



# Elevated mineralocorticoid levels are associated with increased risk of requiring renal replacement therapy

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## Background and Aim

Elevated aldosterone levels are associated with adverse cardiovascular outcomes in the general population and with sudden cardiac death in dialysis patients. Blockade of the mineralocorticoid receptor (MR) reduces proteinuria and regresses left ventricular hypertrophy in CKD. Whether mineralocorticoid levels associate with death or renal outcomes in CKD is not known and was the aim of this study.

## Methods

Patients with CKD stage 3 or 4 and IgA nephropathy, diabetic nephropathy or membranous nephropathy were recruited from renal clinics.

The following measures were taken: plasma aldosterone concentration (PAC), plasma renin concentration (PRC), 24h urine collection for urinary metabolites of aldosterone (tetrahydroaldosterone; THALdo) or deoxycorticosterone (THDOC) via GCMS, urinary electrolytes and urinary protein excretion.

Patients were censored at time of death or RRT.

## Results

Variable	CKD (n=70)
Age (y)	58.2 (12.8)
% Male	75.7
SBP (mmHg)	147.2 (23.0)
DBP (mmHg)	82.1 (12.3)
eGFR (ml/min/1.73m <sup>2</sup> )	38.6 (24.1)
Urine Na (mmol/24h)	162.9 (70.4)
U Pr (g/24h)	1.0 (0.3-2.8)
PAC (pmol/l)	254.5 (162.3-442.5)
PRC (uIU/ml)	62.4 (17.0-213.9)
THALdo (mcg/24h)	56.7 (22.8)
THDOC (mcg/24h)	66.1 (23.0)
RRT (n)	13
Dead (n)	11
Follow-up (days)	1490 (1257-1597)

Table 1: Baseline demographics of cohort

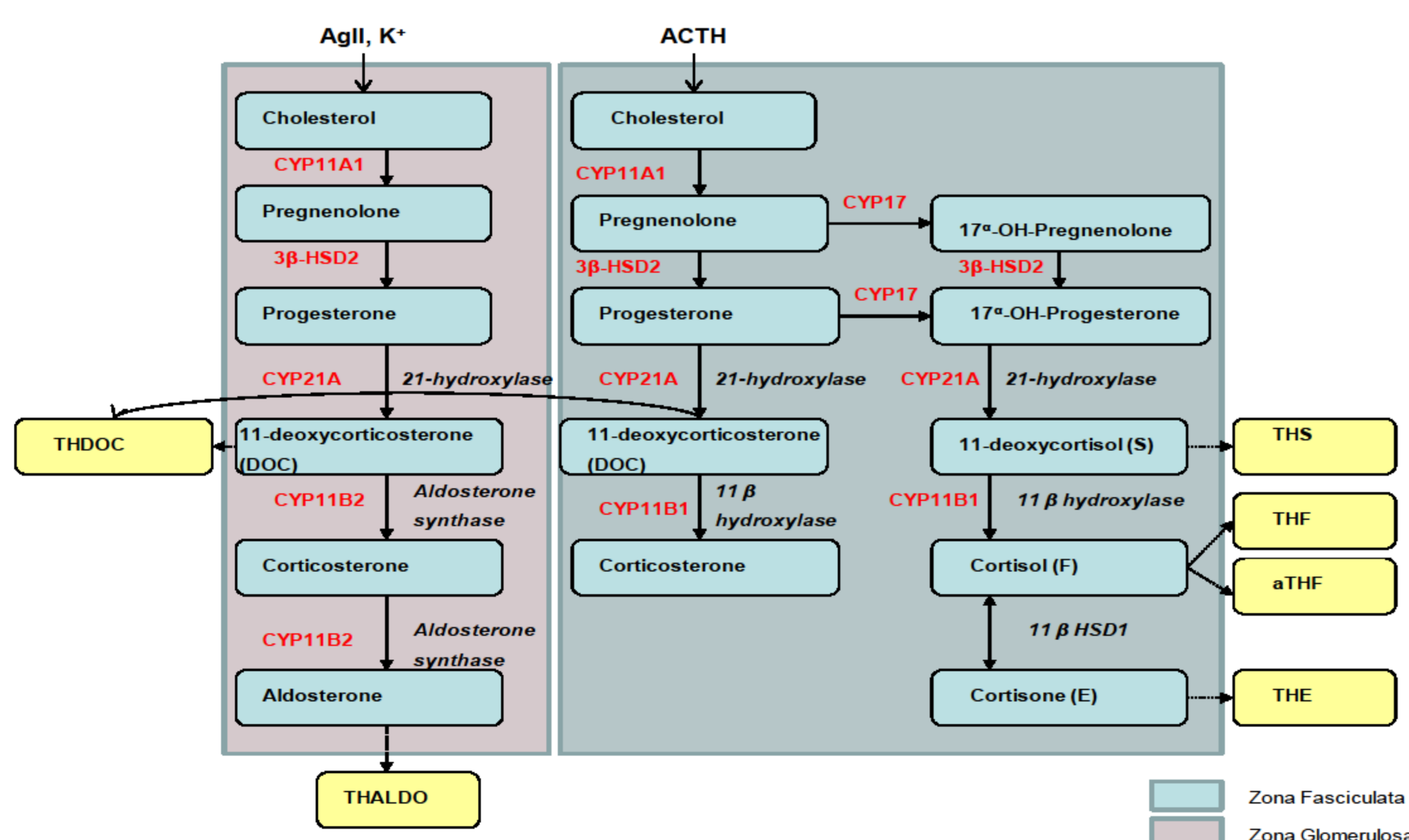


Figure 1: Steroid metabolism in the adrenal cortex

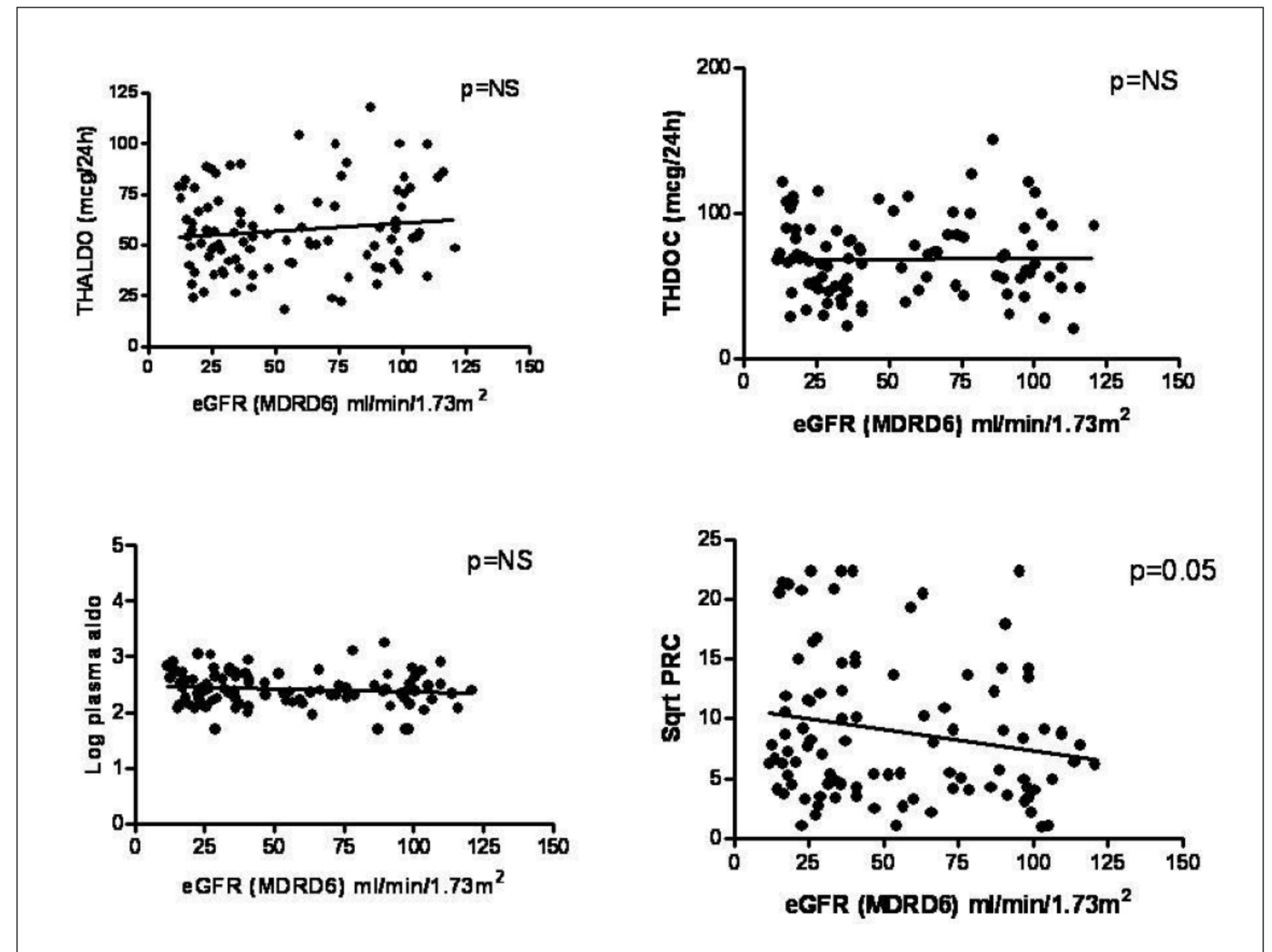


Figure 2: Scatterplot of THALdo, THDOC, PAC and PRC and eGFR at baseline with linear regression line and estimate of significance. No association between eGFR and THALdo, THDOC or PAC was seen.

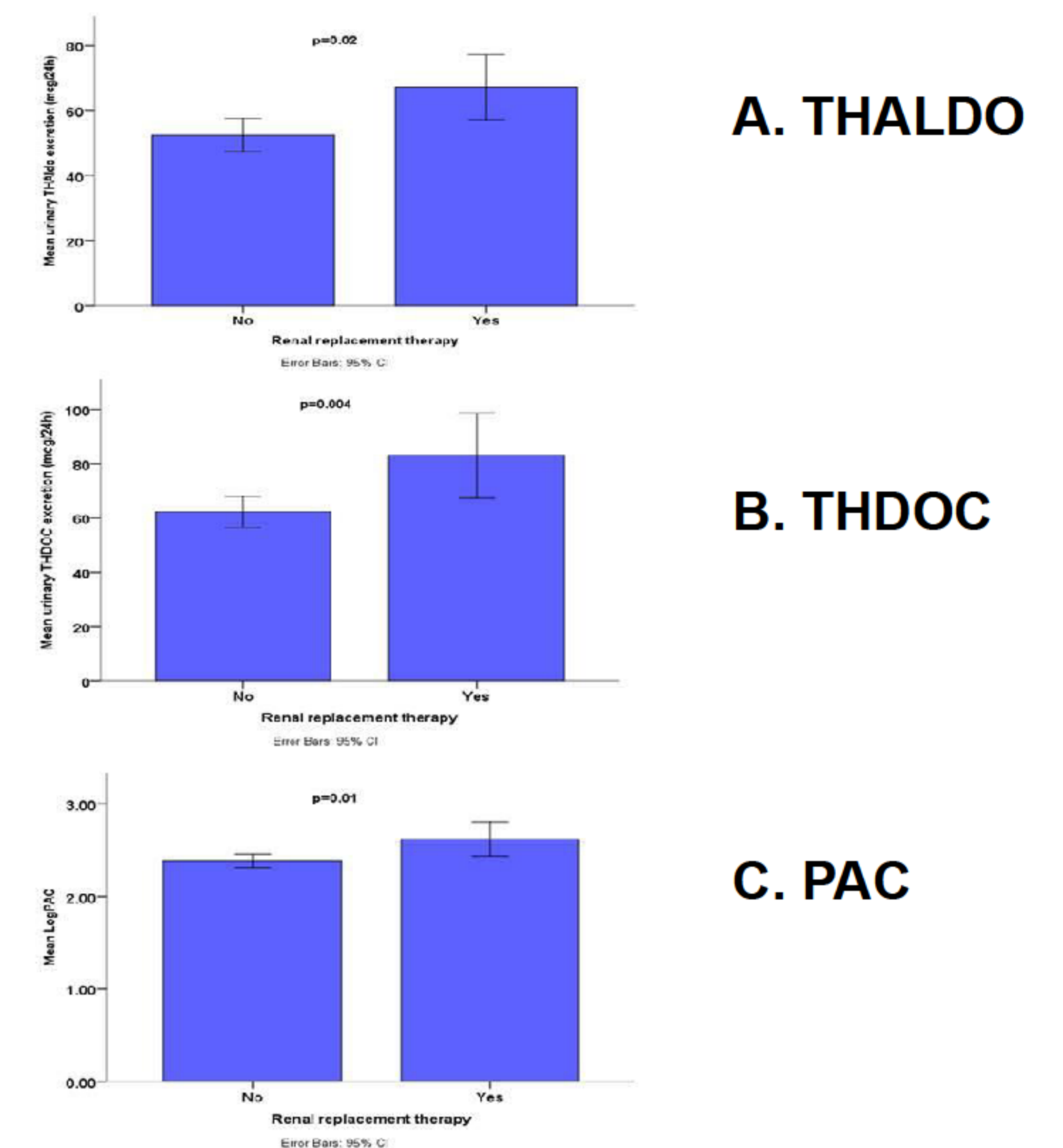


Figure 3: Bar chart of mean THALdo, THDOC and plasma aldosterone concentration (PAC) at time of inclusion in patients who required RRT or not, with estimate of significant difference.

It can be seen that patients who required renal replacement therapy had significantly higher baseline aldosterone and deoxycorticosterone levels. No significant association between steroids and death was seen.

Factor	Exp B	95% CI Exp B	p
eGFR (MDRD4)	0.91	0.84-0.98	0.01
24h QP (log)	12.88	2.50-66.17	0.002
logPAC	16.03	1.69-152.3	0.02
THDOC	1.04	1.01-1.07	0.008
THALDO	1.04	1.00-1.08	0.02

Table 2: Binary logistic regression of factors significantly associated with requirement for renal replacement therapy.

## Conclusion

These data demonstrate an association between elevated mineralocorticoid levels and the risk of requiring renal replacement therapy. These data support the need for further study of the benefits of MR blockade in CKD.

