

## Organ Transplantation Unit

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### Organ Transplantation

- Organ transplantation is a medical procedure in which an organ is removed from one body and placed in the body of the recipient
  - This is for replacing a damaged or missing organ
- The donor and the recipient may be at the same location, or
  - Organs may be transported from a donor site to another location

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### Organ Transplantation

- Autograft
  - Organs and / or tissues that are transplanted within the same person's body are called autograft
- Allografts
  - Transplants that are recently performed between two subjects of the same species are called allografts

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### Organ Transplantation

- Xenotransplantation
  - Even with creative ways to utilise more living and deceased donors, another source of kidneys is most likely necessary
  - Transplantation between an animal source and human recipient is called xenotransplantation
  - This has already occurred from non-human primate donors such as chimpanzees, monkeys and baboons

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### Organ Transplantation

- These are endangered species and the size and blood type differences are great
  - Moreover, there is a concern of transmission of infectious diseases
  - These type transplantation is currently banned in USA by the FDA
- Most research in this field is currently centered on the pig
  - As the donor, pigs has certain desirable characteristics
    - They have multiple offspring, rapid maturity to adult age, lower risk of transmissible infectious disease and appropriate size

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### Organ Transplantation

- Transplant tourism
  - With the short supply of organs patients are travelling from one country to another to receive a transplant
  - Commercialisation and poor regulation can undermine the true nature of transplantation and put patient's life at risk

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## Organ Transplantation

- **History of kidney Transplantation**
  - Alexis Carrel was awarded the Nobel Prize in 1912 for his pioneering work.
  - First case of kidney transplantation was reported in 1902 by a Hungarian surgeon Emerich Ullmann
  - The report was submitted at the Vienna Medical Society Meeting
  - A dog's kidney was transplanted into another Dog's neck
  - In the same year another French surgeon also published a paper on operating technique for organ transplantation

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## Organ Transplantation

- **First Animal to human transplant**
  - In 1906, a French surgeon transplanted left kidney of a pig into the left elbow of a woman suffering from nephrotic syndrome
    - The graft failed because of early vascular thrombosis
- **First unsuccessful kidney transplant between humans**
  - In 1936, Voronoy in Russia reported transplant between humans using cadaveric kidney

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## Organ Transplantation

- **1943-1944 Madawar gave an explanation of graft destruction due to biological incompatibility – as described by Carrel**
  - This 'biological incompatibility' was now explained as rejection due to an immunologic response
- **1947-1953: Initial unsuccessful allotransplants**
  - This was in Peter Bent Brigham Hospital in Boston USA on a young woman
  - Due to objection by hospital administration to perform such operation in OT, it was done in a difficult situation in a small room in the night by using two lamps

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## Organ Transplantation

- **1959: First successful kidney transplant between non-identical twins**
  - This was done in the same hospital (PBB Hospital) between dizygotic twins
- **1960: First successful kidney transplant between non-twin siblings**
  - In January 1960, the first successful kidney transplant was done at the Foch Hospital in France

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## Organ Transplantation

- **1960-61: First successful kidney transplant**
  - A transplant was done at Foch Hospital two kidney transplants was performed between two non-siblings
  - An episode of rejection occurred at 5 weeks
  - It was treated with low doses of total body irradiation, steroids and administration of an immunosuppressive drug – 6-mercaptopurine
- **1961-1962: First kidney transplants using azathioprine**
  - Experimentation with 6-mercaptopurine began in 1959 in London,
    - Roy Calne demonstrated prolonged kidney graft survival in dogs
  - The drug was first used in humans in 1960

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## Organ Transplantation

- **1962: First successful cadaveric kidney transplant using immunosuppressant**
  - In April 1962, at the Peter Bent Brigham Hospital, Murray performed the first successful human cadaveric kidney transplant,
  - They used an immunosuppressive regimen of azathioprine and actinomycin C
  - The graft functioned for more than one year
  - This was a record for a cadaveric kidney at that time.

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## Organ Donation Standards for living Donors

- These standards are published by Accreditation Canada
  - These standards for living donors apply to acute care organisations that have a living donation team and program
- These standards pertain to living donation for kidney, liver, lung, intestine, and pancreas donation

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## WHO – Draft Guiding Principles on Human Organ Transplantation

- Guiding Principle (GP) 1
  - Organs may be removed from the bodies of deceased persons for the purpose of transplantation if:
    - any consents required by law are obtained; and
    - there is no reason to believe that the deceased person objected to such removal, in the absence of any formal consent given during the person's lifetime.

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## WHO – Draft Guiding Principles on Human Organ Transplantation

- Guiding principle 2
  - Physicians determining that the death of a potential donor has occurred
    - should not be directly involved in organ removal from the donor and
    - subsequent transplantation procedures, or
    - be responsible for the care of potential recipients of such organs.

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## WHO – Draft Guiding Principles on Human Organ Transplantation

- Guiding principle 3
  - Organs for transplantation should be removed preferably from the bodies of deceased persons.
  - However, adult living persons may donate organs, but in general such donors should be genetically related to the recipients.
  - Exceptions may be made in the case of transplantation of bone marrow and other acceptable regenerative tissues

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## WHO – Draft Guiding Principles on Human Organ Transplantation

- An organ may be removed from the body of an adult living donor for the purpose of transplantation if the donor gives free consent.
- The donor should be free of
  - any undue influence and pressure and
  - sufficiently informed to be able to understand and weigh the risks, benefits and consequences of consent
- Guiding principle 4
  - No organ should be removed from the body of a living minor for the purpose of transplantation.
  - Exceptions may be made under national law in the case of regenerative tissues

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## WHO – Draft Guiding Principles on Human Organ Transplantation

- Guiding principle 5
  - The human body and its parts cannot be the subject of commercial transactions.
  - Accordingly, giving or receiving payment (including any other compensation or reward) for organs should be prohibited.
- Guiding principle 6
  - Advertising the need for or availability of organs, with a view to offering or seeking payment, should be prohibited.

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### WHO – Draft Guiding Principles on Human Organ Transplantation

- Guiding principle 7
  - It should be prohibited for physicians and other health professionals to engage in organ transplantation procedures, if
    - they have reason to believe that the organs concerned have been the subject of commercial transactions.
- Guiding principle 8
  - It should be prohibited for any person or facility involved in organ transplantation procedures
    - to receive any payment that exceeds a justifiable fee for the services rendered.

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### WHO – Draft Guiding Principles on Human Organ Transplantation

- Guiding principle 9
  - In the light of the principles of distributive justice and equity,
  - donated organs should be made available to patients on the basis of medical need
    - and not on the basis of financial or other considerations.

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### Need

In India there is a growing need of organ and tissue transplant. The estimated number of organs required every year is as under:

Type of organ	Number
Kidney	250000
Heart	50000
Liver	80000
Cornea	100000

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### Status of Organ / Tissue Donation and Transplantation in India

- The organ donation rate in India is currently less than 1 per million
- In comparison, Spain is having 35 donation per million
- The deceased donation is insignificant in India
- Govt. of India enacted the Transplantation of Human Organ Act, 1994
  - The Act provide for removal, storage and transplantation of human organs for therapeutic purposes

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### Status of Organ / Tissue Donation and Transplantation in India

- The Act envisaged prevention of commercial dealings in human organs
- A committee was constituted by the Hon'ble High Court of Delhi to review the provisions of the Act, 1994 and the Rule, 1995 amended in 2008
- The G of I amended the Act in 2011

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### Organ Donation

- What are the Organs that can be donated ?
  - The organs that can be donated are:
    - Liver, Kidney, Pancreas, Heart, Lung, Intestine.
- What are the tissues that can be donated?
  - The tissues that can be donated are:
    - Cornea, Bone, Skin, Heart Valve, blood vessels, nerves and tendon etc.

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## Organ Donation

- How does whole body donation differ from organ donation?
  - Organ donation for therapeutic purposes is covered under the Transplantation of Human Organs Act (THOA 1994).
  - Whole body donation is covered by the Anatomy Act 1984.
    - Body donation is defined as the act of giving one's body after death for medical research and education.
    - Those donated cadavers remain a principal teaching tool for anatomists and medical educators teaching gross anatomy.

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## Organ Donation

- What are the different types of Organ Donation?
  - There are two types of organ donation:-
    1. Living Donor Organ Donation:
      - A person during his life can donate
        - one kidney (the other kidney is capable of maintaining the body functions adequately for the donor),
        - a portion of pancreas (half of the pancreas is adequate for sustaining pancreatic functions) and
        - a part of the liver (the segments of liver will regenerate after a period of time in both recipient and donor).

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## Organ Donation

- Deceased Donor Organ Donation:
  - A person can donate multiple organ and tissues after (brain-stem/cardiac) death.
  - His/her organ continues to live in another person's body..
- What are the different types of living organ donation?
  - Living Near Related Donors:
    - Only immediate blood relations are accepted usually as donors viz., parents, siblings, children, grandparents and grand children (THOA Rules 2014).
    - Spouse is also accepted as a living donor in the category of near relative and is permitted to be a donor.

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## Organ Donation

- Living Non-near relative Donors:
  - They are other than near relative of recipient or patient.
  - They can donate only for the reason of affection and attachment towards the recipient or for any other special reason.
- SWAP Donors:
  - In some cases the living near-relative donor is incompatible with the recipient,
  - Provision for swapping of donors between two such pairs exists,
  - In this, the donor of first pair matches with the second recipient and donor of second pair matches with the first recipient
  - This is permissible only for near relatives as donors.

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## Organ Donation

- What is Brain-stem Death?
  - 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
    - The heart has an inbuilt mechanism for pumping as long as it has a supply of oxygen and blood.

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## Organ Donation

- 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.
- The declaration of brain stem death is made with accepted medical standards.
- The parameters emphasize the 3 clinical findings necessary to confirm irreversible cessation of all functions of the entire brain, including the brain stem:

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## Organ Donation

- coma (loss of consciousness) with a known cause,
- absence of brainstem reflexes, and
- apnea (absence of spontaneous breathing).
- These tests are carried out twice at the interval of at-least 6-12 hours by the team of Medical Experts.
- Brain-stem Death is accepted under the Transplant Human Organ Act since 1994.

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## Organ Donation

### • Who will certify the Brain-stem Death?

- As per THOA Board of Medical Experts Consisting of following will certify Brain-stem Death:
  1. Doctor in charge of the hospital (medical superintendent)
  2. Doctor nominated from a panel of Doctors appointed by the Appropriate Authority
  3. Neurologist/neurosurgeon/intensivist nominated from a panel appointed by the Appropriate Authority.
  4. Doctor treating the patient.
- The panel of four doctors carries out the tests together to certify brain death.

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End of Part 1

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