

Liver transplantation

a lifesaving procedure

BY DR. DINESHANI HETTIARACHCHI SIRISENA

Our liver is the largest internal organ that performs several critical functions. When the liver stops working as it should, the ultimate cure is transplantation. It is a surgical procedure that removes a liver that no longer functions properly due to liver failure and replaces it with a healthy liver from a deceased donor or a portion of a healthy liver from a living donor. This is fundamentally a lifesaving procedure.

In this light, we spoke to hepatobiliary and liver transplant surgeon Prof. Rohan Siriwardana, consultant gastroenterological surgeon Dr. Suchintha Tillakaratne, and Colombo North Teaching Hospital in Ragama consultant pediatrician Dr. Meranthi Fernando.

There are many indications as to why one might require a new, functioning liver, the main reason being end-stage liver disease or cirrhosis in both children and adults due to a multitude of underlying conditions. Some may experience an episode of acute liver failure (ALF), which doesn't recover with standard care. They will also require a liver transplant if all else fails. In cancers involving the liver, a transplant can be lifesaving, especially if the condition is unsalvageable by chemotherapy and surgical resection. When someone reaches a point where their liver can't perform synthetic, excretory, and detoxifying functions, this is when transplantation is considered.

In Sri Lankan adults, the most common is nonalcoholic fatty liver disease (NAFLD). This is different from the West where most of the patients come with alcohol-related cirrhosis, and different from the East where most of the liver diseases are due to viral hepatitis.

It is predicted that there will be a steep rise in patients with fatty liver-related cirrhosis over the next decade, with people in the Indian Subcontinent affected more due to a genetic predisposition (presence of the PNPLA3 gene).

In the paediatric age group, liver disease in childhood is often overlooked. The disease spectrum is very different compared to adults. However, the results are the same when they develop advanced liver disease or cirrhosis. Indications of liver transplantation remain the same, such as cirrhosis, acute liver failure, and malignancies.

The etiological factors in children are unique, where it would depend on the age. In young infancy and childhood, most cases are due to biliary atresia, genetic disorders (e.g. progressive familial intrahepatic cholestasis (PFIC), Alagille syndrome), and metabolic diseases (glycogen storage diseases, tyrosinemia, primary hyperoxaluria); and when they grow older, Wilson's disease, autoimmune liver disease, viral hepatitis, drug-induced liver disease (chemotherapy and anti-rheumatic



Liver transplantation surgery in progress

There is also a dire need in the country to have a well-structured system including a specialised team to retrieve and harvest organs islandwide, to enable an equitable reach to meet the demand. As a result, we don't reap the full benefits of this lifesaving procedure. It is a need of the hour to educate the public in this regard

drug-induced) would predominate. Liver malignancies do occur in children and they are mainly hepatoblastomas.

Clinical manifestations of liver disease

The clinical manifestations of liver disease can be identified as yellowish discoloration of the eyes (jaundice), abdominal distension due to accumulation of fluid (ascites), and gastrointestinal bleeding which would accompany vomiting blood or tar-coloured stools. Dr. Tillakaratne mentioned that if one's kidneys are diseased, they can opt for dialysis during the interim period until a suitable donor kidney is available. However, this is not possible in the case of liver dysfunction. There is no equivalent to dialysis to bridge the gap, and in the absence of liver transplantation, they will succumb to the illness.

Compared to adults, there can be multiple manifestations affecting children's growth, nervous system, and behaviour if a liver transplantation is not carried out at the correct time. Transplantation can reverse

some of these effects, ensuring a normal life span with a good quality of life.

Organ donation

A new, healthy liver is usually obtained either from a living donor (only a portion is taken) or from a deceased individual following brain death (here, a part or the entire liver is taken). This concept is supported by the regenerative capacity of the liver, thus allowing only a segment of the liver to be sufficient for the recipient to lead a healthy life. Similarly, in a living donor, the liver can regenerate.

Organ donation is usually undertaken by those who have sustained irreversible damage to the brain, which results in brain death but maintains heart and lung function. This condition can be diagnosed via brain stem testing and once confirmed a decision is taken to withdraw life support, which includes assisted/mechanical ventilation and medications.

In some instances, they have already expressed their willingness to donate their organs. Depending on their wishes prior to becoming diseased and their relatives' wishes when the decision is made to discontinue life support, multiple organs can be harvested including the liver, kidneys, pancreas, lungs, heart, small bowel, blood vessels, and corneas of the eyes.

However in Sri Lanka, compared to other countries, we see fewer individuals who opt to donate their organs. This could be due to several reasons. Knowledge among the general public on organ donation is poor and the relatives also find it difficult to take this decision at a time of



First successful paediatric liver transplantation from a live donor (mother and daughter)

intense grief, unless the person has already expressed their willingness at some point in their life. In contrast, the practice among most western countries is different, where documenting their consent regarding organ donation is a norm as soon as a child reaches adulthood.

There is also a dire need in the country to have a well-structured system including a specialised team to retrieve and harvest organs islandwide, to enable an equitable reach to meet the demand. As a result, we don't reap the full benefits of this lifesaving procedure. It is a need of the hour to educate the public in this regard.

When obtaining a liver graft from a living donor, it is mandatory to match the blood groups of the donor and the recipient along with a good baseline level of liver parameters. A live donor should be fit enough to undergo major surgery.

Prof. Siriwardana's team mentioned that liver transplantation from a living relative is additionally challenging as it involves performing major surgery on an otherwise healthy individual who has generously volunteered to donate a part of



their liver. There is a remote possibility of serious complications in the donor during and immediately after the surgery. If all goes well, the donor will lead a normal life following recovery within a few weeks. Though the outcome is rewarding, liver transplant surgery is not without risks to the recipient. The success of the procedure is also dependent on the recipient's underlying comorbidities and nutritional status. Many of these challenges can be successfully dealt with by an experienced team.

The procedure

Both recipient and donor surgeries are carried out in dedicated theatres with the help of a specialised anesthetic team. The dissection of the recipient's liver and retrieval of the donor's liver have to be coordinated. As cirrhotic patients also tend to bleed profusely, all precautions should be taken to minimise the bleeding. Once the donor's liver is prepared, the recipient's liver is taken out of the body and the new liver is implanted swiftly.

Living donor liver transplantation is more complex as the donor is a healthy person and complications to the donor should be avoided. The postoperative period is also quite demanding as the recipient is closely monitored for any complications. Optimisation of baseline parameters in both parties before surgery will ensure a favourable outcome. Following successful surgery, the donor can return to normal life. The recipient is however put on lifelong immunosuppressive therapy to avoid organ rejection. This is indeed a small inconvenience in exchange for a healthy life.

Though liver transplantation is a beautiful way of gifting a new life, it is technically demanding. Its short and long-term success is largely dependent on a multidisciplinary team of experts and adequate infrastructure and facilities.

About the writer

The writer, Dr. Dineshani Hettiarachchi Sirisena, is a family physician with a special interest in rare genetic diseases and regenerative medicine currently working as a lecturer at the Department of Anatomy, Faculty of Medicine, University of Colombo, Sri Lanka.



Hepatobiliary and liver transplant surgeon Prof. Rohan Siriwardana