Laparoscopic Pelvic Anatomy and Retroperitoneal Landmarks

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Conflicts of Interest

• I have no conflicts of interest relevant to this talk

• Other relationships
  - Alexion - consulting
  - Merck - consulting/research
  - Novocure - consulting
  - Biodesix - consulting
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  - Clovis - consulting
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Objectives

• Structures
  – Spaces and Landmarks
  – Vascular Anatomy
  – THE Ureter
  – Lymphatic Anatomy
  – Neurologic Anatomy
• Correlation of Anatomy with Surgical Procedures

Please

• e-mail me if you have questions!
• e-mail me if you want videos!
• e-mail me if you are interested in visiting us!

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Anatomy as the Basis of Medicine

Andreas Vesalius
1514-1564
De Humani Corpus Fabrica by Andreas Vesalius, Padua, Italy (1543)

Pelvic Sidewall Dissection
Tying off the ??

Superficial

Highly variable branching pattern - often can be transilluminated
Deep

Watch for Branches!

Anterior Abdominal Wall
Ilioinguinal and Iliohypogastric Nerves

Iliioinguinal and Iliohypogastric

- Injury unlikely with trocar placement but more likely in 10 mm port that require closure

- Injury in 3.7% of Pfannenstiel incisions
  - associated with length of incision esp. if past lateral rectus sheath
- Distribution near lower port sites but injury with trocar uncommon
- Most often injured in fascial closure (entrapment) or neuroma from injury
- Diagnosis
  - Sharp burning pain emanating from the incision and radiating to suprapubic area, labia or thigh
  - Paresthesia over the appropriate nerve distribution
  - Pain relief after infiltrating with local anesthetic
  - Symptoms often worse with Valsalva and can be relieved with hip flexion
- Requires weekly injection with analgesic/steroids, neurolysis, or resection


Genitofemoral Nerve

- often injured removing sidewall masses of pelvic nodes
- consequences minimal (patch of sensory neuropathy)
The Pelvic Spaces

- Para-rectal Space
  - Ureter medially
  - Iliac vessels laterally
  - Cardinal ligament
- Para-vesical Space
  - superior vesical artery medially
  - iliac vessels laterally
  - Cardinal ligament
- Presacral Space
- Space of Retzius
Ureters through Pelvis

Para-rectal space
Para-vesical space
Pre-sacral space

Paravesical and Pararectal Spaces

Opening the round ligament
Hypogastric Nerve Trunk

Superior Hypogastric Nerve Plexus

Obturator Nerve
Umbilical Ligament
Uterine Artery
Ureter
Para-vesical Space
Abnormal Obturator Vessels

Abnormal obturator vessels are present in 25% of cases

Aberrant Obturator Vein
Vascular Complications

Vascular Anatomy

• Common Iliac
• External Iliac
  – Deep circumflex, inferior epigastric
• Internal Iliac
  – Posterior Division
    • ilolumbar, lateral sacral, superior gluteal
  – Anterior Division
    • uterine, inferior gluteal, pudendal, superior vesical, obturator, vaginal, inferior vesical
Umbilicus Relative to Weight

Caution if in Trendelenburg
Beware the Common Iliac Veins!

Major Vascular Injury during Trocar Insertion

FDA - Medical Device Reports, 1993-1996
Vessels of the Pelvis
Unanticipated Finding

Uterine Vessels

Uterine artery often travels inferiorly and branches before entering uterus
The Ureter

- Retroperitoneal and enters the pelvis just medially to the bifurcation of the common iliac artery
  - if you can’t find it -> dissect higher!!!
- Underneath ovarian vessels (but close) at the pelvic brim
- Medial to the internal iliac/superior vesical arteries
- Under uterine artery
- Trigone is right on top of the cervix!!

Pelvic Ureter

Ovarian vessels are tortuous and ALWAYS close to the ureter - GOT to FIND it!

Can always find at the pelvic brim - make the incision higher if you are struggling!
Common Sites of Ureteral Injury

DANGER ZONES!

25%  33%  42%

Ureter at Pelvic Brim
Finding the Ureter

Ureters and Bladder

Ureter enters bladder at the edge - BE CAREFUL!
Cross Sectional Anatomy

Uterine Manipulators
The Koh Ring and Ureter Position

Taking the Uterine Arteries
Abnormal Mass

Ectopic Kidney

D. ECTOPIC PELVIC KIDNEY

Aorta

Inf. vena cava

Right ureter

Left ureter
Ways to Injure the Ureter at the Cuff

- Ureter accidentally nicked while ligating paravaginal tissue
- Bladder wall accidentally nicked with needle
- Cut edge of peritoneum
- Stump of left round lig.
- Stump of left uterine vessels
- Vaginal vault closure
- Ureter accidentally ligated with cardinal lig.
- Stump of rt. infundibulopelvic lig.

Thank you!