 <p><b>SOUTHWESTERN MEDICAL CENTER</b></p> <hr/> <p>UNIVERSITY HOSPITALS &amp; CLINICS</p>	<p><b>UNIVERSITY HOSPITAL – ST PAUL</b></p> <p>Guideline No: UTSW-04.OLT  Created: July 2007  Revised: July 2008</p>
<p><b>Liver Transplant Program</b></p>	

## PATIENT EVALUTAION

**I. Purpose** – To outline the evaluation of potential recipients for liver transplantation.

**II. Policy**

**A. Medical Evaluation**

All patients will be treated with compassion, dignity, and respect. In accordance with University of Texas Southwestern (UTSW) Medical Center policy, we shall provide all patients with impartial access to treatment regardless of race, religion, sex, ethnicity, or handicap. These criteria assure than all potential recipients have fair, non-discriminatory access to the distribution of organs.

UT Southwestern is committed to providing health care services to those in need. To accomplish this goal, the institution must be a steward of the resources available to supply this care. Transplantation involves a long-term personal and financial commitment to medical care. To carry out its mission, UTSW must assure that transplant candidates cared for at UTSW possess adequate resources to fulfill the financial obligations attendant to transplantation. In doing so, the institution may preserve its assets for the greatest service to the entire patient community and to satisfy itself that the scarce organs are responsibly utilized by individuals able to obtain needed care and therefore achieve long-term benefit from the procedure.

Before being transplanted, each potential transplant candidate must demonstrate the ability to meet the expense of medical care related to transplantation. Confirmation of adequate insurance benefits or a cash deposit in accordance with the policy, accompanied by evidence of reasonable ability to provide for post-transplant needs, will satisfy this requirement.

Each patient referred for liver transplantation undergoes a comprehensive evaluation to determine the etiology (cause) and stage of liver disease as well as to search for any medical conditions which might impact the transplant operation or post-operative course. Each patient is evaluated by a team of hepatologists (liver specialists), transplant surgeons, infectious disease specialists, and pulmonary physicians. Selected patients have cardiology, endocrine, or nephrology consults prior to transplantation. A summary of the full evaluation is at the end of this section.

## 1. Transplant Hepatology

The evaluation of potential candidates for liver transplantation is initiated by the Transplant Hepatology Section in the Department of Medicine. Most patients are evaluated in the liver transplant clinic. The transplant hepatology attending is responsible for performing and documenting a complete history and physical examination. Patients who are too ill to undergo transplant evaluation as outpatients may be admitted.

Patients with chronic hepatitis have serologic testing for hepatitis A (HAV), hepatitis B (HBV), and hepatitis C virus (HCV) infections. **Patients who are HCV-PCR-negative (absence of virus) should NOT be designated as HCV-positive in the records.** In addition, metabolic and autoimmune causes of chronic hepatitis are sought through testing for anti-nuclear (ANA), anti-smooth muscle (AMA), alpha-1-antitrypsin levels, serum iron, ferritin, and total iron binding capacity, and ceruloplasmin levels. Slit lamp examination is performed in patients suspected of having Wilson's disease. In addition, a careful history of potential causes of drug induced chronic hepatitis is sought.

Patients with cholestatic disease undergo testing for antimitochondrial antibody (AMA), IgM levels, and have endoscopic or MR retrograde cholangiopancreatography (ERCP or MRCP) performed as necessary

Liver biopsies are usually not performed in patients referred for transplantation because of the risk associated with concurrent coagulopathy and ascites in patients with terminal liver disease. If prior biopsies are available, the liver biopsy of each patient referred for transplantation is reviewed by the hepatologist in consultation with the Department of Pathology. Special stains are performed on paraffin specimens from referred biopsies for alpha-1-antitrypsin globules and hepatitis B virus antigens as needed. In addition, selective biopsies may undergo quantitative copper and iron determination when Wilson's disease or hemochromatosis is suspected.

The clinical stage of each patient's liver disease is assessed by determination of the Child-Turcotte-Pugh (CTP) score, the model for end-stage liver disease (MELD) score, and the Mayo Clinic prognostic indices for primary biliary cirrhosis and sclerosing cholangitis. Overall health is assessed using such studies as thyroid function tests including T4, T3, and rT3, and cardiac testing. The CTP score should be used to help decide when patients are ready for listing. Patients with a MELD score >10 and a CTP score >7 are starting to decompensate and should be considered for evaluation and listing.

## 2. Infectious Disease.

Selected patients may require a comprehensive infectious disease consultation by a member of the Infectious Disease Division of the Department of Medicine. All patients will have a full infectious diseases history with special attention to:

- a. Unusual or unexplained infections

- b. Antimicrobial allergies (including an exact history of reactions and any documentation available)
- c. History of childhood illnesses and vaccination.
- d. Current vaccination history:
  - 1) Last tetanus less than 10 year ago – if not, administer tetanus/diphtheria booster now
  - 2) Pneumovax ever – if not, administer now
  - 3) Hepatitis A and B – if negative, vaccinate per protocol below
  - 4) Influenza – administer yearly in fall/winter
  - 5) Measles, if susceptible – birth after 1957 and no clinical disease or history of vaccination. Booster recommended for those immunized before 1983.
- e. Travel and residence history, especially for risk of intestinal parasites. If at risk, do stool O&P exams x 3 and consider Serologies for coccidiomycosis, histoplasmosis, and strongyloides.
  - 1) Coccidiomycosis – Midwest and south United States
  - 2) Histoplasmosis – Texas
  - 3) Blastomycosis – South America
- f. History of tuberculosis exposure, last chest x-ray, and PPD
- g. Sexual history and history of sexually transmitted diseases
- h. Use of intravenous drugs
- i. History of severe diarrheal diseases, especially with fevers, blood in stool, or prolonged symptoms (if so, do stool cultures and ova & parasite exam x 3)
- j. History of hepatitis
- k. Transfusion history (note HIV risk if between 1980 and 1985).

3. **Pulmonary.**

Each patient undergoes testing including resting arterial blood gases. Exercise tolerance and pulmonary function tests are performed as indicated. Patients are seen in consultation by a member of the Pulmonary/Critical Care team as deemed necessary. All patients with suspected hepatopulmonary syndrome (HPS) or portopulmonary hypertension (ppHTN) will need a full pulmonary consultation. See protocols for HPS and ppHTN in Section F below.

4. **Cardiology.**

Each patient undergoes EKG and 2-D echocardiography for determination of left and right ventricular function as well as pulmonary arterial pressures. In addition, patients over the age of 45, those with cardiac risk factors, or those with a global risk assessment of >10% ([http://www.nhlbi.nih.gov/guidelines/cholesterol/risk\\_tbl.htm](http://www.nhlbi.nih.gov/guidelines/cholesterol/risk_tbl.htm))

will undergo either a thallium stress test or a thallium persantine scan performed. A cardiology consultation is requested in patients who have overt cardiac disease (i.e., angina, congestive heart failure, PND, dyspnea), diabetics, an abnormal stress test, or who have an increased risk assessment.

5. **History of Non-Liver Cancer**

Risk factors such as tobacco use, past and current viral infections, family history of tumors and exposure to various toxins should be obtained. In addition, patients should undergo a radiographic evaluation of the chest, HBC and HCV profiles, prostate evaluation (PSA), breast examination (mammogram), and pelvic examination with cytology. The timing of transplantation is dependent on the type and severity of the non-liver cancer. There is an inverse relationship between the diagnosis of cancer and time of transplant transplantation to post-transplant cancer relapse. However, this should be weighed against current waiting time for cadaveric recipients, associated morbidity/mortality with maintenance dialysis therapy and odds of survival with the tumor. In addition, these patients need periodic physical, radiological and biochemical evaluations while awaiting cadaver transplantation. The following table shows various screening methodology recommended for individual cancer and possible wait time prior to transplantation.

<b>Tumor Type</b>	<b>Screening</b>	<b>Wait-Time Recommendations</b>
Wilm’s Tumor	UA, radiology (CT, MRI, or ultrasound); cytogenetics	2 years
Renal Cell Cancer	UA, radiology (CT, MRI, or ultrasound)	Incidental – none; <5 cm = 2 years >5 cm = 5 years
Bladder	UA, Cystoscopy	2 years
Prostate	Examination, PSA	2 years
Cervix	Pelvic, Cytology	2-5 years
Uterine	Pelvic, Cytology	2 years
Breast	History, Examination, Mammography	2-5 years
Colorectal	Occult blood, colonoscopy	5-years
Lymphoma	History, Examination, antibody to EBV	2-5 years
Melanoma	History, Examination	2- years
Other Skin Cancer	History, Examination	0-2 years

Screening and surveillance needed for transplant recipients with past history of cancer is complex and is dependent on the type of cancer and organ involved. Better markers are needed for optimal screening, which can prevent recurrence. Minimizing immunosuppression will enhance survival post transplantation.

6. **Endocrine**

- a. *Metabolic Bone Disease*. Patients with cholestatic liver disease, especially those with primary biliary cirrhosis, will undergo DEXA bone densitometry scanning

and endocrine evaluation to determine bone density and to optimize therapy prior to and following transplantation.

- b. *Diabetes*. Many cirrhotic patients will have hyperglycemia or frank diabetes. For those with hemoglobin A1c >7 (indicating poor glyceemic control):
  - 1) Must have an endocrinologist or internal medicine physician managing diabetes.
  - 2) Must have a consultation with the dietitian on a regular basis
  - 3) Must attend a Diabetic education program.
  - 4) Must have hemoglobin A1c checked every 3 months to monitor glyceemic control.
7. **Renal**.  
Patients with evidence of acute or chronic renal insufficiency are evaluated by the transplant nephrologist prior to listing for transplantation. The medical history should include screening for history of renal/bladder infections, use of nonsteroidal medications, history of gout, renal stones, IV drugs, trauma, family history of renal disease, number of GI bleeds, recent infections such as pneumonia, peritoneal taps, toxin exposures at work or hobbies
8. **Nutrition**.  
Complete nutritional assessment and followup is implemented for each patient. (*See* Section 9. Nutritional Evaluation)
9. **Social Work**.  
Complete social work assessment and followup is implemented for each patient. (*See* Section 8. Social Work Evaluation)
10. **Patient Education**.  
Each patient seriously considered for transplantation is required to attend an educational class (along with family members and/or other support persons) taught by the liver transplant nurse coordinators. The class outlines the complications which can occur following transplantation and reviews the medications required following a transplant

## **B. Surgical Evaluation**

Every patient referred for liver transplantation undergoes a surgical evaluation as part of their comprehensive evaluation. The goal is to assess any technical factors which may make liver transplantation more difficult, introduce the patient to the risk of liver transplantation and complications, the need for immunosuppression, and overall survival data. Details which are specifically noted in the surgical evaluation include:

1. Prior operative procedures.
2. Size of the abdominal cavity, size of the liver and spleen.
3. Overall patient functional status.
4. Evidence for malignancy.
5. Blood type.

6. Status of listing the patient.
7. Patients with portal vein thrombosis should be evaluated for mesenteric anatomy and hypercoagulable state.

Technical factors that increase the risk of liver transplantation include prior right upper quadrant surgery, especially those procedures which involve dissection of the porta-hepatis. Any prior procedure involving the portal vein increases operative morbidity, and in some series operative mortality. Because of the increase in morbidity, the risks of liver transplantation are increased, and the risk-benefit ratio may be changed. Relative contraindications for liver transplant include:

1. Prior portal venous surgery.
2. Prior complex right upper quadrant surgery (i.e., Roux-en-Y).
3. Portal vein thrombosis.
4. Massive obesity (i.e., BMI >35).

All the risks of liver transplant are too numerous to cover. General operative risks of the procedure are discussed with patients during a clinic visit. A 10% incidence of early retransplantation is covered with each patient. Liver transplant survival/death rates are explained to each patient to their satisfaction.

### C. Liver Transplant Evaluation Summary

#### 1. Evaluations

- a. Transplant Hepatology – Medical Evaluation
- b. Transplant Surgery – Surgical Evaluation
- c. Social Worker – Family Meeting
- d. Financial Counselor
- e. Dietitian
- f. Transplant Coordinator
- g. Psychology/Psychiatry – as needed

#### 2. Phlebotomy

- a. *Chemistries*  
 Chemistry: sodium, potassium, chloride, bicarbonate, BUN, creatinine, glucose  
 Hepatic Panel: Total and Direct bilirubin, AST, ALT, ALP, GGT  
 Magnesium, phosphate, calcium  
 TSH  
 Serum iron, TIBC, iron saturation, and Ferritin  
 AFP (alpha fetoprotein)  
 Blood alcohol level  
 Alpha-1 antitrypsin level  
 Hemoglobin A1c (HgA1c) – on all patients with diabetes mellitus
- b. *Hematology*  
 CBC with differential  
 PT/PTT  
 ABO with Antibody screen on two separate occasions

c. *Serologies*

RPR to rule out syphilis – if positive

- check MHATP; If MHATP positive, obtain ID consult

Anti-HIV (1/2)

Hepatitis B Surface antigen (HBsAg) – if positive:

- obtain HBV DNA (quantitative)

Hepatitis B Surface antibody (anti-HBs)

Hepatitis B core antibody (anti-HBc)

Hepatitis C antibody (anti-HCV) – if positive

- obtain Heptimax (Quest)

- obtain HCV Genotype

Hepatitis A antibody (anti-HAV)

Anti- CMV IgG and IgM

EBV IgG and IgM

HSV IgG and IgM

VZV IgG and IgM

Rubella Immune status screen (on all international patients)

PPD skin test with controls

d. *Optional Serologies*

Hepatitis B IgM core antibody – if acute HBV is suspected

Hepatitis Delta on all HBsAg +, HBcAb+

Antinuclear Antibody (ANA) – cryptogenic cirrhosis

Antismooth Muscle Antibody – cryptogenic cirrhosis

Antimitochondrial Antibody (AMA) – if PBC has not been ruled out

e. *Optional Chemistries*

Lipid profile (Triglycerides, Cholesterol, HDL, LDL) – individuals over 40 yrs

PSA – men over 40 yrs

Ceruloplasmin – patients with cryptogenic cirrhosis and age less than 60

Vitamin B<sub>12</sub>, RBC Folate – individuals with anemia and high MCV

Vitamin A – patients with low albumin, bili>2.5, malnutrition, all PBC and PSC

Vitamin E – patients with low albumin, bili>2.5, malnutrition, all PBC and PSC

β-HCG – females of childbearing age

CEA & CA19-9 – patients with PSC

3. **Cardiac Studies**

Patients may have cardiac disease which is silent. A “global risk assessment” can be performed at: [http://www.nhlbi.nih.gov/guidelines/cholesterol/risk\\_tbl.htm](http://www.nhlbi.nih.gov/guidelines/cholesterol/risk_tbl.htm)

a. *Routine Studies* – all patients

EKG

2D Echocardiogram with estimate of pulmonary artery pressure (PAP)

b. *Patients at Cardiac Risk - risk factors* include diabetes, cardiac symptoms

(angina, dyspnea, PND, etc.), abnormal stress test, >10% global risk assessment or age >45:

- obtain adenosine stress test
- obtain Cardiology consultation

#### 4. **Pulmonary Studies**

Arterial blood gas (ABG)

Pulmonary function tests (PFTs) – for smokers or a history of pulmonary disease

#### 5. **Immunizations** (do not give if pregnant)

- *HBV-Susceptible (HBcAb(-) and anti-HBs <10 mIU/mL)* – Energix-B (20 ug @ 0, 1, & 2 months). Check anti-HBs 1 month after the third dose. If anti-HBs still negative, revaccinate with 40 ug per dose for a total of 3 doses as per schedule above.
- *Anti-HBc(+)* with (-) HBsAg and anti-HBs – vaccinate and check anti-HBs quantitative level 30 days post vaccine
- Hepatitis A vaccine for HAV susceptible (anti-HAV negative) pts; 0 and 6 months
- Twinrix can be considered if patient needs both Hepatitis A & Hepatitis B prophylaxis: 1 mL intramuscularly x 3 doses at 0, 1, and 6 months
- Pneumovax – 0.5 mL subcutaneously every 5 years
- Influenza – intramuscularly, yearly (Nov. – March)
- Diphtheria/Tetanus (DT) – intramuscularly, every 10 years
- Menomune (N. Meningitis) – every 3 to 5 years

#### 6. **Urine Studies**

Urinalysis (U/A)

- check urine culture if U/A has red or white blood cells

Urine toxicology screen

24-hour urine collection for creatinine clearance and protein

Patients with renal stones:

- uric acid, oxalate, citrate

#### 7. **Imaging Studies**

##### a. *Routine* – **must be done at UTSW**

Abdominal US with Doppler of hepatic & splenic vasculature

- If performing a CT on a patient with renal insufficiency, hydrate and administer acetylcysteine prior to the CT

4-phase Abdominal CT with liver protocol

Chest X-ray – PA and Lateral

Chest CT – for patients with hepatocellular carcinoma

Bone Density (DEXA)

- Alcoholic liver disease, patients with cholestatic liver disease, post-menopausal women, patients on corticosteroids, and patients with a history of bone disease

##### b. *Optional*

Bone Scan

Carotid doppler – if patient symptomatic with exam findings

GFR via Glofil in NM- creatinine clearance <75cc/min

Peripheral vascular study (r/o arterial insufficiency)

Peripheral venous doppler (r/o DVT)  
MRI abdomen  
Mammogram if > 35 years and not done within one year

8. **Endoscopic Studies**

EGD – if not done within 1 year and not being treated for varices

Colonoscopy – patients >50-years-old

- within 5 years if there is a history of adenoma
- within 10 years if there is no history of polyps
- within 1 year in the setting of ulcerative colitis

9. **Consultations** – as needed

Gynecology – pap smear

Dental

Infectious Disease

Endocrine

Renal

Cardiology – see cardiology above

Pulmonary – hypoxia, HPS, ppHTN, COPD, sarcoid, abnormal SaO<sub>2</sub>, abnormal PFTs

Neurology – history of seizure or other neurologic disorder

Urology – gross or microscopic hematuria; renal stones

Hematology/ Oncology – those with a history of cancer.

D. **Special Situations**

1. **Hepatitis B Virus (HBV)**

Patients with chronic HBV can be successfully transplanted. The following situations may occur and will be addressed with the patient during the evaluation and the patient must consent to the specific situation.

- Active HBV.* These patients have actively replicating virus (HBV surface antigen positive; DNA positive). These patients will need to be placed on antiviral therapy prior to listing. It is important that the viral load be unmeasurable or as close to unmeasurable as possible prior to transplantation. These patients may accept a liver from a donor who has been previously exposed to HBV (core-positive donor) without compromising their outcome. Appropriate prophylaxis against reactivation must be given.
- Inactive HBV.* These patients have measurable surface antigen, but are no longer replicating HBV to any degree. They do not respond to antiviral therapy. These patients may accept a liver from a core-positive donor without compromising their outcome. Appropriate prophylaxis against reactivation must be given.
- Past HBV.* These patients have been exposed to, and are now immune to HBV (surface antigen negative; core antibody positive). These patients have about a 9% chance of viral reactivation if they accept a liver from a core-positive donor. Appropriate prophylaxis against reactivation must be given in this setting.

**NOTE:** The risk of acquiring the virus and taking additional prophylaxis against reactivation must be outweighed by the benefit of the transplantation.

- d. *HBV Vaccinated Individuals.* These patients have never been exposed to HBV but are immune by vaccination. They carry at least a 17% risk of viral reactivation when receiving a core-positive donor. Appropriate prophylaxis against reactivation must be given in this setting. **NOTE:** The risk of acquiring the virus and taking additional prophylaxis against reactivation must be outweighed by the benefit of the transplantation.
- e. *HBV Naïve Individuals.* These patients are not immune to HBV. They carry up to a 100% chance of reactivation if given a core-positive donor. These patients should not be given core-positive donor organs unless then risk of acquiring the virus and taking additional prophylaxis against reactivation is significantly outweighed by the benefit of the transplantation.

## 2. **Renal Stones**

During evaluation for liver transplant, asymptomatic nephrolithiasis may be revealed by routine CT scan. Evaluation should then include:

- urinalysis
- urine culture and sensitivity
- expanded chemistry profile: uric acid, calcium, phosphorus, oxalate, citrate
- KUB
- non-contrast spiral CT scan of the kidneys if stone is not seen on KUB

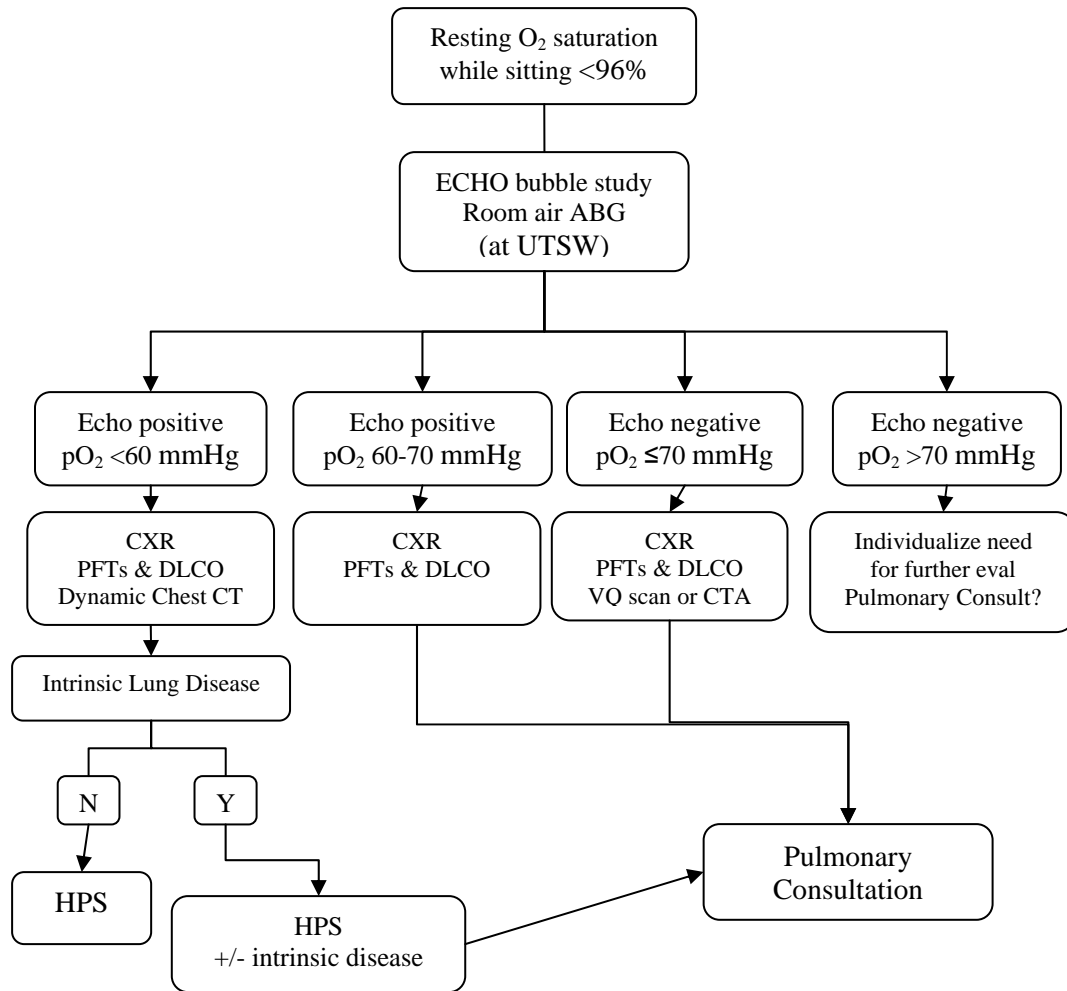
The patient should then be sent to Urology for evaluation and management recommendations. New signs or symptoms such as: abdominal or flank pain, a UTI, or increase in serum creatinine might warrant an ultrasound to rule out obstruction and a KUB to determine if there is a change in stone size or position.

Extracorporeal Sound Wave Lithotripsy (ESWL) or other procedures in patients with portal hypertension and/or coagulopathy carries a significant risk of hemorrhage. Intervention should be undertaken only if symptoms such as pain, infection, and/or obstruction develops. Cystoscopy and stent placement may be performed to temporize until the patient is "stable" post transplant.

## 3. **Malnutrition and Obesity** – see Section 9. Nutritional Evaluation

## 5. **Hepatopulmonary Syndrome (HPS)**

Chronic liver disease of virtually any etiology has been associated with HPS. HPS is considered to be present in patients with the following triad: liver disease, increased alveolar-arterial gradient while breathing room air, and evidence for intrapulmonary vascular abnormalities, referred to as intrapulmonary vascular dilatations (IPVDs). Severe HPS leads to compromised survival during the transplant operation. A complete evaluation should be performed as follows:



Algorithm for the management of patients with confirmed Hepatopulmonary syndrome:

pO <sub>2</sub> <50 mmHg	pO <sub>2</sub> 51-60 mmHg	pO <sub>2</sub> 61-70 mmHg	pO <sub>2</sub> >70 mmHg
<ul style="list-style-type: none"> <li>• pulmonary consult</li> <li>• assess need for O<sub>2</sub></li> <li>• check pO<sub>2</sub> on 100% O<sub>2</sub></li> <li>• consider angiogram if pO<sub>2</sub> &lt;300 on 100% O<sub>2</sub></li> <li>• reassess for OLT</li> <li>• ABG q 3 months</li> <li>• appear for MELD if OLT is feasible</li> </ul>	<ul style="list-style-type: none"> <li>• ABG q 3 months</li> <li>• appeal for MELD per regional guidelines</li> <li>• assess need for O<sub>2</sub></li> <li>• pulmonary consult</li> </ul>	<ul style="list-style-type: none"> <li>• yearly ABG</li> <li>• appeal for MELD upgrade per regional guidelines</li> <li>• assess need for O<sub>2</sub></li> <li>• pulmonary consult</li> </ul>	yearly ABG

## 6. Portopulmonary Hypertension (ppHTN)

Portopulmonary hypertension refers to pulmonary arterial hypertension that is associated with portal hypertension; it is a well-recognized complication of chronic liver disease. ppHTN is inferred by history. It is considered present when pulmonary artery hypertension is present, defined by a mean pulmonary artery pressure (mPAP)

>25 mmHg at rest or >30 mmHg with exercise and a pulmonary capillary wedge pressure (PCWP) <15 mmHg.

a. *Screening* – All patients referred for liver transplantation will have a screening echocardiogram (done at UTSW). If the right ventricular systolic pressure (RVSP) is:

- 1) <45 mmHg (35 mmHg + RA pressure) or unable to measure TR jet
  - a) right ventricular end diastolic diameter (RVEDD) <3.0 cm → proceed with liver transplant evaluation
  - b) RVEDD >3.0 cm (enlarged) → refer to pulmonary hypertension program (214-645-5603 – Pamela Campbell)
- 2) >45 mmHg (35 mmHg + RA pressure) → refer to pulmonary hypertension program (214-645-5603 – Pamela Campbell)

b. *Evaluation for Causes of ppHTN*

- 1) V/Q Scan
- 2) pulmonary function tests (PFTs)
- 3) Rheumatologic studies
- 4) Nocturnal oxymetry
- 5) Cardiac MRI
- 6) Cardiac Catheterization WITH Flolan challenge
  - a) PVR <240 dynes → proceed with liver transplant evaluation
  - b) PVR >240 dynes
    - i) mPAP 25-35 mmHg → start oral therapy/prostacycline SQ (vs. inhale)
      - proceed with liver transplant evaluation
    - ii) mPAP 36-45 mmHg → start SQ/intravenous prostacycline
      - hold liver transplant evaluation until mPAP <35 mmHg and cleared by pulmonary hypertension program
    - iii) mPAP >45 mmHg → start IV prostacycline
      - hold liver transplant evaluation until mPAP <35 mmHg and cleared by pulmonary hypertension program

## 7. **Urgent Liver Transplantation**

Occasionally, patients with chronic liver disease are hospitalized and in danger of dying without transplantation. In this setting, they may need to be urgently evaluated for liver transplantation. Urgent liver transplant evaluation (LTE) should be done only after approval by the committee. The minimum studies necessary to list the patients in this setting are:

- All transplant laboratory studies

- ABO/Rh blood typing x 2
- Echocardiogram
- Cardiac Stress Test, if significant concern for heart disease
- Abdominal Ultrasound with Doppler (or abdominal CT if possible)
- Transplant Hepatology Consultation
- Transplant Surgery Consultation
- Social Work Consultation
- Financial Clearance

**III. Procedure/Intervention(s) – N/A**

**IV. Documentation (Documents & Forms) – N/A**

**V. Other Related Policies/Procedures**

- A. Section 8. Social Work Evaluation
- B. Section 9. Nutritional Evaluation

**VI. References – N/A**