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Perspective

Immunology of organ transplantation and its types

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DESCRIPTION

An organ transplant is a medical procedure in which an organ is removed from one body and placed in the recipient's body to replace a damaged or missing organ. The donor and recipient may be in the same location, or the organs may be transported from the donor's location to another location. Organs and/or tissues that are transplanted into the body of one person are called autografts. Transplants that are recently performed between two individuals of the same species are called allografts. Allografts can be from a living or cadaveric source.

Organs that have been successfully transplanted include the heart, kidney, liver, lung, pancreas, intestine, thymus, and uterus. Tissues include bone, tendons (both called musculoskeletal grafts), cornea, skin, heart valves, nerves, and veins. Worldwide, the kidney is the most frequently transplanted organ, followed by the liver and then the heart. Most often, tissues of the cornea and musculoskeletal system are transplanted; their number exceeds the number of organ transplants more than ten times.

Organ donors can be living, brain dead, or deceased from circulatory death. Tissue can be regenerated from donors who have died from circulatory death, as well as from brain death - up to 24 hours after the heart stops beating. Unlike organs, most tissues (except the cornea) can be preserved and stored for up to five years, meaning they can be stored in jars. Transplantation raises a number of bioethical questions, including the definition of death, when and how to consent to organ transplantation, and payment for organs for transplantation. Other ethical concerns include transplant tourism (medical tourism) and, more broadly, the socio-economic context in which organ procurement or transplantation may occur. Organ trade is a separate problem. There is also the ethical issue of not giving patients false hope.

Transplantation medicine is one of the most complex and challenging branches of modern medicine. One of the key areas of medical treatment are the problems of transplant rejection, during which the body has an immune reaction to the transplanted organ, which can lead to transplant failure and the need for immediate removal of the organ from the recipient. When possible, transplant rejection can be reduced by serotyping to determine the most suitable donor-recipient match and by immunosuppressants.

Types

Autograft : Autografts are tissue transplants into one person. Sometimes this is done with excess tissue, tissue that can be regenerated, or tissue that is more desperately needed elsewhere (examples include skin grafts, vein extraction for CABG, etc.). Sometimes an autologous transplant is done to remove tissue and then treat it or the person before returning it (examples include autologous stem cell transplants and blood storage before surgery). In rotationplasty, a distal joint is used to replace a more proximal one; usually a foot or ankle joint is used to replace the knee joint. The person's foot is cut off and turned over, the knee is removed, and the lower leg is joined to the femur.

Allograft: An allograft is an organ or tissue transplant between two genetically non-identical members of the same species. Most human tissue and organ transplants are allografts. Because of the genetic difference between the organ and the recipient, the recipient's immune system will identify the organ as foreign and attempt to destroy it, leading to rejection of the transplant. The risk of transplant rejection can be assessed by measuring panel-reactive antibody levels.

Xenograft: A xenograft is the transplantation of organs or tissues from one species to another. An example is heart valve transplantation in pigs, which is quite common and successful. Another example is the attempt to transplant pancreatic islets from fish-primates (primates from fish). The latest research study was supposed to pave the way for potential human use if successful. However, xenotransplantation is often an extremely dangerous type of transplantation due to the increased risk of dysfunctional compatibility, rejection, and tissue-borne disease. In the opposite direction, attempts are being made to develop a way to transplant human fetal hearts and kidneys into animals for future transplantation into patients to solve the problem of the shortage of donor organs.

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