

# Initiating haemodialysis twice weekly may protect native kidney function

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## Background

Most patients on in-centre maintenance haemodialysis (HD) receive thrice weekly treatment (3XHD) irrespective of the prevailing residual kidney function (RKF). There is evidence that initiating twice weekly HD (2XHD) in patients who retain significant RKF may preserve RKF. The individualised adjustment of dialysis dose and frequency to prevailing RKF is termed "incremental haemodialysis" but is not widely practiced. We have previously reported no evidence of a detrimental effect on survival of 2XHD provided it is part of an incremental programme based on regular assessment of RKF. The aim of this study is to determine whether there are differences between patients initiated on 2XHD and 3XHD with respect to:

- Rate of loss of kidney function
- Anaemia control
- Potassium control
- Survival

## Methods

We examined the electronic records of patients initiating dialysis in our centre over a 20 year period. Those transferring from other centre already on dialysis, those transferring from peritoneal dialysis, and those returning following a failed transplant were excluded. Patients who had dialysed 2XHD for a period of 3 months or more during the 12 months following initiation were identified for comparison with patients treated solely by 3XHD during the same period. Data was extracted to allow comparison of these groups with respect to RKF loss, serum potassium, EPO Resistance Index and survival. For RKF loss we used urea clearance slope and urea clearance reduction ratio.

## Results

We identified 205 patients who had received 2XHD in this time period. 8 patients received 2XHD as part of a palliative approach and a further 21 during delayed recovery from AKI. The remaining 176 had received this treatment as part of an incremental dialysis programme, treatment being carefully monitored by monthly estimates of total Kt/V combining dialysis and native kidney urea clearance. These 176 were compared with 872 patients dialysed 3XHD during the same period.

### Demographics of 2XHD and 3XHD groups

2XHD patients were younger ( $59 \pm 16$  vs  $62 \pm 15$  years;  $p = 0.01$ ). There were no gender differences, nor any with respect to the prevalence of diabetes, ischaemic heart disease, peripheral vascular disease or malignancy.

### Differences in Residual Kidney Function between 2XHD and 3XHD groups

RKF was higher in the 2XHD than 3XHD group at 0, 6, 12, 24, 36, 48, 60 months (Figure 1:  $p < 0.001$  for each). RKF slope was less negative in the first 12 months in the 2XHD group compared to 3XHD (median  $-0.88$  v  $1.1$  ml/min/year urea clearance,  $p = 0.047$ ). Residual renal urea reduction ratio in the first 2 years of starting HD was significantly lower in 2XHD group (see table).

### Dialysis safety parameters in 2XHD and 3XHD groups

Potassium levels were lower in 2XHD at each time point though this was only significant at 12 months (Figure 2). EPO Resistance Index was lower in the 2XHD at each time point (Figure 3).

### Univariate and multivariate survival differences between 2XHD and 3XHD groups

In a univariate survival analysis (Figure 4) survival was superior in the 2XHD group compared to the 3XHD group (median survival 5.6 v 4.4 years,  $p < 0.001$ ).

In a multivariate Cox regression model (not shown for brevity) correcting for age, gender, comorbidities (diabetes, cardiac disease, malignancy, peripheral vascular disease), body weight and RKF at dialysis initiation, hazard for death was significantly lower in the 2XHD group compared to the 3XHD group (Hazard ratio 0.75 [95%CI 0.59-0.95],  $p = 0.02$ ).

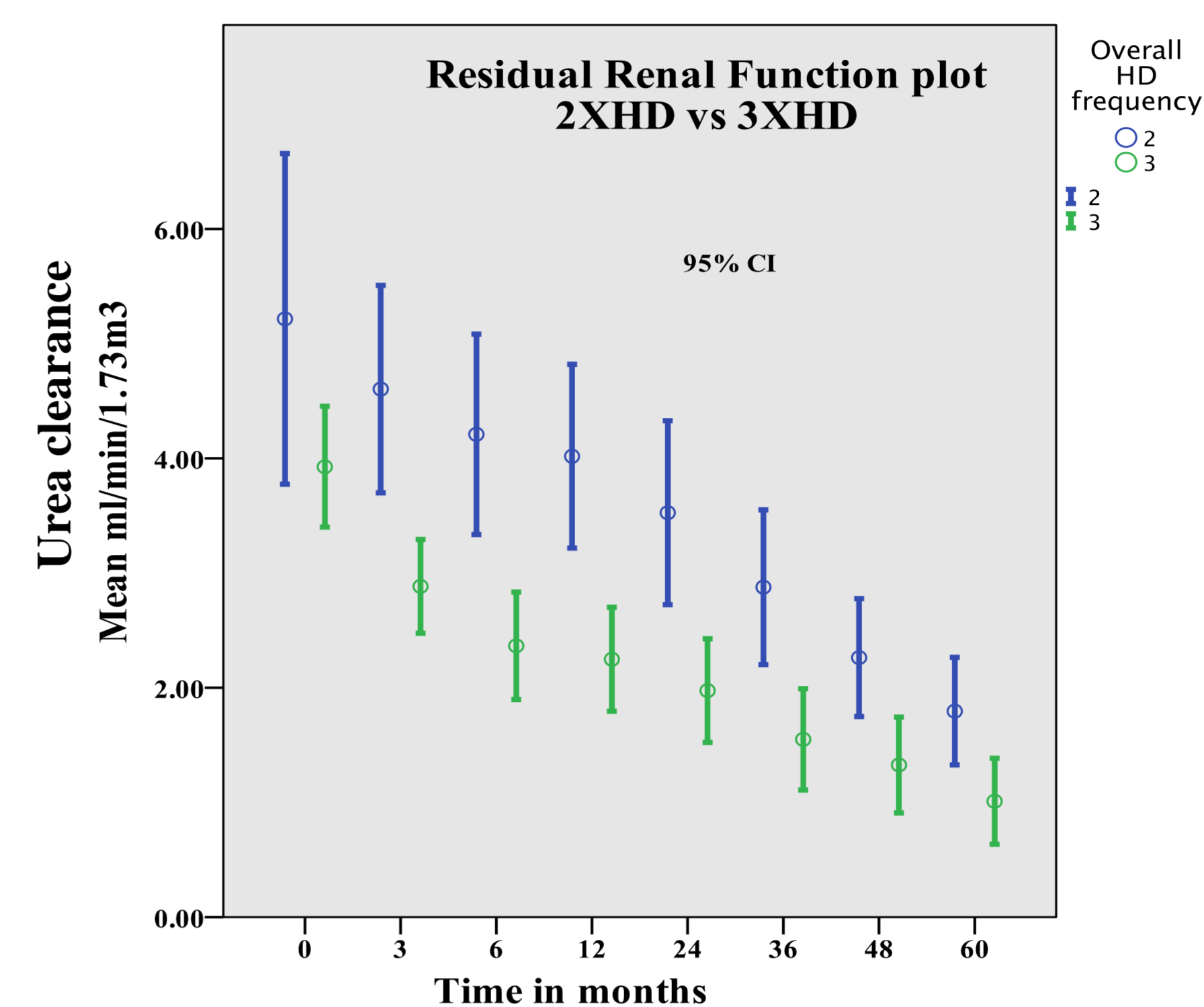
## Discussion

In our retrospective observation study we found

- Rate of loss of RKF in the first year was less in the 2XHD group.
- There appears to be no survival disadvantage to initiating 2XHD as part of an incremental HD programme.
- There was no evidence that 2XHD is detrimental in terms of Potassium control and Epo resistance.

A randomised control trial of initiating 2XHD vs 3XHD is required in patients who commence HD with adequate residual kidney function

## Loss of RKF in 2XHD and 3XHD groups



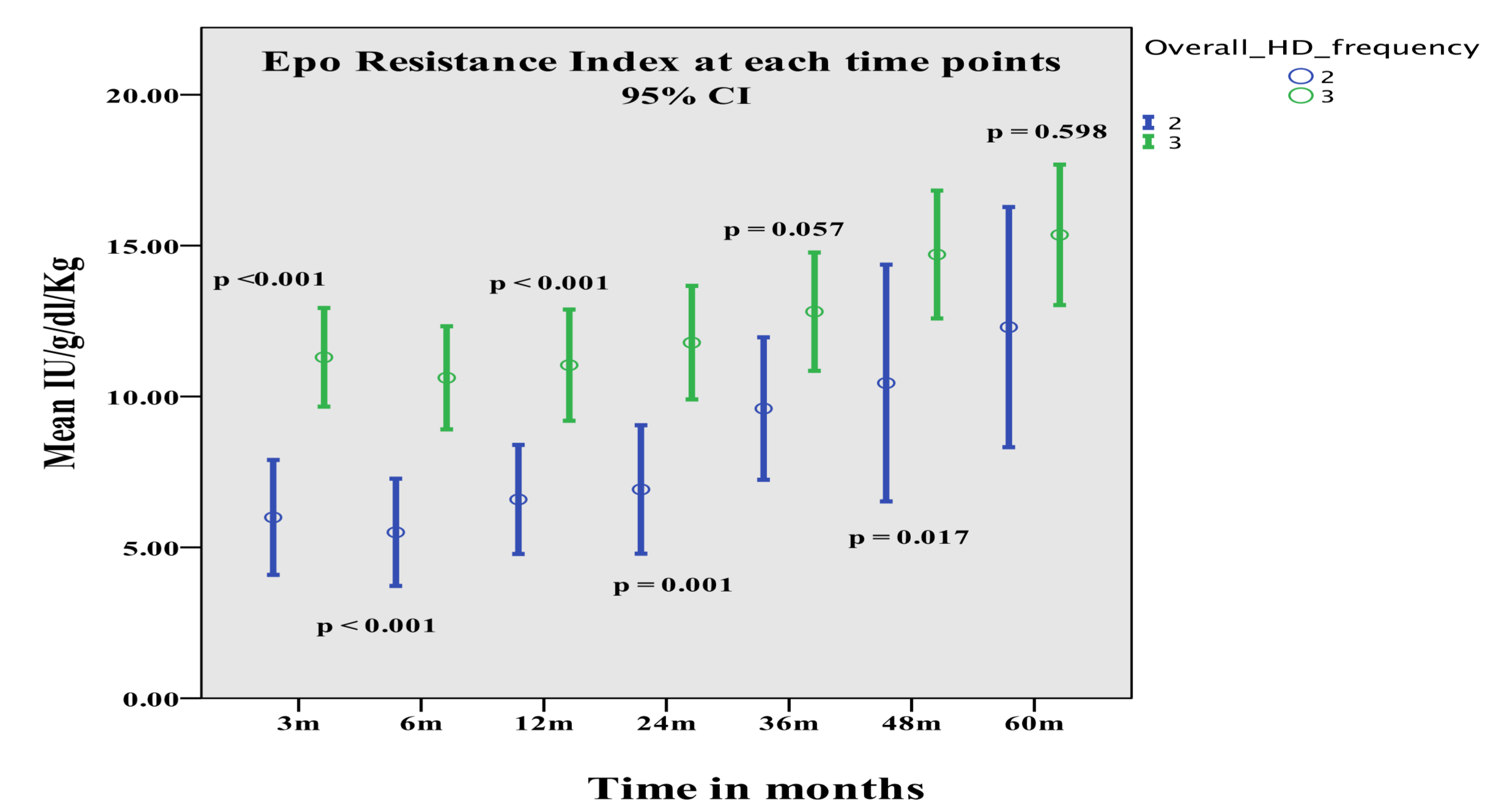
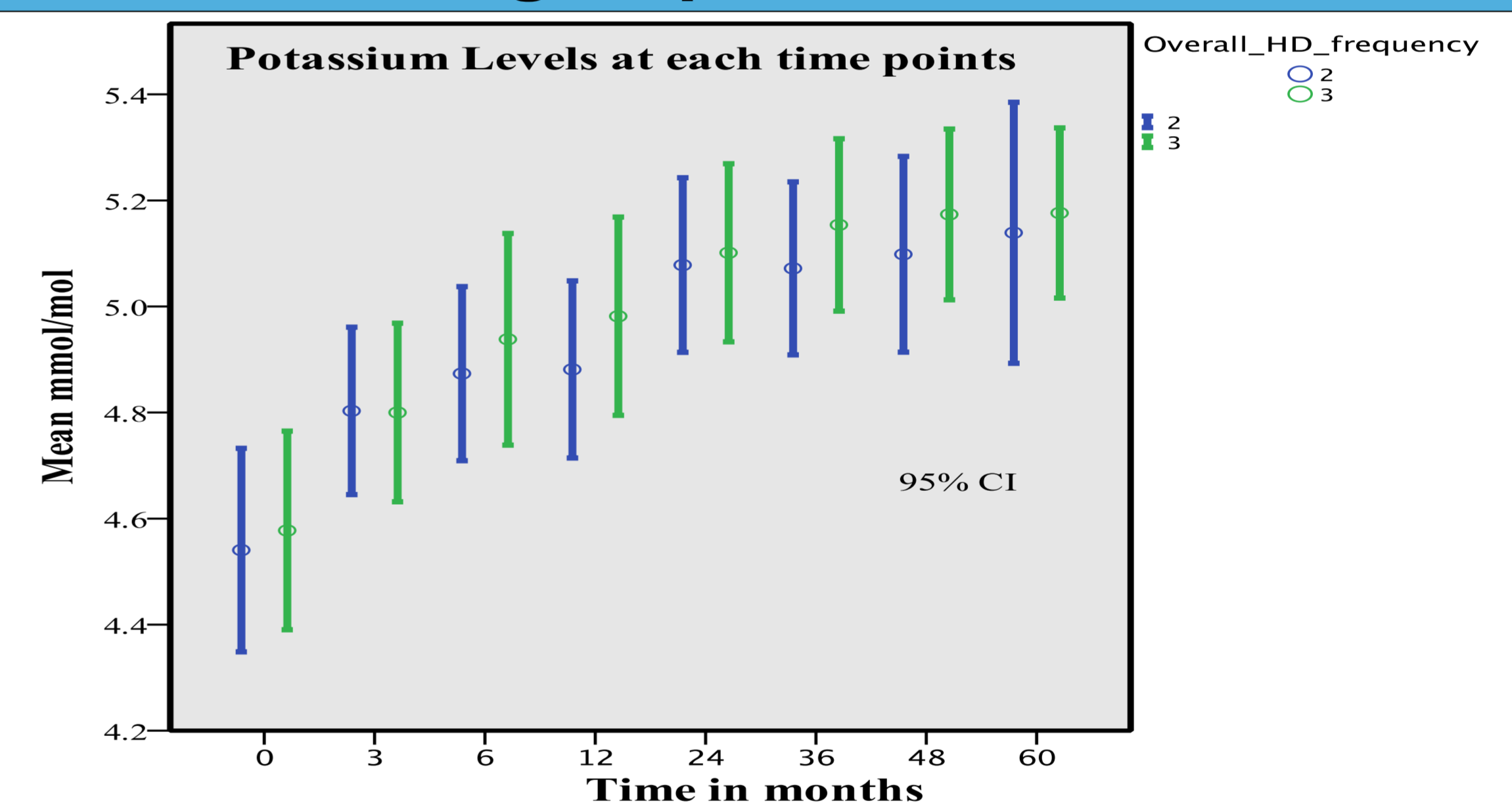
Legend:

2XHD Twice weekly dialysis group  
3XHD Thrice weekly dialysis group

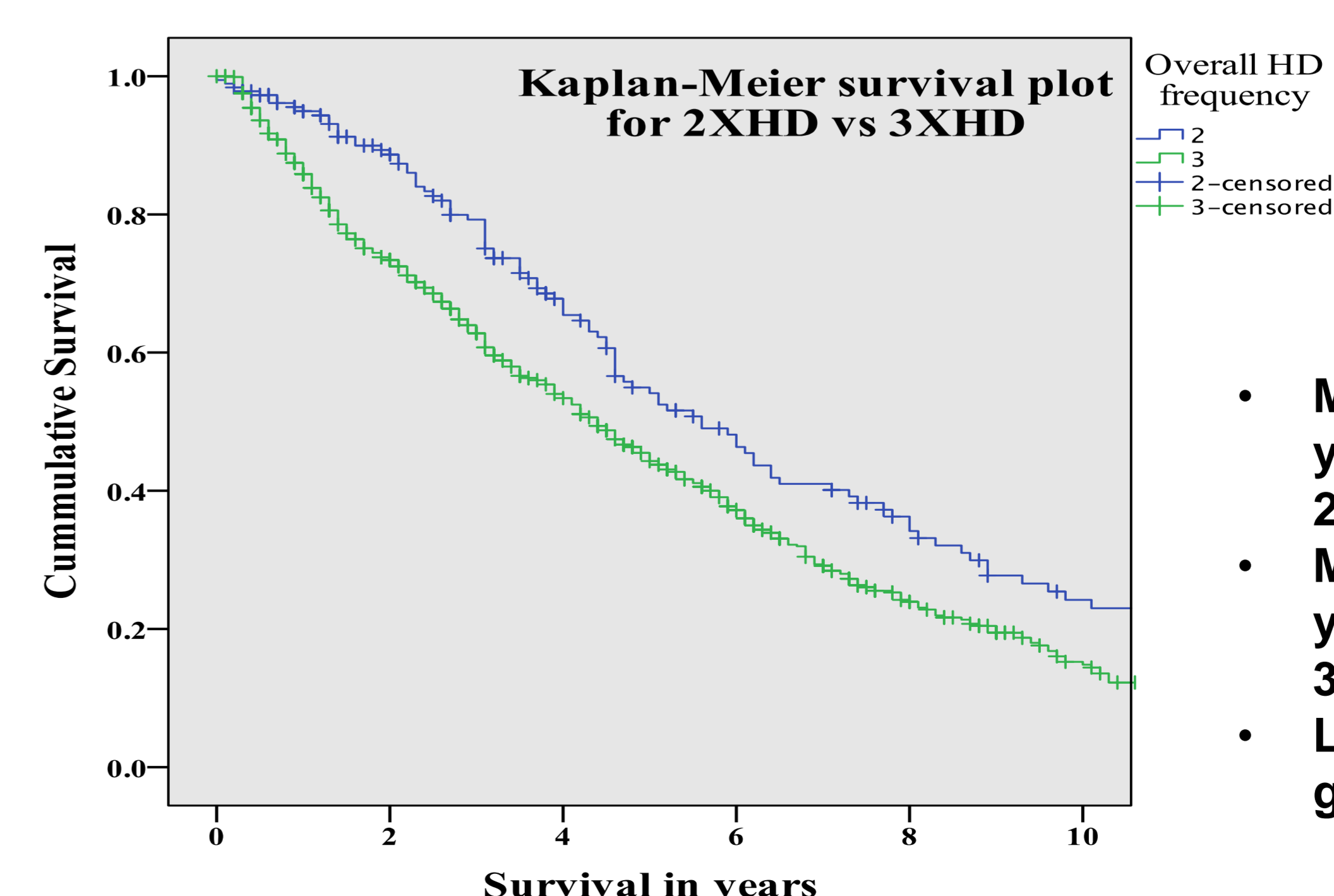
## Residual renal urea clearance reduction ratio in first 2 years after dialysis initiation

	3 to 6 months	3 to 12 months	3 to 24 months
2XHD Median	0.087	0.068	0.298
3XHD Median	0.106	0.247	0.442
Comparison (Mann-Whitney) P value	0.047	<0.001	0.009

## Serum potassium levels and epo resistance in 2XHD and 3XHD groups



## Univariate survival analysis comparing 2XHD and 3XHD groups



- Median Survival was 5.6 years (CI 95% 4.6-6.7) for 2XHD
- Median Survival was 4.4 years (CI 95% 4.0-4.8) for 3XHD
- Log rank comparison of groups  $p < 0.001$

No conflict of interest. Email Contact: rkajakamal@nhs.net

