

SPECIAL SONO-CASE

Ultrasound Surveillance of a Xenotransplant Kidney

A research-protocol case emphasizing perfusion, vascular patency, and serial trend interpretation

CLINICAL CHALLENGE A 55-year-old research participant undergoes transplantation of a genetically modified porcine kidney under an approved clinical protocol and is scanned for rising creatinine.

Clinical context

Key element	Finding
Clinical detail 1	Recent xenotransplantation under research protocol
Clinical detail 2	Creatinine increase from baseline
Clinical detail 3	Immunosuppression and infection prophylaxis
Clinical detail 4	No focal graft tenderness

Learning objectives

- Perform a safe, focused examination adapted to the altered anatomy or clinical context.
- Recognize the principal diagnostic pattern and its most important mimics.
- Document limitations and communicate a clinically actionable impression.

Scanning protocol

- Follow the institution’s research and transplant protocol; coordinate with transplant surgery, nephrology, pathology, and research teams.
- Document graft size, echogenicity, corticomedullary differentiation, collecting system, perinephric collections, and ureter/bladder when relevant.
- Evaluate main renal artery/vein, anastomoses, segmental/interlobar arteries, RI, acceleration time, and perfusion.
- Trend against the patient’s own immediate postoperative baseline; human allograft thresholds may not transfer directly to xenografts.

Sonographic findings

- Graft is mildly enlarged with reduced corticomedullary differentiation.
- Main arterial and venous anastomoses are patent without focal aliasing.
- Interlobar RI increased from 0.66–0.71 at baseline to 0.83–0.88; perfusion is globally reduced.
- No hydronephrosis or compressive collection is present.

Diagnostic reasoning

The nonspecific pattern raises concern for graft dysfunction but does not identify the cause. Rejection, drug toxicity, infection, ischemia, and systemic hemodynamics require multidisciplinary correlation and often biopsy.

Suggested report

IMPRESSION Patent xenograft renal artery and vein without focal anastomotic stenosis. Interval increase in intrarenal resistance and globally reduced perfusion with mild graft enlargement. Findings are nonspecific for graft dysfunction; correlate urgently with laboratory trends, systemic hemodynamics, protocol-defined biomarkers, and transplant team assessment.

Pitfalls and quality checks

- Applying standard human transplant cutoffs as absolute xenograft criteria.
- Diagnosing rejection from elevated RI alone.
- Ignoring baseline and serial trend data.

ARDMS-style review questions

Elevated RI in a graft is:

- A. Nonspecific and requires correlation
- B. Diagnostic of rejection
- C. Proof of thrombosis
- D. Always normal

Answer: A

The strongest interpretation method is:

- A. Serial trend versus protocol baseline
- B. One isolated velocity
- C. Kidney length alone
- D. Color gain alone

Answer: A

Teaching takeaway

KEY POINT The nonspecific pattern raises concern for graft dysfunction but does not identify the

cause. Rejection, drug toxicity, infection, ischemia, and systemic hemodynamics require multidisciplinary correlation and often biopsy.

References and guidance

- AIUM Practice Parameter for Duplex Sonography of Transplanted Kidneys.
- Institution-specific xenotransplant clinical trial and research protocols.

This fictional, de-identified composite case is intended for professional education. It does not replace local protocols, qualified interpretation, specialist consultation, or patient-specific medical care. Rare procedures and research settings require institution-specific guidance.