CHAPTER 1.4 Selection and examination of the living kidney donor

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1 Introduction

Living kidney donation is a complex medical and ethical procedure that requires thorough evaluation, strict adherence to legal standards, and well-structured post-donation care. The following recommendations for the evaluation and management of living kidney donation are primarily based on the 2023 Manual developed by the "Arbeitsgemeinschaft der Nierentransplantationszentren Nordrhein-Westfalens", a not-for-profit collaboration of transplant centres in North Rhine-Westphalia and collaborating centres in Germany. This manual (written in German) is freely available on the websites of both the German Transplant Society and the German Society of Nephrology: https://d-t-g-online.de/inhalte/gesetze-leit-richtlinien/manual-ag-nierentransplantation-nrw.

This chapter provides essential guidelines for transplant teams to evaluate, counsel, and support both kidney donors and recipients before, during, and after transplantation or donation. It provides a standardised approach to ensure rigorous medical assessment, ethical protocols, and comprehensive postoperative care. Each section is designed for flexibility, allowing institutions to adapt protocols as needed to meet specific local or regional regulations.

The following recommendations are based on current German legal regulations as of October 2024. Changes, such as allowing crossover living kidney donation or anonymous altruistic kidney donation or chain donation, are currently being planned but have not yet been finalised and are therefore not considered in this chapter.

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2 Donor evaluation for living kidney donation

Ensure that the donor meets medical, psychological, and regulatory criteria to minimise health risks after donation. Key eligibility requirements include legal adulthood, voluntary consent, and a personal relationship with the recipient, as defined in the Transplantation Act.

2.1 Eligibility Criteria

Medical examination:

- *Comprehensive health evaluation:* A complete medical examination assesses cardiovascular health, surgical fitness, cancer risk, and any chronic infections. This evaluation ensures that the donor's body can handle the procedure and that there are no underlying conditions that could be aggravated by the donation.
- *Psychological assessment:* A psychological evaluation is mandatory to verify the donor's willingness, mental stability and health, and the absence of coercion.

Laboratory tests:

- *Immunological testing:* This includes blood group determination, HLA typing, and Cross-Match tests to assess compatibility and reduce the risk of rejection.
- *Infectious disease testing:* Mandatory tests screen for hepatitis B and C, HIV, and other transmissible infections. Additional serological tests may be performed based on the individual's medical and travel history.
- *Renal function tests:* estimated glomerular filtration rate (eGFR), preferably calculated using the CKD-EPI formula, serum creatinine and cystatin c, and kidney function tests (ideally more than one; could be imaging-based [DTPA or MAG3 clearance], CT/MRT kidney volumetry, or creatinine clearance) determine whether the donor has optimal renal health.

Imaging and diagnostic tests:

- *Ultrasound (sonography) of the abdomen:* Assesses kidney anatomy and any structural abnormalities.

- *Advanced imaging:* CT or MRI scans of the abdomen, possibly with contrast media, provide detailed images of renal blood vessels and surrounding organs, which are essential for planning surgery.

2.2 Contraindications to living kidney donation

The basis for certain donor contraindications according to the German Transplantation Act and to expert opinion, is the medical assessment of whether the donor is likely to be endangered beyond the risk of the operation or severely impaired beyond the immediate consequences of the organ removal. Contraindications are divided into absolute and relative categories, with absolute contraindications excluding donation and relative contraindications requiring careful consideration or further testing.

Absolute contraindications

- *Age* < 18 years
- *Pregnancy:* It is recommended that women donate a kidney only after family planning has been completed.
- *Renal function:* estimated glomerular filtration rate (eGFR) or measured GFR < 60 mL/min x 1.73 m^2, function of one kidney less than 30%.
- *Haematuria:* persistent glomerular haematuria
- *Proteinuria:* persistent proteinuria > 300 mg/g creatinine
- *Nephrocalcinosis, bilateral kidney stones*
- *Pathological kidney anatomy:* Horseshoe kidney, significant arteriosclerosis, fibromuscular dysplasia; evaluation for presence of cysts ≥ Bosniak 2F is required.
- *Arterial hypertension:* Blood pressure levels > 140/90 mmHg (on ≥ 2 antihypertensive medications), hypertension-related clinically relevant end-organ damage
- *Diabetes mellitus*
- *Active infections:* Conditions such as HIV, active tuberculosis, or viral hepatitis prevent donation.
- *Cancer risk:* Any current cancer (despite local tumours with no risk of metastasis) is a contraindication due to the potential risk of transmission to the recipient. If there is a history of cancer, an oncologist or tumour board should be consulted to assess suitability.

- *Hereditary kidney disease:*
  Polycystic kidney disease (PKD): Proven cases of ADPKD or ARPKD are an absolute contraindication to donation. This also applies to related donors under 30 years of age with a PKD mutation, even if no cysts are visible on imaging.
  Alport syndrome: In X-linked Alport syndrome, female donors (e.g. mothers of affected males) should generally avoid donation because of the risk of renal dysfunction in the donor. Heterozygous relatives of autosomal recessive Alport have a lower risk and can donate if renal function and proteinuria are normal. Severe renal disease should be excluded by biopsy and the use of RAAS blockade after transplantation is recommended. Genetic testing is recommended.
  Complement-mediated thrombotic microangiopathy/atypical haemolytic uremic syndrome: Absolute contraindication for related living donors with a proven complement mutation.
- *Psychosocial barriers:* Active psychiatric conditions, substance abuse, or any hint of coercion disqualify candidates to ensure that the donor's decision is fully informed, voluntary, and does not further harm mental health.

Relative contraindications

- *High body mass index (BMI):* A BMI over 35 is discouraged but not always prohibitive; weight loss may help some individuals meet eligibility requirements.
- *Cardiovascular risks:* Higher cardiovascular risk, such as hypertension or heart disease, requires further evaluation to prevent undue health risks to the donor.
- *Renal function:* Relative contraindication: eGFR 60–79 mL/min x 1.73 m^2, decide on a case-by-case basis
- *Proteinuria:* Persistent albuminuria > 30 mg/g creatinine
- *Pre-diabetes:* impaired fasting glucose and pathological glucose tolerance (OGTT-blood sugar BZ 140–199 mg/dL after 2 hours)
- *Smoking:* Strongly recommended to stopped before living kidney donation.

2.3 Surgical considerations

- *Kidney structure:* Detailed imaging ensures that each kidney has sufficient function and size. Donors with certain structural abnormalities may not be suitable candidates.

3 Donor postoperative care

3.1 Follow-up protocols

- *Immediately after donation:* Donors receive regular follow-up to monitor kidney function, assess surgical recovery, and manage any complications.
- *Long-term monitoring:* Annual medical check-ups monitor kidney function, blood pressure, and overall physical and mental health. Routine tests such as serum creatinine and eGFR help monitor renal health, while cardiovascular evaluations help manage long-term risks.
- *Psychosocial support:* Donors have access to psychosocial services, which can be vital for some people after donation. Counselling or support groups can help donors adjust, especially those with pre-existing psychological problems.

3.2 Medical examinations

- *Monitoring kidney function:* Regular blood tests will assess serum creatinine levels and eGFR as indicators of kidney function.
- *Urinalysis:* Routine urine tests can help detect early signs of kidney disease.
- *Blood pressure monitoring:* Hypertension management and cardiovascular evaluation are essential, as kidney donors may be at higher long-term risk.
- *Health counselling:* Donors receive lifestyle counselling to support their long-term health, with advice on diet, exercise, self-monitoring of blood pressure, and avoidance of nephrotoxic medications.

4 ABO incompatible living kidney donation

4.1 Overview

ABO incompatible (ABOi) living kidney donation allows transplantation across the blood type barrier by using pre-transplant plasma exchange or immunoadsorption to reduce blood type-specific antibodies, particularly isoagglutinins (IgG, IgM), thereby minimizing the risk of rejection. Because of the higher immunological risk and the need for a more intensive immunosuppressive regimen, donors and recipients must provide specific consent for this option.

4.2 Selection and counselling

- *Donor-recipient counselling:* Both parties are fully informed of the risks, benefits, and procedures involved in ABOi transplantation. If other ABO-compatible donors are available, they are generally preferred.
- *Immunological evaluation:* The recipient's isoagglutinin titres are measured to assess the likelihood of success. High titres may indicate the need for more intensive treatment.

4.3 Immunological preparation

- *Rituximab and immunoadsorption:* To reduce the immune response, recipients may receive rituximab and undergo immunoadsorption or plasmapheresis, depending on individual needs and titres.
- *Regulatory approval:* The donor must meet with the regional transplant commission, which verifies eligibility and ensures informed, voluntary consent.

5 Consent and mutual disclosure

5.1 Consent forms and documentation

Both donor and recipient must sign consent forms acknowledging the risks and agreeing to the mutual disclosure of relevant medical information. This transparency is essential for informed decision making and trust. If there is a language

barrier, a qualified interpreter must be present during the counselling sessions. According to the German Transplantation Act, a neutral doctor must also observe the counselling session.

5.2 Counselling topics

Donors and recipients are informed about potential complications, long-term health impacts, and the importance of compliance with post-operative care.

5.3 Documentation

Signed and witnessed consent forms are required to ensure compliance with medical and legal standards. These forms outline potential risks, post-transplant expectations, and voluntary participation.

References

2023 Manual developed by the "Arbeitsgemeinschaft der Nierentransplantationszentren Nordrhein-Westfalens": https://d-t-g-online.de/inhalte/gesetze-leit-richtlinien/manual-ag-nierentransplantation-nrw