Kidney transplant

Azienda Provinciale
per i Servizi Sanitari
Provincia Autonoma di Trento

This booklet is intended for persons with severe kidney failure who require renal replacement treatment, for their families and for anyone wishing to learn more about issues related to kidney donation and transplantation.

This is information that the medical and nursing team of the Trentino nephrology network, and in particular of the renal transplant clinic, provides to those persons who are being treated for renal disease and for their potential guidance towards replacement therapy.

The worsening of renal failure and the need to start dialysis and/or the evaluation process for transplant represent a delicate and emotionally challenging time, both for the patient and for those persons close to them. The clinician must dedicate time to providing correct information with appropriate timing. In turn the patient must re-process the information provided to them and evaluate the proposed options.

These pages contain some information about kidney transplantation and about the underlying notions: the donation of organs, free, voluntarily and supportively.

The kidney and its functions

There are 2 kidneys, located in the abdomen, in the retroperitoneal space on the sides of the spinal column. They are bean-shaped and approximately 12 cm long, 6 cm wide and 3 cm deep. They weigh on average 150-170g.
The main renal functions are:

- purification: the kidneys filter 125 ml of blood per minute;
- purification: they eliminate waste substances from metabolism;
- maintaining water and salt balance: they eliminate and/or retain liquids as required and contribute to the complex compensation mechanisms of electrolytes and buffer systems;
- hormone synthesis: the kidneys produce erythropoietin which stimulates the production of red blood cells as well as the enzyme that activates vitamin D, which is necessary for bone metabolism.

In renal failure these functions are completely or partially lost depending on the stage of the disease.
The clinician can propose a **conservative diet**, which consists of a low-protein diet that helps stabilise and slow down the worsening of kidney function. It is an actual course of treatment proposed in the final stages of the disease, before dialysis or transplant.
In cases of irreversible damage to renal function there are a number of therapeutic strategies that the clinician implements or proposes to deal with it, which in the terminal phase would otherwise lead to death.
The best known and most frequent is **dialysis**, in its two modes: hemodialysis or peritoneal dialysis.

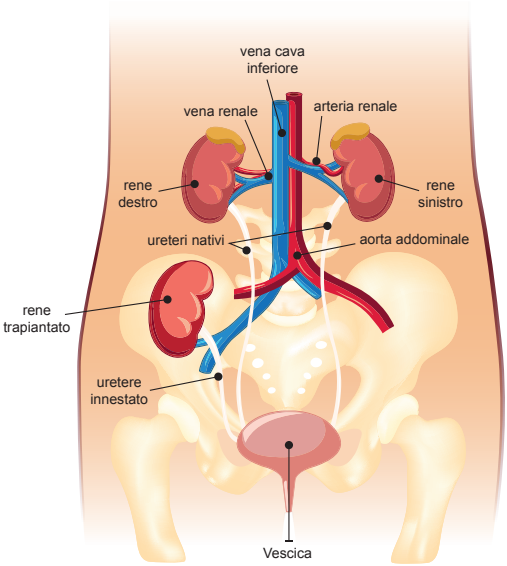
Dialysis is a lifesaving treatment that allows a patient to survive when their kidneys no longer function. However, dialysis treatment can only partially compensate for kidney function, with personal, family and social implications.
Another option is **transplant**: through surgery, a kidney from a suitable and compatible donor is inserted into the abdomen. Donation can be from a living person or from a cadaver.

A transplant offers a quality of life that is undoubtedly preferable to dialysis. Currently, kidney transplantation represents the best treatment for renal failure because the new kidney restores to the patient all the functions lost due to the disease.

Advances in surgical techniques and immunosuppressive drugs ensure a longer life and improved function of the transplanted organ, but the treatment - a pharmacological cocktail necessary to prevent rejection of what the body recognises as foreign - can never be suspended.
No treatment is without risks: each patient must be carefully evaluated with various tests to define the suitability for the surgery itself and for immunosuppressive treatment.

Transplantation is the best answer to end-stage renal failure; unfortunately, there are many more persons waiting than there are available organs and, in addition, the need for immunological compatibility between donor and recipient must be considered, which is not always easy to achieve.
Kidney transplant surgery is performed at a Transplant Centre. In the case of donation from a cadaver, it is performed urgently, when the organ is available; in the case of donation from a living person, it can be scheduled and takes place at the same time as the donor's removal procedure.

The transplanted kidney is positioned in the abdomen, anteriorly, usually in the iliac fossa. The position is therefore different from the usual one of native kidneys which, in most cases, do not need to be removed.
Based on specific clinical evaluations, it may be the case that two kidneys are transplanted instead of one, both coming from the same deceased donor.



Placement of the transplanted kidney in the abdomen

Considering a transplant

When the kidney disease evolves, the most suitable therapeutic strategies for the individual patient must be considered, for whom at this point it is essential to liaise with the Kidney Transplant Clinic.

The evaluation of suitability for receiving a kidney transplant is a multidisciplinary process for which the medical staff of the Transplant Clinic are responsible.

As already stated, a transplant is a surgical procedure followed by the necessary treatment that continues for life: the preliminary assessments are aimed at ascertaining that the patient is able to tolerate the process. The assessment tools are indicated by national and international guidelines and include the study of the history of the disease as well as clinical and instrumental examinations including psychological evaluation. The entire pre-transplant evaluation can be performed at Trentino hospitals and services, and is then shared with the Transplant Centre (TC) where the operation will be performed. The autonomous provinces of Trento and Bolzano do not have TCs, so our clinic collaborates with the other regions. The choice of centre is free and each patient identifies the one they prefer. The legislation allows registering at two different TCs. The Trento Transplant Clinic maintains close relationships with the geographically closest TCs, which are usually also the patients' preferred choices.

The TC is responsible for the final sharing of suitability and for the definitive inclusion of the patient on the waiting list: therefore, a number of visits to the chosen centre are necessary.

The Trento Transplant Clinic remains the reference point for both clinical issues and practical and logistical information. A particular aspect that should be underlined is that the call for a transplant can take place at any time: it is therefore essential to always be contactable by telephone and to share particular needs with the Trentino clinic.

The waiting list for kidney transplant

The numerical imbalance between persons requiring transplants and the availability of organs means that there is a list that seeks to respond to it with fair criteria. The waiting list is not only a chronological matter, but above all it is the detailed definition of the immunological characteristics that allows the assignment of each available organ to the recipient with the best possible compatibility: in this way the organ is preserved for longer and the recipient is protected.

The waiting list includes patients with end-organ disease, already on dialysis or waiting to start dialysis treatment (pre-emptive).

Kidneys are assigned according to national criteria decided by the National Transplant Centre based on algorithms that take into account the characteristics of the donor and the patient (dialysis age, chronological age, cause of renal failure, blood group, presence of antibodies, waiting time on the list).

There are special organ allocation programs such as the urgent transplant program (due to the lack of vascular access and the impossibility of performing peritoneal dialysis), the program for hyperimmune patients (patients with high levels of antibodies and therefore difficult to transplant into due to incompatibility with donors), the multiple transplant program for patients with double organ failure and the paediatric program.

The day of the transplant

A suitcase with the necessary items for hospitalisation must be prepared as soon as a person is added to the list: in fact, the call can happen at any time, especially at night and generally the time to reach the hospital is urgent.
When the organ is available, the patient is notified by telephone by the Transplant Centre, either directly or through the Nephrology Department of Trento. Depending on the situation, it may be necessary to come to

Trento for a pre-transplant dialysis session, or to go directly to the hospital for the operation. This information and the time of arrival at the hospital are reiterated in the TC's phone call.

If the patient is first called to Nephrology at Santa Chiara Hospital, they will then be transferred for the transplant by 118 vehicle. The department will organise the patient's transportation to the Transplant Centre, while family members must travel independently.

At the Transplant Centre

Arriving at the transplant hospital, the final assessments are performed and then the recipient enters the operating room for the surgery.
Normally, after waking up, the recipient need not be admitted to intensive care, but instead can be sent to the hospital ward. Hospitalisation usually lasts for a few days, during which, in addition to the patient's conditions, the functional recovery of the kidney is also evaluated. Immunosuppressive therapy begins immediately and is optimised in the first few days.

After the transplant

After discharge, the patient is sent back to the Kidney Transplant Clinic in Trento where they will have to undergo periodic tests and check-ups, initially frequent and then, gradually, more sporadic.
The patient must strictly adhere to the indications regarding hygiene, behavioural and treatment-related rules. This allows for better survival and functionality of the organ and a better quality of life for the person.

During treatment

Although the greatest compatibility between the donor and the recipient is sought, there is a "diversity" in the transplanted organ that is recognised by the recipient's immune system and that can sometimes trigger a "rejection"

of the new kidney, through a reaction called rejection.
The treatment that can reduce this risk is immunosuppressive: it generally begins before the transplant operation and must then be taken by the patient for the entire duration of the organ's functionality. Given its fundamental importance, this treatment must be followed very carefully, according to the doses and times indicated by the nephrologist.
In addition to immunosuppressive therapy, the patient will need to take other drugs to reduce especially the risk of infections (in the initial period) possibly also combined with other necessary treatments.

Possible complications

Like any treatment, surgery, or therapy, transplantation and its aftermath can have risks and complications.

Specifically:

- **Surgical complications:** during kidney transplant surgery, the ureter and blood vessels of the new organ are surgically connected to the anatomical structures of the recipient, in particular the ureter is connected to the bladder and blood vessels. The main surgical problems that may occur are:
  - losses and consequent collections of blood or urine;
  - stenosis with partial or total closure of the ureter;
  - thrombosis of the arterial or venous vessels due to the formation of clots that can obstruct blood flow;
  - wound dehiscence, or difficulty in closing the surgical wound and possible infection of the same;
  - laparocele, or a hernia that forms on the abdominal wall affected by the surgical wound, mainly due to sagging of the tissues;
  - lymphocele, or collection of lymphatic fluid around the kidney.

  These are mostly early problems, which are highlighted during the first few days of hospitalisation and can be resolved promptly. Laparocele and lymphocele may become evident later: often they do not require surgery, but only periodic checks or the use of an elastic band.

- **Medical complications:** they can occur early or late and medical treatment is necessary.

  The most frequent are:

  - rejection, or the possibility that, despite immunosuppressive therapy, the organism reacts against the transplanted organ. This risk is greater and generally more aggressive in the early post-transplant period and tends to decrease subsequently, without however disappearing completely. Laboratory tests, antibody monitoring (search for specific donor HLA Ab) and ultrasound checks help to recognise it early;
  - cardiovascular diseases: chronic renal failure is an important risk factor for cardiovascular diseases such as atherosclerosis, heart or brain diseases. This risk increases with the worsening of renal function and with dialysis and persists in transplant patients;
  - there is the possibility of recurrence of the underlying disease that caused renal failure: this risk is related to the pathology and is more frequent in some forms of glomerulonephritis.

- **Side effects of immunosuppressive therapy:** these are side effects that can be found in some transplant patients.

  The most significant ones include:

  - infections: due to immunosuppressive therapy the recipient is more susceptible to infections. The risk is higher in the initial period, when immunosuppressive therapy is administered at high doses, while it decreases as the drug dosage decreases: the transplant patient remains at higher risk of infections than those who have not undergone immunosuppressive therapy. It is therefore essential to undergo the recommended vaccinations before and after the transplant, to take prophylactic antibiotic therapy immediately after the transplant and to follow the hygiene instructions given. In case of symptoms of infection (fever, diarrhoea, skin spots, pain at the wound site or other suspicious symptoms) the doctor must be informed promptly;
  - post-transplant diabetes mellitus and glucose intolerance: these complications are linked not only to the use of anti-rejection drugs, but also to a personal predisposition and to the family history of the subject. The treatment will be specific for each individual patient;
  - neoplasms: in the long term, the transplanted patient is at greater risk of developing tumours than those who have not received a transplant; the

immune system, usually involved in the destruction of any tumour cells, after a transplant is depressed by the anti-rejection therapy. In particular, skin tumours, tumours of the urinary tract, female genital tract and liver, tumours related to viral infections and lymphomas are more frequent. Stopping smoking, even before the transplant, careful exposure to the sun with adequate skin protection and periodic checks for early diagnosis of cancer are important and reduce the severity of any disease;

- hyperlipidemia: patients with renal insufficiency are often already undergoing therapy for high levels of cholesterol and triglycerides. In some cases, there is a new increase in lipids for which, in addition to dietary treatment, it may be useful to take specific drugs;
- hypertrichosis or hair loss: depending on the immunosuppressive drug used, some patients experience hair loss or an increased incidence thereof. This is an aesthetic problem rather than a clinical one and is often resolved by modulating the treatment;
- water retention: some drugs, primarily cortisone, can cause water retention. Generally, this is a dose-dependent effect that decreases with the passing of time and with the reduction of doses;
- tremors: infrequent symptoms, caused by some drugs and often dose-dependent;
- drugs, especially in the initial phases, can also cause other situations; these are disorders that mostly decrease with the passing of time and disappear, but which must still be reported. These include changes in perception, mood swings, slowed or confused thinking, reduced short-term memory or more rarely hallucinations.

Who can donate a kidney?

Kidney donation can be from a living or deceased person, the latter being the most common.

From a living person: if a family member or relative offers and if the clinical conditions are met, the donation and therefore the transplant can take place. From a cadaver: in the case of patients on the transplant waiting list, the organ is expected to be taken from a deceased donor in intensive care

whose death was diagnosed either with neurological or cardiac criteria (this second option has been active for several years in Italy too).
The two types of transplant have common characteristics and significant advantages for the recipients compared to dialysis, but they have specific peculiarities that must be considered for each situation of renal failure. Living donation, due to its particular aspects, is discussed in the relevant brochure.

Frequently Asked Questions

Who can receive a kidney transplant?

The patient on dialysis or waiting to start dialysis treatment must undergo various tests, at the end of which the transplant doctor evaluates whether or not they are suitable for a transplant. Those deemed eligible are placed on a waiting list for cadaveric donation or begin the process for living donation.

How much does a transplant cost? Who pays?

Kidney transplant surgery and the costs of therapy in Italy are covered by the National Health Service and are free for patients who are registered with it. Regarding the costs, it is estimated that, on average, the State spends around 52,000 Euro for the transplant and related hospitalisation, to which must be added the costs of immunosuppressive therapy and other drugs, the costs of follow-up and any other hospitalisations.
However, starting from the second year, the costs are lower than what would be spent if the same patient remained on dialysis.

Is it necessary to remove the native kidneys?

The new kidney is placed in the iliac fossa, therefore in the abdomen, in a position different to where the recipient's own kidneys are, which generally should not be removed. Surgical removal is necessary when the anatomical space is not adequate for the transplant, as in the case of very large polycystic kidneys, or if there are problems related to the native kidneys (infections, cysts, reflux).

Can a transplant take place from a living donor even if the blood type is different?

Yes, the name of this practice is “group-incompatible transplant”. In these cases, various immunological evaluations and possibly specific pre-transplant desensitisation therapy are necessary. The Transplant Centre is responsible for deciding whether to use this resource.

Can immunosuppressive therapy be stopped after transplant?

No, immunosuppressive therapy must be taken for the entire duration of the transplant; in case of particular problems, the nephrologists of reference will evaluate. Anyone who decides to undergo a transplant must be aware of this.

How long are waiting lists?

In Italy, the average waiting time on the list is approximately two years. This means that there are patients who wait just a few months and others who wait several years. This depends on the characteristics of the patients, on their clinical conditions and on compatibility with the donors: the waiting list, as mentioned above, is not simply a chronological list.

If I’m on the waiting list, am I guaranteed a transplant?

It is necessary to undergo tests to verify the persistence of suitability for transplant. It may be the case that for clinical reasons a temporary suspension from the transplant list is necessary (e.g. for surgical interventions, infections) or in very rare cases a permanent suspension, if serious worsening occurs. Periodically, tests should be performed to monitor the immunological status.

If I am on the list, can I leave the residence I have indicated to the Transplant Centre?

The call for a transplant can take place at any time. You must be ready and go immediately to the place indicated during the call: therefore it is not advisable to leave your home.
In case of particular situations, it is necessary to consult the Transplant Clinic and possibly also the TC in good time. Long periods of absence from home may require temporary suspension.

Is there anything I can do to reduce the risk of post-transplant complications?

A healthy lifestyle, as indicated by the Outpatient Clinic and Transplant Centre, can prevent a number of possible complications.

The following are particularly important:

- stopping smoking: this reduces the risk of cancer and cardiovascular disease;
- weight reduction in obese patients: this reduces the onset of diabetes, hyperlipidemia and cardiovascular disease; difficulty in healing of the surgical wound may also be related to obesity; weight loss is often required before transplantation; obesity may represent a relative contraindication to transplantation;
- regular physical activity, a varied diet with a reduced intake of sugars and fats help prevent many complications not only of the transplant, but in general of chronic renal failure and facilitate post-surgery recovery;
- avoid direct exposure to sunlight and use the correct protection to reduce the risk of skin cancer;
- carefully follow all the therapeutic indications provided by the nephrologist specialist.

Is it possible to have children after the transplant?

After the transplant, women of childbearing age can become pregnant, while before, due to renal failure, they are less likely to conceive and successfully carry a pregnancy to term. It is essential that the desire and intention of pregnancy, both by transplanted men and women, are discussed with doctors in order to plan conception, checking the renal situation and interrupting or replacing the intake of potentially teratogenic drugs.

It is worth remembering that, once fertility has been recovered, it is important to use effective contraceptive methods if you do not intend to become pregnant.

What is the survival time of a kidney?

With immunosuppressive therapy, kidney survival is 97.5% and 94% at 1 and 5 years, respectively, in the case of transplants from living donors; for transplants from deceased donors, it is 94% at 1 year and 88% at 5 (data from the National Transplant Centre for kidney transplants 2010-2019).

Is it possible to have a transplant multiple times?

If the transplanted kidney loses function, it is possible to undergo a new transplant. Each transplant changes the immunological compatibility.

Is psychological support provided for the transplant patient?

The visits in the preparation process also include a psychological evaluation, performed by psychologists specialised in transplants. Help and support are available for those who require it even afterwards.

Contacts

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for non-urgent calls from Monday to Friday from 14.30 to 15.30;
for urgent calls from Monday to Friday from 8.00 to 16.00.

Nephrology Department
Telephone: 0461 903438
for urgent calls, after 16.00 on weekdays, Saturdays and national holidays.

Useful links

https://www.apss.tn.it/Servizi-e-Prestazioni/Centro-regionale-trapianti-della-Provincia-autonoma-di-Trento
https://www.apss.tn.it/Azienda/Luoghi/Ambulatorio-del-trapianto-di-rene
http://www.trapianti.salute.gov.it/trapianti/homeCnt.js
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