Abstracts

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Nephrocalcinosis in babies born less than 1.5 kgs or less than 32 weeks gestation

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Aims. To study incidence and aetiological factors of nephrocalcinosis in babies born less than 1.5 kgs or less than 32 weeks gestation.

Methods. Babies of birth weight < 1.5 kg or gestation < 32 weeks were eligible. Two renal ultrasound scans were performed, the first at 1-month postnatal age, the second at term or discharge. Oliguria on day 1 and use of phosphate supplements, diuretics, dexamethasone, and nephrotoxic antibiotics was noted and urinary calcium/creatinine ratio measured at discharge or term.

Results. Seventy seven patients have completed the study. Abnormalities on renal ultrasound scan were noted in 18 (23.3%). There were 11 cases of nephrocalcinosis (14.2%). Other renal abnormalities detected on ultrasound were hydronephrosis in 4, renal stone in 1, biliary pelvis in 1, and an absent kidney in 1. Mean gestation of babies was 29.2 weeks (range 24–34). Mean birth weight was 1.23 kg (range 0.56–2.7).

Babies with nephrocalcinosis had lower mean gestation (27.7 weeks) and birth weight (1.1 kg). No baby with nephrocalcinosis had oliguria on day 1. Six babies (54.5%) with nephrocalcinosis had been treated with frusemide and 8 (72.7%) were oxygen dependent at 36 weeks post-conception. Eight babies with nephrocalcinosis (72.7%) had high levels of nephrotoxic antibiotics during their clinical course and 6 (54.5%) had been treated with dexamethasone postnatally. Only 3 (27.2%) babies with nephrocalcinosis had elevated urinary calcium/creatinine ratios. When babies with nephrocalcinosis were compared to babies without nephrocalcinosis gestation, postnatal steroid, ↑ nephrotoxic antibiotic level, oxygen dependency, and frusemide are significant risk factors (P < 0.05); ↑ urinary calcium/creatinine ratio and phosphate supplement are not risk factor in our study population (P > 0.05).

Conclusion. A significant number of babies born < 32 weeks gestation have nephrocalcinosis. Gestation, postnatal steroid, ↑ nephrotoxic A/B level, oxygen dependency at 36 weeks post-conceptional age, and frusemide are risk factors.

Erythropoietin—Does the route of administration really make any difference?

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Objective. The primary objective of this study was to determine if subcutaneous (s.c.) administration of erythropoietin (rHuEpo) is more efficient than intravenous (i.v.) at correcting anaemia in patients on maintenance haemodialysis. The study also attempted to determine the safety, in terms of the occurrence of adverse events, and the cost-effectiveness of s.c. administration.

Methods. A systematic literature review was undertaken, based on a comprehensive search strategy generated to identify all randomized controlled trials (RCTs) or quasi-RCTs which compared s.c. with i.v. administration of rHuEpo in patients on maintenance haemodialysis. This included searching 12 electronic databases, hand-searching Kidney International, interrogating bibliographies of identified RCTs, contacting relevant authors and biomedical companies. Data relevant to predetermined outcome measures were abstracted from the trials that met our inclusion criteria. Where appropriate a meta-analysis was performed calculating a Petos’s odds ratio (OR) for dichotomous data and a weighted mean difference (WMD) for continuous data.

Results. Seven RCTs/quasi RCTs that met the inclusion criteria were identified. There was no difference in the mean haemoglobin achieved with s.c. compared with i.v. administration during the correction phase (WMD = 0.125 g/dl, 95% CI −0.382 to 0.131) or during the maintenance phase (WMD 0.039 g/dl, 95% CI −0.274 to 0.353). Fewer patients failed to achieve the target haemoglobin with s.c. administration (OR 0.43, 95% CI 0.20–0.93) and the mean time to correction was shorter (WMD −2.0 weeks, 95% CI −3.91 to −0.09). There was no statistical difference in the dose of rHuEpo used during the correction phase (WMD = −21.02 U/kg/week, 95% CI −53.56 to 11.51) nor during the maintenance phase (WMD −28.50 U/kg/week, 95% CI −62.46 to 54.7) with s.c. compared with i.v. The number of patients experiencing clotting of vascular access (OR 1.15, 95% CI 0.41 to 3.22), seizures (OR 2.98, 95% CI 0.49 to 18.10), or commencing increasing antihypertensives (OR 0.75, 95% CI 0.46 to 1.21) were similar with both routes.

Conclusions. There is no conclusive evidence demonstrating the benefit or lack of benefit of s.c. administration of rHuEpo in terms of rHuEpo’s efficient use for patients on haemodialysis. Further RCTs are required to clarify this question. In the interim either route can be used, depending on local policy and patient preference.

A review of automated peritoneal dialysis (APD) in a single centre: night-time or day-time

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The clinical experience of APD in a regional peritoneal dialysis unit was reviewed over 66 months. Small solute clearance
In view of the pathological consequences of increased cell surface PS exposure, it may be important to understand the mechanisms leading to this abnormality in renal failure and to the effects of treatment.

**Pulse pressure is a predictor of patient survival following transplantation**

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**Background.** Cardiovascular disease is the major cause of death in patients with renal failure, regardless of the mode of replacement therapy. Conventional risk factors do not have the same prognostic value in this population. We performed a survival analysis on our transplant population, specifically looking at the influence of blood pressure on mortality.


**Results.** Six hundred and thirty five patients were studied and 60 deaths occurred within 3 years (9.4%), 40% as a result of cardiovascular disease. Age and serum creatinine were the major predictors of survival, (hazard ratios 1.045 and 1.0033, P = 0.0001 and 0.0002 respectively). Pulse pressure and systolic blood pressure (SBP) predicted survival, with SBP just failing to reach significance, independent of age and creatinine, in multivariate analysis, (hazard ratios 1.023 and 1.015, P = 0.017 and 0.064 respectively). Kaplan–Meier analysis of the population, divided by quintiles of blood pressure, showed a continuous survival benefit for lower systolic and pulse pressures.

**Conclusion.** Systolic and pulse pressure predicted survival in a small population of transplant patients over only 3 years. The apparent continuous survival benefit of lower blood pressure suggests the need for prospective interventional trials with BP targets below our currently accepted levels. The influence of pulse pressure on survival supports the concept of vascular remodelling in renal failure as a significant cardiac risk factor.

**Prognostic factors in AA amyloid**

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We analysed retrospectively 32 patients (24 female, 8 male) with biopsy-proven AA amyloid presenting to the renal unit with BP targets below our currently accepted levels. The apparent continuous survival benefit of lower blood pressure suggests the need for prospective interventional trials with BP targets below our currently accepted levels.

**Results.** Six hundred and thirty five patients were studied and 60 deaths occurred within 3 years (9.4%), 40% as a result of cardiovascular disease. Age and serum creatinine were the major predictors of survival, (hazard ratios 1.045 and 1.0033, P = 0.0001 and 0.0002 respectively). Pulse pressure and systolic blood pressure (SBP) predicted survival, with SBP just failing to reach significance, independent of age and creatinine, in multivariate analysis, (hazard ratios 1.023 and 1.015, P = 0.017 and 0.064 respectively). Kaplan–Meier analysis of the population, divided by quintiles of blood pressure, showed a continuous survival benefit for lower systolic and pulse pressures.

**Conclusion.** Systolic and pulse pressure predicted survival in a small population of transplant patients over only 3 years. The apparent continuous survival benefit of lower blood pressure suggests the need for prospective interventional trials with BP targets below our currently accepted levels. The influence of pulse pressure on survival supports the concept of vascular remodelling in renal failure as a significant cardiac risk factor.
Diastolic blood pressure is important in the progression of chronic renal failure (CRF): a retrospective review

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Proteinuria and renal diagnosis independently predict outcome in CRF; however, the relative importance of good blood pressure (BP) control in preventing progression of CRF has recently been questioned. We analysed retrospectively the effect of systolic (SBP) and diastolic BP (DBP), proteinuria, cholesterol, sex, and diagnosis on rate of progression of 484 patients with CRF. Patients required >6 months follow-up, 4 BP and creatinine measurements, and progressive CRF, defined as a 10% decrease in estimated creatinine clearance (calculated using the Cockcroft and Gault formula) to <50 ml/min/1.73 m².

The main diagnostic groups were glomerulonephritis (99 patients), interstitial disease (111), polycystic kidney disease (APKD) (58), and diabetic nephropathy (75). Stepwise regression and multivariate analysis were used to identify relative contribution to variability in rate of progression of CRF (ΔECC).

The main contributor to the variability of ΔECC was proteinuria; however, DBP was more important in women. Neither sex nor SBP was significant. Proteinuria and DBP combined, accounted for 13.8% of variability of ΔECC in all patients. In the four main diagnostic groups, both proteinuria and DBP contributed to the variability of ΔECC in glomerulonephritis (13.2% and 9.9%); however, DBP was the only contributor in APKD and interstitial disease (13.2% and 6.2%'). Proteinuria and cholesterol, but not DBP, were important in diabetic nephropathy. In the patients with good BP control (DBP <90, 75% of all patients), DBP remained significant and was more important than primary renal diagnosis.

We conclude that DBP is an independent contributor to the rate of progression of CRF, is as important as proteinuria, and contributes more to ΔECC than diagnosis. It remains important in determining renal outcome even when blood pressure is well controlled.
A systematic review of the use of erythropoietin to correct anaemia in predialysis chronic renal failure

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Objectives. To assess whether rHuEpo use in predialysis patients safely corrects anaemia and improves quality of life without precipitating the requirement for dialysis.

Methods. A systematic review based on a comprehensive search strategy designed to identify all randomized or quasi-randomized trials comparing the use of rHuEpo with no rHuEpo or placebo in predialysis patients was undertaken.

Data relevant to predetermined outcomes were abstracted from studies which met the inclusion criteria. Odds ratio (OR) was calculated for dichotomous data and a weighted mean difference (WMD) for continuous data.

Results. Ten studies met the inclusion criteria and where possible data from these were summated by meta-analyses. There was a significantly higher haemoglobin (mean difference 2.3, 95% CI 1.37–3.23) and haematocrit (WMD 9.82, 95% CI 8.00–11.65) achieved, and fewer patients required blood transfusion (OR 0.25, 95% CI 0.09–0.69) with rHuEpo treatment. The data from all studies that reported quality of life or exercise capacity suggested benefit from rHuEpo therapy. Though the requirement for antihypertensive treatment appears to be increased by rHuEpo (OR 1.84, 95% CI 1.02–3.32) there was no other statistically significant increase in adverse events. However, because of the relatively small patient numbers and short duration of the trials, determination of benefit or lack of benefit in terms of progression of renal disease could not be confidently made.

Conclusion. Treatment with rHuEpo in predialysis patients corrects anaemia, avoids blood transfusions, and improves quality of life and exercise capacity. However, the critical question as to whether predialysis rHuEpo precipitates the requirement for dialysis remains unanswered. Therefore we cannot recommend the routine use of predialysis rHuEpo for patients without symptoms of anaemia.

Can serum creatinine predict adequacy of peritoneal dialysis?

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The assessment of adequacy of peritoneal dialysis is a formidable logistical operation requiring simultaneous collections of all peritoneal fluid effluent and urine over a minimum period of 24 h. The Renal Association has set a weekly creatinine clearance greater than 50 l/week as a minimum standard, and requires that the measurement be repeated at least annually. One of the advantages of CAPD over haemodialysis is that it is a continuous process that results in a steady serum creatinine concentration. It may therefore be possible to calculate the creatinine clearance from the serum creatinine using an established formula such as Cockcroft and Gault, using age, weight and sex.

We have compared the creatinine clearance calculated from the Cockcroft and Gault formula with the creatinine clearance measured by a standard technique in 35 patients on CAPD. Our results show a good correlation between the two measurements ($r = 0.82, P < 0.0001$) but the formula overestimates the measured clearance by 101 on average. This results in a negative predictive value of 80% but a positive predictive value of 100%.

The calculated creatinine clearance therefore is a reasonable estimate of the measured clearance, which is itself prone to error because of the complex collection procedures. The numbers in this study are small, but the formula deserves further examination in a larger population in order to define its role in the clinical management of PD patients. At present, the tests for measuring adequacy of peritoneal dialysis are cumbersome, expensive, done infrequently, and can also be inaccurate. This formula may offer a more practical assessment which could be used regularly and, in conjunction with clinical symptoms, aid management decisions.

Biocompatible dialysis membranes delay renal recovery in acute renal failure following renal transplantation

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Evidence for an improved outcome following the use of biocompatible membrane dialysers in acute renal failure (ARF) is conflicting. Studies that have shown a benefit have involved critically ill patients with multiorgan failure, where renal recovery and patient mortality are influenced by other comorbid disease in the study population.
To assess the current physical status and neurodevelopmental outcome of children born to renal transplant recipient mothers is good.

Outcome of children born to renal transplant recipient mothers

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Objective. To assess the current physical status and neurodevelopmental outcome of children born to mothers following renal transplantation.


Data on maternal renal disease, immunosuppression, pregnancy, delivery, and child development were collected using hospital records and parental questionnaire. Children underwent physical and developmental examination, urinalysis, and urinary-tract ultrasound examination.

Results. Maternal renal failure was due to reflux nephropathy (chronic pyelonephritis (16), chronic glomerulonephritis (8) and other causes (10). All mothers received prednisolone immunosuppression, one as sole therapy, one as part of triple therapy. Sixteen (47%) received azathioprine/prednisolone and 16 (47%) cyclosporin/prednisolone. Twenty-three girls and 25 boys aged 9 months to 18 years (median age 5.3 years) were studied; 27/48 (56%) were born prematurely, 21/48 (44%) with birth-weight (BW) < 2500 g, 21/48 (44%) were small for gestation (BW < 10th centile).

General health and physical assessment were unremarkable in 45/48 (94%) and 41/43 (95%) respectively.

Development was considered normal in 47/48 (98%), but 4/40 (10%) children had urinary-tract abnormalities on ultrasound.

Conclusions. Despite an increase in preterm delivery, low birth-weight, intrauterine growth retardation, and urinary-tract abnormalities, the overall outcome for children of renal transplant recipient mothers is good.

Preparation for chronic dialysis: the influence of case-mix

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Retrospective studies suggest that patients presenting for first chronic dialysis in whom securing access is an emergency procedure have a worse prognosis than those in whom permanent access has been achieved electively. We have prospectively analysed the establishment of dialysis access and burden of comorbid illness in all patients presenting for chronic renal replacement therapy in Scotland (population 5 million) between 01/10/97 and 28/02/98 (n = 204).

Patients were grouped according to mode of presentation. Group 1 were followed up by a nephrologist and had permanent access ready for use by time of first dialysis n = 88. Group 2 required emergency access and comprised those followed up by a nephrologist but with no functional access by first dialysis, as well as those presenting with end-stage or with acute renal failure which failed to resolve n = 116.

Patients were divided using a previously validated system into low; medium; and high-risk groups according to age and comorbid conditions.

The increased mortality reported in patients first dialysed via emergency access may purely be a reflection of increased comorbidity confounded by relatively acute presentation for dialysis. Prospective data are essential to fully assess comorbidity and we are currently conducting a prospective population study of outcome according to mode of presentation.

### Table: Preparation for Chronic Dialysis

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (n = 88)</th>
<th>Group 2 (n = 116)</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Mean 55.4</td>
<td>Mean 64.5</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>Range 21–84</td>
<td>Range 22–87</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>63 Male (71.6%)</td>
<td>58 Male (50%)</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>( x^2 = 11.6 )</td>
<td>( x^2 = 6.8 )</td>
<td></td>
</tr>
<tr>
<td>F/up (months)</td>
<td>Range 1–336</td>
<td>Range 0–216</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Median 26</td>
<td>Median 3</td>
<td>Mann–Whitney</td>
</tr>
<tr>
<td>Albumin (g/l)</td>
<td>Range 20–50</td>
<td>Range 16–47</td>
<td>N/S</td>
</tr>
<tr>
<td></td>
<td>Mean 38.4</td>
<td>Mean 35</td>
<td></td>
</tr>
<tr>
<td>Risk stratification</td>
<td>Group 1</td>
<td>Group 2</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>40 (45.5%)</td>
<td>24 (20.7%)</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>34 (38.6%)</td>
<td>54 (46.6%)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>14 (15.9%)</td>
<td>38 (32.8%)</td>
<td></td>
</tr>
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</table>

Comorbidity is less in group 1 than group 2 \( P < 0.001 \) Chi square.