Renal Transplantation

*Technical Aspects from Donor to Recipient*

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Neither I nor my partner have any relevant financial interests to disclose
Educational Objectives

OBJECTIVES - At the end of this activity, participants should be able to:

• Educate the patient regarding live donor nephrectomy and cadaveric donor nephrectomy
• Educate the patient regarding technical surgical aspects of renal transplant; and refer

Historical Considerations
Renal Transplant Recipient Operation
  Deceased Donor
    – Living Donor
    – Combined Kidney and Pancreas Transplantation
• Donor Operations
  – Deceased Donor Organ Recovery
  – Living Donor Nephrectomy

The first successful renal transplant was performed by a:

A. Urologist
B. Plastic Surgeon
C. General Surgeon
D. Nephrologist

Answer Now

December 23, 1954
Anatomy of a Transplant

- Vascular: Need and Artery and Vein
  - Iliacs
  - Great Vessels
- Urinary: Need a Site for Urinary Drainage
  - Bladder
  - Diversions

Allograft Anatomy

- Deceased Donor
  - Aortic Patch (Carrel)
  - Caval Patch (Left Kidney)
  - Full IVC (Right Kidney)
  - 1 (or more) Ureter
- Living Donor
  - Renal Artery
  - Renal Vein
  - Ureter
  - More Commonly Left Kidney

Benchwork

- Removal of perirenal fat and Adrenal Gland (DDRT)
- Ligation of lymphatic tissue and tiny vascular branches
- Vessel Preparation/Reconstruction
Benchwork

The Right Iliac Vessels are the preferred vascular target in most recipients

- More horizontal lie than the left iliacs
- More anterior than the left iliacs
- Most Surgeons are right handed
- Both A and B

Answer Now

Recipient Operation

- Position: Supine
- Incision: Gibson
  - Sometimes Midline
- Usually Right Side
  - Often left
Recipient Operation

- Development of Retroperitoneal Space/Iliac Fossa
- Exposure of Iliac Vessels
- Vascular Anastomosis (Vein then Artery)
- Hemostasis
- Exposure of Bladder (or Diversion)
- Ureteral Anastomosis

Vascular Anastomosis

When a LEFT kidney is transplanted into the RIGHT iliac fossa, the renal pelvis/ureter:

A. Lies between the donor artery and vein
B. Lies posterior to the donor artery and vein
C. Lies anterior to the donor artery and vein
D. None of the above

Answer: A. B. C. D.
En-Bloc Pediatric Donor

- Donor generally more than 10kg
- Kidneys now split if ≥6cm in length
- Small ureters with tenuous blood supply increases urine leak, stricture...

Lich-Gregoir Ureteroneocystostomy

- Low Ureteral Complication Rate vs. Single Stitch Technique (15.6% vs. 3.9% p<0.0001) Veale, Yew et al
- Use a Stent (remove at 4 weeks) for significantly lower urologic complication rates (1.9% vs. 9%) Mangus et al.
- Foley Catheter removed am POD 3 or 4
- 19 fr Round Blake Drain removed later in day
Robotic Renal Transplant

- Not widespread (yet?), Mainly at UIC
- Promoted for Obese patients; potential for less wound infection? Greater technical ease?
- Hand-Assisted Intra-peritoneal or Retroperitoneal

Donor Operations

- Deceased Donor Organ Recovery
- Open Living Donor Nephrectomy
- Laparoscopic Donor Nephrectomy

Deceased Donor Recovery

- Aortic Cannulation and cross-clamp
- Flush with organ preservation solution (UW)
- Kidneys removed en-bloc
Which of the following is a contraindication to living kidney donation?

A. Age greater than 65
B. History of nephrolithiasis
C. Medication controlled Hypertension
D. Age younger than 25
E. None of the above

Living Donor Evaluation

- Medical
  - Independent donor advocate
  - Thorough medical eval: Fam Hx, Soc Hx, CV, DM, HTN, Renal Function (expect 70% of pre-op GFR)
- Surgical
  - Discuss procedure and risks (0.03% mortality risk)
  - Address GU concerns and Renal Anatomy
- Psychosocial
  - Identify concerns (short and long term)

Living Donor Evaluation

- Age ≥25 (younger needs careful consideration)
- Upper age limit?
- Weight Limit? (BMI <30 preferred, not required)
- Family History of Diabetes (particularly in higher risk groups: Hispanic and African American)
- Basically, must be in “excellent” health
  - Becoming more lenient with 1 HTN med (not in young donors)
GU/Surgical Workup

- Assess history of recurrent UTI, Stones, Congenital issues, malignancy
- Assess Anatomy: CT Angiogram + Urogram
  - can do MRI (but harder for surgeon to interpret)
- Stones
  - Multiple Stones: exclude
  - Single Stone/Episode: Stone workup and consider

Is This a Donor?

Right or Left?
In the previous CT Angiogram, what is the preferred surgical option for donation?

A. Right Lap Donor nephrectomy with 1 Artery  
B. Left LDN, ligate smaller artery  
C. Left LDN with backtable arterial reconstruction  
D. Left LDN with 2 arterial anastomoses  
E. Either A, C, or D

LDN: Technique

- Pure lap, Hand-assisted, Pure Robotic, HA-robotic...Whatever you are most comfortable with  
  - Vast majority are Left Sided  
- Same as Lap Nephroureterectomy  
- (inferiorly to where the ureter crosses the iliacs)  
  - Donor safety is paramount  
  - Adequate vessel/ureteral length important for recipient surgeon  
  - “no-touch” technique on kidney

Safe Ligation of Renal Vessels

- FDA Warning: not to be used on artery in LDN  
- 3 reported donor deaths associated with Hem-o-Lock clips  
- Use endo-GIA stapler, plenty of vessel length + maximum safety
Thank You

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