HSC Business Services Organisation

Directorate of Legal Services

Practitioners in Law to the Health & Social Care Sector

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Your Ref:	Our Ref:	Date:
	HYP B04/01	15.02.12

Ms Bernie Conlon
Secretary to the Inquiry
Arthur House
41 Arthur Street
Belfast
BT1 4GB

Dear Madam,

RE: INQUIRY INTO HYPONATRAEMIA RELATED DEATHS

I refer to the above and previous correspondence herein.

I now enclose the following documentation for your attention: -

1) "Paediatric Prescriber" (July 1994);

2) "Emergency Paediatric Life Support".

I am instructed that Dr Donagh O'Neill used these documents for clinical guidance during his time as a Senior House Office in RBHSC in 1995. I understand that the document referred to at 2 above was obtained by Dr O'Neill at a course he attended in 1995.

Dr O'Neill provided this documentation to the Trust on 2nd February 2012.

Yours faithfully,

Joanna Bolton
Solicitor Consultant
Email: [redacted]
Tel: [redacted]

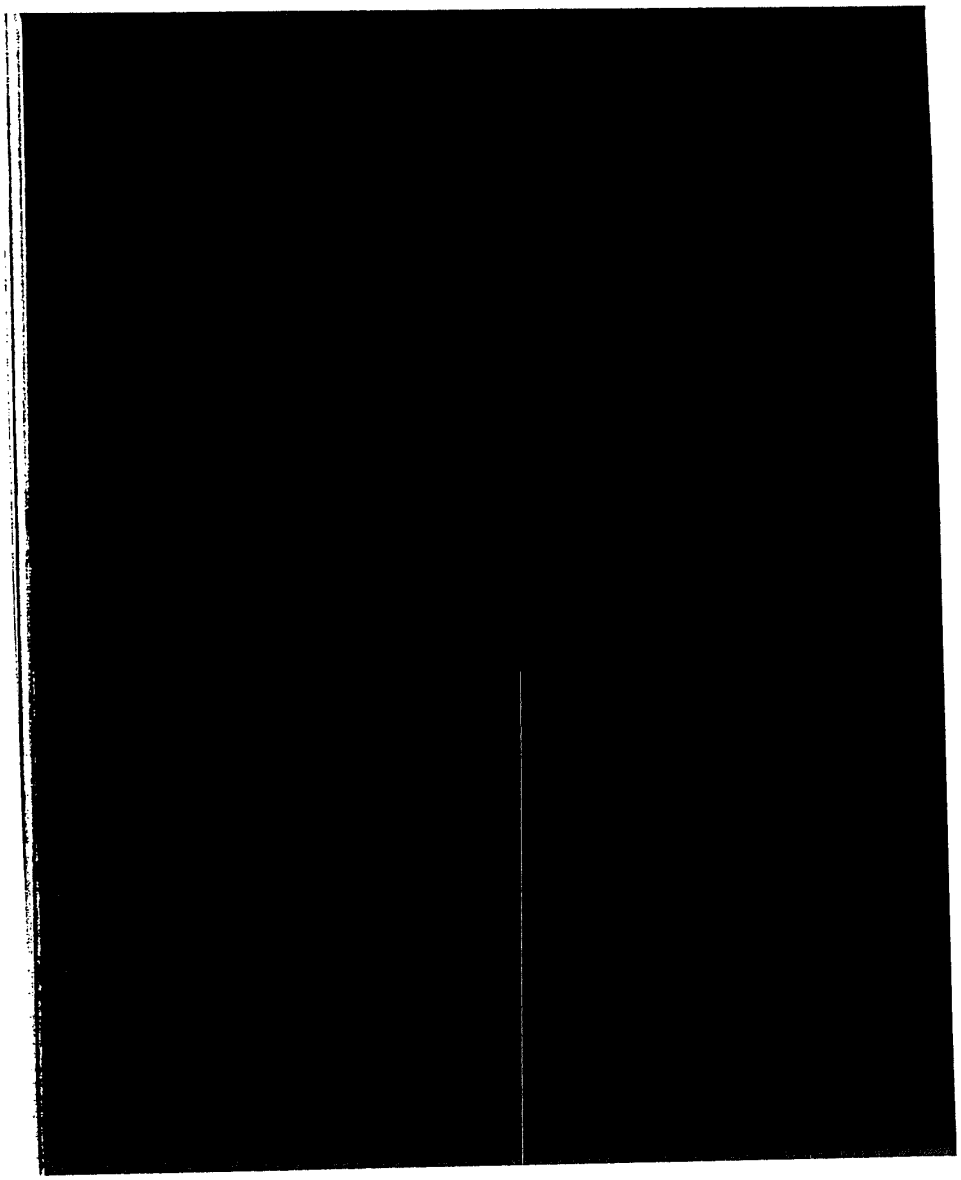
Paediatric Prescriber

ROYAL BELFAST HOSPITAL
FOR SICK CHILDREN

Paediatric Prescriber

Third Edition - July 1994

The ROYAL
HOSPITALS
Royal Belfast Hospital for Sick Children
180 Falls Road
Belfast BT12 6BE



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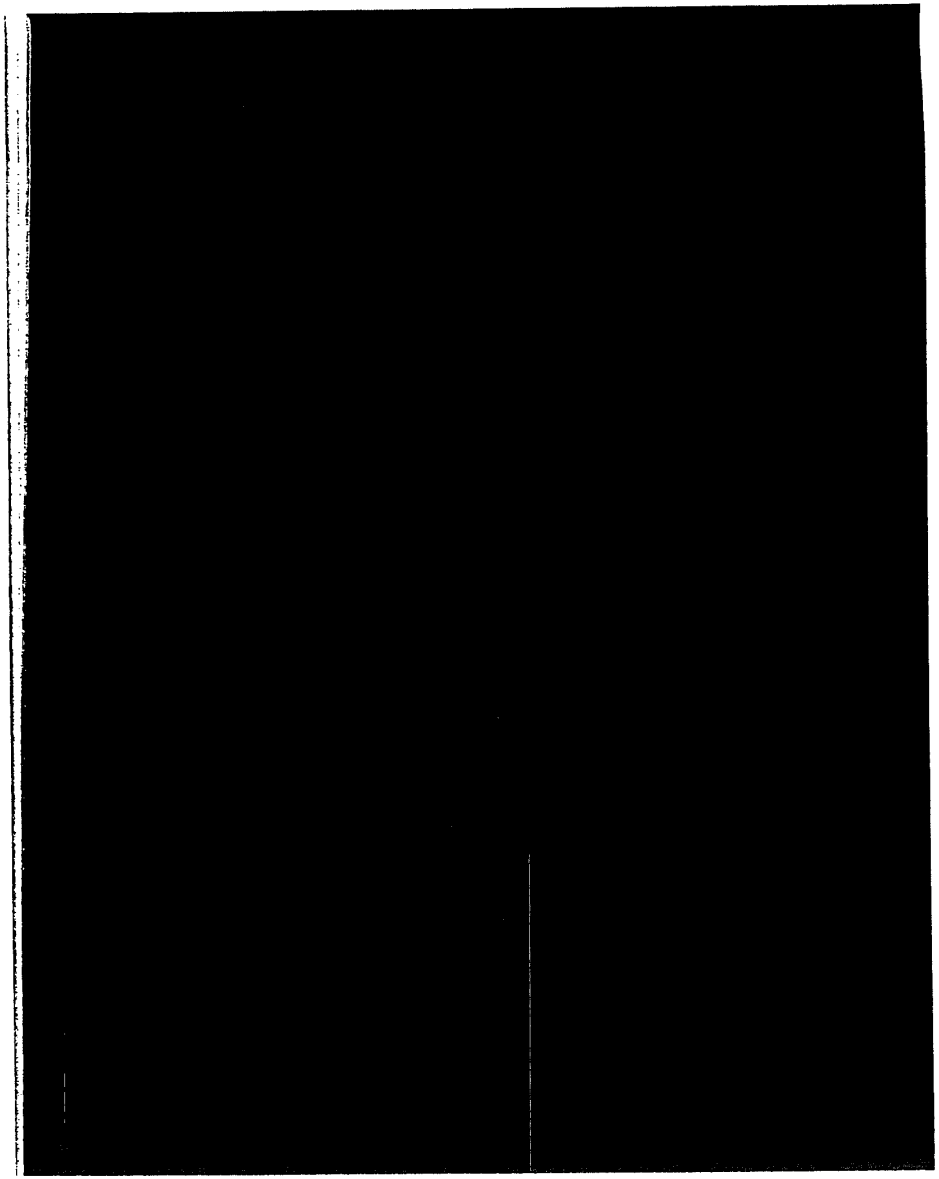

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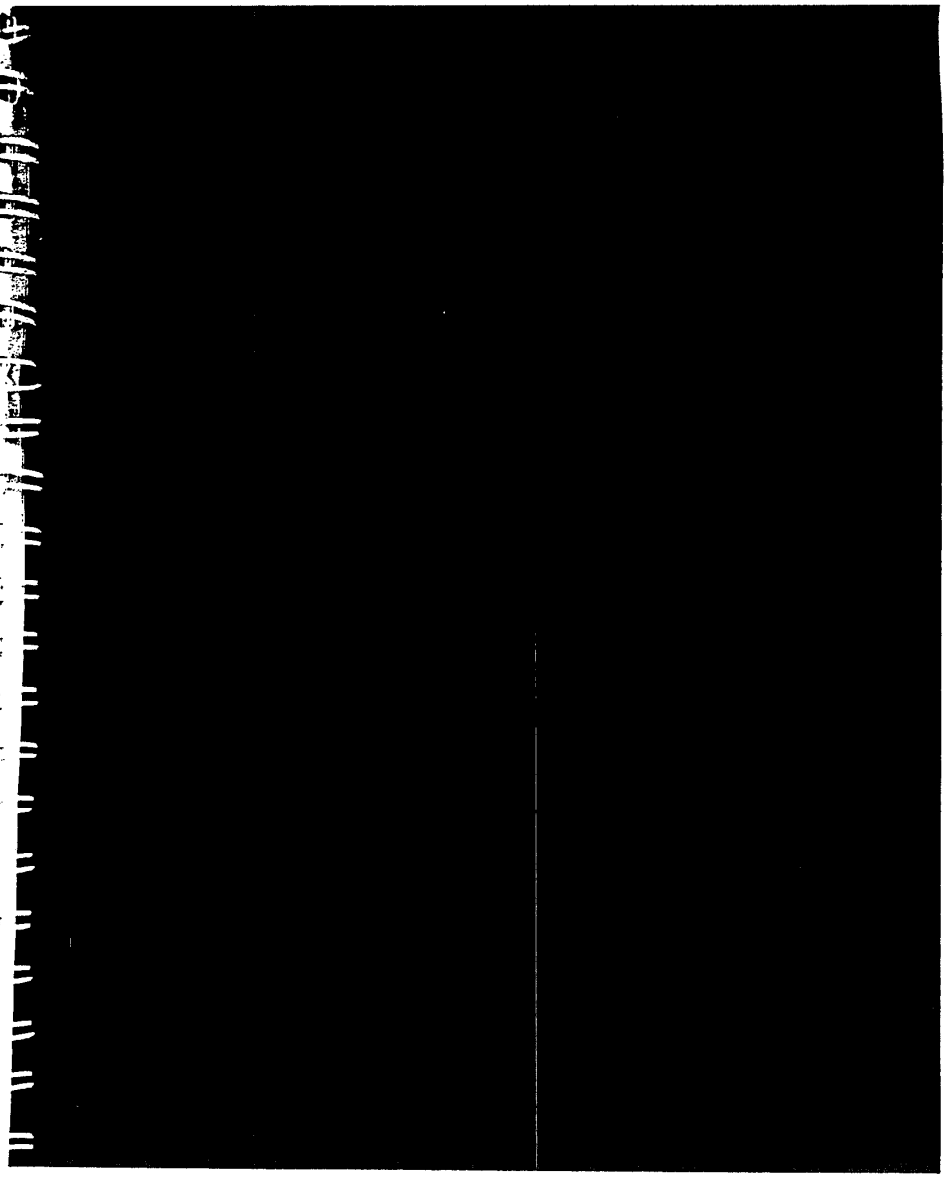

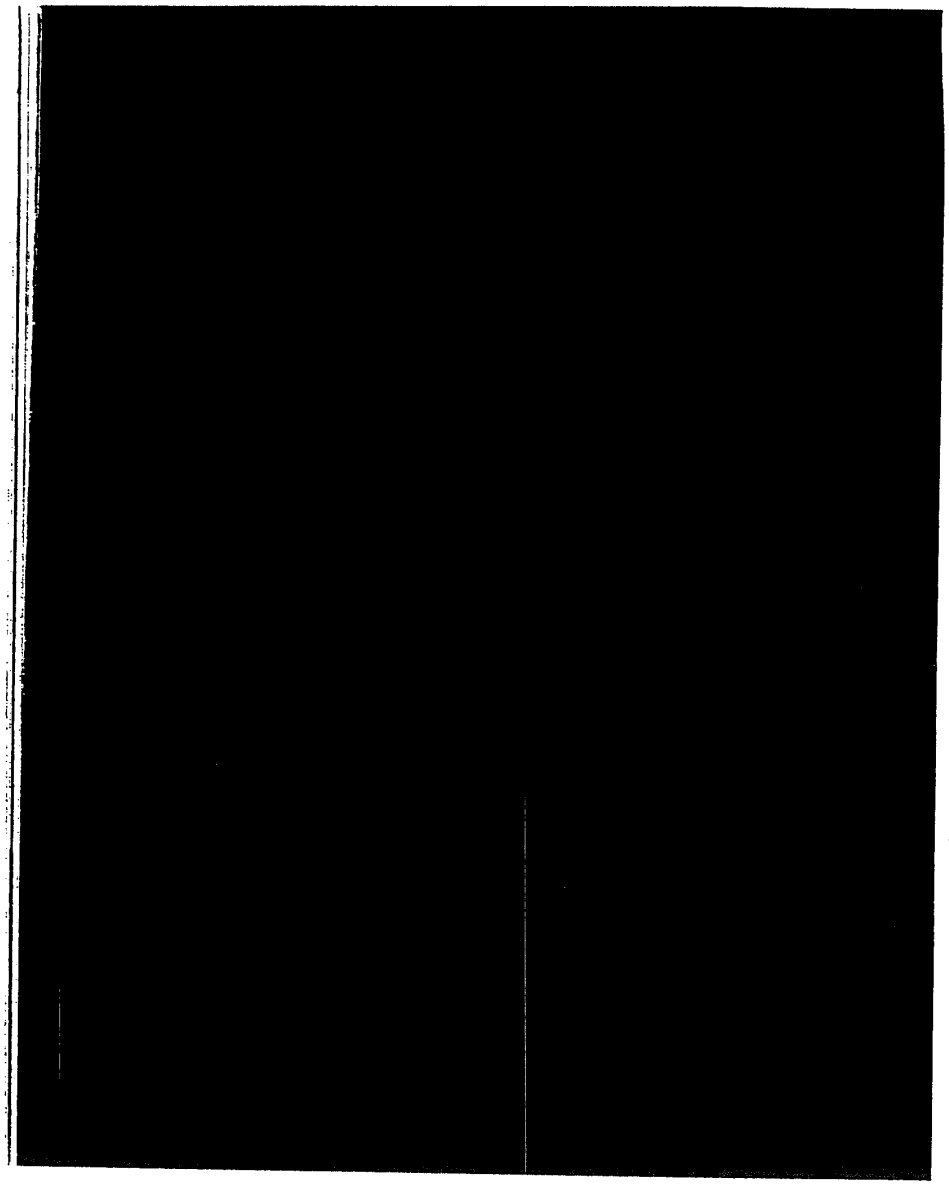

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HYPERKALAEMIA

Treatment is indicated if Serum K^+ > 6.4 mmol/l and/or ECG changes are present.
Patients with hyperkalaemia must have ECG monitoring.

DRUG	DOSE	NOTES
1. Salbutamol	(1) 4 mcg/kg/IV per dose in 10 ml N saline over 20 mins (2) < 25 kg 2.5 mg, > 25 kg 5 mg nebulised over 10 mins	may be repeated after 2 hours may be repeated after 2 hours
2. Calcium Gluconate	up to 0.5 ml/kg of a 10% solution IV over 2-4 mins	
3. Sodium Bicarbonate	1-2 mmol/kg IV over 5-10 mins	
4. Glucose and Insulin	glucose 0.5 g/kg with 0.3 U soluble insulin per g of glucose given IV over 2 hrs	the same dose given subsequently as an IV infusion over 4-6 hrs may be needed, monitor blood sugar and K^+ regularly
5. Calcium Resonium (Ion-exchange resin)	1 g/kg orally or rectally daily in divided doses	

Treatments 1-4 are temporising steps. Only the use of ion-exchange resins will remove net K^+ ion.
Dialysis is indicated when hyperkalaemia is likely to persist or increase.

ACIDOSIS

Acidosis is a feature of acute and chronic renal failure and renal tubular disorders, but other causes should be considered eg intestinal bicarbonate (HCO_3^-) loss or ketoacidosis.

TREATMENT

Sodium Bicarbonate
Total correction is made on the basis of the formula mmol HCO_3^- required = Base Excess x 0.3 x Wt (kg).
The degree of correction required is always a clinical decision.
1 ml of 8.4% sodium bicarbonate contains 1 mmol HCO_3^-.
The dose is given IV over 5-10 mins in acute situations. In chronic disease the same dose can be divided and given orally with meals.
In distal renal tubular acidosis bicarbonate 3-5 mmol/kg/day achieves full correction but in proximal renal tubular acidosis 10-15 mmol/kg/day may be required.

THAM
Attention to serum Na is important and where hypernatraemia is a problem THAM is an alternative to $NaHCO_3^-$. Dose - 0.5 ml/kg/min of a 7.2% injection

NB 1 ml 7% THAM = 1 mmol HCO_3^-

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MANAGEMENT OF CHILDHOOD NEPHROTIC SYNDROME

The majority of children have minimal change disease and unless features of nephritic syndrome are present (hypertension, haematuria, uraemia) a trial of steroids is recommended as follows:

1. Prednisolone 60 mg/m² body surface area/day for 4 weeks as a single daily morning dose

   Then providing proteinuria has cleared

2. Prednisolone 40 mg/m² body surface area/day on alternate days for 4 weeks

   Stop all treatment.

3. Parents test urine daily for protein

4. Relapse is ++ protein/day for 7 days at which stage prednisolone course is repeated as above

5. Unacceptable steroid side effects and/or frequent relapses indicate use of levamisole or cyclophosphamide

6. (a) ‡Levamisole (dose 2.5 mg/kg alternate days) to inhibit relapses (see table below)

Weight (kg)	Dose of Levamisole (mg)
10 - 14	25
15 - 24	50
25 - 34	75
35 - 44	100
45 - 54	125
55	150

or

(b) Cyclophosphamide 2.5-3 mg/kg/day for 8 weeks with regular WCC monitoring to detect leucopenia (WCC < 3,000). The drug should be discontinued until WCC recovers when the drug is recommenced at 2/3 dose.

HYPERCHOLESTEROLAEMIA IN CHRONIC NEPHROTIC SYNDROME

Dietry fat restriction is likely to be ineffective.
Simvastatin 5 mg once daily in the evening - starting dose may need increased to max 40 mg daily depending on response.

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DANGERS OF IMMUNOSUPPRESSIVE THERAPY

All patients receiving systemic corticosteroids or other immunosuppressant drugs eg cyclophosphamide, azathioprine and cyclosporin must be warned of the increased risk of infection.

A steroid treatment card containing patient advice should be given to such patients/parents.

Specific action is indicated if these patients are exposed to chicken pox while on treatment or within 3 months of stopping treatment.

Passive immunisation with Varicella-zoster immunoglobulin (VZIG) preferably within 3 days and not later than 10 days after exposure to chicken pox.

If lesions of chicken pox appear or the diagnosis is expected by the presence of pyrexia of unknown origin treatment with acyclovir should be commenced. It is usual to give at least 48 hrs IV therapy initially.

Corticosteroids should not be stopped and may need to be increased.

NB Live Polio Vaccine is contra-indicated in immunocompromised patients and in their siblings.

DIALYSIS

In acute renal failure dialysis is indicated for hyperkalaemia (K^+ > 6.4 mmol/l), fluid overload causing hypertension or left ventricular failure and symptomatic uraemia. Pre-dialysis measures include fluid restriction to previous hours urinary output plus insensible loss (10 ml/kg/day), protein, sodium and potassium restriction and the use of diuretics and antihypertensives, although β blockers are contra-indicated.

FLUID REMOVAL

Peritoneal dialysis removes fluid more efficiently depending on the osmolarity of the dialysis solution. This is determined by the dextrose concentration.

Intraneal fluids for acute peritoneal dialysis are 1.36%, 3.86% and 6.36% dextrose although the latter is rarely used in children.

Continuous Ambulatory Peritoneal Dialysis (CAPD) fluids are available in 1.36%, 2.27% and 3.86% dextrose solution; these are Dianeal fluids.

POTASSIUM

Potassium is removed quickly by rapid fluid exchanges ie short dwell times of 30 minutes or 1 hour. None of the dialysis fluids contain any potassium, therefore in the unusual situation where potassium is low it may be necessary to add 4 mmol/l of KCl. The fluid osmolarity does not influence K^+ removal.

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It is generally not so critical to rapidly remove urea and indeed too rapid removal may cause a disequilibrium syndrome. Where hyperkalaemia is not life-threatening cyles may be 2, 4 or 6 hourly. Larger volumes are likely to remove more urea.

MANAGEMENT OF PERITONITIS DURING DIALYSIS

A full protocol is available in Musgrave Ward, RBHSC. The first evidence may be cloudy effluent fluid even before abdominal or systemic symptoms.

The cloudy fluid and patient should be brought to hospital. The fluid is sent for WCC, direct microscopy and for bacteriological culture.

Initial treatment is to add vancomycin 500 mg/l and gentamicin 1.7 mg/kg to a bag of dialysis fluid of the volume appropriate to the child's size. The fluid is left dwelling for at least 4 hours.

Depending on the patients clinical condition they may return home to continue maintenance intraperitoneal doses of vancomycin 25 mg/l, gentamicin 5 mg/l ± heparin 1000 IU/L until culture results are available when antimicrobial therapy should be rationalised. Patients failing to respond or already on antibiotic therapy should have fluid culture for fungi as well as bacteria.

ANTIBIOTICS USED IN CAPD PERITONITIS

DRUG	INTRAPERITONEAL DOSES	
	Loading	Maintenance
Vancomycin	500 mg/l	25 mg/l
Gentamicin	1.7 mg/kg	5-8 mg/l
Penicillin G	1 x 10^6 u/l	50,000 u/l
Ampicillin	500 mg/l	50 mg/l
Cefotaxime	500 mg/l	250 mg/l
Cefuroxime	500 mg/l	250 mg/l
Amphotericin	5 mg/l	5 mg/l
Flucytosine	50 mg/l	50 mg/l

BLOCKAGE OF PD CANNULA

1. Instill 2000 units of heparin in 1litre PD fluid for 2-4 hours

2. Urokinase 10,000 units in 5-10 mls of fluid can be instilled into the PD cannula overnight. The volume should be adjusted to fill the PD line and cannula.

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OTHER DRUGS USED IN RENAL DISEASE

1. **Erythropoietin** - is used for the anaemia associated with erythropoietin deficiency in chronic renal failure (CRF). Other factors which contribute to the anaemia of CRF such as iron or folate deficiency should be corrected.
   Dose: Initially 25 units/kg twice weekly by subcutaneous injection increasing to 50 units/kg or more twice weekly until Hb >10 g.
   Initially blood pressure monitoring is necessary pre and post treatment.

2. **Calcium Carbonate** - is used as a phosphate binding agent according to the requirements of the patient to keep phosphate levels within the normal range.
   Available as tablets 420 mg or as a special suspension from pharmacy 600 mg/5 ml.

3. **Alfacalcidol** (One-alpha) - is given for osteodystrophy
   Dose 0.2 - 1 mcg/day to keep phosphate and calcium within normal limits.

RENAL TRANSPLANTATION

A full immunosuppressive protocol is held in Musgrave Ward, RBHSC. Initial immunosuppression is with azathioprine, prednisolone and cyclosporin, intravenously. Maintenance doses (see table below).

DRUG	DOSE	NOTES
Prednisolone	0.5 mg/kg/day	single oral morning dose gradually withdrawn when graft function is stable
Azathioprine	3 mg/kg/day	single oral dose WCC monitoring required
Cyclosporin	9 mg/kg/day	daily oral doses determined by blood level. Total daily dose may be given in 2-3 divided doses depending on individual pharmacokinetics. Regular monitoring of trough levels is necessary to achieve concentrations between 100-200 ng/ml

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