

**QUERIES FOR EXPERT NEPHROLOGIST:
DR. MALCOLM COULTHARD
ADAM STRAIN**

- (a) You state at page 27 of your first Report to the Inquiry, dated 4th August 2010, that because of the effect of the peritoneal dialysis, "*there is a huge safety margin which buffers the impact of variations in fluid status that would otherwise result in children becoming either dehydrated or fluid overloaded.*" In addition, peritoneal dialysis "*tends to correct any imbalances that may exist in the plasma sodium*".

Please find attached Adam's dialysis diary completed by his mother in the months prior to his death. An analysis of Adam's fluid loss produced by overnight peritoneal dialysis on 70 nights in July to October 1995 showed variation from about 138 ml to 642 ml; average 290 ml. On one occasion when only 7 cycles were used, loss was reduced to 82 ml.

- (i) State whether, given your comment that "*there is a huge safety margin which buffers the impact of variations in fluid status that would otherwise result in children becoming either dehydrated or fluid overloaded,*" it is possible to be in fluid deficit after overnight dialysis.
- (ii) State whether the shorter dialysis time than was normal for Adam, i.e. 8 cycles rather than his usual 15 cycles (Ref: 093-006-017), could have had any effect on the ability of his peritoneal dialysis to:
- (1) "*buffer the impact of variations in fluid status that would otherwise result in children becoming either dehydrated or fluid overloaded.*"
- (2) "*correct any imbalances that may exist in the plasma sodium*".
- (iii) In particular, when Adam's dialysis finished at 06:00, state:
- (1) Whether you consider Adam was in fluid deficit at that time, and if so, to what degree he was likely to have been in fluid deficit
- (2) What you consider his serum sodium concentration was likely to have been at that time.
- (b) Adam was prescribed with 50ml 20% mannitol intravenously by Dr. Mary O'Connor at 12:00 on 27th November 1995 on his transfer to PICU after surgery. He was prescribed a further 100ml of 20% mannitol by Dr. Meenakshi Bhat from 14:00 that day. He passed 115ml of urine between 12:00 and 13:00, 35ml between 13:00 and 14:00, 90ml between 14:00 and 15:00 and thereafter between 80ml and 140ml/hr of urine (a mean of 90ml/hr) between 15:00 and 23:00. Input was approximately 247ml between midday and 23:00. By 20:00, he

had produced 809ml of urine. Within 24 hours of arriving in PICU, he had produced 1,460ml of urine. (Ref: 057-018-027)

- (i) Please explain your view of the urine output capabilities of Adam's native kidneys having regard to the effect of the mannitol stimulus in PICU.
- (c) Please find attached a table showing the various phases in a paediatric renal transplant operation. Please modify it, as you consider appropriate, so that it reflects what you consider should have happened and identify under those phases the personnel who you consider should have been involved.
- (d) Please find attached further statements as follows:(You already have copies of these)
 - (i) Dr. Taylor (WS-008-3 dated 28th September 2011)
 - (ii) Dr. Taylor (WS-008-4 dated 28th September 2011)

Please provide your comments on the conduct of Dr Taylor in the light of your view as to what could and should have happened. If those statements provoke further amendment or comment to your previous reports, please outline any such amendments or comments.

- (e) Please find attached schedule of haematology/biochemistry results from 26th November 1995 to 28th November 1995. As you can see, the Inquiry has just been made aware that a blood specimen was taken on 26th November 1995 for biochemistry and haematology analysis (Ref: INQ-0450-11). The reports of this analysis are dated 27th November 1995. It is therefore assumed that this specimen was taken and analysed at some time between the initial blood results on admission and the start of surgery. The results do not appear in the clinical notes at any point, but were as follows:

Sodium 133
Potassium 4.3
Urea 16.0
Creatinine 676
Calcium 2.46
Phosphate 1.21
Haemoglobin 10.5
Erythrocytes 3.47
PCV 0.321
MCV 92.5
MCHC 32.7
MCH 30.3
Leucocytes 9.54
Platelets 336

EXPERTS

Please indicate if this report causes any re-evaluation of your previous conclusions, and if so, what re-evaluations are required.

SCHEDULE OF BLOOD RESULTS

26TH-28TH NOVEMBER 1995

Date/Time of Specimen	Date/Time of Report	Lab Ref No.	Inquiry Ref	Biochemistry report (mmol/l)	Haematology report	Coagulation Report
26/11/95 9:30pm	26/11/95 11.00pm		Ref: 058-035-144 (Clinical Notes) Ref: 057-007-008 (Transplant Form)	Sodium 139 Potassium 3.6 Urea 16.8 Creatinine 702 Calcium 2.54 Phosphate 1.21 Albumin 40	Haemoglobin 10.5 PCV 0.32 WBC 9.3 Platelets 336	Prothrombin 12.3 APTT 28.4 Thrombin CT 20.6 Clauss Fibro'gen 3.58 D-Dimer <250
26/11/95	27/11/95	23022 (Biochem) 02567 (Haem)	Ref: INQ-0450-11	Sodium 133 Potassium 4.3 Urea 16.0 Creatinine 676 Calcium 2.46 Phosphate 1.21	Haemoglobin 10.5 Erythrocytes 3.47 PCV 0.321 MCV 92.5 MCHC 32.7 MCH 30.3 Leucocytes 9.54 Platelets 336	
27/11/95 9:32am	27/11/95 9:32am	1713 (BGE)	Ref: 058-003-003 (Blood Gas Analyser Result)	Sodium 123 Total CO ₂ 25.8	Haemoglobin 6.1 Haematocrit 18% HCO ₃ 24.5 BE -0.3 SBC 24.7 sO ₂ c 98.6%	

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27/11/95 11.30am	27/11/95 1.00pm (Post-op)	00030 (Biochem)	Ref: 058-040-186 (Biochemistry Report) Ref: 057-007-008 (Transplant Form) Ref: 057-009-011 (ICU Daily Record Sheet) Ref: 058-035-138 (Clinical Notes) Ref: INQ-0450-11	Sodium 119 Potassium 4.8 Urea 11.5 Total Protein 41 Creatinine 477 Total CO ₂ 21.4	Haemoglobin 10.6 PCV 0.289 MCV 89.2 MCHC 36.7 MCH 32.7 WBC 8.7 Platelets 140 Red Cell Count 3.24
27/11/95 4.30pm	27/11/95	000057 (Biochem)	Ref: 057-007-008 (Transplant Form) Ref: 057-009-011 (ICU Daily Record Sheet) Ref: INQ-0450-11	Sodium 124 Potassium 5.0 Urea 12.4 Total Protein 51 Albumin 33.5 Creatinine 467	
27/11/95 10.00pm	28/11/95	23587 (Biochem) 028138 (Haem)	Ref: 057-007-008 (Transplant Form) Ref: 057-009-011 (ICU Daily Record Sheet) Re: 058-035-140 (Clinical Notes) Ref: INQ-0450-11	Sodium 120 Potassium 6.0 Urea 14.0 Glucose 7.6 Total Bilirubin 17 Alk. Phos 188 AST 44 Ser. Osmolality 285	Haemoglobin 14.4 Erythrocytes 4.52 PCV 0.404 MCV 89.4 MCHC 35.6 MCH 31.9 Leucocytes 9.75 Platelets 252
28/11/95 2.00am	28/11/95		Ref: 057-020-031 (ICU Daily Record Sheet)	Sodium 122	
28/11/95 4.00am	28/11/95	23616 (Biochem)	Ref: 057-007-008 (Transplant Form) Ref: 057-020-031 (ICU Daily Record Sheet) Ref: INQ-0450-11	Sodium 121 Potassium 6.4 Urea 15.0 Creatinine 537	

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28/11/95 8.00am	28/11/95	23624 (Biochem) 028178 (Haem)	Ref: 057-007-008 (Transplant Form) Ref: 057-020-031 (ICU Daily Record Sheet) Ref: INQ-0450-11	Sodium 125 Potassium 6.3 Urea 16.4 Creatinine 545	Haemoglobin 12.8 Erythrocytes 4.17 PCV 0.382 MCV 91.6 MCHC 33.5 MCH 30.7 Leucocytes 11.64 Platelets 240	
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TABLE FOR PAEDIATRIC RENAL TRANSPLANT
Showing the involvement of personnel in the various phases

Phase of the transplant process	Physicians/ ward staff/ ICU staff	Anaesthetists	ODA/ ODP/ MTO	Surgeons	Scrub nurse	Runner
1. Transplant option first mentioned to family						
2. Transplant surgery consent process started; risks/benefits explained						
3. Preoperative preparation on evening of admission; consent confirmed						
4. Preoperative preparation; fasting, i.v. fluids; blood tests; dialysis; ultra sound of neck re: CVP line						
5. Preparing theatre for start of surgery/check monitors & equipment						
6. Preparing donor kidney						
7. Patient arrival in operating theatre; i.v. inserted; anaesthesia induced						
8. Insertion epidural, arterial and CVP lines; x-ray of the CVP line and urethral catheter inserted						
9. Pre-transplant phase of surgery						
10. Vascular and ureteric anastomoses performed; ureteric and/or suprapubic catheter inserted						
11. Post-transplant phase of surgery including wound closure						
12. Post-surgery; anaesthesia stopped; drapes removed; drains connected						
13. Child transferred to ICU	=					
14. Communicating child's condition at end of surgery to parents						
15. Communicating child's death to parents						