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ABSTRACTS

001

INTERLEUKIN 17- RECEPTOR A (IL-17RA) ON LEUKOCYTES AND TISSUE CELLS MEDIATES INFLAMMATION IN A MURINE MODEL OF CRESCENTIC GLOMERULONEPHRITIS

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Aim: To explore the role of IL-17RA in experimental crescentic glomerulonephritis (GN).
Background: Interleukin (IL)-17A and IL-17F are inflammatory cytokines which signal through IL-17 receptor A (IL-17RA), expressed on many cell types, including renal tissue cells.
Methods: Necrotising, crescentic GN was induced by intravenous administration of sheep anti-mouse glomerular basement membrane globulin, thereby planting sheep globulin (SG) in glomeruli. Mice were culled at day 21. Wild type C57BL/6 (WT), IL-17RA-/- and bone marrow chimeric mice were used.
Results: IL-17RA-/- mice had reduced crescent formation (WT 17 ± 3 vs IL-17RA-/- 9 ± 3% $P < 0.05$), with fewer glomerular neutrophils (1.2 ± 0.1 vs 0.76 ± 0.04 cells/glomerular cross section [c/gcs]; $P < 0.05$), macrophages (2.0 ± 0.2 vs 1.1 ± 0.2c/gcs; $P < 0.05$) and a trend towards fewer T cells (0.25 ± 0.1 vs 0.15 ± 0.1c/gcs; P = NS). IL-17RA-/- mice had lower circulating anti-SG antibodies than WT mice (OD_{450} 1:100; 0.3 ± 0.1 vs 0.2 ± 0.0; $P < 0.05$).

Bone marrow chimeric mice (chimerism 96%) were generated, permitting assessment of the effects of selective IL-17RA deficiency in either bone marrow (BM) or tissue cells (TC). BM-TC+ mice had reduced glomerular segmental necrosis (BM+TC+ 49 ± 5 vs BM-TC+ 27 ± 5; $P < 0.05$) and urinary protein: creatinine ratios (BM+TC + 2.0 ± 0.3 vs BM-TC + 1.1 ± 0.3 mg/mmol; $P < 0.05$). Mice with BM or TC IL-17RA deficiency had impaired cellular immunity (ELISPOT: BM+TC + 91 ± 19 vs BM-TC + 41 ± 6 IFNg+ spots/2×10^6 SG-stimulated splenocytes; BM+TC + 91 ± 19 vs BM+TC- 43 ± 8; both $P < 0.05$).
Conclusion: IL-17A/F signalling promotes glomerular injury. Leukocyte-derived IL-17RA promotes immunity and injury, while IL-17RA on radio-resistant cells enhances antigen-specific systemic immunity.

002

SHORT AND LONG TERM BIOLOGICAL VARIATION OF HIGH SENSITIVITY TROPONIN T (HS-TnT) AND N-TERMINAL B-TYPE NATRIURETIC PEPTIDE (NT-PROBNP) IN THE STABLE DIALYSIS POPULATION

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Aims: To determine the within-person(biological) variation of hs-TnT and NT-proBNP in stable dialysis patients, and derive the difference between serial measurements needed to detect a clinically significant change with 90% certainty(RCV).
Background: hs-TnT is frequently measured in the dialysis population for the diagnosis of acute cardiac events, and NT-proBNP is an emerging biomarker of long-term cardiac-risk, but their underlying biological variation in this setting is unknown; leading to misinterpretation of serial measurements.
Methods: Multicentre, prospective cohort study. 55 prevalent HD and PD patients(1:1) were assessed 10-times: weekly for 5-weeks then monthly for 4-months. Assessments were conducted at the same dialysis-cycle time point and entailed clinical review, bioimpedance spectroscopy, ECG, hs-TnT and NT-proBNP testing. Batched samples underwent duplicate analysis in a single-run. Patients were excluded if they underwent a change in cardiac medication, dialysis prescription, ischaemic symptomatology, extracellular volume >1 L, new arrhythmia or hospitalisation between visits. Between-person(CV_G) and within-person(CV_I) coefficients of variation were estimated using nested analysis of variance.
Results: 136-weekly and 113-monthly intervals from 42 patients were able to be included (age:59 ± 15 yrs, coronary-artery disease = 22%, LV ejection fraction = 60 ± 7%, diastolic dysfunction = 86%). For NT-proBNP: Median = 1974 pg/mL, CV_G = 152%, $CV_{I\text{-weekly}}$ = 27% and $CV_{I\text{-monthly}}$ = 35%, RCV_{weekly} = −46%–+84%, $RCV_{monthly}$ = −54%–+120%, $CV_I : CV_G$ = 0.23. For hs-TnT: Median = 34 ng/L, CV_G = 81%, $CV_{I\text{-weekly}}$ = 7.9% and $CV_{I\text{-monthly}}$ = 12.6%, RCV_{weekly} = −17%–+20%, $RCV_{monthly}$ = −25%–+34%, $CV_I : CV_G$ = 0.16. CV_I was consistent across cardiac comorbidity subgroups.
Conclusions: Serial NT-proBNP levels need to double or halve and hs-TnT levels must increase by 20–34% or fall by 17–25% to confidently exclude change due to analytical & biological variation alone. The low $CV_I : CV_G$ implies the best strategy for applying these biomarkers in dialysis is relative change monitoring after a baseline estimate rather than comparing results to reference intervals.

003

BLOCKING THE NADPH OXIDASE Nox4 ACTIVITY PROVIDES RENOPROTECTION IN LONG TERM DIABETIC NEPHROPATHY

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Aim: To examine the role of the NADPH oxidase Nox1 and Nox4 in diabetic nephropathy (DN) using genetic deletion and pharmacological inhibition approaches in streptozotocin induced diabetic mice.
Background: Chronic kidney failure is a major complication of diabetes. However, the underlying causes remain unclear. Oxidative stress is considered to be a major contributor to the development of diabetic nephropathy. NADPH oxidase is a major source of reactive oxygen species (ROS) in the kidney and contributes to renal damage in diabetes.
Methods: $Nox1^{-/y}ApoE^{-/-}$ or $Nox4^{-/-}ApoE^{-/-}$ and their respective wild type or $ApoE^{-/-}$ mice were rendered diabetic via streptozotocin injection. $ApoE^{-/-}$ non-diabetic and diabetic mice were treated with the specific NOX inhibitor (GKT137831). Animals were culled after 20 weeks and kidneys were removed for assessment of structural damage, oxidative stress markers, as well as protein expressions extracellular matrix (ECM), pro-fibrotic and pro-inflammatory markers. In vitro, Nox4 was silenced in human podocytes and exposed to high glucose and TGF-β for gene expression analysis and ROS measurements.
Results: Deletion of Nox4, but not of Nox1 resulted in renal protection from glomerular injury as evidenced by attenuated albuminuria, preserved renal structure, reduced glomerular accumulation of ECM proteins as well as attenuated glomerular macrophage infiltration. Administration of GKT137831 to diabetic $ApoE^{-/-}$ mice conferred a similar degree of renoprotection as did deletion of Nox4. In human podocytes, silencing of the Nox4 gene resulted in reduced ROS production and down-regulation of profibrotic markers that are implicated in diabetic nephropathy.
Conclusions: Collectively, these results identify Nox4 is a key source of ROS responsible for kidney injury in diabetes and provide proof of principle for an innovative small molecule approach to treat and/or prevent DN.

004

EFFECT OF SODIUM RESTRICTION ON BLOOD PRESSURE, FLUID STATUS AND PROTEINURIA IN CKD PATIENTS: RESULTS OF A RANDOMISED CROSSOVER TRIAL AND 6-MONTH FOLLOW-UP

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Background: High-quality evidence to support the efficacy of sodium-restriction for reducing cardiovascular risk in CKD patients is needed.
Aim: The aim of this study was to examine in CKD patients 1) the degree of blood pressure (BP) and proteinuria reduction achievable on a low- versus high-sodium diet, and 2) whether these benefits are maintained with longer-term sodium-restriction.
Methods: The LowSALT CKD study was a double-blind randomised-crossover trial (period-1) with 6-month follow-up (observational arm; period-2). Stage III-IV CKD patients with BP 130–169/≥70 mm Hg consumed a low- and high sodium intake (median 75 [interquartile range (IQR) 58–112] versus

168 [146–219] mmol sodium/day) each for 2-weeks in random order (period-1). Participants were counselled to continue a low-sodium diet (target <100 mmol/day) with outcomes measured again at 6-months (period-2). Primary outcome was 24-hour ambulatory BP; secondary outcomes were proteinuria and extracellular fluid (ECF, bio-impedance). Outcomes were analysed using paired t-test where normally distributed and Wilcoxon signed-rank test with non-normal distribution.

Results: Twenty patients (age 68 ± 11 years and eGFR 31.6 ± 10.6 ml/min/1.73 m^2) completed the study. In period-1, mean ambulatory SBP/DBP was reduced by 9.8 [95% confidence interval (CI)] 4.5–15.1] /4.0 [1.6–6.4] mm Hg ($P < 0.01$), and ECF by 0.8 [95% CI 0.4–1.2] L ($P < 0.01$) from high- to low-salt period. At 6-months, SBP/DBP reductions were maintained (increase of 1.3 [95% CI -4.8-7.3]/1.2 [-1.5-3.9] mm Hg ($P > 0.05$) when compared with low-sodium period), as was ECF ($P > 0.05$). Median protein/albumin excretion were reduced by 40–50% in period-1 and this was maintained at 6-months ($P > 0.05$).

Conclusions: Sodium restriction considerably reduced BP, ECF and proteinuria in CKD patients, and, with the assistance of ongoing dietary-counselling by an accredited dietitian, these benefits were maintained at 6-months.

005

BLOCKADE OF SPLEEN TYROSINE KINASE (Syk) INHIBITS ANTIBODY-MEDIATED REJECTION IN RAT RENAL ALLOGRAFTS

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Aim: To determine whether spleen tyrosine kinase (Syk) plays a role in acute renal allograft rejection.

Background: Kidney allografts induce strong antibody responses which contributes to graft rejection. Syk is involved in the antibody response (via B-cell receptor signalling) and antibody-dependent activation of macrophages and neutrophils (via FcγR signalling), whereas Syk is not expressed by T-cells. However, the role of Syk in these responses has not been investigated in allograft rejection.

Methods: Groups of 6 Sprague-Dawley rats underwent bilateral nephrectomy and an orthotopic transplant with a MHC mis-matched Wistar rat kidney. Groups of 6 recipient rats were treated with a Syk inhibitor (CC-482417, 30 mg/kg/bid) or vehicle from 1 hr before surgery until killed on day 5. Isografts controls were used.

Results: Vehicle treated recipients developed severe allograft failure (serum creatinine 304 ± 130 vs 46 ± 7 umol/L in isograft; $P < 0.001$). Histologic damage included glomerular and peritubular capillaritis, tubular injury (tubulitis, necrosis, dilation) affecting 90 ± 9% of tubules, and T-cell, macrophage and neutrophil infiltration. Immunostaining identified Syk activation in infiltrating leukocytes. Allografts showed IgG and C4d deposition and circulating donor-specific antibodies (DSA) were identified by flow cytometry. CC-482417 improved allograft function (serum creatinine 149 ± 18 umol/L; $P < 0.05$ vs vehicle), with reduced tubular damage (47 ± 19%; $P < 0.001$) and a reduction in capillaritis. CC-482417 treatment did not affect T-cell infiltration or activation (IL-2, granzyme B, IL-2Rα). However, CC-482417 reduced macrophage and neutrophil infiltration by 40 and 45%, respectively ($P < 0.05$ vs vehicle), and reduced macrophage activation (NOS-2, TNF-α, MMP-12). Interestingly, CC-482417 reduced serum DSA levels by 60% ($P < 0.01$).

Conclusion: This study establishes the involvement of Syk in antibody-mediated, but not T-cell mediated, acute renal allograft rejection. Further studies should examine Syk inhibition in a specific model of AMR.

006

CALCIPROTEIN-ASSOCIATED FETUIN-A CONCENTRATION IS ASSOCIATED WITH ALL-CAUSE MORTALITY IN PATIENTS WITH PRE-DIALYSIS CKD

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Aim: To assess whether serum calciprotein-associated fetuin-A (CPP Fet-A) concentrations are predictive of death in a cohort of patients with pre-dialysis Chronic Kidney Disease (CKD).

Background: Serum CPP Fet-A concentrations have emerged as a potential marker of extraosseous mineralisation stress in patients with CKD or chronic inflammatory disease. *In vitro* studies in the macrophage suggest that CPP are pro-inflammatory and pro-apoptotic at high levels. In CKD, higher CPP Fet-A concentrations are associated with a pro-calcific milieu and aortic stiffness. Data relating CPP Fet-A concentrations to hard outcomes are lacking.

Methods: Serum CPP Fet-A concentrations were measured in a prospective cohort of 200 patients with Stages 3 and 4 CKD at enrolment. Participants were followed for a median 5.3 years until death or the observation period ended. Cox proportional hazards models were used to evaluate the association between serum CPP Fet-A and death, after adjustment for demographic, renal, mineral and inflammation-related risk factors.

Results: Mean ± SD age was 69 ± 11 years, estimated GFR (eGFR) was 33 ± 11 mL/min/1.73 m^2, serum phosphate was 1.08 ± 0.20 mmol/L and CPP Fet-A was 27.5 ± 21.2 mg/L. During follow-up 43 patients died. After adjustment for age, gender, eGFR, proteinuria, serum albumin, calcium, phosphate and intact parathyroid hormone concentrations, a 1SD increase in CPP-Fet-A was associated with 36% higher risk of all-cause mortality (Hazard ratio, HR 1.36, 95% confidence interval CI 1.06 to 1.74, $P = 0.017$). However, addition of high-sensitivity C-reactive protein to this model significantly attenuated the effect size (HR, 1.07 95% CI 1.01 to 1.14, $P = 0.040$).

Conclusions: Serum CPP Fet-A concentration is an inflammation-related risk marker for all-cause mortality in patients with pre-dialysis CKD.

007

CX3CR1-DEC205 DC-TARGETED DNA VACCINE INDUCES SPECIFIC ANTIBODIES AND LIMITS ATHEROSCLEROSIS AND MACROPHAGE INFILTRATION IN THE Apo-E KNOCKOUT MOUSE MODEL OF ATHEROSCLEROSIS

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Aim: To assess the effect of Dendritic Cell (DC)-targeted CX3CR1 vaccination in the prevention of macrophage infiltration and attenuation of atherosclerosis in Apo-E-/- mice.

Background: Monocytes/macrophages are involved in the pathogenesis of atherosclerosis. CX3C chemokine ligand 1 (CX3CL1/Fractalkine) and its receptor CX3CR1 have been identified to have an important role in the migration and recruitment of monocytes during the pathogenesis of atherosclerosis.

Methods: DC-targeted and control vectors with CX3CR1 (DEC-CX3CR1/Con-CX3CR1) were generated. Apo-E -/- mice were vaccinated weekly (3x). Anti-CX3CR1 antibody was determined by ELISA. Whole aortas were dissected at 34 weeks of age. Severity of atherosclerosis, macrophage infiltration and lipid deposition were examined histologically.

Results: DEC-CX3CR1 vaccinated mice had high levels of anti-CX3CR1 antibodies (Abs 1.1), Con-CX3CR1 vaccinated mice also had increased antibodies (Abs 0.85), compared to controls (Abs 0.1) ($p < 0.001$). DEC-CX3CR1 and Con-CX3CR1 vaccinated mice demonstrated a decreased plaque size (39%&46% of luminal area) as compared to the control (58%) in brachiocephalic artery ($p < 0.001$, $p < 0.05$). In the aortic arch, DEC-CX3CR1 vaccinated mice showed a significantly decreased plaque size (7.5%) compared to Con-CX3CR1 vaccinated mice (16%) and control (18%), ($p < 0.05$, $p < 0.01$ respectively). Both DEC-CX3CR1 and Con-CX3CR1 vaccinated mice had a significantly decreased infiltration of macrophages (19%&21% of plaque area) into the atherosclerotic plaques in comparison to controls (40%, $p < 0.05$, $p < 0.001$ respectively). DEC-CX3CR1 vaccinated mice revealed a significantly lower lipid deposition level (9% of plaque area) within the atherosclerotic plaques compared to Con-CX3CR1 mice (14%, $p < 0.05$) and controls (16%, $p < 0.001$).

Conclusions: DC-targeted CX3CR1 vaccination induced specific antibodies that limit macrophage infiltration into atherosclerotic plaques suggesting a potential therapeutic role in atherosclerosis.

008

BENEFITS AND COSTS OF AN ACCEPTABLE HUMAN LEUKOCYTE ANTIGEN MISMATCH PROGRAM IN AUSTRALIA

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Aims: To determine the benefits and costs of implementing an acceptable mismatch program in Australia.
Background: Implementation of an acceptable mismatch program in Europe has improved access to transplantation for highly-sensitised patients on the deceased-donor waiting list, but the benefits and costs of a similar program in Australia is unclear.
Methods: Using a third party perspective, two probabilistic decision analytical models were developed to compare 1) an eplet-defined acceptable mismatch and 2) and eplet/Luminex-defined acceptable mismatch program with the current deceased-donor allocation model in Australia (n = 10,000, age 18+). The model terminated when all transplant recipients were deceased.
Results: Compared with current allocation, an eplet-defined acceptable mismatch model reduces average waiting time for 4 of 28 (14%) highly-sensitised recipients by 34 ± 22 months (p = 0.056), with an average gain of 1.32 life-days and $622 savings per patient; whereas an eplet/Luminex-defined acceptable mismatch model reduces the average waiting time for 12 of 23 (52%) highly-sensitised recipients by 37 ± 33 months (p = 0.03), with an average 6.00 life-days gained and $2,805 savings per patient. Average increase in waiting time for reallocated recipients in the eplet and eplet/Luminex models were 12 ± 9 and 15 ± 18 months respectively. Among non-highly-sensitised patients on the waitlist, there was a reduction of 0.09 life-days and $59 excess cost in the eplet-defined acceptable mismatch model and a reduction of 0.60 life-days and $374 excess cost in eplet/Luminex-defined acceptable mismatch model.
Conclusions: The integration of an acceptable mismatch program into the deceased-donor kidney allocation reduces waiting-time and provides modest health benefits and cost savings for highly-sensitised patients without incurring significant reduction in overall health benefits and extra costs for non-highly-sensitised candidates on the waitlist.

009

THE ASSOCIATION BETWEEN GLOMERULAR FILTRATION RATE ESTIMATED BY MULTIPLE METHODS AT DIALYSIS COMMENCEMENT AND PATIENT SURVIVAL IN THE IDEAL TRIAL

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Background and Aims: The Initiating Dialysis Early and Late (IDEAL) study demonstrated that planned early or late initiation of dialysis, based on the Cockcroft and Gault (CG) estimation of glomerular filtration rate (eGFR), was associated with identical clinical outcomes. This study was a pre-specified analysis examining the association of all-cause mortality with eGFR, measured by the CG, Modification of Diet in Renal Disease (MDRD) or the Chronic Kidney Disease-Epidemiology Collaboration (CKD-EPI) formulae at the time of commencement of dialysis.
Methods: IDEAL trial participants were allocated into tertiles according to the CG, MDRD and CKD-EPI formulae at dialysis commencement. The patient survival was assessed using the Kaplan-Meier method.
Results: There was no difference in survival among patients when stratified into tertiles of GFR according to the CG formula. However, there was a significant survival benefit in the tertile of patients starting dialysis with the lowest eGFR when the MDRD or CKD-EPI was applied (p < 0.01), independent of correction for body surface area. An increased hazard ratio for death was observed in older females and patients with diabetes and cardiovascular disease independent of the formula used.
Conclusion: Discrepancies exist in the relationship between eGFR at dialysis commencement and mortality in patients with stage 5 CKD depending on the formula used. Patients commencing dialysis with a higher eGFR were more likely to be older, Caucasian and have a history of ischemic heart disease, suggesting that observational studies demonstrating a survival benefit in patients who start dialysis 'late' is due to reduced comorbidity.

010

THE SLO-NIACIN TRIAL: A DOUBLE-BLIND PLACEBO CONTROLLED RANDOMISED CROSS-OVER TRIAL OF LOW DOSE SLOW-RELEASE NIACIN TO LOWER PHOSPHATE IN HAEMODIALYSIS PATIENTS

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Aim: Is low dose slow-release niacin better tolerated but still effective at lowering phosphate?
Background: Serum phosphate levels correlate with mortality in dialysis patients. Current phosphate binders often cause side-effects leading to poor compliance. Niacin has previously been shown to lower serum phosphate in patients with kidney disease. However, at doses previously used (≥1 g daily), it is poorly tolerated. Slo-niacin® is a slow-release low-dose formulation (500 mg) taken once daily.
Method: The study was a double-blind placebo-controlled randomised cross-over trial approved by the local ethics committee. Patients were on haemodialysis. All patients received both active treatment and placebo for 8 weeks each with intervening 2 week washout phase. All patients continued usual phosphate binders and Cinacalcet/vitamin D analogues, although no dose adjustments were allowed during the study. Patients were recruited if they were >18 yo, not pregnant and serum phosphate 4 weeks prior to commencement was ≥1.8 mM. All gave informed consent.
Results: 33 patients were recruited. 1 patient died following emergency cardiac surgery during placebo phase but had not taken trial medication for 2 weeks prior. 32 patients were analysed by intention to treat, including 3 drop-outs (2 Slo-niacin®, 1 placebo, p = NS). Mean change in serum phosphate over 8 weeks was –0.23 mM (95% CI –1.29 to 0.81) for niacin versus 0.13 mM (95% CI –0.82 to 1.08) for placebo (p = 0.021, paired t-test). Mean absolute change was thus >0.3 mM decrease in serum phosphate in favour of niacin. ANOVA of mean absolute change was also statistically significant at p < 0.007.

Slo-niacin® was well tolerated apart from early mild flushing.

Conclusion: Low dose slow-release niacin remains effective at lowering serum phosphate and is reasonably tolerated.

011

BUTTONHOLE CANNULATION AND INFECTION OUTCOMES: SYSTEMATIC REVIEW AND META-ANALYSIS

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Aims: To summarise the current evidence on the impact of buttonhole cannulation on infection rates.
Background: Publications in the last decade have reported the utilization of buttonhole cannulation (BH) method for vascular access, especially in the home haemodialysis population. Some have reported an association with increased infections in comparison to ropeladder (RL) cannulation, although definitive evidence is lacking.
Methods: We searched Medline, EMBASE, the clinical trials registry (www.clinicaltrials.gov) and reference lists of review articles and trials for cannulation studies in maintenance haemodialysis patients comparing BH with alternative cannulation methods without language restriction. "Renal dialysis" and "catheterization" were used as MeSH terms while "buttonhole cannulation" as a text term. Randomised clinical trials (RCT's) and observational studies between 1950 and 15/Feb/2013 were included. The primary outcome was access-related infection. Relative risk (RR) or incidence rate ratios (IRRs) with associated 95% confidence intervals (CI) were calculated or reported IRR used. Random effects models were used to calculate overall effect estimate and 95% CI's.

Results: Thirteen studies, all published after 2006, met the inclusion criteria, 3 RCTS and 10 observational studies, studying a total of more than1472 patients. Of these, 9 reported total infections, 3 reported systemic infections only and 1 reported local infections only. The majority of studies were single center. Compared with RL cannulation, BH cannulation increased access-related infection 6-fold (RR 6.41, 95%CI 1.43–28.67) in RCT's, 3 fold (RR 2.95, 95%CI 1.85–4.71) in studies reporting outcomes before and after change of cannulation method and 3 fold (RR 3.27, 95%CI 1.44–7.43) in observational studies comparing units with different cannulation methods.
Conclusions: Buttonhole cannulation is associated with increased infection risk and should be used with caution.

012

UTILITY OF "BACK UP" ARTERIO-VENOUS FISTULAS IN PATIENTS ON PERITONEAL DIALYSIS AND USE OF CENTRAL LINES: A COMPARISON BETWEEN TWO AUSTRALIAN CENTRES

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Aim: To study utility of back up arterio-venous fistulas (AVF) in patients initiated on peritoneal dialysis (PD) and to determine the rates of central venous catheter (CVC) use in patients requiring conversion to haemodialysis (HD).
Background: There is limited data on benefit of back-up AVF in patients treated with PD and it has been argued that these may not be useable at the time of HD transfer. There is therefore a high rate of CVC use in this population when they require transfer to HD.
Methods: We retrospectively analysed data on patients transferred to HD from PD, between January 2008 and December 2012 at both Royal Adelaide Hospital (RAH), where a policy of AVF in most PD patients is followed, and Princess Alexandra Hospital (PAH), where only patients at risk have back up AVF created.
Results: Of the142 patients at RAH, 33 (23%) patients required transfer to HD. 25 patients had back-up AVF, which was successfully used in 22 patients (88%). CVC had to be used in 3 patients (12%) as the fistula was dysfunctional. The CVCs used during transfer at RAH were 11 (33%).Of the 232 patients at PAH, 70 (30%) required transfer. AVF was utilized in 26 (37%) patients, whereas a CVC had to be used in 44 (61%) patients. Routine creation of AVF in PD patients was associated with a catheter usage rate of 24% (RAH) as compared to a rate of 61% (PAH) in a centre where this is not done (P = 0.0006, Fisher's exact test).
Conclusion: Routine creation of a back-up AVF in all PD patients is sustainable and results in a much lower rate of CVC use on HD transfer.

013

FETUIN-CONTAINING CALCIPROTEIN PARTICLE LEVELS CAN BE REDUCED BY DIALYSIS, SODIUM THIOSULPHATE AND PLASMA EXCHANGE. POTENTIAL THERAPEUTIC IMPLICATIONS?

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Aim: Determine which, if any, clinical treatment strategies cause a reduction in Fetuin-A (Fet-A) calciprotien particles (CPP) in dialysis patients.
Background: Fetuin-A is an important regulator of physiological and pathological mineralisation. Fetuin-A (Fet-A) has been shown to protect from ectopic mineralisation. In patients with chronic inflammation and with chronic renal impairment, Fet-A is detectable within large macromolecular complexes called calciprotein particles (CPP). These are composed of nanocrystals of calcium phosphate surrounded by a predominantly Fet-A protein 'shell'. CPP formation may protect cells against the pro-inflammatory and pro-apoptotic effects of naked crystalline calcium phosphate, but may themselves be proinflammatory. We have previously demonstrated that in calciphylaxis, a condition associated with severe vascular calcification and a very poor prognosis, a very high proportion of serum fetuin-A circulates as CPP (CPP%). Treatment of the condition is hindered by the lack of a reliable target to monitor and we wonder if serum CPP% might be a useful biomarker.
Methods: We determined whether include increased duration/frequency of haemodialysis (HDx), sodium thiosulphate (STS) infusion , plasma exchange (PEx) or transplantation were associated with a sustained reduction in CPP%.
Results: HDx reduces serum CPP% but not sustainably so. The addition of STS infusion during HDx further reduced CPP%, but infusion between HDx sessions had no significant sustained reduction. PEx provided additional benefit, reducing CPP% between HDx sessions. Transplantation resulted in sustained lower levels of CPP%.
Conclusion: CPP% may be a modifiable marker of mineral stress. Experiments are being conducted to determine whether CPP are directly involved in the pathology of vascular calcification.

014

USE OF STENTS IN HAEMODIALYSIS FISTULAE: SUCCESS AND LONG TERM FOLLOW-UP

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Aim: Endovascular stent deployment is used to treat dysfunctional haemodialysis fistulae characterized by resistant or recurrent stenosis and pseudoaneurysms. This study aims to report the procedural success, complication rate and long-term patency of stents in haemodialysis fistulae at a single centre.
Background: The use of self-expandable bare metal and covered stents have been described to treat resistant or recurrent stenosis, to obliterate large pseudoaneurysms and as a bailout technique to deal with complications related to angioplasty procedures. The effectiveness of these procedures has been described in the literature with varying degrees of success.
Methods: Between 2008 and 2012, 50 procedures (9 for pseudoaneurysms, 41 for resistant or recurrent stenoses) were performed in 42 patients at a single centre. Clinical and radiological information collected during this period was reviewed retrospectively. Post-intervention primary and secondary (cumulative functional) patency rates were determined using Kaplan Meier analysis. Patients were censored for death, loss to follow-up and transplantation.
Results: The clinical and anatomical success rate was 98% (49/50). Minor complications that did not affect procedural success occurred in 3 instances. A major complication leading to access loss occurred in one procedure. Post-intervention primary patency rates at 6, 12 and 18 months were 52%, 24% and 10% respectively. Post-intervention secondary patency rates at 6, 12 and 18 months were 98%, 92% and 92% respectively, with an additional 1.7 procedures per patient.
Conclusion: The use of stents in haemodialysis fistulae provides excellent function patency of the dialysis fistulae but repeated procedures are required to maintain secondary patency.

015

UPPER ARM FISTULAE AND MULTIPLE STENOSES INFLUENCE HAEMODIALYSIS ARTERIOVENOUS FISTULAE PATENCY AFTER BALLOON ANGIOPLASTY

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Aim: Patency after percutaneous balloon angioplasty (PTA) for haemodialysis fistula stenosis is highly variable. This study aimed to assess factors associated with patency following first episode of treatment with PTA.
Background: Restenosis recurs commonly after PTA. Previous studies have shown that some intrinsic fistula and biochemical factors may influence patency after PTA.
Methods: We retrospectively reviewed all endovascular procedures performed by nephrologists between 2007 and 2012 at a single centre. Anatomical, clinical, biochemical and medication information was subjected to cox regression analysis to identify factors influencing post-intervention patency.
Results: 120 patients were identified as having first episode treatment with PTA. During a median follow-up period of 22.66 months (5.24–53 months), 171 follow-up procedures were performed. Post-intervention primary patency rates at 6, 12 and 18 months were 46%, 25% and 15% respectively. Cumulative (functional) patency rates at 6, 12 and 18 months were 97%, 94 and 92% respectively with 1.4 additional procedures per patient. In univariate cox regression analysis, the presence of multiple lesions (p = 0.037) was associated with early restenosis at 6 months, while upper arm fistulae were associated with early restenosis (p = 0.004) and shorter primary patency (p = 0.001). Other anatomical characteristics (fistula age, lesion length, pre-procedure stenosis), clinical history

(diabetes, coronary and peripheral artery disease), medications, and biochemical parameters (HbA1c, CRP, albumin and lipids) did not influence patency.
Conclusion: Multiple stenoses and upper arm fistulae may be associated with shorter patency after PTA. More large volume prospective studies are required to further assess factors associated with patency after PTA in haemodialysis fistulae, particularly the role of metabolic and inflammatory markers.

016

CLINICAL OUTCOMES AFTER ARTERIOVENOUS FISTULA CREATION IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Aim: Creation of an arteriovenous fistula (AVF) before initiation of haemodialysis (HD) is an important goal in chronic kidney disease (CKD) management. This study aims to determine outcomes and optimal timing for AVF creation in CKD patients.
Methods: We reviewed records of all CKD patients who had a first AVF creation for future HD at Austin Health from 01/01/2007–31/12/2009 and obtained follow-up data until 31/12/2011. Survival analysis was performed for the primary outcome of time from AVF creation to first HD treatment.
Results: In 100 patients who had a first AVF created, the mean age was 63.7 ± 13.7 years, 49 had diabetes and 39 were female. Mean time from AVF creation to first HD in 73 patients who commenced HD was 14.1 ± 12.7 (range: 0.2–47.7) months. Of these 73 patients, 21 (29%) required a radiological and/or surgical procedure before commencing HD and 26 (36%) required a procedure within 3 months of commencing HD. Despite AVF creation, 12 (16%) patients required a catheter to start HD and 2 (3%) required a catheter within 3 months of HD commencement. Median time to starting HD was 479 days. In patients with eGFR < 16 mL/min (the median) median time to starting dialysis was 321 days compared to 909 days for eGFR ≥ 16 ml/min (Log rank p = 0.018). At 3, 6 and 12 months respectively, 20%, 44% and 56% of patients with eGFR < 16 mL/min had commenced HD compared to 11%, 20% and 26% with eGFR ≥ 16 ml/min.
Conclusion: While early AVF creation is an important goal, we demonstrate that optimal timing of AVF creation is challenging, with half of our patients not using the AVF for over a year, and many requiring subsequent AVF procedures before becoming established on HD.

017

OUTCOME OF PREDIALYSIS EDUCATION IN WESTERN SYDNEY: EARLY REFERRAL IS ASSOCIATED *WITH REDUCED RATE OF LINE USE AT FIRST DIALYSIS*

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Aim: To review characteristics and outcomes for patients referred to a comprehensive predialysis programme in Western Sydney.
Background: In 2005 the Western Renal Service (WRS) appointed a Predialysis coordinator to facilitate patient education, informed dialysis modality choice and facilitate access planning. This programme was developed to promote home dialysis therapies and minimise rates of unplanned dialysis commencement and haemodialysis catheter use as initial dialysis access.
Methods: Patients referred for predialysis education between 2005–2010 and who subsequently commenced dialysis were identified from the WRS predialysis database. The proportions of these patients who ultimately undertook a home dialysis therapy or commenced dialysis with permanent access were calculated and related to the GFR at referral to this programme.
Results: 965 patients were referred to the predialysis programme in this period. 546 of these patients subsequently commenced maintenance dialysis; 72% of this group ultimately undertook a home dialysis therapy. The average referral GFR was 12.5 mL/min/1.73 m^2, 74% were referred with a GFR of 15 mL/min/1.73 m^2 and 92% with a GFR of 20 mL/min/1.73 m^2 or less.

Patients who started dialysis with permanent dialysis access had a higher GFR at referral than patients who commenced dialysis with a haemodialysis catheter (13.4 vs 11.1, p < 0.01). Patients referred for predialysis interview with a GFR more than 10 ml/min/1.73 m^2 were more likely to commence dialysis with permanent dialysis access (p < 0.01). Rates of home dialysis did not appear to be affected by the GFR at time of referral.
Conclusions: Despite the referral GFR being lower than recommended levels, high rates of home dialysis uptake was achieved in patients referred to the predialysis programme at WRS. Earlier referral is associated with a higher chance of commencing dialysis with permanent access.

018

FACTORS INFLUENCING HAEMODIALYSIS ARTERIOVENOUS FISTULA PATENCY AFTER BALLOON ANGIOPLASTY; A SYSTEMATIC REVIEW

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Aim: Percutaneous transluminal angioplasty (PTA) is an established treatment for haemodialysis fistula stenosis. This study aimed to systematically review evidence for factors associated with patency after percutaneous transluminal angioplasty (PTA).
Background: The effects of patient comorbidity, demographic, biochemical and anatomical characteristics, with initial PTA success and post-intervention patency have not previously been summarised.
Methods: We searched databases to identify studies assessing patency after PTA in haemodialysis fistulae. Studies of immature or thrombosed fistulae or other dialysis access were excluded. Quality of studies was assessed using a modified validated checklist. Outcomes assessed were post-intervention primary and secondary patency, restenosis at 6 months, technical and clinical success, assisted primary patency and mean interval or frequency of endovascular interventions during follow up. Findings were summarized descriptively.
Results: We included 12 single-centre studies of 1 120 participants with 1281 fistulae. Follow-up ranged from 3 days-10years. Shorter primary patency was seen with more recent fistulae (4 studies), longer stenosis length, upper arm fistulae (2 studies), small inflow artery diameter, arteriovenous anastomotic site and history of previous endovascular interventions (1 study each). Shorter secondary patency was seen with increased patient age (2 studies), and more recent fistulae (1 study). Early restenosis was associated with diabetes (3 studies), HbA1c, low-density lipoprotein, and asymmetric dimethylarginine (1 study each). Technical success was reduced for upper arm fistulae and high-grade stenoses (1 study), while clinical success of PTA was more likely in stenotic compared to thrombosed fistulae (1 study).
Conclusion: Fistula characteristics and diabetes may be associated with poor PTA outcomes, however evidence is inconclusive, and the role of metabolic and inflammatory markers is unclear.

019

IMPROVING VASCULAR ACCESS OUTCOMES AT GOLD COAST

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Background: A mature arteriovenous fistula (AVF) at the start of dialysis reduces morbidity, mortality and costs compared to a cental venous catheter (CVC). In 2005, less than 38% of our patients commenced haemodialysis with an AVF and Central Line Associated Blood Stream Infection (CLABSI) rate associated with our haemodialysis CVC's was 3.5/1000 catheter days.
Aim: A multi-pronged intervention was developed with focus on a renal access co-ordinator to expedite a "fistula first" approach and reduce complications associated with HD CVC use by targeting incident (first dialysis) catheter rates and CLABSI rates.
Methods: Outcome was assessed by 1. Proportion of patients starting dialysis with a CVC. 2. Tunnelled Haemodialysis associated CLABSI rates per 1000 catheter days. 3. Proportion of patients on maintenance dialysis with a CVC. 4. Non tunnelled haemodialysis catheter total yearly dwell days. 5. Proportion of prevalent patients and incident patients with AVF.
Results: The proportion of patients commencing haemodialysis via a CVC dropped from 62% in 2005 to 34% in 2012. The CLABSI Rate associated with tunnelled Haemodialysis catheter use dropped from 3.5/ 1000 days in 2005 to 0.35/ 1000 days in 2012. The percentage of patients on maintenance haemodialysis via a CVC dropped from 13% in 2005 to 9% in 2012. The non-tunnelled CVC line days per year dropped from 1330 line days/ yr in 2006 to 220 line days/ yr in 2012. The percentage of incident patients with AVF improved from 15% in 2007 to 35.7% in 2012, and prevalence rate from 76% to 88%.