



A Comprehensive Introduction To

# KIDNEY TRANSPLANT

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# KIDNEY

## Transplantation

### What is a kidney transplant?

A kidney transplant is a form of treatment for End Stage Kidney Disease, where a healthy kidney from another person is surgically implanted into the patient. The kidney may come from a **deceased organ donor** or from a **living donor**.

Under usual circumstances, each individual is born with a pair of kidneys. Family members or individuals who are unrelated may be able to donate one of their kidneys. This type of transplant is called a **living donor transplant**. Individuals who donate a kidney can live a normal and healthy life with one remaining kidney.

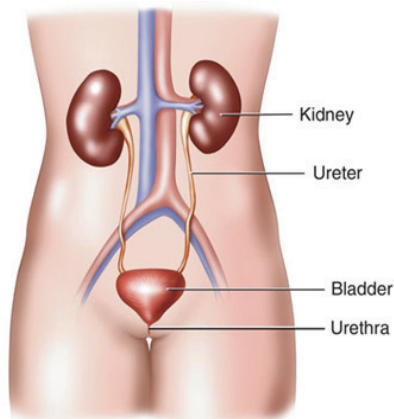
A person receiving a transplant usually receives only one kidney, but, in rare situations, he or she may receive two kidneys from a **deceased donor**. In most cases, the diseased kidneys are left in place during the transplant procedure. The transplanted kidney is implanted in the lower abdomen on the front side of the body.

### How do the kidneys work?

The body takes nutrients from food and converts them to energy. After the body has taken the food that it needs, waste products are left behind in the bowel and in the blood.

The two kidneys are located below the ribs toward the middle of the back. Their functions is to:

- Remove urea and other toxins from the blood
- Remove extra fluid from the blood in the form of urine
- Regulate blood pressure
- Regulate acid-base balance in the body
- Keep a stable balance of salts and other substances in the blood
- Produce erythropoietin, a hormone that aids the formation of red blood cells
- Produce an active form of vitamin D to ensure healthy bones





## What are the causes of End Stage Kidney Disease (ESKD)?

End Stage Kidney Disease (ESKD) is a permanent condition of kidney failure. Some health conditions that may result in ESKD include, but are not limited to the following:

- Diabetes mellitus
- High blood pressure
- Polycystic kidney disease or other inherited disorders
- Glomerulonephritis, which is inflammation of the kidney's filtering units
- Lupus and other diseases of the immune system
- Haemolytic uremic syndrome, a rare disorder that causes kidney failure
- Repeated urinary infections
- Urinary tract obstruction
- Other conditions, such as congenital defects of the kidneys

## Why do I need a kidney transplant?

If you have End Stage Kidney Disease (ESKD), there are a few treatment options available:

- Dialysis
  - Haemodialysis (Home or In-Centre)
  - Peritoneal Dialysis (Home)
- Kidney transplant

Dialysis helps by replacing some kidney functions by using external machines that will help filter out waste products, salt, and water from the body. However, it is not able to perform the other functions of a kidney, for example, erythropoietin (hormone released by the kidney for red blood cell production) and active Vitamin D production.

Therefore, a kidney transplant is the recommended treatment option for most people with ESKD as it offers a better outcome and quality life.

## What are the risks of kidney transplantation?

As with any surgical procedure, complications can occur. Some of the **surgical complications** which may occur include but, are not limited to the following:

- Bleeding
- Infection
- Blockage of the blood vessels to the kidney, causing it to cease function. This usually occurs only within 1-2% of kidney transplant
- Leakage of urine
- Blockage of urine in the ureter
- New kidney not functioning at optimum capacity initially
- Blood clots in the legs (Deep Vein Thrombosis)



As the procedure is done under the administration of general anaesthesia, some side effects may occur. A few of the commonly reported ones are:

- Pain
- Nausea and vomiting - in up to 30% of patients
- Sore throat
- Headache



Some uncommon complications of general anaesthesia may include, but are not limited to:

- Damage to teeth
- Anaphylaxis (allergic reaction)
- Laryngeal damage
- Aspiration pneumonia
- Hypothermia
- Hypoxic brain damage
- Nerve injury
- Awareness during anaesthesia
- Embolism - air, thrombus, venous or arterial
- Backache
- Reactions related to specific general anaesthetic agents
- Pneumothorax (collapse of the lungs) related to central line insertion
- Cardiovascular collapse
- Respiratory depression
- Death

Other complications may include:

- **Rejection of the transplanted kidney.**

The new kidney may be rejected. Rejection is a normal reaction of the body to a foreign object or tissue. When a new kidney is transplanted into a recipient's body, the immune system reacts to what it perceives as a threat and attacks the new organ, not realising that the transplanted kidney is beneficial. To allow the transplanted organ to survive in the recipient's body, medication must be taken to weaken the immune system. However, these may have side effects depending on the type of medication. The exact side effect will depend on the type of medications used. If rejection is suspected, the doctor will advise you to have a kidney biopsy.

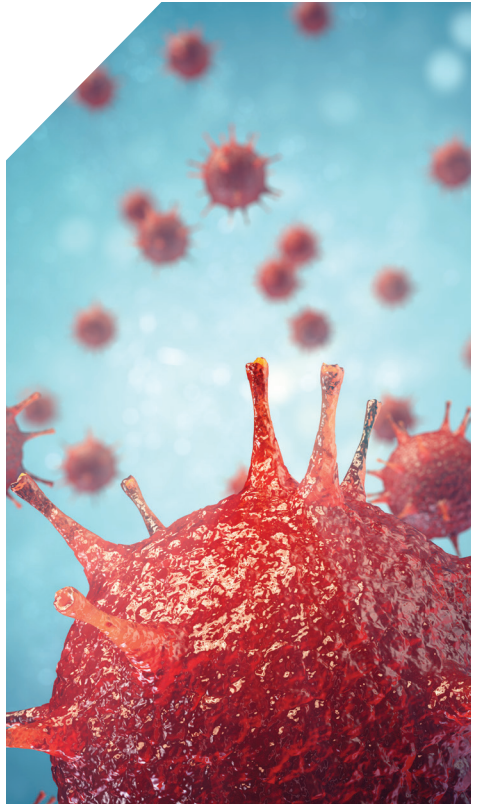
- **Infection due to immunosuppression.**

As the immunosuppression medications weaken the immune system, you are also at increased risk of infection.

- **Cancer.** There is also increased risk of cancer in comparison to non-transplanted patients.

- **Blood borne viral infections from donor organ.** Even though organ donors are screened very carefully for blood borne viral infections, there remains a very small risk for acquiring AIDS, Hepatitis B and other infection from the donor organ.

- **Infectious diseases from blood transfusion.** In the event of moderate to severe bleeding during surgery, you may require a blood transfusion which carries a small risk for the transmission of infectious diseases from the donor. You are also required to sign a blood transfusion consent form prior to surgery.



## What are the contraindications for kidney transplantation?

Contraindications for kidney transplantation include, but are not limited to, the following:

- Current or recurring infection that cannot be treated effectively
- Cancer
- Severe heart or other medical conditions that prevent the ability to tolerate the surgical procedure
- Serious conditions other than kidney disease that would not improve after transplantation
- Non-compliance with treatment regimen

There may be other risks depending on your specific medical condition. Please discuss any concerns with your doctor if you are considering kidney transplantation.

# BEFORE DURING AFTER The Procedure

## BEFORE the procedure

Due to the extensive amount of information necessary in determining eligibility for transplant, the evaluation process is carried out by a transplant team. The team includes a transplant surgeon, a transplant nephrologist (doctor specialising in the treatment of the kidneys), one or more transplant nurses, and a psychiatrist. Additional team members may include a dietitian, physiotherapist, pharmacist, anaesthesiologist, radiologist, pathologist, and a clinical psychologist.

Components of the transplant evaluation process include, but are not limited to the following:



- **Blood tests.** Blood tests are performed to help determine a good donor match and to help improve the chances that the donor organ will not be rejected.



- **Diagnostic tests.** Diagnostic tests may be performed to assess your overall health condition. These tests may include X-rays, ultrasound procedures, CT scans and dental examinations. Women may need to undergo gynaecological evaluations and a mammogram. You may also be required to undergo a urological (urinary tract and bladder) evaluation.



- **Psychological and social evaluation.**

Psychological and social issues involved in organ transplantation, such as stress, financial issues, and family support will be assessed. These issues can significantly impact the outcome of a transplant.



The transplant team will consider all information from interviews, medical history, physical examination, and diagnostic tests in order to determine your eligibility for kidney transplantation.

If you are to receive a kidney from a living family member (living-related transplant), the transplant may be performed at a scheduled time.



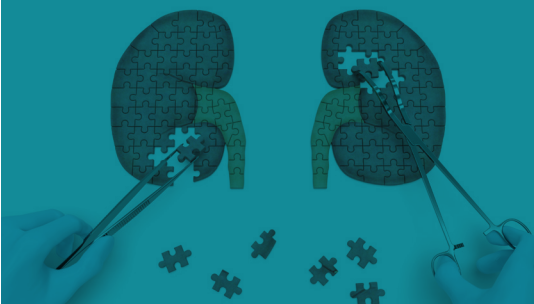
The following steps will precede the transplant:

1. Your doctor will explain the procedure to you and offer you the opportunity to ask any questions that you might have about the procedure.
2. You will be asked to sign a consent form showing that you have agreed to the operation. Please read the form carefully prior to signing, and feel free to ask questions should anything be unclear.
3. You will receive dialysis prior to the procedure if you are currently on a dialysis routine.
4. For a planned living transplant, you should fast for eight hours before the operation, generally after midnight.
5. You may receive a sedative prior to the procedure to help you relax.

## **DURING** the procedure

Generally, a kidney transplant follows this process:

- An intravenous (IV) line will be inserted in your arm or hand.
- Additional catheters/tubes may be inserted in your neck and wrist to monitor the status of your heart and blood pressure, as well as for obtaining blood samples.
- If there is excessive hair at the surgical site, it may be shaved off.
- A catheter/tube will be inserted into your bladder.
- You will be positioned on the operating table, lying on your back.
- The kidney transplant surgery will be performed while you are asleep under general anaesthesia. A tube will be inserted through your mouth into your lungs. The tube will be attached to a ventilator that will breathe for you during the procedure.
- The anaesthesiologist will continuously monitor your heart rate, blood pressure, breathing, and blood oxygen level during the surgery.



- The skin over the surgical site will be cleansed with an antiseptic solution.
- The doctor will make an incision into the lower abdomen on one side.
- The doctor will visually inspect the donor kidney prior to implanting it.
- The renal artery and vein of the donor kidney will be sutured (sewn) to one of the pelvic arteries and veins.
- After the artery and vein are attached, the blood flow through these vessels will be checked for bleeding at the suture lines.
- The donor ureter (the tube that drains urine from the kidney) will be connected to your bladder.
- The incision will be closed with stitches or surgical staples.
- A drain may be placed in the incision site to reduce swelling.
- A sterile bandage or dressing will be applied.



## **AFTER the procedure**

### ► **In the hospital**



After the surgery, you will be taken to the recovery room for observation. Once your blood pressure, pulse, and breathing are stable and you are alert, you will be taken to the intensive care unit (ICU). Kidney transplantation usually requires an in-hospital stay of several days.

A kidney from a living donor may begin to function immediately, whereas a kidney from a deceased donor may take longer to start working. Dialysis may be required until the kidney is functioning adequately. You will have a catheter in your bladder to drain your urine. The amount of urine will be carefully measured to evaluate the new kidney's function.

You will receive IV fluids until you are able to take adequate amount of food and fluids. Your diet will gradually advance from liquids to more solid food as your body's tolerance progresses.

Your liquid intake will be adjusted according to the function of your new kidney.

Your immunosuppression (antirejection) medications will be closely monitored to make sure you are receiving the optimum dose and the best combination of medications.

Blood samples will be taken frequently to monitor the status of the new kidney, as well as other body functions, such as the liver, lungs, and blood system.

You may begin mobilising the day after the procedure. You will also be asked to do intensive lung exercises. A physiotherapist will assist you to do this as early as possible. This will reduce your risk from acquiring lung infection. You should also get out of bed and move around several times a day as this reduces the risk of developing blood clots in your legs.

You will be provided with pain control medication soon after surgery. For the first one or two days, this will be given as an injection. Once you are allowed to take liquid or solid food orally, oral painkillers will be provided. Take painkillers as instructed by your doctor. Be sure to only take recommended medications by the transplant team/nephrologists. Please inform your transplant team if new medications have been prescribed to you.

Prior to discharge, the transplant nurses, pharmacists, dieticians and other members of the transplant team will guide you on how to take care of yourself once you are discharged from the hospital.

## ► At home

Once you are home, it is important to keep the surgical area clean and dry. Your doctor will give you specific bathing instructions. The stitches or surgical staples will be removed during a follow-up clinic visit.

You should not drive until your doctor tells you to. You should avoid any activity or position that causes pressure to be placed on the new kidney. Other activity restrictions may apply.

Please inform your doctor if any of the following occur:

- Fever, which may be a sign of rejection or infection
- Redness, swelling, or bleeding or other drainage from the incision site
- Increase in pain around the incision site

Fever and tenderness over the kidney are some of the most common symptoms of rejection. An elevation of your blood creatinine level (blood test to measure kidney function and/or blood pressure monitored by your doctor) may also indicate rejection. The symptoms of rejection may resemble other medical conditions or problems. Consult your transplant team with any concerns you have. Frequent visit to and contact with the transplant team is essential.



Your transplant clinic visits during the first 6 months are intensive. During the first month, the clinic visit will be thrice per week. During the second and third month, the visit will be reduced to twice per week. From the fourth month onward, the visit will be scheduled once per week.

Depending on your particular situation, your doctor may give you additional or alternate instructions after the procedure.

## What is done to prevent rejection?

To allow the transplanted kidney to survive in a new body, you will be given medications for the rest of your life to prevent rejection. Each person may react differently to medications. The choice of treatment is individualised.

The antirejection medications most commonly used are:

- Tacrolimus (Prograf®) or Cyclosporine (Neoral®)
- Mycophenolate mofetil (Cellcept®) or Mycophenolate Sodium (Myfortic®)
- Prednisolone
- Everolimus (Certican®)

In the initial stages, several anti-rejection medications will be prescribed. The doses of these medications may change, depending on your body's response.

Since antirejection medications affect the immune system, people who receive a transplant will be at higher risk of infections. A balance must be maintained between preventing rejection and making you susceptible to infection.

Some of the common infections you will be susceptible to include oral yeast infection (thrush), herpes, and respiratory viruses. You should avoid contact with crowds and anyone who has an infection for the first few months after your surgery.



# NOTES





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