



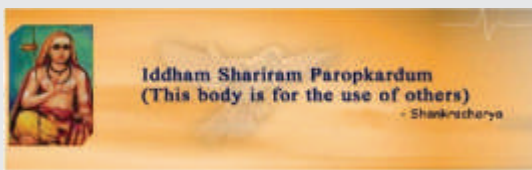
HEALTHY HEART

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Honorary Editor :
Dr. Dhiren Shah



Organ transplantation has improved the lives of hundreds of thousands of patients all the world. Total organ donation shortage of the country can be met with if last 5 to 10% of the victims involved in fatal accidents serve as organ donors. The challenges include an interplay of socio-cultural factors, beliefs and superstitions, lack of communication and organizational support, and negative views by the media. Several initiatives to encourage deceased organ donation include the Indian Network for Organ Sharing, a subdivision of the National Organ and Tissue Transplant Organization, the Transplantation of Human Organ Act (THOA), as well as the Transplantation of Human Organs and Tissue Rules. There are stringent criteria instituted for the retrieval, preservation and transportation of donor organs. This article reviews the ongoing efforts being implemented to encourage organ transplantation. In India, Every year around 5,00,000 patients die for want of organ transplantation and waiting for organs .



DECEASED ORGAN DONATION

What is Organ Donation?

Organ donation is giving an organ to help someone who is in need of urgent organ transplantation because of organ failure or damaged by disease or injury. It is a surgical process of removing an organ or tissue from one person (the organ donor) and placing it into another person (the recipient).

Organ transplantation is one of the great boons of advance and modern medicine. Unfortunately, the need for organ donors is much greater than the number of people who actually donate. According to a survey, in India, 500,000 people die every year because of non-availability of organs.

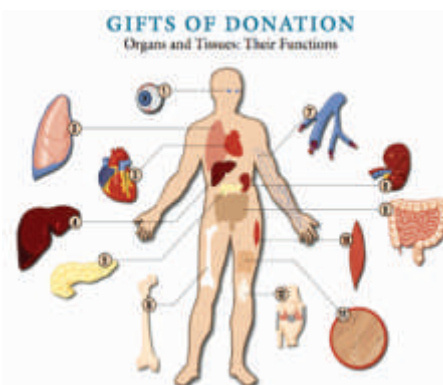
Which Organs or tissues can be donated?

The organs that can be donated are:

Liver, Kidney, Pancreas, Heart, Lung, Intestine.

The tissues that can be donated are:

Cornea, Bone, Skin, Heart Valve, Blood Vessels, Nerves and Tendon, etc.



What is Deceased Donor?

Deceased Donor: Anyone, regardless of age, race or gender can become an organ and tissue donor after his or her Death (Brainstem/Cardiac). Consent of near relative or a person in lawful possession of the dead body is required. If the deceased donor is under the age of 18 years, then the consent required from one of the parent or any near relative authorized by the parents is essential.

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Medical suitability for donation is determined at the time of death.

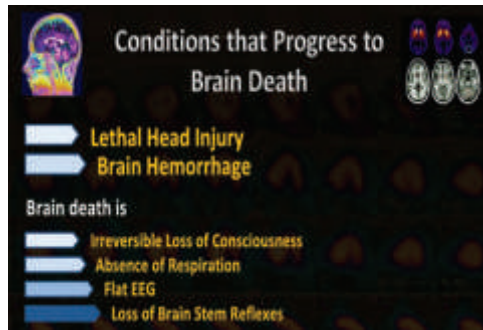
Deceased donors can be divided into two subgroups - donation after brain death (DBD) and donation after cardiac death (DCD). DCD is not done regularly in India due to multiple issues at legal and practical levels.

What is the meaning of Brain Dead Person ?

Brain stem death is cessation of function of the brain stem due to irreversible damage. It is an irreversible condition and the person has died. It is also called Brain Death in India.

A brain stem dead person cannot breathe on his own; however the heart has an inbuilt mechanism for pumping as long as it has a supply of oxygen and blood. A ventilator continues to blow air into lungs of brain stem dead persons, their heart continues to receive oxygenated blood and medicine may be given to maintain their blood pressure. The heart will continue to beat for a period of time after brain stem death - this does not mean that the person is alive, or that there is any chance of recovery.

As there is no global consensus on the criteria for establishing brain death, different tests are used in different parts of the world. In India, apnea testing is used for documenting brain death, which checks the integrity of the brain stem respiratory center at high levels of carbon dioxide.



CERTIFICATION OF BRAIN DEATH

Three prerequisites should be met with while certifying brain death, such as (1) coma or unresponsiveness, (2) absence of brainstem reflexes, and (3) apnea. (Brain-stem Death is accepted under the Transplant Human Organ Act since 1994)

Apnea Test:

Candidates should be normothermic (core temperature $\geq 36^{\circ}\text{C}$), stable hemodynamically (systolic pressure ≥ 90 mm Hg), free from sedative and paralytic drugs with normal oxygenation and near normal PaCO₂. Then Ventilator is disconnected with oxygen connected to T Piece and then watched for 10 minutes. If respiratory movements are not present and the PaCO₂ is >60 mm Hg or elevated >20 mm Hg from baseline value, the test is considered positive.

A second apnea testing is required for certifying brain death. The second test is done at an interval of 6 hours in India and it has to be certified by four physicians from a recommended panel; two of these have to be doctors nominated by the appropriate authority of the government with one of them being a neurologist. If a neurologist or

neurosurgeon is not available, an intensivist or anesthetist nominated by the head of the hospital may certify brain death. Form 10 is used for certifying brain death.

Additional tests are not required to confirm brain death as per the American Association of Neurology (AAN) guidelines. In patients in whom a complete clinical examination cannot be done, however, ancillary testing can be used to confirm brain death such as cerebral angiography, cerebral scintigraphy, isotope angiography, transcranial Doppler ultrasound and electroencephalogram.

Organ Retrieval

The surgery for organ retrieval is performed in controlled settings with careful physiological monitoring to ensure optimal organ perfusion and oxygenation until complete perfusion and cooling of donor organs has taken place. Kidneys from deceased organs are retrieved in conjunction with other thoracic and abdominal organs and, therefore, will require coordination of the surgical teams performing different roles.

The viability of the organs should be maintained during transportation from the donor hospital to the transplant center and during organ preparation on the back table. The main strategy of preservation is cold storage, which is



based on the principle of reducing metabolism while perfusion is absent. This can be achieved by static cold storage techniques and continuous machine perfusion (dynamic perfusion). In the static cold storage technique, the organs are perfused with cold solution via their arterial supply and suspended in a bath of the storage media on ice. Static cold storage is being currently practiced in our country.

Various preservation solutions are used for this purpose. The most commonly used preservation solutions are the Custodial solution, University of Wisconsin and the histidine-tryptophan-ketoglutarate solutions, which vary in the composition of electrolytes, buffers, antioxidants and energy precursors they contain, but share similar goals of reducing graft edema, intracellular acidosis and production of reactive oxygen species and in providing energy substrates for metabolism.

Cold ischemia time refers to the amount of time that an organ is not receiving blood supply and is maintained on a cold preservation fluid. Cold ischemia time varies widely from organ to organ, but in general, the sooner an organ can be transplanted, the better it is for ensuring its viability.

The commonly accepted cold ischemia times for various organs are as listed below:

Heart: 4 hours

Lungs: 4 to 6 hours

Liver: 6 to 10 hours

Pancreas: 12 to 18 hours

Intestines: 6 to 12 hours.

Kidneys: 24 hours (may be extended up to 72 hours if placed on mechanical perfusion)

Tissues such as cornea, skin, heart valves and bones may also be harvested and terminally sterilized and stored in tissue banks. These tissues can be used later for future transplant and reconstructive surgeries.

Thus one organ donor can save up to eight lives by donating heart, 2 lungs, pancreas, two kidneys and intestine.

The same donor can also save or improve the lives of up to 50 people by donating tissues and eyes.

Organ Transport

Organs are transported from the donor hospital to the transplant center in cases. Where the recipient is located at a different center or when there is no expertise/facility available at the retrieval center. In India, still the conventional method of road transport is being used for transport. Green corridors have been particularly helpful in this regard. When the distance is more, the organs are transported via commercial airlines. There have been many instances where valuable organs have been wasted due to delay in the transportation process. Private ambulances are too prohibitively expensive at this point of time.

What happens to the body after organ donation?

Once the retrieval process is completed, doctors handover the

deceased body to the family without any kind of disfigurement. The surgical procedures performed by trained medical professionals and the family can still have a traditional funeral service. Hospital also takes the responsibility of all the expenses right from the time the family gives consent for organ donation till the time they receive the body.

It is to be noted that the shelf life of organs is very limited and shelf life of the heart is 4 – 6 hours once it is outside the body. It is very important to synchronize both the surgeries of donor and recipient because the organs have a limited shelf life.

Hunt for the Recipient

There is a registration process for the recipients who need organ transplantation. They need to be registered themselves in the waiting list handled by National Organ and Tissue Transplant Organisation (NOTTO). Once the registered recipient's parameters match with the donor's medical compatibility, the recipient is informed about the donor and then the transplantation procedure begins.

How is Recipient shortlisted?

In case, the recipient is already registered within the same hospital where the deceased donor is then the organ is directly transplanted to the patient. If the recipient is not from the same hospital, the transplant coordinators of the hospital will notify NOTTO.



NOTTO looks after the nationwide coordination and networking for procurement and distribution of organs and tissues. They categorize the waiting list in 4 categories depending on the blood group type. From this waiting list, the NOTTO will find out the recipient who matches the donor.

Is there any age limit for organ donation?

Age limit for Organ Donation varies, depending upon whether it is living donation or cadaver donation; for example in living donation, person should be above 18 year of age, and for most of the organs deciding factor is the personal physical condition and not the age. Specialist healthcare professionals decide which organs are suitable case to case. Organs and tissue from people in their 70s and 80s have been transplanted successfully all over the world. In the case of tissues and eyes, age usually does not matter. **A deceased donor can generally donate the Organs & Tissues with the age limit of:**

- Kidneys, liver: up-to 70 years
- Heart, lungs: up-to 50 years
- Pancreas, Intestine: up-to 60-65 years
- Corneas, skin: up-to 100 years
- Heart valves: up-to 50 years
- Bone: up-to 70 years

Are There any contraindications for deceased Organ donation?

There are certain conditions where in it is considered as absolute contraindication for organ donation like death due to Septicemia, Hepatitis B positive, HIV positive, Metastatic malignancy. There are certain exceptions also in this.

ndication for organ donation like death due to Septicemia, Hepatitis B positive, HIV positive, Metastatic malignancy. There are certain exceptions also in this.

How can I be a Organ donor?

You can be a donor by expressing your wish in the authorized organ and tissue donation form (Form-7 As per THOA). You may pledge to donate your organs by signing up with our **website www.notto.nic.in** and register yourself as donor or for offline registration you may download Form 7 from our website.

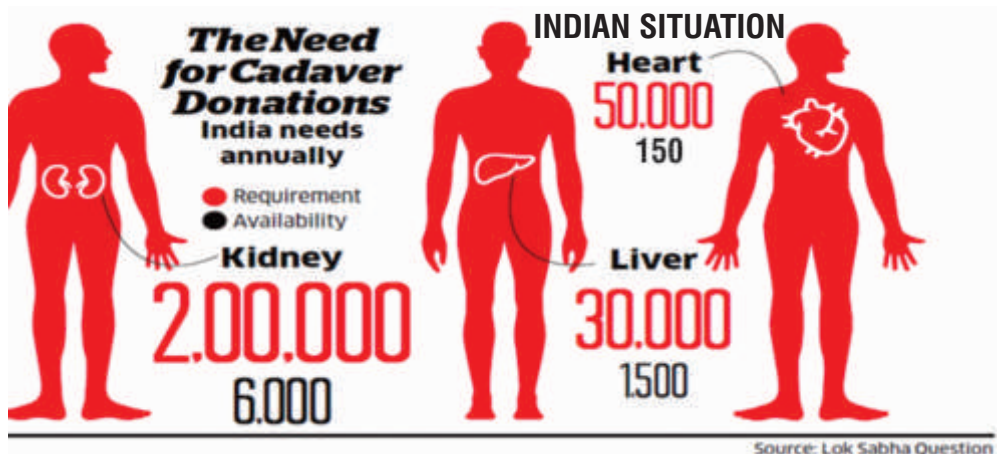
You are requested to fill the form 7 and send signed copy to NOTTO at below mentioned address:

NATIONAL ORGAN AND TISSUE TRANSPLANT ORGANISATION

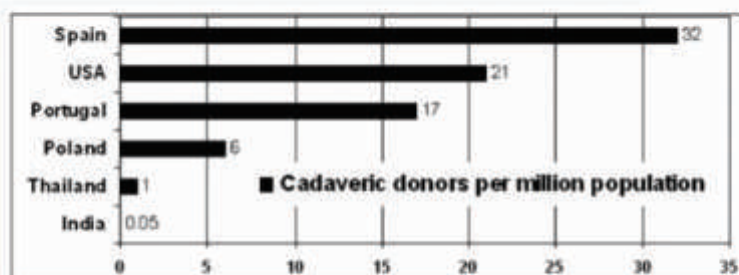
4th Floor, NIOP Building, Safdarjung Hospital Campus, New Delhi-110029

No. It can only be removed when a person is declared as brain stem dead in the hospital and is immediately put on a ventilator and other life support systems. After death at home, only eyes and some tissues can be removed.

Why promotion of Cadaveric organ donation is important ?



Cadaveric Donation in India



From 1995 to 2001 there have been a recorded 426 cadaver transplants in India including kidney (377), heart (34), liver (12), pancreas (2), lungs (1). This averages to just over 50 cadaver organ transplants a year.



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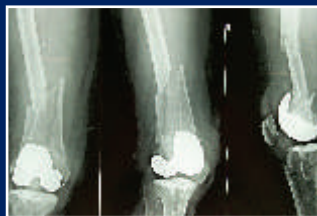
- 5 patients were severely injured after RTA @ Sanand.
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