Kidney Transplantation

Under construction / Forgotten

This article was marked by its author as *Under construction*, but the last edit is older than 30 days. If you want to edit this page, please try to contact its author first (you fill find him in the history (https://www.wikilectures.eu/index.php?title=Kidney_Transplantation&action=history)). Watch the as well. If the author will not continue in work, remove the template `{{Under construction}}` and the page.

Last update: Wednesday, 25 Nov 2020 at 6.12 pm.

This article has been translated from WikiSkripta; ready for the **editor's review**.

Kidney transplantation is indicated for any patient with chronic kidney disease. Currently it is considered a routine method of substitution of the renal function that should be preferred over other methods (dialysis, peritoneal dialysis) for prognostic and economical reasons.

Indication

A patient that reaches the 4^{th} stage of chronic kidney disease based on K/D0QI guidelines should be indicated for transplantation as the renal failure progresses. Generally speaking, the sooner – the better. Ideally the patient shouldn't undergo any other method of renal substitution beforehand (hemodialysis).

Diseases leading to kidney failure:

1. glomerulopathy (most often IgA);
2. chronic tubular diseases;
3. diabetic nephropathy;
4. polycystic kidney disease.

In case of a type 1 diabetes diagnosis combined with a severe (terminal) diabetic nephropathy, the kidneys are being transplanted together with the pancreas in the combined pancreas and kidney transplantation, which employs the benefits of the concurrent immunosuppressive therapy that follows. Already undergone kidney transplantation (followed by the immunosuppressive therapy) is a supportive factor for a future pancreas transplantation.

Contraindications

- Acute or chronic infection;
- heart failure;
- coagulopathy;
- AIDS;
- malignancy;
- advanced liver or lung disease.

Donors

Living Donors

Most often relatives or partners, but not necessarily. Other people can donate as well. The most important factors are the voluntariness of the donation and health of the donor. In order not to threaten the donor by the removal of a kidney it is necessary to evaluate the future function of the kidney, for example to assess the threat of glomerulonephritis.

Dead Donors (Cadavers)

In the Czech republic, the posthumous donation is based on the so-called presumed consent. If a person doesn't proclaim the disagreement with posthumous donation during his or her life, that person is considered for donation automatically. One of the requirements for consideration is the proof of brain death (including panencephalography done twice within 30 minutes). Others are the intact function of the kidney (its preserved peripheral circulation) and cold ischemia for up to 24 hours.

Immunology

The **blood type** (AB0 system) compatibility is one of the most important. However, the transplantation is possible even with blood type incompatibility (as of 2011 in the Czech republic). Incompatible antibodies must be removed from the recipient's blood by e.g. adsorption or plasmapheresis. In the case of maximum possible **HLA complex**

compatibility and low titer of lymphocytotoxic antibodies the crossmatching yields negative results. By crossmatching we understand the mixing of recipient's serum with donor's lymphocytes and complement. If the crossmatching is positive it is necessary to remove the antibodies.

Technique of Surgery

1. Taking of the kidney;
2. heterotopical placement of the graft into the right side of the pelvic cavity (vessels are connected to the iliac artery and vein, the ureter is sewn into the bladder);
3. the original kidneys are usually left in place, where they gradually shrink and atrophy (aside from polycystic kindeys, which are removed);
4. in most cases, only single kidney is transplanted; both get transplanted (the second to the left side) only in cases where one wouldn't suffice for the restoration of renal function.

Post-operation Development

In 65% of cases the kidney **is active** immediately after the transplantation. The patient is being hydrated to start the production of urine
In 25% the development of the graft's **function is delayed** and the kidney doesn't become active (for days or weeks). The function develops after some time, until then dialysis is necessary.
In 10% the kidney **doesn't function at all** due to thrombosis or unknown causes, e.g. primary lack of function.

Statistic Data

An average **waiting time** for a kidney in the Czech republic is **12 months**, which is much less than in the USA for example (3-4 years). The reason is that many patients here are not indicated for a surgery even when they could be. Up to 15% of the surgeries are repeated surgeries done because of a previous rejection of the graft, which is not a contraindication of another surgery. One-year survival after the transplantation exceeds 95%. Ten-year survival of the graft after the surgery is 50%.

Immunosupression

1. **Inductive**
   - ATG – antithymocytic globulin – polyclonal antibodies against T-lymphocytes
   - **basiliximab** – monoclonal antibody against IL-2 receptors on T-lymphocytes (anti-CD25)
   - alemtuzumab (anti-CD52)
2. **Sustained** – triple combination:
   - corticosteroids (prednisone);
   - basic immunosuppressants (cyclosporin A or **tacrolimus**);
   - adjuvant immunosuppressants (azathioprin, **mycophenolate mofetil**).
3. **Rejection pereventing** – therapy of acute graft rejection:
   - pulse doses of corticosteroids – 250-500 mg for 3-5 days; cases where not even doses of 2-3 g are effective are considered corticoresistant;
   - in corticoresistant cases polyclonal antilymphocytic antibodies are used – ATG or monoclonal basiliximab (anti-IL-2R), alemtuzumab (anti-CD52).

Cyclosporin A and tacrolimus bind to cycloneurin and cause the inhibition of IL-2 expression.

Possible Adverse Effects

Notable adverse effects include nephrotoxicity or neurotoxicity. Tacrolimus may cause receptor-type diabetes, which is why cyclosporin is used with diabetic patients instead of tacrolimus. Azathiprin is hepatotoxic and myelotoxic. Usage of mycophenolate mofetil is recommended instead. Last but not least other adverse effects like the threat of the development of diabetes, Cushing's syndrome, osteoporosis or hyperlipidemia because of corticoids.

Post-surgical Complications

1. Early:
   - graft rejection (hyperacute, acute) – for therapy see above;
   - urinary fistula;
   - thrombosis of the graft's arthery or vein;
   - opportunistic infection:
     - CMV pneumonitis (gancyclovir);
     - pneumocystosis (cotrimoxazol);
     - legionella (erythromycin).
2. Late:
   - hypertension (stenosis of graft's artery);
   - chronic liver disease;
   - cancer (skin, lymphoma, Grawitz);
   - chronic rejection.