

Evaluation of Physiological and Biochemical Parameters in Living Kidney Donors – Pre and Post Donation

Clinical Nephrology



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Introduction

- Early studies have shown that kidney donors live longer¹.
- However it was reported subsequently that kidney donors developed renal failure².
- Development of hypertension and proteinuria was also reported^{3,4}.
- Tubular functions may also alter after kidney donation
 - Significant decrease in renal calcium excretion⁵.
 - Changes in uric acid excretion⁶.
- In India living donors constitute the bulk of kidney donors
- There is paucity of Indian data on long term complications such as proteinuria and CKD after donor nephrectomy
- No Indian data on various tubular functions after kidney donation
- Hence we conducted a composite study of various physiological and biochemical parameters in a cohort of living kidney donors pre and post donor nephrectomy

Objectives

- To study the following physiological and biochemical parameters pre and post donor nephrectomy:
 - Hypertension
 - Proteinuria
 - DTPA-GFR
 - Fractional excretion of
 - Calcium
 - Phosphate
 - Uric acid
- To look for presence of hyperhomocystenemia post donor nephrectomy

Subjects & Methods

- Living kidney donors were evaluated
 - At baseline
 - Post donor nephrectomy (at least 3 mths)
- 24 hour urine collection in a state of clinical euhydration for excretion of protein and creatinine
- Fractional excretion of calcium, phosphate and uric acid
- GFR was evaluated by two sample plasma clearance of ^{99m}Tc-DTPA in all donors
- Serum homocysteine was done by chemiluminescence method

Results

- 108 kidney donors were studied
- Male:Female - 42:66
- Age: 44.4±9.1 yrs (24-65)
- Follow-up 04-97 months
 - Median 7 months

Parameter	At Baseline	Post-nephrectomy	p-value
Blood pressure - Systolic	124±7.2	129.8±10.7	<0.001
Blood pressure – Diastolic	82.2±4.6	82.2±5.8	NS
GFR (ml/min)	79.0±8.9	67.1±6.6	<0.001
Sr. Homocysteine (µmol/L)	5.89±1.38	8.12±3.46	<0.001
FeCa %	2.3±0.39	2.26±0.43	NS
FePO4 %	10.39±1.18	10.5±1.15	NS
FeUa %	8.32±0.84	8.5±0.74	NS
24 hr Urinary protein (g/g creatinine)	0.138±0.04	0.197±0.19	NS

Comparison of change in 24 hr Proteinuria and GFR stratified by Age

Parameter	Age<45 (n=72)	Age>45 (n=36)	p-value
Δ 24 hr proteinuria (g/g creatinine)	0.078+0.213	0.014+0.091	0.03
Δ GFR (ml/min)	-10.95+9.3	-12.91+10.6	0.35

Kidney Biopsy in Donors

- Two donors underwent kidney biopsy for clinically indications
 - One had acute interstitial nephritis
 - The other had non-proliferative glomerulopathy
- Both the donors responded satisfactorily to treatment

Conclusions

- Healthy Indian kidney donors have GFR of about 80 ml/min, which is lower than the Western data
- At a mean follow-up of one year post donor nephrectomy there is a small risk of systolic hypertension.
- There is statistically insignificant increase in proteinuria.
- There is significant decrease in GFR
- The decrease in GFR is not different in donors more than 45 years in age.
- There are no changes in the fractional excretion of calcium, phosphate and uric acid
- Serum homocysteine rises significantly
- Occasionally kidney biopsy may be required in the donors. Early and appropriate treatment is helpful in reversing the disease.

References

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