CORONERS ACT (Northern Ireland), 1959

Deposition of Witness taken on FRIDAY the 21st day of JUNE 19 96, at inquest touching the death of ADAM STRAIN, before me MR J L LECKEY Coroner for the District of GREATER BELFAST as follows to wit:–

The Deposition of MAURICE SAVAGE of c/o R.B.H.S.C. *(Address)* who being sworn upon his oath, saith

Adam Strain was a patient with chronic renal failure and polyuria. He developed problems with recurrent urinary infections in infancy and was under the care of Mr Stephen Brown, Consultant Paediatric Surgeon. He required multiple urological operations for vesico ureteric reflux and a Fundal Plication to correct a hiatal hernia. As a result of infection and reflux his kidneys were damaged and deteriorated to the point where peritoneal dislysis was commenced in 1994. He was then placed on call for a renal transplant. He required multiple medications with Calcium Carbonate, Keflex, Iron, One-Alpha Vitamin D, Erythropoietin and Sodium Bicarbonate and night time gastrostomy tube feeding. The medications and tube feeds were to ensure good nutrition and to prevent renal anaemia and bone disease. He was a well nourished, well grown boy with height near the 50th centile and weight at the 90th centile for his age. His most recent acute illness was with a gastrostomy exit site infection in July 1995. On 26th November we had an offer of a kidney from the UK Transplant Service. He was admitted to Musgrave Ward RBHSC for pre-operative assessment. His serum electrolytes, haemoglobin and coagulation were satisfactory. H.B.10.5g/dl, Na 139, K 3.6, Urea 16.8, Ca.2.54, Albumin 40, Prothrombin time 12.3. His chest was clear on examination. B.P. 108/56. He was apyrexial. There were no signs of infection. His night gastrostomy feeds are normally 1.5l of Nutrizon. On anaesthetic advice this was changed to clear fluid which was stopped two hours pre op. This meant he had 900mls of ~~Dioralyte~~ N/S Saline Dextrose overnight. His peritoneal dialysis was performed as usual - 750ml fluid volume 1.36% Dextrose solution.

He was given 8 cycles before going to Theatre at 7am. My contact with Theatre during the procedure indicated no major difficulties with cardiovascular status or anaesthesia. Surgery was complex, but successful, organ transplantation achieved with acceptably matched kidney from a 16 year old donor. Post-operatively Adam failed to breathe spontaneously. On examination he had dilated pupils and bilateral papilloedema. A chest x-ray showed pulmonary oedema and an emergency CAT brain scan confirmed cerebral oedema and herniation and compression of the brain stem. Neurological testing by Dr David Webb on the evening of 27/11/95 and the morning of the 28/11/95 confirmed brain death. Deborah Strain, the mother and the immediate family were informed of the complications and prognosis regularly throughout these events. Death was certified shortly after 9am on 28th November. With the consent and in the presence of the family ventilatory support was withdrawn at 11.30am while Adam was being nursed by his mother. He had sodium in his blood but his sodium was well controlled. His mother's care of him was meticulous and his health was due to her meticulous care. I believe the speedy changed electrolytes is very significant in that the body copes with it less well.

Mrs Higgins: After 1994 Adam was under the care of Mr. Bolton. He had a potential for a low sodium which was being managed. Adam never had these symptoms which disappeared because of his illness. The majority of children with renal failure have similar problems concerning electrolyte levels. ~~They would be monitored 2 hrly as standard practice to ensure they during surgery.~~ Since Adam's death they would be measured more frequently. I have discussed this in the UK we have seen 9 other deaths

TAKEN before me this 21 day of JUNE 19 96 ,

Coroner for the District of GREATER BELFAST

No. 20

CORONERS ACT (Northern Ireland), 1959

Deposition of Witness taken on FRIDAY the 21 day of JUNE 1996., at inquest touching the death of , before me MR J L LECKEY Coroner for the District of GREATER BELFAST as follows to wit:—

The Deposition of MAURICE SAVAGE

of

(Address)

who being sworn upon his oath, saith

from an apparently similar cause though these have not been published. Any level below 135 is hypernatraemia but these is a lower figure at which it becomes dangerous, A level below 120 needs urgent action. At 128 action needs to be taken to redress the balance. However, the patient could be properly well. Electrolytes could not be checked prior to the running of venous access could not be obtained. Standard practice would be to test electrolyte levels near the start of surgery but it is essentially a matter for clinical judgment. I was not aware of the 9.32 reading. I believe a child in renal failure is at greater risk of developing ~~renal failure~~ sodium imbalance. I accept the cause of death given by the pathologist. Mr. Bingham: I had known Adam since he was a baby. He had to have the operation to live any length of time and to have a normal life. We discussed the operation in detail with his mother the day before. Also, I discussed it with Dr. Taylor. The operation had been put back to the following morning. His overnight feeding was

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discussed in detail and he would have been aware what the normal regime would have been. 900 ml over 8 hr led to switch from tube feeding to intra-venous feeding two hours before the operation. I was satisfied the anaesthetic staff had all the relevant information. The information about the 9 other deaths was held to be verbally taken — it was not published. All the fluids given to Adam during the operation contained sodium. One cannot pick a figure for determining hyponatraemia — it is a matter for clinical judgment which will be influenced by the speed of change. The lab would take about an hour to do an electrolyte analysis. Miss Higgins: With the benefit of hindsight his sodium became too low. A lab analysis is more accurate than the blood/gas machine. I personally never use that machine as I have no reason to do so.

J Maurice Savage

TAKEN before me this 21st day of June 1996.

Coroner for the District of Greater Belfast

He did need sodium in his feeds but his sodium was well controlled. His mother's care of him was meticulous and his health was due to her meticulous care. I believe the speedy change of electrolytes is very significant in that the body copes with it less well.

Miss Higgins:- After 1994 Adam was under the care of Mr Boston. He had a potential for a low sodium which was being managed. Adam never had thirst symptoms which disappeared because of his illness. The majority of children with renal failure have similar problems concerning electrolyte levels. Since Adam's death these would be measured more frequently. I have discovered that in the UK there have been 9 other deaths from an apparently similar cause though these have not been published. Any level below 135 is hyponatraemia but there is a lower figure at which it becomes dangerous. A level below 120 needs urgent action. At 128 action need to be taken to redress the balance. However, the patient could be perfectly well. Electrolytes could not be checked first thing in the morning as venous access could not be obtained. Standard practice would be to test electrolyte levels near the start of surgery but it is essentially a matter for clinical judgment. I was not aware of the 9.32 reading. I believe a child in renal failure is at greater risk of developing sodium imbalance. I accept the cause of death given by the pathologist.

Mr Brangham: I had known Adam since he was a baby. He had to have the operation to live any length of time and to have a normal life. We discussed the operation in detail with his mother the day before. Also, I discussed it with Dr Taylor. The operation had been put back to the following morning. His overnight feeding was discussed in detail and he would have been aware what the normal regime would have been. 900 ml arose as we had to switch from tube feeding to intra-venous feeding two hours before the operation. I was satisfied the anaesthetic staff had all the relevant information. The information about the 9 other deaths was told to me verbally later - it was not published. All the fluids given to Adam during the operation contained sodium. One cannot pick a figure for determining hyponatraemia - it is a matter for clinical judgment which will be influenced by the speed of change. The lab would take about an hour to do an electrolyte analysis.

Miss Higgins: With the benefit of hindsight is sodium became too low. A lab analysis is more accurate than the blood/gas machine. I personally never use that machine as I have no reason to do so.