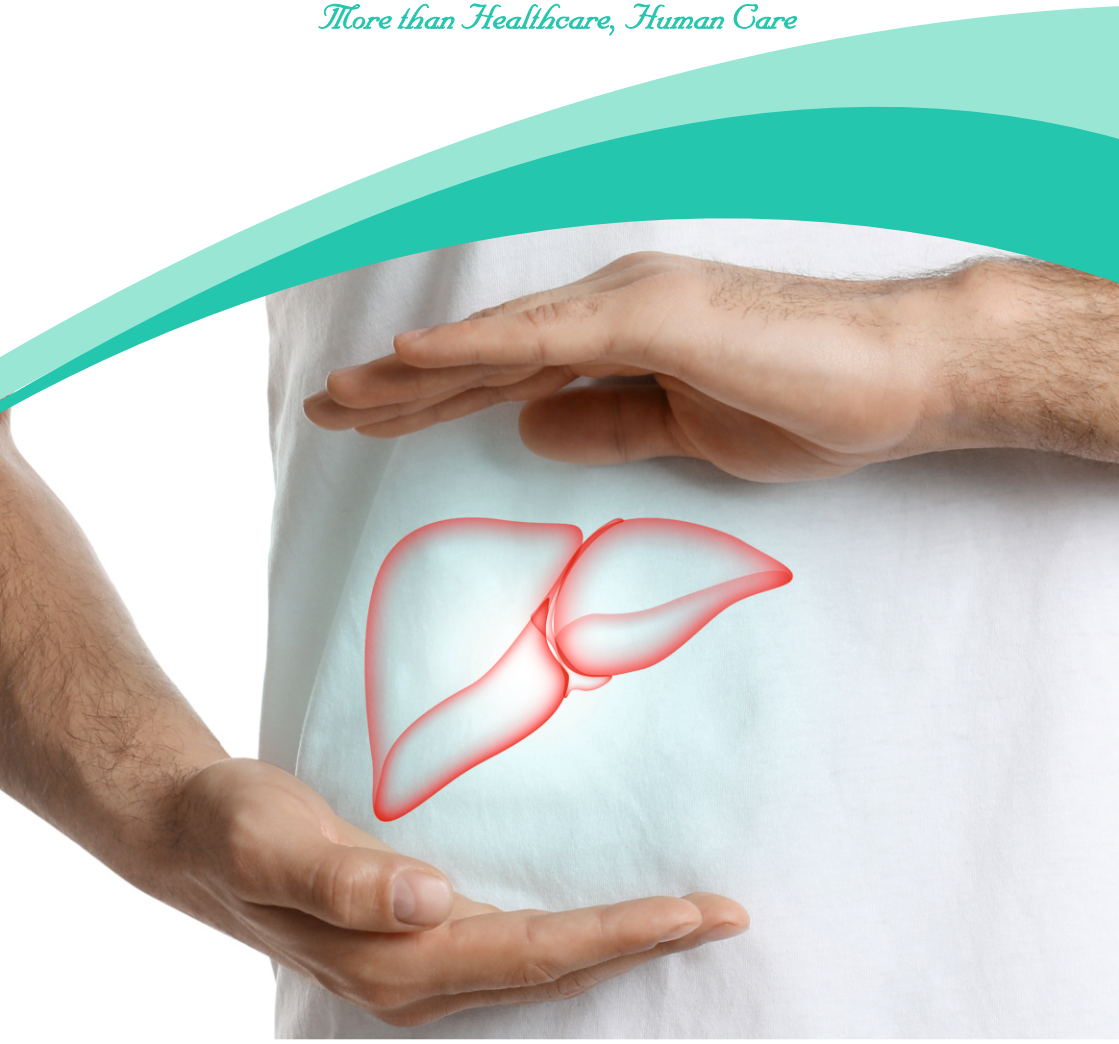
Lilavati Hospital and Research Centre

More than Healthcare, Human Care



A PATIENT'S GUIDE TO

LIVER TRANSPLANTATION

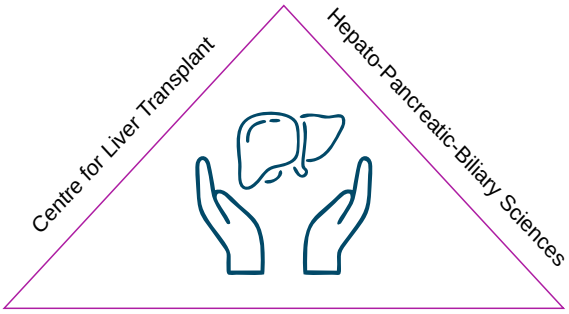
Contents

Department of Liver Transplantation and Hepato-Biliary-Pancreatic Surgery

At Lilavati Hospital and Research Centre, we understand that liver transplantation is a complex procedure that requires specialised care and expertise. Our Liver Transplant Experts - Hepatologists, Surgeons, Anesthesiologists, Coordinators, Social Workers, Dietitians, Nurses and Physiotherapists work together to ensure the best possible outcomes for our patients with human care.

Our specialised and experienced team of doctors in the Department of Liver Transplantation and HPB Surgery carry with them years of expertise in the field of Liver Transplant Surgery and Complex Hepato-Biliary-Pancreatic Surgery. They have worked in the pioneering team performing successful liver transplants in our country. They have been trained in high volume centre's nationally and internationally. They have successfully set up new Liver Transplant Programs in many cities in our country. Keeping abreast with latest technology and giving state-of-art-care in Liver Transplant and HPB Surgery is our promise.

LHRC-LTHPBS



Lilavati Hospital and Research Centre

Why LHRC

- 24x7 Specialised Care by team of experts to take care of liver and HPB patients, before and after surgery and in the follow-up
- Modern Technology in the Operation Theatre
- Detailed and Extensive evaluation of patients for better treatment
- Reliable Treatment at affordable cost
- Highly Equipped ICU with the latest and the best facilities
- 360 degree care in Liver Disease and Transplantation
- The Somatom Drive CT with 256 slice acquisition, dual-source, dual-energy technology enables precise imaging and enhances our ability to differentiate between various tissue types, crucial for accurate diagnosis and treatment planning
- Multi-disciplinary, highly skilled state of-the-art service to patients, supported by cutting-edge medical technology and infrastructure

Save Lives

Every Time

Our Expertise

We are a team of Transplant Surgeons, Hepatologists, Gastroenterologist, Anaesthesiologists, Trained Specialised Nurses,Technicians,Intensivists, Co-ordinators, Physiotherapists, Dietician, and other allied specialists (Radiologists, Interventional Radiologists, Cardiologists, Pulmonologists, Nephrologists, Neurologists, Gynaecologists,and Dental Surgeons) with whom we closely work to provide high quality services to our patients. Our strengths are the faculty members who have been trained and have worked in the best centres both in India and abroad, State of the art operating rooms and Liver ICU.Our liver team is abreast with latest technology in managing patients and operating with the use of latest gadgets (open and minimal invasive techniques).

We are geared to manage acute liver failure patients who need intensive care, and some who might require emergency liver transplantation.

Comprehensive management of liver cancer including locoregional therapy (Ablative Therapy, Chemoembolization, Targeted Radiotherapy, Chemotherapy, and Immunotherapy), liver resection (where indicated), and Liver Transplantation is offered under one roof.

We have exhaustive experience and aim to provide state-of-the-art services to patients suffering from Complex Liver, Biliary and Pancreatic Diseases (both Benign and Malignant). We have dedicated operating theatres and intensive care units to cater to these patients. Transfusion Medicine Physicians, Pathologists, Haematologists, and Microbiologists are the other specialists who are involved in the complete care of our patients.

Our Services

1) Living Donor Liver Transplantation
2) Deceased Donor Liver Transplantation
3) Adult Liver Transplantation
4) Pediatric Liver Transplantation
5) Pediatric Liver Disease(Biliary Atresia, inborn errors of metabolism)
6) Management of Acute Liver Failure (viral cause, drug induced-anti-tubercular drugs, ratol or paracetamol poisoning)
7) Emergency Liver Transplantation for Acute Liver Failure
8) Management of Liver Cancer (Hepatocellular Cancer)
9) Liver Transplantation for Liver cancer
10) Combined Liver and Kidney Transplantation
11) Complex Liver Resection for Liver Tumor, Biliary Tumors (Cholangiocarcinoma), Benign Tumors in Liver
12) Pancreatic Resection for Chronic Pancreatitis, Pancreatic Mass (Benign and Malignant)
13) Surgery for Biliary Stricture, Bile Duct Injury, Biliary Tumor, Choledochal Cyst
14) Surgery for Portal Hypertension (Portocaval Shunt, Devascularization)
15) Whipple's Operation
16) Liver Clinic for all Diseases of the Liver (Fatty Liver, Hepatitis, Jaundice, Bleeding, Hepatic Coma)
17) Comprehensive Care of Alcohol Related Liver Disease
18) ABO mismatched Liver Transplants
19) Swap Liver Transplants, Domino Liver Transplant

Latest Technologies Used

At Lilavati Hospital and Research Centre for Liver Transplant and Pancreatic-Biliary Sciences (LHRC-LTPBS), we pride ourselves on staying at the forefront of medical advancements. Some of the cutting-edge technologies used by our experts in Liver Transplantation include:

- Minimally Invasive Surgery (Laparoscopy) with:
  - Smaller Incisions
  - Reduced Pain
  - Shorter Hospital Stays
  - Faster Recovery
- Intraoperative Ultrasound
- Advanced Imaging (MRI, CT Scans to assess liver function and detect any abnormalities before and after transplantation)
- Intensive Care Unit with facility to manage Acute Liver Failure, Decompensated Chronic Liver Disease and Acute on Chronic Liver Failure
- Ablative treatment for Liver Cancer (RFA, TACE, TARE, etc)

Know more about your Liver and its Functions

The liver is often called the engine of our body, working tirelessly around the clock. It performs a multitude of vital functions, and because of this, when it becomes overwhelmed by repeated injuries or insults and cannot adequately repair or regenerate, it becomes critical to prioritize its care.

The liver has an extraordinary capacity to endure damage—it possesses a remarkable reserve that allows it to compensate and continue functioning, often without obvious signs of distress. However, continuous insults, ignoring early warning signs, and delaying timely treatment can eventually push the liver into a state known as decompensation. It is at this stage that symptoms of liver disease typically begin to appear. Without prompt intervention, this progression can lead to liver failure, a life-threatening condition.

At this stage, the liver's reserve is exhausted, and no matter what interventions are attempted, the liver can no longer be restored to its normal function. This is the point at which a liver transplant becomes the necessary and definitive treatment option.

Functions of the Liver

Liver is the largest solid organ of our body which works tirelessly 24x7 and performs more than 500 functions in our body. It is referred to as the engine in our body.

- **Digestion** - It breaks down the food we eat and stores energy in the form of glycogen and releases glucose in the times of need
- Produces bile and releases into the intestine for **digestion**
- **Excretion** - Blood filtering and excreting the break-down products of blood cells
- **Nutrient Storage and conversion** - Glycogen, Fat, Vitamins and Iron is stored by the liver
- **Detoxification** - Detoxifies the blood ammonia, many drugs, and toxins ingested by our body – cleans our blood
- Liver helps in **the immune system** of the body to fight pathogens
- **Synthesis** of Proteins, Cholesterol, Clotting Factors, Immune Proteins, Hormones, Vitamins

When do you need a liver transplant?

Liver transplantation is a lifesaving operation. It is indicated in patients with:

1. End stage liver disease (decompensated chronic liver disease or cirrhosis)
2. Acute liver failure (refractory to medical treatment)
3. Acute on Chronic Liver Failure (decompensation and organ failure)
4. Liver cancer in a patient with cirrhosis
5. Inborn/Congenital causes in neonates and kids
6. Metabolic disorders
7. Miscellaneous indications – long list mentioned later

By the time the patient presents to the doctor, there is some form of decompensation, liver would have sustained sufficient damage, and the liver functions would be deranged.

Decompensation can be in the form of:

1. Collection of fluid inside the tummy (Ascites) or in the chest (Hydrothorax)
2. Development of Jaundice (Yellowish discoloration of eyes)
3. Disturbance in the sleep pattern / excessive somnolence / drowsiness or coma (Hepatic Encephalopathy / Hepatic Coma)
4. Blood in the vomitus / passing black colored stools (GI bleed / Variceal bleed).
5. Febrile illness / Sepsis / repeated infection in the Ascites (Spontaneous Bacterial Peritonitis)
6. Renal / Kidney Dysfunction (Hepato-Renal Syndrome)

These complications in a patient with liver disease significantly increase the risk of death - by more than 30–50%, depending on the degree of decompensation - if a corrective procedure like liver transplantation is not performed.

Moreover, cirrhosis is considered a pre-cancerous condition, making continuous surveillance essential. Regular monitoring allows for early detection of liver cancer, which, when caught at an early stage, can often be treated effectively.

Who needs a liver transplant?

This table (Table-1) enumerates various indications for liver transplant. It is exhaustive and you may not understand all of it, but a patient with a liver disease where some clinician has informed about the need for a liver transplant will correlate with the list. For things which you do not understand, you can always approach your doctor or transplant coordinator for clarification.

Table-1

1. Acute Liver Failure
- Infection – Viral (Hepatitis A, E & B)
- Seronegative Hepatitis
- Toxic – Acute Paracetamol Poisoning, Mushroom Poisoning, Ratol poisoning
- Acute Fatty Liver (Pregnancy, Tetracyclines, Reye Syndrome)
- Acute Multi-organ (liver) Failure following Cardiac Surgery
- Ischemic (Ligation of Hepatic Artery, other Surgery)
- Vascular Cause (Acute Budd Chiari Syndrome)
- Auto-Immune Hepatitis
- Drugs – Idiosyncratic – Anti-Tuberculous Drugs
- Fulminant presentation of Wilson's Disease
- Neonatal Hemochromatosis
- Cryptogenic/Unknown cause

2. Cirrhosis from Chronic Liver Disease (CLD)
- Infectious
  - Chronic Hepatitis B Virus
  - Chronic Hepatitis C Virus
  - Co-infection (Hepatitis B with Hepatitis D)
  - Co-infection (Hepatitis B Virus with HIV)
- Alcohol related Liver Disease
- Metabolic Dysfunction Associated Fatty Liver Disease / NASH
- Cryptogenic Liver Disease/cause unknown

3. Cholestatic liver diseases (Jaundice/high bilirubin)
- Primary Biliary Cirrhosis (PBC)
- Primary Sclerosing Cholangitis (PSC)
- Secondary Biliary Cirrhosis (SBC)
- Biliary Atresia (BA)

4. Malignant Diseases of the Liver

- Primary Liver Cancer / Hepatocellular Carcinoma
- Primary Neuro-Endocrine-Tumor, NET
- Carcinoid Tumors
- Cholangiocarcinoma (specific indications)

5. Metabolic Liver Disease (Inborn / Congenital)

- Wilson's Disease
- Hereditary Hemochromatosis
- Alpha-1 Antitrypsin Deficiency
- Cystic Fibrosis
- Glycogen Storage Disease I & IV
- Crigler-Najjar Syndrome
- Galactosemia
- Type 1 Hyperoxaluria
- Familial Homozygous Hypercholesterolemia
- Hemophilia A & B

6. Miscellaneous

- Auto-Immune Hepatitis (PBC – AIH, Overlap Syndrome)
- Chronic Drug Induced (Methotrexate etc.)
- Adult Poly-Cystic Liver Disease
- Nodular Regenerative Hyperplasia
- Caroli's Disease
- Severe Graft vs. Host Disease
- Severe Liver Trauma

7. Variant Syndromes (MELD Exceptions)

- Intractable Ascites / Uncontrolled Ascites
- Hepatic Hydrothorax
- Spontaneous Bacterial Peritonitis
- Hepato-Renal Syndrome (Kidney Dysfunction due to Liver)
- Hepato-Pulmonary Syndrome (Lung involvement due to Liver)
- Porto-Pulmonary Hypertension (Heart affected due to Liver Disease)
- Chronic Encephalopathy (Hepatic Coma)
- Intractable Pruritus/ Recurrent Cholangitis (Quality of Life Issues)
- Intractable GI/Variceal Bleed (Unresponsive to Endoscopic Treatment)

When to refer the patient for Liver Transplantation?
Listing Criteria

There are various scoring systems to assess liver patients who would need liver transplant.

These scoring systems are standard and followed globally.
1. MELD score (Model for End Stage Liver Disease score)
2. CTP score (Child Turcotte Pugh score)
3. PELD score (Paediatric End Stage Liver Disease score)
4. King's College Criteria for Acute Liver Failure
5. CLIF-SOFA score for Acute on Chronic Liver Failure

Scoring systems play a crucial role in determining the appropriate time to refer a patient for liver transplantation. However, there are exceptions where, even with a lower score, a transplant may be necessary due to other liver-related complications.

Typically, a MELD score greater than 10, a CTP score above 7, or a PELD score above 10 are used as criteria for listing patients for deceased donor liver transplantation, where patients must wait for an organ to become available. For living donor liver transplantation, where there is no waiting period, a MELD score above 12, a CTP score greater than 10, and other clinical indications—sometimes not fully captured by these scoring systems—are considered.

Timely referral for liver transplantation is critical for achieving the best outcomes. These scoring systems serve as important tools to guide this timing. Early transplantation dramatically improves success rates, transforming a terminally ill patient's prognosis by restoring health and significantly enhancing quality of life.

Acute Liver Failure (ALF)
Patients present with a triad of symptoms
- Jaundice (yellowish discoloration of eyes)
- Hepatic Coma (irritability, drowsiness, or unconsciousness)
- Coagulopathy (thinning of blood and tendency to bleed)

Approximately 10% of patients who require a liver transplant fall into the category of needing an emergency liver transplant, where urgent transplantation becomes a lifesaving measure.

While most cases of viral hepatitis (such as hepatitis A, E, and occasionally B) recover with medical management, a small subset of patients may experience a rapid and severe deterioration. If they meet the criteria for an emergency liver transplant, there is only a very narrow window of opportunity to act—prompt transplantation becomes the only chance for survival.

Other causes of ALF, such as drug-induced liver injury from anti-tubercular medications or paracetamol (acetaminophen) overdose—particularly common in Western countries—can similarly lead to rapid disease progression and necessitate emergency transplantation.

Patients with ALF who require emergency liver transplantation are given priority status on the deceased donor liver transplant list. If a living donor is available, the evaluation process is expedited to facilitate an urgent transplant.

Contraindications – Table 2

1. Absolute contraindications • Severe Cardiac Disease • Severe Pulmonary / Chest Disease • Cancer outside the Liver • Active Alcohol / Substance Abuse • Active Infection / Uncontrolled Sepsis • Lack of Psychosocial Support
2. Relative contraindications • Reversible Chest Conditions • Reactive Airway Disease • Advanced Age • Morbid Obesity • Untreated Acquired Immune Deficiency Syndrome • Cholangiocarcinoma (Cancer of the Bile Duct) • Diffuse Portal Vein Thrombosis

It is important to understand the contraindications to liver transplantation. Patients who are actively consuming alcohol or engaging in substance abuse are not considered suitable candidates for a planned liver transplant. A documented period of abstinence is essential before they can be evaluated for transplantation.

Post-transplant, strict compliance with medications is crucial to ensure the health and longevity of the newly transplanted liver. Advancing age is considered a relative contraindication; however, if vital organs—particularly the heart and lungs—are functioning well enough to tolerate major surgery, older patients may still be considered, depending on the specific indication for liver transplant. In most centers, the age cutoff for consideration is generally around 70 years.

What is liver transplant surgery?

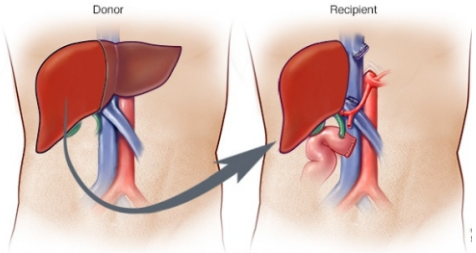
Briefly the operation involves removing the diseased liver and replacing it with a new liver.

The new liver comes from either:
- Living liver donor
- Deceased donor/Brain dead donor

As the liver is foreign to the patient, he/she will be receiving a few medicines (immunosuppressants) to accept the new liver. Timely liver transplant has a success rate of about 85-95%. The new liver has the capacity to work for the rest of the life provided you take care of it like a new baby.

Living Donor Liver Transplant
In this procedure the liver donor is from the family of the patient. The patient's diseased liver is fully removed and is replaced with a part of the liver taken from the living donor.

Who can be Living liver Donor?



A living donor needs to be:

1. **From the family**
   a. First degree (Spouse, Siblings, Parents, Children)
   b. Second degree (Grandparents, Grandchildren, Aunts and Uncles, Nieces and Nephews)
   c. Third degree (In-laws etc)

2. **Should be between 18-50 years of age**

3. **Blood group compatible**

Blood group	Can donate liver	Can receive a liver
O	O, A, B, AB	O
A	A, AB	A, O
B	B, AB	B, O
AB	AB	A, B, AB, O

4. Healthy body and liver

5. Should not be overweight – Body Mass Index >30, or pregnant

6. Willing and in clear state of mind (no coercion whatsoever)

Evaluation of the Living Donor

The living donor is examined by the doctor:

- History and examination - to rule out any major illness or untreated disease.
- Those consuming alcohol on regular basis are not suitable.
- Smokers should stop smoking ideally 6 weeks before surgery.
- Donor is explained about the operation.

Series of tests are performed in 4 stages

First 2 stages – involve testing the basic blood group, blood count, liver function, kidney function, and viral markers. If all is good – a CT scan with contrast is performed for looking at the liver

- CT scan confirms the condition of the liver, the size of the liver, the blood vessels etc.
- We need to know how much liver we can take for the patient and how much we are leaving behind in the donor
- We need about 0.8% of body weight of the patient as the required volume of liver graft
- We need to leave behind at-least 30% of the donor liver
- All this information is received on CT scan

If it is good, MRI of liver is performed to see the bile ducts

We can reject the donors:

- Blood tests are not normal
- If the liver is too small for the patient or remaining liver in the donor is too small.
- Liver is not of good quality (Fatty Liver, Fibrosis)

After the **first 2 stages** (screening stage), the next 2 stages are for looking at the fitness of the donor for a major operation.

Third stage basically involves – Cardiac, Dhest, Gynaecology (in Female Donors), and Psychiatric Evaluation (to rule out any coercion for donation).

Fourth stage involves all the consultations to obtain clearances for the surgery.

The Anaesthesiologist will evaluate the fitness for surgery. Donors are counselled adequately before and after investigations and can voluntarily withdraw consent at any time during or after the evaluation if they feel they are being coerced into doing so.

Donor Evaluation in Acute Liver Failure
These donors are evaluated in one step after confirming their blood group. Rapid work-up is done without wasting any time before transplant. However, final decision is taken once all the reports are ready and acceptable. Normally living donor evaluation can take 2-3 days which may or may not require hospitalization, but this can be hastened to 6-10 hours in case of patients of ALF. Also an emergency authorization committee is called for in case the transplant is planned for acute liver failure.

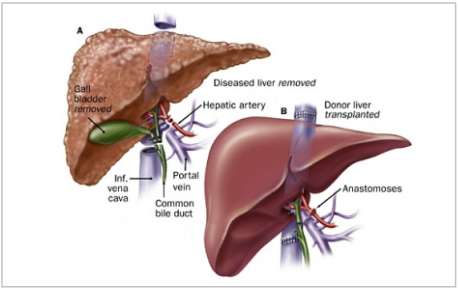
Evaluation of Recipient

Patient Evaluation
Patient with ALF/chronic liver disease for whom liver transplantation is indicated, is extensively investigated before listing for liver transplantation. As end stage liver disease has adverse effects on other organ systems of the body, other doctors get involved (Hepatologist-liver Physician, Transplant Surgeons, Anesthesiologist, Cardiologist, Chest Physician, Dental Surgeon, Psychiatrist - Alcohol related Liver Disease or Substance Abuse, Gynecologist for female recipient) and evaluate the patient. This includes a series of tests for the patient to establish the fitness to undergo transplantation.

Some patients will require advanced tests depending upon the indication for transplant – like for Liver Cancer, they will have whole body PET scan to rule out cancer elsewhere in the body. Some might require Advanced Cardiac Examination or Angiography or some cardiac pressure studies to confirm the fitness for liver transplantation.

Types of Donor

Deceased Donor Liver Transplant



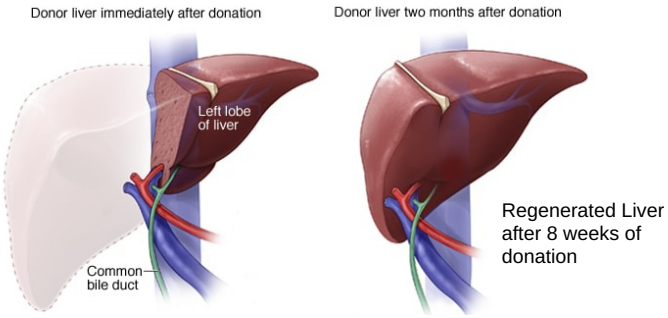
Patients who need liver transplant and they do not have a living donor, are evaluated and put on the deceased donor liver transplant list through the transplant co-ordinator. On this list patients are waiting for a brain-dead donor of their same blood group. Organ allotment is based on the chronology on the list /severity of liver disease. Priority is given to acute liver failure patients and then to those with higher scores/waiting longer on the list. Patients on the deceased donor list need to be on regular follow-up,to rule out any active infection/decompensation which needs treatment before transplant. Once an organ is allotted, the patient receives a call from the transplant co-ordinator, and they should start fasting immediately after the call and rush to the hospital (within 6 hours) with all the tests done before listing and the recent set of tests.

Living Donor versus Deceased Donor

Living donors have increased the rate of liver transplantation in our country. The numbers of brain-dead donors are few and the need for liver transplants is very high. Patients on the deceased donor list can become very sick and die while waiting for the liver. Hence, the need for living donors.

Deceased organs are generally made available at odd hours of the day. In brain dead organs, there is the possibility of organs being of marginal quality or unsuitable, in which case the transplant surgeon might decide not to transplant that organ. Patient is informed about this possibility.

Living Donor Liver Transplantation – FAQ's



How is it possible to take liver from a living donor as it is a single organ?

1. The liver has 2 parts – right and left and we take either left or right or portion of either side
2. One needs only 25% of normal functioning liver, however, 30% of liver is always left behind in the donor
3. The liver has tremendous reserve and up to 75% can be removed from the donor without any adverse effect to the donor.
4. The liver has the property to regenerate/grow back to its original size and this process starts immediately after operation
5. By the end of 2-3 weeks, about 70-80% of the liver growth occurs and by 3 months, the liver grows back to its original size
6. Functionally the transplanted liver starts working immediately and by the end of 3rd week after transplant, has a normal function
7. For the donor there is minimal change in liver function parameters and this reverts back to normal within few days

Advantages

1. No waiting time, also avoids the risk of dying while on the waiting list, no competition with other patients as in the deceased donor list
2. Planned surgery-any treatable condition(infection / decompensation) in the recipient can be taken care of and transplant can be offered at the optimal time

3. Better quality organs – living donors are healthy, and thoroughly investigated, and there is very less cold ischemia time
4. With living donors, liver cancer patients can be offered timely transplant

Disadvantages

1. Living donors are subjected to a donor surgery
2. Small risk posed to the donor because of surgery

Authorisation Committee Clearance

This clearance is important before doing a living donor liver transplant. The committee needs the relationship proofs between the donor and the patient, and this is verified in the form of documents / genetic analysis etc. Once this is done, the clearance certificate permits the transplant team to perform the liver transplant.

Operative Procedure

Patient is admitted 2 days prior to the day of transplant and living donor is admitted a day prior to transplant. On the day of surgery, the donor and patient, both are wheeled in two different operation rooms simultaneously. Both the surgeries start simultaneously (except in patients with Hepatocellular Carcinoma, where recipient might get started earlier to rule out any spread of tumor outside the liver before starting the donor surgery). The part of liver which is planned to be taken as graft (right lobe or left lobe or left lateral segment) is carefully removed, safeguarding the remnant liver in the donor.

Gall bladder is routinely removed in the donor. This is because the blood supply to the gall bladder might get compromised and also because the cystic duct is utilized for intra-operative cholangiogram which aids in the division of the bile duct and thereby reduces/avoids biliary complications in both the donor and the recipient. It is important to note that the gall bladder is just a storage organ for bile, which is formed in the liver; hence removal of the gall bladder does not in any way harm the donor. In liver transplant operation, the diseased liver is removed and replaced with a new liver (whole or partial liver depending upon whether the donor is a brain dead or living donor). Once the recipient is ready to receive the new liver (graft) only then the proposed graft is removed and sent for benching in a basin containing ice. After the donor procedure is over, wound is closed cosmetically to minimize the scar. A tube drain is kept for draining any collected fluid after operation, which is generally removed in 3-4 days. The operation generally lasts for 6-8hours. We also are performing donor surgery with the assistance of laparoscopy. The advantage is smaller incision and less pain, otherwise everything remains the same.

Despite thorough preoperative assessment there remains a very small chance that the operation is abandoned either because of some unusual pathology found at surgery in the donor or because of instability / extrahepatic spread of tumour, in the recipient.

Benching

The graft after resection is flushed with cold preservative solution to remove all the blood. Benching also involves clearing and preparing the vessels and bile ducts for implantation in the patient. It involves joining multiple blood vessels to have minimum number of joints in the patient for better outcomes.

Postoperative Care

Donor is awake after surgery and is shifted to the ICU for overnight observation. After surgery, the donor has a tube in the nose to keep the stomach empty and avoid vomiting immediately after recovery from anaesthesia. This is usually removed on the first postoperative day. Urinary catheters are there for convenience in the initial 2-3 postoperative days, following which as the donor starts ambulating, the catheter is removed. Donors are shifted out of ICU on day 1 or 2 after surgery and are started on pain medication, IV fluids, and vitamins. They are mobilized out of the bed and started on oral liquids and according to the tolerance are progressed on semi-solids and solids. By 5th or 6th postoperative day, if everything is progressing as expected donor is discharged. Liver functions return to normal by 5-6 days following surgery. At discharge, pain killers, vitamins are prescribed. These are stopped in2-3 weeks. Donors should avoid strenuous activity and lifting heavy weights for 8-12 weeks following surgery. They can resume daily activities and jobs which do not require physical exertion as comfortable. After 2-3months they can resume all activities.

Complications

They are minor and can occur in 10-15% of patients in the form of some fluid collection in the abdomen or chest. Like any other surgery there is a chance of bleeding, bile leak, and wound infection, which would require attention in some. This would require extra days of stay in the hospital, antibiotics or aspirations under image guidance. Risk to life in this procedure is about ≤ 1%.

Life After Liver Transplant

Liver transplant is a lifesaving operation and for the new liver to work well and work long, one needs to take some medications, which we call immunosuppressants. Failure to comply with the advice and regular follow-ups with the transplant team is the foremost cause of rejection and complications which may lead to organ failure. Close follow up with your transplant team and primary care physician can help ensure a good outcome. To protect your new liver, it is essential that you and your family members understand the information provided in this guide. After the liver transplant operation, the patient will be transferred to **Liver Transplant Intensive Care Unit (LICU).**

The recipient will need to stay in the liver ICU for 5-7 days, if they are doing well they can be transferred out early and if they are sick and taking time, they are kept in the ICU longer.

Complications
As with any other surgery, complications may occur after liver transplant operation. End stage liver disease may affect the functioning of other body systems. It is important for you and your family to be aware of these complications and the risks, but it does not necessarily mean that you will experience all or any of them.

Some of the major post-operative complications related to liver transplant are enumerated below:

- **Bleeding – might require blood transfusion, or rarely reoperation for controlling the same**
- **Rejection** – Immune reaction against the new liver. This requires increasing the dose of immunosuppressants
- **Infection** – As the patient is immunosuppressed, the ability to fight infection is compromised; hence extra precautions must be observed with the patient. During this period one needs to observe certain precautions like hand washing, wearing a mask, head cap, clean clothes, avoiding crowded and polluted areas, and avoiding contact with people who have infection.

- **Respiratory (Lung) Infection** may develop which would keep you in ICU longer on the breathing machine until you are able to breathe normally
- **Renal (Kidney) Dysfunction** - Reversible kidney damage may occur especially if the patient had kidney dysfunction before the transplant operation. However, the kidneys gradually recover in most, but very rarely dialysis may be necessary
- **Medication Side-effects – Anti-rejection medicines must be taken lifelong in small dose**
- **The long-term side effects of these drugs need follow-up and modifications in the number and type of drugs, as and when required**
- Transient rise in blood pressure and blood sugar in observed, which gets normal with time in most of the patients
- Other side effects include - increased levels of potassium, seizures, tremors, development of cataract etc. Side effects may occur in some patients and not in others

Medication

- Do not change or discontinue the medications prescribed by the Liver Transplant Team on your own
- Do not take any other medication. If other doctors prescribe any medication, please inform the liver transplant team
- Upon discharge you will get a discharge summary detailing all the medicines you need to take. It will also include the timing of these medications
- You will also get a blank blood investigation chart and diabetic control follow-up sheet. Our nursing staff will explain how to fill in these forms. Please keep the investigation chart and medication record updated regularly
- Other side effects include - increased levels of potassium, seizures, tremors, development of cataract etc. Side effects may occur in some patients and not in others

Diet and Nutrition

- Small and frequent meals preferably high protein content specially during the early post transplant period are advisable
- Have plenty of fresh fruits and vegetables, which are thoroughly washed and cooked to increase fiber intake
- Stick to light foods. Avoid fried or greasy foods
- Wash utensils before use
- Drink filtered and boiled water only
- Do not take food that has been left overnight
- Include 2 L of fluid (milk, fruit juices, vegetable juices) as it flushes out waste products from the body though during the early part after transplantation you may be advised to restrict fruit/ fruit juices, as these are rich source of Potassium and you may have imbalance of it in the initial post transplant period
- Abstain from alcohol as it damages the new liver
- Avoid food containing raw egg or mayonnaise. Avoid partially cooked egg
- Include food rich in calcium like skimmed milk cheese, Soya, egg, chicken, fish, green-leafy vegetables

Food to be avoided

- Expired, partly-cooked and rotten meat and eggs
- Cold meat
- Overripe fruits
- Fruits that increase potassium levels (banana, coconut water, fruit juices / pulp in a preservative)
- Unboiled tap water and unfrozen overnight soup

Personal Hygiene:

- Clean your body with a wet towel and wear washed clothes
- Once the wound heals and bags are removed you can take a normal bath before dressing is changed
- Once staples are removed, keep the incision dry and clean
- If the incision oozes fluid, contact the doctors immediately
- Dressing needs to be changed on alternate day

Exercises

- Please do deep breathing exercises as it helps your lungs to expand and enables you to cough up sputum easily
- Incentive spirometer will be kept at your bedside, and you will have to do the exercises every hourly or as frequently as possible
- Take adequate rest and sleep
- Weakness in the muscles all over your body and leg muscles in particular, is a result of a lack of exercise after surgery and a side effect of steroid hormones. To strengthen the leg muscles, you are recommended to progressively increase the level of exercises / activity
- The physiotherapist will visit you twice a day in the wards and teach you how to exercise your limbs, so that your limb muscles are strengthened, blood circulation is increased and the risk of complication like clots in the blood vessels is reduced. You need to continue doing exercise at home as well
- After 3 months you can do almost all exercises like sit-ups, abdominal exercises and swimming etc

Dental Care:

- Maintain your oral hygiene
- Always rinse your mouth after eating
- If you receive dental care or dental treatment, please let the dentist know that you are a liver transplant patient and that you are on immuno-suppressive medication. Patients have to visit hospital at intervals

You will have to come to us twice weekly for first 2-3 weeks followed by weekly visits for a period of further 2-3 weeks.

Thereafter the visits will be less frequent and can be fortnightly or monthly based on your clinical condition, lab reports (Liver Function Tests) and drug levels.

You can do physical activities as a normal person can do, after 3 months.

Liver has remarkable ability to regenerate and is usually restored to its original size in approximately 12 weeks.

Danger Signs

- You should immediately consult your transplant doctor if you develop any of the following symptoms:
- Fever, Shortness of breath, Cough with sputum, Vomiting or Diarrhoea, Persistent or worsening pain, Drainage, redness or swelling at the incision site,
- **Avoid Smoking:** Smoking damages the lungs, putting you at greater risk for lung infections, including bronchitis, emphysema, and pneumonia. It also increases your risk of developing cancer.

- **Driving:** You should speak with your doctor before driving for the first time after your transplant. You will not be able to drive for approximately 3 months after your transplant.
- **Sexual activity:** It is common for transplant recipients to resume a more normal lifestyle, including sexual activity, as they recover. Your doctor is your best guide.
- **Family and Pregnancy:** Some people want to start a family once they have had a transplant and have recovered. However we recommend waiting for a period of 2 years following liver transplant.

For appointment call:
Mr. Pramod Shinge - Transplant Coordinator
9960955453

Lilavati Hospital and Research Centre

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