SCIENCE REPORTER: Dr. Singh, we know that liver is the largest organ inside our body. It helps us digest food, store energy, and remove poisons. But sometimes it malfunctions. What are some of the common symptoms that can alert us to a problem with our liver?

DR. RAVINDER PAL SINGH: Well, there are some common signs and symptoms that can signal sick liver (cirrhosis) such as loss of appetite, nausea and vomiting, weight loss, fatigue, dark colored urine, abdominal pain, enlargement of the liver (hepatomegaly) or spleen (splenomegaly), itching, abnormal blood sugar, vomiting of blood, jaundice (yellow discoloration of the whites of the eyes and skin), and increased susceptibility to infection.

But not everyone with sick liver will have all of the above mentioned signs and symptoms. Many patients may not have any symptoms and are found to have cirrhosis only on physical examination and laboratory tests; this is called compensated liver cirrhosis.

SCIENCE REPORTER: Can a malfunctioning liver be potentially fatal in the long run if not attended in time?

DR. RAVINDER PAL SINGH: It is not possible to live without the liver. Once the liver starts to fail, all of its functions diminish. Nutrition gets compromised, toxins start to build up, and waste products start to accumulate. There is swelling of blood vessels of the esophagus which may rupture and show as vomiting of the blood. Toxins build-up in the blood (liver encephalopathy) resulting in severe jaundice (yellowing of the skin and eyes), fluid accumulation in the abdomen (ascites), and deterioration of mental function (hepatic encephalopathy). It also affects kidneys functions, increases susceptibility to infection, increases bleeding tendency and blood does not clot. Eventually, death occurs.
In Conversation

The liver is the largest internal organ and the largest gland in human body. It has a role to play in many bodily functions from protein production and blood clotting to cholesterol, glucose (sugar), and iron metabolism. But the liver is often beset with disorders that can take a heavy toll on your health.

DR. RAVINDER PAL SINGH, Director, Center for Liver Transplant & Gastro-Sciences at the Saroj Super Speciality Hospital, Delhi, has a long experience with liver diseases, liver transplant and liver surgery. He is also an expert in advanced Laparoscopic Surgery & Robotic Surgery. He has earlier been with the Indraprastha Apollo Hospital, Artemis Health Institute, and the Maharaja Agarsen Hospital.

Dr. Singh talks to Science Reporter about the various problems that can occur with your liver, the symptoms to watch out for, and when to approach a liver specialist.

SCIENCE REPORTER: Are there any figures pertaining to deaths due to liver complications in India?

DR. RAVINDER PAL SINGH: In India, every year nearly 2 lakh people die of liver disease. This may well be an underestimate of the actual figures as many do not get access to health care facility and many are undiagnosed.

SCIENCE REPORTER: At what stage does the doctor decide that the complications with the liver warrant drastic action such as going in for a transplant?

DR. RAVINDER PAL SINGH: The most frequent reason for transplantation in children is biliary atresia—a disease in which the ducts that carry bile out of the liver, are missing or damaged.

For adults, there are many causes of liver failure that may necessitate transplant surgery, like:

- Decompensated Cirrhosis (scarring of the liver) is the most common reason for liver transplants.
- Progressive hepatitis, mostly due to virus infection, like hepatitis B or C accounts for more than one-third of all liver transplants.
- Alcohol damage accounts for one-fifth to one-third of transplants.
- Fatty liver disease (NAFLD and steatohepatitis) accounts for another one-fifth to one-third of transplants. This is the fastest growing reason for liver transplant and may surpass all other causes in the near future.
- Scarring, or abnormality of the biliary system, accounts for roughly another significant share of liver transplants.
- Primary liver cancer.

The remainder of transplants come from various uncommon diseases, and a disease known as fulminant liver failure. Fulminant liver failure most commonly happens during toxic reactions to overdose of some medicines, such as acetaminophen—a medicine commonly used to relieve pain and reduce fever, acute viral hepatitis, and mushroom poisoning by Amanita phalloides.

SCIENCE REPORTER: Organ donation after death has always been a very ticklish issue in India, especially in view of our cultural traditions. What is the situation as far as liver donation is concerned?

DR. RAVINDER PAL SINGH: It is surprising, but in India every year nearly
- 500,000 people die because of non-availability of organs
- 200,000 people die of liver disease
- 50,000 people die from heart disease
- 150,000 people await a kidney transplant but only 5,000 get one.

Nationally, with a population of 1.2 billion people, the statistic stands at 0.08 persons as organ donors per million population (PMP). This is an incredibly small and insignificant number compared to the statistics around the world.

Countries like the USA, UK, Germany, the Netherlands have a ‘family consent’ system for donations where people sign up as donors, and their family’s consent is required. (These countries have seen the donations double Per Million Population averaging between 10-30 PMP). Other countries like Singapore, Belgium, and Spain have a more aggressive approach of ‘presumed consent’, which permits organ donation by default unless the donor has explicitly opposed it during his lifetime. These countries have seen the rate of donations double, averaging between 20-40 PMP.

We understand it is difficult to think about organ donation when you have just lost a loved one; however organ donation is a generous and worthwhile decision that can save many lives. By donating, each person can save the lives of up to seven individuals by way of organ donation and enhance the lives of over 50 people by way of tissue donation.

SCIENCE REPORTER: What is “living donor liver transplant” and how has it improved the lot of critical liver patients?

DR. RAVINDER PAL SINGH: Living donor liver transplant is advantageous to the patient where the waiting list mortality is high (the risk of the patient dying while waiting to get a cadaveric liver from brain dead person). Avoiding a long wait is possible if a person with liver disease has a living donor who is willing to donate part of his or her liver. This procedure is known as living donor liver transplantation (LDLT) or living related liver transplantation (LRLT).

Living donor transplantation is now an accepted method. The success with living donor kidney transplants has encouraged increased use of such techniques.

SCIENCE REPORTER: Dr Singh, you have carried out a number of successful living donor liver transplant surgeries. Can you broadly give us an idea how complicated the surgery is and what are the chances of success?

DR. RAVINDER PAL SINGH: Living donor liver transplant is a very complicated procedure (one of the most...
difficult procedures developed in the medical field ever). In this, two operation theatres with two dedicated teams are simultaneously operating on the donor and the recipient. The two teams coordinate various steps so that the time of taking out part of a liver from the donor coincides with the time of taking out whole of liver from the recipient and preparing the recipient for putting donor liver back into him.

The donor procedure is very precise where the liver is cut very meticulously into respective halves. This requires enormous training and many years of hard work and dedicated practice. At the end of donor surgery the part of the liver is taken out with 2 or 3 hepatic veins, 1 or 2 portal vein branches, 1 or 2 hepatic artery branches and 1 or 2 bile duct branches. These are then joined back in the recipient body very meticulously, again by the team of highly qualified and dedicated surgeons.

The anaesthesia team for both donor and recipient liver surgery is also highly specialized and trained for this purpose and is also one of the most essential components of the transplant surgery.

The operation usually takes between 12-14 hours; another 2-4 hours is spent preparing the patient for surgery and for other parts of the surgery. Therefore, a patient will likely be in the operating room for 14 to 20 hours.

A donor is expected to spend about 7 to 10 days in the hospital, whereas a recipient should expect to spend about 21 days in the hospital, although some stays may be shorter or longer.

The donor can usually resume light physical activity in 1-2 weeks and normal activity in about 3 weeks after surgery.
It is not possible to live without the liver. Once the liver starts to fail, all of its functions diminish. There is swelling of blood vessels of the esophagus which may rupture and show as vomiting of the blood.

decide upon this. However, few basics things which are to be kept in mind are:
- The donor’s liver must be healthy.
- The living donors must have compatible blood type as the recipient.
- They must be aged 18-55 years and be able to tolerate the surgery.
- The donor cannot receive any money or other form of payment for the donation.
- The donor must have a good social support system to aid in emotional aspects of going through the procedure.

SCIENCE REPORTER: Are the donors in any sort of risk due to this surgery? What are the complications, if any, that donors need to be aware about before they go in for giving away a part of their liver?

DR. RAVINDER PAL SINGH: There is some risk to the donor as after every surgery like some cough, mild discharge from stitch line, and mild pain. There are also other problems which are rare but can still occur, like bile leak, bleeding in the drain, infection, and very rarely mortality (0.1 to 1%).

SCIENCE REPORTER: How much time does the donor take to get back on his or her feet?

DR. RAVINDER PAL SINGH: The donor is usually encouraged to walk by about two days after surgery. They are usually fit to be discharged by about 7 to 8 days after surgery. They can usually resume their normal daily activities by the end of the first week, moderately heavy work by the end of the second week and unrestricted activity by the end of the first month.

SCIENCE REPORTER: What is the difference between a living liver donor and a living kidney donor?

DR. RAVINDER PAL SINGH: In living liver donation, we take a part of the liver from the donor, while the rest of the liver is left in place. The part which is taken usually grows back to 85% of its volume by three weeks and the rest of it grows slowly over the span of next few months.

SCIENCE REPORTER: Does the surgery require special skills? What is the status of living donor liver transplant surgeries in the country?

DR. RAVINDER PAL SINGH: Yes, liver transplant surgery is one of the most sophisticated surgeries in medical science. The surgery lasts 18-20 hours. It requires intense dedication, training, and very precise surgical skill sets. At present India is doing good work in living donor liver transplant. The kind of surgery and the results are at par with the world, or even better, if I may say so. However, still there are only a handful of liver transplant centers in India and there is a lot of gap between demand and supply.