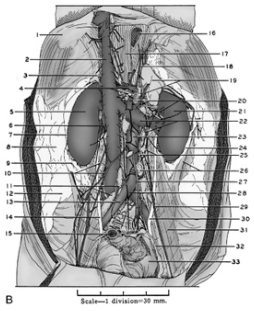
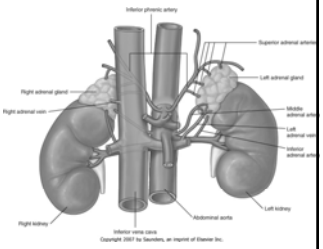
VHL: Surgical Approaches to Renal Carcinoma

Adam S. Kibel, M.D.
Director of Urologic Oncology
Division of Urologic Surgery
Washington University School of Medicine
St. Louis, Missouri

Introduction

- Normal Anatomy
- Renal Cell Carcinoma
- Management
  - Radical Nephrectomy
  - Partial Nephrectomy
  - Cryoablation





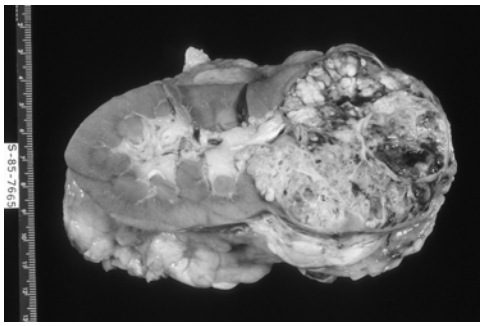
Kidney's Primary Function is to clear waste.

Campbell-Walsh Urology

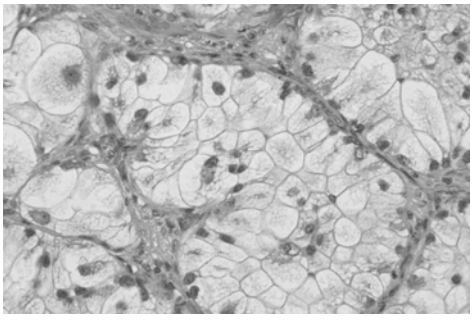
Types of Kidney Cancer

- Clear Cell Carcinoma
- Papillary Carcinoma
- Chromophobe Carcinoma
- Oncocytoma
- Medullary Carcinoma

Clear Cell Carcinoma



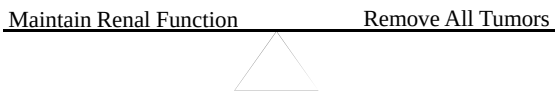
Clear Cell Carcinoma



VHL

- All kidney cells have genetic defect.
  - All kidney cells have potential to develop into a cancer.
- Local growth not the problem
- Tumors can spread – that is the problem
- Eradication of all risk requires removal of both kidneys
- Loss of Renal Function Detrimental
  - Quality of Life
  - Loss of Life Expectancy

Striking A Balance



Kidney Management

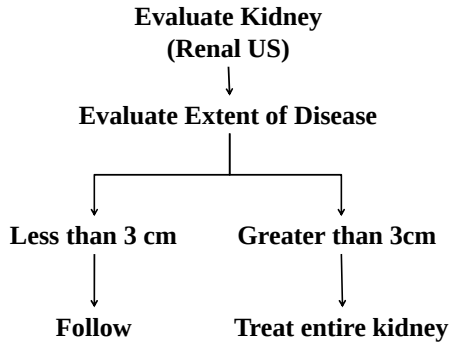
- Goals
  - Preserve Renal Function
  - Maintain Cure Rate
- Problems
  - Never able to make patient "tumor free" without removing kidneys.
  - Want to avoid this as long as possible.
  - Do not want to over operate
    - Each time undergo a procedure it is harder.
    - Tumor unlikely to metastasize before 3 cm.

Kidney Management

- Excise Tumors (not kidneys) whenever possible.
- Leaving Functional Renal Tissue
- Avoiding Dialysis

Treatment Algorithm

- Initial Evaluation
- Follow Tumors Closely
- CT scans, MRI or Renal Ultrasound.
- When index lesion approaches 3 cm in size
  - Treat each kidney separately
  - Treat that entire kidney.
  - Treat index lesion before it has ability to spread
  - Reset the clock for rest of the kidney



Treatment Algorithm

- Never one size fits all.
- Often use treatment modalities sequentially.
- Open Radical Nephrectomy.
- Laparoscopic Radical Nephrectomy
- Open Partial Nephrectomy
- Robotic/ Laparoscopic Partial Nephrectomy
- Percutaneus Cryoablation

Radical Nephrectomy

- Removes all potential tumor cells.
- Cost is loss of nephrons – risk of dialysis.
- Rarely used for primary therapy.
  - Exception in patients who present late.
- Can primarily be done laparoscopically
- Primarily used for large tumors centrally located tumors

  OR
- Salvage Operations.

Partial Nephrectomy

- Mainstay of treatment for VHL
- Can be done open, lap or robotically
  - More rapid recovery time
  - Harder to treat central lesions.
  - Harder to identify all lesions.
- Benefit is maintain renal function.

Partial Nephrectomy

- Should completely expose kidney to see all lesions.
  - Enucleate as many tumors as you can.
  - Unroof all cysts and fulgurate.
- Want to minimize ischemic time
  - Blood supply to kidney needs to be cut off
  - Damaging to kidney.
  - Try to keep less than 30 min
  - As many lesions as possible treated off clamp
  - Packing in ice increases time kidney can do well without blood

Open Radical/Partial Nephrectomy

- Incisions vary
- Flank incision
- 3-4 day hospitalization
  - Revolves around pain management
- 4-6 weeks before feeling “back to normal”
- Can develop “bulge” in side from muscles in side being weakened
  - NOT A HERNIA!

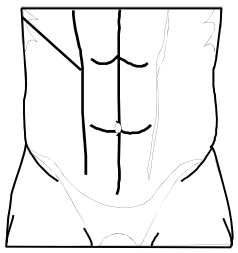
Laparoscopic or Robotic Radical/Partial Nephrectomy

- Smaller Incisions –
  - two to three- 1 cm
  - Extraction site
  - Still need to remove the tumors
- 1-2 day hospitalization
- 2-3 weeks before feeling “back to normal”
  - Biggest problem is over activity

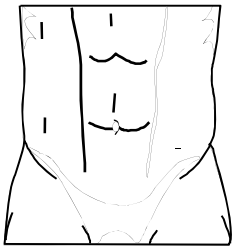
Laparoscopic or Robotic Radical/Partial Nephrectomy

- Complication rate higher.
- Cannot be done for all lesions.
  - Deep
  - Multiple
- Need to be concerned about
  - ability to control bleeding
  - length of time clamped (no ice)

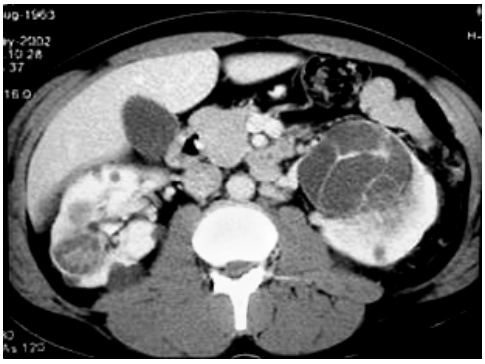
Robotic/Laparoscopic Surgery Access



Open Surgical Access



Minimally Invasive Surgical Access



Robotic Partial Nephrectomy

- A computer enhanced surgical system
- Master-slave system with surgeon in control
- Surgeon operates at the console
- Assistant surgeon is next to the patient

The Surgeon Directs the Instruments

- **The surgeon's hands are placed in special devices that direct the instrument movement**

Wrist and Finger Movement

- **Traditional laparoscopic instruments are straight and do not bend**
- *EndoWrist*® **Instruments move like a human wrist**
- **Allows increased dexterity, maneuverability, and precision**

Cryoablation

- Unknown if as effective
- Can only treat index lesion.
  - Multiple unknown tumors and cysts identified in OR
- Need to treat beyond the tumor.
- Can be done open, lap or percutaneous.
- Percutaneous
  - Outpatient or overnight admission
- Primarily used by me for people who have had multiple prior procedures.

Treatment Algorithm

- Initial Presentation
- Treat each side separately.
- Do not operate on both sides at same time.
- Robotic Partial Nephrectomy
- Open Partial Nephrectomy
- Possible Second Partial Nephrectomy.
- Percutaneous Ablation
- Radical Nephrectomy
- Renal Transplant

Future Directions

- Targeted Therapy for Clear Cell
  - Slow the growth or treat VHL tumors.
- Preventive Strategies
  - Same targeted agents
  - Concerns about lifetime exposure.
- Focused Ultrasound
  - No need to even place probe percutaneously
  - Possible more precise

Conclusion

- Close follow-up is of critical importance.
- Minimally invasive treatments utilized
- Sequential treatments to:
  - Control Cancer
  - Minimize Renal Loss
- Hopefully in future slow growth and decrease need for surgery