

a series of articles written by medical professionals about the management and treatment of hepatitis C

**Lorenzo Rossaro, M.D., F.A.C.P., Professor of Medicine**

and

**Connie Wylie, R.N., M.S.N., F.N.P, Hepatology and Liver Transplant**

University of California, Davis Medical Center

## Increasing the Chance of Receiving Liver Transplantation by Multiple Listing

### SUMMARY

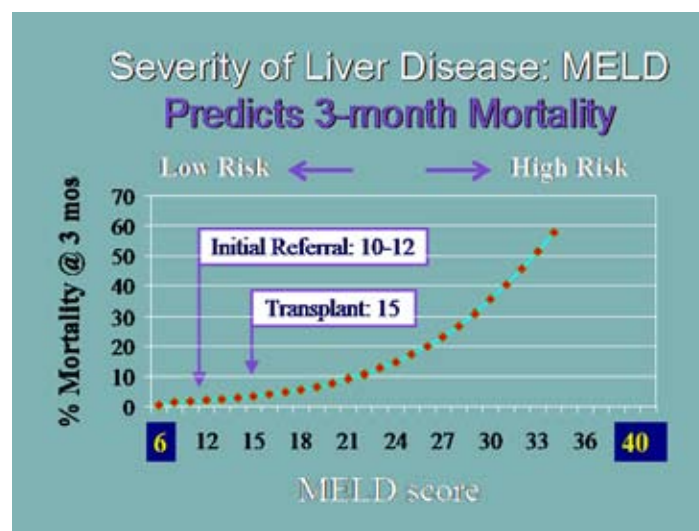
- Multiple listing (registering at two or more transplant centers) increases the chance of receiving liver transplant since candidates at centers local to the donor hospital are usually considered ahead of those who are more distant.
- Multiple listing can also shorten the average waiting time of liver transplant candidates by several months, although it does not guarantee that every multiple-listed patient will have a shorter waiting time.
- Other waiting time factors include how urgently the patient needs a transplant (i.e., MELD score) and how closely the donor and candidate match on body size and blood type.
- There is a shortage of

donors nationwide with about 20,000 patients waiting for liver transplant, and only about 5,000 donors per year. Everyone should share the goal of increasing organ donation to save more lives.

### Organ Allocation and Liver Transplantation (LT)

When organs become available, the United Network for Organ Sharing (UNOS), the agency under contract with the federal government to oversee all organ recovery and transplant activities in the United States, will run a match list based on a point system to identify recipients. The point system, called MELD (Model for End-Stage Liver Disease) score, is the numerical scale used for liver allocation, ranging from 6 (less sick) to 40 (very sick) (Figure 1). Patients waiting for an LT

**Figure 1. MELD Score**



*This graph predicts mortality in End-stage Liver Disease: 10-12 is when patients should be evaluated for liver transplant, 15 is generally required in order to be considered to receive a transplant.*

are ranked in order of their disease severity. The sickest patients are the highest on the list.

The median MELD score for when transplants occur varies in different regions of the country, due to a variety of factors. The national average MELD score is 22, the same as in Sacramento in 2007, while the San Francisco Bay area's median MELD score is 29 or greater (Figure 2). In accordance with UNOS policies (OPTN 3.2.3) transplant centers are required to provide patients listed for LT with written information about multiple listing. They should also keep a form, signed by the

patient, on their files that document compliance with this policy. Listed patients who did not receive the "Questions and Answers for Transplant Candidates about Multiple Listing and Waiting Time Transfer" should contact their transplant center immediately.

### Hepatitis C, liver cirrhosis and transplantation

Complications of Chronic hepatitis C virus (HCV) are the most common indication for LT, accounting for more than 40% of transplants performed in the United States. Most patients with HCV do not require LT, and many

even with liver cirrhosis may have a nearly normal life span and quality of life. It is when the liver fails, in advanced stages of cirrhosis, or when liver cancer occurs, that LT becomes the only option for long term survival. At that point, patients are referred by their physicians to a transplant center. Dual listing or multiple listing may increase patients' chances of receiving an LT by registering at two or more transplant centers in different areas. It can shorten the wait time of LT candidates by several months, can decrease the suffering, or even save lives, given the shortage of organ donors. Many centers offer their patients with HCV the possibility of receiving organs which are infected with HCV (expanded donor pool), as long as the liver graft does not have significant damage or scarring and the patient accepts by signing an informed consent.

### Definition of cirrhosis and liver biopsy

Liver cirrhosis is the presence of large amounts of scar tissue in the liver as a result of many years of liver inflammation and injury. The normal liver

has no evidence of scar tissue. When bands of scar tissue develop and surround groups of liver cells, the diagnosis of cirrhosis is established.

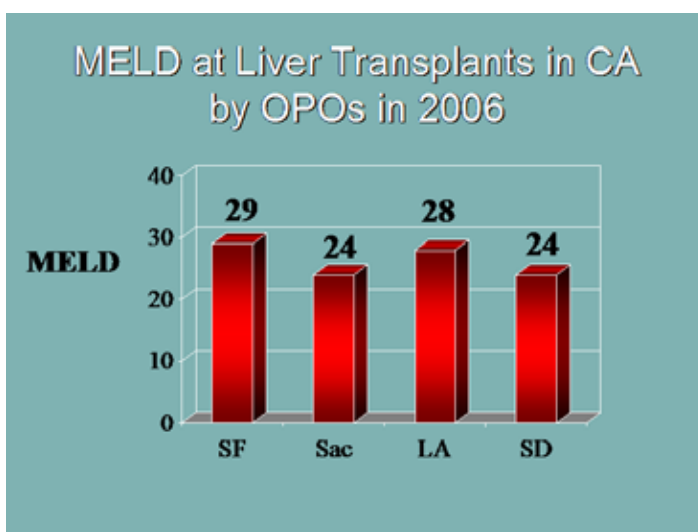
The liver biopsy may be used to diagnose cirrhosis, but is not usually necessary. In general, there could be enough signs on laboratory tests and clinical exam findings to indicate cirrhosis. Liver biopsy is not necessary to be listed for LT, and, furthermore, can be dangerous in the presence of cirrhosis because a diseased liver may not produce enough clotting factors and platelets, which are important in preventing bleeding.

### When the liver fails

Many patients think they need an LT when they have cirrhosis, but that is not usually the case. It is only when the liver fails (i.e., decompensates) that an LT may be needed.

Cirrhosis can remain compensated and stable for many years prior to the development of a decompensating event. Some patients may live long and die of old age without ever knowing they had liver cirrhosis. Decompensated cirrhosis is marked by the development of any of

**Figure 2. MELD score at time of Liver Transplant in California**



In Sacramento (Sac) and in San Diego (SD) the MELD score at the time of Liver Transplant is lower than in the larger cities of San Francisco (SF) and Los Angeles (LA). This usually translates to shorter waiting times for patients listed in the former centers.

the following complications: ascites (fluid in the abdomen), red spots found on the chest, back and arms, called spider angiomas (spiders), or redness on the palms of the hands (palmar erythema), enlarged liver (hepatomegaly), enlarged spleen (splenomegaly), muscle wasting, often seen on the face with temporal loss or general muscle wasting, yellow eyes or skin (icterus or jaundice), and memory loss, confusion, inability to concentrate (encephalopathy).

The laboratory tests are also important to assess the severity of liver disease, and the most important are: clotting factors (PT-INR) and platelets, other proteins such as albumin and alpha-feto-protein (AFP, also used as a cancer marker), bilirubin, ammonia, complete blood count, and renal function. The MELD score comprises some of them: bilirubin, PT-INR, and creatinine (renal function).

### How to measure the severity of liver disease – The MELD score

In order to be listed for LT, a patient needs to be “sick enough” where the chance of not making it

with his/her liver condition in the short term (months) is higher than the chance of not surviving the complications of the operation itself. Today we calculate the severity of disease and the chance of mortality with a mathematical formula known as the MELD score. The calculation cannot be done without a computer or other technical devices, and the best way to calculate it is by using the internet and visiting the UNOS site at <http://www.unos.org/resources/MeldPeldCalculator.asp?index=98> and inserting the following information in a table called MELD calculator:

- 1) Date of birth;
- 2) Bilirubin value (1.0 is normal, higher is abnormal). Total bilirubin is a blood test that measures liver function, and is part of the routine complete metabolic panel (CMP or Chem 20 or equivalents);
- 3) PT-INR (1.0-1.2 is normal, higher is abnormal) is a blood test that measures the ability of the liver to make proteins, in particular the clotting factors that help stop the bleeding process. It is also elevated in patients who take an-

ticoagulant medications (i.e., blood thinners like Coumadin);

4) Creatinine (1.0-1.2 is normal, higher is abnormal) is a blood test that measures the function of the kidneys. In severe liver conditions the kidneys start suffering as well, and retain water and salt (i.e., ascites, edema – swelling of extremities) and eventually can shut down causing kidney failure and the need for dialysis;

5) Check YES or NO on the question about dialysis;

6) Click on the box CALCULATE to obtain the MELD score.

A value of 10-12 is sufficient to qualify for LT evaluation and listing, while liver transplants are usually not done unless the MELD score is greater than 15. At a MELD of over 30-35 patients may require frequent hospitalizations and they are at a very high risk of immediate death. MELD score is now utilized to prioritize the listing for LT regardless of the “seniority” of patients in the list. No matter when the patient is listed, the “sicker”, i.e., those with the highest MELD score go on top of the list, and

vice versa; the lower the MELD the lower the position in the wait list and the longest the wait for LT.

### Indication for Liver Transplant

To get an LT, a patient must have acute (fulminant) or chronic liver failure from any cause, or liver cancer. The first step in considering a patient for LT is determining the need (indication) for the operation. The second step is to confirm that all other effective treatments have been tried. The third is to make sure that there are no contraindications for LT: medical or non-medical. Medical contraindication can be *absolute* (things that cannot be changed) and *relative* (conditions that can be fixed or resolved before listing for transplant).

### Absolute contraindications for liver transplant

Examples of absolute contraindications are: (a) tumor (or cancer) that has already spread outside the liver, or so multiple and big that metastasis (spread outside the original organ) can be presumed to be

already present; (b) irreversible brain damage that can be seen with fulminant liver failure, in which case a LT cannot reverse the brain damage; (c) severe and uncontrollable infection; (d) anatomical technical complications such as obstruction (thrombosis) of the blood vessels that need to be open in order to attach the new liver; (e) uncontrolled or unstable psychiatric disease; (f) severe lung or heart disease (unless lung and heart are transplanted as well – a very rare event); (g) severe malnutrition (cachexia) and deconditioning (that is why it is so important to refer patients early for LT evaluation, before the “end” stage of the disease).

### Relative contraindications for liver transplant

Examples of relative contraindications are: (a) partial obstruction of blood vessels, such as the portal vein; (b) temporary infection and sepsis; (c) previous extensive abdominal surgery; (d) obesity with BMI over 35 (some patients may have BMI between 35 and 40, and may still be candidates); (e) tobacco smoking,

especially in patients with lung and/or heart diseases; (f) illegal drug use; (g) alcohol use. Non-medical contraindications are the inability to understand the full extent of the procedure and the need for long term follow-up (compliance to medical regimen), and psycho-social instability. Although most indications and contraindications are universally accepted, each center for LT may have its own rules and regulations as far as acceptance of candidates.

For a more detailed description of the psycho-social aspects related to liver transplant candidacy, please refer to our previous article, *Liver Transplantation and Methadone*,<sup>1</sup> published in January 2007 in The HCV Advocate Medical Writers' Circle, by Hancock M.M, Craemer E.M., and Rossaro L.

### Exceptions to the MELD score

MELD is not always a good measure of risk of death, and, as with any mathematical model that tries to predict human disease outcome, it has limitations. Examples are: (a) cancer of the liver (hepatocel-

lular carcinoma). Many cancers appear in the cirrhotic liver when the function (and the MELD score) is still relatively well-maintained. Those patients may apply for MELD exceptions to the Regional Review Board of UNOS, upon request of the LT center, to increase their chances to receive a liver before the cancer becomes too advanced. The reverse is true as well: when the number and size of liver cancer lesions are too advanced, the chance of LT to provide long term survival is slim and LT can become futile. In these cases palliative care and other non-surgical modalities of treatment are best to improve the end of life of patients. Finally, the MELD score can also be erroneous because patients with kidney disease often have high creatinine values which raise the MELD score although their livers may be working well. Other persons can receive extra points on their MELD scores if they develop lung and kidney problems related to their liver disease. These are not all of the ways that the MELD can be adjusted but the most common ways. The

transplant center follows all patients awaiting transplant carefully with frequent MELD score checks to see where they are on the list.

### Results of liver transplant

Current survival rates for one, three and five years after primary liver transplant in the United States are (approximately) 88%, 80% and 74% respectively (<http://www.optn.org/latestdata/step2.asp>).<sup>2</sup>

It is always important to remember that patients should be treated with every possible medical or surgical intervention possible before a transplant operation is considered, since success is not 100%. Also LT is not like going to the mechanic and putting in a new engine: we substitute a fatal disease with another condition that has its own risks – rejection, side effects of medications, requirement of attentive and prompt monitoring, and immunosuppression, which means the administration of drugs to fight rejection. These medications can cause many problems including increasing the risk of infections, osteoporosis

sis, skin cancer, kidney problems, psychiatric side effects and many more. With the right follow-up and careful compliance with doctor's recommendations these side effects can most often be managed. Patients are encouraged to go back to work and students to go back to school after an LT.

Patients with HCV, if they are unable to eliminate before transplant (vary rare), will continue to have HCV in their blood which may affect the new liver. Although many do not experience severe recurrence of HCV disease, up to one third develop cirrhosis within 5 years after transplant. Treatment of HCV with interferon and ribavirin after transplant is not as successful as we wish, and a sustained virological response (cure) is rare. For a more detailed description of the result of LT related to HCV, in particular, including the risk of recurrence of HCV, please refer to a previous article published in January 2003 in the *The HCV Advocate Medical Writers' Circle: Hepatitis C and Liver Transplantation*, by Dr. Thomas Shaw-Stiffel.<sup>3</sup>

## How to get more information

Additional information can be found at the following websites: [www.unos.org](http://www.unos.org), [www.optn.org](http://www.optn.org), [www.transplantliving.org](http://www.transplantliving.org), and in the references of the cited publications. The United Network for Organ Sharing (UNOS) also maintains a toll-free phone information line for transplant candidates, recipients, and family members. The number for patient services is 1-888-894-6361.

For more information about liver transplants at UC Davis Medical Center, contact the UC Davis Transplant Center at (800) 821-9912 or (916) 734-2111, or call the UC Davis Physician Referral Center at (800) 4-UCDAVIS (482-3284). Our website is:

[http://www.ucdmc.ucdavis.edu/welcome/features/20080507\\_physpractice\\_liver-transplant/index.html](http://www.ucdmc.ucdavis.edu/welcome/features/20080507_physpractice_liver-transplant/index.html)

## References

<sup>1</sup>Hancock M.M, Craemer E.M., and Rossaro L. *Liver Transplantation and Methadone*. The HCV Advocate Medical Writers' Circle. The Hepatitis C Support Project, January 2007: 1-3.

<sup>2</sup>For more information on survival results and other statistical information nationwide, visit the website: <http://www.optn.org/latestdata/step2.asp>

<sup>3</sup>Thomas Shaw-Stiffel. *Hepatitis C and Liver Transplantation*. The HCV Advocate Medical Writers' Circle. The Hepatitis C Support Project, January 2003: 1-2.



A publication of the  
Hepatitis C Support Project

Medical Writers' Circle

The Mission of the Hepatitis C Support Project is to offer support to those who are affected by the hepatitis C Virus (HCV), hepatitis B Virus (HBV) and HCV coinfections.

Support is provided broadly, through information and education, as well as access to support groups. The Project seeks to serve the HCV community as well as the general public.

**Executive Director  
Editor-in-Chief,  
HCSP Publications**  
Alan Franciscus

**Managing Editor /  
Webmaster**  
C.D. Mazoff, PhD

This information is provided by the Hepatitis C Support Project • a nonprofit organization for HCV education, support and advocacy • © 2008 Hepatitis C Support Project • Reprint permission is granted and encouraged with credit to the Hepatitis C Support Project.

Visit our web site at  
[www.hcvadvocate.org](http://www.hcvadvocate.org)