

Correlation between kidney sizes and split renal function in prospective living kidney donors

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Introduction

Asymmetry of kidney size is generally held to suggest asymmetry of kidney function. In living donor kidney transplantation, there is variation in practice with regard to which prospective donors undergo a DMSA scan to accurately assess split renal function (SRF). Whilst previous guidelines have recommended renal size asymmetry of >2cm or >10% as indications for DMSA scanning, some centres routinely perform DMSA scans in all prospective donors. We assessed the relationship between kidney sizes and DMSA-derived SRF to determine whether abnormal SRF can be reliably identified by kidney lengths.

Methods

Data were retrospectively collected on a random sample of 123 prospective living kidney donors from a single renal centre who had undergone renal CT and DMSA. Absolute and relative differences in kidney lengths on CT were calculated and their correlation with DMSA-derived SRF assessed using Pearson's correlation coefficients. Sensitivity, specificity, and ROC curve analyses were used to assess the ability of differential kidney lengths to detect abnormal SRF (defined as a >10% difference).

Results

123 prospective donors were included of whom 59% were female, mean age was 43 years, and mean GFR was 94 mL/min/1.73m². 25 (20.3%) had a >10% difference in SRF on DMSA.

Absolute kidney length and relative kidney lengths both had weak correlations with DMSA-derived percentage kidney function ($r=0.252$, $P=0.005$, and $r=0.378$, $P<0.0001$, respectively).

Absolute difference in kidney length did not have a significant correlation with SRF ($r=0.168$, $P=0.06$) and was not able to identify those with abnormal SRF (AUC 0.54 [95% CI 0.41-0.68]). No patients with abnormal SRF had a >2cm difference in kidney lengths (sensitivity 0% [0 to 14%]; specificity 100% [96 to 100%]).

Relative difference in kidney lengths had a very weak correlation with SRF ($r=0.183$, $P=0.043$) and also was not able to identify those with abnormal SRF (AUC 0.55 [0.42-0.68]). Only 6 (24%) of those with abnormal SRF had a >10% difference in kidney length (sensitivity 24% [7 to 41%], specificity 87% [80 to 93%]).

Discussion

Measured absolute and relative kidney lengths do not have good correlation with split renal function, and the cut-offs of 2cm or 10% recommended in previous guidelines do not have sufficient sensitivity for detecting abnormal split renal function in prospective living kidney donors.