



Canadian Liver Foundation
Fondation canadienne du foie

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Liver Transplantation

What is a liver transplant?

A liver transplant is a life-preserving operation that replaces a diseased and poorly functioning liver with either a whole or portion of a healthy donated liver. Liver transplantation has become a well-recognized treatment option for people with liver failure. In Canada, over 400 such operations are performed every year. Livers are donated either from individuals who have been declared brain dead and with the consent of their next of kin, or from a living donor such as a relative or friend. Liver transplant centres match donors with recipients based on compatible liver size and blood type.

What diseases are most commonly treated by liver transplants?

The most common reasons for liver transplantation in adults include chronic viral hepatitis C and B, autoimmune hepatitis, primary biliary cholangitis (PBC), primary sclerosing cholangitis (PSC), alcoholic liver disease, non-alcoholic fatty liver disease, and liver cancer. In children, biliary atresia (failure of the bile ducts to develop and drain bile from the liver) is the most common indication for liver transplantation.

At what stage of liver disease is transplantation considered?

When medical therapy is effective in stopping the progression of liver disease, transplantation may be avoided or delayed. If a patient develops advanced disease, with impaired liver function, which is non-reversible, liver transplantation should be considered. Liver transplantation is not suitable for everyone, so all potential transplant patients must be carefully assessed. The assessment starts when the specialist or family doctor makes a referral to the transplant team. Patients receive a comprehensive medical evaluation which includes tests and being interviewed by various team members to determine whether transplantation is the best treatment option. The patient and/or family are extensively involved in the transplant assessment and decision making process.

Are people with liver cancer considered for transplantation?

Most cancers of the liver begin elsewhere in the body and spread, or “metastasize”, to the liver. These cancers cannot be cured with a transplant. Other tumours such as hepatocellular carcinoma, which are confined to the liver, may be treated with radio frequency ablation, chemo-embolization, surgery to remove the tumour or liver transplantation. The choice of treatment depends on the size, number and location of the tumours. Not all liver cancers can be treated by liver transplantation. Only small, early tumours have an acceptable chance at success.

Are people with alcohol-related liver disease considered for transplantation?

Most people who develop cirrhosis (scarring) of the liver due to alcohol misuse do not require a liver transplant. Abstinence from alcohol can lead to improvement in liver function by giving the liver an opportunity to



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regenerate. When prolonged abstinence and medical treatment fail to restore the liver health, transplantation may be considered. Patients who continue to drink alcohol despite medical advice are not considered for transplantation in Canada.

What risks are involved?

A liver transplant is a major surgery with an operation lasting between six and eight hours. As with any major medical procedure, liver transplantation has risks. These risks along with the benefits are carefully considered before a patient is placed on a waiting list for a new organ. A successful outcome depends upon many factors. Patients who enter surgery very ill carry a higher risk of dying. Similarly, older patients with cardiac or respiratory illnesses will find the transplant a greater challenge.

How long is the waiting period?

The waiting time for a new liver may be uncertain and stressful. The sickest patients receive priority for a transplant. Prioritizing is based on severity of liver disease measured by a MELD score which stands for a **Model for End-stage Liver Disease**. In children, a modified scoring system, called PELD, is used to prioritize paediatric patients in need of a liver transplant. If patients and families are having difficulty in coping during this time, it is recommended that they seek the assistance of a qualified health professional.

What is the success rate?

This depends on many factors but in Canada, the average success rate for both adults and children is over 80%.

What is involved after the operation?

After surgery, patients are taken to the Intensive Care Unit (ICU) where they are placed on a machine, which supports their breathing and is known as a mechanical ventilator. They are carefully monitored for signs of infection. Frequent tests are conducted to assess the functioning of their new liver. Most patients spend one to three days in the ICU and are transferred to a step-down transplant unit. At this point, they are able to breathe on their own but will continue to have intravenous lines delivering medication. Following continued improvement and physiotherapy, patients usually leave the hospital after 10 to 14 days. They will be required to remain close to the transplant centre for several weeks and will attend an outpatient clinic for continued monitoring of their new liver. Most patients return to a good quality of life within three to six months after surgery.

What are the side effects of the anti-rejection medications?

All liver transplant patients must take anti-rejection medications for life. These medications must be monitored to ensure the right amount of medications is present in the patient's blood. These medications suppress the immune system, which enables your body to accept the new liver without attacking it. However, it also means that all liver

transplant patients will be at a higher risk for developing an infection. Infection prevention techniques are very important after receiving a transplant. The side effects associated with anti-rejection medications are many and are specific to the medication regimen a patient receives. Many patients experience some form of side effect during their course of treatment; however, many of the side effects are temporary or manageable. The risk of side effects also depends on the amount of anti-rejection medications one requires to protect the transplanted organ. The transplant team will often use the least amount of anti-rejection medications needed in hopes to avoid or minimize the risk of unwanted side effects. Furthermore, the transplant team monitors patients closely so that side effects can be identified and dealt with quickly.

Before Your Transplant

Some people wait a long time for their transplant while others may experience a rapid decline in their health, leading to an urgent transplant. It is normal for patients and family members to feel a range of emotions during the transplant journey, regardless of the kind of path they are on.

Many people have positive emotions: hope, joy, and gratitude. But it is also normal to have difficult emotions, such as fear, sadness, anxiety, irritability, anger, and grief. It may be the patient who experiences strong emotions, or it may be their caregivers; anyone can experience stress and burn out during the transplant journey. Here are some common causes of stress for those who are being assessed or waiting for a transplant:

Feelings of Guilt—

- Thinking that someone has to die for you to receive an organ
- Feeling like you are a burden to others
- Blaming yourself for your disease

Lifestyle Changes—

- Experiencing symptoms of your disease, such as confusion, shortness of breath, low-blood sugar, dizziness or fatigue
- Living with the medical treatments and side effects that impact your quality of life (This might include taking new medications that have unpleasant side effects, monitoring your blood sugar and giving yourself insulin, having dialysis, or carrying oxygen tanks or mechanical devices.)
- Having a hard time following the recommendations made by your health team, such as physical activity guidelines, fluid or diet restrictions, or abstaining from alcohol or cigarettes
- Losing your sex drive or ability due to your physical condition, side effects of medication, changes in self-esteem, or emotional health

Fear and Anxiety—

- Worrying about what may happen in the future
- Worrying about having a long hospital stay
- Waiting for assessment results or to be placed on the transplant list



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- Being called in for a transplant and finding out the organ was not a suitable match for you (false alarms)
- Being in denial that you need a transplant
- Fearing that death may come before a donor organ becomes available
- Worrying about not surviving the surgery or about potential risks

Social or Relationship Stresses—

- Losing control over your life (choices, careers, school, or time)
- Lacking support from family or friends
- Feeling isolated and alone, like no one else understands
- Experiencing financial problems
- Feeling helpless and dependent on others

The Transplant Process

A liver transplant is a major surgery; the operation usually lasts between six and eight hours. Like any major medical procedure, liver transplantation has risks. These risks and the benefits are carefully considered before a patient is placed on the waiting list for a new organ. A successful outcome depends on many factors. For instance, patients who enter surgery when they are very ill have a greater risk of dying than those who are in better health. Similarly, older patients with cardiac or respiratory illnesses will find the transplant a greater challenge than younger patients who don't have other health conditions.

When medical therapy is effective in stopping the progression of liver disease, transplantation may be avoided or delayed. If a patient develops advanced disease with non-reversible impaired liver function, liver transplantation should be considered. Liver transplantation is not suitable for everyone, so all potential transplant patients must be carefully assessed. The assessment starts when the specialist or family doctor makes a referral to the transplant team. Patients receive a comprehensive medical evaluation, including various tests and interviews, by various team members to determine whether transplantation is the best treatment option. The patient and/or family members are extensively involved in the transplant assessment and decision-making process.

The waiting time for a new liver may be uncertain and stressful. The sickest patients receive a higher priority for a transplant. Prioritization is based on severity of the liver disease, measured by a Model for End-Stage Liver Disease (MELD) score. In children, a modified scoring system, called Pediatric End-Stage Liver Disease (PELD) score, is used. If patients and families have difficulty coping during the waiting time, they are encouraged to seek assistance from a qualified health professional.

After Your Transplant

Most liver transplant recipients are able to return to a normal and healthy lifestyle. Most report that they feel re-energized, have an improved quality of life, and enjoy everyday activities once more. Liver transplant recipients are able to participate in normal exercise after their recuperation, and women are able to conceive and have normal

post-transplant pregnancies and deliveries. Despite successful surgeries, some liver transplant recipients may experience feelings of stress, anxiety, guilt and depression following their operation.

Below are some common reasons that may cause stress in the time after your transplant:

Hospital-Stay Stressors—

- Feeling confused or disoriented after your surgery
- Staying in the hospital for a long time, maybe longer than planned
- Experiencing complications from surgery or new medical issues after your transplant
- Feeling pain and discomfort

Anti-Rejection Medications—

- Feeling the emotional side effects of anti-rejection medications, such as anxiety, confusion, depression, irritability, or trouble sleeping
- Noticing changes in how you look and in your self-esteem, both related to the side effects of anti-rejection medication
- Worrying about missing doses or taking the wrong medication at the wrong time

Feelings of Guilt—

- Feeling guilty about having depression or anxiety after your transplant
- Being unsure of how to fully express gratitude or feeling indebted to your living donor or to a deceased donor's family
- Feeling guilty about receiving an organ, knowing others who may have passed away while waiting
- Wondering where the donor organ came from

Adjustment to Life After Transplant—

- Feeling too dependent on others and wanting to get back to being independent
- Feeling that your recovery is slow and that it is taking a long time to get your physical strength back to normal
- Feeling worried about leaving the hospital and returning home
- Feeling that your family or friends do not fully understand what you have gone through
- Living with a suppressed immune system
- Dealing with new lifestyle restrictions on activities like travelling, eating, taking supplements, or being out in the sun
- Fear of organ rejection
- Fear of infections and illnesses



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Can there be a recurrence of the original disease in the transplanted liver?

Often, the original disease can return and cause similar liver damage. For example, a liver transplant for hepatitis C does not eradicate the illness. In many cases, the virus will re-affect the liver within one year. Antiviral therapy is now given to liver transplant recipients who have hepatitis C. Patients with hepatitis B usually have their virus well controlled by antiviral drugs prior to transplantation. Autoimmune diseases (PBC, PSC and autoimmune hepatitis) are known to re-occur but hopefully because of the immunosuppressants will progress much more slowly. Recurrence of fatty liver disease and obesity after transplantation is a problem because it leads to metabolic syndrome with higher risk for stroke and heart attacks. In few cases where liver transplant is unsuccessful, a second liver transplant may be needed which carries greater risk than the first transplant.

Living Liver Donation

The long waiting time for a liver transplant and the progression of the liver disease that occurs in this time has motivated many families to consider living donation. It should be noted, however, that not all candidates are suitable for this option. Liver transplant centres match donors with recipients based on compatible liver size and blood type.

Living donor transplants in children involve transplanting a small portion of the left lobe of the adult donor's liver to an infant. Adult to adult living donor transplant is achieved by using the entire right lobe of the donor's liver. Not all potential living donors are suitable for donation and extra precautions are taken by the transplant team to ensure that the decision to donate is without coercion and is unconditional. The living donation operation is a major surgery and requires a five to 10 day-hospitalization and two to three month period of recovery. The donor surgery has a very low risk of death. Within a few months, the donor's liver regenerates to within 90 per cent its original size.

Being a Liver Donor

The long waiting time for a liver transplant and the progression of the liver disease that occurs during this period has motivated many families to consider living donation. It should be noted, however, that not all candidates are suited for this option. Liver transplant centres match donors with recipients based on compatible liver size and blood type.

In babies, living donor transplants involve transplanting a small portion of the left lobe of the adult donor's liver to an infant. Adult-to-adult living donor transplantation is achieved by using the entire right lobe of the donor's liver. Not all potential donors are suitable for living donation, and extra precautions are taken by the transplant team to ensure that the decision to donate is without coercion and is unconditional. The living donation operation is a major surgery and requires a five to 10-day hospitalization and two to three month period of recovery. However, the donor surgery has a very low risk of death, and, within a few months, the donor's liver regenerates to within 90% of its original size.



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Advantages & Risks of Being a Living Liver Donor

Advantages

- Provides a lifesaving transplant, scheduled at time convenient for the donor, and with minimal waiting time for the recipient
- Provides an opportunity for the donor to give “the gift of life,” with a faster return to good health and good quality of life for the recipient
- Removes a person from the deceased liver wait list and increases organs available for transplant
- Allows donor to feel deep satisfaction from their act of kindness and generosity

Risks

- Requires all parties to recognize that not all transplants are successful
- Calls for a major operation, and, although living donors are in good health, there are risks related to having surgery (The transplant team will address the potential candidates about the risks involved.)
- Requires multiple visits to the hospital for evaluation and a recovery period of at least six weeks.
- Involves financial responsibility, with only part of the costs associated with surgery being reimbursed by the certain provincial governments

Liver transplantation is available to all residents in Canada. Each province has a multi-organ transplant program, however, not all programs perform liver transplant surgery. All multi-organ transplant centres are able to initiate a living liver donor assessment process. For a list of multi-organ transplant centres and organ procurement organizations in Canada, visit the [Canadian Society of Transplantation](#).

The organ donation process and the requirements for becoming a living liver donor differ between multi-organ transplant centres across the country. If you are interested in becoming a living liver donor, it is important to speak with your healthcare professional and contact your local multi-organ transplant centre or organ procurement organization for details.

Are any lifestyle changes required after a liver transplant?

Most liver transplant recipients are able to return to a normal and healthy lifestyle. Most report that they feel re-energized, have an improved quality of life and enjoy everyday activities once more. Liver transplant recipients are able to participate in normal exercise after their recuperation and women are able to conceive and have normal post-transplant pregnancies and deliveries.

The information is current for September 2021.