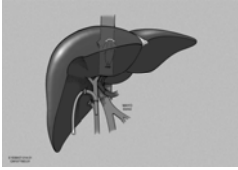


Abdominal Transplantation: Technical Issues and their Clinical Ramifications



Julie Heimbach, M.D.
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Mayo Clinic, Rochester, MN
no disclosures

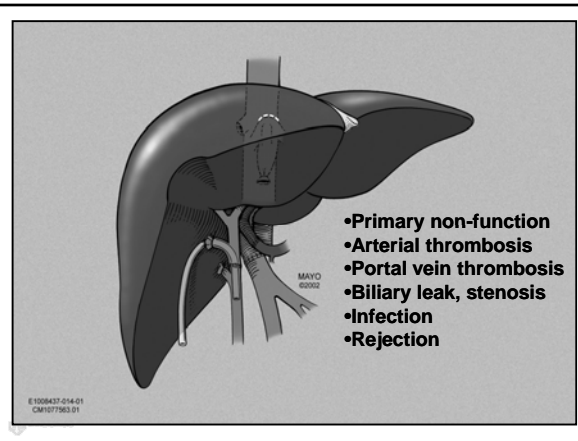


Goals:

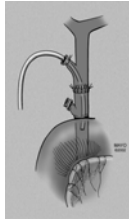
Allow coordinators to become familiar with technical aspects of liver, kidney and pancreas

- Anticipate and understand complications
- Liver: types of allografts:
 - Living donor
 - DCD
 - High risk, marginal, amyloid donors





Biliary Reconstruction

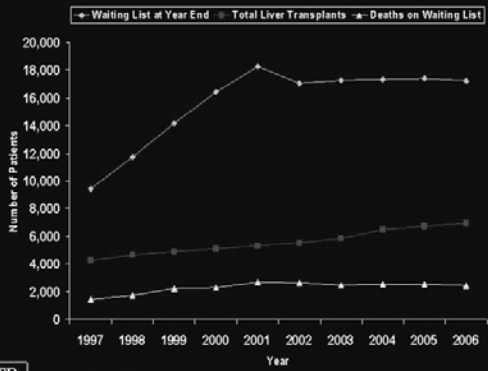


Duct-to-duct



Roux Y

Waitlist and Transplant Activity for Liver, 1997-2006



SRTR Source: OPTNSRTR Annual Report Tables 1.3, 1.6, 1.7

<http://www.unos.org/resources/meldPeldCalculator.asp>

What is the INR ?

What is the bilirubin ?

What is the serum creatinine?

Has the patient been on dialysis at least twice in the past week? yes no

MELD

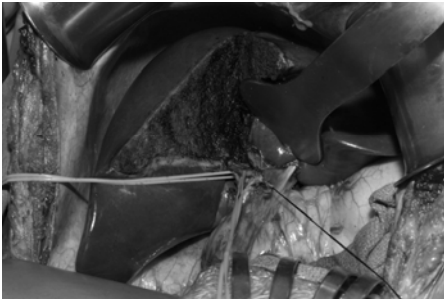
LIVING DONOR LIVER TRANSPLANTATION

Disadvantages

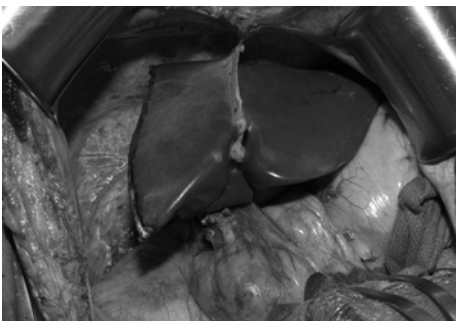
- Risk of donor death: 0.3 to 0.5%
- Donor morbidity and discomfort (30%)
- Higher cost
- Potential for donor coercion
- Recipient biliary complications (15-30%)



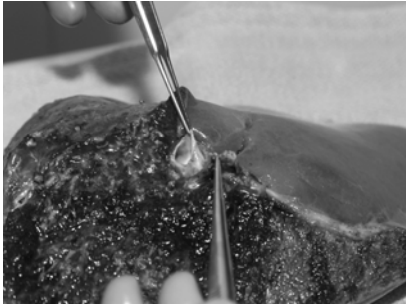
Living Donor Right Hepatectomy



Living Donor Right Hepatectomy



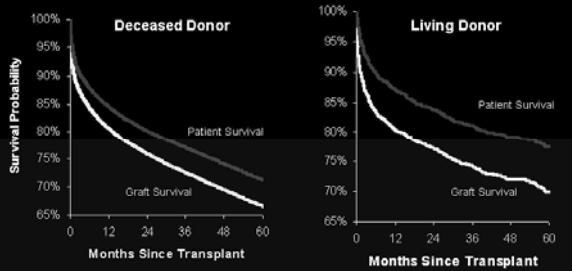
Living Donor Right Liver Graft



Living Donor Right Liver Allograft



Figure V-16. Unadjusted Patient and Graft Survival of Liver Recipients, by Deceased and Living Donor



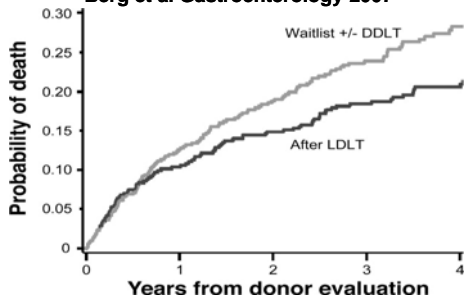
Includes all liver transplants from 1/1/96 through 12/31/05.
Source: SRTR Analysis, November 2006.

SRTR

2006 OPTN/SRTR Annual Report, Chapter V.

Improvement in Survival Associated with Adult-to-Adult LDLT

Berg et al Gastroenterology 2007



Adjusted for MELD, age, and HCC.

LIVING DONOR LIVER TRANSPLANTATION Donor Considerations

- Recovery from major operation: (6-12 weeks for return to work)
- Incisional discomfort
- Potential morbidity (30%), mortality (0.5%).
- Economic considerations
- Adverse recipient outcome

Living Donor Liver Transplantation Potential Donor Complications

- Wound infection
- Ileus
- DVT and PE
- Pleural effusion
- Vascular and/or biliary injury
- Bleeding, bile leak
- Hepatic insufficiency
- Estimated need for transplant/mortality: 0.3 to 0.5%

Living Donor Right Hepatectomy



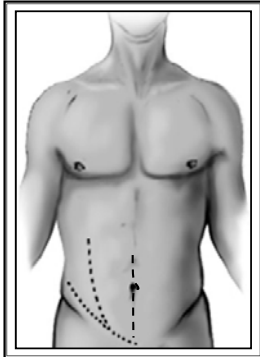
ECD/High Risk Donor

- Older donor: higher PNF, higher recurrence of HCV, possibly other primary disease?
- Split liver: higher complication rate, labor intensive, disadvantage to primary recipient
- Fatty liver: increased risk of primary non-function (consider up to 40% macro).
- Domino transplant: amyloid donor
- High risk: risk of disease transmission to recipient (donor with malignancy, etc.)
- DCD: (donation after cardiac death)

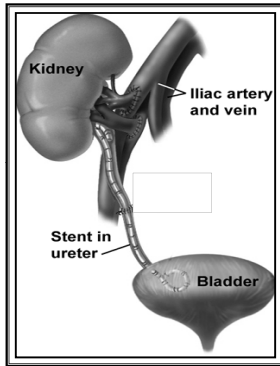
Kidney Transplant: why?

- Glomerular disease 32%
- Diabetes mellitus 19%
- Hypertension 13%
- Tubular disease 9%
- Polycystic kidney disease 6%
- Vascular Disease 2%
- Other 19%

Kidney Transplant Incisions



Kidney Transplant



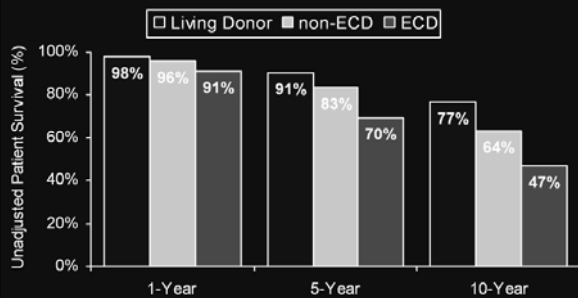
Complications

- **Surgical**
 - **Vascular thrombosis**
 - **Ureteral obstruction**
 - **Ureteral stricture**
 - **Lymphocele**
 - **Urine leak**
 - **Wound infection**

Complications

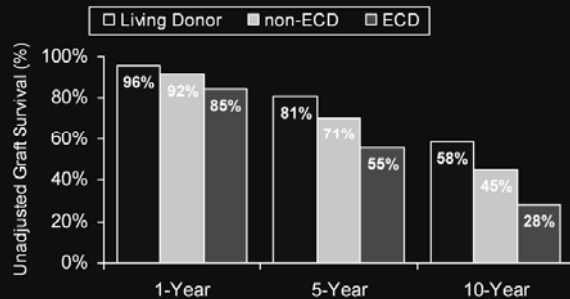
- **Decreased urine output**
 - **Hypovolemia**
 - **Vascular thrombosis**
 - **Bladder outlet obstruction**
 - **Ureteral obstruction**
 - **Acute rejection**
 - **Delayed graft function**

Figure III-6. Unadjusted 1-Year (2005-2006), 5-Year (2001-2006), and 10-Year (1996-2006) Kidney Recipient Survival, by Donor Type



SRTR Source: 2008 OPTN/SRTR Annual Report, Tables 5.14a, b, d.

Figure III-7. Unadjusted 1-Year (2005-2006), 5-Year (2001-2006), and 10-Year (1996-2006) Kidney Graft Survival*, by Donor Type



*Death is included as an event.
SRTR Source: 2008 OPTN/SRTR Annual Report, Tables 5.10a, b, d.

Pancreas Transplantation

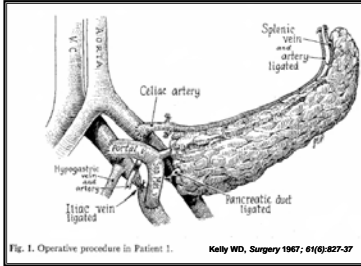


Fig. 1. Operative procedure in Patient 1. Kelly WD, Surgery 1947; 61(6):827-37

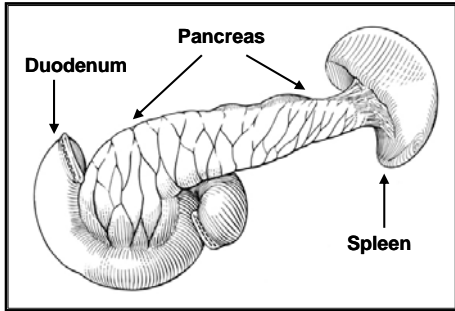
Type 1 Diabetes Mellitus

- Autoimmune destruction of beta cells of Islets of Langerhans in pancreas
- Patients with Type 1 require insulin to live (different than Type 2)

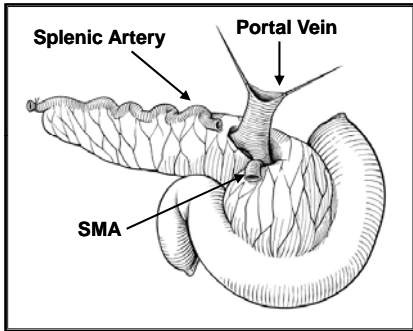
Types of Pancreas Transplant

- Pancreas after Kidney (PAK)
 - Usually after living donor kidney
- Pancreas Transplant Alone
 - For patients without nephropathy
- Simultaneous Pancreas-Kidney (SPK)
 - Usually from same donor

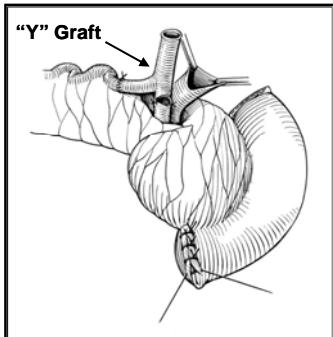
Operative Technique



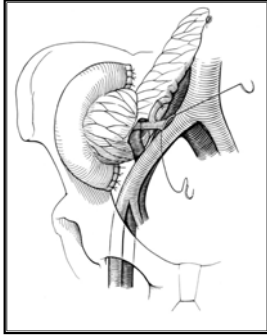
Operative Technique



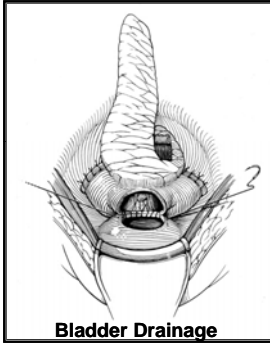
Operative Technique



Operative Technique

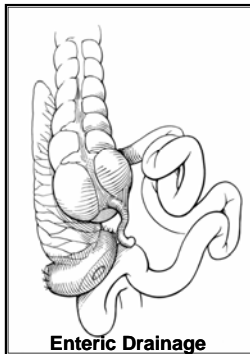


Operative Technique



Bladder Drainage

Operative Technique



Enteric Drainage

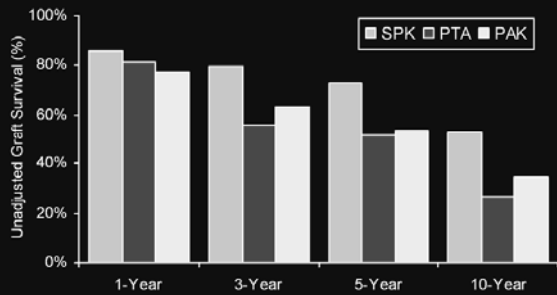
Complications

- **Thrombosis**
- **Hemorrhage**
- **Pancreatitis**
- **Anastomotic leak**
- **Acute rejection**

Enteric vs. Bladder Drainage

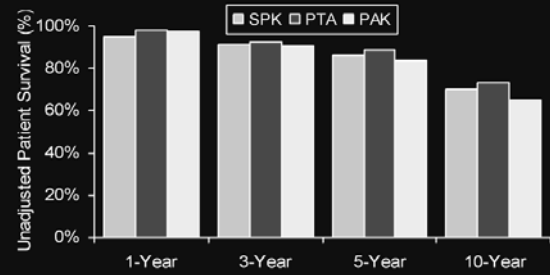
- | | |
|--|--|
| <ul style="list-style-type: none"> • Bladder • Leaks less lethal • Urinary amylase | <ul style="list-style-type: none"> • Enteric • More physiologic • Less dehydration |
| <ul style="list-style-type: none"> • Dehydration • Metabolic acidosis • Cystitis/UTIs • Pancreatitis | <ul style="list-style-type: none"> • Leaks are BAD |

Figure III-12. Unadjusted 1-Year, 3-Year, 5-Year, and 10-Year Pancreas Graft Survival*, by Transplant Type



*Death is included as an event.
SRTR Source: 2008 OPTN/SRTR Annual Report, Table 1.13.

Figure III-11. Unadjusted 1-Year, 3-Year, 5-Year, and 10-Year Pancreas Patient Survival, by Transplant Type



SRTR Source: 2008 OPTN/SRTR Annual Report, Table 1.13

Summary



- Liver transplantation is the standard of care for patients with decompensated cirrhosis or other life-threatening complications of liver disease.
- Living donor liver transplant, and ECD/high risk donors are options for symptomatic patients with low MELD scores.
- Kidney transplant provides superior outcomes to other forms of renal replacement therapy but a critical shortage of donor organs remains
- Pancreas transplantation is available in several options (SPK, PAK, PA, islets) with good graft survival though with potential for complications.

SRTR

Heart and Lung Transplant Procedure and Anatomy: Overview for the Procurement Professional

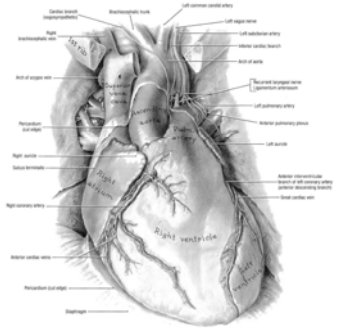
Phillip Camp, Jr., M.D.
 Director, Lung Transplant Program
 Brigham and Women's Hospital
 Assistant Professor, Harvard
 Boston, MA

January 16, 2010

 Brigham and Women's Hospital
 Harvard Medical School

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Procurement



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Procurement

- Careful on-sight inspection
- Maintain stable vital signs
- Wide anatomic dissection
- Bolus injection of prostaglandin E₁ into pulmonary artery
- Clear communication between teams on timing and protocol
- Flushing of lung with cold electrolyte solution
 - Univ of Wisconsin Solution
 - Perfadex



- Antrograde
- Retrograde

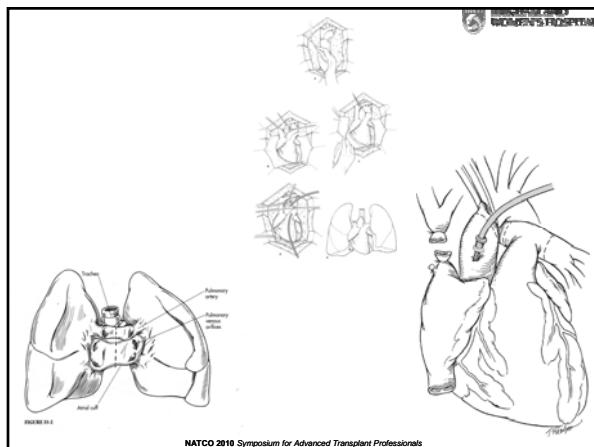
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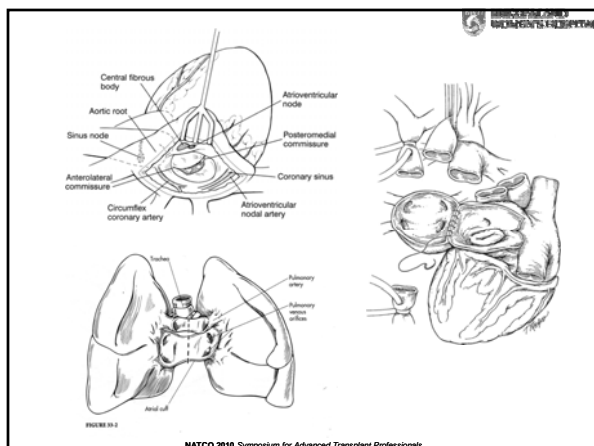
UNIVERSITY OF MICHIGAN
WOMEN'S HOSPITAL

Donor Procurement

- In conjunction with multiple organs and teams
- Heart removed first
 - 1-2 liters cardioplegia, high pressure
 - 4 hours Rule
- Lungs taken as a single or double lung bloc
 - 6 hours Rule
- Removed after 3 liters antegrade flush per lung
 - AND 1-2 liters flushed RETROGRADE before removed from chest
- Stored on ice with lungs inflated to mid-inflation
 - Reduces atelectasis
 - Prevents flooding of the lung during transit

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WOMEN'S HOSPITAL

Implantation

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WOMEN'S HOSPITAL

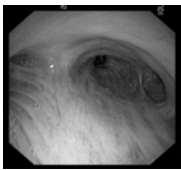
Single Lung Transplant

- Either side is acceptable, but right more readily facilitates cardiopulmonary bypass
- Right is larger volume organ vs. Left
- If there is significant discrepancy on split lung function test, transplant worst side
 - allows patient to be supported
 - avoid prior operative side
- One lung anesthesia with CPB on standby
- TEE

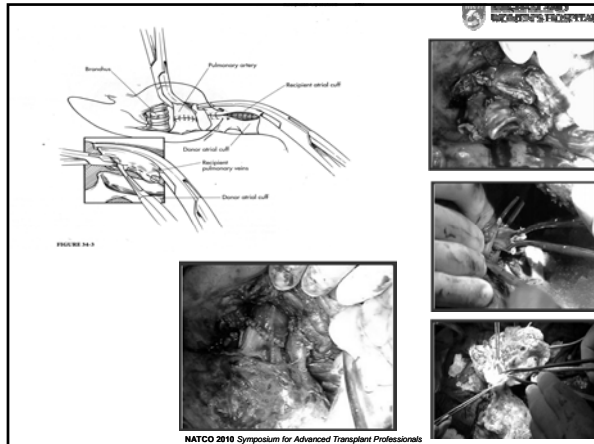
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WOMEN'S HOSPITAL

4-0 monofilament running suture posteriorly and interrupted sutures anteriorly



reprints



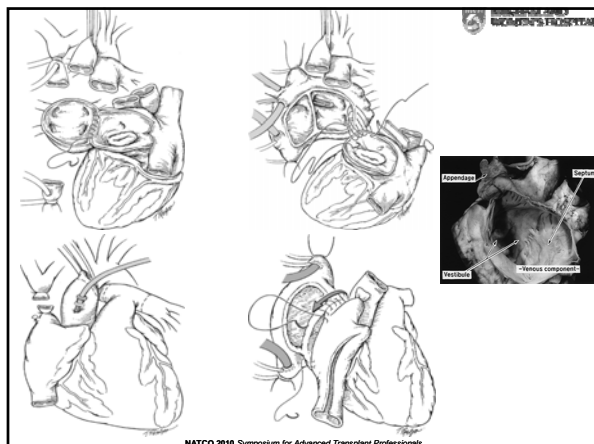
Sequential Bilateral Lung Transplant

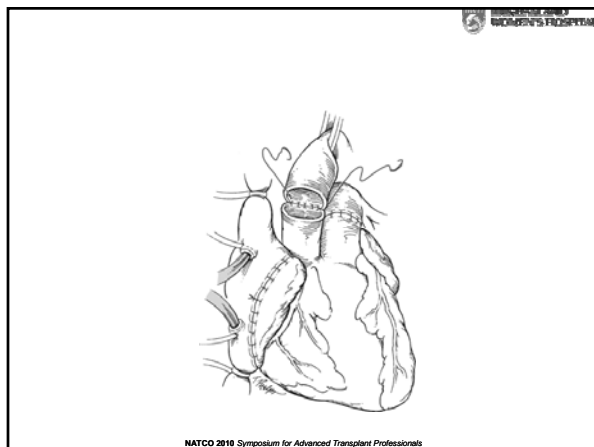
- Transverse Sternotomy with bilateral thoracotomy (clamshell) - 4th Intercostal Space
- Replace the worst lung first, avoid CPB
- Better to establish cardiopulmonary bypass than to see the RV Dilate
- Ischemic Time Trumps all other issues
- CPB utilized in about 50% of Sequential Bilateral Lung Transplant

BLT can be done with or without division of the sternum

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Learning Points about DC impact for Transplantation: Heart

- Fluid Status
 - Distended heart has decreased initial function
 - Distention is bad
 - Heart arrhythmias
- Confirming anatomic dysfunction
 - Valve dysfunction
 - Mitral valve "prolapse"
 - Global vs. focal wall motion dysfunction

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Learning Points about DC impact for Transplantation: Lung

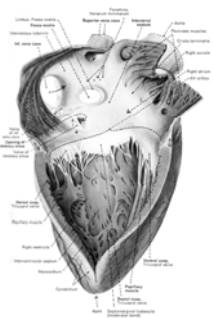
- Airway anatomic variations
- Clearance or debulking airway debris
- Post Transplant tissue perfusion
 - End stage benefit of recruitment
- Post reperfusion tissue edema
 - Early vs intraoperative atelectasis recruitment
 - Fluid Status
 - Pulmonary pressures

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Learning Points about DC impact for Transplantation: Global



- DC on scene seeing problem with surgeon interaction, young surgeons who appear to be uncomfortable with the anatomy or procedure needs to speak up, up-channel issues, be a positive role model



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Thank You for Your Time and Consideration!




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Questions?



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