

# ***GUNDERSEN HEALTH SYSTEM ULTRASOUND DEPARTMENT POLICY AND PROCEDURE MANUAL***

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SUBJECT: Liver Transplant Ultrasound Exam

SECTION: Radiology Ultrasound

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## **Patient Prep:**

NPO 12 hours prior to exam

**Purpose:** “Doppler ultrasound plays an important role in the postoperative management of hepatic transplantation, by enabling early detection and treatment of various vascular complications. Liver transplantation is performed for a variety of irreversible acute and chronic liver diseases for which no other satisfactory therapy is available. Patients are selected for transplantation when their life expectancy without transplantation is less than the life expectancy following the procedure. Accepted contraindications include extrahepatic malignancy, active untreated sepsis, advanced cardiopulmonary disease, active alcoholism or substance abuse, or an anatomic abnormality precluding the surgical procedure. Whole-liver transplantation is an accepted and successful method of treating end-stage liver disease. Ultrasonography (US) is the initial imaging modality of choice for detection and follow-up of early and delayed complications from all types of liver transplantation. Knowledge of the surgical technique of liver transplantation and awareness of the normal US appearance of the transplanted liver permit early detection of complications and prevent misdiagnosis.”

**Indications** for an ultrasound examination of the liver transplant include but are not limited to:

1. Evaluation for vascular patency and/or suspected thrombosis, anastomosis stenosis (or downstream affects via abnormal waveform), or pseudoaneurysm
2. Evaluation for a possible fluid collection – intra and/or extrahepatic
3. Assessment of the biliary tree for dilatation (can be segmental in the setting of hepatic artery infarct), a stricture, biloma, or an abscess
4. Assessment of the transplant in the setting of abnormal liver function test results
5. Evaluation for pain, fever, sepsis, or other clinical issues
6. Follow-up of abnormal findings on a prior transplant ultrasound examination
7. Evaluation for recurrent malignancy, mass, or posttransplant lymphoproliferative disorder
8. Evaluation for cirrhosis or recurrent underlying liver disease

## **Imaging Protocol:**

### Grayscale:

- Transverse liver with all hepatic veins: take more than one image if necessary to be sure all three hepatic veins are imaged.
- Transverse image of the liver with the portal vein.
- Longitudinal liver with images to include:
  - left lobe of liver with prox. aorta
  - left lobe of liver with left portal vein
  - liver with IVC labeled
  - right lobe of liver with right portal vein
  - right lobe of liver / right kidney interface
- Longitudinal measurement of CHD
- Longitudinal measurement of CBD
- All 4 quadrants looking for ascites

### Color/Spectral Doppler:

- Main hepatic artery for patency, waveform, and angle-corrected measurement of PSV, RI
- RT and LT hepatic arteries for patency, waveform, and angle-corrected measurement of PSV, RI  
(Normal hepatic artery = PSV < 1 m/s and RI 0.5 to 0.7)
- MPV for patency and waveform with angle-corrected measurement of PSV
- RPV and LPV for patency and flow direction
- Hepatic veins – RHV, MHV, LHV – for patency and waveform
- IVC for patency and waveform
- Demonstrate coronal hepatic vein confluence with IVC using color Doppler

## **References**

1. “Ultrasound of Liver Transplants: Normal and Abnormal”  
[https://pubs.rsna.org/doi/10.1148/rg.235035031?url\\_ver=Z39.88-2003&rfr\\_id=ori%3Arid%3Acrossref.org&rfr\\_dat=cr\\_pub++0pubmed&](https://pubs.rsna.org/doi/10.1148/rg.235035031?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub++0pubmed&)
2. “Postoperative Doppler Evaluation of Liver Transplants”  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4247505/>
3. “AIUM Practice Parameter for the Performance of an Ultrasound Examination of Solid-Organ Transplants” [www.aium.org](http://www.aium.org)