

Smoking Exposure Among Kidney Allograft Recipients and Outcomes After Transplant

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1. Introduction

- Current data on the effects of smoking on outcomes after renal transplantation is limited and conflicting
- All studies are conducted outside of the UK so may not be generalisable to the UK transplant setting
- Previous studies suggest smoking is a risk factor for graft loss however only one study has shown that smoking significantly increases death-censored graft loss¹
- Previous studies suggest current smoking or greater than 25 pack year history smoking are risk factors for mortality^{2,3}
- Previous studies have shown no difference in post transplant renal function^{2,3}

2. Aims

1. Assess the effect of smoking exposure on kidney allograft survival and recipient survival
2. Assess the effect of smoking exposure on allograft associated outcomes and recipient outcomes

3. Methods

Queen Elizabeth Hospital Transplant Centre Database

- Retrospective analysis of all kidney transplant recipients that were transplanted at the QE from January 2007 to January 2015.
- 1140 patients
- Data was first extracted by the hospitals informatics team and then a manually searched 3 separate hospital patient records, PICS (Prescribing Information and communications Systems), Clinical Portal and MARS
- This was then linked to together to create a comprehensive database of baseline demographics, donor details, biochemical parameters, histological findings and clinical events.
- Patient smoking history gathered from PICS and MARS.
- A patient with any history of smoking was defined as an ever smoker and all other patients were defined as never smokers for analysis. **24% (n=274)** recipient had a history of smoking
- Unadjusted Kaplan-Meier plots used to examine survival
- Multivariate Cox proportional hazard analysis conducted
- SPSS version 22 software used for statistical analysis

4. Results - Patient Outcomes

Table 1: Smoking exposure increases rate of post transplant complications including cancer, in particular PTLD. There were also higher rates of post transplant cardiac events and post transplant diabetes

Event	OR	95% CI	P
Cancer (any type)	2.23	1.36-3.68	0.002
Post Transplant Lymphoproliferative Disease	4.16	1.01-19.16	0.04
Skin Cancer	2.07	0.89-4.83	0.94
PTDM	1.65	1.05-1.60	0.03
Cardiac Events	2.78	1.70-4.56	<0.001
Cerebrovascular Events	0.90	0.36-2.26	0.52 NS
Avascular Necrosis of the Hip	2.00	0.65-6.15	0.18 NS

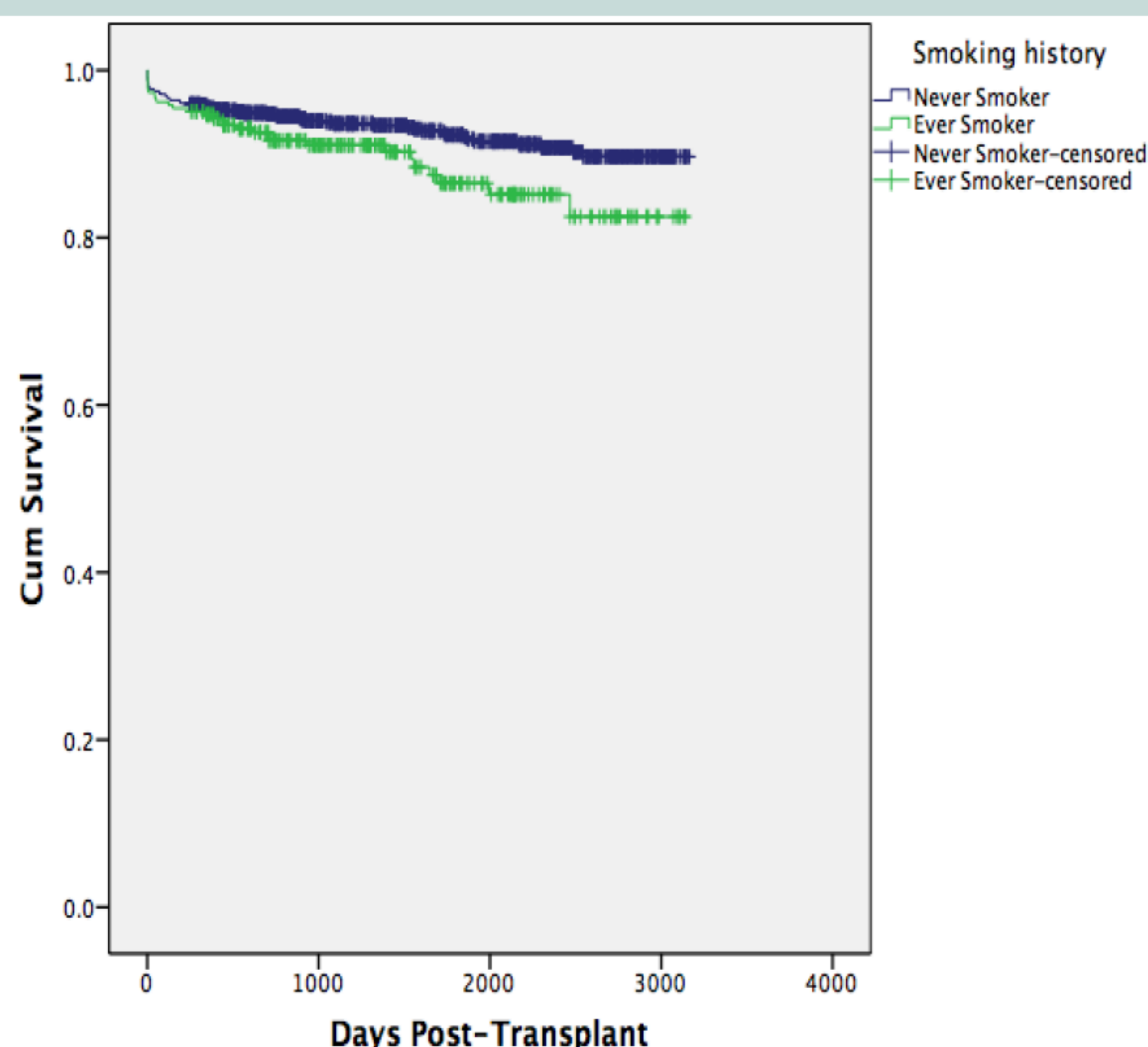
5. Results – Graft Outcomes

Histological Diagnosis	OR	95% CI	P
Any Rejection	1.23	0.85-1.80	0.27
Cellular Rejection	1.32	0.9-1.94	0.15
Antibody-Mediated Rejection	1.28	0.64-2.53	0.48
Acute rejection within first post transplant year	1.42	0.95-2.12	0.084
Interstitial Fibrosis & Tubular Atrophy	1.60	0.54-4.70	0.40
Thrombotic Microangiopathy	2.40	1.08-5.23	0.032
Acute Tubular Damage	1.50	1.01-2.13	0.048
Chronic Allograft Damage	2.18	1.14-4.16	0.019

Table 2: 502 underwent post transplant renal biopsies. Ever smokers had increased rates of thrombotic microangiopathy, acute tubular damage and chronic allograft damage. No differences in overall rates of rejection

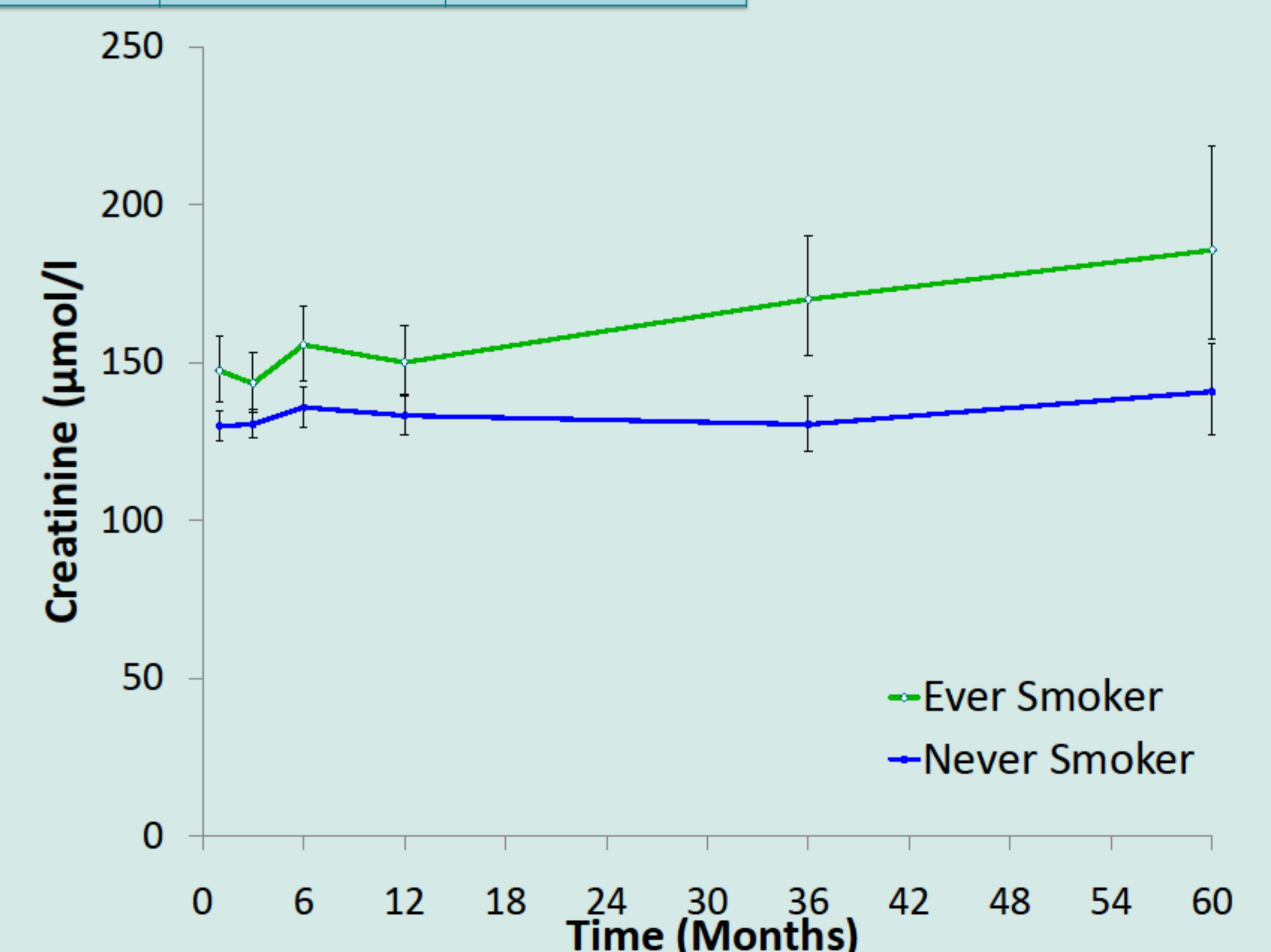
6. Results – Survival

Figure 2: Kaplan Meier Survival Curve showing ever smoking is associated with decreased death-censored graft survival (**P=0.003**), this persisted on multivariate analysis showing smoking to be an independent risk factor for graft loss **HR 1.58 (95% CI 1.01-2.49 P=0.048)**



Ever smoking did not significantly impact on patient survival. 1 year patient survival for ever and never smokers were both 97%. On both univariate (**8.8% v 6.6%, P=0.117**) and multivariate analysis (**HR 1.53, 95% CI 0.93-2.54, P=0.098**) there was no difference in mortality rates between ever and never smokers. However median follow up was only 4.4 years and in that time only 81 patients (7.1%) died, longer follow up needed.

Figure 1: Changes in geometric mean of patients creatinine over time comparing ever and never smokers. Ever smokers consistently have higher creatinine levels suggesting inferior renal function



7. Conclusion

- History of ever smoking independently increases risk of graft failure but not recipient mortality after renal transplantation
- Smoking consistently reduces renal function post transplant
- Increases risk of post transplant complications
- Improvements in hospital smoking documentation needed to quantify smoking status using pack years or to identify current smokers

¹Sung R. Excess risk of renal allograft loss associated with cigarette smoking. Transplantation. 2001;71(12):1752-7.
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³Kasike K. Cigarette Smoking in Renal Transplant Recipients. Journal of the American Society of Nephrology. 2000;11(4):753-9.

