FACTORS AND OUTCOME OF DELAYED GRAFT FUNCTION AFTER KIDNEY TRANSPLANTATION OVER A PERIOD OF 8 YEARS – A SINGLE CENTER STUDY

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Introduction

Delayed graft function (DGF) is a frequent complication after kidney transplantation with consequences for the function of kidney transplants. The aim of the study was to determine the frequency and risk factors of DGF as well as their outcome.

Patients and methods

In this retrospective study, 525 consecutive recipients of cadaveric kidneys (age 54.2 ± 13.4 years, 33% (n = 173) female) between 2005 and 2012 were examined for the occurrence of DGF as defined by dialysis requirement post transplantation. In addition to baseline data, renal function was evaluated at 3, 6, 9 and 12 months after transplantation. Differences between recipients with and without DGF as well as the rate of permanent non-function (PNF) were determined. By means of multivariate logistic regression, factors for the occurrence and outcome of DGF were examined.

Table 1. Baseline data of 525 transplant recipients

Variable Median (min/max)	Total n=525	DGF n=111	No DGF n=414	*P-value*
Gender male/ female (%)	352/173 (67/33)	72/39 (64.9/35.1)	280/134 (67.6/32.4)	*0.582*
Age (years)	56 (14/82)	55 (17/82)	56 (14/77)	*0.845*
BMI (kg/m²)	25.8 (15.3/44.5)	27.9 (16.7/41.8)	25.3 (15.3/44.5)	***<0.001***
Duration of dialysis (months)	65 (4/281)	72 (12/281)	63 (4/226)	***0.027***
Residual diuresis (mL/d)	200 (0/3000)	0 (0/2500)	300 (0/3000)	***<0.001***
Cold ischemia time (h)	10.4 (1.5/30.5)	11.2 (1.5/30.3)	10.2 (4.5/30.5)	***0.039***
Warm ischemia time (min)	37 (17/77)	40 (24/73)	37 (17/77)	***<0.001***
CRP preoperatively (mg/L)	4.2 (2/76.8)	5.9 (2/76.8)	3.7 (2/63)	***<0.001***
BMI donor (kg/m²)	25.7 (17.1/58.8)	26.1 (18.3/57.8)	25.5 (17.1/58.8)	***0.036***

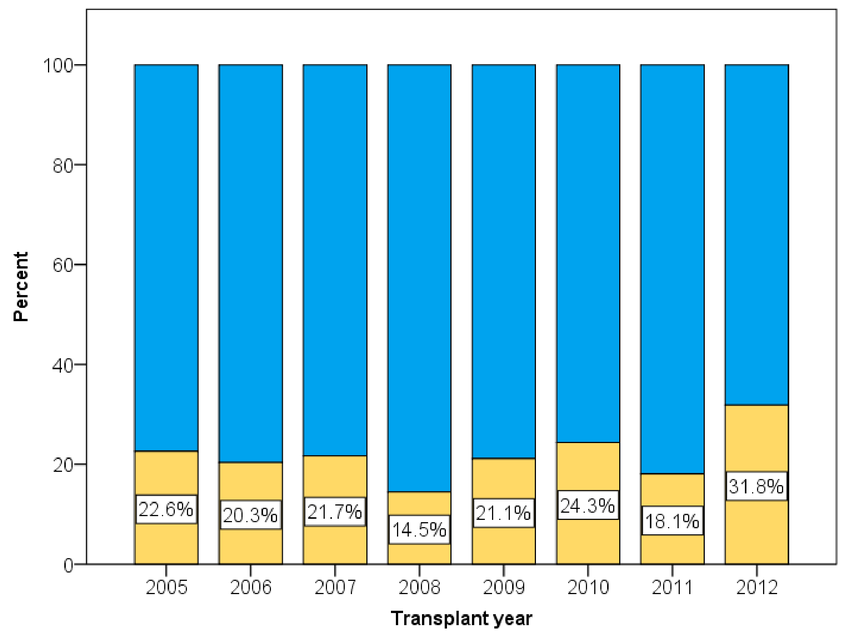

Fig. 1: DGF rate (yellow) per year

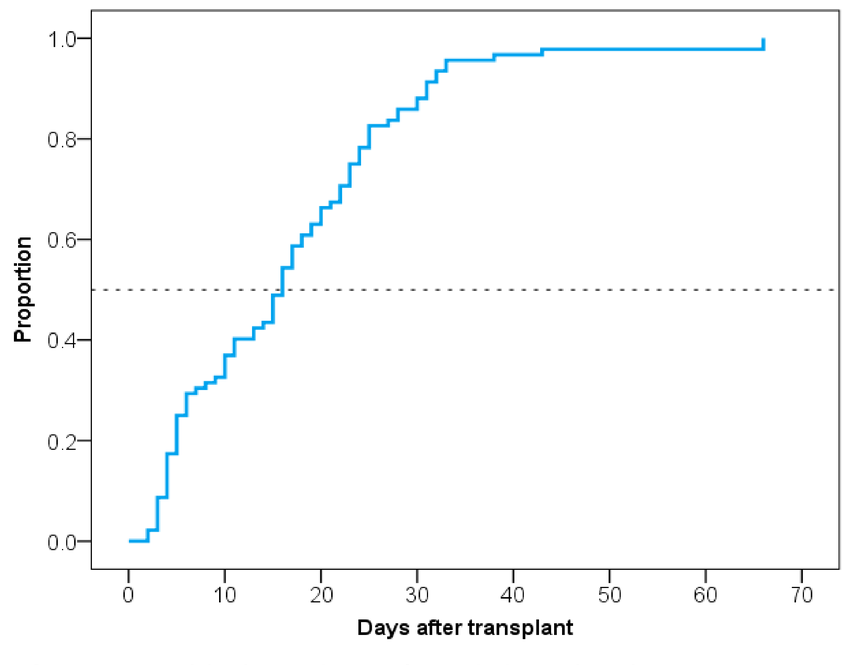

Fig. 2. Initiation of renal graft function in DGF

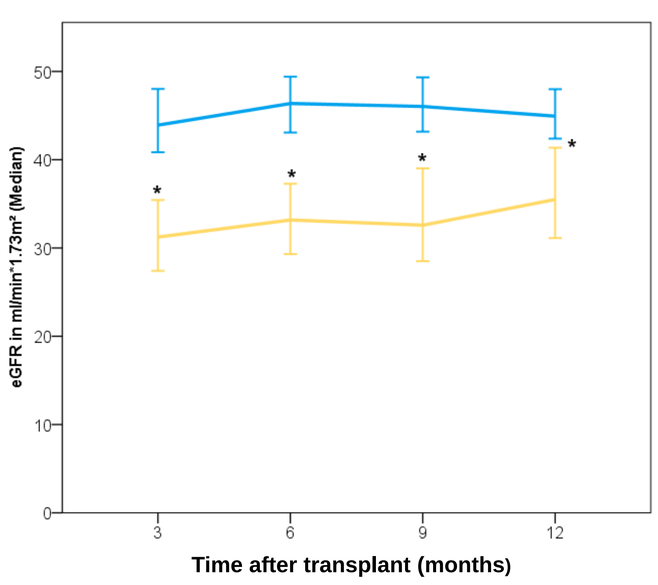

Fig. 3. eGFR after transplantation
* p<0.05, error bars: 95% CI

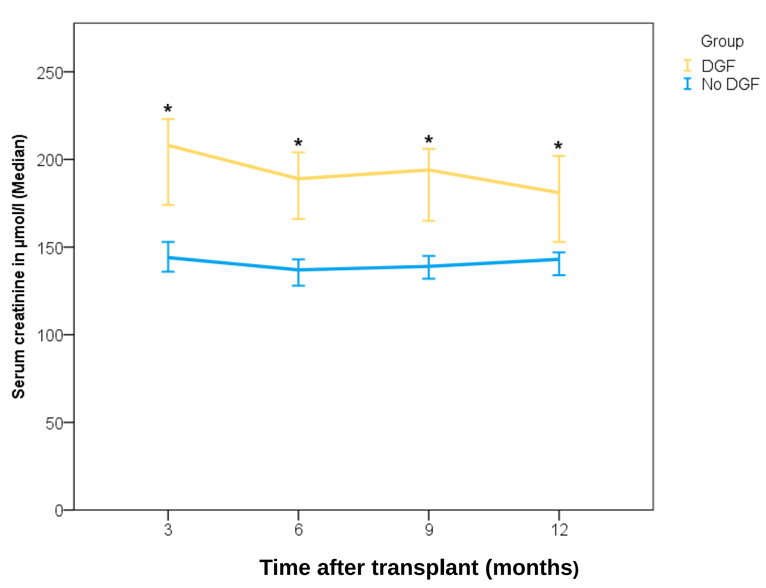

Fig. 4. Serum creatinine after transplantation
* p<0.05, error bars: 95% CI

Results I

DGF developed in 21.1 percent (n = 111) of renal transplants (**Fig. 1**). A total of 80.2% (n = 89) of the DGF patients underwent transplant biopsy. Recipients with DGF had a significantly higher BMI, received organs from obese donors, had a longer preoperative dialysis time, a lower residual diuresis, longer cold and warm ischemia times, as well as preoperatively higher values of C-reactive protein (CRP) (p≤0.039, resp., **Table 1**).

Results II

Although 35 days after transplantation, most transplants gained function (**Fig. 2**), recipients with a DGF showed a significantly lower eGFR and higher serum creatinine compared to recipients without DGF immediately postoperative and after 3, 6, 9 and 12 months (mean eGFR 39±19 vs. 49+20 ml/min*1.73 m², p≤0.001, **Figs. 3 and 4**).
Factors associated with the onset of DGF (p≤0.035) were recipient BMI, preoperative CRP, and residual diuresis, moreover cold ischemia time, donor age, and diuresis in the first hour post transplant (**Table 2**).
Within the DGF group, 16.2 percent (n=18) remained on PNF. Significant **factors for PNF** (p≤0.045) were high immunological risk (retransplantation, panel reactive antibodies >5%, >1 HLA-mismatch in B and/or DR), low leukocyte values on the first postoperative day (mostly depending on the perioperative use of antithymocyte globulin in patients with high immunological risk), as well as histological evidence of transplant glomerulitis and interstitial fibrosis/ tubular atrophy.

Table 2: Logistic regression for the presence of DGF (final model)

Variable	OR	95% - CI	*P-value*
Recipient BMI (per kg/m²)	1.070	1.015 – 1.128	***0.012***
Donor BMI (per kg/m²)	1.044	0.993 – 1.098	*0.090*
Cold ischemia time (per h)	1.057	1.004 – 1.112	***0.035***
Residual diuresis (per 100 ml/d)	0.921	0.879 – 0.965	***0.001***
Recipient age (per year)	0.979	0.956 – 1.002	*0.071*
Donor age (per year)	1.026	1.002 – 1.051	***0.035***
Recipient CRP (pre-TX) (per mg/l)	1.026	1.002 – 1.051	***0.035***
Diuresis in the first hour (per 100 ml)	0.611	0.440 – 0.850	***0.003***

Adjusted for all the above as well as duration of dialysis, warm ischemia time

Conclusion

The presence of DGF is the result of multiple factors and affects one in five kidney transplants of cadaveric kidneys. DGF is associated with a poorer renal function up to one year after transplantation. Minimizing modifiable risk factors may reduce the incidence of DGF and improve renal function after renal transplantation.

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