
- \(>45^\circ C\) - proteins denatured
- \(>90^\circ C\) - liquid evaporates causing dessication
- \(>200^\circ C\) - carbonisation
Coag mode

- Intermittent flow of energy
- Lower temperatures
- Forms a coagulum

Cut mode

- Continuous application of current
- High tissue temperatures
- Short time
- Rapid expansion of intracellular components
- Explosive vaporisation

Other factors

- Size, geometry and surface of electrode
- Time of application

Tissue effects

1. Cutting
   - Continuous mode
   - Electrode held away from tissue
   - Temperatures above 100° C

2. Fulguration
   - Coag mode
   - Electrode held away and wave of sparks formed
   - Lower heat and creates a coagulum
   - Coagulates and chars tissue over a larger surface area
3. Dessication

- Electrode in direct contact with the tissue
- This reduces current concentration and less heat production
- Drying out of tissue and coagulum forming

Advances in Monopolar

- Argon beam to blow away the blood

Advances in Bipolar

- Feedback for more than 7mm

Complications of Monopolar

- 1. Direct inadvertent application

Complications of Monopolar

- 2. Insulation failure
Complications of Monopolar

- 3. Capacitative coupling
- 4. Direct coupling
- 5. Offsite burns

Advantages Disadvantages

<table>
<thead>
<tr>
<th>Monopolar</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ideal for cutting eg Vault and endometriosis</td>
<td>More collateral damage</td>
</tr>
<tr>
<td>Bipolar</td>
<td>Safer with regards to collateral damage</td>
<td>Cannot cut or fulgurate</td>
</tr>
</tbody>
</table>

Vessel sealing technologies

- Bipolar electrosurgery with a tissue response generator
- Combines with a mechanical pressure to seal vessels and create a seal
- Seal vessels of up to 7mm
- Withstand more than 3x SBP

Advanced bipolar

- Ligasure
- Enseal
Ultrasonic energy

- Vibrates at 55,000 per second
- All mechanical – no heat generation
- Combination of low heat and vibration denatures proteins
- Coagulum seals vessels of up to 5mm
- Tension free application
- Minimal bleeding and lateral thermal spread
- Disadvantage = aerosolised droplets impair vision

Harmonic Ace

Sonicision

Bipolar and Ultrasonic Energy

Table 3. Comparison of energy modalities

<table>
<thead>
<tr>
<th>Monopolar</th>
<th>Tractional bipolar</th>
<th>Advanced bipolar</th>
<th>Ultrasonic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tissue effect</td>
<td>Cutting, coagulation</td>
<td>Cutting, coagulation</td>
<td>Cutting, coagulation</td>
</tr>
<tr>
<td>Power setting</td>
<td>20-50W</td>
<td>40-60W</td>
<td>40-60W</td>
</tr>
<tr>
<td>Transected</td>
<td>50-100mm</td>
<td>50-100mm</td>
<td>50-100mm</td>
</tr>
<tr>
<td>Maximum temperature</td>
<td>100°C</td>
<td>&gt;100°C</td>
<td>&gt;100°C</td>
</tr>
<tr>
<td>Vessel sealing ability</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Technique</td>
<td>0-1mm</td>
<td>0-1mm</td>
<td>1-4mm</td>
</tr>
<tr>
<td>Disadvantage</td>
<td>Aerosolised droplets impair vision</td>
<td>Aerosolised droplets impair vision</td>
<td>Aerosolised droplets impair vision</td>
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</tbody>
</table>
What about laser?

- Significant decline in use
- High cost of equipment and maintenance
- Slower than other modern energy sources
- Better cutting, less thermal damage, better large vessel haemostasis
- Change in surgical technique eg endometriosis excision rather than ablation

New devices

Argon Beam Coagulator

- Elaborate monopolar current
- Argon gas removes debris, eschar and debris enabling unipolar current to work on the bleeding vessel
- Dangers – reflection and argon embolisation

Plasmajet

- Argon neutral plasma energy
- Good alternative to monopolar
- Electrically neutral
  - No ground plate
  - No capacitative coupling
  - No alternate site burns

Plasmajet

- Uses ionised gas
- Effective for
  - Coagulation (distance)
  - Ablation (Closer)
  - Cutting (close)
- May be better preservation of ovarian tissue at removal of endometrioma
Helica thermal coagulator (Helica Instruments, Ltd., Broxburn, Lothian, UK) and Bovie J-plasma (Bovie Medical Corp., Melville, NY) combine low pressure helium gas with low voltage current (4-6 kW). Over 14000 probes have been used in the UK. Good for superficial endometriosis. No carbonisation or smoke. Highly selective tissue coagulation and haemostasis. No risk of tissue injury or burn since the energy level is much lower than conventional diathermy.

Arthrocare coblation device

Peak plasma blade

Selecting your instrument

TLH

- Bipolar and monopolar useful
- Harmonic not good for large uterine vessels or vault
- Advanced bipolar eg Ligasure or Enseal good options

Myomectomy

- Monopolar for peritoneum
- Haemostasis with monopolar
Sacrompopexy

- Ultrasonic good for adhesiolysis and peritoneum
- Use cold scissors for bladder dissection

Conclusion

- Be familiar with risks associated with mono and bipolar energy sources
- Newer generation useful but also associated with complications
- All energy sources can cause injuries
Prevention and management of laparoscopic complication

Dr. Shailesh Puntambekar
Galaxy Laparoscopy Institute, Pune, India

I have no financial relationships to disclose.

OBJECTIVES

• To learn how to recognize complications
• To discuss prevention of laparoscopic complications
• To discuss management of complications

Complication is an event that is largely unpredictable

“Prevention of complication” therefore has very precise limits

Prevention

• Knowledge of anatomy
• Technical abilities of the team
• Proper instrumentation
• Knowing that a number of complications exists

Intraoperative solutions.....

• Correct diagnosis of the complication
• Better results with immediate repair
• Knowledge of the limits of laparoscopic surgery
• Maximum coordination of the surgical team
Organ damage

Immediate
- Bowel
- Bladder
- Ureter

Delayed
- Fistula
  - Vesicovaginal
  - Ureterovaginal
  - Rectovaginal
  - Gastrointestinal

Causes
- Port entry
- Instrument injuries
- Thermal injuries

Injury to viscus

- Stomach
  - Hyperventilation by mask
  - Distended stomach
  - Injury with trocar or needle

Prevention
- Ryles tube insertion

Management
- Laparoscopic –
  2 layer suturing or a figure of 8 suture in the seromuscular layer surround the defect.
  Nasogastric tube drainage

Bowel injury

Classification
- Type I
  Damage by veress or trocar to normally located bowel
- Type II
  Damage by veress or trocar to bowel adherent to abdominal wall.
Bowel injury

- Often during insertion of umbilical or lower quadrant trocars
- While retracting bowel away from surgical site
- Thermal injury

Prevention of bowel injury

- History to rule out previous adhesions
- Bowel preparation
- Spinal anesthesia
- Vesi port insertion through palmer point
- Anterior abdominal wall adhesions to be released before port insertions

Microlaparoscopy (Scout laparoscope)

1.3-2 mm minilaproscope introduced at palmer point.
Bowel Injury

**Diagnosis:**
- Directly under vision
- Foul smelling gas through port
- Consider if adhesions are found through umbilical port

**Management**
- Veress needle penetration with no tearing-
  - Conservative approach with antibiotic and observation
- Trocar penetration
  - Keep trocar in place to mark the site of injury
  - Laparoscopy/ laparotomy suturing.

**Management**
- Laparoscopically it may be sutured
- Laparoscopic stapler
- Withdrawn through 10 mm trocar tract & repaired
- Mini laparotomy
- Colostomy

Bladder injury

- Trocar injury
- While dissecting adherent bladder
- Extensive surgery
- Distorted anatomy

**Prevention of bladder injury**
- Anticipates injury in difficult cases
- Bladder catheterisation
- Dissecting principle “fat belongs to bladder”
- Sharp dissection
- Less energy source near bladder
- Lateral dissection in case of central adhesion
- Intraoperative diagnosis (Bladder dye test)
Management

Diagnosis
1. Presence of urine in field
2. Appearance of gas and blood in foley’s catheter bag
3. Bladder rent or foley’s bulb seen

Management
• Primary laparoscopic repair
• Needle injury: conservative
• Only serosa: simple running 3-0 vicryl suture
• All layer: two layer using absorbable suture in running fashion

Continue.....
• **Trigone area**: interrupted suture.
  Bilateral DJ stent
• Water tight seal repair confirmed by dye test
• Place an indwelling catheter for 7-10 days

Ureteric injury

Common sites
1. Infundibulopelvic ligament ureter crosses under uterine artery
2. Tunnel of Wertheim
3. Intramural portion of ureter
4. Lateral pelvic sidewall above uterosacral ligament
Risk Factors for Ureteral Injury

- Most cases do NOT have an identifiable risk factor
- Disruption of normal anatomy
  - Endometriosis, ovarian masses, Inflammation (Diverticulitis, PID)
- Pelvic malignancy present in 44% of cases
  - Previous pelvic surgery
  - Pelvic radiation

Management

- Depends on cause, location, and extent
  - Minor trauma (ligature or crush) may be managed with stent and drainage for 6 weeks
  - Partial transection corrected with suture repair or resection.

Ureteric injury repair

- Best success – intra operative repair
- Tension free repair
- Water tight repair
- Absorbable suture material (PDS, vicryl 3-0)
- Avoid devascularisation
- Spatulation of anastomatic ends
- Stenting
- Retroperitoneal drain

Ureteric injury

- Upper and mid ureter:
  - uncomplicated: ureteroureterostomy
  - complicated: transureteroureterostomy, ureteroenteroneocystotomy

- Lower third
  - Primary ureteroureterostomy (ligation)
  - Bladder tube flap (Boari flap)
  - Transureteroureterostomy (extensive urinoma or pelvic infection)
  - Procedure of choice: Psoas Hitch
Vascular injury

Prevention

- Note anatomical landmarks
- Position of the patient
- Adequate pneumoperitoneum
- Depth of insertion of trocar or veress
- Lateral deviation of varess or trocar
- Excessive force
- Blunt trocar
- Failure to maintain perpendicular entry with second ports
- Obesity/ Thin patient

Position of the patient

- Primary port should be put in supine position
- Aortic bifurcation is more caudal to the umbilicus
- Angle of insertion is smaller than in supine position.
Pneumoperitonium

- Port entry pressure - 20 mm of Hg

- Pressure should be reduced to 12-15 mm of Hg once trocars have been inserted.

Surface anatomy

- Location of superficial inferior epigastric artery, circumflex ext iliac artery, deep inferior epigastric artery
- Iliac crest - Landmark for L4- Aortic bifurcation lie within 1.25 cm of L4 in 80% population.

- Open technique: Reduces risk of vascular injury during insertion of the primary trocar.
- Identify anterior abdominal wall vessels
- Inserted under direct vision
- Inserted at 90 degrees to the skin
- If vascular trauma occurs - trocar should be left in place as a marker
• Balloon tamponade
• Ligation by Port suture needle
• Bipolar coagulation

• No pulling
• Prolene 6-0
• Single layer
• Interrupted suture
• Adventitia should be stripped off
• Do not hold lumen wall from inside
• Entry of needle 90 degree to vessel wall

• Co2 peritoneum may tamponade a large vessel injury
• When pressure normalizes it starts bleeding

Management
• Examine the course of large vessels
• Overlying peritoneum is opened with laparoscopic scissors.
• Hematoma evacuated by alternate suction and irrigation
• Laprotomy is required if hematoma is expanding or persistent bleeding

DIATHERMY RELATED INJURIES
• Inadvertent activation of the diathermy pedal.
• Faulty insulation: Direct coupling Capacitative coupling
• Cautery should be used under vision.

Port site herniation
• Port closure
• Avoid increase of intra-abdominal pressure
The eyes see what the mind knows...
Learn to foresee

Check for urinary bladder and rectal injury at the end of each surgery

A problem recognized is a problem half solved

Tips to manage complications:
- Don’t Panic
- Keep the left hand free in case of vascular injuries
- self confidence
- Conversion to open surgery is not a defeat.

Last but not the least
Always make a good start so that it ends well
Prepare and prevent rather than repair and repent

Anticipate Problem in
- Previous Surgery
- Obese patient
- Inflammatory case
- Large tumor
- Positive medical history
- Good surgical knowledge
- Good surgical plan – but always keep an open trolley ready
- Good team
- Good instrumentation
- Good back up

Never make a decision when:
- Hungry
- Angry
- Lonely
- Tired

Lessons learnt:
- Conversion to open surgery is not a defeat but victory over complications
- Egoistic approach should be condemned
  "Open many once than open one many"
- Technology however advanced has limitations
- Law of averages

Defeat is not when you fall down.... but when you refuse to get up

So get up every time you have a fall !!

THANK YOU!

It's a GALAXY Presentation!
Laparoscopic Pelvic Anatomy
The Necessary Weapon

Sven Becker, MD, PhD
University Women’s Hospital

Objectives
- To appreciate the key steps of anatomically correct dissection
- To use anatomic knowledge to resolve difficult surgical situations
- To avoid conversion in challenging patients

I. Anatomy of the Pelvis
II. Anatomy of the Pelvic Sidewall
III. Anatomy of the Abdominal Retroperitoneum

I. Anatomy of the pelvis
  ➤ Pelvic spaces
  ➤ External and Internal Iliac Vessels
  ➤ Ureters
  ➤ Uterine arteries
  ➤ Bladder, Rectum
  ➤ Sacrouterine ligaments
Medial Approach to the Ureter

The Pararectal Space

The Paravesical Space

The Uterine Artery

The Ureter in the Pelvis

Ureter, Bladder, Vagina, Uterine Artery
II. Anatomy of the Pelvic Sidewall

- The Psoas Space
- Finding the Ureter
III. Anatomy of the abdominal retroperitoneum

- Ureters
- Ovarian vessels
- Inferior mesenteric artery
- Aorta, Vena cava inferior
- Duodenum
- Left renal vein
Review
• Atlas of Gynecologic Surgery, Thieme Editing House, Germany 2009

• Anatomie-Atlas, Sobotta, 1998
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.