

KIDNEY TRANSPLANTATION, BASICS

MOST FREQUENT TYPES OF KIDNEY DONORS: Brain dead / Cardiac arrest (Maastricht III) / Living donors

The Modified Maastricht Classification of Donation after Circulatory Death (DCD):

Category I Uncontrolled	Dead on arrival at hospital	Found dead IA. Out-of-hospital IB. In-hospital	The duration of asystolic warm ischaemia during procurement in DCD donors is associated with increased risk of graft failure
Category II Uncontrolled	Death with unsuccessful resuscitation	Witnessed cardiac arrest IIA. Out-of- hospital IIB. In-hospital	
Category III Controlled	Awaiting cardiac death	Withdrawal of lifesustaining therapy	Extraction time begins with aortic cross-clamp and it ends with placement of the kidneys on ice
Category IV Uncontrolled Controlled	Cardiac arrest while brain dead	Cardiac arrest while life brain dead	

ORGAN PRESERVATION aims to:

- Control of cell-swelling during hypothermic ischaemia
- Maintenance of intra- and extra-cellular electrolyte gradient during ischaemia
- Buffering of acidosis
- Provision of energy reserve
- Minimisation of oxidative reperfusion injury

University of Wisconsin (UW) or histidine tryptophane ketoglutarate (HTK) preservation solutions for cold storage are preferred

Use Celsior or Marshall's solution as alternative

Euro-Collins is no longer recommended



Hypothermic machine perfusion reduces the risk of DGF in donor kidneys after brain death regardless of cold ischaemia time. They should be controlled by pressure and not flow, using low pressures to avoid pressure-related injury. The perfusion solutions used are specific, and are qualitatively different to cold storage solution

TECHNIQUE TIPS:

- Small upper pole artery may be sacrificed. Lower polar artery should be preserved (prevent ureteral ischemia)
- The donor ureter should be kept as short as possible with peri-ureteric fat to ensure good ureteric blood supply
- Lich-Gregoir-like extra-vesical ureteric anastomosis technique minimises urinary tract complications (specifically urine leak, stricture and post-operative haematuria)
- Mono-filament absorbable sutures should be used for the urinary anastomosis to prevent stone formation
- Ureteric stents are recommended to reduce major urological complications, especially urinary leak. If it is left over 30 days, it is associated with more UTIs

IMMUNOSUPPRESSION REGIME:

- Calcineurin inhibitors (preferably tacrolimus, alternatively cyclosporine)
- Mycophenolate (MMF or enteric-coated mycophenolate sodium [EC-MPS])
- Steroids (prednisolone or methylprednisolone)
- Induction therapy (pref. basiliximab in low-standard-risk and anti-thymocyte globulin (ATG) in high-risk patients)

In **LIVING DONORS**, left kidney is preferred because of renal vein length. However, best kidney always stays with the donor

All potential receptors must have their serum screened for anti-HLA antibodies, which are particularly common after pregnancy, previous transplant and blood transfusions

MAJOR HISTOCOMPATIBILITY COMPLEX (MHC): encodes glycoproteins expressed on almost all cells surfaces

Human Leukocyte Antigen (HLA), (MCH in humans) in chromosome 6

- MHC class 1: HLA- A,B,C: On nearly all cells (not on sperm) cellular immunity, attracts CD8 cells
- MHC class 2: HLA D, DR, DQ, DP: antigens on B-lymphos and antigen presenting cells. Presents antigen to CD4 cells

Perform cross-match tests to avoid hyper-acute rejection before each kidney transplantation