Live kidney donors with lower pre-donation GFR have poorer renal function after two years

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Background

- A third of all kidney transplants carried out in the UK are from living donors. Kidneys from live donors have lower rates of delayed graft function and longer term graft survival compared to cadaveric kidneys.
- Currently, living donors have a wide range of pre-donation renal function, with guidelines in the UK stratifying acceptable pre donation GFRs according to donor age.¹
- These GFR thresholds should be set to ensure donors have sufficient kidney function after donation to avoid the risk of developing significant renal impairment.

Aim

The aim of this study was to determine the relationship between pre-donation GFR and the residual renal function during follow up.

Patients and Methods

- We performed a retrospective analysis of a series of 222 living kidney donors who underwent laparoscopic live donor nephrectomy in Addenbrooke's Hospital, Cambridge, between January 2011 and July 2016.
- Data was obtained from internal electronic records, paper records and requested from NHS Blood and Transplant.
- Mean ($\pm$ SD) age at donation was 51 ± 11 years and the male to female ratio was 1:1.13.
- Statistical analysis was performed using GraphPad Prism software.

Results

Calculated GFR prior to donation positively correlated with estimated GFR 1 year after donation, $p < 0.0001^{****}$, $r = 0.4315$

The absolute drop in estimated GFR at 1 year after donation, from pre-donation levels, positively correlated with the magnitude of pre-donation calculated GFR, $p < 0.0001^{****}$, $r = 0.6649$

The percentage drop in estimated GFR at 1 year after donation, from pre-donation levels positively correlated with the magnitude of pre-donation calculated GFR, $p < 0.0001^{****}$, $R = 0.3966$

Calculated GFR prior to donation positively correlated with estimated GFR 2 years after donation, $p < 0.0001^{****}$, $R = 0.4711$

The absolute drop in estimated GFR at 2 years after donation, from pre-donation levels, positively correlated with the magnitude of pre-donation calculated GFR, $p < 0.0001^{****}$, $R = 0.4951$

The percentage drop in estimated GFR at 2 years after donation, from pre-donation levels, positively correlated with the magnitude of pre-donation calculated GFR, $p = 0.0318^*$, $R = 0.2171$

Discussion

Living kidney donors with higher pre-donation GFR have a greater percentage decline in renal function at 1 and 2 year follow up in this single centre study.

This suggests that there is a compensatory mechanism that occurs in donors with lower initial renal functional capacity.

Is there an increased risk of developing end stage renal failure (ESRF)?

One study following 50 000 living donors for an average of 9.8 years found a low overall ESRF rate of 0.134 per 1000 years at risk.²

Another study found no correlation of the ratio of the estimated to the predicted GFR from the time since donation. This suggests that there is no accelerated loss of renal function after donation when compared to normal ageing.³

It would be interesting to investigate further the physiological mechanisms of the decline in function.

References

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