

## QUESTIONS FOR DR. SIMON HAYNES

ARISING OUT OF CONSULTATION NOTE DATED 14<sup>TH</sup> JUNE 1996

RE: ADAM STRAIN

Please find attached a note of a consultation of 14<sup>th</sup> June 1996 between Dr George Murnaghan, Dr Joe Gaston, Dr Robert Taylor and Dr Maurice Savage with the Trust's solicitor Mr George Brangam, in which they discuss Adam's case and the upcoming Coroner's Inquest. The Inquiry Team believes that the note was taken by a Mrs Heather Neill, who was assisting Mr Brangam.

The Inquiry Team would welcome your views and comments generally on the content of this document, particularly any implications the information contained in the note may have on the evidence already given to the Inquiry during the course of the Oral Hearings.

The Inquiry would particularly welcome your comments on the following issues:

### Timings of the surgery

- (1) In a surgical case such as Adam's, how long would you expect the following to take:
  - (a) The reversal of the anaesthetic
  - (b) The preparation of the patient for transfer to PICU (including how long this would take)
- (2) Please provide, from your knowledge of Adam's case to date, your understanding of, and comments on, each of the following statements:
  - (a) *"Dr Taylor pointed out it was very possible that this kidney could have been in place within an hour."* (Ref: 122-001-002)
  - (b) *"In this case the kidney was in at around 9.30am. The vein was in and the arteries were being finished. At this stage Dr Taylor did a blood gas assessment and based on the results of this then started to give the blood. Once the blood was being put through the clamps were released and further blood was given at a later stage."* (Ref: 122-001-003)
    - (i) What may be meant by:
      - *"the kidney was in at around 9.30am"*?
      - *"The vein was in"*?(emphasis added)
    - (ii) What would be the time period between the vein being "in" and the "arteries [...] being finished"?

- (iii) What would have been the implications for Adam's fluid management when the "kidney was in" and the "arteries were being finished"?
- (c) "this procedure was planned to last 1-1 ½ hours." (Ref: 122-001-003)

### **Content of fluids**

- (3) Please provide, from your knowledge of Adam's case to date, your understanding of, and comments on, each of the following statements:
- (a) "Dr. Taylor explained that if water is in a vein, the red blood cells that water and burst. To prevent this type of occurrence they use an isotonic solution and he pointed out again that saline and dextrose together is an isotonic solution. Hartmanns solution is also isotonic." (Ref: 122-001-001)
- (b) "Dr Taylor is adamant that the fluid being used was isotonic and not hypotonic. He did start to indicate that a dextrose solution which is initially isotonic can become hypotonic in the body." (Ref: 122-001-003)
- (c) "This child was used to overnight feeding and therefore produced enough insulin to keep the sugar levels under control at night. He was therefore producing high insulin levels at night and if not given food ie dextrose then his sugar levels would be severely effected by the high insulin levels and would drop very low." (Ref: 122-001-003)
- (d) "Another alternative to the solution given would have been to use 5% dextrose with normal saline. However this child was not passing normal saline so the lower concentration sodium was used. At the end of the procedure the child's blood sugar was 4 which is at the low end of normal. Had he not been given large volumes of food during the procedure then his blood sugar levels would have been very low at the end of the procedure and he would have suffered brain damage as a result of this." (Ref: 122-001-003)
- (e) "Dr Gaston pointed out that there is very little literature on this subject. He said to provide the one-fifth normal saline solution was providing the same sodium concentration as the child had previously been receiving in the same type of fluid as the child was used to." (Ref: 122-001-004)
- (f) "It was briefly referred to that there is a move in North America away from providing dextrose. Dr Taylor confirmed that they would generally not use dextrose in babies over 6 months of age." (Ref: 122-001-004)
- (g) "The other options being 10% dextrose and saline which was not appropriate as this child was not passing normal urine or Hartmanns which was not appropriate either." (Ref: 122-001-004)

### **Fluid management**

- (4) Please provide, from your knowledge of Adam's case to date, your understanding of, and comments on, each of the following statements:

- (a) *“Generally for surgery one would hope to replace half of the fluid deficit in the first hour, a quarter in the second hour and a quarter in the third hour.” (Ref: 122-001-001)*
- (b) *“During this procedure judging by the CVP and BP Dr Taylor felt that he was not ahead of the fluid requirement and at 9.30am he started to give the Hartmanns. He pointed out that the Hartmanns may not have been necessary if the kidney had been in situ quickly.” (Ref: 122-001-002)*
- (c) *“Dr Taylor mentioned the analogy of a colander in that the more fluid you put in the more pours out.” (Ref: 122-001-002)*
- (d) *“His urine output was assumed to be fixed but was not measurable as the child was in nappies. However over a period of time the child had been receiving 2,100 mls of fluid per day and his weight was steady so therefore his fluid input and output were balanced.” (Ref: 122-001-002)*
- (e) *“Usually the child received a low sodium feed ie 3 milimoles of sodium per 100 mls of feed. This is why the one-fifth normal saline was used as it had the same sodium concentration as his feed would have had. He was therefore receiving the same sodium concentration but less fluid.” (Ref: 122-001-002)*
- (f) *“To maintain fluid one requires 4 mls per kilo of weight per hour for the first 10 kilos which would equal 40 mls per hour plus 2 mls per kilo per hour for the next 10 kilos which would equal 20 mls per hour therefore for maintenance one requires 60 mls per hour for a normal child.” (Ref: 122-001-002)*
- (g) *“This child was passing large quantities of urine, perhaps up to 100 mls per hour of dilute urine ie low in sodium.” (Ref: 122-001-002)*
- (h) *His maintenance requirements were therefore :- (Ref: 122-001-002)*
- |                                |                                         |
|--------------------------------|-----------------------------------------|
| <i>100mls per hour</i>         | <i>To compensate for urinary output</i> |
| <i>60 mls per hour</i>         | <i>For metabolism</i>                   |
| <i>160 mls per hour</i>        | <i>Total requirement</i>                |
| <i>Less 10-20 mls per hour</i> | <i>Urinary output of a normal child</i> |
| <i>150 mls per hour</i>        | <i>Total fluid requirement</i>          |
- (i) *“The Doctors pointed out that the mother in this situation needs to understand that the child did not drown. It was also pointed out that the volume of fluids provided here was typical of the volume of fluids provided in many situations for children, for example, for sepsis they may in fact give as much as 1 litre of fluid an hour.” (Ref: 122-001-005)*
- (j) *“He also pointed out that there seemed to be some suggestion in the reports that the fluids had perhaps been given via the neck. He pointed out that this was not the case. All the fluids were given into the arm and there were no fluid tubes leading to the brain.” (Ref: 122-001-006)*

- (5) Please explain the likely significance for the further administration of fluids to Adam in circumstances where:
- (a) Replacement and maintenance fluids had been administered on the basis that the kidney would be in place in around an hour by which time there would need to be enough fluid to properly perfuse it
  - (b) The kidney is then not in place until a further:
    - (i) half hour;
    - (ii) hour;
    - (iii) hour and a half

### **Blood loss**

- (6) Please provide, from your knowledge of Adam's case to date, your understanding of, and comments on, each of the following statements:
- (a) *"To replace blood one must provide 2½ times the volume of blood lost"* (Ref: 122-001-001)
  - (b) *"The first packed cell was given after the blood gas readings had been checked. It is generally the situation that they prefer not to give blood if this is avoidable particularly with children as it may contain viruses."* (Ref: 122-001-002)
  - (c) *"The low haematocrit level could be explained either by blood loss or over transfusion of water. If this was explained by an over transfusion of water one would have expected the haemoglobin level to be very high at the end of the procedure whereas in fact it was normal at the end of the procedure suggesting that the haematocrit low level had been due to blood loss."* (Ref: 122-001-003)
  - (d) *"The blood loss was measured as approximately 1,200 mls. Only 500 mls of packed cells were given but these actually are equivalent to double the amount of fluid."* (Ref: 122-001-003)
  - (e) *"It was also pointed out that some of what was thought to be blood loss could in fact have been a mixture of urine and blood. However, the haemoglobin at the end of the procedure was fine showing that the sums to compensate for this had been correct."* (Ref: 122-001-004)
  - (f) *"There had also been a query raised that there was a delay in providing blood replacement. The doctors considered the following to be of guidance:- If one has lost 10% of blood volume then you could provide a drip of platelets and fluid. If 15-20% of blood volume was lost then one could give blood."* (Ref: 122-001-005)
  - (g) *"However it was felt not to be as clear cut as to when one would start to replace the lost blood volume and it was commented that some people would bleed down to 30% prior to surgery. They said that the anaesthetist monitoring the situation would look at all factors and may not rush straight in to replace blood depending on the situation."* (Ref: 122-001-005)

## Electrolyte testing

- (7) Please provide, from your knowledge of Adam's case to date, your understanding of, and comments on, each of the following statements:
- (a) *"It was asked whether there was an opportunity to do the electrolytes when the child was in theatre and it was confirmed that the opportunity was certainly there. However, this procedure was planned to last 1-1 ½ hours. A blood result taken at the start of the procedure would not have been back from the labs for perhaps 1-1 ½ hours so the procedure would have been almost complete leaving no opportunity to act on any results received."* (Ref: 122-001-003)
  - (b) *"There was also no reason to expect the sodium level to need to be checked and it would not be normal to send off for electrolyte tests at this stage. In the ward the child had been "screaming and yelling" and it wasn't possible to do the test. The child has been receiving the same sodium levels and it was not anticipated that there would be any change in those so there was no reason to do the blood electrolyte tests."* (Ref: 122-001-003)

## CVP

- (8) Please provide, from your knowledge of Adam's case to date, your understanding of, and comments on, each of the following statements:
- (a) *"The CVP readings although showing as 17 were felt to really provide a base of 12 because of the gradient between the jugular and the heart which was assessed at around 5 cms. For this procedure one would push up the CVP as high as one would dare ie around 5 cms. Therefore one would allow it to go up to 22 when starting with the base of 17."* (Ref: 122-001-003)
  - (b) *"Dr Taylor pointed out that his practice would tend to be to have the CVP on a pole and to keep the transducer well away from the dialysis tube."* (Ref: 122-001-005)
  - (c) *"Dr Taylor would have the transducers, arterial and CVP clipped onto the drip stand rather than attached to the table. In either situation when the table surface, that the patient is lying on, is tilted the CVP would have to be recalibrated and indeed in this particular case the table was moved and Dr Taylor recalibrated the settings."* (Ref: 122-001-007)
- (9) In the accompanying "Notes of Inspection of Equipment"(Ref: 122-001-007), it states:
- "There are default alarms on the screen with the CVP alarms at 20 and minus 5. However, the alarm had been suspended in this case so did not go off even though the CVP readings went above 20."*
- The monitor printout can be seen at Ref: 094-037-217, in which there is a 'mute' symbol at the top left hand corner.
- (a) How do you interpret the 'mute' symbol for the alarm? For example:
    - (i) Does it mean that it was switched off at the very outset?

- (ii) Is the level at which the alarm sounds pre-set or can the anaesthetist, technician set the parameters?
- (iii) Why would you switch the alarm off?
- (b) The Inquiry Team would welcome any other comments you may have about anything of significance that you believe arises from the monitor printout (Ref: 094-037-217), including:
  - (i) The trend of the CVP readings, including the increase after 09:30, and what might have given rise to this
  - (ii) The APS/APM/APD scores including the shape encountered just after 09:30, and what may have given rise to this
  - (iii) The trend of the heart rate

### Urinary catheter

- (10) Please provide, from your knowledge of Adam's case to date, your understanding of, and comments on, each of the following statements:
  - (a) *"It was pointed out that one would not routinely catheterise patients going to theatre simply to measure their urinary output."* (Ref: 122-001-002)
  - (b) *"It was pointed out that it was of vital importance that one was not able to measure the urine output during the procedure as the bladder was open. Normally one would be able to measure urinary output during operation every 5 mins except for a short period when the bladder was open. However during this procedure the bladder was opened immediately and was opened for some 2 hours so it was not possible to measure the urinary output and this child was known to have high urine output."* (Ref: 122-001-004)
    - (i) Please explain what *"the bladder was open"* means and why it would have been opened immediately
    - (ii) Please state whether the bladder being opened immediately can be ascertained from Mr. Keane's entry into Adam's medical notes and records and if not whether it should be
    - (iii) Please explain why in the circumstances where the bladder was opened immediately it was nonetheless *"not possible to measure the urinary output"* and what, if any, steps could have been taken to ensure that urine output could be measured.

### Pulmonary oedema

- (11) Please provide, from your knowledge of Adam's case to date, your understanding of, and comments on, each of the following statements:
  - (a) *"There is no evidence in other organs of oedema."* (Ref: 122-001-001)

- (i) Please note that Dr Taylor in his evidence at the Inquest stated that Adam had “severe pulmonary and cerebral oedema” (011-014-098). Dr Louise Sweeney, Consultant Paediatric Radiologist at RBHSC, states at WS-242 p.2, that there was mild pulmonary oedema at 1.20pm, with a deterioration in the lungs due to increased pulmonary oedema at 9.30pm.

### Hyponatraemia

- (12) Please provide, from your knowledge of Adam’s case to date, your understanding of, and comments on, each of the following statements:
  - (a) *“Again Dr Taylor referred to the issue of overload and said if there was overload then there would be heart failure and on x-ray the child’s heart was not enlarged so clearly there had been no fluid overload.”* (Ref: 122-001-005)
    - (i) Please note that Dr Louise Sweeney, Consultant Paediatric Radiologist at RBHSC, states at WS-242 p.2, that the 9.30pm x-ray on 27th November 1995 shows an increase in the size of the heart from the x-ray taken at 1.20pm on the same day.
  - (b) *“What had occurred was that fluid had sequestered in the brain. There was a higher concentration in the brain of sodium than elsewhere and the child then coned. However, what had been done was reasonable. This child got no free water, every fluid used contained salt.”* (Ref: 122-001-005)
    - (i) Please explain what might be meant by *“fluid had sequestered in the brain. There was a higher concentration in the brain of sodium than elsewhere.”*

### Dr Joe Gaston

- (13) Dr Joe Gaston was a Consultant Paediatric Anaesthetist and Clinical Director of Anaesthesia, Theatres and Intensive Care in November 1995. Please therefore comment if, having seen Adam’s medical notes and the reports of Dr Armour and Dr Sumner, Dr Gaston’s conclusions below were reasonable or appropriate:
  - (a) *“Dr Gaston felt there were two main issues to consider:-* (Ref: 122-001-004)  
  
*Firstly, the issue of volume replacement which he felt had been appropriately covered and the calculations had been reasonable, and”*
  - (b) *“Secondly, was this the most appropriate fluid to use. However obviously the fluids provided had not been correct but one does not know why.”*

### Additional Comments

- (14) Please provide any further points and comments that you wish to make, together with any documents.