Patient Information

LIVER TRANSPLANT PROGRAM

Beaumont

WE WILL HELP
IMPROVE YOUR
QUALITY OF LIFE

CONTENTS

SECTION 1

WELCOME

Welcome to Beaumont's Liver Transplant Program. We are looking forward to working with you on your journey to a liver transplant and a healthier life.

Our team includes physicians, surgeons, nurse coordinators, social workers, dietitians, pharmacists and financial representatives with specialized transplant experience.

We have clinical partnerships with physicians from multiple specialties including interventional radiology, anesthesiology, nephrology, infectious disease, cardiology and oncology. These partnerships allow us to care for patients with even the most complicated conditions.

The Beaumont transplant team provides coverage for outpatients 24 hours a day, 7 days a week, 365 days a year. There is always a dedicated transplant surgeon and/or transplant physician available on-call.

Beaumont's Liver Transplant Program data about transplant outcomes is available for national comparison at srtr.org.

PLEASE KEEP IN MIND

The information contained in this booklet contains general information. Your individual experience may vary.

SECTION 2

YOUR LIVER

Your liver is the largest solid organ in your body. It is located below your ribs, in the upper right side of your abdomen. A healthy adult liver weighs about two to four pounds.

The liver performs several essential jobs to keep you healthy. Some of these functions include:

- filtering out potentially toxic substances from certain medications
- helping your body breakdown nutrients in food to produce energy
- filtering out bacteria in your blood to help your body fight infection
- helping regulate blood clotting
- producing bile to aid in digestion
- producing many proteins needed by the body
- storing sugars used for energy

LIVER FAILURE

Liver failure can be acute (sudden) or chronic (gradual). Liver transplant may be a treatment option for either.

Acute liver failure may be caused by certain viruses (such as hepatitis A or B), medications, drug or alcohol induced injury and by conditions that block blood flow to the liver.

Chronic liver disease can be the result of conditions such as, but not limited to, viruses (such as hepatitis B and C), autoimmune disorders, fatty liver, alcohol or drug use, primary biliary cirrhosis, primary sclerosing cholangitis, polycystic liver disease and alpha-1 antitrypsin disease.

A healthy liver can heal itself from injury. Over time, injury to the liver (due to any of the conditions listed above) may cause scarring in the liver. Scar tissue inhibits the liver's regeneration (regrowth) process and affects the ability to carry out its essential functions.

Eventually the scarring will lead to a condition called cirrhosis. Cirrhosis is an irreversible condition. Cirrhosis can usually be diagnosed by imaging such as abdominal ultrasound, computerized tomography (CT) scan or magnetic resonance imaging (MRI). Some patients may require a liver biopsy.

Some of the symptoms you may experience due to your liver failure include:

- fatigue
- intense itching
- yellowing of skin or eyes (jaundice)
- swelling in your abdomen (ascites) and/or legs
- confusion or forgetfulness (hepatic encephalopathy)
- prolonged or excessive bleeding (especially gastrointestinal bleeding)
- muscle wasting (loss of muscle mass)

Sometimes a patient's cirrhosis can be managed with medical therapies, which are mainly aimed at symptom management. Liver transplant is the only life-saving option for patients who have not responded to medical therapies.

Liver transplant may also be offered as a treatment for patients with certain types of cancer, primarily liver cancer without metastasis (spread of the cancer).

SECTION 3

TYPES OF LIVER TRANSPLANTS

Livers for transplant can be obtained from a living donor (living-related or living non-related) or a deceased donor.

Living-related liver transplant

With living donor liver transplants, a healthy adult donates a portion of their liver to be placed in the recipient. Both livers then regrow to normal size within a few weeks.

Donors must go through a careful screening process to minimize the risks associated with the procedure.

Not every patient is a candidate for a living donor liver transplant. We encourage you to speak with the transplant physician about your options.

Deceased donor liver transplant

Deceased donors are individuals who have arranged in advance to be an organ donor or their family has granted permission to donate their organs either after cardiac or brain death.

Patients on the transplant waiting list are waiting for a deceased donor.

Transplant recipients who receive an organ from a deceased donor typically receive a whole liver as opposed to a partial liver.

It is important to know that a liver transplant is considered a treatment, not a cure.

It will require a lifetime commitment from you, which includes:

- lifelong use of medications
- frequent visits with the transplant team (including blood work and physician visits)
- follow-up testing

SECTION 4

MEDICAL THERAPIES

Options for treating liver disease vary depending on the symptoms you are experiencing. Not every patient's treatment is the same.

Hepatic encephalopathy

Patients or family members may notice personality changes, confusion, forgetfulness, sleep disturbances or lethargy. If not treated, hepatic encephalopathy can lead to a coma.

These mental status changes result from toxins building up in the blood due to the liver's inability to filter them out effectively.

Treatments for hepatic encephalopathy include:

- **Lactulose:** A sugary syrup that removes excess ammonia from the intestine by a laxative effect. Everyone's response is different but the goal is to adjust the dose to achieve three to four bowel movements per day.
- **Rifaximin:** This is an antibiotic that helps to eliminate ammonia producing bacteria in your gut.
- **Zinc:** A supplement that helps decrease ammonia levels in your blood.

Ascites

Ascites is fluid that builds up in your abdomen causing uncomfortable swelling and tightness (distension). A large amount of fluid in the abdomen may also cause shortness of breath.

Treatment for ascites may include:

- **Diuretics:** Sometimes called "water pills". These medications help eliminate excess fluid through urine. Examples include furosemide (Lasix), spironolactone (Aldactone), amiloride (Midamor) and bumetanide (Bumex).
- **Paracentesis:** Under ultrasound guidance, a needle is inserted into the abdomen to drain extra fluid from the abdomen.
- **Diet:** Maintaining a strict low sodium diet is important. A diet high in sodium can cause excess fluid to remain in your body.

- **Transjugular intrahepatic portosystemic shunt (TIPS):** In some cases, ascites may be severe and diuretic therapy has failed or is unable to be used. These patients may be evaluated to have a TIPS placed.
  - This procedure is performed in interventional radiology. A shunt is placed from the hepatic vein to your portal vein to decrease the pressure. This shunts blood around the liver, instead of through it. As a result, it may place patients at higher risk for developing symptoms of hepatic encephalopathy. Typically, these symptoms can be managed with medications, but if severe, a TIPS can be reversed.

Esophageal varices

Esophageal varices are enlarged veins that form in your esophagus because of high pressure in your portal vein. These veins are at increased risk for rupture and bleeding.

Treatment for esophageal varices may include:

- **Esophagogastroduodenoscopy (EGD):** A camera is used to visualize your stomach and esophagus to check for the size, number and location of varices. If needed, bands may be placed to help prevent bleeding.
- **Beta Blocker:** A medication used to keep your blood pressure down to keep pressure off the varices to prevent bleeding.
- **TIPS:** In severe cases, a TIPS may be considered to help alleviate the pressure and minimize bleeding.

Hepatocellular carcinoma

Patients who have cirrhosis are at an increased risk for developing hepatocellular carcinoma (HCC), which is a type of liver cancer.

Transplant may be a treatment option for HCC if patients meet certain criteria based on the size, number and location of lesions or tumors (areas of cancer). Patients with HCC may require cancer treatment to keep the lesions within the required criteria while they wait for their transplant. Treatment is individualized and determined by the multidisciplinary transplant team after thorough review of the patient's medical history and imaging.

Ablation therapy

This treatment is mostly used for smaller tumors. A thin, needle-like probe is inserted into the tumor where it is destroyed by using heat (microwave ablation), cold (cryoablation) or high frequency currents (radiofrequency ablation).

TACE (Transarterial chemoembolization)

Used for larger tumors. The goal is to embolize, or "block", the blood flow to the tumor. Many times, the tumor site is treated with chemotherapy (medication to destroy cancer cells) before embolization to treat the area more effectively. The type of chemotherapy used in this procedure is localized to the tumor, so patients do not typically experience effects usually associated with chemotherapy (hair loss, nausea, vomiting).

TARE (Transarterial radioembolization)

Another option for larger tumors. This utilizes embolization and radiation therapy. Small radioactive beads are placed in the hepatic artery. Over several days, the beads give off small amounts of radiation that are directed to the blood vessels that are connected to the liver tumor.

SBRT (Stereotactic body radiotherapy)/ external beam radiation

These radiation therapies use guided imaging (CT or MRI) to target the exact area of the tumor and deliver high doses of radiation to the area. This causes the tumor to shrink, with minimal damage done to the healthy tissue surrounding the tumor.

SECTION 5

EVALUATION FOR LIVER TRANSPLANT

If your physician thinks that you may benefit from a liver transplant, a referral will be sent to our transplant center. Your medical history will be reviewed by the transplant nurse coordinators, who will reach out to you to discuss your health and personal information and to provide you with details regarding your evaluation appointment.

Prior to your appointment, you and your support team will be provided instructions about how to access the online Beaumont liver transplant education video. This provides an overview of the different phases of the transplant process and includes information that will be reinforced during your appointment. It reviews what will be expected from you and your support team.

We encourage you to write down questions related to the transplant process to bring to your appointment.

Bring your medical insurance cards to your appointment. If you receive benefits through Medicare or Medicaid, bring those cards as well. This information will be reviewed with you to help prevent future billing problems.

Be familiar with your insurance coverage before any doctor appointments, diagnostic testing and hospitalizations.

If you require a referral for transplant clinic appointments, please make sure you secure it before the appointment. If the referral is not in place, your insurance may not cover the cost of your office visit. Your primary care physician's office can assist you in obtaining this referral and referrals for future appointments and testing.

Your evaluation appointment can last up to six hours. You must bring a support person with you. If you are a candidate for transplant, you will be required to identify two support people (an additional support person). Your support team is expected to actively participate throughout the transplant process and will be asked to sign an agreement to commit to assisting you through the transplant evaluation, while on the organ waiting list and while you recover from surgery.

Your evaluation for transplant includes a multidisciplinary team, as described below. This team will be available to you throughout the transplant process to answer questions and to help you decide if a liver transplant is right for you.

- **Transplant hepatologist:** A doctor who specializes in liver disease and liver transplantation.
  - The hepatologist will review your history and will complete a physical exam. If you are a candidate for transplant, the hepatologist will follow you routinely in the transplant clinic and will be primarily responsible for managing the symptoms of your liver disease.
- **Transplant surgeon:** A doctor who has undergone special training to perform liver transplant surgery.
  - The transplant surgeon will ask you about your medical history, perform a physical exam and discuss the liver transplant operation.
- **Transplant nurse coordinator:** The transplant nurse coordinator's role is to provide continuity of care while you are being evaluated for your liver transplant. The transplant coordinator will work closely with you to be sure that tests are being scheduled and completed, results are being sent to the transplant office for review, communication lines are staying open, and questions are being answered.
  - It is very important that you keep in touch with your coordinator. Any test results that you have from other hospitals should be sent directly to your coordinator.
  - Your transplant coordinator is a liaison between you and the other transplant team members to be sure that accurate information is being shared and recorded in your medical record.

- **Transplant social worker:** The transplant social worker's role is to make sure you have adequate emotional support and resources to help in your adjustment to a liver transplant.
  - The social worker can help you find healthy ways to manage stress during your pre-transplant work-up, your wait for a liver transplant and after you receive your liver transplant.
  - At the time of your evaluation, the social worker will meet with you, and possibly your support person, to discuss how you are adjusting to your liver failure and how you plan on coping with the transplant surgery and post-transplant experience.
- **Transplant financial representative:** The transplant financial representative will discuss your financial situation and counsel you about resources that may help you pay for your transplant, follow-up care and your transplant medicines.
- **Transplant dietitian:** The transplant dietitian will complete a nutritional assessment and education about how to maintain a healthy diet.
- **Transplant pharmacist:** The transplant pharmacist will review your medications and will provide education as needed.
- **Transplant program coordinator:** On the day of your evaluation appointment, the transplant program coordinator schedules your meetings with the individual members of the transplant team.
  - If you are considered to be a potential candidate for a kidney transplant, the transplant program coordinator will work with the nurse coordinators to help keep you informed of important information related to your evaluation. The program coordinator is also available to help you schedule the tests that will be part of your kidney transplant work-up.

SECTION 6

SELECTION FOR TRANSPLANT

Transplant centers are required to have selection criteria for transplant candidates. Some of these criteria are mandated by the United Network for Organ Sharing and others are transplant center specific. The reason for the criteria is to ensure safety for the potential transplant recipient and to provide guidelines for an unbiased selection. A copy of Beaumont's Criteria for Liver Transplant Wait List Candidacy is provided to you in your education folder.

The decision regarding liver transplant candidacy is made collectively by a multidisciplinary transplant team using information gathered during your evaluation appointment. If you are deemed a potential candidate for liver transplant, the transplant team will formulate an individualized plan of testing to make sure that transplant is a safe option for you. This may consist of both medical and psychosocial requirements. You will be assigned a transplant nurse coordinator to assist you throughout the process.

MEDICAL TESTING

The goal of the transplant team is to complete thorough medical testing prior to surgery to identify any potential risks or barriers that may make the operation or long-term survival unsuccessful. Your transplant nurse coordinator will provide you with a detailed list of the required testing and information about how to schedule.

It is the responsibility of the patient, with assistance from their support team as needed, to complete the pre-transplant testing as quickly as possible. The transplant program coordinator and your transplant nurse coordinator are available to assist you if needed.

Medical testing may include:

- **Blood work:** To determine ABO blood type, to monitor progression of your disease and to obtain information needed for post-transplant management.

- **Cardiac evaluation:** Testing may include a two dimensional (2D) echocardiogram, stress test or coronary computed tomography angiogram (CTA) and/or a consultation with a cardiologist.
  - This will identify underlying heart disease or a heart condition that would make it unsafe for you to undergo surgery. In certain cases, a cardiac catheterization may be required.
- **Chest X-ray and/or Chest computerized tomography (CT):** To make sure that there is no lung disease.
  - A chest CT is performed for patients with liver cancer to ensure there is no metastatic disease (spread of the cancer to other areas), which could be a barrier to transplant.
- **Liver imaging:** This is done through ultrasound, CT scan or magnetic resonance imaging (MRI) to screen patients for liver cancer and to look for formation of blood clots in your liver arteries or veins. Depending on the results and your medical condition, this may be required to be repeated in intervals of every three to six months.
- **Colonoscopy:** Required for patients who meet the current American Cancer Society guidelines for screening for colon cancer or who have conditions that make them more prone to colon cancer.
- **EGD (Esophagogastroduodenoscopy):** This upper endoscopy screens for esophageal varices (enlarged blood vessels in your esophagus) or stomach ulcers that may place you at risk for bleeding.
- **Dental clearance:** A dentist must examine you to verify that you are free of active oral infection or gum disease.
- **Tuberculosis (TB) testing:** This will be done by TB Quantiferon blood test. If you have risk factors for TB or have had previous exposure, additional testing may be required.
- **Vaccinations:** We require immunizations for pneumonia and hepatitis A and B prior to transplant. We strongly encourage an influenza vaccine and vaccination for COVID-19. Speak with your primary care physician to ensure all your immunizations are up to date.

Women

– Pap smear: Women must have an up to date pap smear and pelvic exam. This is repeated annually while on the wait list.

– Mammogram: Breast cancer screening is required based on the American Cancer Society's guidelines.

Males

– Prostate specific antigen (PSA) screening: This is a blood test that screens for prostate cancer.

Depending on the results of your initial testing, additional studies may be required to complete your evaluation. These may include more detailed cardiopulmonary evaluations, pulmonary function tests or consultations with specialty providers.

SECTION 7

FINANCIAL CONSIDERATIONS

A transplant financial representative will meet with you to discuss your individual insurance coverage and possible out-of-pocket expenses.

Transplant medications are expensive, so it is important to have a financial plan for your medications and other transplant related expenses.

While you are on the waiting list for your transplant, you should develop a long-term financial plan. That long-term plan should include your income from employment, insurance coverage and fundraising, if needed.

During the transplant process (evaluation, time on the waiting list and after transplant) do not change insurance plans without first speaking with the transplant financial representative.

When a center is certified by Medicare and the patient has Medicare Part A at the time of transplant, the transplant recipient's immunosuppressant medications may be covered under Medicare Part B at a reimbursement rate of 80%. The patient must also have Medicare Part B coverage to receive this benefit.

If a transplant center is a non-approved facility or if the center loses their Medicare certification, the center is unable to bill Medicare and services related to the transplant will not be paid. Our adult liver transplant program is Medicare certified.

PSYCHOSOCIAL REQUIREMENTS

Support

Having an adequate support team is required for approval for transplant. This can be family, friends or members of your community.

Support persons need to be actively engaged throughout the process and be willing and able to assist you as needed. In addition to emotional support, you may need assistance with transportation, help in carrying out medical or psychosocial treatment plans and assistance with care in the home.

Transplant candidates must identify a minimum of two support people.

Abstinence policy

Alcohol and drugs of abuse are toxic to the liver. Alcohol includes “hard alcohol” such as vodka or whiskey, but also includes beer and wine.

Patients with substance use issues may be required to attend group meetings regularly, as well as engage in counseling to help develop a relapse prevention plan. Each patient’s requirements will vary.

All patients are randomly screened for alcohol and/or drugs of abuse throughout the transplant process to verify compliance. To avoid false positive alcohol results, avoid all substances that contain alcohol and alcohol products. This includes, but is not limited to, mouthwashes (which actually contains a small amount of alcohol), certain over-the-counter medications, and certain foods. “Non-alcoholic” beer and foods that contain wine are not to be consumed. It is the expectation of the transplant team that patients will have life-long abstinence from these substances.

In some cases, liver transplant may be considered for patients with less than six months of alcohol abstinence. These patients must meet strict criteria and have a low risk for returning to alcohol use after transplant. These patients are required to commit to engaging in routine therapy to support their continued abstinence.

SECTION 8

TRANSPLANT WAITING LIST

The transplant team will review your medical and psychosocial testing to decide if you are eligible to be placed on the liver transplant waiting list. Some contraindications to transplant may include (but are not limited to):

- severe underlying heart or lung disease
- active malignancy or aggressive liver cancer determined to be out of criteria for transplant
- elevated body mass index (BMI)
- inadequate support team (family or friends who can help you after your transplant)
- medical non-compliance
- active substance abuse
- poor functional or nutritional status
- lack of insurance
- behavior patterns or psychiatric illness that are barriers to compliance with care of the transplant

If the team determines that you are a candidate for liver transplant, your name will be added to the deceased donor transplant waiting list. A waiting list for transplant is necessary because there are more people waiting for a liver transplant than available organ donors.

The waiting list is managed by the Organ Procurement and Transplantation Network (OPTN) which is managed by the Federal Government. The OPTN currently has contracted with the United Network for Organ Sharing (UNOS) to manage the duties of the OPTN.

When a deceased donor liver becomes available, the donor information in the UNOS national computer matches the information with the patients on the waiting list.

While on the waiting list, it is important to closely follow the transplant team's recommendations to optimize your condition for transplant. You will be assessed by the transplant staff at least every six months. Frequency of visits will be determined by clinical condition and MELD (Model for End Stage Liver Disease) score.

While you wait for a liver transplant, updated testing may be required. Your transplant nurse coordinator will let you know when you require additional testing.

It is crucial that you keep open communication with the transplant team during this process. It is essential that you notify the clinic of changes in address or telephone numbers.

You or your support team must notify the clinic if you:

- have a change in your medical condition
- are hospitalized at an outside hospital
- need to make any changes in your medical insurance
- have a change in your support team
- plan to travel

Failure to communicate with the transplant team may affect your candidacy for transplant.

Maintain your health by staying as active as possible, getting adequate nutrition (or if needed, engaging in weight loss efforts), avoiding toxic substances and staying engaged in recommended emotional support plans.

MELD SCORE

MELD stands for the "Model for End Stage Liver Disease". The MELD score gives an indication on the severity of a patient's liver disease and determines a person's place on the waiting list. The patients who have the highest MELD score are offered the first compatible liver for transplant.

MELD is calculated using the following lab values:

- sodium
- creatinine
- total bilirubin
- albumin
- INR (international normalized ratio)

Scores range from 6 to 40 (from the least ill to the sickest patient). Depending on your blood type and MELD score, the wait for a liver can take six months to over a year.

Your place on the list will vary as your MELD score changes. It is not uncommon for your score to fluctuate.

The higher your MELD score, the more often you will have blood work drawn to prioritize your placement on the waiting list.

Your transplant nurse coordinator will keep track of when you are due for a MELD update. If you fail to have your blood drawn by the given due date, you are moved to a lower priority on the waiting list. If you consistently fail to meet these deadlines, it may jeopardize your candidacy for transplant.

MELD EXCEPTIONS

In certain cases, patients may qualify for extra points while on the waiting list. Exception points may increase a patient's score from the calculated score obtained using their labs. Not every patient is eligible for MELD exception points.

Examples of potential MELD exceptions include (but are not limited to):

- HCC (liver cancer)
- hepatopulmonary syndrome
- portopulmonary hypertension
- polycystic liver disease
- certain metabolic diseases

If you qualify for exception points, you will be provided with further education by your transplant nurse coordinator.

HOLD STATUS

If there is a new medical problem or concern for non-adherence to pre-transplant requirements while on the waiting list, your status may be changed to "on hold". During this time, you are ineligible for offers for a liver transplant.

The transplant team will inform you about what needs to be completed to be reactivated. If the requirements cannot be met, you may be removed from the liver transplant wait list.

SECTION 9

DONOR CONSIDERATIONS

Donors with risk criteria for hepatitis B, hepatitis C or human immunodeficiency virus (HIV) according to the 2020 U.S. Public Health Service Guidelines.

Donors who have a history of certain high-risk behaviors are classified as donors with risk criteria for hepatitis B, hepatitis C or HIV.

It is important to know that these organs are not bad quality. Lab tests performed prior to donation are extremely sensitive, so the chance of detecting a potential infection is greater than the chance of acquiring disease from the donor.

It is not known what the actual risk of transmission is but it is thought to be less than 1%. The risk of dying from liver disease while waiting on the transplant waiting list is higher than the risk of developing hepatitis B, hepatitis C or HIV from a donor with identified risk criteria.

Patients who accept an organ with potential risks identified are routinely screened after transplant to monitor for possible transmission of the virus from the donor to the recipient.

There are treatments for hepatitis B, hepatitis C and HIV in the rare chance that the virus is contracted from this type of donor.

Hepatitis C donors

There have been major medical advancements in the treatment for hepatitis C. In certain cases, your transplant team may talk to you about accepting an organ from a donor with a known hepatitis C infection. By considering this type of donor, it may expand organ availability and decrease your wait time.

These organs are carefully evaluated by our team to determine that there is no underlying liver disease prior to transplant. Patients who accept a liver from a hepatitis C positive donor receive treatment with medication for hepatitis C soon after transplant. Patients have been successfully treated in as little as eight to 12 weeks.

Hepatitis B donors

Some donors have been previously exposed to hepatitis B and have made antibodies against the virus. Many of these donor livers are suitable for transplant. Your physician may recommend accepting an organ from a donor with a previous hepatitis B infection. If you receive an organ from such a donor, you will be given an additional medication to prevent reactivation of the virus.

When a liver becomes available your transplant team will discuss with you if the donor had increased risk factors for hepatitis C, hepatitis B or HIV, or if the donor was infected with hepatitis B or C. The liver will not be accepted for transplant without your knowledge and willingness to accept it.

RIGHT TO REFUSE TRANSPLANT

You have the right to refuse transplantation at any point in the process.

SECTION 10

NOTIFICATION OF POTENTIAL TRANSPLANT

The call that a liver is available could happen at any time of day or night. This call will come from a service that Beaumont Transplant contracts to assist with organ offers. It is important to know that you will not recognize the number of the person who is calling with the organ notification. You should answer all calls, even those from out of state numbers.

Due to time constraints associated with transplant, it is crucial that you check your messages frequently and return any missed calls promptly. Failure to do this may result in the need to bypass your offer to the next available patient.

You will be given instructions on what time to report to the hospital, where to register and when you must avoid eating or drinking. You must be accompanied by a member of your support team when you arrive.

You will be admitted to the transplant unit where you will be prepared for surgery. You will meet with the surgical team who will answer any final questions you have about the surgery.

Once admitted for a liver transplant, there are circumstances which may require cancelling the surgery. The transplant cannot be performed if you have an active, serious infection or other serious medical issues.

Changes in the medical condition of the potential liver donor or issues with the quality of the liver may also cause your surgery to be cancelled.

While having your surgery cancelled may be frustrating, please remember that the transplant team wants your transplant to be successful and would not complete the transplant surgery if it could endanger your health.

SECTION 11

TRANSPLANT SURGERY

In the operating room (OR), you will be administered general anesthesia and placed on a ventilator (breathing machine). The liver transplant operation takes approximately six to 12 hours. The length of the operation varies depending on individual complexities. The OR staff will keep your loved ones updated throughout the procedure.

You will have a large incision which extends across the middle of your abdomen. Your diseased liver is removed entirely and the donated liver put in its place. Your new liver should start to function right away but it may take a few days for your liver function to normalize.

After the operation is complete, you will be taken to the Intensive Care Unit (ICU) that specializes in caring for transplant recipients. Many patients have the ventilator tube removed prior to fully waking up from surgery. Some patients may require a ventilator for several days. You will have several monitors, intravenous (IV) lines and drains in place. You will have a small tube through nose that extends into your stomach to help prevent nausea and for administration of medications. Once that tube has been removed, you may begin a clear liquid diet, which will be advanced to solid food as tolerated. The transplant dietitian will assist the physicians in individualizing your nutritional needs.

You will have a catheter in your bladder to drain urine and to monitor your kidney function. You will receive a large amount of fluid and some blood products during surgery. Many patients will look and feel swollen for a few weeks. The body will slowly remove this fluid through urination.

Pain is experienced differently from person to person. Our goal is to keep you as comfortable as possible but you will have some incisional pain after surgery. You will be ordered pain medications to help manage the discomfort. You may try other techniques, such as meditation or distraction, to manage your pain in addition to medication.

You will be asked to get out of bed to a chair and to walk on the day after surgery. Moving helps to prevent pneumonia, prevent blood clots and maintain strength.

Once stable, you will be moved from the ICU to a medical-surgical unit that specializes in the care of transplant patients. You can anticipate being in the hospital for seven to fourteen days after surgery.

SECTION 12

POTENTIAL RISKS OF LIVER TRANSPLANT

As with any surgical procedure, there are potential risks involved. The transplant team will monitor you closely to identify and treat complications quickly.

Complications of surgery may include:

- **Cardiopulmonary complications:** Including, but not limited to, heart attack, stroke, blood clot, pulmonary embolism (blood clot in the lung).
- **Bleeding:** This usually occurs in the first 12-24 hours after surgery. May require returning to the operating room and/or a blood transfusion.
- **Bile duct issues:** The bile ducts are small, delicate tubes that drain bile from the liver. Some patients may experience a leak or stricture in the bile ducts.
- **Transplant rejection:** As described in the next section about antirejection medications, you will be educated about signs of rejection after surgery. Most transplant rejection episodes are reversible if treated early.
- **Transplant failure:** There is a rare complication called primary nonfunction in which the liver transplant fails to work. This requires another liver transplant.
- **Infection:** This includes, but is not limited to, pneumonia or a wound infection. You will receive antibiotics to help reduce your chance of infection.
- **Hepatic Artery Thrombosis (HAT):** This is a rare but serious complication in which the main artery to the liver is blocked by a blood clot. It can sometimes be reversed; however, it may require another urgent liver transplant.
- **Multi-system organ failure & death:** This is rare, but is a risk with any surgery.

Obese patients are at a higher risk for wound complications, heart and lung issues, infections, hernias and blood clots. We encourage patients to exercise and eat healthily while waiting for liver transplantation to reduce these risks.

SECTION 13

IMMUNOSUPPRESSION MEDICATIONS

Your body's natural response to a foreign object is rejection. Immunosuppressants, or antirejection medications, are critical to avoid rejection after transplant. Right after surgery you will be on high doses of immunosuppression but these doses will gradually decrease as you get further out from surgery.

Prograf (tacrolimus) and prednisone are used to prevent rejection. Prograf helps inhibit certain types of white blood cells, called lymphocytes, that are involved in rejection. Prednisone is a steroid that helps reduce inflammation and antibody production.

Patients may also be on an additional antirejection medication called CellCept (mycophenolate mofetil), based on their condition.

Patients must make sure that they are taking these medications as directed. You will have your blood drawn frequently to make sure that your Prograf (tacrolimus) is at an appropriate level to prevent rejection while minimizing potential side effects.

Patients may experience side effects from the anti-rejection medications. Side effects may include but are not limited to:

- upset stomach/ nausea
- diarrhea
- weight gain
- diabetes
- hair loss
- hypertension
- high blood pressure

Right after transplant, you will be on additional medications to help reduce your chance of infection. You will be given a medication schedule to take home with you to keep track of when and how to take your medications.

Discuss any difficulties you may have with these medications with the transplant team. You should not alter the dose of your medication unless directed by the transplant team. Doing so may put you at risk for rejection.

After transplant, you will be educated about the signs and symptoms of rejection. It is important to monitor yourself for these symptoms and notify the transplant team promptly if they occur. Rejection can happen at any time after transplant but is treatable and usually reversible when diagnosed early.

Immunosuppression places patients at higher risk for more serious or rare infections. Patients on long-term immunosuppression are also at higher risk for certain cancers and are encouraged to maintain screening for cancer as directed by your physician.

SECTION 14

PREPARATION FOR DISCHARGE

While you are in the hospital, the nursing staff, transplant physicians and surgeons will provide education to you about caring for yourself at home.

In preparation for discharge, you and your support team will meet with several different team members who will provide you with additional education about how to care for yourself and your new liver. These team members include a transplant nurse, transplant dietitian and transplant pharmacist. You will also receive written educational materials to assist you with keeping yourself and your transplanted liver healthy.

The transplant social worker will assess your situation for any discharge needs.

A Continuing Care nurse will determine if special equipment or help is needed at home.

Some patients will require additional physical therapy to regain strength and stability in order to be safe at home. This may be completed at home or in an inpatient or outpatient rehabilitation unit, based on individual needs.

Follow-up

After discharge to home, you will have frequent follow-up visits in the transplant clinic. You will be unable to drive for several weeks after your transplant, so plan for someone reliable to bring you to your clinic visits.

If you live far from the Beaumont Transplant Center, you may want to consider staying in the area for several weeks after your transplant.

You will be expected to follow-up with the transplant team for the life of your transplant. Close monitoring is crucial to the long-term success of your health.

Coping

Transplant can be emotionally difficult. Having the proper support is extremely important. Beaumont offers a transplant support group that meets regularly to provide patients, families and caregivers a forum to share ideas, thoughts, stories and gather additional information. The support group is open to patients who are under evaluation, actively listed and post-transplant. We highly encourage patients to participate. More information can be obtained from the transplant social worker.

AFTER HOURS NUMBER: **248-551-1033** *(Medical emergencies should go to the nearest emergency room)*

Call to speak with a physician after hours or on the weekend. We will take your name and contact information, and a transplant physician will return your call.

SECTION 15

DEFINITIONS OF TERMS

Abstinence: The practice of restraining oneself from indulging in something, typically alcohol or non-prescribed drugs.

Acute rejection: Acute rejection can happen at any time after a transplant.

During an acute liver transplant rejection episode, the serum (blood) liver function tests rise. This can usually be treated by taking a higher dose or different type of immunosuppressive medicine until the blood tests return to a baseline.

Antirejection medicines: These drugs are taken every day through the life of the transplanted liver. They are also known as immunosuppressive medicines. They help prevent the immune system from rejecting the new liver.

Ascites: A buildup of fluid in the abdomen, usually associated with liver disease.

Bile: Thick alkaline fluid that is secreted by the liver and stored in the gallbladder.

Bile ducts: The ducts (tubes) that transport bile from the liver.

Bilirubin: A breakdown product of hemoglobin from blood cells; used as a measure of liver function.

Blood typing: A blood test that indicates blood group. There are four blood types: O, A, B and AB. The recipient's blood type needs to be compatible with the donor's blood type to receive the liver transplant.

Chronic rejection: Chronic rejection is a process that may develop over months or even years. During this process, the bilirubin slowly rises. There is no known treatment for chronic rejection however, adjusting medicines may slow the damage to the liver.

Cirrhosis: A chronic liver condition caused by scar tissue and damage to cells which replaces normal, healthy liver tissue.

Cirrhosis makes it hard for the liver to remove poisons (toxins) like alcohol and drugs from the blood. These toxins build up in the blood and may affect the brain.

Creatinine: A product of muscle metabolism. Creatinine level serves as a very good indicator of kidney function.

Deceased donor: A person who has donated organs after dying from a brain injury or cardiac death.

Diastolic blood pressure: The bottom blood pressure number. Diastolic is when the heart relaxes and refills with blood.

Donor hepatectomy: Removal of a portion of liver for donation from a living person.

Encephalopathy: Brain function abnormalities experienced by some patients with advanced liver disease and other diseases. Symptoms most commonly include confusion, disorientation, and insomnia and may progress to coma.

End-stage liver disease (ESLD): Irreversible liver failure that requires transplantation as hepatic replacement therapy.

Fatty liver: A buildup of excess fat in liver cells.

Fulminant: A medical event that occurs very quickly with an acute onset, as in fulminant liver failure. This usually occurs over days, not weeks.

Fulminant hepatic failure (FHF): Acute liver failure with no pre-existing liver disease.

Gallbladder: A pear-shaped sac lying beneath the right lobe of the liver, in which bile is stored.

Graft: A liver transplant is sometimes referred to as a graft.

Hepatic: Having to do with, or referring to, the liver.

Hepatitis: A viral infection or non-specific inflammation of the liver that can lead to liver failure.

Hepatitis A: An inflammation of the liver caused by the hepatitis A virus, or HAV. Hepatitis A is transmitted when fecal matter from someone who has the disease is ingested, either directly or via food or water contaminated with the fecal matter.

Hepatitis B: An inflammation of the liver caused by the hepatitis B virus, or HBV. Hepatitis B is transmitted through blood and infected bodily fluids.

Hepatitis C: An inflammation of the liver caused by the hepatitis C virus, or HCV. HCV is transmitted primarily through direct exposure to infected blood.

Hepatologist: A specialist who is an expert in the diagnosis and treatment of liver diseases.

Hypertension: Another word for high blood pressure.

Immunosuppressive medicines: These medications are taken daily to help prevent the transplant recipient's immune system from rejecting the new liver. Also known as antirejection medicine.

Intravenous (IV): A small catheter (tube) placed into a vein; refers to the fluids and medicines that are injected into a vein through a needle or catheter.

Jaundice: A symptom of many disorders, including liver disease. Jaundice causes the skin and the whites of the eyes to turn yellow.

Kidneys: Two bean-shaped organs located beside the spine, just above the waist. They remove waste and balance fluids in the body by producing urine.

Liver: The largest organ in the body, made up of a spongy mass of wedge-shaped lobes. The liver secretes bile, which aids in digestion, stores substances like vitamins and helps process proteins, carbohydrates and fats. It also removes wastes from the blood.

Liver enzymes: Liver enzymes are substances produced by the liver. When the liver is injured, these enzyme levels can be higher than normal.

Model for end-stage liver disease (MELD): The scoring system used to measure the illness severity in liver transplant candidates. This system prioritizes the distribution of livers to adult patients waiting for a liver transplant.

MELD is a numerical scale used for adult liver transplant candidates. The range is from six (less ill) to 40 (gravely ill). The individual score determines how urgently a patient needs a liver transplant within the next three months.

Rejection: The process by which the body responds to a "foreign object," such as a transplanted liver. Rejection can be acute or chronic.

Renal: Having to do with the kidneys or referring to them.

Systolic blood pressure: The top blood pressure number. It measures the force of the heart muscle as blood is pumped out of the heart chambers.

Transplant: Transferring an organ from a donor to a recipient.

Each person is an individual and responses may vary.

If you have any questions, please talk
to a member of your health care team.

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