Nephrology

**G214 HEPARIN AND RENAL ALLOGRAFT THROMBOSIS: DOES HEPARIN SIGNIFICANTLY REDUCE THE INCIDENCE OF THROMBOSIS IN PAEDIATRIC RENAL ALLOGRAFTS?**


**Aim:** To establish whether heparin reduces the incidence of renal graft thrombosis in children aged 0 to 16 years.

**Method:** Retrospective study of 306 transplants undertaken in 274 children between 1987 to 2000. Heparin was given to all patients after 1993. Repeat grafts (n=32), >16 years of age (n=12), recurrence of HUS (n=1) and insufficient data (n=7) were excluded. The dose was 24 units/kg per dose.

**Results:** There were fewer grafts lost to thrombosis in Group 2, but there was no statistically significant difference in Group 1 and 2 in patients aged 1 year or less and Group 2 patients who received heparin for more than 3 days (p=0.052). The incidence of graft thrombosis in both groups was calculated for logistic regression analysis and used to assess the effect of variables previously identified with increased risk of graft thrombosis. The main predictors were: donor and recipient age and sex, cold ischaemia time (CIIT), and multiple donor vessels.

**Conclusion:** This retrospective analysis has demonstrated that heparin does not significantly reduce the incidence of renal graft thrombosis. A review of previous studies has shown that heparin reduces the incidence of acute graft thrombosis but has no effect on the incidence of chronic graft thrombosis.

**G215 DOSAGE AND ADVERSE EFFECTS OF MYCOPHENOLATE MOFETIL IN PAEDIATRIC RENAL TRANSPLANTATION**

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**Aims:** Mycophenolate Mofetil (MMF) is increasingly used as a substitute for Azathioprine in patients post renal transplant for steroid resistant rejection or toxicity from calcineurin inhibitors. We report our experience with MMF in view of the adverse side-effects noted with the immunosuppressive regimen but appears to have marked gastrointestinal side effects with significant weight loss noted in a number of patients. The optimal dosing level needs to be established but would appear to be lower than the current recommended target dose.

**Method:** The records of all transplant children receiving MMF in our tertiary nephrology centre since August 1999 were reviewed.

**Results:** MMF has been prescribed in 23 post transplant children (14 male) at a median age of 14.4 years (range 2–3–16 yrs). 3 children received MMF immediately post transplant for primary immunosuppression but 20 received it at a mean of 2.9 years (range 0.3–8.4 yrs) post transplant for resistant rejection and/or Cyclosporin/Tacrolimus toxicity.

On MMF 43% of patients had a mean weight loss of 10.3% (range 4 to 22.2%); 39% diarrhoea; 22% anaemia, 8.6% neutropenia; 4.3% lymphopenia and 4.3% recurrent infections. In 6 patients the MMF has been discontinued after a mean of 4.3 months because of adverse effects. The mean initial dose of MMF was 300mg/m² per dose twice a day with the maximum mean dose being 450mg/m² per dose once a day. Only 7 patients received the recommended target dose of 600mg/m² twice a day.

**Conclusion:** MMF has been a valuable addition to the immunosuppressive regimen but appears to have marked gastrointestinal side effects with significant weight loss noted in a number of patients. The optimal dosing level needs to be established but would appear to be lower than the current recommended target dose.

**G216 NEONATAL PERITONEAL DIALYSIS—OUTCOME IN A REGIONAL CENTRE**

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**Background:** Only in the last ten years has continuous peritoneal dialysis been advocated in neonates. Limited information is available on its use in acute renal failure.

**Aims:** (1) To describe the profile of dialysed neonates, the duration and complications of treatment, morbidity and outcome. (2) To determine pre-dialysis assessment.

**Method:** All cases of neonatal peritoneal dialysis, from March 1996 to March 2001, were reviewed for the following data: indication for dialysis, gestation, corrected age and weight at dialysis, presence of cranial and renal ultrasound assessment, duration of dialysis, complications and outcome.

**Results:** 19 neonates were referred for consideration of dialysis. 7 were unsuitable: necrotizing enterocolitis (2), enerocternal abnormality (1), ileostomy (1), and extremely poor prognosis (3). 12 were dialysed. Median (range) gestational age was 29 (23–41) weeks. Median (range) age at dialysis was 33 (28–41) weeks. Median (range) duration of dialysis was 3 (1–231) days. Indications for dialysis included hyperkalaemia (3), oliguria/anuria (4), hyperammonaemia (1), persistent acidosis (2), bilateral renal vein thrombosis (1) and renal fungal balls (1). Pre-dialysis cranial ultrasound scans were performed in 11 of the dialysed patients, 2 subsequently developed periventricular leucomalacia. 8 babies had complications including catheter blockage (4), leakage (3) and peritonitis (3). 6 required one or more catheter replacements. 9 (75%) babies died; 7 in the neonatal intensive care unit (NICU) and 2 post-discharge. Median (range) age at death in NICU 27 (6–59) days. Of the 3 survivors, 1 required long-term dialysis and all are developmentally delayed.

**Conclusion:** Morbidity and mortality are extremely high and are related to the underlying co-morbidities. Careful parental counseling and patient selection needs to be undertaken prior to treatment.

**G217 EDUCATIONAL DIFFICULTIES AND SUPPORT NEEDS OF CHILDREN FOLLOWING RENAL TRANSPLANTATION**

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**Aims:** Improving the educational experiences and attainment of children with chronic illness is an important aspect of their care. Our study sought to i) investigate the educational difficulties and problems of children following renal transplantation, and ii) identify the support necessary to promote their effective educational and social inclusion.

**Methods:** Semi-structured interviews were conducted in the homes and schools with 12 children (all >2 yrs post transplant), their parents, their teachers and their non-ill school friends. Drawing on multiple informants enabled data to be triangulated. Interview transcripts were content-analysed on the basis of key themes. Schools were contacted for statistical information on school attendance and achievement.

**Results:** Analysis of 39 interviews indicates that post-transplant children are likely to experience peer relations difficulties at school, including bullying/name-calling. Other difficulties include i) issues of school absence and re-integration, ii) low motivation for school work due to tiredness or worry and iii) lack of teachers’ awareness and knowledge about the child’s health condition. Liaison between hospital and mainstream school staff was regarded as essential, especially at times of crisis or transition. Parents also acknowledged their difficulties in maintaining a balance between being supportive or over-involved in their child’s schooling. Analysis of data on school attendance for 8 children to date revealed an average attendance of 83% (range 66–93%).

**Conclusions:** Minimizing the barriers to children’s effective educational and social inclusion post-transplant, will require i) providing support to help the children deal with academic and social difficulties (in particular, peer relations problems), ii) raising teacher-awareness and information levels, iii) enhancing hospital-school liaison, and iv) addressing parents’ support needs in relation to their children’s education.
CATCH-UP GROWTH CAN OCCUR WITH NORMAL PARATHYROID HORMONE LEVELS IN CHILDREN WITH CHRONIC RENAL FAILURE

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Aims: Parathyroid hormone (PTH) levels of 2 to 4 times normal have been recommended to maintain normal growth in children on dialysis. We aimed to assess the effect of circulating PTH levels on the growth of children with chronic renal failure (CRF).

Methods: The renal unit database was used to identify patients who presented after 1989 [when current immunometric PTH assays where introduced] under the age of 5 years, with a glomerular filtration rate (GFR) of <41 ml/min/1.73 m² and with ≥2 years of 3 monthly dialysis treatments. Children with comorbid features affecting growth were excluded and data collection was stopped when renal replacement therapy (n=9) or growth hormone (n=6) was commenced. The departmental policy is to ensure dietary intake, correct acidosis and salt depletion and to maintain a normal PTH by phosphate control (using dietary restriction and calcium carbonate or acetate) and prescription of activated vitamin D.

Results: Data have been collected for a mean (range) of 3.6 (2.0–4.9) years from 59 patients aged 2.0 (0.4–4.9) years, GFR 21 (6–41) ml/min/1.73 m². The mean (SEM) height standard deviation score (Ht SDS) was 0.0 (0.0) and the mean (SEM) weight SD was 0.0 (0.0). The median (IQR) height increase was 0.11 (0.04), which is significantly different from normal (p=0.001). The overall mean change in Ht SDS (Ht SDS per year was 0.11 (0.04), which is a significant (p=0.01) improvement on normal growth. This catch-up growth was independent of age and occurred during the first 2 years of treatment (Ht SDS 0.4 (0.14) [p=0.001]). In subsequent years there was no further change in Ht SDS. Overall, age, corrected mean, calcium and phosphate levels were 0.97 (0.91–1.03) and 0.83 (0.72–0.95) times the upper limit of the normal range (ULN) respectively and the median PTH level was equal to the ULN (inter-quartile range (IQR) 0.8–1.3 times ULN).

Conclusion. Children with a GFR <41 ml/min/1.73 m² who are managed conservatively maintain excellent growth with normal PTH levels, suggesting that normalisation of PTH levels in this patient group is appropriate.

THE INCIDENCE OF HYPERTENSION FOLLOWING VESICO URETERIC REFLUX

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Aims: Hypertension in children with vesico ureteric reflux (VUR) and renal scarring is reported in at least 10%. The prevalence in adults with renal scarring is up to 50%. Studies to date have concentrated on those with the highest risk of developing hypertension (i.e. those with bilateral renal scarring) but have not compared the outcomes between those with no scarring, unilateral and bilateral scars. This study investigated the development of hypertension in all patients with VUR with and without renal scarring.

Methods: A total of 771 patients with VUR, reflux nephropathy or both were identified from our paediatric nephrology-urology database. 512 (66%) records have been scrutinised to date for grade of renal scarring. In those with no scarring, unilateral and bilateral scars (8 out of 168 (4.7%)) and VUR + bilateral scars (17 out of 69 (24.6%)]. There was a significant association between the detection and severity of scars and the presence of hypertension.

Results: Data have been collected for a mean (range) of 3.6 (2.0–4.9) years from 59 patients aged 2.0 (0.4–4.9) years, GFR 21 (6–41) ml/min/1.73 m². The mean (SEM) height standard deviation score (Ht SDS) was 0.0 (0.0) and the mean (SEM) weight SD was 0.0 (0.0). The median (IQR) height increase was 0.11 (0.04), which is significantly different from normal (p=0.001). The overall mean change in Ht SDS (Ht SDS per year was 0.11 (0.04), which is a significant (p=0.01) improvement on normal growth. This catch-up growth was independent of age and occurred during the first 2 years of treatment (Ht SDS 0.4 (0.14) [p=0.001]). In subsequent years there was no further change in Ht SDS. Overall, age, corrected mean, calcium and phosphate levels were 0.97 (0.91–1.03) and 0.83 (0.72–0.95) times the upper limit of the normal range (ULN) respectively and the median PTH level was equal to the ULN (inter-quartile range (IQR) 0.8–1.3 times ULN).

Conclusion. Children with a GFR <41 ml/min/1.73 m² who are managed conservatively maintain excellent growth with normal PTH levels, suggesting that normalisation of PTH levels in this patient group is appropriate.

A NEW URINE COLLECTION METHOD BY ABSORBENT PAD AND MOISTURE SENSITIVE ALARM

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Background: Collecting a ‘clean’ urine sample in young children to rule out urinary tract infection (UTI) is difficult. Urine collection pads (U.C.P.) are inexpensive and easy to use but about 25% of samples have a high rate of local flora (>10⁵ mixed growth organisms/ml) and contamination. We hypothesised that reducing the contact time between the wet urine pad and skin might reduce the risk of contamination. We decided a new U.C.P. method incorporating an enuresis alarm sensor.

Aims: To compare the mixed growth (>10⁵ mixed growth organisms/ml) of urine samples obtained from U.C.P and U.C.P connected to a moisture sensitive alarm.

Methods: Febrile children under the age of 2 years with suspected urinary tract infection were randomised to 2 groups, U.C.P alone and U.C.P with enuresis alarm.

Results: 91 children were enrolled in the study and 71 adequate samples were obtained (UCP group—37, UCP & alarm group—34). U.T.I occurred in 7% (UCP—3/37, UCP & alarm 2/34). The overall incidence of any mixed growth (>10⁵ mixed growth organisms/ml) was 49% (55/112), which was not significantly different between the 2 groups; UCP 16/37 (45%), UCP & alarm 19/34 (55%) (Odds ratio 1.66, 95% CI 0.6–4.2). Excluding those with UTI, the rate of heavy mixed growth (>10⁶/ml) was similar in both groups, UCP 7/34 (21%), UCP & alarm 7/32 (22%) (Odds ratio 1.08, 95% CI 0.3–3.5). There were no adverse effects from the use of alarms & one false alarm.

Conclusion: The use of moisture a sensitive alarm with UCP to reduce the contact time of wet pad with skin does not reduce the likelihood of contamination of the urine sample. However, the alarm method was faster and easier to use and was the preferred method by the nursing staff.

ETHNICITY AND RELAPSE RATES IN CHILDREN WITH NEPHROTIC SYNDROME

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Nephrotic syndrome (NS) affects children throughout the world. There are clear racial differences in incidence, histology and prognosis in the U.K. There is a higher prevalence of MCNS in Asian children.

Aims: To study the demographics, clinical course and outcome of children with nephrotic syndrome in Leicester/over a seven year period.

Methods: Data was obtained from case note review. Follow up data were available for at least one-year post diagnosis. Features at presentation, racial variations in steroid response, relapse rates and biopsy findings were studied.

Results: 57 children presented within this period. Male to female ratio 1.7:1 Asian: Caucasian, 1.2:1. Estimated incidence of NS in Leicester/Leicestershire Asians 13/100 000. Haematuria was present in 51% of children at presentation. Relapse rates were significantly higher in Asians v Caucasians 97% v 70% Chi square p=0.002

Conclusion: Our study confirms the higher prevalence of NS in Asians. All Asians were steroid responsive at first presentation but were significantly more likely to relapse than Caucasians. Caucasians had a higher incidence of steroid resistant NS at presentation.

PROGNOSTIC FACTORS AND OUTCOME IN CHILDHOOD MESANGIOCAPILLARY GLOMERULONEPHRITIS (MCGN)

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MCGN is uncommon in children, and reported to have poor long-term renal survival. We present results of a two centre retrospective analysis of 53 children with MCGN diagnosed on renal biopsy.

The children (21 females and 32 males) presented at a mean of 8.8 years (range 13 mo–15 yr). Classification by renal histology identified 31 type I, 14 type II, 2 type III and 6 undetermined. Presenting features included proteinuria 92%, haematuria 87% (microscopic 70%, macroscopic 17%), hypoparathyroidism 81%, hypocomplementaemia 74%, renal impairment (eGFR<80ml/min/m²) 72%, hypertension 49% and nephrotic syndrome 40%.
They were followed for a mean of 4.9 years (range 2 mo–17 yr). Mean renal survival time was estimated at 12.2 years [CI 9.7–14.6 yr]. Five year renal survival was 92% [CI 88–100%] and ten year renal survival 83% [CI 74–92%]. MCGN type, sex, age at presentation, hypertension and low complement at presentation were not predictive of outcome. Nephrotic syndrome was a significant adverse prognostic factor with mean renal survival of 8.9 years [CI 7.1–10.7 years] vs 13.6 years [CI 10.8–16.5 years] (p=0.047). The degree of proteinuria at presentation and at one year, however, had no significant association with renal survival. Renal impairment at one year was a poor prognostic factor for renal survival at five years (87% [CI 70–100%] vs 100% if normal eGFR at one year, p=0.037). Mean renal survival at follow-up was 13 years when eGFR was normal at one year vs 11.3 years [CI 8–14.7 years] when abnormal (p=0.065). The mean difference in eGFR at one year in those who progressed to ESRF compared to those who did not was 46 ml/min/1.73m² [CI 23-69, p<0.001).

We conclude that nephrotic syndrome at presentation and abnormal eGFR at one year predict poor renal outcome.

**G223**  **THE INFLUENCE OF TREATMENT UPON OUTCOME IN MESANGIOCAPILLARY GLOMERULONEPHRITIS PRESENTING IN CHILDHOOD**

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**Aims:** To determine the effect of treatment upon the treatment used and the influence of treatment upon outcome in children presenting with mesangiocapillary glomerulonephritis (MCGN).

**Methods:** Data were collected retrospectively from patient notes. Details related to steroid and 34 patients treated with cyclophosphamide and 4 plasma exchange.

**Results:** 53 patients were identified presenting between 1980 and 2000. The range of follow-up time was 1–17 years with 45% having data to 5 years. Treatment varied within and between 2 units. Evidence based recommendations to several endothelial markers and platelet markers were used to identify and quantify MPs.

**Results:** Plasma from patients with active vasculitis contained a 12.4 fold elevation of E-selectin positive endothelial MPs compared with patients in remission (p=0.001), a 5.7 fold elevation compared with controls (p=0.000) and a 7.9 fold elevation compared with disease controls (p=0.001). A similar result was obtained for MPs expressing the endothelial marker CD105. No difference was observed for MPs of platelet origin between the groups. 4/4 patients with active vasculitis demonstrated high levels of endothelial MPs which fell to normal following induction of remission (a 10.5 fold decrease for CD105 MPs and an 8.7 fold decrease for E-selectin MPs).

**Conclusion:** Endothelial MPs may provide a “window” to the activated endothelium, and these preliminary data suggest that they may be useful diagnostically and for the monitoring of disease activity in SV of childhood.

This work was supported by Charlotte Parkinson and John Herring and Friends research funds.

**G225**  **ENDOTHELIAL MICROPARTICLES: JUST BLOOD “DUST”, OR A “MUST” FOR THE DIAGNOSIS AND MONITORING OF DISEASE ACTIVITY IN CHILDHOOD VASCULITIES?**

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Introduction: Microparticles (MPs) are released from endothelial cells in response to a variety of injurious stimuli and recently have been shown to be increased in multiple sclerosis and antiphospholipid syndrome. Microparticles (MPs) are released from endothelial cells in response to a variety of injurious stimuli and recently have been shown to be increased in multiple sclerosis and antiphospholipid syndrome.

**Aims:** This study examined endothelial and platelet MPs profiles in children with systemic vasculitis (SV) to test the hypothesis that endothelial MPs may provide a tool for the diagnosis and monitoring of disease activity.

**Patients:** 12 children with active SV (9 with polyarteritis, 2 with Kawasaki disease, and 1 with hypersensitivity vasculitis); 8 children with inactive SV; 8 disease control children without SV; and a control group of 28 healthy subjects comprising 11 healthy children and 17 young adults were studied. Additionally, paired samples from 4 children with SV pre and post induction of remission were examined.

**Methods:** Plasma was centrifuged at 13000g for 60 minutes, and the pellet resuspended and prepared for flow cytometry. MPs were defined as particles less than 2 microns in diameter and with surface binding of annexin-V. Fluorescent conjugated monoclonal antibodies to several endothelial markers and platelet markers were used to identify and quantify MPs.

**Results:** Plasma from patients with active vasculitis contained a 12.4 fold elevation of E-selectin positive endothelial MPs compared with patients in remission (p=0.001), a 5.7 fold elevation compared with controls (p=0.000) and a 7.9 fold elevation compared with disease controls (p=0.001). A similar result was obtained for MPs expressing the endothelial marker CD105. No difference was observed for MPs of platelet origin between the groups. 4/4 patients with active vasculitis demonstrated high levels of endothelial MPs which fell to normal following induction of remission (a 10.5 fold decrease for CD105 MPs and an 8.7 fold decrease for E-selectin MPs).

**Conclusion:** Endothelial MPs may provide a “window” to the activated endothelium, and these preliminary data suggest that they may be useful diagnostically and for the monitoring of disease activity in SV of childhood.