# ULTRASOUND IN SOLID ORGAN TRANSPLANT ASSESSMENT

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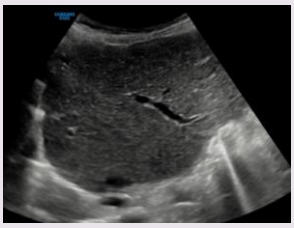
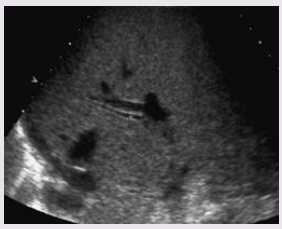
- The rate of solid organ transplantation has more than doubled in the last decade, with liver and kidney the most transplanted organs.
- Transplant grafts are actively monitored for the entirety of the graft life as complications, particularly vascular complications, can lead to graft failure.
- Ultrasound imaging is generally first line in assessment of solid organ transplants when there is a need to exclude post-transplant complications.

## Transplant Assessment:

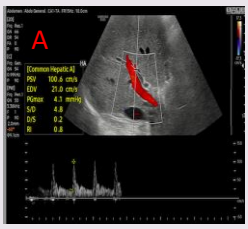
**Liver:** Supine position; low frequency, curvilinear probe

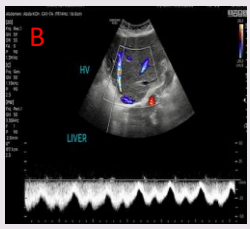


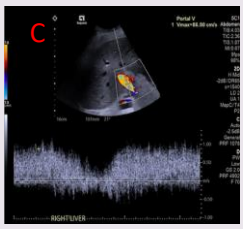
Assess parenchyma for lesion, infarct or abscess and peri-hepatic spaces for collection



Assess common bile duct for dilatation or stricture



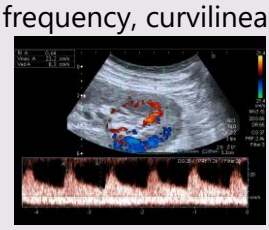



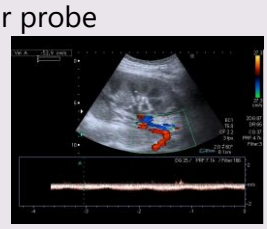




Assess colour and spectral Doppler waveform of hepatic artery (HA), portal and hepatic veins. **HA (A):** continuous diastolic flow, with resistive index (RI) of 0.5 – 0.8. **Hepatic veins (B):** triphasic flow **Portal vein (C):** continuous hepatopetal flow.

**Kidney:** Supine position; empty bladder, low frequency, curvilinear probe

Assess for cortico-medullary (CM) differentiation, hydronephrosis or peri-renal collection





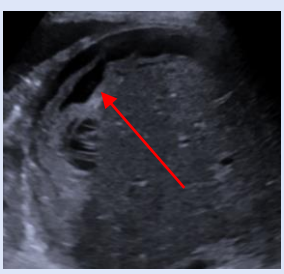
Assess colour and spectral Doppler waveform of selected interlobar artery (RI < 0.7) and vein

## Transplant Complications:

*Vascular*
*Non-vascular*

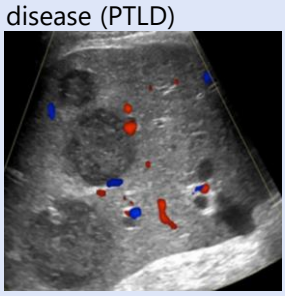
### Liver:

**Collection**
Haematoma is common post-operatively. Biloma, due to bile duct leak, may occur in first 2 months



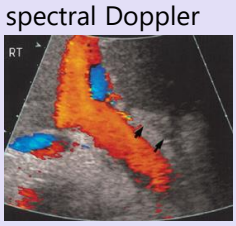
Complex collection adjacent to the right lobe, most likely haematoma

**Lesion**
Within a year of transplant - may indicate post-transplant lymphoproliferative disease (PTLD)

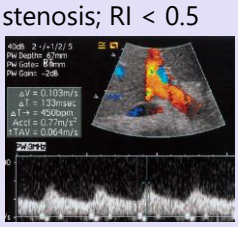


Multiple echo-poor masses in biopsy-proven PTLD

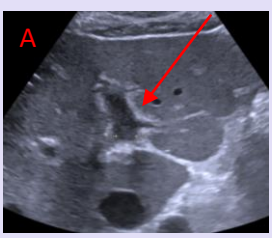
**Hepatic artery thrombosis**
Surgical emergency, with high mortality. Absent colour and spectral Doppler




**Hepatic artery stenosis**
Occurs in first few weeks. Typical 'tardus parvus' pattern distal to stenosis; RI < 0.5

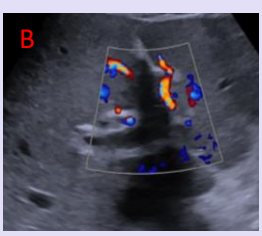


**Hepatic or portal vein thrombosis**



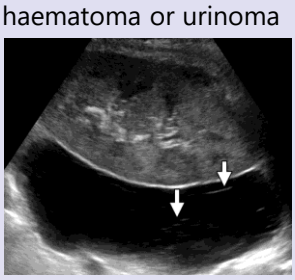

Echogenic material in the left portal vein (A) with absence of colour Doppler flow (B)

**Infarction**
Due to ischaemia, which may be arterial or venous. (Biliary abscess in patient with hepatic artery occlusion)




### Kidney:

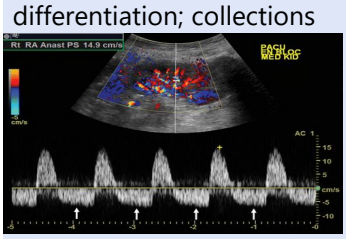
**Collection:** Lymphocele, haematoma or urinoma



Hypoechoic perinephric collection with thin echogenic septae – confirmed lymphocoele

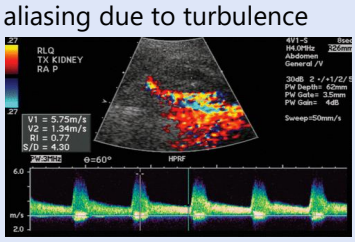
**Rejection**
Occurs in either acute or chronic phase. US findings are non-specific (oedematous enlargement; reduced CM differentiation; poor cortical Doppler flow) but US might reveal another cause for reduced graft function

**Renal vein thrombosis**
In first 5 days. Early US findings: enlargement; loss of CM differentiation; collections




Classic finding: reversed diastolic flow in intrarenal artery, with preserved systolic upstroke

**Renal artery thrombosis**
Between 3 months and 2 years. Findings: increased PSV (> 250 cm/s); abnormal RA:EIA PSV ratio (> 1.8); aliasing due to turbulence




Increased PSV (575 cm/s)

**Solid organ transplant complications may present at any stage and patients may present to both specialist and non-specialist centres.**
**Radiologists and Sonographers should be able to perform post-transplant US assessment to exclude graft-threatening complications.**

**References:**
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