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Medicine for Managers

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Kidney Transplant

A kidney transplant is a life-saving surgical procedure to place a healthy and functioning kidney taken from a living or a deceased donor into a person whose kidneys have little or no function. The kidneys filter the blood and remove waste products, minerals and water, which is formed into the urine. In those patients who have little or no kidney function, failure of the filtration mechanism without dialysis or transplant would result in death.

The History

As with so many bodily organs and structures, the holy grail of many physicians has been finding a way of substituting failing components with new or recycled healthy replacements. It has been considered possible for more than 100 years that diseased organs such as the kidneys could be replaced. The first known attempt to transplant a kidney was carried out in 1933 by the Ukrainian surgeon Yuriy Vorony, but incompatibility and surgical naivety resulted in rejection and death of the patient within a couple of days.

In 1950 a successful kidney transplant was done by Richard Lawler. It was rejected ten months later but, by then, the other kidney had recovered and the patient lived for five years.

In 1954, Dr Murray Hume performed the first living-related kidney transplant in Boston. Rejection risks were reduced because the surgery was performed on identical twins. The recipient of the kidney died eight years later.

In the UK, the first recorded deceased donor transplant, which was unsuccessful, was carried out in 1955. Four years later, a further attempt to transplant a deceased donor kidney resulted in the recipient surviving eight months. In 1960, Woodruff transplanted a living kidney between identical twins in Edinburgh successfully.

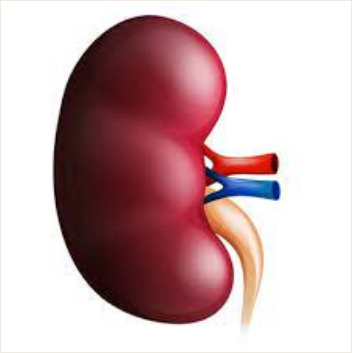
Techniques were developed but the next key stage was the discovery and introduction of the first widely-used and successful anti-rejection drug, ***ciclosporin*** (formerly cyclosporin).

Since that time, the numbers of transplanted kidneys have burgeoned with the development of effective kidney donor programmes, the discovery of other immunosuppressant drugs to minimise the risks of rejection and more effective review of available kidneys to identify the best organ for an individual patient.

The Anatomy

The kidneys are bean-shaped organs located on either side of the spine in the abdomen below the ribs. They filter the blood and remove waste

products and excess fluid which is passed out in the urine.



There are a variety of factors which may result in the kidneys experiencing diminishing function. Common causes of kidney disease include:

- High blood pressure
- Diabetes
- Kidney diseases such as ***glomerulonephritis***, where inflammation within the kidneys results in scarring and loss of function.
- Congenital abnormalities such as ***polycystic kidney disease***.

As the kidneys lose their ability to effectively filter the blood and eliminate the waste products, the result is progressive kidney failure which in itself can raise blood pressure. The kidneys are said to have ***end-stage failure*** when They have lost 90% of their function.

In such circumstances patients can only remain alive if the waste materials are removed, either by undergoing regular kidney dialysis or by having a transplant.

Why a transplant?

A kidney transplant has advantages over the alternative, which is a lifetime of kidney dialysis.

The advantages are:

- Better quality of life
- Lower treatment costs and elimination of difficulties associated with dialysis availability
- Reduced death rate
- Reduced necessity for dietary restrictions associated with dialysis

However, not all patients are suitable for transplant, due to advanced age, severe systemic disease (e.g. heart or liver disease), or alcohol or drug abuse.

A kidney transplant may be from one of two sources:

1. The kidney of a deceased donor
2. The kidney of a living donor.

Living donor kidneys are an important option and family members are most likely to be compatible with the individual needing the transplant. Sometimes unrelated people may give a kidney, especially if circumstances allow a recipient to obtain a kidney if the intended donor is not a match and some sort of exchange arrangement is possible.

Eligibility for Transplant

Following a diagnosis of renal failure, the individual will be assessed to establish whether he or she fits the criteria for transplant. This will include:

- Assessment of fitness for surgery and compliance with post-operative instructions

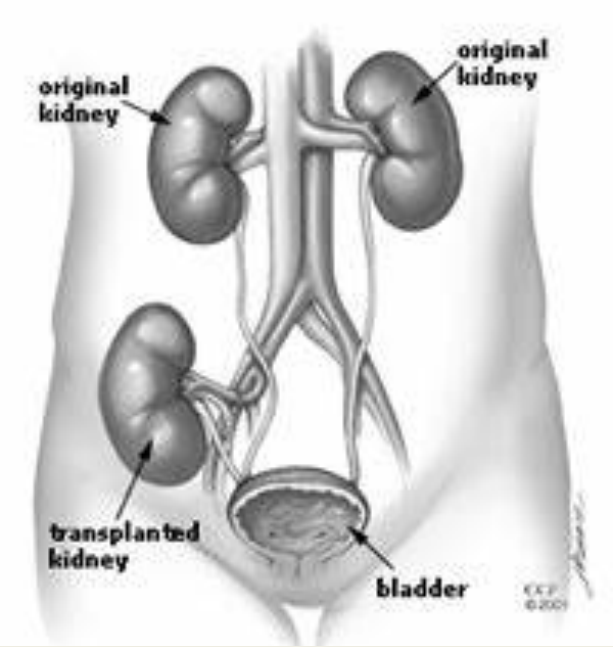
The physical assessment will include:

- Comprehensive physical examination
- Blood tests, scans and other investigations
- Possible other tests to evaluate the individual for transplant

If accepted for the procedure, it is necessary to undergo tests to help finding a match.

- ***Blood grouping***. The recipient should have a blood group the same as, or compatible with, the donor.
- ***Crossmatching***. The donor and recipient blood are tested to determine whether specific donor antigens with react with recipient antibodies. Crossmatch issues do not preclude transplant but may necessitate additional medical treatment.
- ***Tissue typing***. This is called Human Leucocyte Antigen (HLA) typing. It identifies particular genetic markers that reduce the risk of kidney rejection.

If accepted for the kidney transplant programme, the patient must stay healthy whilst awaiting a suitable donor which, in some cases, may involve a delay of up to 2-3 years. The individual will need to take all prescribed medication, not smoke or drink alcohol, exercise when possible and follow dialysis guidelines.



Surgery

When a kidney becomes available, the surgery is performed under general anaesthetic. The surgeon opens the abdomen on the affected side and locates the new kidney low in the abdomen. The old kidney may be left in place and the new donor kidney blood vessels attached to the recipient main blood vessels lower down.

Post-operative course

Like most surgical procedures, success rates are good and complications few. However, significant risks include:

- Post-operative bleeding
- Infection
- Failure or rejection of the kidney
- Transmission of disease from the donated kidney
- Other clinical complications

The patient will be required to take medication to prevent rejection of the transplanted kidney.

Such drugs can cause side effects including osteomalacia (bone thinning) and diabetes.

The immunosuppressant therapy will help to prevent that individual's own immune system from attacking and rejecting the new kidney.

However, reduced immunity may result in the likelihood of increased infections.

The new kidney will take over the process of blood filtration, obviating the need for dialysis. Success rates are high and figures suggest that between 87 and 90% of transplanted patients are still alive ten years after surgery.

The NHS Organ Donor Register

In the UK consent is needed for organ donation, which can be provided by joining the Donor Register which gives authority after death. Alternatively consent can be given after death by an authorised person such as a relative.

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