Prevention and Management of Laparoscopic and Robotic Surgical Complications

GU Perspective

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FINANCIAL DISCLOSURE

No for Profit relationships in the past twelve months, by presenter or spouse/partner is related to this presentation.
GU Complications Overview

- 614 complications in 525 patients (22.1%)
- 72% minor; 28% major
- 79% postop; 21% intraop
- 4 Most Common Complications
  - vascular injuries (19.8 per 1000)
  - postop bleeding requiring blood Tx (17.6 per 1000)
  - ileus prolonging LOS (16.2 per 1000)
  - wound infection (10.5 per 1000)

Rate of Complication Decreases With Experience

What Complications are Unique to GU Laparoscopy/Robotics

**Access & Positioning Complications**

*Positioning issues*

**Intraoperative Complications**

- Ureteral Injuries
- Bowel Injuries
- Vascular Injuries

**Postoperative Complications**

- Exiting the abdomen
- Abdominal wall trocar site hernias
Positioning: Neuromuscular Injuries
18 centers - 1651 procedures

2.7% (45 pts)
Clinical rhabdomyolysis 0.4%

- Twice as common with upper abdominal vs. pelvic laparoscopy (3.1 vs. 1.5%)
- Heavier patients
- Longer procedures (>5 hours)
- Older patients

Wolf et al., Urol 55: 831, 2000
Neuromuscular Injuries

**Avoidance**

**Renal Surgery**
- Careful positioning & padding
- Gel pad in bean bag - “cocoon effect”
- Avoid flexion of table
- Use axillary roll

**Prostate Surgery**
- Arms and hands well padded
- Legs abducted on split leg OR table (Maquet)
- Avoid lithotomy position; avoid table flexion
What Complications are Unique to GU and GYN Laparoscopy

Access & Positioning Complications

- Positioning issues

Intraoperative Complications

- Ureteral Injuries
- Bowel Injuries
- Vascular Injuries

Postoperative Complications

-Exiting the abdomen
-Abdominal wall trocar site hernias
Injury to Urinary Tract

- Gynecologic surgery responsible for up to 75% of cases of iatrogenic injury to ureter
- Risk Factors during Hysterectomy
  - Malignancy
  - Endometriosis
  - Prior surgery
  - Prolapse surgery
  - Not identifiable
Ureteral Injury

**Diagnosis**

Intraoperative – indigo carmine
Ureteral Injury

**Diagnosis**

Postoperative

- urinary ascites
- elevated BUN/Cr
- flank/abdominal pain, abdominal discomfort, ileus
- IVP, CT scan, Retrograde pyelogram
Ureteral Injury

Treatment Options

Postoperative

- Primary ureteroureterostomy
- Psoas hitch or Boari Flap
- Transureteroureterostomy
- Renal autotransplantation
- Ileal interposition
- Nephrectomy
Ureteral Injury

Prevention

- Insertion of End-hole Ureteral stent pre-op
- Prepare catheter into operative field
- Place stiff guidewire into ureteral stent
- Manipulate catheter intraoperatively
- Careful appreciation of surrounding anatomy
Bladder Injuries After Hysterectomy

Bladder Injuries 0.13%

- 0.22% after laparoscopic
- 0.10% after total abdominal
- 0.00% after supracervical abdominal
- 0.02% after vaginal hysterectomy

- 65% of reported bladder injuries were fistulas
- 0.08% vesicovaginal fistulas after all hysterectomies

Bladder Injury

**Management**

- Identify bladder opening
- Clean edges
- Close in 2 or 3 layers
- Foley catheter drainage x 7-10 days
- Cystogram – filling and empty films
Vesicovaginal or Enteric Fistula

- Robotic intervention ideal in managing pelvic surgery
- Separate vagina or bowel from bladder
- Resect fistula involved tissue
- Intervening tissue with omentum or peritoneal flap
- Freshen bladder edges
- Close in multiple layers
Bowel Electrocautery Injury
Rectal Injury - RRP
Intraoperative

Courtesy of Dr. Vincenzo Pansadoro
Rectal Injury – Radical Prostatectomy Postoperative

Diagnosis

- pneumaturia
- urine per rectum
- ileus, GI complaints
- wound infection (ports)
Rectal Injury - Postoperative

Management

• end colostomy
• Foley catheter drainage
• antibiotics
• may develop urethrorectal fistula, urinary sphincter incontinence
**Bowel Injuries**

Bishoff et al (1999) - multi-institutional study 915 patients

**Visceral injuries**

- bowel perforation/abrasion – 0.8%
- 69% not recognized intra-operative
- 50% as result of electrocautery
- 80% rate of laparotomy
Bowel Injuries

Presentation Atypical

- Focal “trocar site” pain
- Abdominal distension
- Low-grade fever
- Diarrhea
- Leukopenia
Bowel Injuries

Management

Intra-op Period

decision - lap vs. open repair?

size
location
prepared bowel
associated morbidity

→drainage, antibiotics

Post-op Period

laparotomy
Hemorrhage
Vascular Dissection Error

IVC
Vascular Dissection Error
?IVC Hemorrhage?
Keep Your Eyes on the Game!
Lt Kidney

Courtesy of Dr. T. Matsuda
Red Out!!
Vascular Dissection Error

- Study pre-op imaging - aberrant vessels
- Work from easy to hard
- Avoid migrating too far into renal hilum
- Minimize visual time away from monitor
Exit Complications

• “Getting out” safely is as important as “getting in”

• Don’t forget to lower pneumoperitoneal pressure to 5 mm Hg to check for bleeding

• Port site hernias
Port-Site Hernias

Management
1) Laparoscopy - determine viable bowel
2) Repair - laparoscopic vs. open

Prevention
1) Close all ≥ 10 mm port fascial defects
2) Consider non-bladed or dilating trocars (not a guarantee)
3) Close all ports in pediatric patients
4) Routine use of Carter-Thomason device
Closed Loop Sm Bowel

Knuckle sm bowel caught in port closure stitch when patient waking up.
Laparoscopic Hernia Repair

**WARNING!!**

- Pelvic scarring significant
- Subsequent robotic or laparoscopic prostate surgery difficult
- Especially if extraperitoneal approach with mesh and bilateral
Da Vinci Robotic System Malfunction

• Rare, occurring in 0.6 – 2.6% cases
• 57% of 176 responding surgeons had experienced irrecoverable malfunction *
• Plan should be devised on how to manage
• Preoperative counseling of patients regarding possible robotic mechanical failure

* Kaushik et al., J Endourol 24: 571-575, 2010
“See one, Do one, Teach one”

Not for Laparoscopy or Robotics
Predictors of Laparoscopic Complications after Weekend Course

- No additional training at 12 months (4.85 times)
- In solo practice (7.74 times)
- Variable assistant (4.80 times)
- Significant inverse correlation with # of lap procedures performed

See et al. - JAMA 270, 1993
Complications in Urologic Laparoscopy/Robotic

Prevention

- Training & proctoring
- Patient selection & preparation
- Pre-operative planning - OR & staff
- Establish laparoscopic team
- Meticulous attention to detail
- Honesty, humility & humbleness