Can serum creatinine in the first year after transplant predict long-term renal transplant outcome?

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NHS
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Aim

- To explore the relationship between renal function in the first year post-transplant and long-term kidney transplant survival
- Study carried out to assist the National Institute of Clinical Excellence in their appraisal of immunosuppression

Data

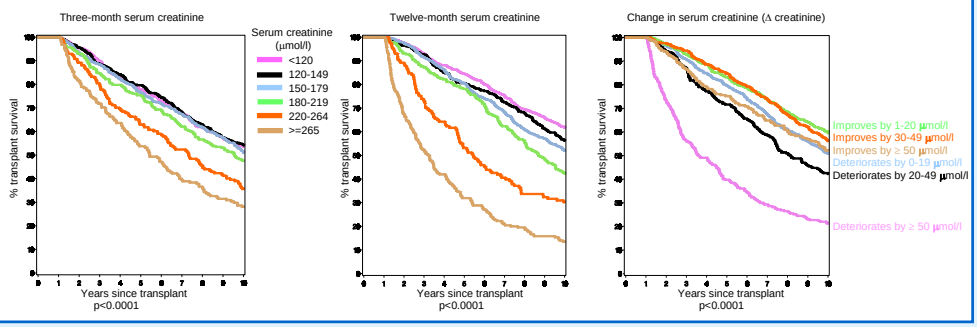
- Cadaveric heartbeating donor kidney only transplants
- Adult recipients
- 1983 - 1987
- All transplants functioning for at least the first year
- 24 UK kidney transplant centres (4 small centres excluded due to lack of data)
- 25% of transplants excluded due to missing serum creatinine data
- Analysis based on 2304 first transplants with 97% ten-year follow-up (462 re-transplants analysed separately)

Methods

- Transplant survival (death with function treated as failure)
- Ten-year follow up
- Cox regression analysis considered the influence of:
  - 3 and 12-month serum creatinine
  - the change between 3 and 12-month serum creatinine (Δ creatinine)
  - donor and recipient factors
- Kaplan-Meier survival curves to illustrate effects
- Similar to analysis by Hariharan et al. (Kidney International, 2002)

Results

Ten year transplant survival of first cadaveric heartbeating donor kidney transplants, 1983-1987



- Univariate analysis of first transplants showed a highly statistically significant association between ten-year transplant survival and three-month serum creatinine, twelve-month serum creatinine and Δ creatinine (p<0.0001)
- Unadjusted 10-year transplant survival ranged from :

  13% (95% confidence interval (CI) 9-18%) for patients with twelve-month creatinine >=265 μmol/l

  to

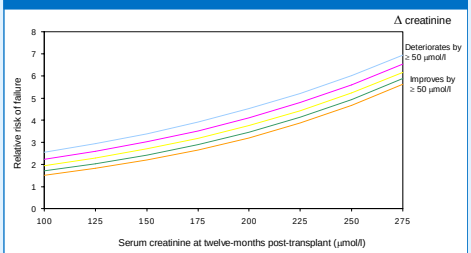
  62% (95% CI 58-65%) for patients with twelve-month creatinine <120 mol/l

Multifactorial survival analysis – relative risks of renal transplant failure within 10 years (first transplants)

Factor	Level (baseline)	RR	95% CI	p
Twelve-month serum creatinine	Linear (per 50 μmol/)	1.37	1.32 – 1.42	<0.001
Δ creatinine	Linear (per 50 μmol/l)	1.42	1.29 – 1.57	<0.001
	Quadratic (per 50 μmol/l)	1.01	1.01 – 1.02	<0.001

Adjusted for recipient age and HLA match

Relative risk of transplant failure according to twelve-month serum creatinine and Δ creatinine



- Adjusting for other risk factors, both twelve-month serum creatinine and Δ creatinine were strongly associated with ten-year transplant survival (p<0.0001)
- Significant effects of donor age disappeared with the introduction of measures of post-transplant renal function
- The risk of failure was greatest for patients with poor function twelve-months post-transplant and for patients whose renal function had deteriorated the most between three and twelve-months post-transplant
- The risk of transplant failure was twice as great for patients with a twelve-month serum creatinine of 250 μmol/l compared with those with a creatinine of 150 μmol/l

Summary

- For transplants functioning at one year after transplant, twelve-month serum creatinine and Δ creatinine were strongly associated with ten-year transplant survival (p<0.0001)
- There was a 49% survival difference at ten-years between the group of patients with the poorest renal function at twelve-months and the group with the best function
- In addition, analysis of regrafts and graft survival (deaths censored) showed comparable results
- Results were consistent with those of Hariharan et al.