



# Ultrasound in Abdominal Transplantation

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CLINICAL LEAD FOR ULTRASOUND

*BMUS General Medicine Study Day*  
Friday 26<sup>th</sup> June, 2026

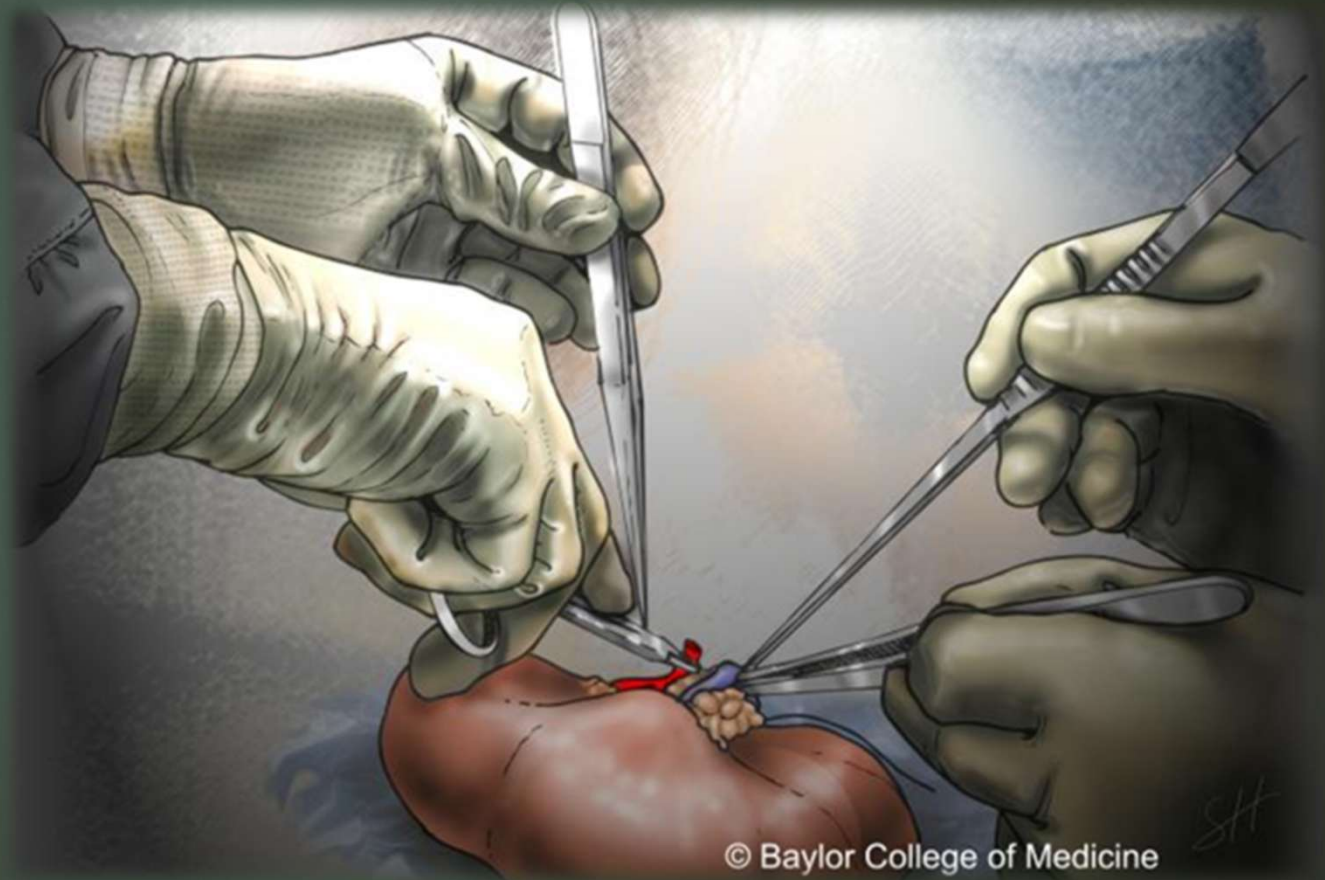
# Overview of Session

- Transplant Medicine
  - Terminology, organs & tissues
  - Viability & other issues
- Renal Transplants
  - Reasons for transplantation
  - Types of renal transplant
  - Anatomy & assessments
  - Common pathological findings
- Pancreatic Transplants
  - Vascular complications
  - Non-vascular complications
- Liver Transplants
  - Reasons for transplantation
  - Types of liver transplant
  - Anatomy & assessments
  - Common pathological findings



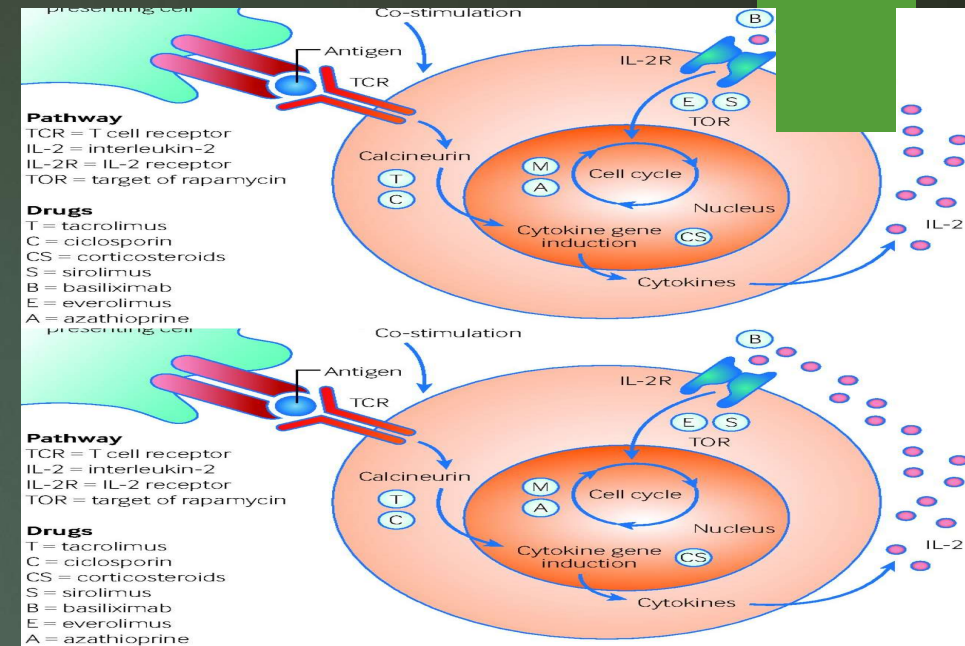
# Transplantable Organs/Tissue

- ▶ Heart valves
- ▶ Heart
- ▶ Kidney
- ▶ Liver
- ▶ Pancreas
- ▶ Lung
- ▶ Bone
- ▶ Intestine
- ▶ Bone Marrow



# Viability & Other Issues

- ▶ Most Tissues are viable for up to 5 years
- ▶ Organs must be transplanted within 24 hours
- ▶ Ethical/Bioethical Issues
- ▶ Immune response and drugs



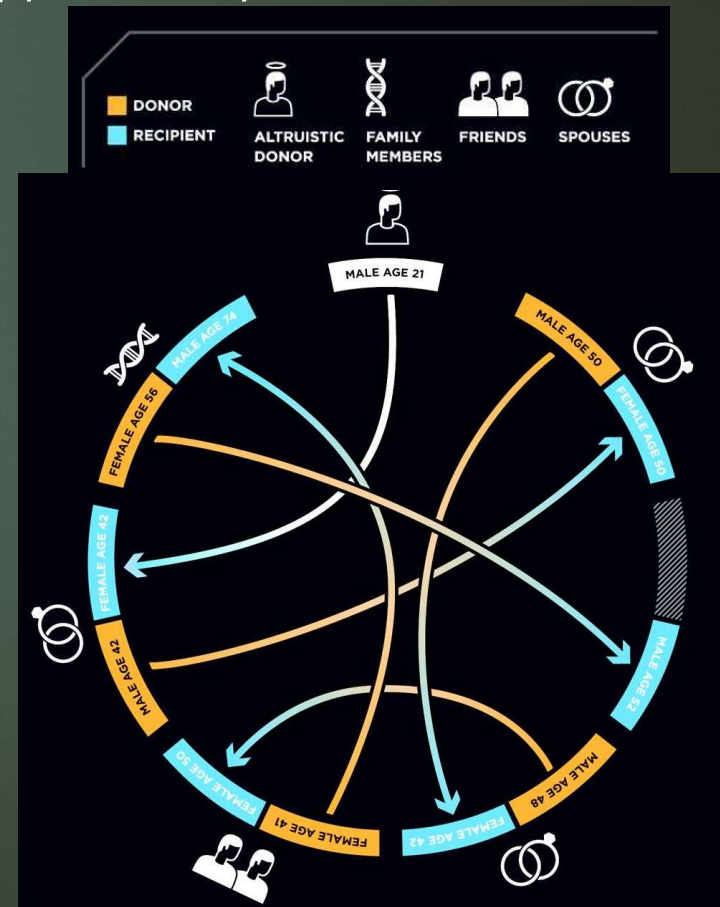
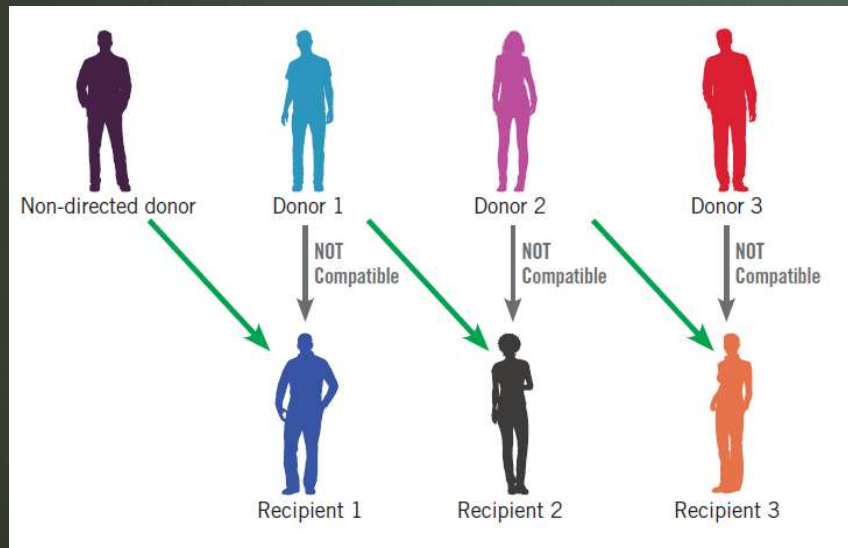
# Transplant Terminology



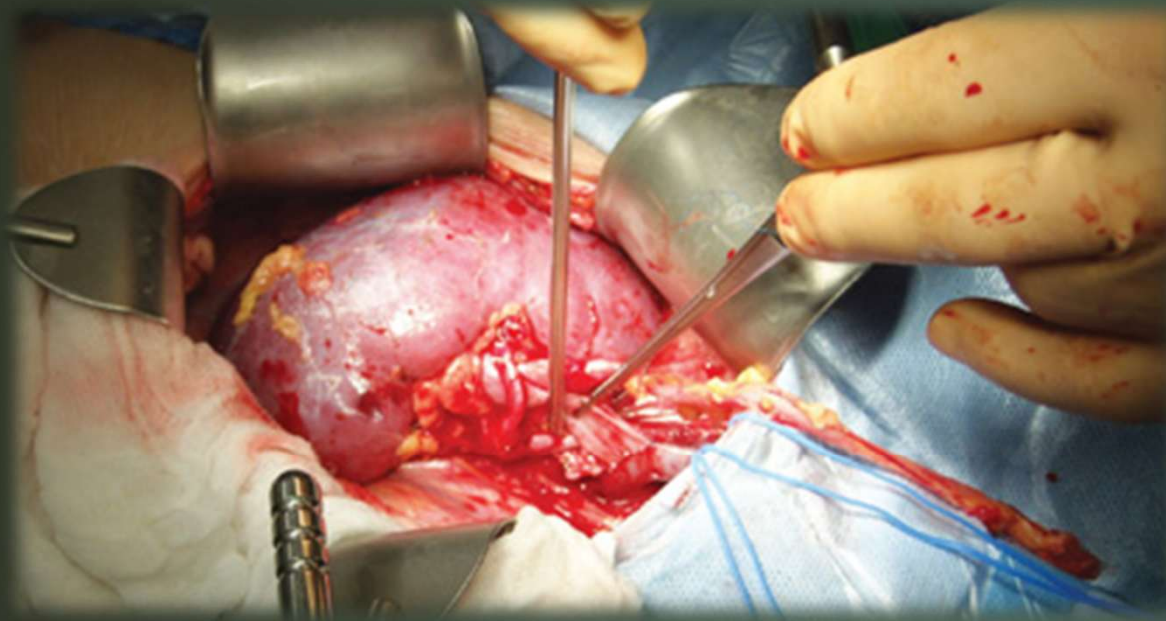
- ▶ Autograft
  - ▶ Transplanted tissue from the same person
- ▶ Allograft
  - ▶ Transplant between 2 genetically non-identical people
  - ▶ Immunity issues will occur
- ▶ Isograft
  - ▶ graft between genetically identical donors (i.e. identical twins)
- ▶ Xenograft – from different species
- ▶ Other – Synthetic/metal implants

# Transplant Terminology 2

- ▶ Donor types
  - Live-related
    - Death after Brain Death (DBD) *previously know as heart-beating*
    - Death after Cardiac Death (DCD) *previously known as cadaveric*
  - Altruistic
  - Transplant pools



# Renal Transplants



## 2021/2022 – NHS Data

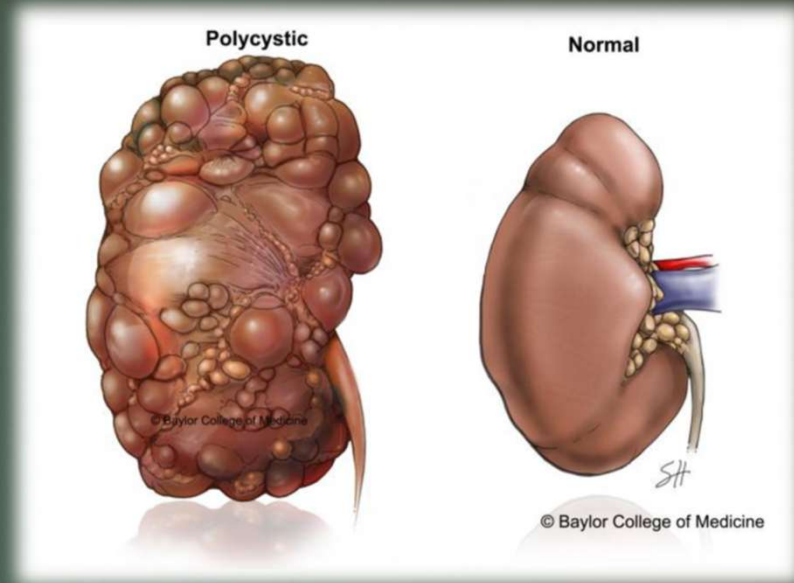
24 x Transplant Centres

2,868 adult kidneys  
transplants performed



# Reasons for Transplantation

- ▶ End stage renal failure
  - ▶ Malignant Hypertension
  - ▶ Infections (severe)
- ▶ Diabetes Mellitus
- ▶ Polycystic Kidney Disease (ADPKD)
- ▶ Autoimmune Diseases

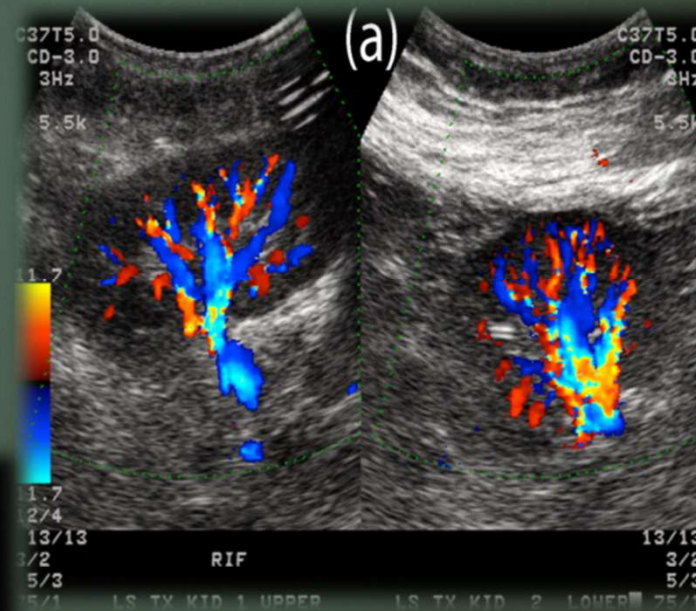


# Types of Renal Transplant

- ▶ Anastomosis types
  - ▶ End to end (*MRA anastomosis to IIA*)
  - ▶ End to side (*MRA anastomosis to EIA*)

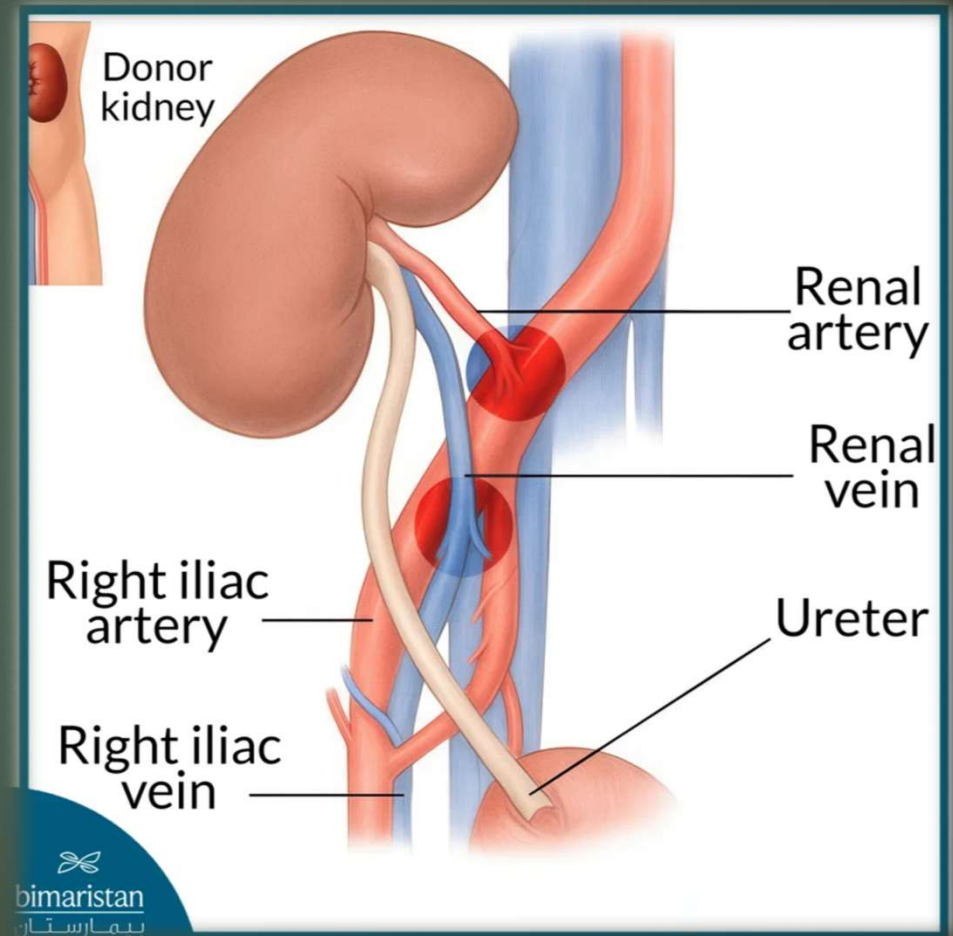
- ▶ Dual transplant

- ▶ Paediatric en-bloc



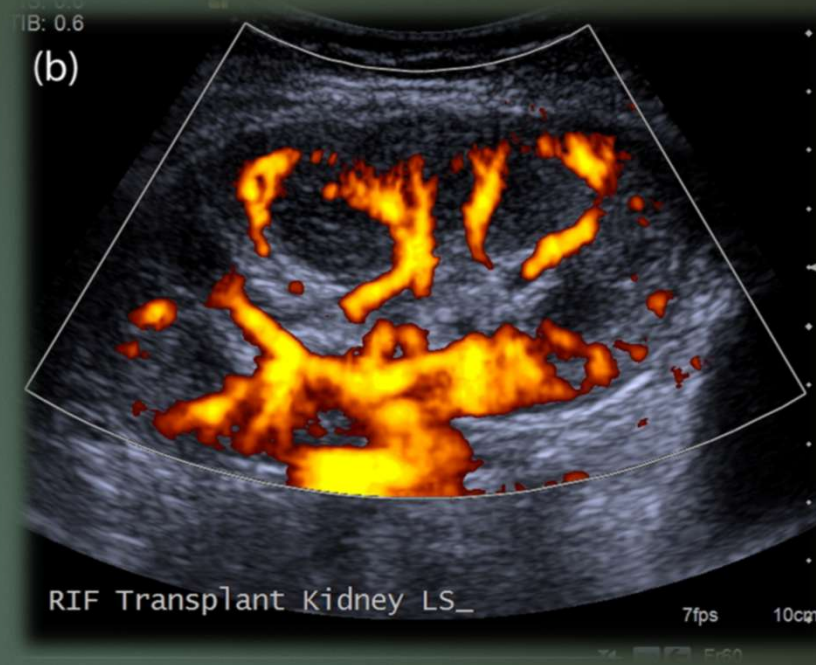
# Kidney Transplant Anatomy

- ▶ Size
- ▶ Overall Perfusion
- ▶ Intrarenal Arteries
- ▶ Main Renal Artery & it's Anastomosis
- ▶ Main Renal Vein
- ▶ Urinary Bladder

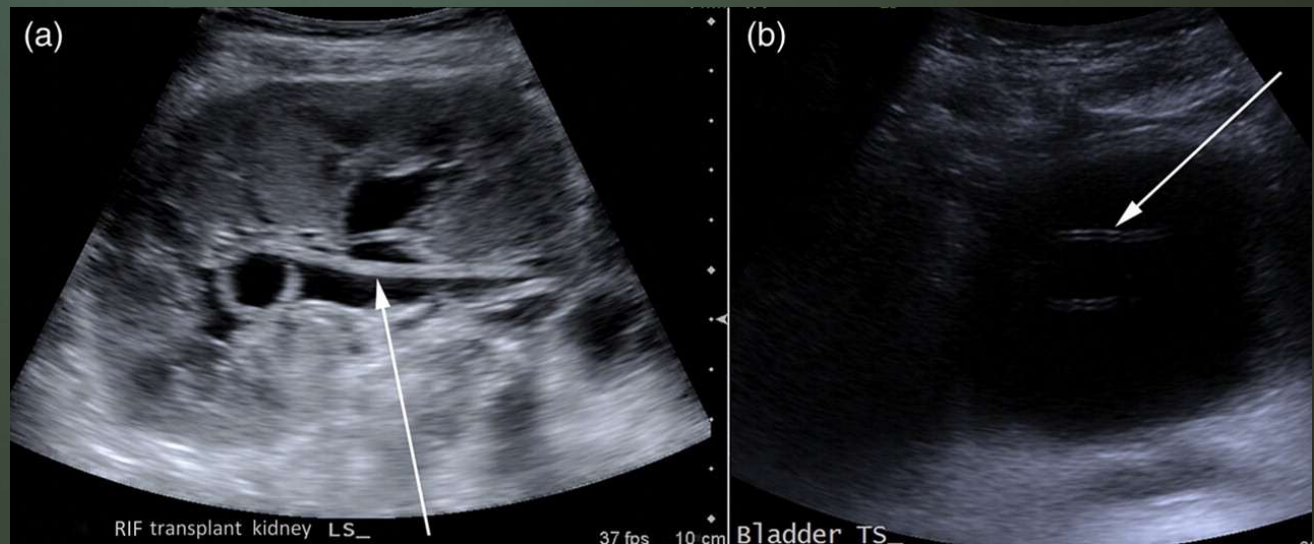


# Standard Assessment

- ▶ B-mode
  - ▶ Transplant Kidney
  - ▶ Bladder assessment
  - ▶ Presence of fluid
  - ▶ Presence of collections

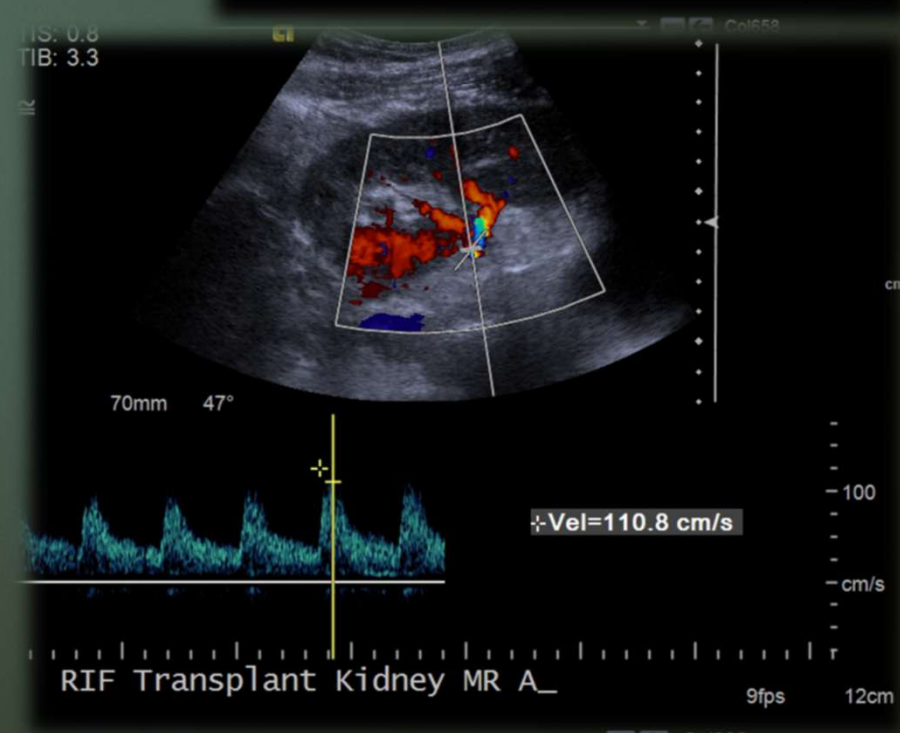
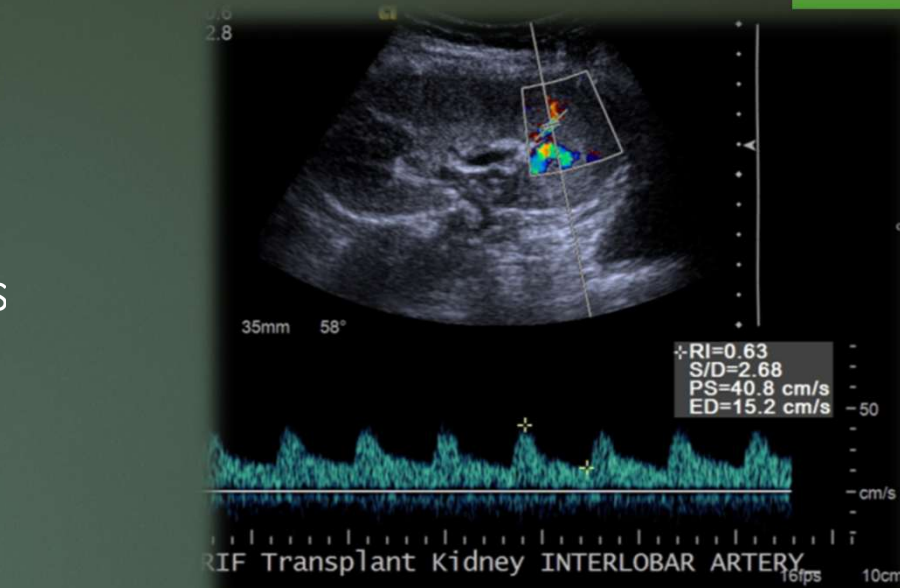


- ▶ Colour/power Doppler
  - ▶ Overall perfusion
  - ▶ Focal lesion assessment



# Vascular Assessment

- ▶ Intrarenal arterial assessment
  - ▶ Interlobar & Segmental arteries
- ▶ Spectral Doppler
  - ▶ Resistive index assessment
  - ▶ Peak Systolic Velocity assessment
- ▶ Extrarenal vessel assessment
  - ▶ Main renal artery & it's anastomosis
  - ▶ Main renal vein



# Kidney - Pathologies

- ▶ Renal Vein Thrombosis
- ▶ Acute Tubular Necrosis
- ▶ Infarction
- ▶ Renal Artery Thrombosis

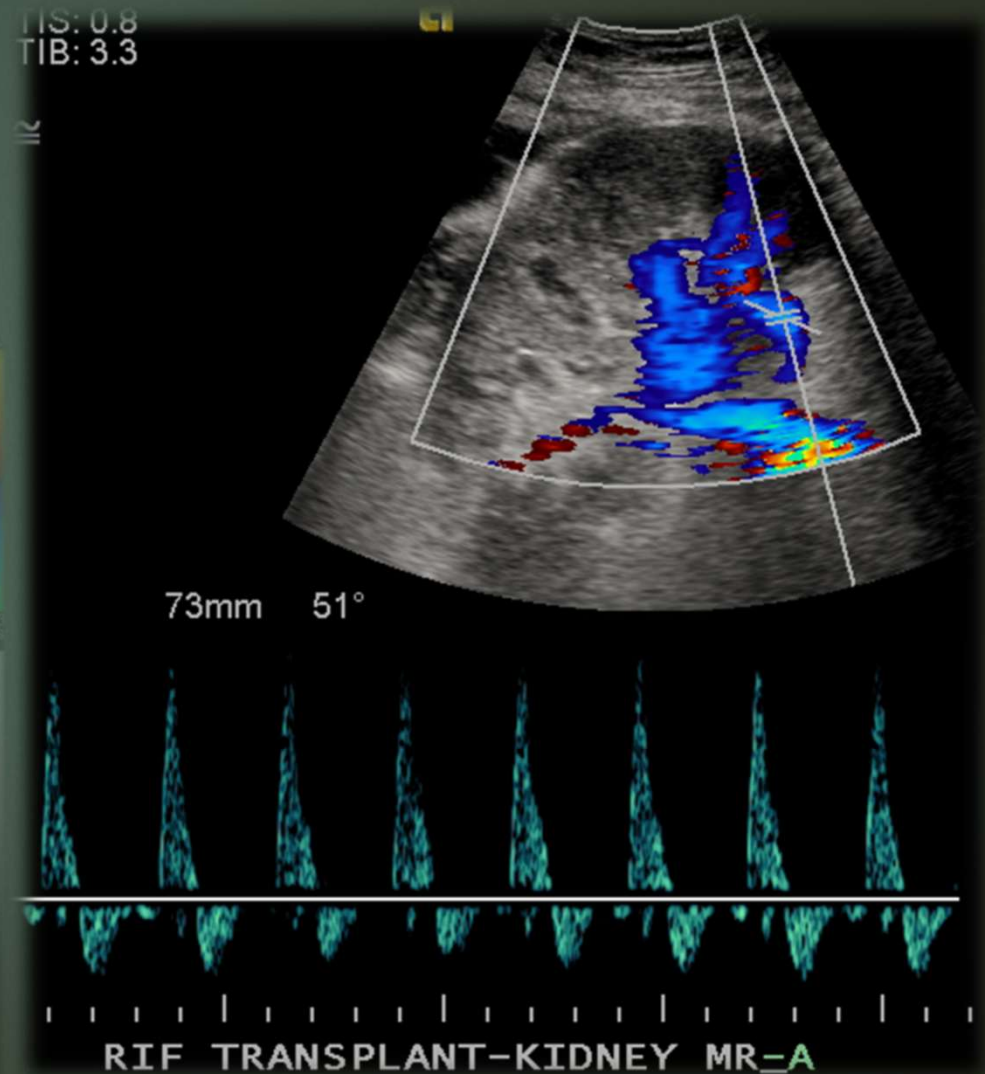
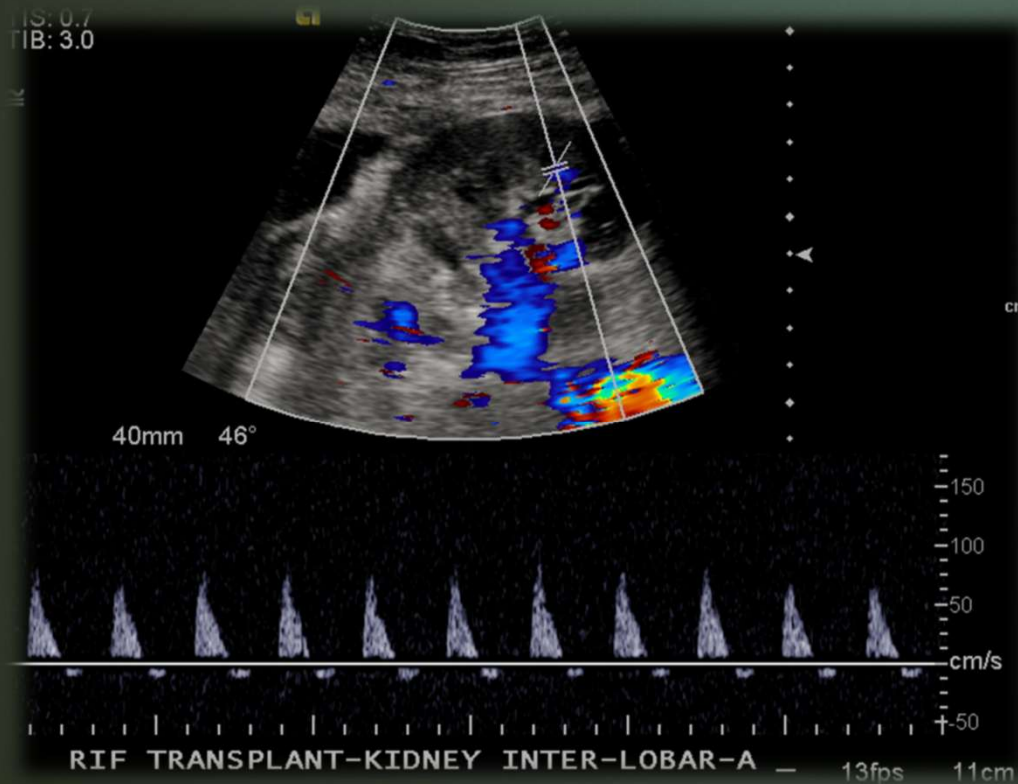
Vascular  
Complications

- ▶ Hydronephrosis/Obstruction
- ▶ Calculi
- ▶ Neoplasia
- ▶ Cysts

Non-Vascular  
Complications

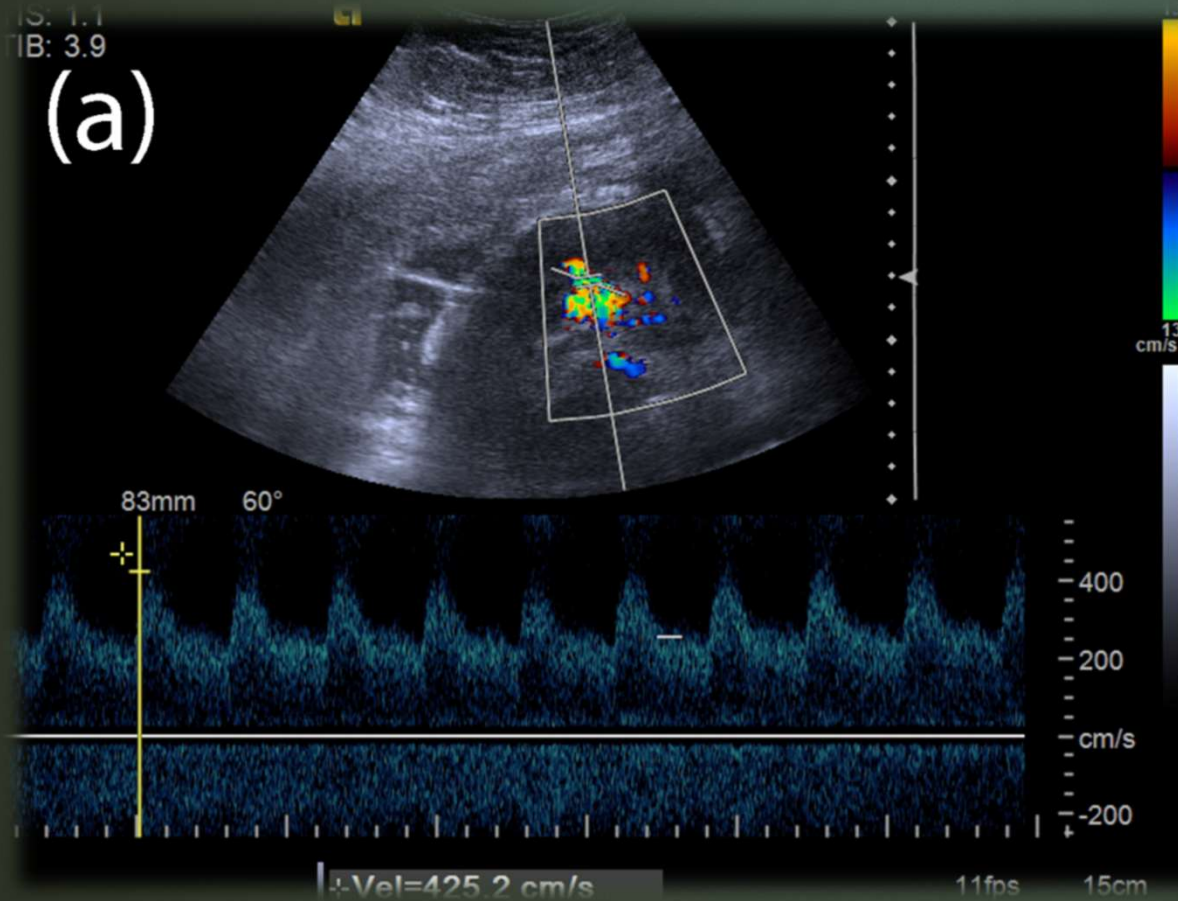
# Renal Vein Thrombosis

- ▶ Clinical Urgent Situation
  - ▶ Needs surgical intervention
- ▶ Reversed diastolic flow



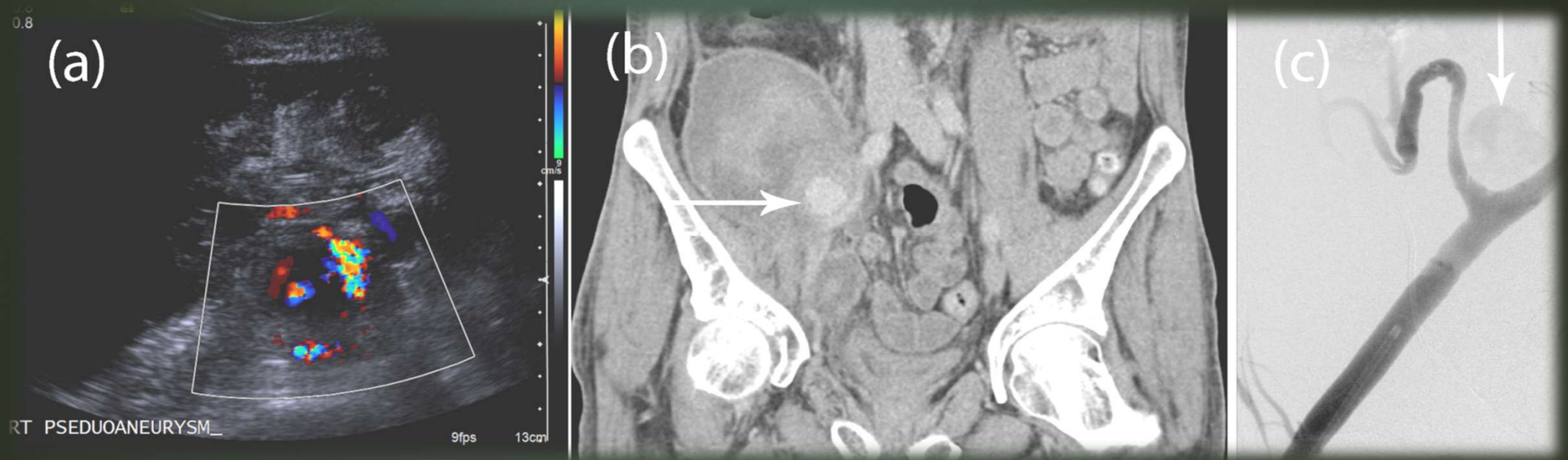
# AV Fistula

- ▶ Usually post biopsy

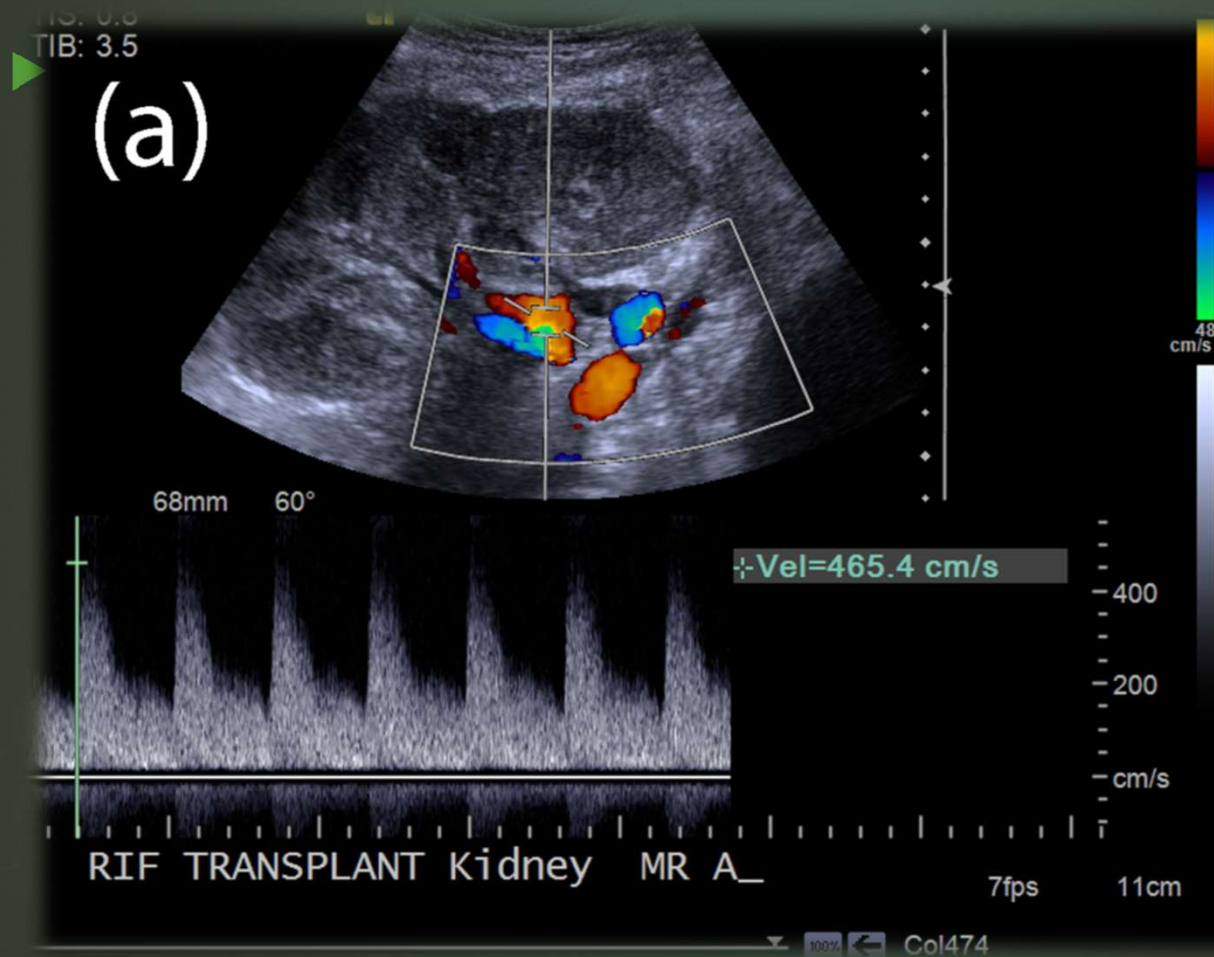


# Pseudoaneurysm

- ▶ Arising from arterial anastomosis

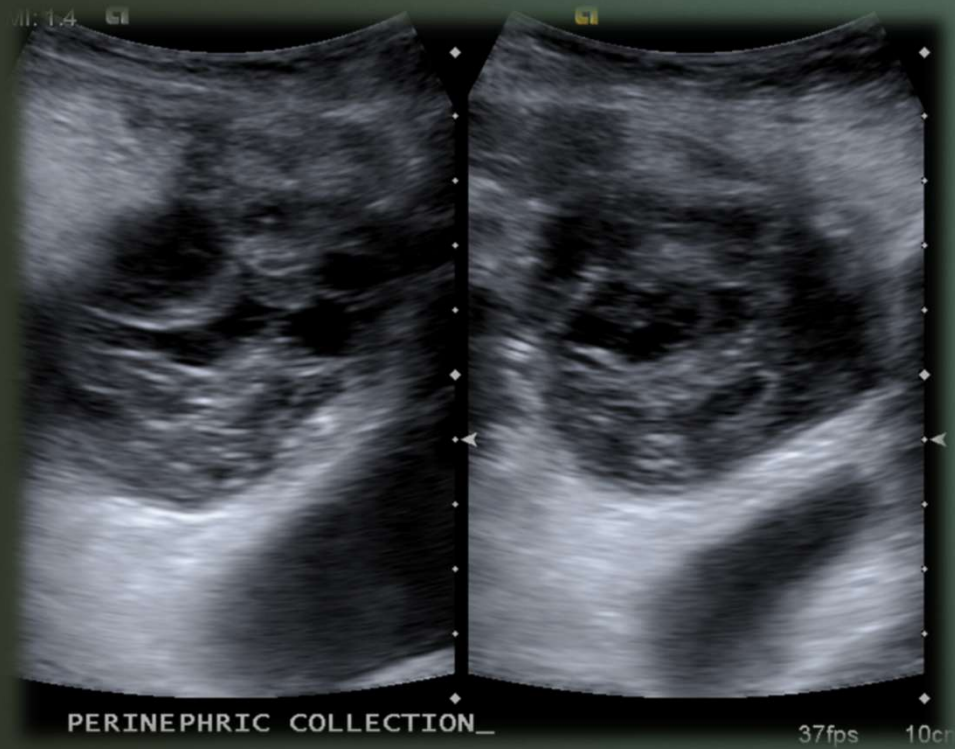


# Renal Artery Stenosis

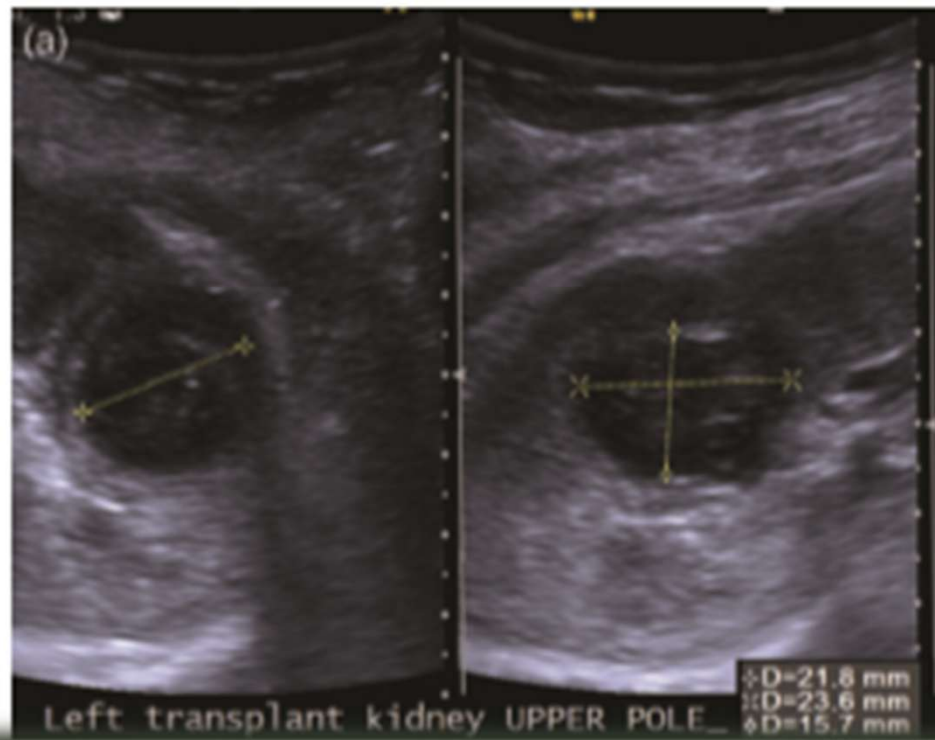


# Collections

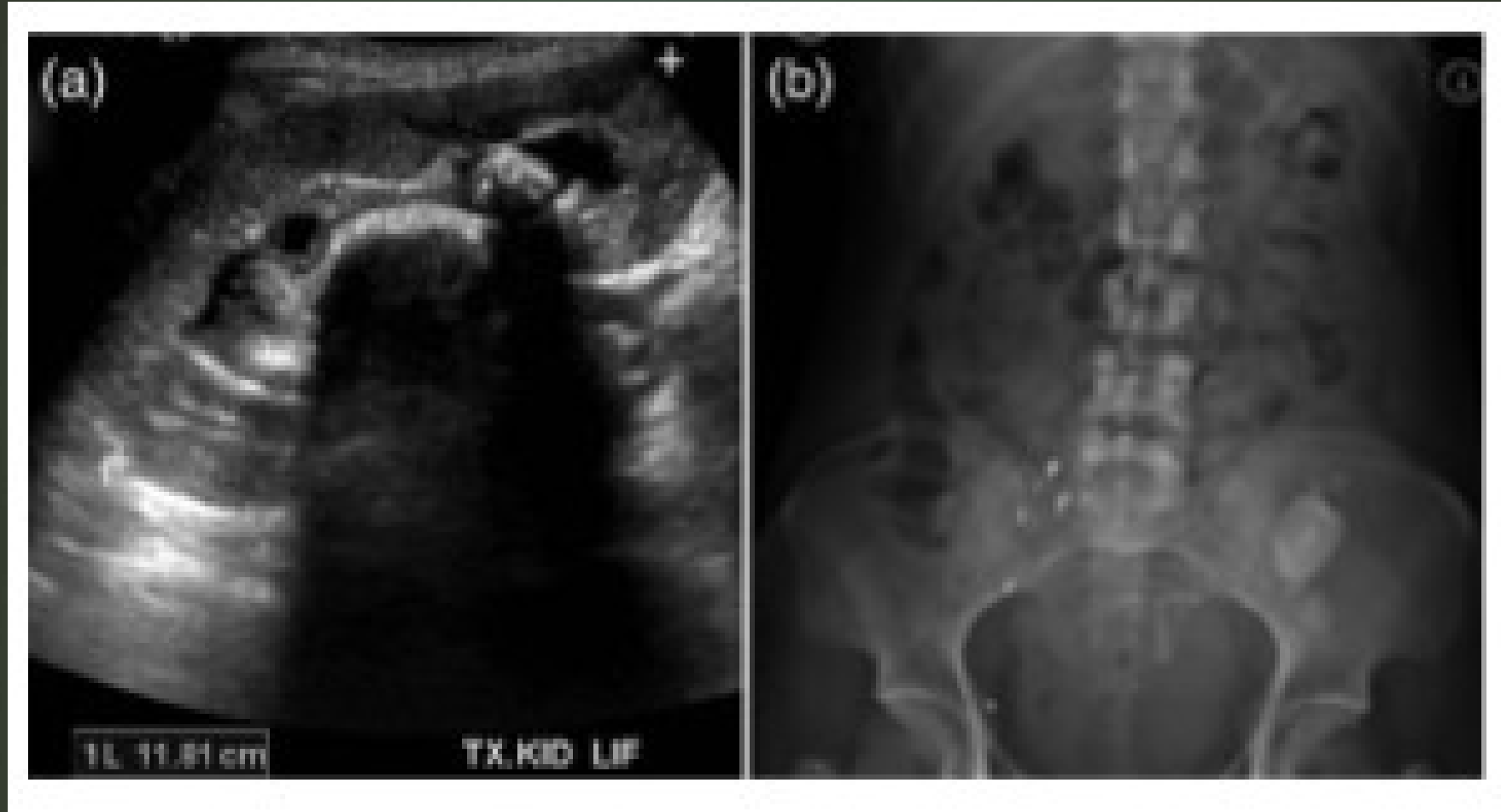
- ▶ Most common complication



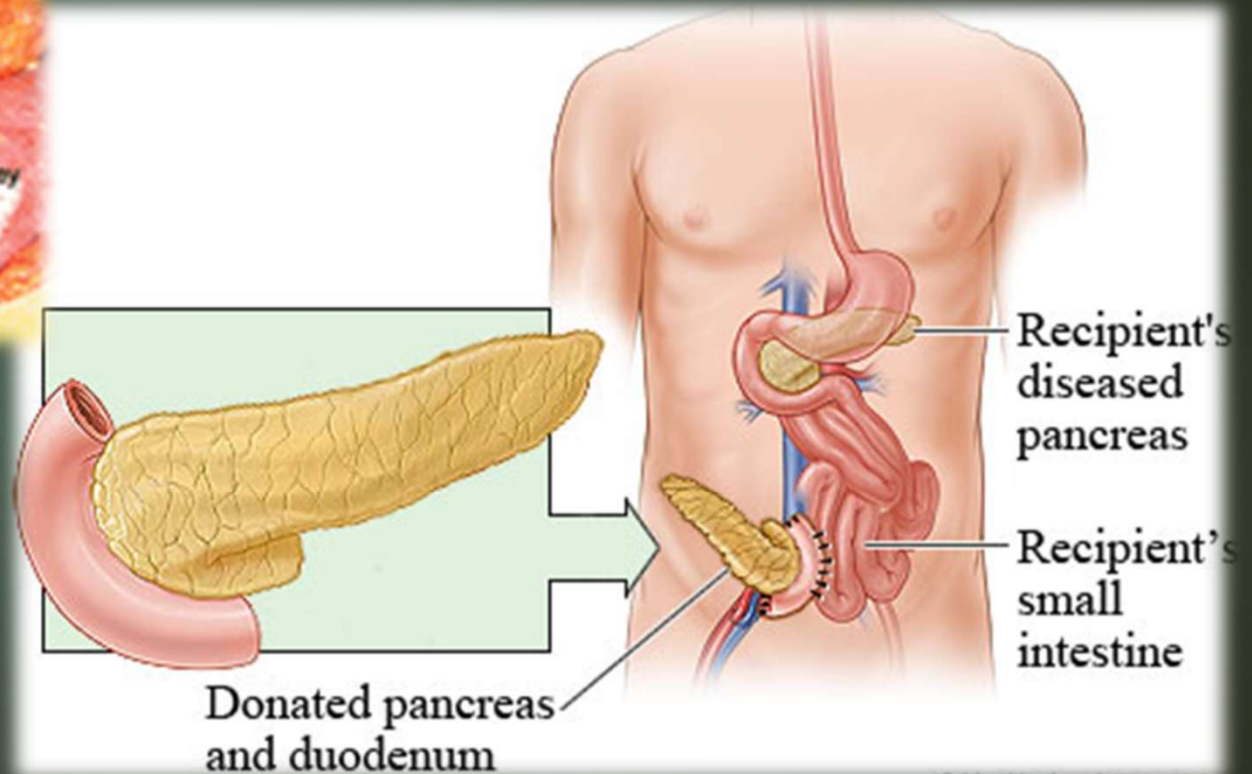
# Cysts/Tumours



# Calculus

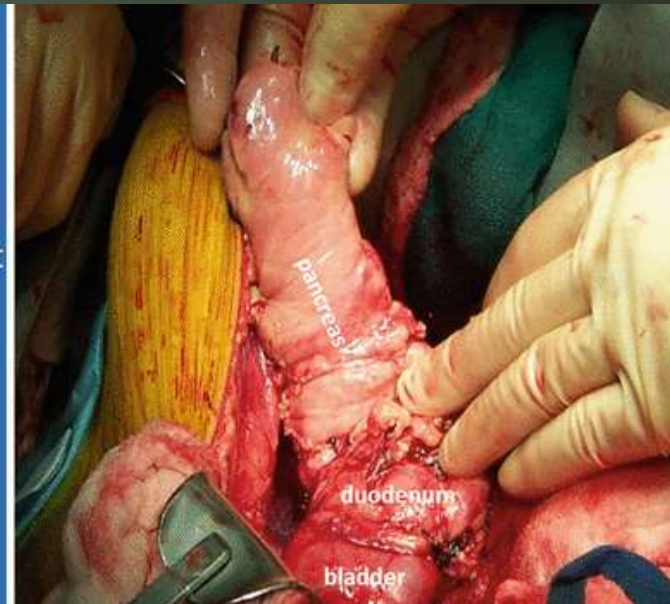
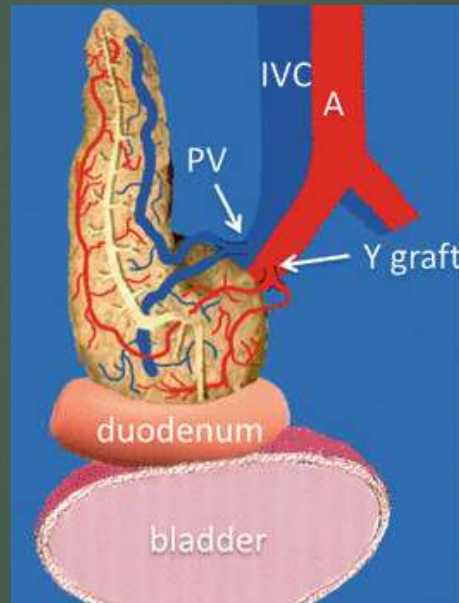


# Pancreatic Transplants



# Pancreatic Transplantation

- ▶ Type 1 DM patients (mainly)
- ▶ Not life-saving but will improve quality of life
- ▶ Harvesting
  - ▶ Ampulla of Vater
  - ▶ Splenic artery and SMA
  - ▶ PV with confluence of SMV and Splenic v

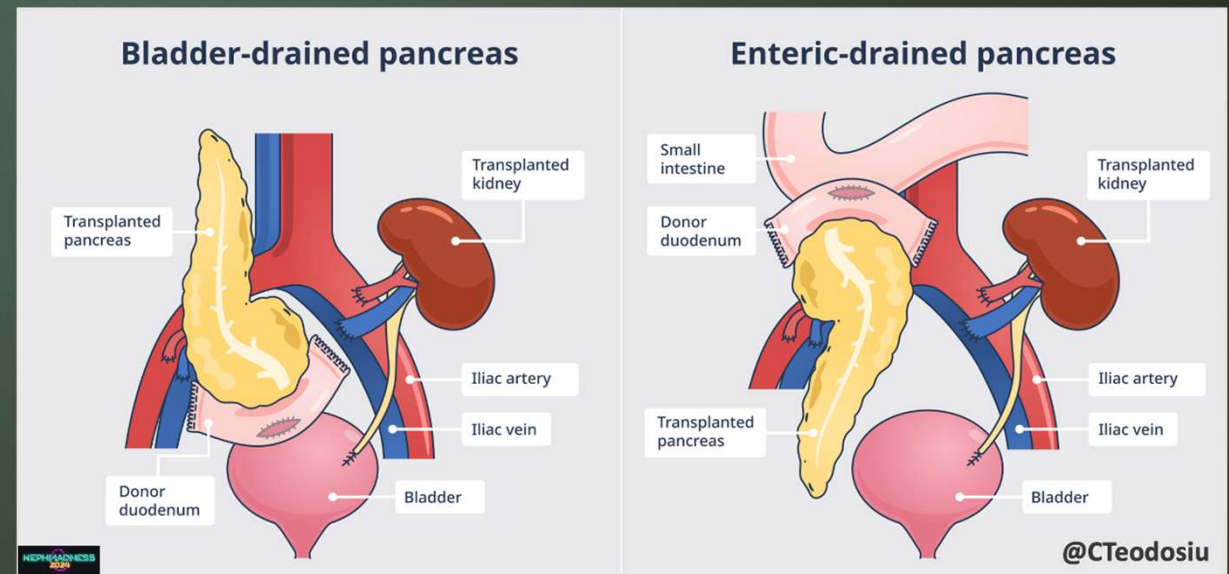


# Pancreatic Transplant

- ▶ Transplant Types
  - ▶ Simultaneous pancreatic & kidney
    - ▶ Renal Tx on left and Panc on right
  - ▶ Living donor renal tx  
(+ (pancreas when available))
  - ▶ Pancreatic only

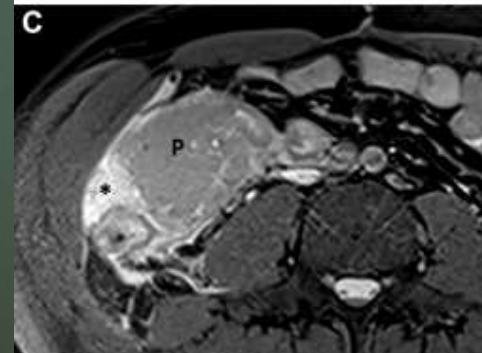


- ▶ Endocrine function
  - ▶ Into iliac or portal vein
- ▶ Exocrine function
  - ▶ Into bladder or bowel



# Pancreatic Transplantation

- ▶ US Appearances
  - ▶ No capsule so difficult to delineate
  - ▶ (CEUS useful to look at graft)
- ▶ Normal
  - ▶ Hypoechoic
  - ▶ Ill-defined with internal vascularity within vessels
  - ▶ HOP: 3-3.5mm (up to 6mm in rejection)



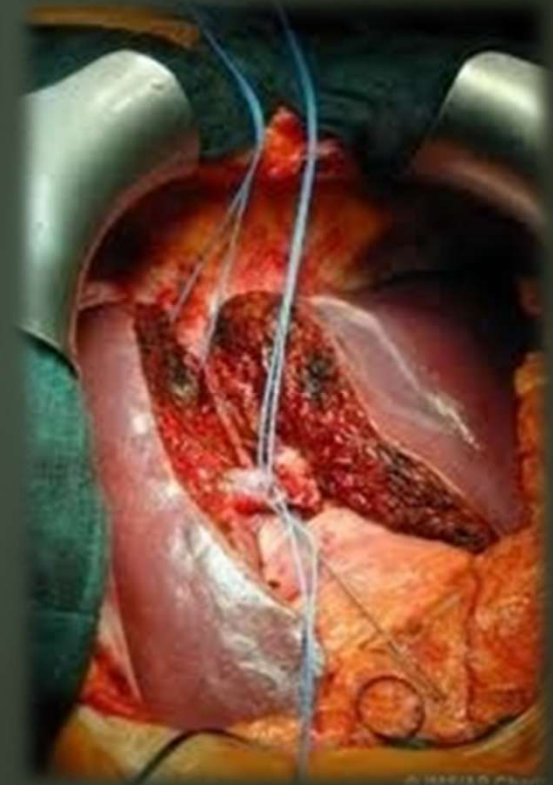
# Liver Transplants



## 2021/2022 – NHS Data

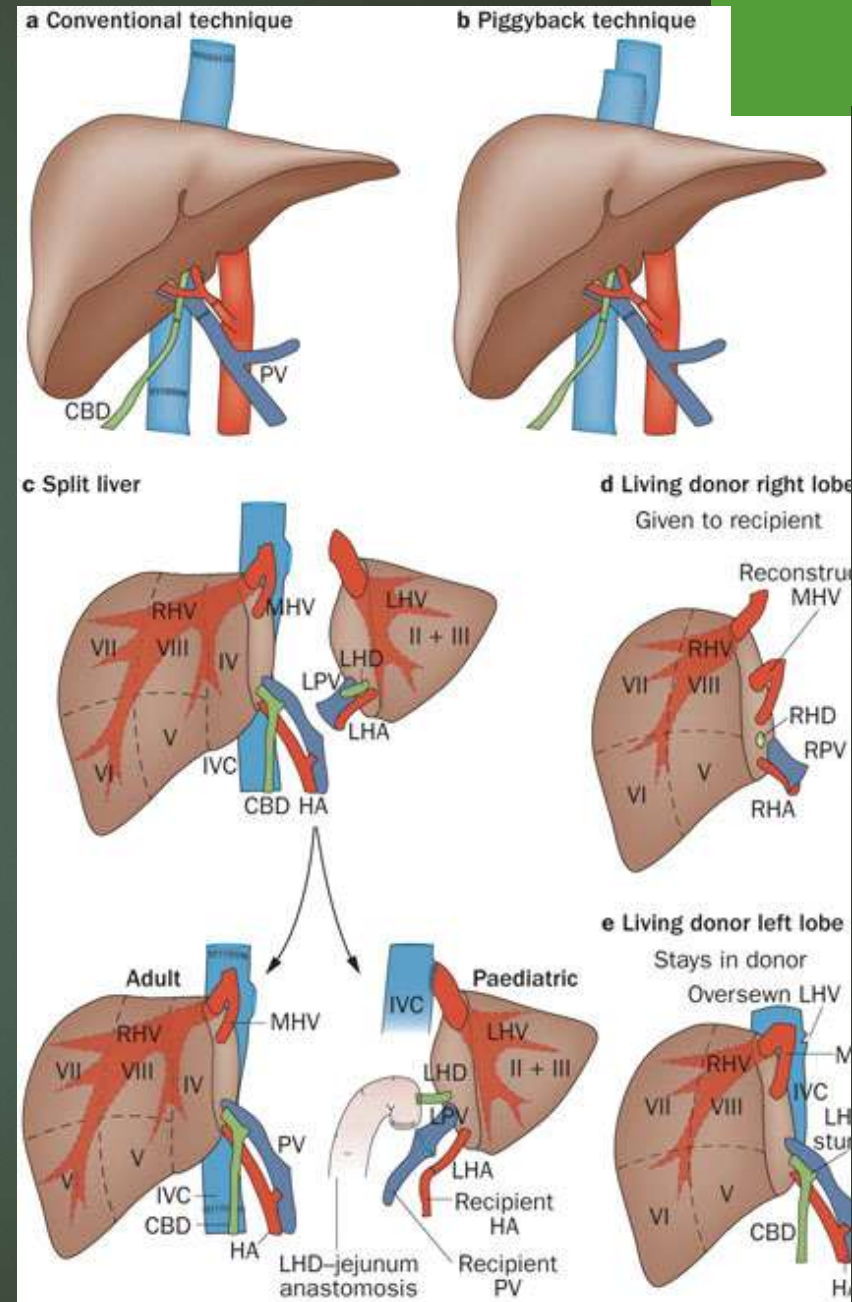
7 x Transplant centres

746 adult liver transplants  
performed



# Types of Liver Transplantation

- ▶ Orthotopic Liver Tx (OLT)
  - ▶ Most Common 90%
  
- ▶ Split transplants
  - ▶ Approx 10%
  - ▶ Left lobe to child
  - ▶ Right lobe to adult (of appropriate body habitus)
  
- ▶ Living Donor (RLL vs LLL)
  - ▶ Full regeneration 8-12 weeks
  
- ▶ Auxiliary transplantation



# Transplanted Liver

Deceased Donor



- Better quantity (Whole graft)
- Donor complication or coercion N/A
- Lower recipient complication

Living Donor



- Better graft quality
- Minimal waiting time
- Elective surgery

# Transplanted Liver (Pre-op Assessment)

- ▶ Portal Venous patency, length & diameter (extra-hepatic)
- ▶ Hepatic artery (HA) anatomical variants
- ▶ Patency of IVC
- ▶ Identify and describe collateralisation from the portal to the systemic circulation
- ▶ Identify and liver lesion that may represent HCC
- ▶ Quantify amount of ascites
- ▶ Estimated extent of liver disease
- ▶ Size of spleen

# Transplanted Liver (Post-op Assessment)

- ▶ Survey liver parenchyma for focal disease or infarction
- ▶ Look for fluid collections
- ▶ Evaluation of biliary system (intra and extrahepatic)
  - ▶ Rule out obstruction, intra-ductal sludge, stones
- ▶ Confirm the presence of both intra and extrahepatic arterial flow and assess waveforms (<200cm/s)
- ▶ Confirm portal venous, hepatic vein and IVC patency and analysis of waveforms especially at anastomotic sites

# Transplant Liver Post-op Complications (Parenchymal)

## ➤ Vascular Complications

- Hepatic Artery Thrombosis (usually presents within the first 2 weeks post-transplant)
- Hepatic Artery Stenosis (presents weeks – months post-transplant)
- Portal Vein Thrombosis (majority occur within 1 month)
- Portal Vein Stenosis (occurs usually after 6 months)
- Hepatic Vein Stenosis (occurs usually after 6 months)

## ➤ Biliary Complications

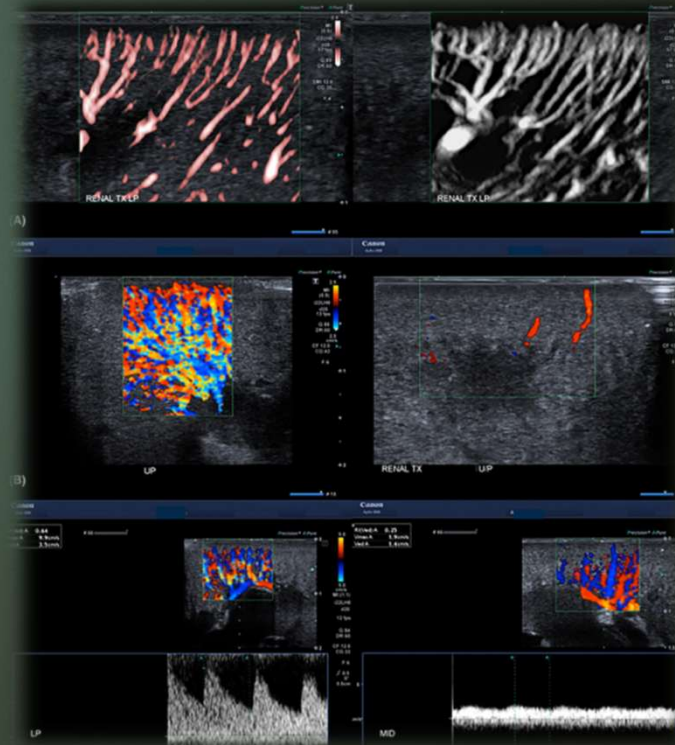
- Biliary obstruction (stones, stenoses)
- Bile leaks and biloma

## ➤ Other Complications

- Infection & Abscesses
- Haematoma
- Neoplasm
- Cirrhosis and parenchymal disease
- Iatrogenic issues (bowel perforation)

# Review

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  - ☺ Reasons for transplantation
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Any  
Questions?