Laparoscopic and Robotic Complications, Prevention, Recognition and Management (Didactic)

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Laparoscopic and Robotic Complications, Prevention, Recognition and Management (Didactic)

Resad P. Pasic, Chair
Faculty: Jennifer H. Ford, Ceana H. Nezhat, Silvana Perretta, Shailesh P. Puntambekar

Course Description
This course provides an overview of prevention, recognition and management of laparoscopic and robotic complications. The emphasis will be placed on entry techniques, vascular, bowel, genitourinary and neurologic complications prevention and management. The faculty has been selected for their breadth of experience and will present practical tips how to avoid, recognize and manage complications during laparoscopic and robotic surgery.

Learning Objectives
At the conclusion of this course, the participant will be able to: 1) Evaluate the current methods to prevent, recognize, and manage complications of abdominal entry; 2) use the learning process to understand the principles, advantages, limitations, and complications of bowel injury during laparoscopic and robotic surgery; 3) demonstrate an understanding of the descriptive and functional anatomy of pelvic sidewall and ureteral injury; 4) recognize factors contributing to vascular injuries during laparoscopic and robotic surgery; and 5) demonstrate understanding of neurological complications during laparoscopic surgery.

Course Outline

1:30 Welcome, Introductions and Course Overview
R.P. Pasic

1:35 Safe Surgery Saves Lives – The Checklist
J.H. Ford

2:15 Twenty-Five Years of Performing Laparoscopic Surgery with Residents – Prevention, Recognition and Management of Laparoscopic Complications
R.P. Pasic

2:55 Pelvic Sidewall and Prevention, Recognition and Management of Ureteral Injuries
S.P. Puntambekar

3:35 Questions & Answers
All Faculty

3:45 Break

4:00 Recognition and Management of Bowel Complications
S. Perretta

4:40 Prevention, Recognition and Management of Vascular Complication during Laparoscopic and Robotic Surgery
C.H. Nezhat
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<td>Questions &amp; Answers</td>
<td>All Faculty</td>
</tr>
<tr>
<td>5:30</td>
<td>Course Evaluation</td>
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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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Surgical Public Health: Safe Surgery Saves Lives - The Checklist

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University of Louisville School of Medicine

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DISCLOSURES

I have no financial relationships to disclose.

OBJECTIVES

Upon completion of this presentation, participants will be able:
To think “outside of the box” about low-cost ways to improve safety in the operating room
To develop ways to effectively communicate in the operating room in order to improve patient safety
To utilize an efficient and simple approach to patient safety in complex and technologically advanced surgeries

Why do we fail?

1970’s - philosophers, Samuel Gorovitz and Alasdair MacIntyre looked at this question

“Necessary fallibility” - some things we want to do but are simply beyond our capacity
Others are within our reach – ignorance vs. ineptitude

Ignorance vs. Ineptitude

Over past several decades in medicine, the balance of ignorance and ineptitude has shifted

Now the problem we face is making sure we apply the knowledge we have in a consistent and correct fashion

How do we overcome failure?

Avoidable failures are common and persistent among many fields

Over 6,000 drugs and 4,000 medical and surgical procedures, each with different risks, requirements and considerations

The volume and complexity of what we know has exceeded our ability to deliver its benefits correctly, safely and reliably

We need a different strategy……Is it a Checklist?
The Checklist

Boeing Corporation’s Aluminum-Alloy Model 299

What caused the failure?
Should they require more training for the pilots?
Was the plane just too advanced?

They created a pilot’s checklist – the pilots went on to fly the Model 299 a total of 1.8 million miles without one accident.

The Checklist

Simple, brief and to the point – all on an index card
Complex environment, experts are often up against two difficulties –
- faulty memory and distraction
- lulling ourselves into skipping steps because they’ve never been an issue before

Checklist provided protection against such failures by removing the mundane/routine matters so the focus could be on the complex issues.

The Checklist

In 2001, a critical care specialist at John Hopkins Hospital, Peter Pronovost, decided to give a doctor checklist a try.
He decided to tackle central line infections.

It was simple:
- Wash hands with soap
- Clean patient’s skin with chlorhexidine
- Put sterile drapes over the entire patient
- Wear a mask, hat, sterile gown and gloves
- Put a sterile dressing over the insertion site once the line is in

After one year, the 10-day line infection rate went from

11% to ZERO

So they followed for 15 more months – only 2 line infections occurred during the entire period.
They calculated that, in this one hospital, the checklist had prevented 43 infections, 8 deaths and saved 2 million dollars in costs.
The Checklist

December 2006 - the Keystone Initiative published its findings in *New England Journal of Medicine*

Within the first three months –
- central line infection rate was down by 66%
- most ICU’s cut their infection rate to ZERO
In the first 18 months –
- hospitals saved an estimated $175 million over 1500 lives

In the first 18 months –
- hospitals saved an estimated $175 million over 1500 lives

Late 2006, Dr. Gawande contacted by the WHO

Officials concerned that volume of surgery was increasing worldwide
Significant portion of the care was so unsafe as to be a public danger
2007 – Geneva meeting to review health system reports and data from the organization’s 193 member countries

3 central problems in surgical safety
1. Unrecognized as a public health issue
2. Lack of data on surgery and outcomes
3. Failure to use existing safety know-how

Problem 1:
Unrecognized as a public health issue

- Known surgical complications of 3-16%
- Known death rates of 0.4-0.8%

At least 7 million disabling complications – including 1 million deaths – worldwide each year

Problem 1:
Unrecognized as a public health issue (cont.)

- Burden of surgical disease is increasing worldwide
  - Cardiovascular disease
  - Traumatic injuries
  - Cancer
  - Longer life expectancies
Problem 2: Lack of data on surgery and outcomes

- Improvements in maternal mortality depended on routine surveillance
- Such surveillance is lacking for surgical care
- Four big killers in surgery - wherever it is done in the world: infection, bleeding, unsafe anesthesia and “the unexpected”

Problem 3: Failure to use existing safety know-how

- High rates of preventable surgical site infection result from inconsistent timing of antibiotic prophylaxis
- Anesthetic complications are 100-1000x higher in countries that do not adhere to monitoring standards
- Wrong-patient, wrong-site operations persist despite high publicity of such events

The Safe Surgery Saves Lives

Strategy

1. Promotion of surgical safety as a public health issue
2. Creation of a checklist to improve the standards of surgical safety
3. Collection of “Surgical Vital Statistics”

WHO’s 10 objectives for Safe Surgery

1. The team will operate on the correct patient at the correct site.
2. The team will use methods known to prevent harm from administration of anesthetics, while protecting the patient from pain.
3. The team will recognize and effectively prepare for life-threatening loss of airway or respiratory function.
4. The team will recognize and effectively prepare for risk of high blood loss.
5. The team will avoid inducing an allergic or adverse drug reaction for which the patient is known to be at significant risk.

WHO’s 10 objectives for Safe Surgery (cont.)

6. The team will consistently use methods known to minimize the risk for surgical site infection.
7. The team will prevent inadvertent retention of instruments or sponges in surgical wounds.
8. The team will secure and accurately identify all surgical specimens.
9. The team will effectively communicate and exchange critical information for the safe conduct of the operation.
10. Hospitals and public health systems will establish routine surveillance of surgical capacity, volume and results.

Reality Check

Currently, hospitals do MOST of the right things, on MOST patients, MOST of the time.

The Checklist helps us do ALL the right things, on ALL patients, ALL the time.
Advantages of using a Checklist

- Customizable to local setting and needs
- Supported by evidence
- Evaluated in diverse settings around the world
- Promotes adherence to established safety practices
- Minimal resources required to implement a far-reaching safety intervention

What is this tool that addresses the 10 objectives?

The Checklist was piloted in 8 cities...

- New Delhi, India
- Ifakara, Tanzania
- Toronto, Canada
- London, UK
- Amman, Jordan
- Manila, Philippines
- Seattle, USA
- Auckland, NZ
The Checklist

Gave all the hospitals YouTube videos:

www.youtube.com/watch?v=DOGJMOMHDJk
www.youtube.com/watch?v=CIFhLUI8H0

...the checklist was found to reduce the rate of postoperative complications and death by more than one-third!


Results: All sites

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Checklist</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>3733</td>
<td>3955</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>1.5%</td>
<td>0.8%</td>
<td>0.003</td>
</tr>
<tr>
<td>Any Complication</td>
<td>11.0%</td>
<td>7.0%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SSI</td>
<td>6.2%</td>
<td>3.4%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Unplanned Reoperation</td>
<td>2.4%</td>
<td>1.8%</td>
<td>0.047</td>
</tr>
</tbody>
</table>


Change in Death and Complications by Income Classification

<table>
<thead>
<tr>
<th></th>
<th>Change in Complications</th>
<th>Change in Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Income</td>
<td>10.3% -&gt; 7.1%*</td>
<td>0.9% -&gt; 0.6%*</td>
</tr>
<tr>
<td>Low and Middle Income</td>
<td>11.7% -&gt; 6.8%*</td>
<td>2.1% -&gt; 1.0%*</td>
</tr>
</tbody>
</table>

*p<0.05


What problems does this Checklist address?

Before induction of anaesthesia:

- Correct patient, operation and operative site
  - There are between 1500 and 2500 wrong site surgery incidents every year in the US.¹
  - In a survey of 1050 hand surgeons, 21% reported having performed wrong-site surgery at least once in their career.²

- Confirm the patient’s name, procedure, and where the insertion will be made.

Before skin incision:

- Confirm the name of the procedure

Before patient leaves operating room:

- Get verbal confirmation.

Change in Death and Complications by Income Classification

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*p<0.05

What problems does this Checklist address? (cont.)

Safe Anesthesia and Resuscitation

- An analysis of 1256 incidents involving general anesthesia in Australia showed that pulse oximetry on its own would have detected 82% of them.³

Before induction of anaesthesia:

- Is the anesthesia machine and medication stock complete?
- Yes

- Is the pulse oximeter on the patient and functioning?
- Yes

Before skin incision:

- Are there any patient-specific concerns?

¹ Seiden, Archives of Surgery, 2006
² Joint Commission, Sentinel Event Statistics, 2006
³ Webb, Anesthesia and Intensive Care, 1995
What problems does this Checklist address? (cont.)

Minimize risk of infection

Before skin incision:

- Has antibiotic prophylaxis been given within the last 60 minutes?
  - Yes
  - No
  - Not applicable


Effective teamwork

Before skin incision:

- Communication is a root cause of nearly 70% of the events reported to the Joint Commission from 1995-2005.¹
- A preoperative team briefing was associated with enhanced prophylactic antibiotic choice and timing, and appropriate maintenance of intraoperative temperature and glycemia.² ³

Before patient leaves operating room:

- To Surgeon, Anesthesiologist and Nurse:
  - Who are the key contacts for recovery and management of the patient?


---

Easy Math

234 million people are operated on each year, and >1 million of these individuals die from complications

+ At least ½ are avoidable with the Checklist

500,000 lives on the line each year

---

The Checklist

Is it just as easy as ticking the boxes?

No. We have to embrace a culture of teamwork and discipline. And if we recognize the opportunity, the two-minute WHO checklist is just a start.

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Safe Surgery Saves Lives

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Plane Crashes Into Hudson River

Resources and information

www.who.int/safesurgery
www.safesurg.org


Questions/Comments?

http://en.wikipedia.org/wiki/Ignaz_Semmelweis
Twenty-Five Years of Performing Laparoscopic Surgery with Residents – Prevention, Recognition and Management of Laparoscopic Complications

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University of Louisville
School of Medicine
Louisville, Kentucky

DISCLOSURE
Consultant: Ethicon Endo-Surgery, CooperSurgical, Karl Storz
Endoscopy-America

Learning Objectives

- Review of endoscopic entry techniques and risks associated with laparoscopic entry
- To present the risk and management of vascular complications
- To review the risk and management of bowel injuries
- To present the risk and management of genitourinary injuries.

Chapron C at al.: 2001

- Multicenter study, 7 centers in France, 9Y
- 29,966 patients
- Mortality: 3,33/100 000
- Overall complication rate: 4,64/100
- Risk is directly proportional to the complexity of the procedure (p=0,0001)

Surgeons experience has 3 consequences

- Statistically significant decrease in bowel injuries (p=0,0003)
- Statistically significant decrease in serious complications that require laparotomy during standard laparoscopic operations (p=0,01)
- Statistically significant increase in laparoscopic treatment of complications (p=0,0001)

Chapron C at al.: 2001

- 1 out of 3 complications (34,1%) happened in the early stage of surgery (trocar entry)
- 1 of 4 complications (28,6%) not recognized at the time of surgery

Chapron C at al.:
What it takes to become an expert?

Standards from Airline industry
5,000 hours

Risk Factors for Laparoscopic Complications

- Previous abdominal surgery
- Difficulty or complexity of laparoscopic procedure
- Low / High BMI

LAPAROSCOPIC COMPLICATIONS

- Positional
- Equipment
- Insufflation
- Electrical energy
- Trocar placement
- Vascular injury
- Bowel injury
- Genitourinary
- Wound hernia

Positional Complications

- Brachial plexus - arm extension > 90°
- Peroneal nerve - lateral pressure
- Femoral & Sciatic nerve - compression
- Shoulder brace
- Return electrode positioning
- Foley catheter

Time Line for Complications

- Immediate postoperative / first 24 hours
  - Vessel/vascular injury
    - Vital signs H&M
- 48-72 hours postoperative
  - Ureteral injury
    - Creatinine IVP
- Days to weeks
  - Bowel injury
    - Clinical signs
Patients should get better every day

Always Check the Equipment Before Each Surgery!

ELECTRICAL INJURY

Always keep the tips of your instruments in the center of the screen, while applying energy!!

Never use two different power sources in the abdomen at the same time!

Insufflation Failures

- Obese patients
- Thin Patients
- Patients with abdominal scars
- Patients with failed insufflation

Alternative Insufflation Techniques

- Transumbilical
- Direct
- Open laparoscopy (Hasson)
- Transuterine insufflations
- Subcostal insufflations (Palmer's point)
Choose the right Insufflation technique

Vascular Injury

- Abdominal wall bleeding
  - Inferior epigastric artery
- Intra peritoneal vessel injury
  - Mesentery, ovarian, uterine artery
- Retro peritoneal major vessel injury
  - Iliac, vena cava, aorta

Secondary trocar placement always under direct vision!
Retro peritoneal vessel injury

- Early recognition is the key to survival
- Direct compression on aorta
- IV fluids
- Do not open the peritoneum over a hematoma!
- Call a vascular or trauma surgeon !!!
**BOWEL INJURY**

- Not from Veress needle
- Injury may not be apparent for 4-5 days
- Any symptoms of peritonitis (sharp abdominal pain, vomiting) must be considered as bowel injury unless proven otherwise!!!
- Use bowel prep

---

**Small bowel injury**

- Bands
- Leukocytes
- C - Reactive Protein > 100 MG/L
- No antibiotics
- Surgery!

---

**Brosens et al.**

- Minor operative laparoscopy associated with 0.08% risk of bowel injury
- Major operative laparoscopy associated with 0.33%
- Injuries decrease significantly with experience
- Delayed diagnosis remains major problem; up to 15% of injuries not diagnosed during laparoscopy; one in five cases of delayed diagnosis results in death

Genitourinary complications

- Bladder ................ Indigo carmine
- If <1cm consider Foley catheter for 7-10 days
- If >1cm laparoscopic 2 layer closure + Foley
- Cystoscope

- Ureter ............... Trace from pelvic brim
- Small non electrical injury - primary repair over stent
Genito urinary tract Injury Evaluation

- Cysto, Ureteral stents
- Indigo carmine vs. Methilene blue
- Creatinine
- IVP

Bladder injury

Incisional hernia
Incision Hernia

Basic Laparoscopic Contraindications

**ABSOLUTE**
- Conditions which mitigate against creation of pneumoperitoneum
- Cardiovascular
- Pulmonary

**RELATIVE**
- Training and experience
- Availability of necessary instrumentation
- Diffuse peritonitis
- Shock or impending shock
- Obesity

"COMPLICATIONS AND LITIGATION IN GYNECOLOGIC ENDOSCOPY"

- "Most medical malpractice lawsuits that involve gynecologic endoscopy and laparoscopy result from either improper prevention, inadequate recognition, or delayed intervention."


References

Pelvic Sidewall and Prevention, Recognition and Management of Ureteral Injuries

Shailesh Puntambekar,
Consultant cancer surgeon and Robotic surgeon,
Galaxy Care Laparoscopy Institute, Pune, India

Disclosures

• I have no financial relationships to disclose.

Objectives

• Review important surgical principles to follow during pelvic surgery.
• Review ureteric anatomy for prevention of ureteric injuries during pelvic surgery.
• Discuss timely diagnosis and management of ureteric injuries.

Complications are not always natural. Some of them are due to less belief in the forces of nature and most due to over enthusiastic practice of the art.

--- Munro Kerr
Introduction

Many go unnoticed. Cause immediate and late complications and are of great medicolegal importance. Ureteric injuries are a cause of great morbidity and mortality in laparoscopic surgery.

Disadvantages of laparoscopy

- Instrument dependent
- Limited View
- Energy sources - Heat transmission
- Team work - Requires trained team members
- Complications cannot be hidden

Vascular injuries

- Arterial
- Venous

Causes:

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

Video

Internal iliac A. bleed

How to tackle Arterial Bleed

- When spurting - best time to catch
- Keep left hand free
- Application of clips on major vessels
- Additional port for suction if required
Internal iliac V. bleed

How to tackle Venous bleed
• Compression – best and most useful
• Bipolar to be used
• Placement of Abgel

Lymph node dissection bleed

Secondary Hemorrhage

Ureteric Injuries
• **Rt. Side:** During reflection of ascending Colon during Rt Hemicolecotomy
• **Lt. Side:** During reflection oh Descending Colon and Sigmoid
• Hysterectomy
Injuries to Ureter

- Avascular
- Thermal
- Surgical

Ureteric injuries

Divided in-
- Upper third
- Middle third
- Lower third

Injuries to upper third portion

- Relatively rare

Injuries to middle third portion

- More common
- Double-J stenting
- Ureteroneocystostomy
- If significant loss of length- uretero-ureteric anastomosis

Injuries to lower third portion

- Common with bulky tumors, endometriotic adhesions
- Minor injury-Double-J stenting
- Major injury/vascular necrosis- ureteric implantation

Mechanism of Injury

**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

**Cautery Injuries**
- Direct Burns due to sparking
- Necrosis due to lateral spread
- Capacitance injuries
- Preternatural Combustion

Clinical diagnosis

- Delayed per-vaginal leak
- Hydronephrosis

Complications

**Ureteric Injuries**
- Intraperitoneal & Extraperitoneal leaks
- Fistulae
- Peritonitis
- Septicemic Shock

Treatment

Recognition of injury and the extent of injury
- Serosal tears : intracorporeal suturing 'Ryle's tube aspiration
- Cystotomy : intracorporeal suturing and bladder drainage
- When in doubt convert to open procedure
- Err on the side of safety

Prevention

- Bowel Preparation
- Role of regional anaesthesia
- Ureteral Highlighting by stents etc
- Good anatomical knowledge
- Good technique
How do we avoid them?

- Careful use of instruments
- Sharp dissection near the ureters and bowel
- Dissect the ureters
- Stent the ureters

Anatomical facts

- Ureter carries its own blood supply along the course
- Ureteric tunnel is the most susceptible portion of the ureter for injuries
- Endometriotic adhesions disrupt the ureteric anatomy and hence make it susceptible
- Ureter will always be lateral to hypogastric nerves and uterosacral ligaments
- During bladder dissection- ureter will always be below the uterine vessels

Steps to reduce ureteric injuries

- Preserve the mesentery of the ureter
- Avoid using energy while dissecting in ureteric tunnel
- Remain medial to nerves and uterosacral ligaments
- Endometriosis- always dissect the ureters first and know their course
- During bladder dissection-remain above the uterine vessels

A problem recognized is a problem half solved

- Do not Panic
- Keep the left hand free in case of vascular injuries
- self confidence
- Conversion to open surgery is not a defeat.

The eyes see what the mind knows...
Learn to foresee
When in doubt-
Stent the ureters

While managing complications:
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
- Endometriosis/previous CT/RT
- Positive medical history

Conclusion
- There is no substitute for good surgical technique.
- It is said that the "nut behind the wheel" is the most important part of a car.
- No technology can ever be better than the surgeon using it

Prepare and prevent
- Good surgical knowledge
- Good surgical plan – always keep an open instrument trolley ready
- Good team
- Good instrumentation
- Back up plan

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!!
References

Recognition and Management of Bowel Complications

Silvana Perretta, MD

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UNIVERSITY of STRASBOURG, France

Disclosure

I have no financial relationships to disclose.

Complications of Laparoscopic Surgery

Bowel Injuries

Complications during Laparoscopic surgery: Bowel injuries

BOWEL INJURIES
0.2%

SMALL BOWEL: 60%
COLON: 40%

AETIOLOGY

1. Previous surgery or Advanced procedures: 70%
2. Veress needle and TROCARTS: 25%
3. OTHER TYPES OF LESION: 5%
   1. THERMAL (monopolar, ultrasound, Ligasure, laser)
   2. MECANICAL (retractors, manipulation,...)
   3. LATE (NECROSIS?)
Complications during Laparoscopic surgery: Bowel injuries

DIAGNOSIS

1. **MAIN DANGER : DELAY**

2. **15% ARE NON DIAGNOSED**
   DURING THE LAPAROSCOPIC PROCEDURE

1. MORTALITY RISK = 3.6%

2. Up to 20% IN CASE OF DELAY

Complications: Bowel injuries

Small Bowel Injury (Per Op repair)

WRONG MANIPULATION

| INSTRUMENTS |
| SKILL |

PerOperative diagnosis

Complications: Bowel injuries

Small Bowel Injury (Per Op repair)

THERMAL INJURIES

Bowel Injuries: mechanism

Bowel Injuries: Thermal Injury

thermal injury: small bowel
Bowel Injuries: mechanism

Bowel Injuries: operative repair
TREATMENT / EARLY DIAGNOSIS

What To DO?

Bowel Injuries: diagnosis
Small Bowel Thermal Injury

Early Laparoscopic Exploration

Bowel Injuries: operative repair
TREATMENT / EARLY DIAGNOSIS

What To DO?
Bowel Injuries: Peroperative repair
TREATMENT / COLON

1. RESECTIONS ANASTOMOSIS
2. SUTURE
3. COLOSTOMIES (HARTMANN?)
4. TOILETTE +OU- DRAINAGE

Bowel Injuries: suture repair «out»
TREATMENT / SMALL BOWEL INJURIES

SUTURE (OUT)

Bowel Injuries: Rectal resection and anastomosis

BOWEL INJURIES

PEROPERATIVE DIAGNOSIS

BOWEL INJURIES

POST-OPERATIVE DIAGNOSIS

Bowel Injuries
TREATMENT / EARLY DIAGNOSIS
LAPAROSCOPIC APPROACH
IF EXPERIMENTED SURGEON

LAPAROTOMY (80%)
Bowel Injuries: Late Diagnosis

PAIN ++++

Bowel Injuries: Early Diagnosis

1. Inflammatory symptom (clinical, biological)
2. IMAGERY (Scanner +++, Ultrasonography)
3. OTHER (HSE)
4. LAPAROSCOPY +++

Bowel Injuries: Anastomosis «in»

Post Operative Complications
Bowel Obstructions

Internal Hernias

Post Operatives Complications
Bowel Perforation and Anastomotic Dehiscones

1% EARLY POST-OP
1% LATE
5% PAUCI SYMPTOMATIC ??

Closure of the Mesocolic and Mesenteric Gap
Post operative complications

Complications of Laparoscopic Surgery

When to Convert?

Why to convert: Choice?

Adhesions?

Complications of Laparoscopic Surgery

Why to convert: Choice?

Beginning of the procedures

- Problems of exposure
  - Adhesions, bowel obstruction
  - Limited experience
  - Technical problems

- Others
  - Carcinomatosis
  - Bulky tumor

Why to convert: Choice?

When to convert

- Bleeding
- Organ perforation
- No tumor or bulky tumor
- Anatomical difficulties
- Technical problems

No advantage for the patient
or the surgeon

OR

Not recommended for the patient

No tumor or bulky tumor

• Technical problems

• Anatomical difficulties
When to convert?
Due to complications

When to convert
Distorted anatomy

CONCLUSIONS
1. LOW INCIDENCE BUT HIGH RISK OF MORTALITY
2. DELAY IN DIAGNOSIS IS THE MAIN DANGER
3. ALL TYPES OF LAPAROSCOPIC PROCEDURE
4. DECREASE WITH EXPERIENCE BUT ALWAYS EXIST
5. MULTIDISCIPLINARY COLLABORATION
6. LAPAROSCOPIC REOPERATION MUST BE DONE BY AN EXPERIMENTED SURGEON
7. INFORMED CONSENT with POSSIBILITY of CONVERSION to OPEN PROCEDURE

THANK YOU for your attention
Prevention, Recognition and Management of Vascular Complication during Laparoscopic and Robotic Surgery

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Disclosures

- Consultant: Intuitive Surgical, Lumenis, Karl Storz Endoscopy-America
- Speaker's Bureau: Conceptus Incorporated, Ethicon Women's Health & Urology

Objectives

- Review normal anatomy
- Delineate indications for sidewall dissection
- Discuss preoperative planning
- Examine proper instrumentation and techniques for dissection
- Review possible complications and management

Pelvic Sidewall Dissection

- Division or excision or pathologic lesions adherent to the pelvic sidewall
- Retroperitoneal dissection to confirm normal anatomy or to excise pathologic tissue

Normal Anatomy of Pelvic Sidewall

3 Surgical Layers

1. Ureter in its parietal peritoneum
2. Internal iliac vessels w/ anterior branches
3. Psoas w/ external iliac artery, external iliac vein, obturator nerve and vessels

Sound surgical technique is based on accurate anatomic knowledge.
Videolaparoscopy
Introduced to Literature

Fertil Steril 1985 as an abstract

Even advanced (stage IV) endometriosis was treated by this technique.
Indications

- Endometriosis
- Peritoneal Implants
- Endometriomas
- Cul-de-sac Obliteration
- Ovarian Remnant
- Adhesions
- Malignancy

Ovarian Remnant

- Remnant ovarian tissue after oophorectomy
  - Responds to hormonal stimulation
  - Growth
  - Cystic degeneration
  - Hemorrhage
  - Pain
  - Onset of sx <5 years after oophorectomy

- Advantages of laparoscopic excision
  - Magnification
  - Increased intra-abdominal pressure
  - Distention allows for better visualization of retroperitoneal structures

Prevention of Ovarian Remnant

- Ensure IP ligament is free and mobile prior to ligation of ovarian vessels
  - Ensure that pre-tied suture or staplers are well below ovarian tissue
  - Electrocoagulation and ligation or clips are preferable
- If ovary is adherent to sidewall ensure:
  - Meticulous adhesiolysis
  - Retroperitoneal hydrodissection
  - Removal of contiguous peritoneum

Preoperative Planning

- Bowel prep
  - Mechanical
  - Antibiotic
- Ureteral Stents
- Preoperative IVP
- Cystoscopy
- Sigmoidoscopy

Planning should be individualized

Controversies in Preoperative Planning

- Kuno et al, review of 3071 major gynecologic surgeries
  - Prophylactic ureteral catheters did not prevent injury
- To Prep or Not to Prep...
  - Cochrane Database 2005 review of mechanical bowel prep (MBP) data
    - 9 RCT, 1592 patients: 789 MBC, 803 no MBP
    - No convincing evidence MBP reduces post-op complications
    - When looking at anastomotic leakage, MBP was harmful

Technique

- Hydrodissection starting at IP ligament
  - Use of adjustable pressure pumps
  - Sharp dissection w/ CO2 laser
- Traction/Counter-traction
  - Dissection of major pelvic blood vessels and ureters
  - For ORS, coagulation of ovarian blood supply, wide excision of ovarian remnant
  - Complete removal of ovarian remnant

GOAL: Restoration of normal anatomy

Complications

- Ureteral
- Bladder
- Vascular
- Nerve

Causes of Complications

- Distorted anatomy
  - Congenital anomalies
  - Malignancy
  - Adhesions
    - Endometriosis
    - Prior surgery
    - Irradiation
    - PID
- Reduced visibility
  - Large masses
  - Bleeding
  - Inadequate exposure
Intraoperative Management of Ureteral Injury

- Indigo Carmine leakage
- Obvious injury

Minor Injury
- Place stents by cystoscopy
- Follow up w/ IVP x 6 wks

Major Injury
- Ureteroneocystotomy
- End to end anastamosis
- Ureteral reimplantation

Ureteral Dissection
- Knowledge of anatomy
- Begin dissection at pelvic brim, outside pelvis
- Blood supply – medial in abdomen; lateral in pelvis

Ureteral Dissection
- Steep Trendelenberg
- Start with hydrodissection
- Begin dissection outside of pelvis
- Identify ureter above sacral promontory
- Mobilize rectosigmoid until EIA exposed
- Medial traction on rectosigmoid
- From lateral to medial visualize: ovarian vessels, ureter, superior rectal artery

Normal Pelvic Anatomy
- Part I
- Part II

Anterior Pelvic Wall Dissection
Retroperitoneal Anatomy

Harmonic® to open broad ligament

Hydrodissection and peri-ureteral lesion removal

Pelvic side wall dissection

Para-rectal lesion removal

Ureteroneocystotomy with Psoas Hitch

Double Ureter
Complications of pelvic sidewall dissection

**Mechanical Injury**

Stapler L External Iliac

Scissors External Iliac

Complications of pelvic sidewall dissection

**Electrical Injury**
Left external artery injury with monopolar current

Plasma Jet

ELI Robotic

L External Iliac Vein

Presacral

Conclusions

- Pelvic sidewall dissection can be learned and applied safely
- Laparoscopy facilitates dissection through improved visualization and magnification
- Knowledge of anatomy remains the cornerstone of sound surgical technique
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.