

**REPORT OF EXPERT ON ANAESTHESIA: DR. SIMON HAYNES
ADAM STRAIN**

SUPPLEMENTARY BRIEF

There are some specific queries arising out of your Report and we would be grateful if you would address the following matters and provide your response in a fully referenced Supplemental Report -

Page 2

1. (i), 1st para, line 1:

"Protocols (and guidelines) for specific circumstances e.g. renal transplantation in children, are generally prepared by individual institutions. I enclose two recent excellent examples."

- (i) Please provide, if available, any examples you have of protocols that were generally available in 1995 governing or impacting upon the work or role of an anaesthetist before, during, and after a transplant procedure.

Page 4

2. (B), 1st para, line 1:

"The presence of a second anaesthetist is not essential, but would be useful in terms of providing assistance with technical tasks (if competent), and observation of the patient." (Emphasis added)

- (i) Describe the "technical tasks" in Adam's surgery with which a second anaesthetist may have been able to provide assistance.
- (ii) Please explain your caveat of "if competent". Why would an anaesthetist be included in the operation team as a second anaesthetist for a paediatric renal transplant if he or she was not "competent" to assist with technical tasks?
- (iii) Mr. Brown (Consultant Paediatric Surgeon who assisted Mr. Keane with Adam's transplant) states in his PSNI Statement [Ref: 093-011-031]: *"The reason that I assisted Mr. Keane in the operation and not a more junior doctor, which would have been entirely acceptable, was because I knew Adam and had operated on him in the past."* Mr. Brown lists in his Inquiry Witness

Statement [Ref: WS-007-03] the surgical procedures that he performed on Adam, the most recent of which being on 8th February 1992. Please:

- (a) State the qualifications and experience that the second Anaesthetist should have
- (b) Comment on Mr. Brown's reference to a more junior doctor being "*entirely acceptable*"
- (c) Explain what Mr. Brown might have learned from the procedures he carried out in 1991 and 1992 so as to warrant his inclusion in the surgical team

See also at page 8, para. X:

"The requirement is the same during all these periods. One consultant anaesthetist and one anaesthetist assistant (either anaesthetist nurse or operating department practitioner) must be present ...

It is usual in the UK for there also to be a trainee anaesthetist present for a major case such as this ... For a case such as Adam's the trainee would usually be relatively experienced.

Additional help may be required ... this is usually provided by the scrub and floor nurses" (Emphasis added)

- (iv) Please explain the qualifications and role of an operating department practitioner and how they differ (if at all) from those of a medical technical officer.
- (v) The PSNI Statement of SN Gillian Popplestone refers to "*circulating nurse*" and describes their role [Ref: 093-012-039]. The swab count refers to a nurse described as a "*runner*" [Ref: 058-007-020]. The PSNI Statement of SN Margaret Mathewson also refers to "*runner*" [Ref: 093-013-042]. It seems clear from those documents that the terms 'circulating nurse' and 'runner' are used interchangeably. Please clarify whether a 'floor nurse' is the same as a 'circulating nurse'/'runner'. If not, please explain what you mean by a 'floor nurse'.
- (vi) Is an anaesthetic assistant a position or a role? If it is a position, what qualifications are required to hold it?
- (vii) Please explain why you consider that the trainee anaesthetist for a case such as Adam's "*would usually be relatively experienced*" and the level of experience which you would consider reasonable. Is the 'usual presence' of a trainee anaesthetist in the UK for the benefit of: (a) the trainee; (b) the Consultant Anaesthetist; (c) the patient? If it is a combination of those factors, then where does the balance lie?
- (viii) Do the guidelines on 'The Anaesthesia Team' dated May 2010 differ

significantly from the position that existed in November 1995 and, if so, in which respects? Attached is the Report of a Working Party of the British Association for Nephrology: 'The provision of services in the UK for children and adolescents with renal disease' (March 1995). Please comment upon it as appropriate in terms of the position in 1995 in respect of staffing.

- (ix) It would be helpful if the position in relation to the 'anaesthetist team' for a paediatric renal transplant could be made absolutely clear as to numbers, position and level of expertise (i.e. anaesthetist, trainee anaesthetist, anaesthetist nurse, operating departmental practitioner, experienced trainee anaesthetist) in terms of:
- What was required
 - What was recommended/constituted good practice, and
 - What was common practice (to the extent that differs from 'recommended/good practice')
- (x) It would also be helpful if you could assess the adequacy of the anaesthetist team for Adam's surgery in terms of those requirements/recommendations. The members of that 'team' appear from the following statements:
- Dr. Taylor (Consultant Paediatric Anaesthetist [Ref: WS-008-02]) who was the on-call Anaesthetist. According to correspondence from the Department of Legal Services he had not been involved in a paediatric renal transplant between 1st April 1993 and Adam's transplant, has no recollection of how many if any he had been involved with prior to then and had never anaesthetised a polyuric child before Adam
 - Dr. Montague (Senior Anaesthetic Registrar [Ref: WS-009-01], who had not previously been involved in a renal transplant and who was in his first month of training in RBHSC in November 1995 [Ref: 093-037-117])
 - Unidentified trainee anaesthetic registrar referred to by Dr. Taylor in his Inquiry Witness Statement [Ref: WS-008-02] as assisting after Dr. Montague left at about 08.30
 - Peter Shaw (Medical Technical Officer [Ref: WS-106-01])

The presence of an anaesthetic nurse is unclear. Dr. Taylor claims that there was one but neither he nor the Inquiry has so far been able to identify her. The following are the nurses that were present and therefore able to assist. None has accepted that they acted as anaesthetic nurse:

- SN Conway (scrub nurse who went off duty at 08.00 [Ref: WS-060-03, p.3])
- SN Popplestone (who took over from SN Conway as scrub nurse [Ref: 093-012-039])
- SN Mathewson (circulating nurse who claims in her Inquiry Witness Statement that in November 1995 her duties ranged from "*being anaesthetic nurse, to scrub nurse to being runner and also working in recovery*" - Ref: WS-101-01, p.2])

Further at page 4

3. (iii), 1st para, line 1:

*“Both in 1995 and at present an operation such as this **should take place** in a fully equipped operating theatre ... This would typically include ... Access 24 hours a day, within the operating theatre suite or in immediate proximity, to a blood gas machine which would include sodium, potassium, and glucose measurements in its functions.”*
(Emphasis in bold added)

Please explain what you think should have happened if the RBHSC operating theatre did not have access to a blood gas machine capable of reliably measuring serum electrolytes reasonably accurately at the time of Adam’s transplant surgery.

Page 6

4. (v), line 1:

“[Given that Adam was known to have unstable sodium levels], these should have been measured hourly during the operation (page 2, reference 2)”

See also at page 7, 1st para, line 1:

“During the course of surgery, especially given that there was significant blood loss, it would have been appropriate to have carried out point of care testing of blood gas samples – including the measurement of sodium, potassium glucose, and haematocrit (or haemoglobin) concentrations at approximately hourly intervals (reference 2)”
(Emphasis added)

- (i) Please provide the date of reference 2 – ‘Guidelines for Anaesthesia for Paediatric Renal Transplantation’
 - (ii) Please identify within those guidelines the source of your statement that it would have been appropriate to carry out the measurement of inter alia sodium at approximately hourly intervals
 - (iii) Are serum electrolytes routinely measured hourly during paediatric renal transplant surgery at Newcastle? If not, on what basis do you consider that should have happened in Adam’s case?
 - (iv) Please explain why “significant blood loss” should constitute a further reason for measuring “sodium, potassium glucose, and haematocrit (or haemoglobin) concentrations at approximately hourly intervals”
5. (vi), 2nd para, line 5:

"Clinical examination at this point would have given a guide as to whether Adam was in any degree either dehydrated or fluid overloaded."

Please state and explain the degree of accuracy that a clinical examination of Adam was likely to have produced of his hydration status, i.e. whether he was "dehydrated or fluid overloaded".

6. (vii), 1st para, line 1:

*"Serum electrolyte measurement would be **strongly indicated** at the completion of dialysis, in time for the results to be available to the anaesthetist at the start of surgery."*
(Emphasis added)

- (i) Please identify the source of this statement (e.g. whether from guidelines, protocols, textbooks, articles etc) and explain the reason for doing so.
- (ii) Were there any factors in Adam's case that rendered such measurement particularly advisable? If so, please provide a description/explanation of those factors.
- (iii) Dr. Coulthard addresses the issue of a repeat serum sodium test in 2 reports provided for the Inquiry¹ (Report dated 4th August 2010 at page 27 and Report dated 4th December 2010 at pages 14 and 16). Please comment on his analysis, in particular his view that the "Newcastle transplant protocol would not have demanded that [Adam's] blood tests were repeated in the morning" (p.27 of his first report).

Page 7

7. (viii), 2nd para.:

"In practice, even though less accurate, such testing alerts the anaesthetist to dangerous changes in sodium concentration more rapidly than waiting for the results of laboratory testing, and thus allows corrective action to be initiated. (This had undoubtedly been my personal experience over the years, including the time frame of this case).

- (i) Please comment on the statements by Dr. Taylor that "When heparin is used the sodium result was unreliable" when asked why he would not rely on the blood gas machine to accurately analyse sodium levels and that "Syringes with Heparin crystals are now used with a different analyser" (Ref: IWS/008/2 p.24, Answer to questions 55(a) and (b)).
- (ii) What was your "personal experience over the years, including the time

¹ The views of others can be found at: (i) the treating nephrologist Dr. Savage [Ref: WS-002-02, pgs.15, 17, 19], (ii) the PSNI's Expert Professor Koffman [Ref: 094-007-032], (iii) the Inquiry's other experts Professor Gross [first report, p.15, report of 2nd January 2011, p.48], Messrs. Forsythe & Rigg [dated June 2011, p.7]

frame of this case" of the use of blood gas analyser machines to measure serum sodium, and in particular their accuracy and reliability in measuring serum sodium when using (a) heparin syringes and (b) syringes with heparin crystals, compared to serum sodium measurement by laboratory analysis.

- (iii) Please explain how and why heparin was used in syringes in November 1995 when a blood sample was taken for analysis by a blood gas analyser machine.
- (iv) Please explain any difference in effect of the use of (a) heparin in a syringe and (b) heparin crystals in a syringe when the serum sample is being analysed by a blood gas analyser machine.
- (v) Please describe and explain the margin of any difference, on sodium results in 1995, between the results from a blood gas analyser machine and those from laboratory analysis, including:
 - when a syringe with (a) heparin and (b) heparin crystals is used
 - the extent to which the results from a blood gas analyser machine when (a) heparin in a syringe and (b) heparin crystals in a syringe is used tend to be in a particular direction in relation to the results from laboratory analysis (ie generally higher or lower)
- (vi) The blood gas analyser used during Adam's surgery to produce the serum sodium reading at 09.32 was an Instrumentation Laboratory Blood Gas Analyser machine model number 1400. State whether you have any personal experience of this particular machine and model, and in particular its measurement of serum sodium when using (a) heparin in a syringe and/or (b) heparin crystals in a syringe .
- (vii) We refer you to the hazard notice HC (Hazard) (89) 31 'Blood Gas Measuring: The need for reliability of results produced in extra laboratory areas'. In your experience what ought reasonably to have been included in a written operational protocol for the equipment in November 1995.
- (viii) Also, what reasonable steps would you have expected to have been taken by November 1995 in RBHSC to ensure that the results of blood gas analyser machines were comparable with those produced by a quality-controlled laboratory-based instrument as required by the Hazard Notice referred to above.

Page 9

8. (A), 2nd para, line 7:

"It would be incumbent on the consultant anaesthetist to appraise the surgeon of any

difficulties encountered (e.g. in Adam's case with central venous line insertion), and an alternative strategy (e.g. surgical cutdown) agreed" (Emphasis added)

See also:

(D), 1st para, line 1, at page 14:

"This line was inserted with some difficulty after several attempts and there was a clearly documented previous history of central venous line insertion, including surgically placed lines, on several occasions. There is always a possibility that thrombosis and partial or even complete occlusion of a central vein occurs in the presence of a central venous catheter. Furthermore, it was known that a ligature had been placed around the left facial vein adjacent to the left internal jugular vein (although the pathologist describes this as encircling the left internal jugular vein in the autopsy report) ...

Given this history, as part of his elective work up for transplant, Adam should have had an ultrasound examination of the veins in his neck to identify those which remained patent ... Had this been the case, the problem of central venous access could have been considered electively, with formulation for this; this could include normal percutaneous insertion by the anaesthetist, surgical cutdown and cannulation of one or other internal jugular vein, or a decision that against usual practice for a renal transplant, femoral venous cannulation would be utilised" (Emphasis added)

- (i) Whether or not "a ligature had been placed around the left facial vein adjacent to the left internal jugular vein" is a matter of contention. An operation note on 29th May 1992 refers to the insertion of a Broviac line: "Left common facial (vein) ligated with 5x) PDS" [Ref: 057-115-336]. Dr. O'Connor noted that when Adam was admitted to PICU he had "multiple venous access before + jugular vessels tied off" [Ref: 059-006-013] which she had assumed because it was common practice. The Autopsy Report by Dr. Armour is clear: "ligation of the left internal jugular vein" [Ref: 059-039-089]. She stands by that view in her Inquiry Witness Statement [Ref: WS-012-01, p.2]. It would therefore be helpful if you could clarify:
- (a) Who you consider 'knew' that "a ligature had been placed around the left facial vein"
- (b) When you consider it was known and on what basis
- (ii) Although it took several attempts, nonetheless the line was inserted. It would therefore be helpful if you would clarify what you think should have happened:
- (a) Was it appropriate for Dr. Taylor to have attempted to insert the central venous line given Adam's previous history? If not, should there have been a discussion at the outset between him and Mr. Keane about an alternative strategy?
- (b) In the light of Adam's previous history, was it appropriate for Dr.

Taylor to continue with trying to insert the central venous line once he encountered difficulties? If not at what stage should he have stopped, alerted Mr. Keane to the difficulties he was experiencing and had a discussion with him about an alternative strategy?

- (iii) Please describe and explain the following procedures, providing diagrams where possible:
 - (a) Percutaneous insertion by the anaesthetist
 - (b) Surgical cutdown
 - (c) Cannulation of one or other internal jugular vein
 - (d) Femoral venous cannulation

- (iv) There is no record of any of the procedures set out at (iii) above having been considered "*electively*" and assuming therefore that they were not, please identify which of them could feasibly have been carried out at the time when:
 - (a) Anaesthesia was first introduced
 - (b) Dr. Taylor experienced difficulty with inserting the line

- (v) Who should have been responsible for taking the decision for Adam to have "*an ultrasound examination of the veins in his neck to identify those which remained patent*" and:
 - (a) When should that decision have been made?
 - (b) When should the ultrasound examination have been carried out?
 - (c) What should have happened if it was not possible to carry out a pre-operative ultrasound examination of the veins in Adam's neck?

- (vi) You go on to state in your report that: "*This type of problem is best considered by a multi-disciplinary team meeting at which patients presenting for a complex procedure such as transplantation are discussed in detail by all parties involved*" (p.14):
 - (a) When in the circumstances of Adam's case should such a meeting have taken place?
 - (b) Who would have attended it having regard to the fact that Dr. Taylor and Mr. Keane were the clinicians on call?

- (vii) Given the problems that were subsequently encountered with the position of the tip of the central venous line, what difference could it have made to the accuracy of Adam's central venous pressure monitoring if any of the alternative procedures at (iii) had been employed either at the very outset when anaesthesia was first introduced or subsequently when Dr. Taylor was experiencing difficulty with inserting the line?

- (viii) Was the failure to correctly position the tip of the central venous line rendered more likely due Adam's previous history?

See further:

EXPERTS

"D: What should have been done when at 0800 a central venous line was inserted via the right subclavian vein produced a reading of 17 mmHg)" (p.14)

9. You provide a description of the elective work that might have been undertaken in the light of Adam's previous history and the alternative procedures available. You also set out the checks that are to be made once the line is inserted. However, it would assist if you could explain in detail the options open to Dr. Taylor when the central venous line produced a reading of 17 mmHg at 0800 shortly after he had inserted it. In particular, should he have:
 - (i) Withdrawn the central venous line a little and reviewed the reading?
 - (ii) Removed the central venous line and inserted a new one so as to try and position the tip correctly?
 - (iii) Discussed the matter with Mr. Keane and agreed upon a strategy?
10. The printout of the central venous line pressure recordings during Adam's transplant surgery [Ref: 058-008-023] show figures from 17 mmHg at the start, peaking at about 30 mmHg at 10.00 but apparently throughout not falling below 17mmHg
 - (i) Please comment on the printout and the pattern of recordings over the 3½ hours shown from 08.00 to 11.30
 - (ii) Please comment on Dr. Taylor's hypothesis about the effect of the central venous line tip being in the ligated left internal jugular vein in the light of those figures. Are those figures consistent with his hypothesis?
 - (iii) Notwithstanding Dr. Taylor's rationale for the high recordings (17 mmHg up to a maximum of about 30 mmHg), was there any action that he should have taken during that 3½ period in the light of those recordings and if so what was it and when should he have taken it?
11. Dr. Taylor states in his Inquiry Witness Statement [Ref: WS-008-002] that *"the CVP could not be trusted as an absolute number but could be useful as a relative marker"* (para.24(e), p.12)

It would be helpful to have your views on:

- (i) The appropriateness and reliability of Dr. Taylor's approach
- (ii) Whether, accepting that approach, the relative changes were within acceptable parameters and if not which of them fell outside such parameters

Page 11

12. (xiii), (A), line 8:

"... the surgeon should always alert the anaesthetist to any impending or actual bleeding" (Emphasis added)

It would be helpful if you could describe and explain what in practical terms that would mean for a paediatric renal transplant procedure including the stages when, typically, such an alert should be given.

Page 12

13. (xiv), (A), line 1:

"A continuous display of central venous pressure would be required in a patient such as Adam (references 1 and 2). Although these references would suggest that non-invasive blood pressure measurements might suffice"

- (i) Please provide the reasons for your statement in respect of the requirement for *"continuous display of central venous pressure"*.
- (ii) Please provide the page references in the 2 articles for the *"suggest[ion] that non-invasive blood pressure measurements might suffice"*.

See also at page 13, final para, penultimate line:

"... proceeding without central venous access. In my opinion, the latter would have been unsafe"

- (iii) What step(s) in your view should have been taken once it was believed that the tip of the central venous line was misplaced in Adam's neck

Page 13

14. (B), 1st para, line 2:

"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. (Ref 2 page 2) ... measurement of urine production during the initial part of the operation whilst his native kidneys were still perfused would have guided fluid therapy ... There may be a period of time during the transplant operation when the urinary catheter is occluded to allow the bladder to fill" (Emphasis added)

- (i) Are the decisions as to (a) the insertion of such a urinary catheter following the induction of anaesthesia and (b) the monitoring of the urine the primary responsibility of the Anaesthetist or the Surgeon?
- (ii) Is it the responsibility of the Anaesthetist or the Surgeon to insert such a urinary catheter?
- (iii) Professor Koffman states in a report that he provided to the PSNI that: *"There was no record of urine output monitored during the procedure. This is not commonly measured during renal transplant surgery because the bladder catheter is usually kept clamped until the ureter to bladder anastomosis is performed"* [Ref: 094-007-030, para.2.8] and that *"Urine output is not normally recorded during the transplant procedure. The majority of patients undergoing transplantation do not pass a great deal of urine and usually a bladder catheter is clamped in order to distend the bladder to facilitate the ureter to bladder anastomosis. A minority of patients are polyuric and the bladder may be left on free drainage in these patients. It would not be particularly important to monitor the urine output in these patients as the critical monitoring would be central venous pressure and BP which would be achieved by variation in the intravenous fluid administered to the patient. The urine output following implantation of the new kidney and anastomosis of the ureter to the bladder becomes important immediately after the transplant and the surgeon would normally start to record urine output on an hourly basis towards the end of the operation."* [Ref: 094-007-035, para.3.8].

Professor Alexander states in a report that he provided to the Coroner [Ref: 011-012-083] that *"During surgery it would have been impossible for the anaesthetist to measure urinary output."* He subsequently stated in his Inquiry Witness Statement [Ref: WS-120-03] in response to a question on why it would have been impossible for Dr. Taylor to have measured Adam's urinary output, that: *"During renal transplantation the urinary bladder is allowed to fill, so that it is easy to identify when it is time to transplant the ureter into the bladder. This is normal practice."* Please:

- (a) Comment in detail on the views that both Professor Koffman and Professor Alexander express and their applicability to Adam's case.
- (b) Explain what *"free drainage means"* and what happens to the urine of a polyuric patient when the bladder is left on *"free drainage"*
- (iv) Please provide the reference in the article that you cite in support of your view that not only should bladder catheters be inserted prior to surgery but that urine should be: *"monitored when possible during the operation"*.
- (v) Dr. Savage states in his Inquiry Witness Statement that Adam's daily urine output was 1200-1500ml [Ref: WS 002/02, p.19]. The surgical note by Dr. O'Connor records *"vascular anastomosis ~ 10.30am"* [Ref: 058-035-134] and Mr. Keane states in his Inquiry Witness Statement that Adam's bladder

was catheterised *"within a few minutes of 10.30am"* [Ref: WS 006/02, p.10] In response to the question of why Adam's urine was not measured, Mr. Keane states: *"we allowed the bladder to distend naturally and not measured his urine output but depended on his CVP measurements"* [Ref: WS 002/02, p.10]

In relation to your view that *"There may be a period of time during the transplant operation when the urinary catheter is occluded to allow the bladder to fill"*, please clarify:

- (a) The period of time over which Adam's urine output could have been measured before it was necessary to occlude the urinary catheter so as to allow the bladder to fill
- (b) The period of time in a case such as Adam's where large volumes of urine are produced over which the urinary catheter is usually occluded so as to allow the bladder to fill
- (c) The point in the surgery at which the catheter is usually occluded in a case such as Adam's where large volumes of urine are produced

Page 14

15. (D), 1st para, line 6:

"Furthermore, it was known that a ligature had been placed around the left facial vein adjacent to the left internal jugular vein ... A central venous pressure of 17 mm Hg is large."

- (i) Assuming that Adam's left internal jugular vein had been ligated in a previous operation to insert a Broviac line on 29th May 1992 (Ref: 053-015-052), what central venous pressure reading would you have expected?
- (ii) Please provide the range of central venous pressure values you would have expected to have seen in Adam at the start of the operation
- (iii) Please provide the range of central venous pressure values you would have considered optimal in a child like Adam during a renal transplantation operation.

Page 15

16. (D), 2nd para, line 5:

"Other parameters (blood pressure, heart rate, peripheral perfusion) may have subsequently made it apparent that the central line measurement was misleading."

Please explain this comment, including how those parameters might have *"made it apparent that the central line measurement was misleading"*

Page 16

17. (E), 1st para, 2nd bullet:

"To correct this abnormality [serum sodium level of 123mmol/L] the following steps should have been considered ... Mannitol in a dose of 0.5 gram/kg should have been given"

Please explain the basis of that view, including in the light of the reference to hypertonic saline being administered as a response to acute hyponatraemia in: Albanese A et al. *Arch Dis Child* 2001; 85: 246-51. Vachharajani TJ et al. *J Intens Care Med* 2003; 18: 3-8

Page 17

18. (F), 2nd para, line 7:

Please confirm that the reference to "saine" in "0.18% saine/4% dextrose" is a typographical error and should read 'saline'.

Page 19

19. (C), last para, line 1:

"It is inappropriate that written consent for the transplant operation was taken by a nephrologist. This should have been taken by a member of the surgical team."

Professor Koffman states in the report that he provided to the PSNI [Ref: 094-007-031] that: *"It appears from the records that consent for the operation was not performed by the surgeons but probably by the paediatric nephrologist Dr. Savage and this would be normal acceptable practice for the mid 1990s."*

It would be helpful if you could comment upon that statement in the light of the view that you express in your report.

Additional queries

20. Dr. Gibson FFARCSI produced a report to Dr. Murnaghan, Director of Medical Administration, The Royal Hospitals Trust, as part of an internal inquiry at the RBHSC (Ref: 011-005-016). Please examine this document and comment generally on it (you may ignore the sections entitled 'Case 1' and 'Case 2' as these are not relevant to this Inquiry).

21. We have referred you to a textbook titled 'Clinical Management of Renal Transplantation' that was a current text in Northern Ireland at the time of Adam's transplant. It is compiled by Dr. Mary McGeown with assistance from other Northern Ireland clinicians. You have requested certain the following extracts: Chapter 13, Chapter 14 (sections 1,6 and 7), Chapter 16 (section 2), Chapter 18 (section 2), and Chapter 20 (sections 1, 2 and 3). In the light of the information made available to you, your analysis of the role of and competencies required of an anaesthetist involved in a renal transplant and the particular circumstances and complexities of Adam's case, please comment on Dr. Robert Taylor's approach to and execution of the duties and responsibilities expected of a Consultant Paediatric Anaesthetist in carrying out a paediatric renal transplantation operation.
22. Please find attached a table detailing Adam's surgical procedures from his birth to the date of his death. Please:
- (i) Describe and explain what medical notes and records you would have expected Adam's anaesthetists to have examined prior to his surgery, including identifying any literature in support of your view.
 - (ii) State and explain whether you would have expected the Registrar Anaesthetist or the anaesthetic trainee to examine these medical notes and records prior to surgery, again including identifying any literature in support of your view.
 - (iii) Describe and explain what Dr. Taylor should have learned from those notes and records, in particular Adam's previous surgeries, that would have affected his preparation for and the fluid management during Adam's surgery.
23. Dr. Taylor comments in his Inquiry witness statement that "*[Adam] had undergone a shorter procedure on 18th October 1995. I examined the anaesthetic record (058-025-069 to 074) ... Otherwise there were no difficulties noted with his anaesthetic management ... Although there were no fluid calculations performed on this, I noted that 300mls of '1/5 NSaline/4%' were given over approximately 1hr.*" [WS 008-1, page 3, Answer to question 1(ii)]. That led Dr. Taylor to the conclusion that "*Adam could tolerate a large volume of 0.18NaCl / 4% Glucose to replace deficit and urine losses.*" [WS 008-2, page 7, Answer to question 11(e)]

Please comment on Dr. Taylor's conclusion.

24. Attached is a table showing the various phases in a paediatric renal transplant operation. Please modify it, as you consider appropriate, so that it reflects what you consider should have happened and identify under those phases the personnel who you consider should have been involved.