

Treatment of kidney failure

Kidney failure is a condition in which the kidneys fail to adequately filter waste products from the blood. It can be caused by injury or disease symptoms vary depending on the seriousness and progression of the disease. If not treated kidney failure leads to death.

Treatment of kidney failure focuses on two main approaches:

- Hemodialysis
- Kidney transplants

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Treatment of kidney failure

Hemodialysis (commonly called kidney dialysis) is a process of purifying the blood of a person whose kidneys are not working normally.

Hemodialysis treatment lasts about four hours and is done three times per week. A person can be treated this way for years.

Fresh dialysate contains*:

- No urea – to encourage diffusion from the blood
- Glucose and other useful molecules at optimal concentrations – to minimize loss from the blood.
- High solute concentration removes excess water.

Used dialysate collects filtered out small molecules such as urea.

Saline solution prevents excessive water loss which could lead to dehydration.

Heparin pump (to prevent clotting)

Arterial pressure monitor

Blood pump

Removed blood for cleaning

Saline solution

Fresh dialysate

Used dialysate

Inflow pressure monitor

Dialyser

Venous pressure monitor

Air trap and air detector

Clean blood

Patient

The Dialyser contains a semi-permeable membrane that allows small particles (e.g. urea) to diffuse through, but larger molecules and cells remain in the blood.

*Other molecules and ions are present and therefore filtered/balanced, but these are the key components of the dialysate.

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<https://commons.wikimedia.org/wiki/File:Hemodialysis-en.svg>

Treatment of kidney failure

A transplant is the best long-term treatment.

Donors can be either:

- Someone who has recently died
- A person who has chosen to give up one of their two kidneys

Donors and the recipient have to be a close match in both blood and tissues to minimize the chance of rejection*.

The transplanted kidney is grafted in to the lower abdomen with the renal artery, renal vein and ureter connected to the recipient's blood vessels and bladder.

A Grafted (Transplanted) Kidney

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*If the match is not close enough the recipient's immune system will react to the new kidney as it would to a pathogen.

<http://www.kalingahospital.com/data/images/transplant1.jpg>