



UNC  
SCHOOL OF MEDICINE

# Robotic Retroperitoneal Surgery

**Mathew C. Raynor, MD, FACS**  
**Department of Urology**  
**The University of North Carolina**  
**School of Medicine**

**@Matt\_Raynor\_uro**

**@UNCurology**

# Disclosures

## Consultant

- » Intuitive Surgical
- » Teleflex Medical

# History

When was “laparoscopy” first described?

» 1842

» 1895

» 1910

» 1938

# History

When was “laparoscopy” first described?

» 1842 – first use of ether as anesthetic

» 1895 – first x-ray performed

» **1910**

» 1938 – Veress described needle technique for pneumo

# History



Jacobaeus demonstrating the thoracoscopic approach (c.1920).

# History

- 1969 – first laparoscopic retroperitoneal approach described
  - » Dr. Bartel (Germany)

## THE NEW ENGLAND JOURNAL OF MEDICINE May 9, 1991

**RALPH V. CLAYMAN, M.D., LOUIS R. KAVOUSSI, M.D.,  
NATHANIEL J. SOPER, M.D., STEPHEN M. DIERKS, M.D.,  
SHIMON MERETYK, M.D., MICHAEL D. DARCY, M.D.,  
AND STEPHANIE R. LONG, B.A.**

- 1992 – Gaur describes retroperitoneal balloon dilator
- 1993 – Gaur describes first retroperitoneal lap nephrectomy

# Benefits

- **Avoids peritoneal cavity**
  - » Prior abdominal surgeries
  - » Peritoneal dialysis
- **Access to renal hilum**
  - » Direct access to hilum
- **Location of tumor**
  - » Posterior tumors (especially upper pole) ideal

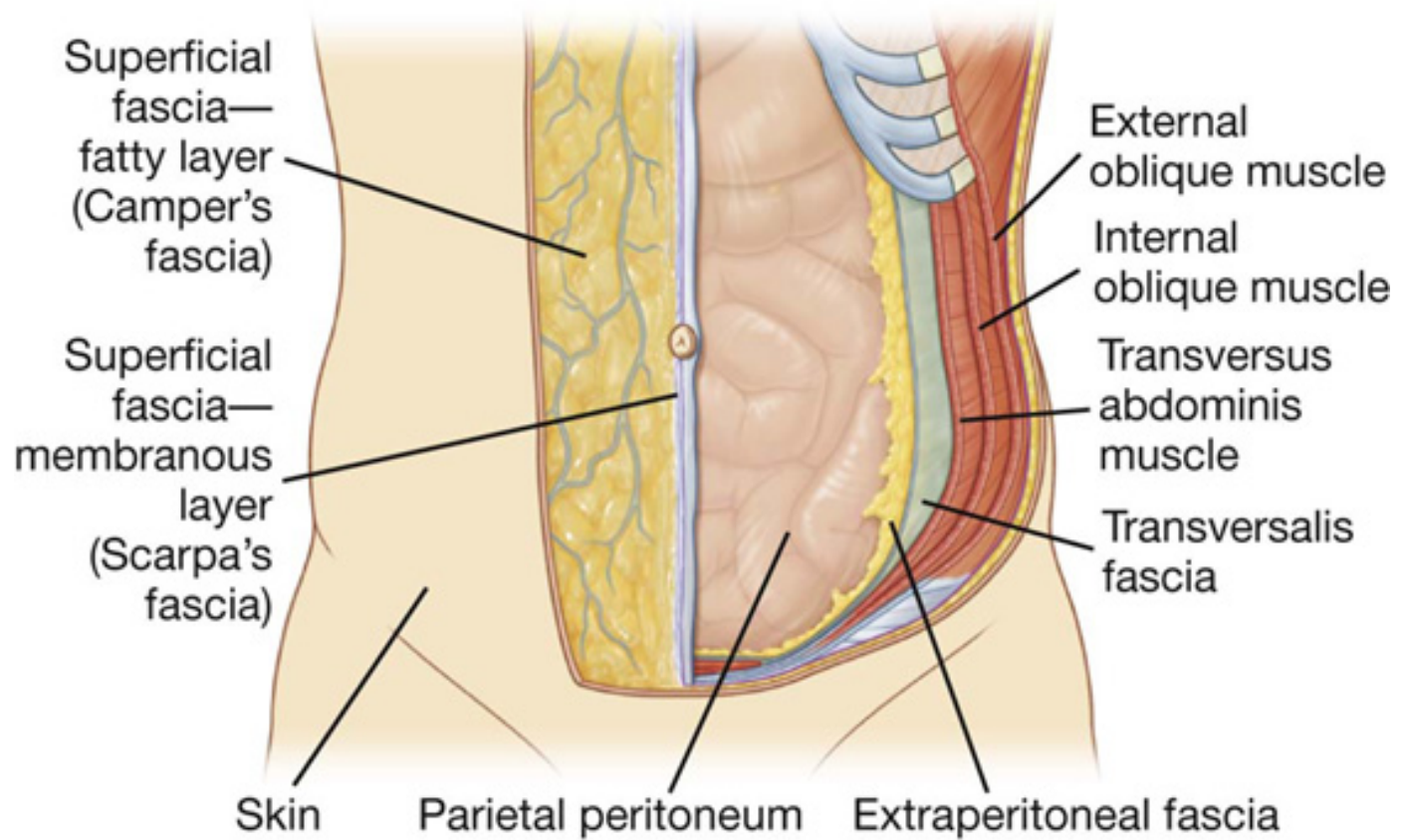


# Risks

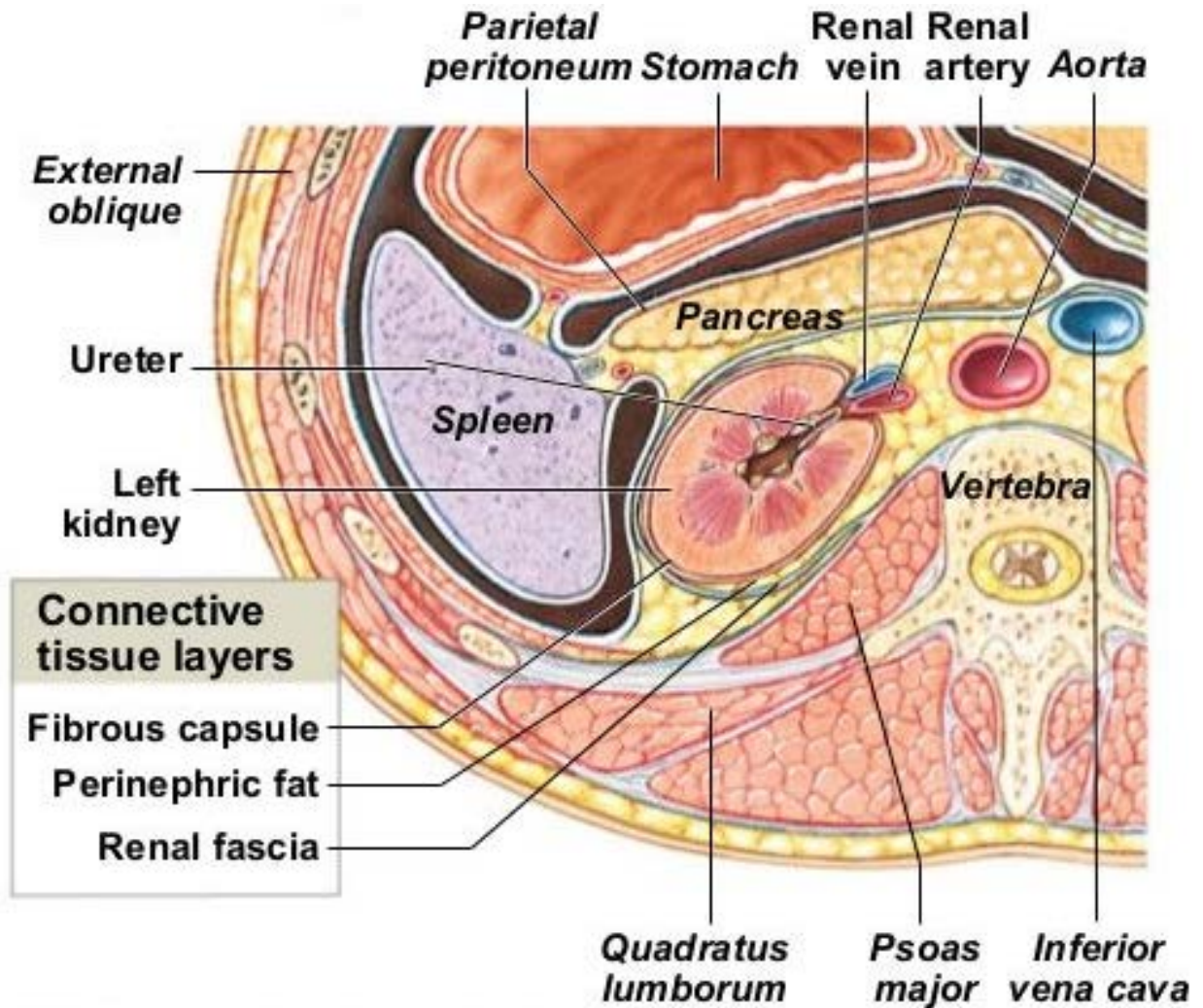
- Small working space
- Lack of anatomic landmarks
  - » Psoas
  - » Major vessels
  
  - » Two reports of vena cava transection
- Peritoneal entry
  - » Pneumoperitoneum
  - » Compression of retroperitoneal working space



# Anatomy



# Anatomy



# UNC Experience

## Retroperitoneal Robotic Partial Nephrectomy

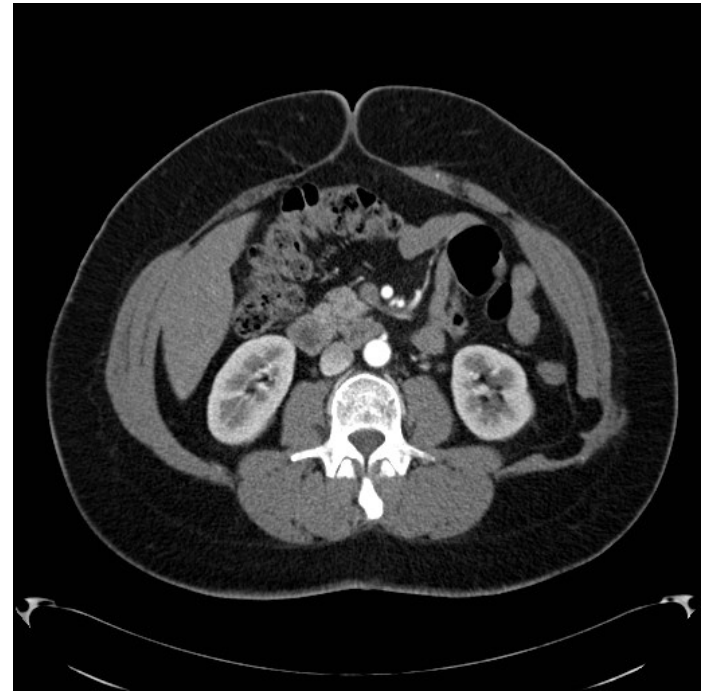
- Retrospective review 2011-2016
  - » 42 patients (42 tumors)
  - » Age 54.5
  - » BMI 30.7
  - » Tumor size 2.9cm
  - » RENAL score 7.3
- Peri-operative outcomes
  - » OR time 193 min
  - » EBL 113 mL
  - » WIT 19 min
  - » LOS 1.7 days
  
  - » 34/42 RCC, all negative margins

# UNC Experience

## Retroperitoneal Robotic Partial Nephrectomy

- **Complications**
  - » 23.8% Clavien Grade ½
  - » 5% Clavien Grade 3+
    - 2 patients with delayed bleed
- **Long term complications**
  - » Flank/hip pain
    - 5 patients with persistent pain/numbness
  - » Flank hernia
    - 4 patients developed hernia in follow-up
    - 2 required eventual repair

# Flank Hernia



# Access

- Various methods
  - » Below tip of 12<sup>th</sup> rib
    - Open access (Hasson) technique
    - Enter retroperitoneal fat
    - Balloon dilation
    - Place 12mm port
  - » Optical trocar placement
    - Enter with port to retroperitoneal fat
    - Balloon dilation
  - » Modified mini-Gibson access
    - Medial to ASIS
    - Enter retroperitoneal fat
    - Balloon dilation
    - Place 15mm assistant port

# Evolution of Technique

- With Si robot
  - » Hasson approach below tip of 12<sup>th</sup> rib
  - » 3-arm robotic approach
  - » Assistant port medial to ASIS
  - » Second assistant above iliac crest, if needed
  - » Extract via camera port
  
- Learning points
  - » Difficult closure of flank extraction site (hernia)
  - » Only 2 robotic working arms
  - » Clashing and lack of room for assistant

# Ports

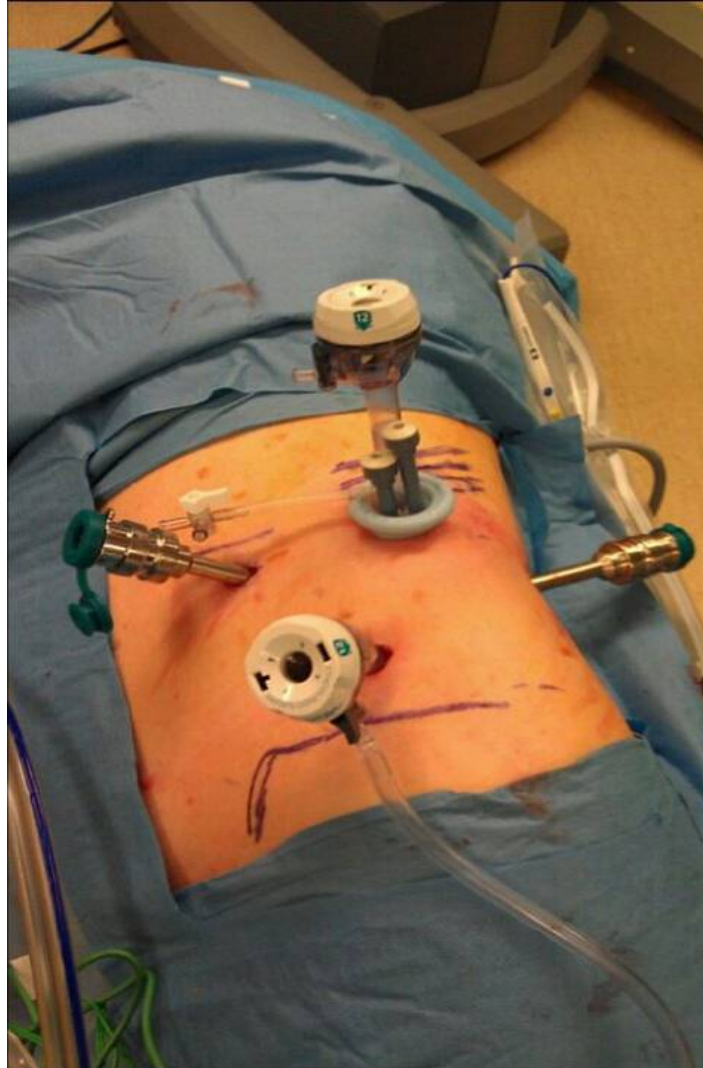




# Evolution of Technique

- Use of SILS port
  - » Allow for large incision for proper access
  - » 2cm incision could be used for extraction
  - » Additional assistant through SILS port
- Learning points
  - » Extra cost
  - » Difficult assistant port
  - » Still difficult to close flank incision

# SILS Port



# Evolution of Technique

- Access through mini-Gibson incision
  - » Medial to ASIS
  - » Easier visualization of muscle layers
  - » Easier extraction site
  - » Easier closure of fascia in multiple layers
  - » SILS port – two assistant ports
- Learning points
  - » Still difficult to fit 4 robotic arms
  - » Still using SILS port
  - » Balloon dilation below kidney
    - Dilation anterior to kidney possible

# Evolution of Technique

- Xi robot
  - » Smaller working distance
  - » Use of 4 arms
  - » All 8mm ports
  - » No need for additional assistant
    - Only one assistant port needed

# Access

# Balloon Dilation

- Different options
  - » Oval
  - » Round
  - » Glove



# Balloon Dilation

# Initial Port Placement



# Initial Port Placement

# Increase Working Space

# Increase Working Space



# Troubleshooting

# Peritoneal Entry

- Easiest points of entry
  - » Anterior-medial
    - Reflection of peritoneum to create space
    - Finger dissection toward pelvis
  - » Superior
    - Beneath liver/spleen
- Solutions
  - » Oversew defect, suction pneumo
  - » Vent peritoneum (Veress or 5mm port)
  - » Open peritoneum

# Peritoneal Entry

- Easiest points of entry
  - » Anterior-medial
    - Reflection of peritoneum to create space
    - Finger dissection toward pelvis
  - » Superior
    - Beneath liver/spleen
- Solutions
  - » Oversew defect, suction pneumo
  - » Vent peritoneum (Veress or 5mm port)
  - » ***Open peritoneum***
    - Exception → PD

# Peritoneal Entry

# Open Peritoneum



# Anterior Dissection Plane

- Balloon dilation inferior to kidney
  - » Instead of posterior to kidney off 12<sup>th</sup> rib
- Lack of anatomic landmarks
  - » May be difficult to visualize psoas
  - » Excess retroperitoneal fat
  - » Surface of kidney can resemble psoas
- Visualize psoas
  - » Open peri-renal fascia above psoas
  - » Keep psoas fascia down

# Anterior Dissection

# Identifying Correct Plane

# Posterior Dissection

# Partial Nephrectomy

# Conclusions

- Great approach for posterior tumors
  - » Or prior extensive abdominal surgery
- Proper access is most important
  - » Not many “outs”
- Xi is ideal
- Beware – anatomy can be confusing
  - » Pay attention
  - » Use psoas as home base
- Unique complications
  - » Hernia – difficult to close small flank incisions
    - Especially in obese
  - » Counsel about possible neuropathic pain/numbness
- Learn from each case
  - » Improve on each case

