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Exploring risk factors related to delayed graft function in kidney transplantation: a retrospective cohort study

Presenter: Dr Kimberley Crawford (Monash University)

Research undertaken by Guoxi (Tim) Yang as part of his Honours



THE PROJECT TEAM

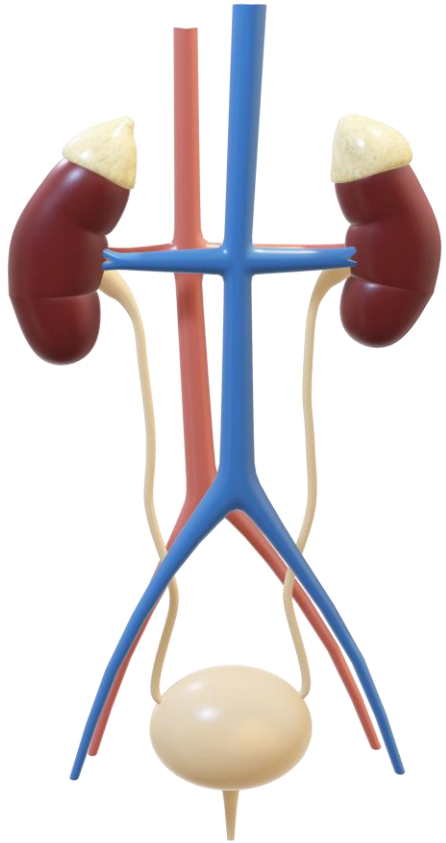
Student researcher	Organisation
Guoxi (Tim) Yang	Monash University

Researchers	Organisation
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Dr Kimberley Crawford	Monash University
Professor John Kanellis	Monash Health

DELAYED GRAFT FUNCTION

DEFINITION: DELAYED GRAFT FUNCTION (DGF)

Acute kidney injury (AKI) needing dialysis within 1 week of transplantation



OUTCOMES

Outcomes of Delayed Graft Function

Readmission
DGF predicts 30-day readmission

Rejection
DGF is associated with BPAR up to 5 years post transplant

Graft Survival
DGF leads to ↓GF/GS with higher SCr up to 3.5 years post-KT and ↓ in graft half lives by 3-5 years

Death
DGF is associated with DWFG (HR =1.83 [95% CI 1.73 -1.93] in adjusted models

Taken from: Swanson et al. (2023). Delayed graft function: current status and future directions. *Current Opinion in Organ Transplantation*, *28*(1), 1–7.

BPAR, biopsy proven acute rejection; DWFG, death with functioning graft; GF, graft function; GS, graft survival; HR, hazard ratio; KT, kidney transplant; SCr, serum creatinine

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DELAYED GRAFT FUNCTION

RISK FACTORS

Systematic review explored risk factors to DGF (Yao et al. 2025)

- Cold ischaemia time, time on dialysis, donor age, recipient BMI, donor BMI, recipient diabetes

AUSTRALIAN STUDIES



Mogulla et al. (2019)

- Case-control study
- Explored Deceased donor kidney transplantation

Reiling et al. (2012)

- Cohort study
- Living kidney transplantation and deceased donor kidney transplantation

Mogulla, et al. (2019). Risk factors for and outcomes of delayed graft function in live donor kidney transplantation - a retrospective study. *Transplant International*, *32*(11), 1151–1160.
Reiling, et al. (2012). Association of pre-transplant statin use with delayed graft function in kidney transplant recipients. *BMC Nephrology*, *13*, 111.
Yao et al. (2025). Risk factors for delayed graft function in patients with kidney transplantation: a systematic review and meta-analysis. *BMJ Open*, *15*(3), e087128.

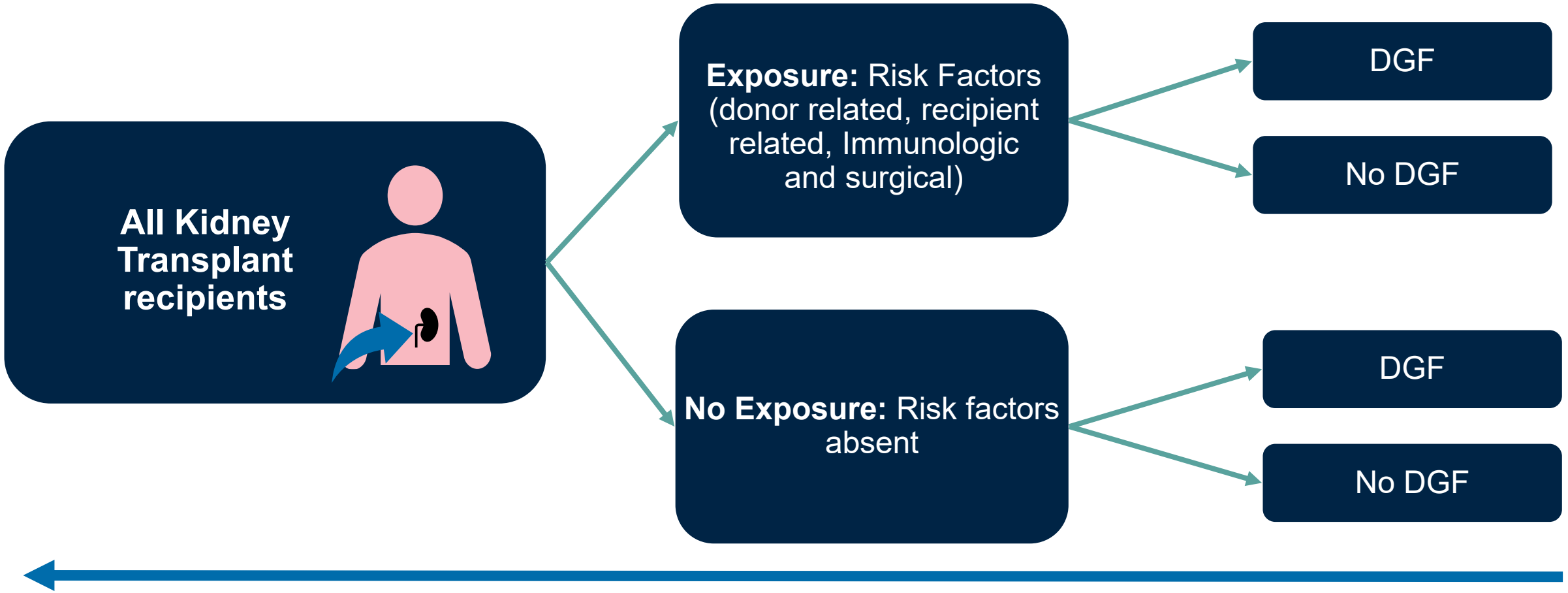
AIM

This study aimed to identify the risk factors for DGF in both deceased and live donor kidney transplant recipients

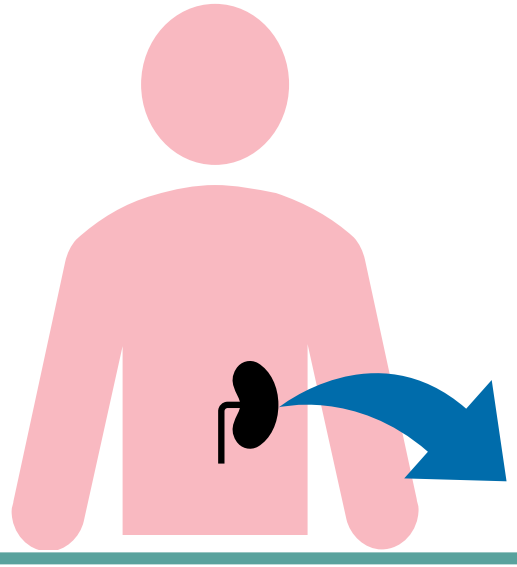
STUDY DESIGN

Retrospective cohort study conducted at one tertiary health service in Victoria, Australia

METHODS


All Kidney Transplant recipients
Exposure: Risk Factors (donor related, recipient related, Immunologic and surgical)
DGF
No DGF
No Exposure: Risk factors absent
DGF
No DGF
January 2019
Direction of study
December 2023

VARIABLES



Donor related

Demographic factors: age, sex, BMI, terminal creatinine level. Allograft factors: source of kidney allografts, side of allograft, number of arteries



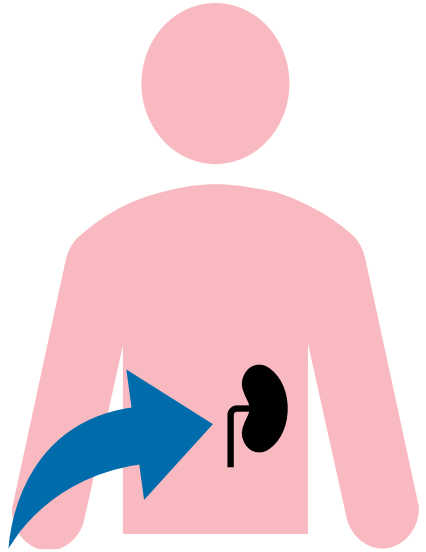
Immunologic factors

ABO-blood compatibility, induction therapy



Surgical factors

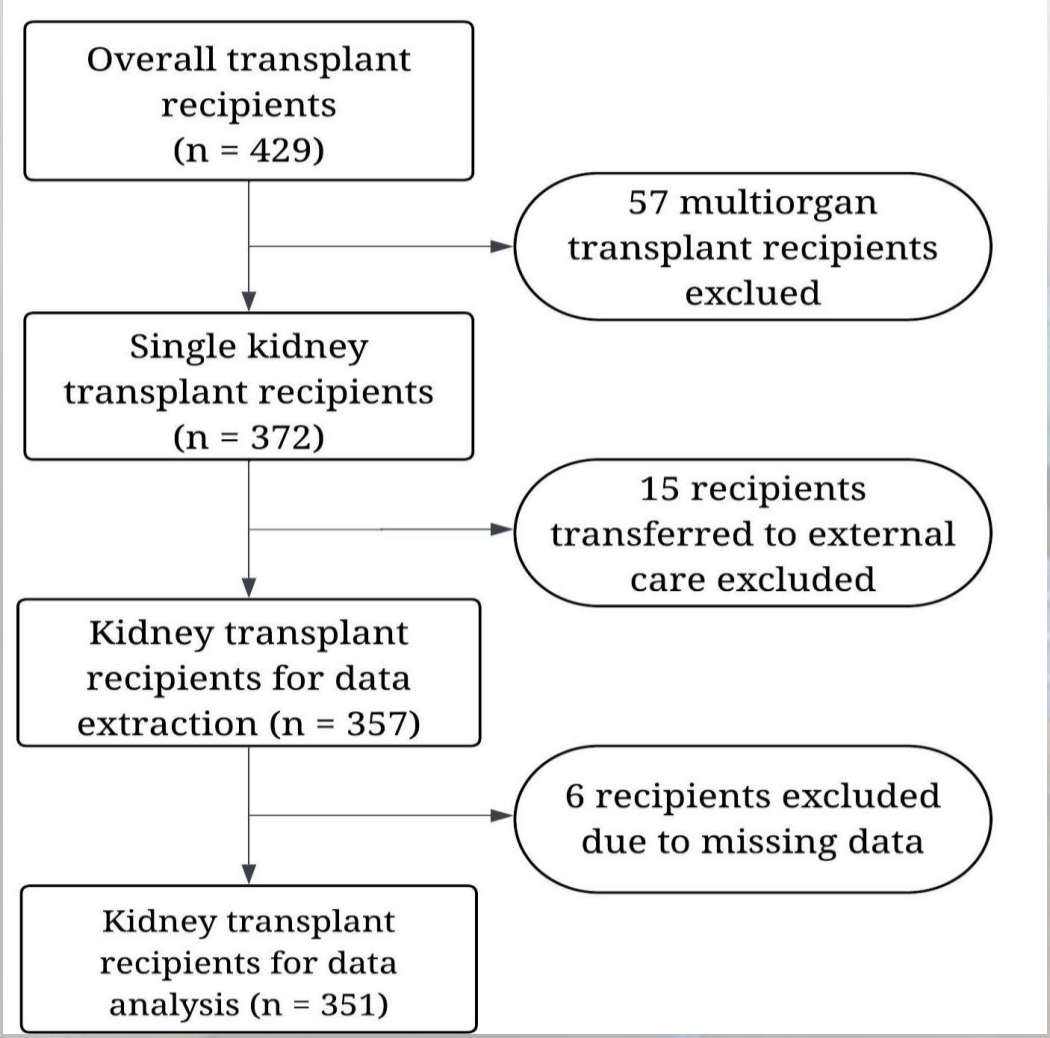
Warm ischaemic time, cold ischaemia time, and operative time



Recipient related

Demographic factors: Age, BMI, country of birth, primary language, smoking status
Comorbidities
Dialysis factors

METHODS



Data Analysis

- Whitney–Mann U test, Chi-square test, or Fisher's exact test were used to examine differences between variables, depending on data type
- Multivariate hierarchical logistic regression

RESULTS, n=351

Recipient Factors
Demographic factors



Age, years median (IQR)
53 (43-62)

Australian born: 55.2%

Male: 66.1%

Comorbidities



CVD: 87.4%
VTE: 10.6%
Diabetes: 31.1%
First transplant: 82.3%

Dialysis characteristics



92% Dialysis
- 72.6% HD
- 19.4% PD

Dialysis duration, months,
Median (IQR): 29 (21-50)

Donor Factors



Age, years median
(IQR): 49 (36-59)

Male: 57.1%

BMI, kg/m^2 (IQR): 27 (24-31)

Donor Factors



Living donor: 20.7%
DCD: 23.0%
DBD: 56.3%

Immunologic characteristics



ABO incompatible: 4.7%
Donor specific antibody:
11.2%

Surgical factors



Warm ischaemia time,
minutes (IQR):
30 (25-35)
CIT, 8-16 hours: 26.1%

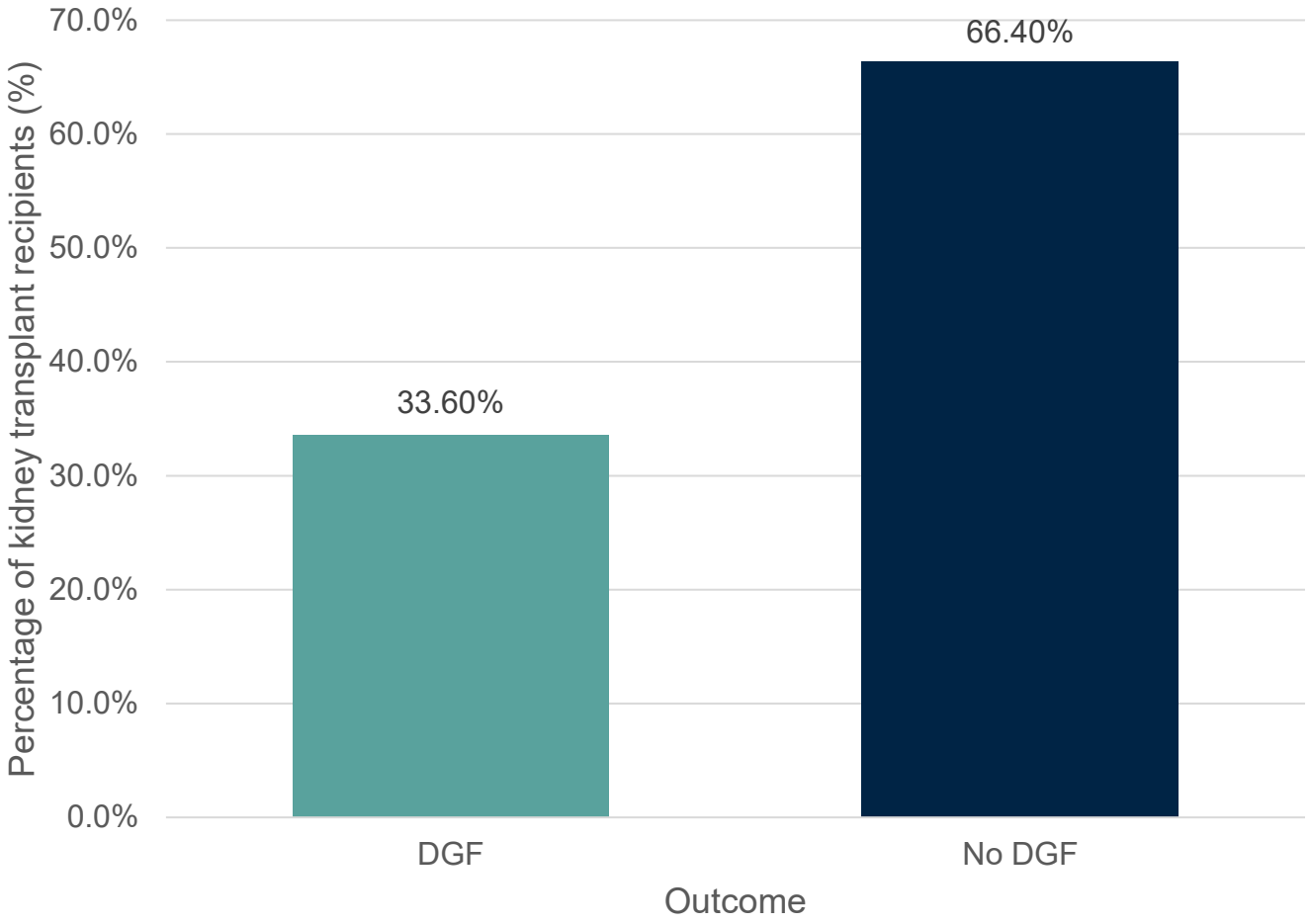
CVD: cardiovascular diseases; VTE: venous thromboembolic events

Donation after Circulatory Death (DCD), Donation after Brain Death (DCD)

Cold Ischemic Time (CIT)

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RESULTS- DGF



One-third of kidney transplant recipients experienced DGF (n= 120, 33.6%)

Stratified by donor groups



Living-donor KTRs the incidence was 2.7%

Deceased donor KTRs the incidence was 41.8%%

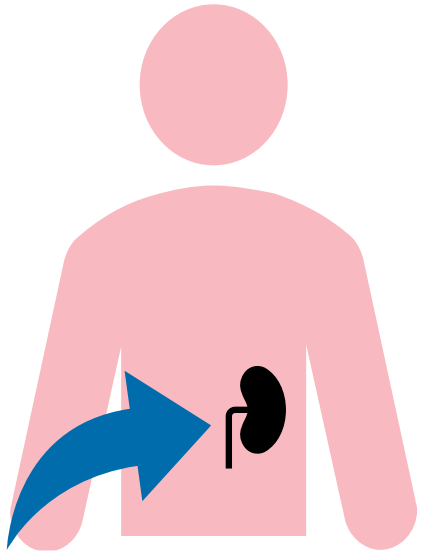
SIGNIFICANT DIFFERENCES BY DGF STATUS

Demographics	Age	DGF recipients were older (58 vs 51), *p < 0.01*
	Obesity	More common in DGF (33.3% vs 22.4%), *p = 0.03*
	Australian-born	Lower in DGF (41.7% vs 60.2%), *p < 0.01*
	English speaking	Lower in DGF (85.0% vs 92.4%), *p = 0.03*
C	Diabetes	Higher in DGF (42.5% vs 25.3%), p < 0.01
Dialysis	Dialysis	More common in DGF (98.3% vs 89.5%), p < 0.01
	Haemodialysis	Higher in DGF (85.8% vs 65.8%), p < 0.01
	Peritoneal dialysis	Lower in DGF (12.5% vs 23.6%), p < 0.01
	Dialysis duration	Longer in DGF (37 vs 22 months), p < 0.01
Donor	Living donor	Lower in DGF (1.7% vs 30.3%), p < 0.01
	DCD	Higher in DGF (39.2% vs 14.8%), p < 0.01
	DBD	Higher in DGF (59.1% vs 54.4%), p < 0.01

Only variables with p < 0.05 in univariate analysis are shown

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RESULTS- MULTIVARIATE ANALYSIS



Variables	OR (95% CI)	*p*
Age	1.03 (1.01-1.05)	0.01
DCD	48.97 (6.31 – 644.38)	< 0.01
DBD	20.65 (2.16 -196.97)	0.01

DISCUSSION

CURRENT STUDY

33% DGF in current study

Risk factors

Age DCD DBD

COMPARED TO PREVIOUS RESEARCH

35% DGF in Australia (Mulley et al. 2023)

Risk factors

Cold ischaemia time Dialysis duration

Donor age Donor BMI Diabetes

IMPLICATIONS FOR PRACTICE

With older recipients and increasing reliance on deceased donors, there is the need for: **individualised DGF management**, **early monitoring**, and careful **immunosuppression decisions**

Mulley et al. (2023). *46th Report, Chapter 7: Kidney Transplantation*. ANZDATA

Thank you

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