ADAM STRAIN

Contents

Introduction

2.1 Adam Strain was born on 4th August 1991[1] and died on 28th November 1995 in the Royal Belfast Hospital for Sick Children (the 'Children's Hospital') having undergone renal transplant surgery.[2] During his short life he lived with his mother and maternal grandparents in Holywood, Co Down. His devoted mother Debra Slavin paid warm tribute to her son, recalling that "*no matter what life threw at him he faced it with a smile, he was such a happy little boy who endured more in his four short years than most people go through in a lifetime.*"

2.2 Adam was born with cystic dysplastic kidneys and a medical abnormality known as vesico-ureteric reflux causing him repeated and damaging urinary tract infection.[3] He endured five surgical operations to re-implant the ureter and another procedure to treat gastro-oesophageal reflux.[4] On a number of occasions he became critically ill and was admitted into Intensive Care. Feeding and nutrition were problematic and it became necessary to administer gastronomy feeds. Eventually he refused all feeds and took nothing by mouth.[5] His condition deteriorated and he suffered renal failure necessitating peritoneal dialysis. Adam produced urine of poor quality and was described as polyuric. His kidneys were unable to regulate the salt content of his urine very well and he had suffered acute hyponatraemia following surgery in November 1991. He was assessed a potential candidate for renal replacement (without which he would not have survived[6]) and was placed on the transplant register in July 1994.[7]

2.3 Throughout this period he was the patient of Professor Maurice Savage,[8] Consultant Nephrologist, who co-ordinated his "*care, prescribed and monitored his dialysis treatment with support from a dietician, psychologist,*

1 050-022-061
2 070-001-001
3 011-009-025
4 011-009-025
5 011-011-054 & 011-009-025
6 Professor Savage T-17-04-12 p.80 line 16
7 016-042-078
8 303-001-003

social worker, the renal nursing team, and of course his mother"[9] who actually performed the home dialysis.

Expert reports

2.4 The Inquiry, guided by its advisors, engaged the following experts to address specific issues:

(i) Dr Simon Haynes[10] (Consultant in Paediatric Cardiothoracic Anaesthesia and Intensive Care, Freeman Hospital, Newcastle-upon-Tyne) who provided reports on anaesthetic matters.[11]

(ii) Dr Malcolm Coulthard[12] (Honorary Consultant Paediatric Nephrologist, Royal Victoria Infirmary, Newcastle-upon-Tyne) who reported on the roles and responsibilities of the nephrologists involved in Adam's case and analysed the management of Adam's fluid balance and electrolytes.[13]

(iii) Professor John Forsythe[14] (Consultant Transplant Surgeon, the Royal Infirmary of Edinburgh and Honorary Professor, University of Edinburgh) and Mr Keith Rigg (Consultant Transplant Surgeon, Nottingham University Hospitals NHS Trust), who provided joint reports addressing aspects of paediatric renal transplant surgery.[15]

(iv) Professor Dr Peter Gross[16] (Professor of Medicine and Nephrology, Universitätsklinkum Carl Gustav Carus, Dresden) who provided reports on hyponatraemia and fluid management.[17]

(v) Ms Sally Ramsay[18] (former Director of Nursing and Family Services and Director of Nursing, Quality and Clinical Support at Great

9 WS-002-1 p.2
10 303-001-009
11 File 204
12 303-001-008
13 File 200
14 303-001-009
15 File 203
16 303-001-008
17 File 201
18 303-001-009

Ormond Street Hospital for Children, NHS Trust) who advised on nursing care at the Children's Hospital and in particular the care given Adam in November 1995.[19]

(vi) Professor Fenella Kirkham[20] (Professor of Paediatric Neurology, Institute of Child Health, London and Consultant Paediatric Neurologist, Southampton General Hospital) who provided neurological opinion as to the effect of fluid infusion upon the brain and the possible contribution, if any, of venous obstruction to Adam's cerebral oedema.[21]

(vii) Dr Waney Squier[22] (Consultant Neuropathologist and Clinical Lecturer, John Radcliffe Hospital, Oxford) who advised on the histological slides of brain tissue and the autopsy photographs of Adam's brain.[23]

(viii) Dr Caren Landes[24] (Consultant Paediatric Radiologist, Alder Hey Children's NHS Foundation Trust) who reported on the chest x-rays taken at 13:20 and 21:30 on 27th November 1995.[25]

(ix) Dr Philip Anslow[26] (Consultant Neuroradiologist, Radcliffe Infirmary, Oxford) who interpreted CT scans dated 7th July 1995 and 27th November 1995.[27]

(x) Professor Dr Dietz Rating (Consultant in Paediatric Neurology at the Children's Hospital at the University of Heidelberg) who reported on neurological issues arising in Adam's case.[28]

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19 File 202
20 303-001-009
21 File 208
22 303-001-009
23 File 206
24 303-001-009
25 File 207
26 303-001-009
27 206-005-109
28 File 240

(xi) Professor Aidan Mullan[29] (former Acting Chief Executive Officer and Director of Nursing and Clinical Governance, North Tees and Hartlepool NHS Trust) who provided his opinion on clinical governance issues.[30]

(xii) Mr Stephen Ramsden[31] (Chief Executive Officer of the Luton & Dunstable Hospital NHS Foundation Trust), who reported on hospital management and governance issues.[32]

(xiii) Professor Sebastian Lucas[33] (Department of Histopathology, St Thomas' Hospital London) who commented on Adam's autopsy and other aspects of coronial autopsy practice.[34]

(xiv) Mr Geoff Koffman[35] (Consultant Transplant Surgeon at Guy's and St Thomas's NHS Foundation Trust) who provided a report on the transplant surgery.[36]

2.5 The Inquiry also had the benefit of expert opinion commissioned by the Coroner and the Police Service of Northern Ireland ('PSNI') from:

(i) Professor Peter Jeremy Berry (Professor of Paediatric Pathology, University of Bristol) who reported to the Coroner on 23rd March 1996.[37]

(ii) Dr Edward Sumner (Consultant Paediatric Anaesthetist at Great Ormond Street Childrens' Hospital) who reported for the Coroner on 22nd January 1996[38] and the PSNI in September 2005.[39]

29 306-081-008
30 File 210
31 306-081-008
32 File 211
33 306-081-009
34 File 209
35 303-001-010
36 205-002-009
37 011-007-020
38 059-054-109
39 094-002-002

(iii) Mr Geoff Koffman (Consultant Surgeon at Guy's & St Thomas Hospital and Great Ormond Street Hospital, London) who provided a report to the PSNI on 5th July 2006.[40]

(iv) Dr John Alexander (Consultant Anaesthetist at Belfast City Hospital) who provided his expert opinion to the Coroner on 5th January 1996.[41]

Schedules compiled by the Inquiry

2.6 In an attempt to summarise the very considerable quantities of information received, the following schedules and charts were compiled:

(i) Chronology of events (clinical).[42]

(ii) List of persons - clinical.[43]

(iii) Schedule detailing experience of the anaesthetists and surgeons involved.[44]

(iv) Schedule of anaesthetic nurses and trainee anaesthetists involved.[45]

(v) Schedule detailing education and training of doctors involved.[46]

(vi) Table detailing education & training of nurses involved.[47]

(vii) Chronology of hospital management and governance.[48]

(viii) List of persons - governance.[49]

40 094-007-027
41 059-057-134
42 306-003-001
43 303-001-001
44 306-004-001
45 306-002-001
46 306-005-001
47 306-001-001
48 306-010-001
49 306-081-001

(ix) Chronology relating to draft recommendations submitted to the Coroner.[50]

(x) Summaries of Inquiry expert opinion as to contributory factors to death, given before and after Newcastle-upon-Tyne meeting of experts (March 2012).[51]

(xi) Glossary of Medical Terms[52]

2.7 All of the above, together with the reports of the Inquiry experts, have been published on the Inquiry website.

The Paediatric Transplant Service

2.8 Professor Savage was appointed Consultant Paediatrician and Nephrologist at the Children's Hospital in 1980.[53] He is a Fellow of both the Royal College of Physicians ('RCP') and the Royal College of Paediatrics and Child Health ('RCPCH'). He is now Professor Emeritus of the Medical Faculty of The Queens University of Belfast. For 15 years he was the only consultant paediatrician and nephrologist working in Northern Ireland but was always careful to maintain his broader professional contacts through the European Society of Paediatric Nephrology.[54]

2.9 A paediatric renal transplant programme was started in 1980 at the Belfast City Hospital ('BCH') which was, at that time, providing an established adult transplant service.[55] Professor Savage subsequently arranged for some paediatric renal transplants to be performed at the Children's Hospital as well. The first renal transplant involving a child younger than five years took place in the Children's Hospital in 1990.[56] Whilst the BCH (which was run by a different Trust to that of the Children's Hospital) was the recognised

50 306-122-001
51 306-016-130 & 306-017-146
52 303-002
53 306-018-004
54 306-018-001 *et seq*
55 Mayes C, Savage JM. Paediatric renal transplantation in Northern Ireland (1984-1998). *The Ulster Medical Journal*. 2000; 69(2):90-96.
56 300-021-033

Renal Transplant Centre for Northern Ireland, it appears that the Royal Group Hospitals Trust (the 'Trust') assumed control of those paediatric renal transplants performed in the Children's Hospital.[57]

2.10 Professor Savage became the moving force behind a gradual transfer of paediatric renal transplant surgery to the Children's Hospital. He explained that "*as we gradually developed the service... and as we gained the skill to dialyse and transplant smaller and smaller children, it became obvious that we should be taking those children into the environment of a children's hospital...*"[58]

2.11 Paediatric renal transplants were a comparatively recent innovation in the 1980s and 1990s. Between 1984 and 1993 there were 1,406 paediatric renal transplants in the UK[59] of which less than 10% involved children under the age of five years. In Northern Ireland an Ulster Medical Journal review of the years 1984-98 recorded 77 transplants for patients under 18 years.[60]

2.12 There was then comparative inexperience at both the BCH and the Children's Hospital in renal transplant surgery for children as young as Adam.[61] There was no dedicated paediatric renal transplant surgeon and there had been no paediatric transplants involving a living donor.[62] The provision of cadaveric transplants meant that the Paediatric Renal Transplant Service was reliant upon the availability of the necessary expertise and resources 'around the clock.' On occasion, the offer of a kidney had to be declined because of the lack of key nephrology or surgical staff or the want of a post-operative intensive care bed.[63]

2.13 The British Association for Paediatric Nephrology produced a working party report in March 1995 on 'The Provision of Services in the United Kingdom

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57 300-021-033
58 Professor Savage T-17-04-12 p.12 line 1
59 'Audit of United Kingdom Transplants Support Service Authority' 1995
60 Mayes C, Savage JM. Paediatric renal transplantation in Northern Ireland (1984-1998). *The Ulster Medical Journal*. 2000; 69(2):90-96.
61 Professor Savage T-17-04-12 p.15 line 12 *et seq*
62 Professor Forsythe T-03-05-12 p.173 line 5
63 Mayes C, Savage JM. Paediatric renal transplantation in Northern Ireland (1984-1998). *The Ulster Medical Journal*. 2000; 69(2):90-96.

for Children and Adolescents with Renal Disease'[64] which provides insight into paediatric nephrology and transplantation practice at that time. It recommended that to accumulate and maintain expertise, a population base of 3 million was the minimum necessary to sustain a comprehensive paediatric renal service although a population of 4 million was deemed optimal. However, it was recognised that some exceptions to this proposition were necessary and on geographical grounds Northern Ireland was recognised as a justifiable exception, notwithstanding a population in 1995 of approximately 1.6 million.[65]

2.14 Northern Ireland paediatric transplant statistics at that time reveal comparable outcomes to those recorded in other transplant centres in the UK.[66] Such is testimony to the work of Professor Savage and the anaesthetists, surgeons and nurses who collectively provided the paediatric renal transplant service. Accordingly, Dr Coulthard considered that the Children's Hospital did have the experience, infrastructure and case load to undertake paediatric renal transplants in 1995.[67] However, it was also clear that by 1995 the service required a second consultant to assist Professor Savage.

2.15 To that end Dr Mary O'Connor[68] was appointed as an additional Consultant Paediatric Nephrologist in the Children's Hospital on 1st November 1995.[69] She had trained under Professor Savage and advanced her specialism at the Southmead Hospital, Bristol.[70] She returned to Belfast a little less than four weeks before Adam was admitted.[71] Her appointment gave Professor Savage a consultant colleague with whom to share the workload and develop the service.

64 306-065-001
65 'Population and Migration Estimates Northern Ireland' (statistical report, NISRA 2011)
66 306-065-027 & Transcript 17-04-12 p.24 line 21
67 200-007-111
68 303-001-002
69 WS-014-1 p.2
70 306-030-001
71 WS-014-1 p.2

2.16 At that time Professor Savage prepared for transplant operations using a procedure protocol he had drawn up in 1990.[72] This was a brief document developed as a checklist to be attached to the medical records of the patient in order to better inform the doctors and nurses involved.[73] Dr O'Connor brought to Belfast a copy of the protocol used in Bristol which had been updated to 1995 and was a more detailed and comprehensive guide. It set out very clearly the steps to be taken from point of acceptance of a donor kidney for transplant through to the post-operative care to be delivered.[74] This updated protocol was to be adopted in Belfast but not before Adam's death.[75]

2.17 Likewise, developments emerging from other transplant centres had yet to be adopted in Belfast. An important innovation referred to by Professor Forsythe and Mr Rigg was the detailed consideration of a patient's case at the time of acceptance onto the transplant list.[76] This was to be undertaken by a multi-disciplinary team including nephrologists, surgeons and renal nurses in order to better identify patient-specific issues. These could range from assessments of urgency and general health to necessary preparatory procedures and surgical difficulties. A summary of these considerations might then attach to the medical record and thereby save the transplant team valuable time when an offer of a donor kidney was made. An inherent disadvantage of cadaveric transplant surgery is that the timing of the offer of the donor kidney is unpredictable. If a kidney is a reasonable match then the necessity to accept it places pressure on the transplant team to act quickly.[77] In such a context the advantage of preparatory work is clear.

2.18 I do not criticise Professor Savage's 1990 Protocol nor the absence of multi-disciplinary team input because these developments had not yet become

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72 WS-002-2 p.52
73 Professor Savage T-17-04-12 p.26 line 25
74 WS-014-2 p.31
75 WS-014-2 p.22
76 Mr Rigg T-03-05-12 p.167-68
77 Professor Forsythe T-03-05-12 p.172-73

standard by 1995. The existence of better practice elsewhere does not mean that the practices of the Children's Hospital were sub-standard.

July 1994 - November 1995

2.19 Professor Savage had lengthy discussions with Ms Slavin at the time Adam was placed on the transplant register.[78] She had volunteered donation of one of her own kidneys.[79] Professor Savage did not support this idea (although success rates were favourable) because Ms Slavin was a single mother and were complications to arise then her ability to care for Adam might be affected, and even if all went well she might take months to recuperate.[80] I cannot disagree with that approach.

2.20 Additionally, it has been suggested that the possibility of transfer to another transplant centre such as Great Ormond Street Hospital in London ought to have been discussed.[81] However, Professor Savage maintained that he did not then believe that it was beyond the ability of local paediatric anaesthetists and surgeons with relevant experience to treat Adam and "*as there was only one venue for transplant surgery in Northern Ireland for a child of Adam's age, I did not offer Ms Slavin any other venue for the transplant.*"[82] While this was not unreasonable it would have been better had he discussed it with her.[83]

2.21 Professor Savage described how Ms Slavin was given a copy of the 'Kidney Transplantation in Childhood… a Guide for Families'[84] which explained that "*Placement on the transplant waiting list follows discussion with the kidney specialist and transplant surgeon.*"[85] Ms Slavin could not remember this document nor indeed any discussion with a transplant surgeon. Professor Savage conceded that "*the transplant surgeon did not participate in these multi-disciplinary team meetings, except by special arrangement, as he*

78 WS-002-3 p.6
79 Professor Savage T-17-04-12 p.68-69
80 Professor Savage T-17-04-12 p.70
81 Professor Savage T-17-04-12 p.74 line 13
82 WS-002-3 p.11
83 Professor Savage T-17-04-12 p.74 line 15
84 City Hospital Nottingham - WS-002-3 p.124
85 WS-002-3 p.127

worked not on the Royal Victoria site but on the Belfast City site"[86] and accepted that "*it would have been better if one of the transplant surgeons had met Adam in advance... it's one of my regrets that we didn't have that arrangement.*"[87]

2.22 Professor Savage acknowledged that he did not make a record of what he said to Ms Slavin[88] at that time but described how the relevant "*information is repeated and drip fed over many months, not just by me, but by our renal nurse specialists...in the ward and by our social worker, by perhaps the psychologist...so that information is generally reiterated and built up.*"[89]

2.23 Photographs taken of Adam just a fortnight before his renal transplant show him looking happy and well. His mother described him, despite his renal problems, as being "*back on top form again. He was really well at that point.*"[90] Accordingly, it is clear that while Adam required a transplant he was not an emergency patient and, if a donor kidney was not a particularly good match, it did not have to be accepted. Of course, were a reasonable match to become available then it would have been a good time to proceed because he was comparatively well.

Offer of kidney, Sunday 26th November 1995

2.24 A donor kidney became available at the Glasgow Southern General Hospital at 01:42 on Sunday 26th November 1995 from a 16 year old who had enjoyed previous good health.[91] The kidney was formally offered to Professor Savage and it seems that he discussed it first with Ms Slavin, then Dr Robert Taylor,[92] the on-call Consultant Paediatric Anaesthetist at

86 WS-002-3 p.19-20 & Professor Savage T-17-04-12 p.83 line 11
87 Professor Savage T-17-04-12 p.89 line 9
88 WS-002-3 p.11
89 Professor Savage T-17-04-12 p.82 line 13
90 WS-001-1 p.2
91 306-007-043 & 059-006-012
92 303-001-003

the Children's Hospital,[93] and then Mr Patrick Keane,[94] a Consultant Urologist at BCH with transplant experience.

2.25 Dr Taylor was an experienced consultant who had previously anaesthetised Adam but had not previously acted as lead anaesthetist in a renal transplant. Nonetheless, he was a consultant paediatric anaesthetist in a regional centre and one who had responsibility for critically ill children in intensive care. He should therefore have had the necessary skills to manage Adam safely.[95]

2.26 Mr Keane had extensive experience of adult transplant surgery and had previously undertaken four paediatric transplants,[96] the most recent being only weeks before and on a three year old child.[97] He was therefore an appropriate surgeon in the local context.

2.27 Mr Keane required confirmation that the donor kidney was a reasonable match for Adam. Only limited information was available about donor size, age and anatomy. However, it was established that the tissue type match was an acceptable 50%[98] and that the kidney could be brought to Belfast within a cold ischaemic time ('CIT') of 24 hours.[99]

2.28 On that basis Professor Savage conferred with Ms Slavin and decided to accept the kidney.[100] Adam was admitted to the Children's Hospital at 20:00 on 26th November 1995[101] at which time the donor kidney had a CIT of about 19 hours. That was close to the 24 hour optimal CIT period within which to commence surgery.[102]

2.29 There was some disagreement between Professor Savage and Mr Keane as to the extent of the surgeon's involvement in the decision to accept the

93 093-006-016
94 303-001-002
95 204-004-147
96 094-013k-083
97 WS-006-2 p.12 & 301-047-414
98 059-006-012 & Professor Savage T-17-04-12 p.125 line 1
99 WS-002-3 p.8
100 WS-002-1 p.3
101 057-006-007
102 WS-002-3 p.8

kidney.[103] I do not however, attach much significance to the lack of clear recollection[104] of the events of that Sunday evening, given that much time has passed since and those discussions became relatively unimportant given what was to happen in the next 24 hours.

2.30 Nor do I intend to analyse the much debated issue of the viability of the donor kidney given its CIT. Mr Keane believed that it was acceptable and Mr Koffman agreed.[105] Professor Forsythe and Mr Rigg did not think that they themselves would have accepted the kidney, but recognised that other UK transplant surgeons might have.[106] It had been removed from its donor early on the morning of 26th November 1995 and offered to Professor Savage in the afternoon, perhaps having already been offered elsewhere.[107] It was flown to Belfast with an intention of transplantation between 01:00 and 02:00 on 27th November.[108] However, and for reasons which remain unclear, the operation was delayed until approximately 08:00[109] by which time the CIT was approximately 30 hours. It is impossible to be certain that the kidney was viable at the time of implantation but the likelihood is that it was. Whilst a CIT of 30 hours was certainly less than ideal and more than Professor Savage would have wanted, it was not the cause of Adam's death. In addition, Mr Keane considered that the kidney was a sufficiently good match to warrant transplant.[110] Expert evidence was received from those who agreed with this proposition and some who did not.[111] However, on the basis that it has not been strongly suggested that death was associated with transplantation of an unsuitable kidney, I do not intend to make any finding on this issue.

103 WS-006-3 p.23 & Professor Savage T-17-04-12 p.131 line 24
104 Professor Savage T-17-04-12 p.140 line 23
105 205-002-009
106 203-004-064
107 Professor Savage T-18-04-12 p.14 line 17
108 Professor Savage T-18-04-12 p.14
109 093-038-127 & WS-006-3 p.12
110 Mr Keane T-24-04-12 p.9 line 22
111 205-002-009 & Professor Forsythe T-04-05-12 p.16

Recruiting the transplant team

2.31 Professor Savage was responsible for bringing together the team for Adam's transplant and in particular for recruiting the anaesthetist and the surgeon.[112] Confirmation of operating theatre availability and a post-operative bed in the Paediatric Intensive Care Unit ('PICU') must also have been obtained.[113]

2.32 Discussions with Dr Taylor ensued and he "*agreed to provide general anaesthesia for Adam with an experienced senior registrar, Dr T Montague, experienced theatre nursing staff and the ready access to experienced surgeons, and nephrologists...*"[114]

2.33 Dr Terence Montague,[115] a Senior Registrar in anaesthesia, was recruited by Dr Taylor directly. He had no previous experience of paediatric renal transplants[116] and indeed "*from January 1995 until November 1995* [he] *had not actually anaesthetised any children, supervised or unsupervised.*"[117] It seems that his commitment was for a limited period only[118] because his 24 hour shift was to end at 09:00 on Monday 27th November.[119] His contribution was not therefore intended to be significant.

2.34 Over the course of the Sunday evening Professor Savage continued to assemble the transplant team.[120] The details cannot now be recalled,[121] but Mr Keane was to be assisted by Mr Stephen Brown,[122] a senior Consultant Paediatric Surgeon who had operated on Adam before. Whilst his experience and familiarity with Adam ought to have recommended him, Ms Slavin was not informed of his inclusion and has said that she had previously made it clear to Professor Savage that she "*did not want Mr*

112 WS-002-2 p.2-3
113 Professor Savage T-17-04-12 p.37 line 3
114 WS-008-1 p.4
115 303-001-002
116 WS-009-1 p.4
117 WS-009-1 p.4
118 WS-009-1 p.3
119 WS-009-1 p.3
120 WS-002-2 p.15
121 WS-002-2 p.15
122 303-001-001

Brown to be involved in any surgery with Adam because previous experience had left me with no faith in him."[123]

2.35 Professor Savage conceded that he knew of Ms Slavin's concerns, but it is not clear that he knew the full extent of them[124] and Mr Brown may not have been aware of these concerns at all. Indeed he said that had he known of her objection he would not have agreed to assist Mr Keane.[125] In any event the role of the assistant surgeon was limited and, given that Mr Brown had no previous transplant experience,[126] his role was always intended to be limited.

2.36 Even after Adam's admission and until such time as the compatibility tests with the donor kidney had been satisfactorily concluded, there remained some uncertainty as to whether the transplant would proceed.[127] Professor Savage believed that a positive compatibility result was received at some time after 01:00 hours on 27th November.[128] It was then that he obtained Ms Slavin's consent to surgery.[129]

Consent process

2.37 The consent of a parent on behalf of a child to something so serious as transplant surgery is an important matter. The fact that Adam was on the transplant register with his mother's approval did not mean that she would automatically consent to the surgery. Professor Savage had been closely involved with Adam's care and it must therefore have seemed natural that he would obtain her consent. He explained that in 1995 it was not uncommon for the "*initial consent to be obtained by someone other than the surgeon carrying out the procedure*"[130] and accordingly he sought the consent.[131] However, at that time Ms Slavin had neither spoken with the

123 WS-001-1 p.2
124 Professor Savage T-17-04-12 p.167 line 19
125 Mr Brown T-01-05-12 p.9 line 6-11
126 WS-007-1 p.3
127 WS-002-2 p.13
128 WS-002-2 p.13
129 WS-002-2 p.12
130 WS-002-3 p.27
131 WS-002-3 p.5

intended anaesthetist or surgeon nor, does she believe, discussed the risks involved,[132] recalling "*the only complication that was discussed with me was that of rejection.*"[133] Professor Savage remembered things differently, believing that he had discussed with her the process of the operation, the suitability of the donor kidney and the likelihood of a successful transplant.[134] He believed that she "*was aware of risks associated with surgery*"[135] excepting only the risk of fluid mismanagement because he did not foresee that as a likely problem.[136]

2.38 The signed consent form[137] is the sole record of their conversation and it contains scant detail. Likewise, Professor Savage was "*unable to identify in Adam's notes any recording of the discussions... in relation to obtaining consent, nor in relation to the detail of the transplant surgery.*"[138] He explained that it was "*not my habit at that time to make such detailed notes, but would now be standard practice. Modern consent forms now require the list of potential complications discussed to be recorded. This was not so in 1995.*"[139]

2.39 It was suggested that Mr Keane, as lead surgeon, should have obtained the consent.[140] It is clear that had Mr Keane or Dr Taylor spoken to Ms Slavin at that time they would then have had to examine Adam's medical history and condition. That alone would have constituted an important step in preparation for the surgery and justification in itself for their engagement in the consent process.

2.40 My concern relates not so much to the fact that Professor Savage obtained the consent but rather that he did so before Ms Slavin had spoken to the surgeon or learned of the identity and experience of the transplant team. The Trust had at that time formally acknowledged that "*patients and their*

132 WS-001-2 p.7-8
133 WS-001-2 p.5
134 WS-002-3 p.5 & Professor Savage T-18-04-12 p.33
135 Professor Savage T-18-04-12 p.48 line 5-15
136 Professor Savage T-18-04-12 p.48 line 17
137 058-039-185
138 WS-002-3 p.11
139 WS-002-3 p.11
140 203-002-032

families [are] *entitled to be told the name and status of each person involved in their care.*"[141] Mr Keane considered that he ought to have been part of the process of consent[142] and indeed Professor Savage had the opportunity to involve him.[143] In the circumstances, I consider that, on balance, it was inappropriate for Professor Savage to have proceeded to take the consent as he did.

2.41 Evidence revealed that a new and detailed consent form had been issued to the Trust by the Management Executive of the Department in October 1995 with the direction that it be introduced by 31st December 1995.[144] The fact that it was not used in relation to Adam five weeks before the deadline cannot be a matter for criticism. What is however a matter of much more particular concern, is that it took almost five years before it was eventually adopted in the Children's Hospital.[145]

Overnight

2.42 Adam was admitted at about 21:00 hours on 26th November 1995 to Musgrave Ward in the Children's Hospital.[146] He was seen by Dr Jacqueline Cartmill[147] who prescribed fluids and took blood samples as part of routine pre-operative hospital procedures.[148] A normal serum sodium concentration of 139mmol/L was recorded.[149]

2.43 Dr Coulthard gave it as his view that "*if you put all the evidence together as to what condition he was in when he went to theatre, everything else points to him being in a relatively good condition*."[150]

2.44 In the early hours of Monday morning Dr Montague was contacted because of difficulty in re-siting the cannula used for the infusion of intravenous ('IV')

141 WS-061-2 p.42: 1993/94 Annual Report Royal Hospitals - 'Charter for Patients and Clients'
142 Mr Keane T-24-04-12 p.135 line 5
143 Professor Savage T-18-04-12 p.32 line 4
144 305-002-004
145 210-003-022
146 057-013-017
147 303-001-002
148 058-035-144
149 058-035-144 as confirmed by Dr O'Connor T- 25-04-12 p.137 line 8
150 307-008-184

fluid.[151] Adam was upset and crying.[152] Dr Montague considered that if the paediatric doctors on the ward were unable to reinsert the cannula then it was unlikely that he could.[153] Accordingly, he telephoned Dr Taylor for advice and was told that Dr Taylor would attend to it in theatre. As Adam was distressed it was decided to leave it until then.[154]

Preparation for theatre

2.45 Dr Haynes explained that "*preoperative assessment is an integral part of the anaesthetist's duties... If not performed adequately, mistakes will inevitably be made.*"[155] Accordingly, and as part of that assessment, he would have expected Dr Taylor to have taken steps to ascertain the nature of Adam's renal pathology, and to have noted his normal fluid balance, fluid intake, insensible fluid losses and urine production.[156] Furthermore, in his view, Dr Taylor should have taken time to understand Adam's electrolyte requirements and the fact that he could not regulate urinary sodium losses and required sodium supplements to maintain normal sodium serum levels.[157] Dr Haynes emphasised that in particular Dr Taylor should have understood the "*central importance*"[158] of Adam's previous history of hyponatraemia[159] and its implications for fluid management.

2.46 Dr Taylor did not attend on the Sunday evening to assess Adam or meet Ms Slavin. He now recognises that this "*was a mistake.*"[160] Had he done so he would have had time to examine the extensive case record and note that inadequate sodium administration and/or water overload had previously resulted in hyponatraemia (including one instance when he had himself administered the anaesthetic in December 1991).[161] He could then

151 WS-009-1 p.3
152 093-037-117
153 Dr Montague T-11-05-12 p.27 line 17
154 WS-009-1 p.3
155 204-004-163
156 204-004-163
157 204-004-163
158 204-002-023
159 With serum sodium readings of below 120mmol/L
160 Dr Taylor T-19-04-12 p.121 line 14
161 200-002-047

have planned his IV fluid therapy in light of known risk and discussed any queries with Professor Savage.

2.47 Similarly, Mr Keane did not attend at the Children's Hospital on Sunday 26th November to meet with Adam and Ms Slavin.[162] He apologised for this omission but was unable to explain it.[163]

2.48 At one stage it had been hoped to operate at approximately 02:00 on Monday; it was then decided to start at 06:00[164] and finally surgery was rescheduled for 07:00.[165] Delay may have been justified in the hope of a well-rested transplant team but each delay increased the CIT. By 07:00 the donor kidney CIT was approximately 30 hours.

2.49 Professor Savage acted appropriately to ensure that Adam was in a suitable condition when he finally went to theatre. He had oversight of the overnight dialysis which was important because it affected both Adam's fluid balance and his serum sodium levels. Notwithstanding, there is no record of his fluid balance upon completion of the dialysis at 05:00[166] nor any indication of the urinary sodium concentration.[167] Whilst Professor Savage liaised with Dr Taylor and communicated relevant information including fluid status,[168] urine output,[169] and Adam's "*propensity to develop hyponatraemia,*"[170] Dr Taylor may not have been given the fullest of information[171] and may not have read Professor Savage's Renal Transplant Protocol. In any event, Dr Taylor did not make any record of what Professor Savage did tell him.[172]

2.50 Nonetheless, it remained Dr Taylor's responsibility to assess "*the preoperative condition of the patient, including liaison with referring*

162 Mr Keane T-24-04-12 p.108 line 23
163 Mr Keane T-24-04-12 p.107
164 058-035-133
165 058-035-133
166 Professor Savage T-17-04-12 p.100 line 2
167 Professor Savage T-17-04-12 p.56-57
168 Professor Savage T-18-04-12 p.94 line 2
169 WS-002-1 p.3
170 Professor Savage T-17-04-12 p.119 line 24
171 Dr Taylor T-20-04-12 p.28 line 15
172 Dr Taylor T-20-04-12 p.14 line 12

clinicians... ensuring that appropriate fluid management took place in the hours leading up to the operation that the appropriate investigations had taken place and the results were obtained and noted..."[173]

2.51 It was thus that Adam was submitted to a surgeon and a paediatric anaesthetist whose knowledge in respect of his case was what they had gathered on the telephone late the previous evening[174] and what they had learned when presented with his extensive medical record in theatre. That was less than adequate because Adam's medical history of multiple previous surgical interventions and occasional hyponatraemia made the surgery and anaesthetic more demanding and the nature of his renal condition meant that particular attention had to be paid to the detail of fluid and electrolyte replacement.[175] Dr Haynes suggested that the lead up to the transplant surgery meant that Dr Taylor "*put himself... on the back foot.*"[176] I agree and believe that both Dr Taylor and Mr Keane were disadvantaged by inadequate preparation.

The operation

2.52 Adam entered the operating theatre at 07:00 hours.[177] Ms Slavin accompanied him. He was crying.[178] Professor Savage met with Dr Taylor in theatre[179] and "*having checked that he felt he had all the information he needed*" withdrew "*and let him get on with the essential things that he had to do...*"[180] Dr Taylor then anaesthetised Adam in the presence of his mother.[181] No criticism is made of the induction of anaesthesia.

2.53 Throughout the transplant Dr Taylor was to take the lead in the "*monitoring of vital signs and fluid/blood management.*"[182] His task was to assess ECG, blood pressure, temperature, heart rate and central venous pressure

173 204-002-026
174 Dr Taylor T-19-04-12 p.141 line 18
175 204-002-021
176 Dr Haynes T-02-05-12 p.61 line 5
177 057-014-019
178 058-003-057
179 Professor Savage T-18-04-12 p.116 line 18
180 Professor Savage T-18-04-12 p.132 line 6-8
181 011-014-096
182 WS-008-2 p.2

('CVP')[183] in order to gauge the depth of anaesthesia and the stability of respiratory and cardiovascular systems. He was to make periodic checks on blood loss and urine output in order to manage fluids and perform blood gas tests for serum sodium concentration. In addition, he was to monitor the colour of blood, other losses and the general appearance of the veins so as to assess fluid replacement needs.[184] Dr Taylor claimed to have made pre-operative fluid calculations to inform his fluid management in respect of deficit, maintenance and blood loss.

2.54 Shortly after the anaesthetic was administered, arterial access was obtained in order to monitor the arterial blood pressure[185] and permit an assessment of electrolytes. Professor Savage recalled that he "*made it clear to Dr Taylor that it was important that his sodium and electrolytes were checked...*"[186] However, and significantly, this was not done. Mr Keane was unable to "*explain why Adam's electrolytes were not checked when the central line was inserted. He should have had his electrolytes checked once the central or arterial lines were inserted.*"[187] Dr Taylor provided multiple explanations as to why he did not take a blood sample at that stage. However he has since acknowledged that he "*omitted doing blood samples as requested by Professor Savage*"[188] and should have sent "*a blood sample for electrolyte analysis... before starting the operation. I should also have sent other samples as necessary and used those results to adjust the rate and type of the intravenous fluids.*"[189] Given Adam's history of electrolyte abnormality that was an important failure because it risked uncontrolled electrolyte disturbance during surgery.

2.55 In addition to the failure to measure Adam's electrolytes after the induction of anaesthesia there was a failure to measure his urinary output during surgery. This was of particular importance for Adam because his urine

183 WS-008-2 p.2
184 WS-008-2 p.2
185 011-030-155
186 WS-002-3 p.14
187 WS-006-2 p.13
188 Dr Taylor T-19-04-12 p.74 line 7
189 WS-008-6 p.3

production was abnormal. Dr Haynes advised that "*Adam produced significant volumes of urine and his urinary output should have been monitored when possible during the operation and a urinary catheter should have been inserted following induction of anaesthesia prior to commencing surgery.*"[190] This was so that Dr Taylor might know the rate of fluid lost as urine in order to calculate the correct rate for the IV fluid infusion.

2.56 However, Adam's urinary output remained unmeasured until a catheter was inserted by Mr Keane at about 10:30.[191] Mr Keane indicated that whilst there was no contra-indication to inserting a urinary catheter immediately after Adam was anaesthetised[192] he nonetheless felt that "*Adam's urethra was very small and in my opinion urethral catheterisation was unnecessary. I wanted the bladder full.*"[193] However, it was the anaesthetist's responsibility to manage fluid balance and that entailed monitoring the output of urine. Dr Taylor should have insisted that a urinary catheter be inserted for that purpose. He would then have been able to gauge the quantity of urine spent and review and adjust the volume of fluids Adam was receiving. Dr Taylor eventually conceded that this was "*another element of care that... left me unable to reassess and review my fluid administration during Adam's procedure.*"[194]

Fluids administered

2.57 Dr Taylor commenced an infusion of Solution No.18[195] in accordance with his own calculation of fluid requirements[196] predicated upon a maintenance rate of 200mls per hour.[197] He then administered 750mls of Solution No. 18 in the first hour of surgery[198] in order to restore perceived deficit, provide maintenance and replace insensible losses.[199] In total, he gave Adam

190 204-002-031
191 WS-006-3 p.8
192 WS-006-2 p.6
193 WS-006-3 p.9
194 Dr Taylor T-20-04-12 p.51 line 10
195 303-002-042 An IV solution containing 30mmol/litre of sodium and chloride or 1/5 the concentration occurring in natural body fluids such as blood.
196 058-003-005
197 WS-008-2 p.31
198 WS-008-5 p.5 & 058-003-005
199 011-014-101

1,500mls of Solution No.18 during surgery. Because Solution No. 18 contains one fifth of the sodium content of normal saline this equated to 300mls of normal saline and 1,200mls of "*free water.*"[200] Other solutions given included 1,000mls of human plasma and 500mls of packed blood cells each containing similar levels of sodium to blood.[201]

2.58 In justifying his fluid management Dr Taylor insisted that Adam would pass 200mls of dilute urine per hour[202] and that because of kidney disease this was a "*minimum loss*" which may indeed have been "*unlimited*"[203] rendering Adam like a hole in a bucket which he was obliged to fill.[204] Consequently he argued that Adam would not retain "*free water*" and could not therefore suffer dilutional hyponatraemia.[205]

2.59 Dr Coulthard's expert opinion categorised this argument as "*without foundation*"[206] and estimated urinary output as significantly less than 200mls. Indeed he was of the opinion that Adam's urinary output was fixed,[207] that the kidneys were working "*flat out*"[208] and that if Adam were given more fluids than he could excrete, the surplus would be retained in the body.[209]

2.60 Dr Haynes said that he was amazed at the suggestion that Adam might have had an hourly urine output of 200mls which would amount to 4.8 litres per day. He was surprised that the "*simple arithmetic*" did not strike Dr Taylor as "*being extremely unusual and well beyond what would normally be expected, certainly for a 20-kilogram boy.*"[210]

2.61 Only belatedly did Dr Taylor reconsider his position and acknowledge that Adam did in fact have a fixed urine output of 70-80mls per hour. He then

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200 201-006-176
201 058-003-005
202 WS-008-2 p.6 & WS-008-3 p.12
203 093-038-242
204 093-038-195
205 WS-008-2 p.39
206 200-002-056
207 Dr Coulthard T-08-05-12 p.168 line 22
208 200-009-151
209 200-002-045
210 Dr Haynes T-02-05-12 p.128

conceded that his arguments about fluid requirements were wrong, that he "*wrongly estimated or calculated his urinary losses*"[211] and that he administered Solution No.18 to Adam "*at a rate in excess of his ability to excrete it, particularly in the first hour of anaesthesia.*"[212]

2.62 Such sodium as was lost in surgery through bleeding could not have been replaced by the low sodium Solution No.18. Whilst Solution No.18 may have served as a partial maintenance fluid it could never have been a sodium replacement fluid given the levels of sodium lost.

2.63 Dr Haynes considered that hyponatraemia was the inevitable consequence of administering the low sodium Solution No. 18 in significant volume.[213]

2.64 In addition, expert evidence agreed that not only was the quantity of low sodium fluids administered excessive but the rate was "*dramatically fast.*"[214] This led to an acute fall in Adam's serum sodium levels and as Dr Coulthard explained the "*absolutely critical element of management is about how quickly or how slowly you allow the sodium to fall. Letting the sodium fall quickly leads to cerebral oedema and brain death.*"[215] In the opinion of Mr Keane, Adam was given "*no chance.*"[216]

2.65 When, at the end of surgery, Dr Taylor reversed the anaesthesia and removed the sterile towels from Adam's face - Adam did not wake, he did not breathe. His pupils were fixed and dilated[217] and his face was markedly swollen.[218]

2.66 Adam's death was avoidable.

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211 Dr Taylor T-19-04-12 p.26 line 1
212 WS-008-6 p.3
213 204-002-035
214 200-002-054
215 307-007-102
216 Mr Keane T-23-04-12 p.29 line 24
217 058-035-135
218 WS-008-2 p.45

Other fluid management issues

2.67 From the outset, Dr Taylor persistently raised misleading assertion and argument in defence of his fluid management, namely:

Fluid Deficit

2.68 Dr Taylor asserted that Adam was in fluid deficit before surgery and accordingly there was "*an urgency to replace this deficit so that Adam did not become dehydrated...*"[219] However, expert opinion agreed that Adam was in little or no fluid deficit and was not dehydrated when he arrived in theatre.[220] Not only was Dr Taylor's assumption that Adam required fluid to correct a deficit wrong, but the nature of the fluid he chose to correct it was also wrong.[221]

Solution No. 18

2.69 Dr Taylor claimed that Solution No.18 was the fluid recommended by the British National Formulary[222] for the treatment of dehydration, however, as Dr Coulthard pointed out, the actual recommendation was for normal saline[223] and the use of Solution No. 18 to "*replace his deficit*" was quite "*simply wrong.*"[224] Further, Dr Taylor contended in his evidence that Solution No.18 was more widely used in 1995 than it is now. That proposition was accepted by Dr Haynes and others in their evidence but as Dr Haynes emphasised basic training warned against the inappropriate infusion of low sodium fluids.[225]

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219 WS-008-1 p.3
220 Dr Coulthard T-08-05-12 p.169 line 17
221 200-007-126
222 093-038-132
223 200-005-094
224 200-002-054
225 Dr Haynes T-02-05-12 p.24 line12

Blood Loss

2.70 Dr Taylor maintained that he administered fluids to replace what he categorised as a "*substantial ongoing blood loss*"[226] which he estimated to be as much as 1,411mls.[227] However, Mr Keane recalled "*no major bleeding in Adam's case*"[228] and Dr Haynes, having examined the evidence, ventured an informed guess of 800-1,000mls.[229] Dr Taylor conceded in evidence that it was "*possible that there was an error on my measurement and otherwise of the blood loss.*"[230]

Monitoring the CVP

2.71 CVP readings were displayed throughout surgery and were an important guide for the safe management of Adam's fluid balance.[231] Notwithstanding that the readings were high indicating fluid overload, Dr Taylor ignored them and insisted that a mis-siting of the CVP catheter had rendered the read-out inflated and unreliable.[232] Rather than remedy the problem or disregard the reading altogether, he chose to silence the alarm[233] and reinterpret the unreliable figures.[234] Dr Coulthard was simply unable to "*accept that it was good practice to assume that a monitoring system is not working, and to make clinical decisions that appear to conflict with its read-outs.*"[235] Dr Haynes pointed out that if the CVP readings were wrong then that was all the more reason not to use them as the basis for reinterpretation.[236] If Dr Taylor did not believe the reading he should have agreed with Mr Keane at the outset to rectify the problem.[237] It is unlikely that time thus spent would have had "*significant negative impact.*"[238] Mr Keane said that if the reading

226 011-014-096
227 WS-008-1 p.7
228 WS-006-2 p.14
229 204-006-337
230 Dr Taylor T-20-04-12 p.108 line 10
231 058-008-022
232 WS-008-2 p.12
233 Dr Taylor T-06-09-12 p.137 line 10
234 Dr Taylor T-19-04-12 p.76 line 15
235 200-002-055
236 204-013-395
237 204-004-155
238 203-004-076

could not be relied on then "*the whole thing has to stop.*"[239] Dr Coulthard considered the correct approach would have been to delay surgery until a satisfactory CVP reading was available. Somehow and in the event Dr Taylor reassured the surgeons and allowed his lack of concern to reassure Dr O'Connor.[240] Dr Taylor now recognises that he "*shouldn't have relied on that line at all*"[241] and ought to have considered ending the transplant because "*this potentially should have been a show-stopper.*"[242] Had he taken the time to resolve this issue he would then have had a reliable measure of vascular fullness and would have known that Adam did not need extra fluid.

Blood gas machine sodium level assessment

2.72 Dr Taylor failed to make an early assessment of Adam's sodium levels during surgery. After some time he did despatch a blood sample for analysis by blood gas machine and received the result at 09:32. It recorded a sodium value of 123mmol/L.[243] Not only was this reading very low but it revealed a significant drop from normal in only a matter of hours. Dr Taylor ignored this result because he said that it was his understanding that the blood gas machine did not always provide reliable results for serum electrolytes.[244] However, Dr Coulthard has since calculated that the "*plasma sodium reading of 123mmol/L as measured is likely to be correct*"[245] and should in any event should have prompted an urgent blood sodium assessment from the hospital laboratory to inform fluid management.[246] Dr Haynes agreed, observing that even if blood gas testing is not very accurate it does alert the anaesthetist to potentially dangerous changes in sodium levels more quickly than laboratory testing and "*allows corrective action*"[247] In Adam's case it may also have allowed

239 Mr Keane T-26-04-12 p.95 line 6
240 Dr O'Connor T-25-04-12 p.129 line 14
241 Dr Taylor T-19-04-12 p.82 line 1
242 Dr Taylor T-19-04-12 p.82 line 1
243 058-003-003
244 Dr Taylor T-20-04-12 p.103
245 200-002-053
246 200-004-085
247 204-002-025

an opportunity to minimise his cerebral oedema.[248] That was a missed opportunity. Dr Taylor belatedly acknowledged that he should have sent "*a confirmatory sample to the lab. I did not do that and I regret that I did not do that*"[249] and further that he "*should have done regular blood samples to adjust my fluids... and I also failed to do that.*"[250]

Dr Taylor

2.73 In addition to proceeding without understanding Adam's sodium levels or urine output and with a profound misunderstanding as to his fluid management, Dr Taylor was wrong to ignore the danger signals given by the CVP and the blood gas sodium analysis. Furthermore, it was wrong and misleading of him to insist upon justifying his clinical performance in the way he did and false to assure the Coroner, Adam's mother and others that his management of Adam was "*caring, appropriate, expert and representative of the highest quality and intensity of care that I can provide.*"[251]

2.74 Dr Taylor steadfastly maintained his baseless justifications for many years and only changed his position in late 2011 after he was provided with the Inquiry expert reports. In early 2012, and having received legal advice which was independent of the Trust for the first time, he made a written statement admitting error.[252] In April 2012, he acknowledged in oral evidence much that he had previously denied. He said:

"*...I accept that it was my miscalculation of urine output that led me to give the inappropriate amount of fluids that led to a drop in his sodium called dilutional hyponatraemia which led to cerebral oedema.*"[253]

248 204-002-033
249 Dr Taylor T-20-04-12 p.105 line 9-10
250 Dr Taylor T-19-04-12 p.74 line 4
251 011-002-009
252 WS-008-6
253 Dr Taylor T-19-04-12 p.40 line 5

2.75 However, Dr Taylor would not accept that Adam's death occurred in consequence of the dilutional hyponatraemia.[254] He relied on the evidence of Professor Kirkham that it could not have been so. For the reasons set out in the section of this report entitled "*Fatal cerebral oedema: alternative causes and contributory factors*" (Para 2.177) I do not accept Professor Kirkham's analysis.

2.76 Dr Taylor's management of Adam's fluids before and during the surgery of 27th November 1995 defies understanding. In his oral evidence, Dr Taylor accepted that he could not understand it either, nor could he explain or justify what he did or how he subsequently defended it,[255] except to say that he found it "*difficult to cope with* [his] *thought processes, going over such a devastating event. I think that has permitted me to say things that are clearly irrational, wrong, disturbed, confused, and I offer that as an explanation for making such really outrageous statements.*"[256]

2.77 I heard a lot of evidence from Dr Taylor but do not believe I was told the full story. Dr Taylor offered no insight into why he did what he did during Adam's transplant. Ms Slavin wanted to know why he had made so many mistakes.[257] Inquiry counsel questioned how, given his experience and expertise, he could make such fundamental errors.[258] Yet despite, or perhaps because, he provided so much evidence, Dr Taylor managed to keep his own thought processes obscure. Even though he now accepts what he did, he makes no attempt to explain it.

2.78 Dr Taylor made fatal errors in his treatment of Adam. I accept that this was most probably uncharacteristic[259] and do not query his usual competence. However, and over and above the hurt inflicted on Adam's family by death, Dr Taylor caused significant additional pain by acting as he did to avoid his own responsibility.

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254 Dr Taylor T-20-04-12 p.189 line 13
255 Dr Taylor T-19-04-12 p.56 line 24
256 Dr Taylor T-19-04-12 p.57 line 25
257 Dr Taylor T-20-04-12 p.154 line 10
258 Dr Taylor T-19-04-12 p.67 line 3
259 Dr Taylor T-19-04-12 p.58 line 23

Other issues

Assistant anaesthetist

2.79 A question arose as to when Dr Montague left the operating theatre and whether he was replaced. This became an issue of potential concern because Dr Taylor accepted that he had himself left the theatre from time to time[260] and accordingly, if he had been without an assistant anaesthetist at any such time, responsibility for monitoring Adam would have fallen to the anaesthetic nurse who cannot now be identified.[261]

2.80 Considerable efforts were made to establish the facts. Dr Montague probably left at some point between 09:00 and 09:30.[262] He is not to be criticised for leaving because he would not have done so without Dr Taylor's approval and there is no suggestion that that was withheld.[263] The evidence does not suggest that Dr Montague was replaced. No trace of replacement has been found.

2.81 The necessity for an anaesthetist to replace Dr Montague is not to be assumed. It depended in part upon whether there was a nurse actually present and assisting Dr Taylor with the anaesthetic. The evidence agreed that there would have been three nurses in theatre, one of whom would have helped Dr Taylor. Whilst none could remember who was there, all agreed that the appropriate number of nurses was present. I therefore accept, on the evidence, that there was such a nurse.[264] Her role was a relatively minor one in 1995. Some vagueness as to who was present is understandable, the absence of written record is not.

2.82 Furthermore, and given that Dr Montague was inexperienced and probably only there to train and gain experience, I believe that Dr Taylor was in

260 WS-008-2 p.9
261 306-002-003
262 Dr O'Connor T-25-04-12 p.71 line 3
263 Dr Taylor T-20-04-12 p.60 line 11
264 Staff Nurse Popplestone T-30-04-12 p.60 line 1

charge of anaesthesia at all times during Adam's operation, irrespective of the presence or otherwise of any other doctor or nurse to assist him.

Communication between surgical and anaesthetic teams

2.83 The shared priority of surgeon and anaesthetist is patient safety. Accordingly effective exchange of patient information between them and their assistants is of particular importance.[265] Expert witnesses to the Inquiry questioned whether the two teams communicated successfully during the transplant. Dr Haynes observed that "*reading and re-reading the various witness statements does not reassure me that surgeon and anaesthetist were working effectively together as a team, communicating well with each other.*"[266] Communication was critical in relation to blood loss,[267] CVP readings and fluid management at the time of re-perfusion of the transplanted kidney.[268] Mr Keane confirmed that communication between them may not always have been "*helpful*"[269] but emphasised that if Dr Taylor did not understand what he was to impart then he was expected to ask.[270] I believe that had Dr Taylor explained what he was doing and had better dialogue with the transplant surgeon then the risk of gross fluid mismanagement may have been reduced.

Determining what happened in the operating theatre

2.84 It might be expected that a detailed analysis of Adam's surgery would allow a clear understanding of events in theatre. However, establishing exactly what happened during surgery has proved to be one of the most difficult areas of the Inquiry's investigation. There are issues about which it is not possible to make a clear finding, even on the balance of probabilities. Some issues are more important than others but the overall number of them is significant. This is troubling because of a concern that the full truth of what

265 Mr Keane T-26-04-12 p.161 line 7
266 204-006-334
267 Mr Keane T-26-04-12 p.41 line 20
268 Mr Keane T-26-04-12 p.160 line 1
269 Mr Keane T-26-04-12 p.157 line 1
270 Mr Keane T-26-04-12 p.158 line 18

happened in theatre may not have been revealed and that Adam's surgery may not have been as recorded by the doctors and nurses in the case notes, or as described by them in their written statements to the Coroner, the Police and this Inquiry or as recounted by them under oath.

2.85 Doubts as to the accuracy of the broad narrative first emerged from the evidence of the Regional Transplant Co-ordinator for Northern Ireland, Ms Eleanor Boyce (née Donaghy),[271] who made a statement to the Police Service of Northern Ireland ('PSNI') on 28th April 2006 recalling how Staff Nurse Joanne Sharratt (née Clingham)[272] had informed her, when Adam was still in theatre, that he might even then be brain-stem dead. Ms Boyce described how, on entering the theatre, she had found the mood very sombre. She believed the surgeons were at the operating table and although she could not say what they were doing or what stage had been reached[273] she could "*...remember Patrick Keane (Surgeon) being at the table. There was another surgeon however I do not recall who it was. There were other staff present in the operating theatre; however I do not recall who they were. I remember when I was in the theatre wondering why they were continuing with the procedure if the child was supposed to be brain-stem dead.*"[274] She said that "*there was an awareness that we were dealing with a very serious situation.*"[275] Her presence in theatre was confirmed by Dr O'Connor[276] but her account was flatly dismissed by everyone.

2.86 Notwithstanding that uniquely Ms Boyce was independent of the Trust and had no apparent reason to invent such an account, her very different recollection of surgery was not initially accorded particular significance beyond that of puzzling anomaly. However, her statement assumed greater significance when a pre-inquest consultation minute taken by Mr George Brangam's[277] para-legal assistant, Ms Heather Neill, came unexpectedly to

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271 306-081-005
272 303-001-003
273 093-015-048
274 093-016-049
275 Ms Boyce T-27-04-12 p.120 line 13
276 Dr O'Connor T-25-04-12 p.75 line 22
277 306-081-006 The late Mr George Brangam, erstwhile partner in Brangam, Bagnall & Co Solicitors, retained by the Trust. His death precluded his giving evidence to the Inquiry

light in June 2012.[278] On the 14th June 1996 she had recorded Dr Taylor and Professor Savage in discussion with Dr George Murnaghan,[279] Dr Joseph Gaston[280] and Mr Brangam and had noted an assertion that "*during the surgery when this kidney was failing to operate a needle was put into the artery and no blood came out and clearly the kidney was not working when the operation site was closed however, the performance of the kidney was no longer relevant at this stage.*"[281] This perplexed because it is so markedly at odds with the other evidence about what happened in theatre, with the possible exception of Ms Boyce's account.

2.87 In particular the operation record, far from noting any concern with perfusion, records in Mr Keane's hand that "*the kidney was perfused reasonably at the end.*"[282] Indeed, Mr Keane stated in his deposition for inquest that "*the operation was difficult but a successful result was achieved at the end of the procedure*"[283] (by which he said he meant a "*technically successful result*").[284] Accordingly, had a needle been placed in the artery and no blood emerged so as to indicate that the "*kidney was not working*",[285] then that most certainly would have been recorded.

2.88 The possibility that an 'unknown event' had occurred in theatre, which was being concealed, focused attention on the totality of evidence in the search for answers. An unexpected degree of vagueness and inconsistency emerged. I found this very surprising because I had been told repeatedly that the death of a child in hospital is a rare event. It might therefore be supposed that those involved would remember with some clarity what had gone wrong, no matter whose fault it was or even if it was nobody's fault. However, even the evidence identifying where the operation took place, when it took place and who was there, is worryingly unclear:

278 122-001-001
279 306-081-005
280 306-081-003 to 004
281 122-001-005
282 059-006-013
283 011-003-010
284 Mr Keane T-23-04-12 p.60 line 15
285 122-001-005

(i) There is no record as to which theatre was used. Not even the reported closure of the theatre[286] after the catastrophic event generated any documentary evidence. The only available record is the swab count marked "*Theatre II.*"[287] Doubt however emerged in oral evidence[288] as to whether this could be correct.

(ii) There is no reliable record as to who was present in theatre at the time of surgery. Dr Taylor believed that Dr Montague was replaced by a trainee anaesthetist. Despite extensive enquiry this individual could not be identified.[289] Likewise, Dr Taylor indicated that an anaesthetic nurse was present. Again, despite exhaustive efforts by the Inquiry and the Directorate of Legal Services ('DLS'), that nurse remains unidentified.[290] An auxiliary nurse would have been present in theatre[291] and another made entries in the record of blood loss.[292] These individuals also remain unidentified.[293]

(iii) Additionally, there is a problem determining when surgery started and when it ended. Timings do not appear in the record and reliance must be placed upon the recollection of those involved. Professor Savage recalled that Adam was taken to theatre at 07:00.[294] Mr Keane deposed that "*the operation started at 7.30am.*"[295] Subsequently and upon reflection he stated "*... it would now appear that the surgery started at around 8:00am*"[296] and then gave his "*best possible estimate... a start time of 8:10.*"[297] Witnesses were at odds about the timing of events in surgery. Dr Taylor believed

286 093-034-086
287 058-007-020
288 Mr Brown and Dr Montague T-11-05-12 p.80 line 16-25 & other nurse witnesses - Patricia Conway T-30-04-12 p.41 lines 11-16, Nurse Popplestone T-30-04-12 p.63 lines 13-20, Margaret Matthewson T-30-04-12 p.107 line 21-108 line 9 & Dr Gibson's Report (059-069-162)
289 306-002-004
290 301-043-407 & 306-002-003
291 Dr Taylor 20-04-12 p.78 line 12
292 058-007-021
293 Mr Keane T-24-04-12 p.124 line 11
294 016-004-014
295 011-013-093
296 WS-006-3 p.12
297 Mr Keane T-26-04-12 p.5 line 16

anastomosis[298] occurred shortly after 09:30[299] but Dr O'Connor was astounded that he should think that and said that it was not achieved until around 10:30.[300] Dr Taylor was driven to concede "*discrepancy in the notes*"[301] and could neither recollect nor explain why nothing was seemingly done between 10:15 and 11:00.[302] The anaesthetic record ends at 11:00 when Dr Taylor administered drugs to reverse the neuromuscular blockade,[303] however he was quite unable to explain what was done subsequently between then and midday.[304]

2.89 Furthermore, the evidence detailing events in theatre was contradictory.

(i) Mr Keane has stated that when he left theatre "*... the kidney was reasonably well perfused.*"[305] However, his deposition for inquest indicated that "*at the end of the procedure it was obvious that the kidney was not perfusing as well as it had initially done.*"[306] Conversely, Staff Nurse Gillian Popplestone[307] remembered "*... it was discoloured and then that seemed to subside*."[308] Other witnesses were similarly inconsistent in relation to the condition of the donor kidney. Dr O'Connor said it was described as "*bluish.*"[309] Mr Brown in his statement to the PSNI recalled that "*from what I can remember the kidney turned pink... As far as I can remember the kidney remained pink....*"[310] Dr Taylor informed the Coroner that at around 10:00 the donor kidney was not looking good and not producing urine.[311] Mr Keane recalled urine being produced whereas Mr Brown was clear that none had been produced.[312]

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298 312-005-002
299 122-001-003
300 Dr O'Connor T-25-04-12 p.124 line 12
301 Dr Taylor T-06-09-12 p.59 line 23
302 Dr Taylor T-06-09-12 p.70 line 22
303 058-003-005
304 Dr Taylor T-06-09-12 p.146 line 2 & p.147 line 14 & p.149 line 2
305 WS-006-2 p.7
306 011-013-093
307 303-001-004
308 Staff Nurse Popplestone T-30-04-12 p.81 line 2
309 Dr O'Connor T-25-04-12 p.138 line 15
310 093-011-032
311 011-014-101
312 059-060-146 & Mr Brown T-01-05-12 p.102 line 21

(ii) Neither the time of Mr Keane's departure from the operating theatre nor the time of wound closure is recorded. Mr Keane has stated that he left the operating theatre at "*approximately 10-30am*"[313] and yet when he gave his evidence at inquest he made no reference whatsoever to leaving early or of relying upon Mr Brown to close the wound and complete the operation.[314] Similarly Mr Brown, in his statement to the Coroner, made no reference to Mr Keane's departure before the end of transplant surgery or to the fact that he had closed the wound.[315] Subsequently, and in response to police questioning, he stated that "*it would appear to be the case that Mr Keane left myself to sew up the wound. I do not have any recollection of the end of the operation or the anaesthetist trying to bring Adam round.*"[316]

(iii) Mr Keane claimed to have left the theatre "*10 minutes prior to the end of the anaesthesia*" to attend an emergency[317] explaining that he had received a call from the BCH about "*a patient who was undergoing a percutaneous nephrolithotomy, was bleeding heavily in the operating theatre there and they needed help urgently.*"[318] Despite extensive enquiry this emergency was uncorroborated and remained a mystery until Mr Keane conceded that there may not have been an emergency at all but suggested that he might have returned to BCH for a scheduled operation for which he may already have been late.[319]

(iv) Mr Keane's surgical notes are poor and remarkably, Mr Brown made no notes at all.[320] Professor Forsythe and Mr Rigg in their joint report describe the operating record as brief.[321] Whilst it does record key

313 WS-006-2 p.7
314 011-013-093
315 059-060-146
316 093-011-032
317 WS-006-1 p.3
318 WS-006-2 p.7
319 Mr Keane T-26-04-12 p.163-4
320 Mr Brown T-20-06-12 p.185 line 18
321 203-004-078

issues, lesser matters are omitted. Some entries lack detail, there is no timing for the beginning or end of anastomosis and no comment on the perfusion of the kidney after removal of the clamps. Furthermore, the post-operative assessment was not completed,[322] kidney performance at the end of surgery was left unrecorded and there is no post-operative management plan.

2.90 The inevitable suspicion was that Adam had suffered a failed transplant and had died earlier than previously indicated and in unclear circumstances. It is to be emphasised that none of the experts believe that the infarction of the kidney contributed to Adam's death. Accordingly, suspicion as to what else may have happened in theatre is almost certainly irrelevant to the history of the development of hyponatraemia, its role in Adam's death and the principal focus of this Inquiry. Nonetheless, the matter assumed considerable importance because it was so clearly relevant to the candour and credibility of all involved in the operating theatre. Were there to have been concealment of facts, such would only have been possible by an active conspiracy of silence and deceit involving all those doctors and nurses engaged in the operating theatre, and some perhaps who were not.

2.91 Such a proposition was entirely speculative but would perhaps have accounted for the unexplained delays in theatre, the inconsistencies relating to exchange of CVP values and the perfusion of the kidney, the poor operation notes, the departure of the lead surgeon, the failure of the surgical team to speak to Ms Slavin and the opinion of some experts as to the likely timings of kidney infarction[323] and brain stem death.[324] Accordingly, hearings were arranged[325] and witnesses recalled in order that the matter be further examined in detail.

2.92 Those involved in the operating theatre had their recollection and previous evidence tested under focused examination. Inevitable minor discrepancies

322 058-003-006
323 011-007-022
324 200-022-267
325 In September 2012

were revealed but I found the general version of events to be as previously described and no new issues were revealed.

2.93 In particular the evidence of Ms Boyce and the consultation note of Ms Neill were subjected to the closest scrutiny.

(i) Ms Neill was able and experienced and had recorded a minute of a private consultation between the Trust's witnesses and the Trust's solicitor. She made it for internal legal purposes without any intention of wider circulation. To that extent it might be thought to possess the detachment necessary to lend it weight. There is no reason to suspect that Ms Neill sought to distort or invent what was said at the meeting. It is hard, likewise, to comprehend how she might have misunderstood or misinterpreted what was said. Despite a lack of medical training, much of her note is self-evidently correct. However, the fact remains that identifiable mistakes do appear in the minute, there is re-ordering of subject matter by theme obscuring the nuance and context of the discussion and, with some rearrangement of punctuation and emphasis, less troubling meanings can be found in the controversial wording. The contentious account deals specifically with the surgeon's role but it must be noted that there was no surgeon at the meeting and no surgical perspective on the issue under discussion. Indeed the statement cannot be attributed with confidence to any one individual. The minute was not checked by Ms Neill's principal, Mr Brangam, nor was it circulated for comment or agreement. The account recorded differs so obviously from those depositions already held from the witnesses that Mr Brangam might have been expected to query this particular version of events. Ms Neill would, I am quite sure, have recorded any such discussion. None is noted. Accordingly, I conclude on the balance of probabilities, that the consultation note is not to be relied upon in its entirety and is therefore an unsound basis upon which to make a finding of fact.

(ii) Ms Boyce did not make her statement recalling her presence in theatre until long after Adam's death. Whilst I do not doubt her sincerity, there was nobody who agreed with her recollection. The fact that it differs from everybody else's is a valid reason for taking it seriously but it is also a valid reason for suspecting its accuracy if it is not completely compelling. Ms Boyce gave evidence that she watched from a distance as surgeons worked with Adam and wondered why if he was already dead. Her account was based on what she sensed of the mood in theatre and interpreted in the light of what she remembered being told. If she had misunderstood the context then she may have misinterpreted the scene. She said that she remained in theatre until the end and did so because of her interest in Adam as a patient known to her. Her inability, however, to recall how long she stayed[326] is hard to understand in the circumstances described, as indeed was her failure, then or at any time thereafter, to enquire about what had happened.[327] If she had confused one memory with another that could lead to error. Very properly she accepted the possibility that her memory was wrong.[328] On balance, and on the hearing of the evidence,[329] I am unable to conclude that Ms Boyce's perception and recollection of what she witnessed necessarily reflects what actually occurred.

2.94 It is with frustration that I cannot make findings from the evidence as to what did happen at all times during Adam's surgery. The available evidence was degraded by the passage of time, the paucity of documentation, the absence of contemporary investigation, the number of inconsistencies and the decidedly poor quality of some of the oral testimony given at public hearings. However, I consider my inability to form a view after so rigorous an inquiry into the avoidable death of a child in Northern Ireland's Regional

326 Ms Boyce T-27-04-12 p.119 lines 10-13
327 Ms Boyce T-27-04-12 p.121 line 19
328 Ms Boyce T-27-04-12 p.129 line 20
329 In particular that of Dr O'Connor

Paediatric Centre to be, of itself, a grave indictment of both the Trust and its systems.

Early appraisal of condition and communication with Ms Slavin

2.95 The first assessment of the cause of Adam's death appears to have been made at the conclusion of surgery by Dr O'Connor when she "*was called back to theatre when the fixed dilated pupils were apparent.*"[330] She "*formed a view that he had cerebral oedema*"[331] and "*a significantly positive fluid balance.*"[332] She proceeded to telephone Professor Savage who "*rapidly went to the intensive care unit and reviewed the situation, with her... with a rapid calculation we thought he had had 1,500ml of fluid more in than out... so at that stage with a low sodium and subsequently with a lower sodium coming back from the laboratory, I think Dr O'Connor and I felt that there was a situation where his fluid balance was excessive on the positive side. He had a lot of fifth normal saline and we felt he had probably got cerebral oedema and coned.*"[333] Dr O'Connor concluded that "*the picture seemed to be of fluid overload*"[334] and felt that it was Professor Savage who was best placed to speak to Ms Slavin[335]

2.96 Professor Savage recalls discussing "*with Dr Taylor that Adam looked bloated and... would appear to* [to have] *had excessive amounts of fluid and that that was the cause of his cerebral oedema... I said that I believed that I then had to go and explain that to Debra Strain and asked him to accompany me.*"[336]

2.97 Ms Slavin arrived at the PICU at 12:15. She saw Adam and was struck by "*how bloated he was.*"[337] She was met by Professor Savage, Dr Taylor and Staff Nurse Susan Beattie.[338] Professor Savage explained to her that

330 Dr O'Connor T-25-04-12 p.112
331 Dr O'Connor T-25-04-12 p. 114 line 21
332 Dr O'Connor T-25-04-12 p.115 line 21
333 Professor Savage T-18-04-12 p.151 line 6
334 Dr O'Connor T-25-04-12 p.136 line 5
335 WS-014-2 p.4
336 Professor Savage T-22-06-12 p.14 line 3
337 WS-001-1 p. 2
338 303-001-003

"*Adam had cerebral oedema with a swollen brain causing pressure on his vital centres,*"[339] "*there had been an imbalance of fluids in his body*"[340] and that "*hope of recovery was remote.*"[341] He told her that he did not yet understand why this had happened, principally because he felt that "*it did not seem an appropriate time to get into* [dilutional hyponatraemia] *with Mrs Strain, bearing in mind that I knew she would likely only remember the bad news that I was giving her.*"[342] She was informed by Dr Taylor that something was "*drastically wrong*" and that it was a "*one in a million thing.*"[343] Dr Taylor has since apologised for "*this really quite silly statement*" of meaningless statistics.[344]

2.98 After the operation the surgeons did not speak to Ms Slavin. Mr Keane explained that whilst he would normally speak to the family, on this occasion and in his absence he "*expected Mr Brown to speak to Adam's family.*"[345] Mr Brown stated that he did not consider it his responsibility to speak to Adam's mother because "*this was not a paediatric surgery operation, but a transplant.*"[346] He subsequently acknowledged that he "*should have spoken to the mum because there was nobody else to speak to her.*"[347] Expert evidence agreed that a surgeon would normally be expected to join in such a conversation.[348] As Professor Savage observed in his oral evidence "*it would have been good if one of the surgeons had come and spoken to them, but they didn't.*"[349] I share this view and furthermore believe that active attempts should have been made to secure the attendance of one of the surgeons.

2.99 Mr Keane returned to the Children's Hospital the following morning and having reviewed the notes,[350] came to his own conclusion as to the cause

339 WS-002-1 p.4
340 058-038-181
341 WS-002-1 p.4 & 059-006-016
342 Professor Savage T-22-06-12 p.16 line 20
343 WS-001-1 p.4
344 Dr Taylor T-20-04-12 p.136 lines 12-21
345 WS-006-2 p.7
346 WS-007-3 p.6
347 Mr Brown T-01-05-12 p.141 line 9
348 200-007-118
349 Professor Savage T-18-04-12 p.158 line 11
350 Mr Keane T-23-04-12 p.30-1

of death. He spoke with Professor Savage and "*confirmed that I was seriously worried about what had happened in terms of the fluid management...*"[351] He said: "*all I can remember of the encounter was that he had his head buried. I think he was crying.*"[352]

2.100 Dr Terence Montague recalled how he "*came into the hospital the next morning and... met Dr Taylor in the theatre where the surgery had taken place... and he told me that Adam was likely to die, that Adam had cerebral oedema, and at that stage he was pointing out to me that the anaesthetic machine was being quarantined so that it could be examined...*"[353]

2.101 The 11:30 serum sodium test result was received at 13:00. It revealed a sodium value of 119mmol/L.[354] Dr O'Connor noted this in the record at about 13:20, [355] and entered a query as to whether this might not be a case of dilutional hyponatraemia.[356]

2.102 Neurological advice was sought from Dr David Webb[357] who saw Adam at 19:30 on 27th November 1995. His examination, witnessed by Dr Rosalie Campbell,[358] was the first part of the formal clinical assessment necessary to confirm brain stem death.[359] Dr Webb spoke with the clinicians in PICU, examined Adam and reviewed the CT scan. He recorded that "*the examination is comparable with brain stem death 2˚ severe acute cerebral oedema. This may have occurred on the basis of unexpected fluid shifts – 'osmotic disequilibrium syndrome.'*"[360] It may be significant that he made no reference to Adam's hyponatraemia. He said "*if I'd been aware of the low sodium, I would have considered hyponatraemia to be the likely cause of the fluid shift.*"[361] Dr Webb should have been aware of Adam's low sodium reading. The notes clearly record the laboratory sodium results of

351 Mr Keane T-23-04-12 p.31, line 14
352 Mr Keane T-23-04-12 p.31 line 23
353 Dr Montague T-11-05-12 p.153-54
354 058-040-186
355 Dr O'Connor T-25-04-12 p.117 line 5
356 059-006-016, 058-035-138 & Dr O'Connor T-25-04-12 p.157 line 15
357 303-001-003 Consultant Paediatric Neurologist
358 303-001-001 to 002
359 058-004-009 & 058-035-139
360 058-035-140
361 WS-107-2 p.4

119mmol/L. Dr Webb however, believed that he may not have appreciated this or may have been told that this result was unreliable, because he was prompted to conduct medical literature research in order to explain the brain swelling.[362] This is not necessarily convincing. A consultant paediatric neurologist asked for his formal opinion in relation to a brain stem death test would undoubtedly examine the notes and even if told that the sodium result was suspect, could not justify ignoring it. Dr Webb must be open to the criticism that he either did not properly review the notes, or alternatively, that he deliberately avoided entering a diagnosis of hyponatraemia with its inherent suggestion of fluid mismanagement.[363]

2.103 In making the necessary clinical assessment to confirm brain stem death, Drs Webb, Campbell and O'Connor had each to satisfy themselves that there was an underlying cause for the brain stem death and, importantly, that other potential reasons for coma, including metabolic causes or drugs, were excluded. The drug record should therefore have been double-checked and the metabolic disorder of hyponatraemia corrected before the tests were undertaken.[364]

2.104 Notwithstanding,[365] Dr Webb recorded the brain stem death criteria to be fulfilled at 09:10.[366] Consent was then sought from Ms Slavin to discontinue life support[367] and this was done with Adam on her knee[368] at 11:30 on 28th November 1995.[369]

2.105 Professor Savage then notified the Coroner because he "*knew that there had to be a coroner's inquest*"[370] but did not seemingly report his views on the mishandling of fluids.[371] He then attended the post-mortem "*probably*

362 WS-107-2 p.2
363 Dr Webb provided two witness statements to the Inquiry relating to the death of Adam Strain. For personal reasons he was unable to attend the oral hearings to give evidence.
364 204-014-003 & 204-012-386 & Dr Haynes T -03-05-12 p.115 line 19
365 Dr Haynes T-03-05-12 p.112 line1
366 058-004-009
367 WS-001-1 p.4
368 016-004-015
369 WS-001-1 p.4 & 016-004-015
370 Professor Savage T-22-06-12 p.3 line 19
371 011-025-125

just to make sure that the conclusions we had reached were correct"[372] and to ensure "*that Dr Armour understood my perception of the fluid balance situation.*"[373] The pathologist Dr Alison Armour[374] could not remember speaking with Professor Savage and does not appear to have understood the "*fluid balance situation*" until sometime later.[375]

2.106 Professor Savage wrote to the Strain family GP on 4th December 1995[376] to advise as to the circumstances of Adam's death. He did not however refer to the cause of death because he "*probably thought it would have been inappropriate for me to suggest a diagnosis in advance of the coroner's inquest.*"[377] Ms Slavin recalled that she "*knew that the cause of Adam's death was the swelling of his brain but at no time do I recall anyone telling me that this had happened because he had been given too much fluid.*"[378] Nor does it seem that anyone told her that Adam's sodium levels had fallen so far and that he had severe hyponatraemia.[379]

2.107 There is no evidence to suggest any formal communication with Adam's family by the Trust, not even a letter of condolence.

Adam Strain Governance

2.108 It is understandable and perhaps all too easy to make a mistake working in the complex field of medicine. However, after an unexpected death like Adam's, it might have been expected, even by the standards of 1995, that those involved would openly and honestly analyse what had happened in order to minimise the risk of recurrence. Analysis should have taken place immediately, when memories were fresh, so that lessons could be learned straight away. A major failing in Adam's case is that, according to the

372 Professor Savage T-18-04-12 p.156 line 19
373 Professor Savage T-22-06-12 p.22 line 4
374 303-001-001
375 Professor Savage T-22-06-12 p.22 line 6
376 016-004-014
377 Professor Savage T-22-06-12 p.30 line 16
378 WS-001-1 p.4
379 011-006-019

evidence, that analysis did not take place. How and why that happened will be explored below but central to it was reluctance to accept or attribute fault.

Adverse incident reporting

2.109 No Serious Adverse Incident ('SAI') report of Adam's death was made within the Children's Hospital or the Trust. There was, however, no formal requirement to do so at that time.

2.110 The Medical Director, Dr Ian Carson,[380] explained that "*unexpected or unexplained deaths during or following anaesthesia and surgery would be reported externally to H.M. Coroner, and internally to Dr G Murnaghan in his capacity as Director of Medical Administration*"[381] but "*were not formally reported to the Medical Director as a routine.*"[382] However, in the case of "*death where a doctor's practice is called into question or patients are put at risk, those are cases that quite definitely should have been referred to the Trust Medical Director*"[383] and the Clinical Director of Paediatrics.[384]

2.111 An oral report of the death was made to Dr George Murnaghan who, in his capacity as Director of Medical Administration, was charged with risk management and the defence of medical negligence claims.[385] He served on the Clinical Risk Management Group which was responsible for untoward incident reporting in clinical matters.[386] He was, in addition, responsible for the Trust's engagement with the Coroner[387] and the internal dissemination of lessons drawn from inquests.[388] He was ideally placed to ensure that relevant issues were brought to the attention of all those who needed to know within the Trust. His reporting line was to the Medical Director,[389] he sat in "*attendance at the Board,*"[390] reported to the Hospital

380 306-081-004
381 WS-077-2 p.6
382 WS-077-2 p.21
383 Dr Carson T-16-01-13 p.66 line 12
384 Dr Carson T-16-01-13 p.67 line 11
385 Dr Murnaghan T-25-06-12 p.33 line 19
386 WS-061-2 p.262
387 011-025-125 & 093-025-068
388 WS-061-1 p.2
389 Dr Murnaghan T-25-06-12 p.2 line 9
390 Dr Murnaghan T-25-06-12 p.6 line 16

Council on behalf of the Medical Risk Management Group[391] and kept the Chief Executive "*in the loop.*"[392] His role was significant within the Trust. He was a link between clinicians and the Trust Board and the connection between the internal procedures of the Trust and the external requirements of the Coroner.

2.112 Dr Murnaghan liaised with Dr Gaston who, as Clinical Director of Anaesthetics, Theatre & Intensive Care ('ATICS'), likewise held a 'governance' position in the Trust and was also Dr Taylor's clinical lead. Dr Gaston was experienced in critical incident reporting, incident investigation and audit[393] and was an appointed surveyor with Kings Fund Organisational Audit ('KFOA').[394]

2.113 Dr Gaston did not seek a written report in respect of this unexpected and unexplained death. Nor, would it seem, did he really expect one.[395] He heard about the death from a nurse on a corridor.[396]

2.114 Notwithstanding, and within days, Professor Savage and Dr Taylor[397] did submit written statements. They cannot however have been of much assistance to Drs Murnaghan and Gaston, omitting as they do all reference to hyponatraemia and any explanation for Adam's unexpected death.

2.115 Professor Savage received a copy of Dr Taylor's statement very soon after.[398] He immediately informed Dr Murnaghan that there was an explanation for what had happened and stated his belief that "*Adam's cerebral oedema and death were related to fluid mismanagement.*"[399] Dr Murnaghan accepts that Professor Savage brought this to his attention.[400]

391 Dr Murnaghan T-25-06-12 p.56 line 3 & WS-061-2 p.241
392 Dr Murnaghan T-25-06-12 p.3 line 8
393 Dr Gaston T-18-06-12 p.76 line 23 & p.77 line 10 & p.105 line 12
394 Dr Gaston T-18-06-12 p.71 line 17
395 Dr Gaston T-18-06-12 p.114 line 17
396 Dr Gaston T-19-06-12 p.12 line 4
397 059-066-153 & 059-067-155
398 059-067-156
399 Professor Savage T-22-06-12 p.22 line 19
400 Dr Murnaghan T-25-06-12 p.119 line 5

2.116 Dr Murnaghan said that then "*informally, if not formally, I brought the matter up with the Medical Director, Dr Carson*"[401] and that he was "*almost certain that I would have told him that Dr Taylor had a different view... that the Coroner was involved and was going to hold an Inquest. And I do not know what we agreed after that.*"[402]

2.117 Dr Carson was very clear that Dr Murnaghan did not bring Adam's death to his attention whether formally or informally until the time of the inquest.[403] There is no evidence of any involvement of Dr Carson before then, whether as Medical Director or as a fellow anaesthetist. Had he been notified I believe he would have taken some action or at the very least sought some information - which he seemingly did not. The sole suggestion that he was notified was made by Dr Murnaghan, whose evidence on the point was far from compelling. [404] He was unable to provide any detail about what was said or agreed or done in respect of this most important communication. On balance I do not believe that Dr Murnaghan reported Adam's death to the Medical Director until very much later. Instead he proceeded to act without reference to Dr Carson.

2.118 Nor did Drs Murnaghan or Gaston report the death to the Clinical Lead of the Paediatric Directorate, the Director of Nursing or the Chief Executive.

2.119 The acting Clinical Lead of the Children's Hospital[405]was Dr Conor Mulholland.[406] He had only recently assumed this responsibility in addition to his full time practice as a Consultant Paediatric Cardiologist and his role as Clinical Director in Cardiology and Cardiac Surgery.[407] There was no written guidance to assist him in his duties as acting Clinical Director of

401 Dr Murnaghan T-25-06-12 p.155 line 6
402 Dr Murnaghan T-25-06-12 p.165 line 1
403 Dr Carson T-15-01-13 p.156 line 6
404 Dr Murnaghan T-25-06-12 p.152 line 15
405 The Directorate of Paediatrics
406 306-081-004
407 Dr Mulholland T-21-06-12 p.141

Paediatrics.[408] His principal administrative concerns at that time in the Children's Hospital were financial.[409]

2.120 With hindsight he accepted that he should have received a report into Adam's death[410] in order to understand what had happened.[411] However, on hearing of the death, he assumed that the matter would be taken forward by Drs Murnaghan and Gaston,[412] that the Medical Director would be informed[413] and that the death would be formally dealt with by the Coroner. On the basis of these assumptions he did nothing[414] and remained "*completely outside the loop on Adam Strain.*"[415]

2.121 Dr Mulholland had appointed Consultant Paediatric Anaesthetist Dr Peter Crean[416] to be his Sub-Director in the Children's Hospital with responsibility for anaesthetics. Dr Crean did not, however, report Adam's case within the Paediatric Directorate because he was accountable to Dr Gaston's ATICS Directorate[417] and the matter had already been reported to Dr Gaston.

2.122 The necessity for the Clinical Director of Paediatrics to become involved in the investigation of a death in the Children's Hospital was obvious, yet the system imposed no obligation to report the matter to him, gave him no guidance as to what was expected of him and left him no time from his other duties to engage. A structural confusion of reporting lines left him in ignorance and allowed others to proceed without him.

2.123 The Director of Nursing and Patient Services was Miss Elizabeth Duffin.[418] She reported to the Chief Executive, received reports from nurse managers and talked regularly with Drs Murnaghan and Carson.[419] Her responsibilities included clinical quality assurance and the Trust application

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408 Dr Mulholland T-21-06-12 p.191 line 14
409 Dr Mulholland T-21-06-12 p.143 line 9
410 Dr Mulholland T-21-06-12 p.173 line 11
411 Dr Mulholland T-21-06-12 p.174 line 1
412 Dr Mulholland T-21-06-12 p.173 line 2
413 Dr Mulholland T-21-06-12 p.177 line 6
414 Dr Mulholland T-21-06-12 p.178 line 9
415 Dr Mulholland T-21-06-12 p.182 line 22
416 303-001-007
417 Dr Crean T-20-06-12 p.5
418 306-081-005
419 Miss Duffin T-26-06-12 p.36 line 16

for KFOA accreditation.[420] Nonetheless, she also claimed to have heard nothing about Adam's death and to have learned nothing about it for many years.[421] She said she thought this "*very strange*"[422] and was quite unable to explain it given that she would have expected to hear about it on her own 'grapevine.'[423]

2.124 The Trust's Clinical Risk Management Group was charged on paper with responsibility for untoward clinical incident reporting. In reality this group does not appear to have fulfilled this function[424] and its existence may have been largely aspirational.[425] It was chaired by the Medical Director Dr Carson.[426]

2.125 Dr Carson was aware of the correct procedures for serious adverse incident reporting. He possessed the 'Risk Management in the NHS' manual[427] received from the Management Executive of the Department in 1993-4.[428] It provided guidance on clinical incident reporting[429] as did KFOA in its published criteria for accreditation (1994).[430]

2.126 More current advices were also then available from The Report of the Independent Inquiry into deaths on the Children's ward at Grantham & Kesteven General Hospital (the 'Allitt Inquiry') also published in 1994.[431] In relation to clinical incidents it was emphatic that "*There must be a quick route to ensure that serious matters... are reported in writing to the Chief Executive of the hospital...All District Health Authorities and NHS Trust Boards should take steps immediately to ensure that such arrangements are in place*" These advices were not acted upon nor were policies for

420 Miss Duffin T-26-06-12 p.58 line 11
421 Miss Duffin T-26-06-12 p.35 line 10
422 Miss Duffin T-26-06-12 p.24 line 18
423 Miss Duffin T-26-06-12 p.27 line 20
424 WS-273-1 p.9
425 Dr Murnaghan T-25-06-12 p.71 line 12
426 WS-061-2 p.263
427 Dr Carson T-16-01-13 p.6 line 2
428 Dr Carson T-16-01-12 p.44 line 5
429 306-117-013
430 211-003-026
431 210-003-038

critical and serious clinical incident reporting developed within the Trust. That was primarily a failure of the Trust Board.

2.127 The lack of formal obligation and mechanism to report such a death to the Medical Director was an obvious deficiency in control and one which created a system dangerously vulnerable to abuse and failure. These systemic shortcomings are clear and should have been clear in 1995 not least to the Medical Director.

2.128 Notwithstanding the lack of leadership from the clinical directors on the Trust Board, Drs Murnaghan and Gaston both held 'governance' positions within the Trust and both knew from their professional experience that a potentially avoidable hospital death should be formally reported to the medical director. In Dr Haynes' view that was just "*commonsense.*"[432] Dr Carson agreed, even "*in the light of very early developments in our clinical governance agenda.*"[433] The failure of Drs Murnaghan and Gaston in this regard, foreshadows their later failures to investigate, manage and assess.

Investigation

2.129 The investigative response of the Trust was led by Dr Murnaghan in liaison with Dr Gaston.[434] Dr Murnaghan acknowledged that where there "*was a possibility that medical care and treatment would have contributed to a death I would have expected that to be the cause of an investigation.*"[435]

2.130 There was no investigation of the case involving the Medical Director of the Trust.

2.131 There was no investigation of the case within the Paediatric Directorate. Dr Mulholland conceded that Adam's case should have been discussed at a paediatric mortality meeting and that a written record should have been

[432] Dr Haynes T-03-05-12 p.129 line 7
[433] Dr Carson T-15-01-13 p.160 line 5
[434] Dr Gaston T-18-06-12 p.114 line 25
[435] WS-273-1 p.4

kept.[436] However, there is no record of any such meeting[437] and Dr Mulholland did not believe that Adam's case was reviewed.[438]

2.132 There was no investigation of the case within nursing.[439] Miss Elizabeth Duffin said that had she been notified she would have pursued a nursing investigation to "*to prevent something similar happening again.*"[440] That would indeed have been useful because then the nurses in theatre could have been identified from the "*record of the staffing in theatre.*"[441] She said she would have expected Dr Murnaghan to involve nurses in his investigation[442] and expressed her dismay that he had failed to seek statements from the nursing staff.[443]

2.133 Mr Keane said that he "*would have expected a full clinical... investigation of this, with no lawyers...*"[444] That didn't happen. Professor Savage expressed to the Inquiry his "*eternal regret that there wasn't a more detailed internal inquiry...*"[445] and Mr Brown conceded that this was "*self-evidently unsatisfactory.*"[446]

Dr Gaston's role in investigation

2.134 Despite the fact that Dr Gaston was an anaesthetist, he did not review the anaesthetic record.[447] Dr Taylor explained his calculations[448] but Dr Gaston neither assessed the intraoperative fluid balance nor made any search of the medical literature. He did, however, understand that there was a problem because he "*felt we needed an external assessor because it wasn't*

436 Dr Mulholland T-21-06-12 p.156 line 14
437 Dr Savage T-22-06-12 p.69 line 24
438 Transcript 21-06-12 p.156 line 11
439 Staff Nurse Popplestone T-30-04-12 p.95
440 Miss Duffin T-26-06-12 p.26 line 4
441 Miss Duffin T-26-06-12 p.32 line 21
442 Miss Duffin T-26-06-12 p.34
443 Miss Duffin T-26-06-12 p.32 line 11
444 Mr Keane T-10-09-12 p.38 line 25
445 Professor Savage T-22-06-12 p.68 line 4
446 Mr Brown T-01-05-12 p.151 line1
447 Dr Gaston T-19-06-12 p.15 line 10 *et seq*
448 Dr Gaston T-18-06-12 p.127 line 21

particularly clear right at the beginning... and there were differences of opinion and it needed to be... clarified."[449]

2.135 Despite these differences of professional opinion, Dr Gaston did not commission an external assessment but rather arranged for an internal investigation to be conducted by his anaesthetic colleague Dr Fiona Gibson,[450] because she was "*the one person... in Northern Ireland who would have experience of... major Paediatric Anaesthesia and who I considered independent...*".[451] She was asked to review the processes and equipment involved in Adam's case[452] and to discuss the matter with Dr Taylor.[453] Her inspection took place on 2nd December 1995[454] and focused on anaesthetic issues. She was not asked to speak to Professor Savage, Dr O'Connor or the surgeon.

2.136 At the same time Drs Gaston and Murnaghan instructed two Trust Technical Officers to check the equipment in the operating theatre.[455] The lead technician Mr John Wilson[456] was then a member of Dr Gaston's ATICS Management team.[457] Dr Gibson was not present when Messrs Wilson and McLaughlin[458] carried out their inspection.[459] Nonetheless, her report states that she "*was accompanied by Mr J. Wilson and Mr B. McLaughlin, senior Medical Technical Officers, on the site who carried out checks into the ventilators and other equipment in the theatre. The technical checks... found nothing at fault...*"[460] Her report concluded that "*a very carefully thought out and well monitored anaesthetic was delivered with great care to fluid management*"[461] and that "*the protocols for*

449 Dr Gaston T-19-06-12 p.10 line 2
450 303-001-002 due to ill health the late Dr Gibson was unable to provide oral evidence
451 Dr Gaston T-19-06-12 p.20 line 13
452 093-026-069
453 059-069-162
454 059-069-161
455 093-023-065c & 093-025-068b
456 306-081-006
457 Dr Gaston T-18-06-12 p.99 line 24
458 306-081-006
459 WS-109-1 p.3
460 059-069-162
461 059-069-162

monitoring, anaesthetic set-up and drug administration in this area are among the best on the Royal Hospital site..."[462]

2.137 Quite apart from Dr Gibson's praise for protocols which may be doubted to exist[463] it is now clear that the relevant medical devices were not actually examined. Her conclusion that great care was paid to fluid management, is hard to comprehend in the absence of recorded urinary output. Her involvement was not independent and her conclusions were not reliable. Her worryingly uncritical report was submitted to Dr Murnaghan on 11th December 1995.[464]

Dr Gaston's approach

2.138 Dr Gaston believed strongly in Dr Taylor's outstanding professional ability[465] and was concerned because "*there was more to this than just that event... there were issues about... a shortage of anaesthetists at that time.*"[466] He went further to say that should Dr Taylor "*stop giving anaesthetics... we probably would have had the collapse of anaesthesia and ICU in Northern Ireland.*"[467]

2.139 Dr Gaston offered support to Dr Taylor and listened to his "*feelings about the anaesthetic, his feelings about what had happened, his feeling about how he was going to actually take it forward and how he would cope with it*."[468] He did not question or pursue inconsistency between what he was being told and Dr Taylor's written statement nor draw it to the attention of anyone else. He now concedes that he should have done so.[469]

2.140 Dr Gaston thought "*it was important that Dr Taylor had an opportunity to speak to some of the people of a senior level... partly as a follow up to the*

462 059-069-162
463 305-014-001
464 059-065-151
465 Dr Gaston T-19-06-12 p.130 line 19
466 Dr Gaston T-19-06-12 p.113 line 6
467 Dr Gaston T-19-06-12 p.138 line 13
468 Dr Gaston T-19-06-12 p.24 line13
469 Dr Gaston T-19-06-12 p.65 line 16

counselling type situation."[470] Accordingly, and rather than report the matter to the Medical Director and fellow anaesthetist Dr Carson, he approached an even more senior anaesthetic colleague Dr Samuel Morrell Lyons[471] (President of The Association of Anaesthetists of Great Britain and Ireland and Chairman of the Central Medical Advisory Committee of The Department of Health).[472]

2.141 Dr Gaston then led a delegation of Dr Lyons and Dr Murnaghan to speak with the Coroner. By that stage the Coroner had already commissioned expert opinion on Adam's case from consultant anaesthetist Dr John Alexander.[473] Drs Gaston and Lyons cautioned the Coroner against relying upon such opinion because Dr Alexander had "*little if any experience in this very specialist field.*"[474] They urged upon the Coroner the importance of obtaining the opinion of a consultant paediatric anaesthetist. To that end, the Trust recommended that the Coroner approach Dr Edward Sumner.[475]

2.142 After the meeting the Coroner wrote that "*their considered view is that the death had nothing to do with anaesthetics.*"[476] I consider it remarkable that a senior Trust delegation to the Coroner could have felt confident to advance a "*considered view*" exonerating the anaesthetics on the basis of so little investigation. Dr Lyons has confirmed that he has "*no recollection of being involved in any formal review or interviews of any of the doctors involved in the care of Adam Strain,*"[477] Dr Gibson's Report had not then been received,[478] there had been no examination of the anaesthetic equipment and Dr Gaston had probably not even read the anaesthetic record.[479] More troubling is Dr Murnaghan's tacit association with this view

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470 Dr Gaston T-19-06-12 p.25 line 6
471 306-081-006
472 093-024-066 – (11th December 1995)
473 303-001-010
474 011-027-128
475 303-001-010
476 011-027-128
477 093-024-067
478 059-065-151: meeting with Coroner, Monday 11th December 1995
479 Dr Gaston T-19-06-12 p.15

given what he had been told by Professor Savage regarding Dr Taylor's mismanagement of the fluids.[480]

2.143 Dr Gaston was unrepentant when he gave evidence about how Adam's death was dealt with: "*Yes, it would have been better to have had an investigation, better to have a discussion, but it was important that Dr Taylor's confidence and his ability as an anaesthetist, was not damaged by the process. And I still believe... that today, and I think history backs that up.*"[481] Such an approach may have seemed pragmatic to Dr Gaston but it was clearly wrong, even by the standards of 1995 to risk patient safety in the interests of a single individual, no matter how important. Long term confidence in, and respect for, the Health Service, depends upon proper response to critical incidents, rather than an approach which fails to engage with a problem in the hope that it will not recur.

Dr Murnaghan's role in investigation

2.144 Even though internal control systems within the Trust at that time were rudimentary, Dr Murnaghan's responsibilities were clear. He was to lead the Trust in assisting the Coroner and respond to the challenges of risk management and litigation.[482] It was his task to decide what and how to investigate. He might reasonably have been expected to analyse what had gone so tragically wrong. That is at least what Dr Armour, the pathologist, believed when she volunteered to Dr Murnaghan her willingness to attend any meeting to review Adam's case because she felt her "*opinion... relevant... and as such the case could be discussed in full.*"[483] Her input was not sought.

2.145 Dr Murnaghan has stated that "*no steps were taken apart from... involving... clinicians in discussion with pathologists and the anaesthetic technical staff in attempting to clarify the cause of death and thereby assist*

480 Professor Savage T-22-06-12 p.22 line 19
481 Dr Gaston T-19-06-12 p.138 line 23
482 093-025-068
483 059-063-149

the Coroner..."[484] If there were any such discussions they were neither recorded nor monitored. Almost nothing was put in writing. There was no multi-disciplinary meeting to discuss the issue, no consideration of the matter within the Paediatric Directorate and no involvement of nursing staff in any consideration of Adam's case.[485] Dr Murnaghan did not even request a list of the staff on duty.

2.146 Dr Murnaghan explained that he did not fully review the death because "*it was a Coronial investigation, it wasn't my investigation.*"[486] He worked on the assumption that the Trust had to await the views of the Coroner's experts.[487] Such an approach was not only potentially dangerous but ran contrary to the specific advice of the Health and Personal Social Services ('HPSS') 'Complaint Procedure Guide'[488] which stressed how important it was "*for the Trust... to initiate proper investigations regardless of the Coroner's inquiries.*"[489]

2.147 On 30th November 1995 the Coroner wrote to request that Dr Murnaghan obtain a statement from "*the technician responsible for the equipment in the theatre confirming that it was functioning properly.*"[490] Dr Murnaghan did nothing. The Coroner wrote again to Dr Murnaghan on 8th December 1995 stressing that it was "*imperative that the equipment* [is] *now independently examined.*"[491] Dr Murnaghan decided instead to rely upon the internal investigation report submitted by Messrs Wilson and McLaughlin which clearly indicated that they had not been able to inspect all the equipment.[492] Notwithstanding, Dr Murnaghan then asserted that "*this examination observed* [that] *the equipment was found to be in satisfactory condition.*"[493]

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484 093-025-068b
485 093-025-068b
486 Dr Murnaghan T-25-06-12 p.132 line 10
487 Dr Murnaghan T-25-06-12 p.152 line 4
488 314-016-001 (March 1996)
489 314-016-010
490 059-073-166
491 011-025-125
492 094-210-999
493 WS-015-1 p.2

2.148 On 30th November 1995 the Coroner also requested that Dr Murnaghan forward statements from the clinicians involved as soon as possible.[494] Dr Murnaghan sought only a limited number of statements, advising witnesses to restrict content to factual matter and exclude opinion. Dr O'Connor was not asked to make a statement.[495] Dr Montague was not asked to make a statement.[496] No member of the nursing team or technical staff was asked to make a statement.[497] By so doing Dr Murnaghan allowed a restricted number of uninformative reports to be furnished to the Coroner on the basis that that was "*the information that was provided and I was the conduit for that information.*"[498]

2.149 When Dr Murnaghan asked for Professor Savage's factual statement he advised him not to draw any conclusions because that was the role of the Coroner.[499] Accordingly and notwithstanding that Professor Savage believed that Adam's death was due to fluid mismanagement,[500] he made a statement on 28th November 1995[501] omitting not only his own opinion as to the cause of hyponatraemia but also the relevant known factual information relating to Adam's sodium levels and the quantities of fluid infused.

2.150 Mr Keane, who had likewise formed the view that Adam's death was due to fluid mismanagement, made a statement for the Coroner and failed to identify anything untoward. He was unable to explain this omission.[502]

2.151 On 6th December 1995 Dr Murnaghan wrote to Dr Webb requesting his statement for the Coroner.[503] Dr Webb obliged and he too omitted all reference to Adam's hyponatraemia.

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494 059-073-166
495 Dr O'Connor T-20-06-12 p.115 line 6
496 Dr Montague T-11-05-12 p.153 line 18
497 093-025-068b
498 Dr Murnaghan T-25-06-12 p.131 line 16
499 Professor Savage T-22-06-12 p.90 line 18
500 Professor Savage T-22-06-12 p.22 line 19
501 059-066-154
502 Mr Keane T-23-04-12 p.71 line 22 *et seq*
503 059-071-164

2.152 Mr Brown supplied his statement on 20th December 1995 to inform only that "*the transplantation procedure appeared to be technically satisfactory and at no stage during the operation was I conscious of any problem with his general condition.*"[504] Mr Brown's remarkable detachment extended so far as to even avoid any reference to the death.

2.153 Dr Taylor prepared his statement for Dr Murnaghan on 30th November 1995.[505] He stated that he was unable to "*offer a physiological explanation for such severe pulmonary and cerebral oedema in the presence of normal monitoring signs.*"[506] Given what Dr Taylor must have known of the abnormal CVP and sodium readings – that assertion was clearly suspect and should have prompted inquiry. Likewise, Dr Taylor's claim that he "*regarded the fluids to be appropriate and discussed this with other doctors present in the theatre*"[507] presented further obvious issues for discussion and enquiry which were seemingly ignored.

2.154 Dr Murnaghan's failure, then and subsequently, to query the content of these statements, given what he had been told by Professor Savage, is remarkable. His failure to ask any questions about fluid management is striking. This cannot have been accidental. Not only did the Trust thereby disregard the opportunity to establish what had happened, but it denied the Coroner assistance he might reasonably have expected.

The Coroner's expert anaesthetic reports received

2.155 On 5th January 1996 the Coroner forwarded to Dr Murnaghan[508] a copy of the report he had received from Dr John Alexander, Consultant Anaesthetist.[509] It concluded that Adam's requirements "*led to the administration of a large volume of hypotonic (0.18%) saline which produced a dilutional hyponatraemia and subsequent cerebral oedema.*"[510]

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504 059-060-146
505 059-067-155
506 059-067-156
507 059-067-156
508 059-057-134
509 011-012-084
510 094-027-140

He cited Professor Arieff's paper in support. This was clear support for Professor Savage's stated opinion.

2.156 Dr Sumner's anaesthetic report was then received at the end of January 1996.[511] It was even more damning in its conclusion and provided additional external confirmation for Drs Murnaghan and Gaston that Dr Taylor may have been wrong in both his anaesthetic and his argument. Even though Dr Murnaghan claimed that he would have gone to the Medical Director had anaesthetic colleagues advised him that something was seriously wrong,[512] he still neglected to inform Dr Carson and no further steps were taken to question the clinicians or examine the case in the light of these reports. Dr Murnaghan's continued omission to report to the medical director is hard to understand unless it was to avoid the formalised response and investigation a medical director might expect. Dr Gaston was unable to explain his reason for not informing the Medical Director.[513]

2.157 It should be noted that throughout this period, Professor Savage maintained contact with Adam's mother[514] and was content to discuss both Dr Alexander's and Dr Sumner's medical opinions with her "*provided that Dr Murnaghan was happy and there were no medico-legal reasons to suggest otherwise.*"[515] He was cautious lest he say anything inappropriate from the point of view of the Trust,[516] perhaps because he knew that "*Debbie Strain, at that time, felt that someone should take the blame for what happened to Adam.*"[517] He wrote to her to say that "*once the cause of Adam's death is established it is right we should try and work out why.*"[518]

2.158 Dr Murnaghan and Dr Gaston were part of the 'governance' investigation into Adam's death[519] but their failure to investigate was blatant. I believe their failure to conduct a thorough investigation was deliberate. Their

511 059-051-106
512 Dr Murnaghan T-25-06-12 p.152 line 15
513 Dr Gaston T-19-06-12 p.129 line 8
514 093-006-019
515 011-033-165
516 Professor Savage T-22-06-12 p.31 line 22
517 Professor Savage T-22-06-12 p.36 line 14
518 306-090-001
519 Dr Gaston T-18-06-12 p.114 line 25

response to Adam's death was to commit as little to writing as possible and to reveal as little by investigation as was consistent with appearing to assist the Coroner. Realising, as they must have done, the vulnerabilities of the Trust to criticism, I interpret their actions on behalf of the Trust as essentially defensive. That was inappropriate. Whilst this failing was grave and principally the responsibility of Dr Murnaghan, I consider that all involved must bear responsibility because the necessity to investigate what had happened to Adam must have been obvious to all.

Assessment of Dr Taylor

2.159 Dr Murnaghan described an informal and off-the-record routine for managing the problem of the skilled doctor who has made a mistake. In such situations, he said the lead clinicians together with their colleagues might review the problem, the doctor and his performance. A decision would then be made amongst themselves about how best to proceed and "*almost certainly there might be an element of supervision.*"[520]

2.160 It was in this context, and rather than report the death formally to the Medical Director, that I believe Dr Murnaghan allowed Dr Taylor's anaesthetic colleagues some control of the situation, not least because they were "*separately and severally... all totally supportive of Dr Taylor.*"[521] Dr Murnaghan "*knew and had been reassured that Dr Taylor had never ever in all his time... in the Royal... ever had a problem... he was probably the most diligent of all the anaesthetists in the RBHSC.*"[522] Indeed, Dr Taylor received support from the most senior anaesthetist in the Trust, Dr Dennis Coppell, who wrote to say that he did "*not believe on reading the information available to me that there is any negligence on your part and, to the contrary, you demonstrated considerable professional skills and expertise.*"[523]

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520 Dr Murnaghan T-25-06-12 p.35 line 17 *et seq*
521 Dr Murnaghan T-25-06-12 p.157 line 23
522 Dr Murnaghan T-25-06-12 p.155 line 15
523 122-048-002

2.161 It was Professor Savage who sensed that Dr Taylor was "*ill advised*"[524] by his anaesthetic colleagues. He suggested that "*...what was allowed to happen was that Dr Taylor did not get advice from anyone that said 'look, the evidence from Dr Sumner, from the Autopsy, from Dr Savage, from Dr O'Connor is such that we think the position you are taking is untenable.' No one ever said that to him, I don't think. Therefore he was allowed to proceed down that road and, unfortunately, has got into the difficulties that he is now in*."[525]

2.162 That was a mistaken approach. When Dr Sumner's report confirming Dr Taylor's error was received, Dr Murnaghan did nothing because "*Dr Taylor had a view which differed from Dr Sumner's view and he received a degree of support from Dr Gaston in relation to that view... I wasn't in a position to make a judgment on that.*"[526] What I believe he should have done was to seek the opinion of someone who was in a position to make a judgment. That would then have obligated Dr Taylor to either accept his error or, if he wished to defend it, to do so from a position independent of the Trust.

2.163 To make matters worse, Dr Murnaghan did not assess Dr Taylor's fitness to practice because he had been "*reassured that his colleagues were looking after him, overseeing his work.*"[527] That approach meant that the safety of Dr Taylor's patients may have become dependent upon the supervision his colleagues provided.[528] That was unacceptable. Dr Murnaghan justified his actions on the basis that "*This was a singular aberration that he would have learned from as well as everybody else... He didn't cause dilutional hyponatraemia again.*"[529] However, Dr Murnaghan knew that Dr Taylor did not accept the aberration[530] and could not therefore have been satisfied that lessons had been learned.

524 Professor Savage T-10-09-12 p.125 line 7
525 Professor Savage T-10-09-12 p.128 line 12
526 Dr Murnaghan T-25-06-12 p.185 line 16
527 Dr Murnaghan T-25-06-12 p.160 line 25
528 Dr Murnaghan T-25-06-12 p.162 line 4
529 Dr Murnaghan T-25-06-12 p.223 line 17
530 Dr Murnaghan T-25-06-12 p.221 line 8

2.164 Drs Gaston and Murnaghan failed to place patient safety before other interests. Dr Murnaghan has conceded that "*on reflection... we should have done things earlier and we didn't do, even then afterwards, what we should have done. And I'm sorry.*"[531]

Post-mortem

2.165 Adam's death was reported to the Coroner on 28th November 1995.[532] Upon his instruction a post-mortem was carried out on 29th November 1995 at the Royal Victoria Hospital by Dr Alison Armour,[533] a trainee Forensic Pathologist of Senior Registrar grade employed within the State Pathologist's Department.[534] She was at that time an experienced pathologist who had been a member of the College of Pathologists for a number of years. Dr Armour had 10 files of medical notes and records made available to her.[535] She performed external and internal examinations[536] and amongst other things noted "*complete infarction*" of the transplanted kidney.[537]

2.166 Dr Armour examined the brain on 12th January 1996[538] noting swelling and "*massive cerebral oedema of the cortex and white matter.*"[539] She subsequently described the severity of Adam's cerebral oedema as "*the worst she had ever seen.*"[540] Dr Armour sought the input and advice of others, namely Drs Mirakhur,[541] O'Hara[542] and Bharucha.[543]

2.167 Dr Murnaghan then made an approach to Dr Armour. He wrote to her on 7th February 1996 that "*I have spoken on the telephone with Bob Taylor and obtained his permission to share the attached with you on the*

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531 Dr Murnaghan T-11-09-12 p.181 line 14
532 011-025-125 & Professor Savage T-22-06-12 p.3 line 17
533 011-010-034
534 WS-021-1 p.1
535 011-010-033
536 011-010-037-8
537 059-039-088
538 011-010-039
539 011-010-040
540 011-010-033
541 303-001-002
542 303-001-003
543 Dr Armour T-13-06-12 p.20 line 4

understanding that its contents are for your personal information and as a background briefing, in order to assist in coming to your conclusions in this difficult matter."[544] His attachment was a note prepared by Dr Taylor pointing out the "*several major problems*"[545] he had identified in the evidence of Drs Sumner and Alexander together with Dr Taylor's assertion that both experts had "*failed to comprehend the physiological difference in this case and have used dubious scientific argument in an attempt to explain cerebral oedema*."[546] If this was an attempt to influence Dr Armour it was to fail because she was quite confident that she "*did not agree with him and he knew I did not agree with him*."[547]

2.168 Dr Armour completed her work and produced an Autopsy Report in which she referred to Professor Arieff's 1992 paper[548] and formulated the cause of Adam's death as:

"*1 (a) cerebral oedema due to*

(b) dilutional hyponatraemia and impaired cerebral perfusion during renal transplant operation for chronic renal failure (Congenital Obstructive Uropathy)."[549]

She did not implicate the infarcted kidney in the cause of cerebral oedema or death.

2.169 The Autopsy Report is undated.[550] Copies were sent to the Coroner on 22nd April 1996[551] and to Adam's mother, Dr Murnaghan and Dr Sumner.[552]

2.170 Dr Armour's reference to "*impaired cerebral perfusion*" arises from her identification of "*a suture in situ on the left side of the neck at the junction*

544 059-052-107
545 059-053-108
546 059-053-108
547 Dr Armour T-13-06-12 p.88 line 25
548 011-011-074: Arieff A. I., Ayus J. C., Fraser C. L. Hyponatraemia and death or permanent brain damage in healthy children. BMJ 1992; 304 :1218
549 011-010-034
550 011-010-041
551 011-059-124
552 011-061-196, 011-062-197 & 011-059-194

of the internal jugular vein and the sub-clavian vein"[553] which she thought had impaired the blood flow to Adam's brain. She believed that this had exacerbated the effect of the cerebral oedema and was thus relevant to her conclusions as to cause of death.

2.171 Evidence was received that the presence of such a suture was improbable.[554] On this issue (which is relevant but not central to the investigation of Adam's death) I believe that Dr Armour's identification of a suture was mistaken. She subsequently acknowledged this herself, having considered the expert opinion of others.[555]

2.172 However and apart from that, her identification and analysis of the important issues was more than competent. Professor Sebastian Lucas advised the Inquiry as to the content of her report. He found her autopsy to have been "*performed competently*" and to have been "*internally consistent.*"[556] He stated that he would grade the report as "*good*" because it "*addressed the central issue and produced a coherent answer.*"[557]

2.173 Dr Waney Squire also praised "*a very well worked commentary... Dr Armour has looked at the clinical story in some detail and she has done her best to make a detailed account of the factors which may have been relevant in death and how they fit in with what she has seen*."[558] However, she believed the Autopsy Report was open to criticism in relation to the possible ligation of the left internal jugular vein and the failure to investigate the cause of infarction in the transplanted kidney.[559] She also noted some inconsistency between contemporaneous notes and the Autopsy Report and questioned the involvement of Drs O'Hara and Bharucha without supporting documentation. Seemingly Dr Armour formed an opinion differing from that of Drs O'Hara and Bharucha. Dr Squire stated that in such a complex case "*specialist assistance should have been sought formally and the reports of*

553 011-010-039
554 WS-228-1 p.2-3, WS-232-1 p.2 & WS-007-4, p.2
555 Dr Armour T-13-06-12 p.1 line 22
556 209-001-005
557 209-001-006
558 Dr Squire T-12-06-12 p.136 line 22
559 Dr Squire T-12-06-12 p.141 line 3

those specialists included as signed reports within the final pathology report."[560]

2.174 The input of Drs O'Hara and Bharucha is unknown but it is clear that their input should have been recorded and Dr Mirakhur's contribution formally incorporated by way of signed report.[561]

2.175 Professor Lucas observed in relation to coronial autopsy practice at that time that there was "*no governance, no standard of quality demanded by Coroners, no obligatory linkage with feedback of autopsy findings with pre-mortem clinical practice and no agreed level of investigations for particular scenarios of death*."[562] Furthermore, in 1995 the State Pathologists Department generally "*did their own neuropathology*"[563] gave limited training,[564] had no formal system of referral for expert opinion,[565] did not retain a paediatric pathologist and did not attend mortality meetings for the purposes of clinico-pathological correlation.[566] It is not believed that the State Pathologist reviewed Dr Armour's report.[567] It would therefore be harsh to criticise Dr Armour's work. I find that her Autopsy Report was independent and, more importantly, correct in its principal finding.

2.176 Dr Armour's Autopsy Report was received by Dr Murnaghan at the end of April 1996.[568] It was in broad agreement with Dr Sumner and yet Dr Taylor's performance was still not reviewed nor his fitness to practice assessed. The lessons to be learned from Adam's death could have been learnt by the end of April 1996.

560 206-004-030
561 Dr Armour T-13-06-12 p.67 line 17
562 209-001-009
563 Dr Armour T-13-06-12 p.45 line 8
564 Dr Armour T-13-06-12 p.90 line 8
565 Dr Mirakhur T-12-06-12 p.31 line 8
566 Dr Armour T-13-06-12 p.37 line 20
567 WS-012-3 p.3
568 059-039-083

Fatal cerebral oedema: alternative causes and contributory factors

2.177 Arising from the expert opinions received by the Inquiry, a range of potential alternate causes for Adam's fatal cerebral oedema emerged together with a number of possible contributory factors, including:

(i) Pre-existing central nervous system condition.

(ii) Acute cerebral venous sinus thrombosis.

(iii) Chronic cerebral venous sinus thrombosis.

(iv) Thrombosis of the paravertebral plexus.

(v) Reduced jugular venous drainage or possible venous obstruction.

(vi) Cerebral blood flow, anaemia and reduced cerebral O2 delivery/low CO2.

(vii) Hypoxia.

(viii) Posterior Reversible Encephalopathy Syndrome during surgery/hypertensive encephalopathy.

(ix) Seizure(s) during surgery.

(x) Halothane in anaesthetic giving rise to cerebral vasodilation.

(xi) Dilutional anaemia.

(xii) Head down position during surgery.

These were exhaustively considered and two schedules summarising contrasting expert views compiled.[569] For the sake of completeness it may be stated that whilst the condition of the kidney did not contribute to death, the possibility cannot be discounted that dilutional hyponatraemia and

[569] 306-016-130 & 306-017-146

cerebral oedema might have contributed to the non-functioning of the kidney.[570]

2.178 In addressing these many issues, the Inquiry sought the neurological opinion of Professor Kirkham, practising Consultant Paediatric Neurologist and Professor of Paediatric Neurology, as to the effect of the fluid infusion upon Adam's brain and the possible contribution of venous obstruction to the cerebral oedema.

2.179 Amongst other things, Professor Kirkham gave it as her opinion that hyponatraemia was not, in fact, the primary cause of Adam's death and that he would have survived had it not been for other and unrelated conditions. Whilst conceding the possibility that dilutional hyponatraemia was implicated in a secondary role, she advanced specific vascular pathologies as the likely primary cause of the fatal cerebral oedema.

2.180 Her views raised issues going to the heart of the work of the Inquiry. They contradicted the inquest verdict and the opinions of Drs Sumner, Armour and Alexander and ran expressly counter to the analysis and conclusions of Professor Dr Gross, Dr Coulthard and Dr Haynes. Whilst her opinion was unsupported by the neuro-pathological and radiological findings of Drs Squier[571] and Anslow,[572] it was apparent that her opinion could not be disregarded because her hypothesis could not be excluded. Accordingly, expert response to her opinion was sought and meetings arranged in early 2012 in order to explore the emerging difference in diagnosis.[573]

2.181 Consensus was not possible[574] and the necessity for a second paediatric neurological opinion became obvious. Accordingly Professor Dr Dietz Rating of the Children's Hospital, University of Heidelberg[575] was commissioned to analyse the evidence, consider the diagnosis and give his opinion. He too disagreed with Professor Kirkham, concluding that it was

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570 Professor Forsythe T-04-05-12 p.145 line 8 & Professor Risdon T-03-05-12 p.38-39
571 208-003-050
572 208-004-051
573 307-007-073, 307-008-162, 306-016-130 & 306-017-146
574 306-017-146, 309-008-230 & 307-008-242
575 306-097-001

the "*acute overload with free water, nothing else.*"[576] Whilst I am unable to make a definitive judgment in such a complex field, I believe that the evidence nonetheless permits a finding on the balance of probabilities.

2.182 Professor Kirkham advanced her opinion because she was unable to accept the proposition that hyponatraemia alone could, on the balance of probabilities, have caused Adam's death. This was on the basis that she could find no proof for it. She was very clear that available medical literature disclosed no data to confirm that such a large infusion of hypotonic fluid or such a drop in sodium levels had ever given rise to fatal cerebral oedema in the absence of another pre-existing brain compromise.[577]

2.183 Conceding that the literature did not extend much beyond Arieff "*and the number of cases reported is relatively small*"[578] she argued that those patients comprising Professor Arieff's study group must all have presented with other pre-existing risk factors and that dilutional hyponatraemia was not therefore the primary cause of their fatal cerebral oedemas. Examination of Professor Arieff's paper, did not however appear to support this interpretation. It is further to be noted that Professor Arieff has not subsequently amended his central findings[579] but has maintained his conclusion that the cause of cerebral oedema in such cases is the ill-considered use of hypotonic intravenous fluids. It is in any event unlikely that the literature could encompass cases directly comparable to Adam.[580]

2.184 Professor Kirkham pointed out that Adam had survived previous similar episodes of hyponatraemia and that there must therefore have been other factors involved. However upon analysis it was found that the rate of fall of his serum sodium levels was at least five times greater than that recorded

576 240-002-045
577 Professor Kirkham T-14-01-13 p.54 line 1
578 Professor Kirkham T-15-01-13 p.41 line 9
579 Professor Dr Rating T-15-01-13 p.89 line 9. See also Moritz and Ayus (2005) – 208-007-084 & Halberthal, Halperin and Bohn (2001)
580 307-007-094 & Professor Dr Rating T-15-01-13 p.32 line 22

for his previous episodes.[581] The rate of fall remained for Professor Dr Rating a key diagnostic feature.[582]

2.185 Nonetheless and proceeding on the basis that dilutional hyponatraemia was not the primary cause of death, Professor Kirkham gave her opinion, again on the balance of probabilities and largely on the basis that Adam presented with what may have been relevant risk factors, that he was likely to have suffered a cerebral venous sinus thrombosis ('CVST') and/or posterior reversible encephalopathy syndrome ('PRES') and that these pathologies caused the cerebral oedema. Whilst they might also have rendered Adam vulnerable to the effects of the dilutional hyponatraemia, she believed he would have survived but for the CVST and/or PRES.[583]

2.186 Whilst demonstrating that these conditions were possible and that there was no basis upon which to positively exclude them, she was unable to present evidence that Adam actually had them. In particular, there was no persuasive evidence that Adam was neurologically vulnerable[584] or that he had suffered previous neurological disorder,[585] or that he suffered any venous sinus thrombosis[586] or any PRES event[587] whether in isolation or together or at any time.

2.187 Professor Kirkham further advanced the proposition that hyponatraemia could not have been the primary causative factor unless hypoxia was also present.[588] The evidence for hypoxia was equivocal [589] and in any event the conclusion that dilutional hyponatraemia could not cause cerebral oedema without it, uncertain.[590]

2.188 Considerable debate surrounded the interpretation of the neuro-pathological investigations and whether or not the findings were more or

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581 201-015-225
582 240-004-022 & 200-022-271 & Professor Dr Rating T-15-01-13 p.31 line 18 & 306-113-001
583 208-007-112 & Professor Kirkham T-15-01-13 p.60 line 19.
584 208-002-034
585 Professor Kirkham T-14-01-13 p.68 line 12
586 Professor Kirkham T-14-01-13 p.73 line 3 & p.72 line 22 & p.70 line 7
587 Professor Kirkham T-15-01-13 p.70 line 8
588 Professor Kirkham T-15-01-13 p.5 line 18
589 Professor Kirkham T-15-01-13 p.61 line 11 & 206-002-005 & 011-025-125
590 Professor Kirkham T-15-01-13 p.83 line 22 & 201-016-289

less typical or indicative of this condition or that. This provided no more conclusive evidence than imperfect analogies drawn from experimentation with piglets.[591] Diagnosis on the basis of risk factors led to analysis of the hypothetical. Ultimately the problem of diagnosis in the absence of comprehensive information became a matter for informed clinical interpretation of the patho-physiology.

2.189 In determining the causative factors for the acute event which befell Adam, the overload of approximately 5% of his own body weight in free water[592] cannot on the evidence be disregarded. Adam was well before he went to theatre, by common agreement received an excessive quantity of free water very much too quickly and within hours suffered acute hyponatraemia and was dead. It is hard not to make the connection given that no other cause can be demonstrated and dilutional hyponatraemia is recognised in the medical literature as a cause of potentially lethal cerebral oedema.

2.190 Professor Kirkham conceded very fairly that the infusion of so much free water may have been a factor in the fatal cerebral oedema.[593] However she considered it rather more likely that the increase in Adam's blood pressure had given rise to a hypertensive encephalopathy and that was the major factor.[594] However, as she herself pointed out, the evidence and the literature were not conclusive in supporting such a diagnosis. Nonetheless and on the balance of probabilities she preferred it.[595]

2.191 Professor Dr Rating remained at variance with Professor Kirkham. Whilst acknowledging the fine judgments inherent in defining the primary and secondary causes of cerebral oedema, he said that a conventional application of physiological rules permitted the conclusion that dilutional hyponatraemia alone could cause a fatal cerebral oedema.[596] He said it was a diagnosis that he would accept immediately[597] being for him "*as a*

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591 Professor Kirkham T-15-01-13 p.42 line 23
592 300-077-148
593 Professor Kirkham T-14-01-13 p.54 line 12 & Professor Kirkham T-15-01-13 p.84 line 15
594 Professor Kirkham T-15-01-13 p.100 line 15
595 Professor Kirkham T-15-01-13 p.70 line 8
596 240-004-025 & Professor Dr Gross at 307-008-228 & Dr Coulthard at 307-007-094
597 Professor Dr Rating T-15-01-13 p.89 line 20

clinician the most logical and reliable explanation."[598] Having reviewed the arguments and the theory he said he was "*not convinced*" that there was any other primary cause[599] and that on the balance of probabilities, hyponatraemia was the primary cause of Adam's fatal cerebral oedema.

2.192 In this Professor Dr Rating was in accord with the other available expert comment as to the cause of death. All proposed that dilutional hyponatraemia was most probably the cause of Adam's fatal cerebral oedema. Accordingly, Professor Kirkham's rejection, on the balance of probabilities, of the consensus diagnosis in preference for a more speculative differential diagnosis could not stand without positive supporting evidence. That evidence was lacking.

2.193 Accordingly and given that there was broad agreement as to a plausible diagnosis and there was no compelling reason for me to prefer any other explanation, I conclude on the balance of probabilities that Professor Kirkham's opinion does not prevail.[600]

Inquest preparation

2.194 Dr Murnaghan had six months to prepare the Trust for Adam's inquest. His activity in meeting the Coroner and forwarding representations to Dr Armour may be contrasted with his inactivity elsewhere. Dr Murnaghan was aware of his obligation to assist the Coroner in clarifying the cause of death[601] but he took no further steps to formally investigate the death[602] or interview all those involved in order to clarify the conflicting opinions received.

2.195 Dr Murnaghan liaised with the Trust's Solicitor, Mr George Brangam, and arranged meetings with the Trust witnesses prior to inquest.[603]

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598 Professor Dr Rating T-15-01-13 p.93 line 9
599 Professor Dr Rating T-15-01-13 p.91 line 5
600 In these circumstances I determined that no useful purpose was served by seeking Professor Kirkham's opinion as to the cause of Raychel Ferguson's death.
601 093-025-068b
602 093-025-068b
603 059-036-069

Consultation with witnesses was undertaken in April[604] and May 1996.[605] Solicitor's advices were received.[606] Mr Brangam advised Dr Murnaghan on 30th May 1996[607] that Dr Sumner's views were capable of creating difficulties for the Trust at inquest and moreover that Professor Savage agreed with them. In addition Mr Brangam reiterated Professor Savage's suggestion that the Trust should adopt the attitude "*...that everyone concerned in the care of this child was devastated by his death and that where possible, answers will be provided to the queries raised by the solicitors on behalf of the next of kin.*"[608]

2.196 Dr Taylor's attitude remained assertive and defiant throughout. He informed Dr Murnaghan that it was unacceptable "*to speculate on the cause of Adam's death without direct post-mortem evidence and by misrepresenting the quantities and types of fluids given.*" He found "*several fundamental problems*" with Dr Armour's report and pointedly *observed that he* "*would hope that reasons* [were] *not being generated or misrepresented to suit the diagnosis.*"[609]

2.197 Dr Murnaghan was all too keenly aware that Dr Taylor disagreed with both Dr Sumner and Professor Savage. His response was to arrange further discussion with Dr Taylor and Dr Gaston[610] to reconsider the issue of Adam's fluid management. A final meeting with the solicitor, Dr Taylor, Professor Savage and Dr Gaston was convened on 14th June 1996[611] presumably in an attempt to establish an agreed position before proceeding to inquest, however, Dr Taylor refused to accept that there had been fluid overload or that Adam had suffered from dilutional hyponatraemia.[612] The

604 059-043-098
605 059-030-061
606 059-014-038
607 059-020-046
608 059-020-046
609 059-036-072
610 059-017-043
611 122-001-001
612 122-001-004

most that seems to have been agreed was that they would not use the words "*fluid overload.*"[613]

2.198 In Dr Murnaghan's view "*the purpose of the meeting* [was]*... to inform the Trust's legal advisor who was to ... represent the Trust at the Inquest.*"[614] Indeed Mr Brangam might, when informed of the contradictory opinions expressed by the Trust witnesses as to cause of death, have considered that a conflict existed in the Trust position and suggested separate legal representation for Dr Taylor at the inquest. He did not.

2.199 That was a very unsatisfactory position for the Trust and as Professor Savage observed "*it seemed to be that the people who were advising on the approach to the Coroner's Inquest were saying 'Dr Savage has that view, Dr Taylor has that view, and we must allow him to put that view forward.'*"[615] To have allowed a medical witness on behalf of the Trust to give evidence relating to the circumstances of a death which was known to be contrary to the beliefs of other medical witnesses appearing on behalf of the Trust was inappropriate. It conflicted the Trust's position and encouraged witnesses to minimise rather than articulate the differences between them.

2.200 Dr Gaston did not attend the pre-inquest consultations as a potential witness but in his governance capacity as a clinical director.[616] Notwithstanding that he was aware of the differences of opinion between Professor Savage and Dr Taylor as to the cause of Adam's death, he did not, even then, think it appropriate to inform the medical director but rather continued "*with a view to ensuring the evidence that was presented reflected fairly Dr Taylor's position so that the Coroner had the opportunity to hear the other points of view...*"[617] I believe that Dr Gaston was principally motivated to support Dr Taylor at a time when he and Dr Murnaghan should have been primarily concerned with ensuring that all involved complied with

613 122-001-004
614 Dr Murnaghan T-11-09-12 p.152 line 6
615 Professor Savage T-10-09-12 p.126 line 5
616 Dr Gaston T-11-09-12 p.42 line 21 & Dr Gaston T-19-06-12 p.111 line 12
617 Dr Gaston T-11-09-12 p.43 line 2

their legal duty[618] to inform the Coroner about what they knew of the facts and circumstances of Adam's death.

Inquest into Adam's death

2.201 Adam's inquest opened on 18th June 1996 before H.M. Coroner, Mr John Leckey, and heard from a number of witnesses including Adam's mother,[619] Dr Armour,[620] Dr Alexander[621] and Mr Keane[622] before resuming on 21st June 1996 to hear Dr Taylor[623] and Professor Savage.[624] No nursing or technical evidence was given. Mr Brown did not give evidence.

2.202 It is significant, that of the opinions expressed as to cause of death at inquest, it was Dr Taylor alone who dissented. He insisted that Adam's polyuric condition meant that he could not develop dilutional hyponatraemia and that this could not therefore have been the cause of death.[625] Mr Keane did not proffer his opinion as to what had gone wrong and Professor Savage, whilst indicating his agreement with Dr Sumner[626] was less critical of Dr Taylor's fluid management than might have been expected. Indeed, he was reluctant to say that there had been "*gross fluid overload.*"[627]

2.203 During the course of the inquest, the Trust provided the Coroner with draft "*recommendations for the prevention and management of hyponatraemia arising during paediatric surgery.*"[628] These were signed by Dr Taylor and submitted as evidence of how such cases might be managed in the future.[629] These recommendations were drafted by Dr Gaston,[630] in liaison with Dr Murnaghan,[631] and endorsed by consultant paediatric anaesthetist

618 Pursuant to section 7 of the Coroners Act (Northern Ireland) 1959. www.legislation.gov.uk/apni/1959/15/section/7
619 011-009-025
620 011-010-030
621 011-012-079
622 011-013-093
623 011-014-019
624 011-015-109
625 011-014-098
626 122-044-034
627 122-044-035
628 060-018-036
629 122-044-048
630 060-018-035 & WS-013-2 p.4
631 093-025-068b

Dr Seamus McKaigue.[632] The draft received the approval of Dr Crean[633] who stated that the primary purpose of the recommendations was that they might be produced at Adam's inquest.[634]

2.204 The recommendations specifically claim to be made with regard to the Arieff paper and the circumstances of Adam's case and seek to reassure that in future all anaesthetic staff will be made aware of the complications of hyponatraemia and advised to act appropriately.

2.205 Professor Arieff's paper was referenced because it was the medical literature cited by Drs Alexander, Armour and Sumner in support of the conclusion that Adam's cerebral oedema was caused by dilutional hyponatraemia resulting from an excess administration of low sodium fluids. Dr Sumner described it as a "*very important paper on the subject - about which* [there is] *not much general knowledge.*"[635]

2.206 Rule 23(2) of The Coroner's (Practice and Procedure) Rules (Northern Ireland) 1963 allowed the Coroner discretion to report the circumstances of Adam's death to the relevant authorities, if he considered…"*that action should be taken to prevent the occurrence of fatalities*"[636] The suspicion arose that the draft recommendations had been cynically provided to the Coroner in order to deflect him from issuing a Rule 23(2) report by reassuring that action would indeed be taken.

2.207 Evidence was received that the recommendations were not distributed beyond the same small group of anaesthetists which had drafted them in the first place.[637] They were not circulated amongst other clinicians or paediatricians involved in paediatric surgery or amongst other paediatric anaesthetists. In fact, nothing was done with the 'recommendations.' Accordingly, their principal reassurance that "*all anaesthetic staff will be made aware of the paediatric phenomena* [dilutional hyponatraemia] *and*

632 303-001-002, 060-014-025 & 093-023-065b
633 060-014-025
634 WS-130-1 p.16
635 122-044-011
636 303-052-715
637 WS-130-1 p.16

advised to act accordingly"[638] was almost certainly insincere. Given the lack of any subsequent dissemination of these recommendations or of "*the information contained in the paper by Arieff*"[639] it must be concluded that they were indeed drafted solely for production at the inquest and accordingly that their purpose must have been to provide comfort to the Coroner and dissuade him from making a Rule 23 report.

2.208 In the event, the Coroner was not convinced that such a report was necessary. He considered that Professor Savage's proposal "*to monitor electrolytes more closely*" [640] was clear[641] and was persuaded "*that changes would be made in relation to the future management of cases such as that of Adam's.*"[642]

2.209 In an apparently separate exercise the same draft recommendations were then developed into a "*press release.*" This was forwarded to the Trust's Public Relations department on 21st June 1996[643] "*in anticipation of media interest at the conclusion of the Inquest.*"[644] It subsequently found reference in both the Belfast Telegraph[645] and The Irish News.[646] The press and public were thus given the same empty assurances as were given the Coroner. It was, indeed, an exercise in public relations.

2.210 With hindsight, it was also a wasted opportunity to familiarise clinicians in Northern Ireland with the risks of dilutional hyponatraemia in children. It was later noted by Mr Clive Gowdy[647] that the references to hyponatraemia "*were of such general application to be of interest and significance to other hospitals likely to be treating young patients.*"[648] The fact that Dr Mulholland, then acting Clinical Director for Paediatrics, and Dr Terence Montague, Senior Registrar in Anaesthetics at the Children's Hospital, were both

638 011-014-107a
639 011-014-107a & Dr Crean T-04-06-13 p.34 line 5
640 122-044-034
641 122-044-051
642 006-015-311
643 059-007-023 & WS-105-2 p.19
644 305-020-001
645 070-016-073
646 070-016-070
647 Permanent Secretary, Department of Health, Social Services and Public Safety (DHSSPS) Northern Ireland
648 WS-062-2 p.10

unaware of the Arieff paper[649] emphasises the importance of this missed opportunity, which may have been significant for the care Claire Roberts was to receive only months later in the Children's Hospital.

2.211 Mr Gowdy went further and observed that he would have expected a copy of the recommendations to be sent to the Department and to Dr Henrietta Campbell, the Chief Medical Officer ('CMO') because of regional implication and the desirability of wider dissemination. The CMO herself believed that had they been brought to her attention she would have considered them an appropriate matter for discussion within the Specialty Advisory Committees ('SAC') for anaesthetics and paediatrics.[650]

2.212 The Inquest verdict given on 21st June 1996 found the cause of Adam's death to be "*(A) Cerebral Oedema due to (B) Dilutional Hyponatraemia and impaired cerebral perfusion during renal transplant operation for a chronic renal failure (congenital obstructive uropathy).*"[651] The Coroner made an additional finding that the onset of "*gross cerebral oedema was caused by the acute onset of hyponatraemia from the excess administration of fluids containing only very small amounts of sodium.*"[652]

2.213 The Coroner's verdict was damning for Dr Taylor and the Trust.

Post-inquest

2.214 After the inquest, Dr Murnaghan noted that "*generally the outcome was satisfactory with fair write up in Friday evening's Telegraph.*"[653] The newspaper report was headlined "*Death left me devastated - op doctor. Boy's death prompts action from Royal Hospital Trust.*"[654] He telephoned the Editor of the Belfast Telegraph to thank him.

649 Dr Mulholland T-21-06-12 p.178 line 15 & Dr Montague T-11-05-12 p.158 line 5
650 WS-075-2 p.8
651 011-016-114
652 011-011-063
653 059-001-001
654 070-016-073

2.215 The Trust's solicitor, Mr Brangam, wrote to Dr Murnaghan on 2nd July 1996 hoping that "*everyone involved was satisfied by the way in which matters progressed and, indeed, I believe it is not without note that the Coroner did not issue a recommendation in this case, which I believe was in a large part due to the fact that the deponents gave their evidence in fair, objective and professional manner and at the same time were alert and aware of those issues which might cause an erosion of public confidence.*"[655] He also sought to place on "*record my appreciation for the sterling help and assistance given at the hearing of this matter by Dr Gaston.*"[656]

2.216 Mr Brangam was to write further to Dr Murnaghan on 19th March 1997 in respect of the medical negligence claim brought by Adam's mother to advise that "*from a liability point of view, this case cannot be defended, and this is based largely upon the information given by one of the independent experts retained by H.M. Coroner at the Inquest. Additionally I believe that it would unwise for The Trust to engage in litigation in this matter given the particularly tragic circumstances of the death and the opportunity for the exploration of any differences of opinion which might exist between a number of the attending physicians.*"[657]

2.217 The solicitor thus reveals what I believe to have been the Trust tactic at inquest. Given that Dr Sumner's views were likely to prevail and that there were issues which could cause an erosion of public confidence, it was decided to draw as little attention as possible to the differences of opinion between doctors lest the full extent of what may have gone wrong be explored. That was an approach which, in effect, withheld relevant information and analysis from the Coroner and discouraged review.

2.218 Dr Carson recalled "*Dr Murnaghan coming into my office after the Inquest to say basically, the Inquest went all right... satisfactory.*"[658] Having acknowledged that there could be nothing "*satisfactory*" about such a

655 060-020-039
656 060-020-039
657 060-016-031
658 Dr Carson T-16-01-13 p.150 line 13

verdict from the point of view of the Trust, Dr Carson explained that Dr Murnaghan must have thought it "*went all right*" from the perspective of "*reputational risk - being damaged by an adverse outcome in an Inquest.*"[659]

2.219 I conclude that overall Dr Murnaghan engaged in a 'damage limitation' exercise to protect the reputation of the hospital. That was not the role of one who should had been motivated to assist the Coroner.

Informing the Medical Director

2.220 Dr Murnaghan informed Dr Carson about the inquest but did not seemingly communicate the crucial point that Dr Taylor had made a grievous error[660] and refused to acknowledge it. Dr Carson explained that he had not been told that there was criticism of Dr Taylor[661] or that the Coroner had suggested a dissemination of information[662] and it was thus that he did not "*give any thought to a review or investigation of any sort into the case.*"[663]

2.221 However, Dr Murnaghan did inform Dr Carson that the inquest had raised risk management issues and Dr Carson seemingly agreed that this warranted a seminar as soon as possible with Drs Taylor, O'Connor, Mulholland and Gaston, Professor Savage and Mr Keane.[664] This did not happen and Dr Carson did not pursue it. Nor did he ask to see the Coroner's verdict[665] or enquire if Dr Taylor accepted it.[666] He asked no questions, sought no report, and made no report to the Board.

2.222 The absence of any engagement by the Medical Director, Dr Carson, with the issues generated by the Inquest verdict is extraordinary and may have had a major bearing on how the Trust responded to the Coroner's finding, managed Dr Taylor and learned from the tragedy.

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659 Dr Carson T-16-01-13 p.151line 17
660 Dr Carson T-16-01-13 p.158 line 7
661 Dr Carson T-16-01-13 p.159 line 11
662 Dr Carson T-16-01-13 p.175 line 9
663 Dr Carson T-16-01-13 p.164 line 13
664 059-001-001
665 Dr Carson T-16-01-13 p.155 line 25
666 Dr Carson T-16-01-13 p.156 line 24

Post-inquest response

2.223 It was Dr Taylor alone who had did not accept the finding of the Coroner.[667] He continued to brazenly defend his position to both the PSNI and this Inquiry until he was finally obliged to concede error in February 2012.[668] He did not, however, publically disagree with the inquest verdict and somehow managed to leave his colleagues unclear as to exactly what his position was.

2.224 It is to be regretted that the Trust took no formal steps to find out if Dr Taylor accepted the verdict.[669] Mr Keane "*thought that the verdict of the inquest would have perhaps offered an opportunity for other people to talk to him*"[670] but as Professor Savage recalled - "*the Coroner made his decision, we accepted it and things seemed to have ended there.*"[671]

2.225 Mr Koffman was of the view that "*if the Coroner's verdict was that this was an avoidable hyponatraemic death, it has to be accepted by the team. If you do not accept that, you cannot be part of that team. So I would immediately say he could do no transplant work. But the problem with hyponatraemic illness is that it could relate to any operation; it is not just specific to transplantation. So that is why there is a wider connotation.*"[672] I believe that was the proper response and the one which should have been adopted by the Trust in 1996. Until such time as the Trust could be confident that such an error would not be repeated, patient safety was potentially jeopardised. Steps ought to have been taken to formally assess and, if necessary, retrain Dr Taylor at that time. Instead, Dr Taylor was permitted to continue in his practice.

2.226 However in 1996, the Trust did not assess the clinical performance of its medical staff. Dr Gaston recalled "*no policy... for the appraisal of*

667 Dr Montague T-11-05-12 p.155 line 21 & Professor Savage T-18-04-12 p.171 line 12
668 WS-008-6 p.3
669 Dr Gaston T-11-09-12 p.108 line 20
670 Mr Keane T-26-04-12 p.171 line 10
671 Professor Savage T-22-06-12 p.99 line 3
672 Mr Koffman T-16-05-12 p.153-154

anaesthetic staff after an unexpected death."[673] There was no external review and as Mr William McKee[674] advised, no "*process of assessing and developing the competence of doctors outside the GMC.*"[675] There was no referral to the General Medical Council ('GMC'), whether by the Trust or its medical staff, notwithstanding the clear duty imposed by the GMC Code of Good Practice to protect patients when clinical performance was thought to pose a threat.[676] Mr McKee stated that the Board "*relied on the wider clinical team to ascertain whether there should be a referral to the GMC.*"[677] However, as Dr Murnaghan explained "*there wasn't a culture of referral to the GMC.*"[678] That must however have been known to all.

2.227 The consultant paediatric anaesthetists in the Children's Hospital do not appear to have even considered referring Dr Taylor to the GMC. They did discuss Adam's case[679] but somehow allowed themselves to understand that whilst Dr Taylor may not have agreed with the Inquest verdict he did acknowledge error in respect of his care of Adam.[680] They appeared to have been content to leave it at that without further reassurance as to his competency in fluid management.[681] In short, they appear to have trusted to luck.[682] Professor Savage and the nephrology team do not seem to have been so trusting and in consequence of Adam's death they made it their "*business to be in theatre for the duration of every transplant and to have discussions with the Anaesthetist about the fluids beforehand and during and actively observe all the fluids that were given.*"[683]

2.228 I can only conclude that the Trust lacked a proper system to manage the consultant who failed to acknowledge error or the risk he might pose to patients or the extent to which further training might be necessary. The

673 WS-013-2 p.7
674 306-081-006 Chief Executive, Royal Hospitals Trust
675 WS-061-2 p.17
676 WS-130-1 p.25
677 Mr McKee T-17-01-13 p.52 line 11
678 Dr Murnaghan T-25-06-12 p.212 line 23
679 Dr Crean T-20-06-12 p.51 line 17
680 Dr Crean T-20-06-12 p.25 line 11
681 Dr Crean T-20-06-12 p.28 line 6
682 Dr Crean T-20-06-12 p.28 line 3
683 Dr O'Connor T-20-06-12 p.104 line 17

Trust had no means of satisfying itself that the clinicians involved in the paediatric renal transplant programme were competent or that problems would be addressed. Because there was no proper review to identify poor performance, clinicians were left with only themselves to satisfy that the service they provided was of an appropriate standard. Left alone, not even a critical Coroner's verdict on a patient's death could prompt them to formally question their performance or refer to the GMC. This approach amounted to the Trust surrendering such mechanisms of risk management control as it claimed to a culture of uncritical medical self-regulation about which it did not enquire. This was a failure in leadership of the Medical Director, the Board of the Trust and the Chief Executive.

Post-inquest audit and review

2.229 The Inquiry was informed that the Paediatric Directorate held regular medical audit meetings in 1995.[684] Indeed the Royal Hospitals Annual Report 1993-94 described "*... sessions on case note review, discussion and presentation of audit projects... More recently there has been a move toward multi-disciplinary audit (clinical audit)...*"[685]

2.230 There was no clinical audit of Adam's case before the Inquest because as Dr Taylor said he "*did not do anything in terms of clinical audit as it was a Coroner's case.*"[686] Regrettably, he did nothing about a clinical audit of the case after the inquest either. Nor was Adam's case seemingly presented at any other Paediatric Directorate meeting.

2.231 Dr Taylor believed however that Adam's case could have been presented at an ATICS mortality meeting[687] by Dr Gaston[688] but was unable to identify any learning to have emerged from the meeting.[689] That is probably because it was the meeting held on 10th December 1996 when Dr Gaston chose to openly praise the excellence of Dr Taylor's record keeping in the

684 305-011-572
685 WS-061-2 p.58
686 WS-008-03 p.43
687 Dr Taylor T-21-06-12 p.109 line 20
688 Dr Taylor T-21-06-12 p.114 line 19
689 Dr Taylor T-21-06-12 p.115 line 19

context of assisting the Coroner's investigation.[690] Given what was by then known about Adam's death I believe that this reveals an underlying institutionalised reluctance to admit major shortcomings. Furthermore, and given that Dr Taylor had not, at that stage, accepted the Coroner's verdict[691] I consider that proper discussion of the case should have focussed on Dr Taylor's position and how it might have been dealt with.

2.232 Dr Murnaghan described the response within the Trust to the introduction of clinical audit as slow and incorporating a "*touch of resistance.*"[692] I find that the evidence revealed concrete resistance in 1996 to any meaningful audit, review or analysis of Adam's case.

Lessons

2.233 Ms Slavin observed that "*families may still be angry. However, if they can be assured, both that lessons have been learned and that changes have been made, then it may ease their grief and give them solace and closure.*"[693]

2.234 In general, I agree with the view expressed to the Inquiry by Mr Ramsden that "*in 1995 I would have expected a more formal approach to the lessons learned to be taken by the RBHSC. I have seen no formal report from RBHSC summarising the incident, the lessons learned and an Action Plan for implementing improvement. In view of the seriousness of this case, I would have expected to see a report created by RBHSC in 1995, summarising all this... certainly such a report should then have commented on whether any broader lessons on fluid management and the prevention of hyponatraemia were needed.*"[694]

2.235 At inquest the Coroner had a discussion with Dr Sumner about how Dr Sumner's views "*could be disseminated amongst the medical profession in*

690 WS-013-1 p.3
691 Dr Taylor T-21-06-12 p.112 line 7
692 Dr Murnaghan T-25-06-12 p.15 line 2
693 WS-001-2 p.17
694 211-005-018

Northern Ireland."[695] The Coroner "*assumed that the Royal Belfast Hospital for Sick Children would have circulated other hospitals in Northern Ireland with details of the evidence given at the inquest and, possibly, some 'best practice' guidelines*"[696] and further that he "*attached great importance to* [this] *bearing in mind that the Royal Victoria Hospital was pre-eminently a teaching hospital.*"[697] He was to be disappointed. Mr McKee advised that "*prior to July 2004 there was no formal mechanism or requirement within Northern Ireland to report lessons learned from Inquest.*"[698]

2.236 Dr Murnaghan did not report the outcome of the inquest to the Trust Board and neither the Chief Executive nor the Clinical Director of Paediatrics[699] was informed of the verdict or the Coroner's intention that information be shared.[700] Dr Gaston claimed not to remember the Coroner discussing how lessons might be shared[701] and gave no thought to the identification of lessons or the prevention of a possible recurrence.

2.237 In respect of learning lessons within the hospital, Mr McKee advised that "*until 1999 the Director of Medical Administration ensured the internal dissemination of lessons learned from Inquests.*"[702] There is no evidence that Dr Murnaghan did anything. Whilst he did discuss convening a seminar involving Professor Savage, Drs Mulholland, Gaston, O'Connor, Taylor, Hicks[703] and Mr Keane to address "*the other issues identified*"[704] he did not pursue the idea.[705] Dr Murnaghan spoke of his "*regret to this day that I forgot totally about this important issue.*"[706]

2.238 With hindsight it is indeed to be regretted that Dr Murnaghan's idea of a seminar was forgotten because the principal learning from the death was

695 WS-091-1 p.2
696 WS-091-1 p.4
697 Mr Leckey T-25-06-13 p.61 line 12
698 WS-061-1 p.2
699 Dr Mulholland T-21-06-12 p.178 line 22
700 WS-061-1 p.2
701 Dr Gaston T-19-06-12 p.185 line 8
702 WS-061-1 p.2
703 306-081-004
704 059-001-001
705 WS-015-2 p.20
706 Dr Murnaghan T-25-06-12 p.209 line 1

available and had been since January 1996 in the reports of Drs Alexander[707] and Sumner.[708] Both had relied for authority upon Professor Arieff's paper 'Hyponatraemia and death, or permanent brain damage, in healthy children' (1992)[709] as indeed had Dr Armour and all the consultant paediatric anaesthetists in the Children's Hospital.[710] The Arieff paper therefore became the obvious basis for teaching about IV administration of hypotonic fluids and the risks of dilutional hyponatraemia in children. Dr Sumner could so easily have been invited to the Children's Hospital for an open discussion as to the issues arising. An invitation to Dr Armour or Professor Savage would have been simpler still.[711]

2.239 Arieff's study analysed a group of patients who had died or suffered brain damage from hyponatraemia. The paper had broad Children's Hospital application because none of Arieff's study group had undergone renal transplantation or even major paediatric surgery but had been hospitalised by minor fevers, appendicitis and other non-critical conditions. Most were admitted with symptoms of lethargy, emesis or weakness. It is to be remembered that only four months after Inquest, Claire Roberts was admitted to the Children's Hospital with symptoms of lethargy, emesis and nausea.[712]

2.240 Drs Taylor, McKaigue and Crean, who had all felt it appropriate to endorse the draft recommendations for the Coroner with "*regard to the information contained in the paper by Arieff et al (BMJ 1992)*"[713] all still practiced in the hospital at the time of Claire's admission but had made no attempt to share Arieff's guidance or give any relevant training whatsoever in what was Northern Ireland's only regional paediatric training hospital. Dr Taylor conceded that "*it ought to have been read and understood and put into the*

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707 011-012-084
708 011-011-053
709 011-011-074
710 011-014-107a
711 Dr Armour T-13-06-12 p.111 line 6
In May 1997 Dr Alison Armour published an article about Adam's case in the Journal of Clinical Pathology (WS-012-1 p.8) *"to ensure that this would not happen again.."*
712 090-011-013
713 011-014-107a

practice of all anaesthetists and paediatricians... who are looking after children in Northern Ireland."[714]

2.241 It is in this context additionally unsettling to record that Lucy Crawford was admitted to the Erne Hospital in 2000 with a history of lethargy, drowsiness and floppiness,[715] and Raychel Ferguson to the Altnagelvin Area Hospital in 2001 for an appendectomy.[716] They, and Claire, all presented with symptoms similar to those recorded in Arieff's study and all were to receive IV infusion of the hypotonic Solution No.18.

2.242 Professor Arieff's concluding paragraph now seems particularly relevant to the treatment given Claire in that he advised that "*when a paediatric patient receiving hypotonic fluid begins to have headache, emesis, nausea or lethargy the serum sodium concentration must be measured. Although these symptoms are somewhat non-specific, the diagnosis is easily established at minimal cost and with virtually no risk to the patient by evaluating plasma electrolyte values.*"[717]

2.243 There was ample opportunity to direct and influence the learning from Adam's case.[718] The lead members of Adam's transplant team, Professor Savage, Dr Taylor and Mr Keane all held teaching posts at Queens University, Belfast.[719] Professor Savage chaired the Faculty of Medicine Education Committee in 1995[720] and Dr Taylor served on the Education Sub-Committee of the Anaesthetics, Theatre and Intensive Care Directorate 1995-1997 and was in a position to influence post-registration training.[721] This additional aspect of Dr Taylor's practice emphasises the importance which should have been attached to assessment of his clinical competence in respect of fluid management in the context of end-stage renal failure.

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714 Dr Taylor T-21-06-12 p.98 line 20
715 027-009-020
716 020-006-010
717 011-011-077
718 Professor Savage T-22-06-12 p.119 line 9
719 306-018-004 & 306-019-010 & 306-023-003
720 306-018-008
721 306-019-011

2.244 Indeed, Dr Haynes expressed concern about Dr Taylor's teaching role given the mistakes made by him in fluid management and his failure to acknowledge error.[722] However Dr Taylor, doubtless intending to reassure, claimed to have "*stuck to textbook teaching about the management of fluids.*"[723] That must, however, have meant that his teaching was then at odds with his explanations to the PSNI and this Inquiry. Dr Taylor categorised his "*answers to the Police as... irrational.*"[724] I categorise his answers as dishonest.

2.245 I believe that by refusing to accept Adam's dilutional hyponatraemia, Dr Taylor restricted the scope for learning. His opinion alone seems to have been a limiting factor because even eight years later when the Trust was asked by the Department whether anything had been learned from Adam's case, the Trust's Press and Public Relations Officer responded having "*just spoken with Dr Bob Taylor, Consultant Anaesthetist in PICU, who was involved in the management of Adam Strain and gave evidence at the Inquest. Following a detailed examination of the issues surrounding patient AS there were no new learning points, and therefore no need to disseminate any information.*"[725]

2.246 The Coroner has said that "*looking back, it was one of the most important inquests I've ever held...*"[726] It is therefore not only disappointing but disturbing that so little should have been learned from it. Dr Gaston considered that the responsibility for the failing to learn lessons was collective.[727] I agree, but would add that those involved were not given the necessary guidance or leadership from within the Trust. In the light of the critical verdict at inquest, Drs Carson and Murnaghan should never have allowed so important a learning opportunity to go unexplored.

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722 Dr Haynes T-02-05-12 p.29 lines 6-14
723 Dr Taylor T-21-06-12 p.136 line 19
724 Dr Taylor T-21-06-12 p.138 line 1
725 023-045-105
726 Dr Murnaghan T-25-06-12 p.132 line 9
727 Dr Gaston T-19-06-12 p.146 line 7

2.247 The learning to be extracted from Adam's death was left to the discretion of the doctors and the individual judgement of Dr Murnaghan.[728] Those individuals could not be relied upon. Dr Murnaghan was still engaged in 'defending' the medical negligence claim and unlikely to draw attention to deficiencies in clinical care; Dr Taylor was still denying that Adam had dilutional hyponatraemia and the doctors involved remained predictably averse to focusing on clinical failings.

2.248 That Dr Murnaghan was expected to disseminate learning from inquests in addition to all his other responsibilities was unrealistic. That he should have been left alone to manage matters of such importance without reference to the Trust Board, confirms to me that the Board was not engaged with patient safety. From the point of view of the Children's Hospital that was deeply unsatisfactory.

Medical negligence litigation

2.249 No apology was given to Adam's mother as contemplated by 'The Complaints Procedure.'[729] Her litigation was concluded by settlement on 29th April 1997 without admission of liability and subject to confidentiality.[730] The terms of settlement appear to have been drafted by Mr Brangam and the confidentiality clause inserted on his advice.[731] Refusal to admit liability made it very much less likely that Ms Slavin would ever receive a clear explanation about her son's death and the imposition of confidentiality stifled discussion.

2.250 Mr Brangam had previously advised the Trust about handling complaints. He had observed that "*too often in the past clinicians seemed to entertain the notion that the complaints process of itself was threatening, potentially hostile and one where possibly too much information was given to complainants*" and advised that "*to say 'sorry' is not an admission of liability but rather ought to be seen as a proper and sympathetic approach to*

728 211-005-017
729 WS-062-1 p.351
730 060-013-024
731 Dr Murnaghan T-25-06-12 p.226 line 2

matters which may have caused a patient or their family concern."[732] These advices were shared with Dr Murnaghan but do not appear to have tempered their shared approach to litigation which was directed at disposing of potentially embarrassing litigation as quietly and unapologetically as possible.

2.251 Ms Slavin expressed her frustration, annoyance and disappointment with a litigation settlement process which was confidential and did not admit fault.[733] She said that "*the inquest and subsequent civil proceedings should have brought closure to my grief. They did not.*"[734] It was not until 17th October 2013 that the Trust eventually offered Ms Slavin an admission of liability, an apology and an expression of sympathy.[735] This could and should have been done after the Inquest in June 1996. The delay was inexcusable and further distress was unnecessarily caused.

2.252 On 12th November 2013 the Chief Executive of the Belfast Health and Social Care Trust[736] Mr Colm Donaghy publically acknowledged that the way "*litigation has been handled by the Belfast Trust has added to the hurt and grief felt by the families... I wish to apologise unreservedly to the families for the unacceptable delay in the Belfast Trust accepting liability.*"[737]

2.253 That nothing was done to review the medical negligence claim after settlement or draw anything from it confirms my view that the way claims were processed acted as an obstacle rather than a support to the practice of learning from error. That was an obvious waste of opportunity for clinical improvement.

2.254 Dr Murnaghan's role as manager of litigation was untenable. His responsibility to defend claims against the Trust was in potential conflict

732 126-021-001
733 WS-001-2 p.16
734 WS-001-2 p.17
735 T-17-10-13 p.2-3
736 Which incorporated the former Royal Group of Hospitals Trust ('RGHT')
737 Mr Donaghy T-12-11-13 p.5 line 15

with his duties as impartial investigator of fact, facilitator to the Coroner and disseminator of learning. The arrangement did not work.

Response within paediatric renal transplant service

2.255 Professor Savage continued to lead the Paediatric Renal Transplant Service and to rely upon the services of Dr Taylor and Mr Keane. He and Dr O'Connor revised the 1990 Renal Transplant Protocol to ensure that, prior to being called for transplant, each child and family would meet with the surgeon and an individualised transplant plan would be prepared.[738] They tried to make sure that Solution No.18 would not be administered[739] and that urinary output and sodium concentrations would be measured.[740]

2.256 In April 2011 Dr O'Connor was able to advise that all 50 paediatric renal transplant patients operated on in the Children's Hospital since Adam's death had survived transplant surgery.[741] Dr Taylor performed the anaesthesia for six of them[742] and Mr Keane the surgery for two.[743] Of the transplants performed in 2010-2012 she advised that "*100 per cent of the transplants are working, which equals the best results in the UK.*"[744]

Other issues: unsatisfactory evidence

2.257 I found the evidence of the surgeons before this Inquiry to be so unsatisfactory as to justify my singling them out for specific comment. It was Dr Taylor who observed that "*It's very unusual for a patient of any age to die on the operating table and has a devastating effect on the operating department.*"[745] That might be thought self-evident. However, Mr Brown gave evidence from the perspective of one so little marked by the event as to be unable to recall almost anything of it. I did not always find that convincing and consider Mr Brown knew more than he was prepared to

738 Professor Savage T-22-06-12 p.130 line 4
739 Professor Savage T-17-04-12 p.62 line 14
740 Professor Savage T-18-04-12 p.77 line 14
741 WS-014-2 p.20
742 301-047-414
743 Mr Keane T-24-04-12 p.6 line 9 & 301-047-414
744 Dr O'Connor T-25-04-12 p.182 line 3
745 Dr Taylor T-19-04-12 p.57 line 4

say. He did say by way of an unexpected aside that "*my mantra is I don't know and I don't remember.*"[746] I found his attitude inappropriate.

2.258 By contrast it was Mr Keane's evidence I found inappropriate. It was so undermined by inconsistency[747] that only limited reliance could be placed on it. I formed the view that Mr Keane initially told Professor Savage the truth about Adam's fluid overload but for 'internal' purposes only. Later, and for the 'external' purpose of inquest, he avoided what he knew to be true hoping that the Coroner would correctly identify the cause of death and relieve him of his obligation to assist.[748] Then having stated "*as far as I was concerned the anaesthetic went ahead on a very difficult patient without any particular problems*"[749] he placed himself in a position of inescapable inconsistency as far as this Inquiry was concerned. He failed in his professional duty to assist the Coroner and I believe he failed in his professional duty to assist me.[750]

Concluding remarks

2.259 Even though I found defensiveness, deceit and a strong inclination amongst colleagues to close ranks, I do not conclude that the Trust itself engaged in a systematic 'cover-up.' It is to be recognised that Dr O'Connor recorded the provisional diagnosis of dilutional hyponatraemia within hours of Adam's admission to PICU. Dr Taylor carefully filed the anaesthetic notes and the CVP trace in the chart. The death was notified promptly to the Coroner who commissioned a post-mortem report, investigated and sought

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746 Mr Brown T-01-05-12 p.102 line 21

747 For example, inconsistent evidence in relation to:
- (i) the decision to accept kidney (see: WS-006-3 p.23 & Mr Keane T-24-04-12 p.16)
- (ii) an arrangement to leave before the completion of surgery (see: Mr Keane T-24-04-12 p.83 line 15 & Mr Keane T-24-04-12 p.87 line 17)
- (iii) checking the catheter before inserting supra-pubic catheter (see: Mr Keane T-23-04-12 p.96 line 17 & WS-006-3 p.8)
- (iv) the CVP readings sought from Dr Taylor (see: WS-006-3 p.17 & Mr Keane T-23-04-12 p.117 line 12)
- (v) his role in wound closure (see: 093-010-030 & Mr Keane T-10-09-12 p.16 line 20)
- (vi) his reason for leaving the theatre before completion of surgery (see: WS-006-2 p.7 & Mr Keane T-26-04-12 p.163-64)
- (vii) non-participation in subsequent paediatric transplant surgery (see: 301-127-001 & Mr Keane T-24-04-12 p.17 & 301-047-414)

748 Mr Keane T-23-04-12 p.73 line 2

749 059-034-067

750 315-002-009

the views of consultant anaesthetist Dr Alexander. Dr Murnaghan and the paediatric anaesthetists advised the Coroner to obtain the additional expert advices of Dr Sumner. These independent reports were shared with Ms Slavin and Professor Savage was authorised to explain them to her. He met and corresponded with her. Neither the diagnosis nor the implications were concealed and Professor Savage advised her in February 1996 that "*after Adam came out of theatre and we knew his sodium was low we realised this was dilutional.*"[751] Thereafter Dr Armour's Autopsy Report was forwarded to her.[752] Professor Savage placed on record his disagreement with Dr Taylor,[753] advised the Trust's solicitors accordingly and publically endorsed the conclusions of Dr Sumner at inquest.

It is, however, impossible to avoid the conclusion that the Trust, by its systems and employees, allowed the barest possible constructive response to Adam's death. Lessons were not learned and that was to compound tragedy.

751 306-090-001
752 011-061-196
753 059-003-005