STATEMENT OF WITNESS

STATEMENT OF: DR G A NESBITT, CLINICAL DIRECTOR

Name *Rank*

AGE OF WITNESS *(If over 18 enter "over 18"):* OVER 18

To be completed when the statement has been written

I declare that this statement consisting of 18 pages, each signed by me is true to the best of my knowledge and belief and I make it knowing that, if it is tendered in evidence at a preliminary enquiry or at the trial of any person, I shall be liable to prosecution if I have wilfully stated in it anything which I know to be false or do not believe to be true.

Dated this 14 day of March 2006

William R. Cross

***SIGNATURE OF MEMBER** by whom statement was recorded or received*

William R. Cross

PRINT NAME IN CAPS

SIGNATURE OF WITNESS

I am a Consultant in Anaesthesia and Critical Care and presently the Medical Director in Altnagelvin Hospital. In June 2001 I was Consultant Anaesthetist, with an interest in Paediatrics, and Clinical Director in Anaesthesia and Critical Care in Altnagelvin Hospital. I was called to Altnagelvin Hospital in the early hours of Saturday 9th June 2001 to assist with the transfer of Raychel Ferguson from the Paediatric Ward to the X Ray Department where a CT scan was to be performed. I was not on call but was contacted by the Anaesthetic Registrar, Dr Date, who described the situation in Ward 6 where Raychel had been intubated and required ventilation following a respiratory arrest. The Registrar required assistance because the other anaesthetists on call were busy with another emergency and she had just been called to the maternity unit. I came in immediately and took Raychel to the Radiology Department where a CT scan was performed. I arrived on the ward after Dr McCord. A team at night comprises of a Consultant, a Registrar and a SHO. When I arrived Raychel's condition was critical but a precise diagnosis had not been

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made. I had no previous involvement with Raychel. Raychel had had an uneventful operation for appendectomy the day previously and had made a good recovery. However throughout the day she had several episodes of vomiting and had developed a headache in the evening. Nursing staff found Raychel fitting around 3 am and called medical staff. Her condition deteriorated requiring intubation and ventilation. Blood results taken following the seizure showed a low Sodium level and a Saline infusion was in place to allow a slow correction of this imbalance. Raychel remained intubated and ventilated and it was obvious that her condition was extremely serious and the prognosis poor. I attended Raychel around 5.30 am by which time she had been brought to the X Ray Department. A CT scan was performed uneventfully. During the time taken to perform the CT scan, I reviewed the notes and gathered a history from the other clinicians present. It was not clear why Raychel had collapsed, the CT scan seemed to indicate cerebral oedema and the possibility of a sub-arachnoid bleed. Electrolyte measurement following her collapse showed severe hyponatraemia (WRC 16, WRC 17) and this was being treated using Normal Saline intravenously at a rate of 40 mls per hour (WRC 18). During the time spent in the CT suite, I spoke with the Neurosurgeons in Belfast who were able to view the results concurrently due to image linking. Following this conversation and at the Neurosurgeon's request it was clear that Raychel would need to be transferred to the Royal Belfast Hospital for Sick Children (RBHSC). I contacted the Intensive Care Unit, explained the situation and requested that a bed be organised so that we could stabilize Raychel prior to her transfer to Belfast. Following the CT scan, Raychel was taken to the Intensive Care Unit. Notes made there indicated that Raychel was seriously ill but that her

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observations were stable (WRC 19, WRC 20, WRC 21). Following discussion of the CT findings with the Neurosurgeons in Belfast a second CT scan, enhanced using contrast, was performed prior to transfer to the Royal Belfast Hospital for Sick Children. I spoke to the consultant on duty at the Intensive Care Unit in Belfast, who I believe was Dr Chisakuta, a Consultant Paediatric Anaesthetist, outlining the history as above. I accompanied Raychel to the CT suite for this second investigation and monitored her condition to ensure her stability throughout the scan. We were all extremely concerned as to the cause of Raychel's brain swelling. One diagnosis suggested by the Neurosurgeons had been that possibly a sub-dural empyema (an area of infection) had developed, and we hoped that surgical intervention might be possible. Transfer to the Children's Hospital was organised following this and I accompanied Raychel to their Intensive Care Unit, leaving Altnagelvin at around 11.10 am (WRC 22, WRC 23). Throughout the transfer Raychel was ventilated and monitored. Her condition remained unchanged and she was admitted to Intensive Care in the Children's Hospital around 12.20 pm. Following the transfer I handed over Raychel to the care of the intensive care team and gave them an update on the details of the case and a report of her condition throughout the transfer. There had been no change in her clinical condition during this time. I explained that my involvement with Raychel's treatment was from the time of her collapse but that I understood that she had had an uneventful appendectomy on the evening of Thursday 7th June and that initially she had made a good recovery. I outlined the course of Friday 8th June leading to her fitting and subsequent respiratory arrest in the early hours of Saturday morning. I gave a summary of the fluids administered including the change to Normal Saline to treat

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the hyponatraemia. The transfer had taken just over one hour and shortly after this time I returned to Altnagelvin Hospital. I telephoned RBHSC either later that evening or possibly the following day and spoke to Dr Crean, a Consultant Paediatric Anaesthetist, who informed me that brain stem function tests had confirmed that Raychel's condition was irretrievable. I expressed my shock and deep sadness that this had occurred following such a routine procedure. I had never come across before the death of a child from hyponatraemia. During my investigation into the incidence of hyponatraemia and in the course of informing my colleagues in hospitals in Northern Ireland of this tragedy, I contacted the RBHSC to ask about their use of No. 18 Solution. I believe this would have been around 13th June 2001. I feel there is a worry with No. 18 Solution and Hartman's is now used instead. Solution 18 was used for historical reasons in paediatric practice but I was convinced that the use of a low sodium-containing solution together with an abnormally high response to anti- diuretic hormone, produced as a response to surgery, had contributed to the severe hyponatraemia and subsequent brain swelling in Raychel's case. I was informed that the RBHSC had ceased prescribing this fluid in post-operative children some 6 months previously but that, as in other hospitals, it had been the default solution up to that time. I requested that any data on hyponatraemia or the incidence of this in Northern Ireland would be helpful and Dr Taylor, a Consultant Paediatric Anaesthetist, agreed to send me these details.

Prior to Raychel's death, my knowledge on the subject of hyponatraemia was gathered during my medical education and as part of my anaesthetic training. Hyponatraemia is a term describing a low sodium level in the plasma. Sodium is the main positively charged ion in plasma and contributes to the serum osmolality. It

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has a normal range of around 135 – 145 mmoles per litre and hyponatraemia would, by definition, be a level below the normal. Severe hyponatraemia, likely to be symptomatic, would usually be a level less than 128 mmoles per litre. As an anaesthetist I would have been taught about electrolyte balance and of serum or plasma osmolality. Cells require a balance between extra cellular plasma sodium and intracellular potassium, both of which are positive ions. If a cell experiences an imbalance such as might occur in hyponatraemia, then the plasma is relatively hypo-osmolar and the cell draws water into itself to dilute the intracellular potassium ion. This results in cellular swelling. The converse occurs if cells experience hyper-osmolar plasma such as occurs in hypernatraemia. In this situation the cell will give up intracellular water to the plasma in an attempt to balance osmolality. This results in intracellular dehydration. The teaching on fluid administration has in the past emphasised the importance of fluids being isotonic, that is to say of a similar osmolality to plasma, so that the above scenarios and subsequent cellular damage would be avoided. Fluids of equal tonicity could for example contain water plus electrolytes, water plus a smaller amount of electrolytes but including sugar, or water and sugar alone. The emphasis would not have been on the sodium content specifically. Hypernatraemia, a high sodium, would have been a recognised problem in paediatric practice often resulting from the actions of well meaning parents adding "one more scoop" to formula feeds for their infants. I was not aware of any teaching on the specific problem of hyponatraemia, particularly in reference to the care of surgical children. I spoke to Raychel's mother in the Intensive Care Unit in Altnagelvin Hospital following the CT scan. I think this was around 10 am on Saturday morning, 8th June 2001. I explained that Raychel's condition was

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extremely serious and that we were unsure as to the reason for her brain swelling, which this scan had revealed. I told her that there was a possibility that there could have been a bleed into her brain (sub-arachnoid haemorrhage) and that we had contacted the Neurosurgeons in Belfast and were treating Raychel as they had requested. I explained that it would be necessary to take Raychel to the RBHSC so that the experts in treating her condition could take over her care. I tried to give whatever comfort I could but had to emphasise that the situation was extremely serious. Prior to the transfer, which took place around 11 am, I explained that it would not be possible for family members to accompany us in the ambulance. I explained exactly where we would be taking Raychel and that the transfer would be as fast as we could possibly make it. This was going to involve a police escort and I stressed that the family should make their way by car to RBHSC but should not attempt to follow the ambulance. This was for safety reasons and Raychel's mum said she understood this. I next spoke to Raychel's relatives, including her mother, just prior to returning to Altnagelvin Hospital following her admission to RBHSC intensive care. The time was approximately 12.30 pm. I told them that Raychel's condition had remained unchanged throughout the journey and that everyone would do what they could to look after her. I expressed my deep sympathy for their obvious distress and said that we would all be thinking of them and praying for Raychel's recovery. Following the tragic news of Raychel's death in RBHSC, Altnagelvin Trust offered to meet with her parents to offer condolences and to help with questions, which they would inevitably have. Understandably this proved difficult for the Ferguson family and it was not until September when Raychel's mum felt able to attend such a meeting. I was present at this meeting and spoke frankly,

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openly and honestly to those present. No official notes were kept of this meeting but the Patient's Advocate representing the Ferguson family did keep a record (WRC 24). This however is not a full note of the meeting in that it does not include the opening sympathy for the family following Raychel's loss. We stated that we were sorry that Raychel had died whilst in our care and stressed that the treatment she had received, which was the same as in other hospitals, would be reviewed, and whatever changes necessary be made as quickly as possible. I expressed my sincere condolences and shock at Raychel's tragic death. During the meeting I remember answering why I thought Raychel had died. I tried to answer their questions sympathetically and as best I could. Where possible, I answered questions which the family asked, relating to the surgery. I explained that although the Coroner had yet to state the cause of death, I believed that the cause was due to severe brain swelling following the development of a condition called hyponatraemia. I said that this was an extremely rare occurrence and one which I had not seen before in a child. The fluid therapy which Raychel received was the same as that used in other hospitals and the standards of care were the same as in other units treating children. On several occasions during the meeting we stressed that had we known then what we now knew following our investigation into the circumstances of Raychel's death, then perhaps the tragedy could have been prevented. I went on to explain all the steps which we had taken so that such an occurrence would not happen again. I gave details of the discussions which I had with my colleagues in other hospitals treating children so that they would be aware of the risks of hyponatraemia, of how we had changed the fluid prescription in our children's ward, and of how I was introducing teaching on fluid management and the

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dangers of hyponatraemia to both nurses and doctors. I, along with Dr McCord, also spoke to Mrs Ferguson when we met at the Coroner's Inquest in Belfast. We both at that time expressed our deepest sympathy and inquired as to how the family members were coping during what was a particularly difficult time. By way of explanation of the procedures at Altnagelvin Hospital at the time of Raychel's death regarding the prescribing of post-operative fluids in paediatric patients I would explain that initial post-operative fluids are usually a continuation of fluids prescribed intra-operatively. This is usually instigated by the anaesthetist in theatre and taken over by the surgical team in the post-operative period. Paediatric medical staff would be present on the children's ward more commonly than the surgeons and, on occasion, might be asked to prescribe fluids. In Raychel's case I understand the fluid regime was prescribed in A&E and did not commence until Raychel reached the ward. That would be normal in children with abdominal surgery. In Raychel's hospital notes page 39 sets out the fluid amounts prior to theatre (WRC 25). The drip was re-erected in theatre and again in the ward. I can confirm that Dr Makar prescribed the fluids as shown on page 40 (WRC 26). The monitoring of fluids in the post-operative period would be the responsibility of nursing staff and prescription of further fluids would be the responsibility of surgical staff. I had no personal input into the paediatric ward procedures in relation to fluid management as applied in June 2001. Following Raychel's death, I spoke to the Chief Executive, Mrs Burnside, on Monday morning 11th June and informed her of the tragic events which had occurred. Mrs Burnside relayed this information to Dr Fulton, the Medical Director, and asked him to set up an internal inquiry to investigate the events leading to such an unusual tragedy. The Critical Incident meeting, instigated

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according to hospital policy (WRC 27) was arranged for the following day, 12th June 2001 and Therese Brown, the Hospital Risk Manager, informed me of this meeting. The reason for this meeting was to gather together everyone involved so that an accurate account could be made of the events leading to an unexpected death. This is hospital policy and encourages accurate reporting of incidents in a blame-free environment. The purpose of such a meeting is to establish a factual account, to investigate the circumstances and where possible, to put in place measures to prevent recurrence. I was concerned about the fluid administration and documentation around it. It appeared that the amount of fluid prescribed was too much for Raychel's weight. Raychel had been prescribed a rate of 80 mls per hour. By my calculation this should have been 65 mls per hour. However, initial fluid administration is often more than this figure to account for the fasting period prior to surgery. This fasting period results in a fluid deficit. Normal practice would be to replace one half of this deficit in the first hour together with the maintenance fluids and the second half over the next two hours, again together with the maintenance fluid. I would have expected the rate to then be reduced following surgery. I was also concerned that the anaesthetic record documented 1000 mls of Hartman's solution in the "total fluid" box (WRC 28). This was clearly wrong and I had ascertained from the anaesthetists involved that the total given in theatre was 200 mls and that the remainder had been discarded. On 13th June I asked that Dr Jamison, SHO in Anaesthesia, add a retrospective note to the chart to show this correction. I countersigned and dated this correction. I was also concerned about the type of post-operative fluid given to Raychel. Because of my involvement in Raychel's care following her collapse and subsequent discussion with colleagues in

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RBHSC, I had investigated the role of No. 18 solution in the development of hyponatraemia. I reviewed all the relevant literature in connection with this. This literature had not been widely read though it was available. I came to the view that No. 18 solution was inappropriate for post-operative children and prior to that time was unaware that the fluids were routinely changed to this as the default solution in paediatrics. I decided to change to Hartmann's solution and believe that now all units are using 0.45% saline. No. 18 solution is not dangerous in itself but if excessive amounts of anti-diuretic hormone are produced then the possibility of dilution of sodium could occur. In my view this might have explained the low sodium in Raychel's case. Raychel's sodium level would have been diluted by the retention of water as a result of anti-diuretic hormone and No. 18 solution, which contains 4% dextrose, could produce more free water as the sugar was metabolised. The problem would be exacerbated by sodium loss following vomiting. I believed that Raychel had displayed an unusual response, which resulted in severe hyponatraemia. I felt that the meeting was conducted promptly, was informative and constructive. An action list was drawn up to address all the points raised during the meeting (WRC 29). I was charged with gathering information about the routine use of No. 18 solution in post-operative children and I suggested that I contact other hospitals where children might be receiving this fluid, to warn them of the risks in the light of our experience. Throughout the meeting I was struck by the feeling of shock and sorrow that such an unusual and tragic event could have occurred. All present agreed to investigate all aspects of the case so that, where lessons could be learned, steps would be taken to prevent a recurrence. I believe this was a vital meeting and that the subsequent investigation was thorough, constructive and

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played a large part in the redesign of fluid administration in children throughout Northern Ireland. Following Raychel's death and after discussion with colleagues in RBHSC, when it became apparent that the cause of death was cerebral swelling due to hyponatraemia, I decided to call colleagues in other hospitals where children could be treated surgically. I believe that I made telephone calls on 13th June 2001. I spoke to anaesthetic colleagues in several hospitals. I recollect speaking to Tyrone County, Antrim, Craigavon and the Ulster Hospitals. This is not an exhaustive list of hospitals and I did not make a list of everyone I contacted. To those colleagues that I did speak to I outlined the events in Altnagelvin Hospital and indicated that a healthy child had died totally unexpectedly following an uneventful appendectomy. I explained in detail the fluid regime and in particular the use of No. 18 Solution as the default fluid in the paediatric ward. I remember specifically that the situation in both Craigavon and the Ulster Hospitals was exactly the same. Colleagues in both these hospitals expressed concerns that the very same conditions existed and that they would take steps to see that changes were made as soon as possible. Craigavon Hospital said specifically that anaesthetists had been trying to prescribe Hartmann's solution as the post-operative fluid, but that as in Altnagelvin, the default solution meant that it was changed to No. 18 on the ward. I spoke to Dr Chisakuta, a Consultant in Paediatric Anaesthesia and Intensive Care in RBHSC about their use of No. 18 solution in post-operative surgical children and he informed me that they had been using precisely the same regime as Altnagelvin Hospital but had changed from No. 18 solution six months previously because of concerns about the possibility of low sodium levels. This was also the position in Tyrone County Hospital. The nature of these communications took the form of a

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telephone call for information. I realised that steps would need to be taken at a regional level and I was aware that the Department of Health were to be contacted by Dr Fulton, the Medical Director. However the urgency of the situation and my real belief that such an occurrence, however rare, could happen again if the same conditions existed, led me to have direct communication with colleagues, who might find themselves in a similar situation. Following the Critical Incident meeting held on 12th June 2001, I was asked to review the routine use of No 18 solution in postoperative children and to ascertain the practice in other hospitals in Northern Ireland. Dr Fulton requested that urgent recommendations be made following this review. On 13th June 2001 I informed Dr Fulton and Mrs Burnside verbally that, following my research, I had decided to stop the use of No 18 solution in postoperative children. I wrote formally to Dr Fulton on 14th June 2001 confirming this decision (WRC 30). With their agreement I informed Sister Miller in the children's ward of this decision and requested that steps be taken in the ward to effect this change. As a preliminary step, in Altnagelvin Hospital, a notice outlining the change in fluid to be prescribed and a chart to aid the calculation of a child's weight according to age were posted in the children's ward (WRC 31, WRC 32). The default fluid in surgical children became Hartmann's solution from that date. This information was shared with the Paediatricians, Surgeons and my Anaesthetic colleagues. Mre Burnside was given a written update of the outcome of the critical incident meeting (WRC 33). Initially there were some concerns expressed by surgical colleagues concerning the removal of No 18 solution and I addressed this by a letter to Mr Bateson giving my reasons for this decision (WRC 34). Following discussions with my colleagues in the children's ward, a letter of consensus was

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drawn up and signed by all the Paediatricians and the Clinical Directors in Surgery and Anaesthesia. The default solution was changed to 0.45% saline (half-strength saline) in 2.5% dextrose at this time to address concerns that small children required some sugar which was not present in Hartmann's solution. I undertook to provide teaching on hyponatraemia and prepared a computer presentation to assist me in this task (WRC 35). This presentation is approximately one hour in length and has been presented to many groups in Altnagelvin Hospital. My target is principally nurses and doctors but the talk has been presented to The Hospital Management team, Hospital Executive members, and I recall giving the presentation to the Trust Board of the Hospital. I also gave this presentation to the Chief Medical Officer when she visited Altnagelvin Hospital on 14th January 2002. A similar presentation was given to the Western Health and Social Services Council on 19th February 2003 (WRC 36). The teaching is an ongoing process and I was most recently involved in the Medication Study Day in May 2005. New doctors to Altnagelvin are given instruction in the administration of fluids in children and details are included in the Junior Doctor's Handbook (WRC 37). Posters on the subject of hyponatraemia and treatment guidance, issued by the Department of Health, are displayed throughout Altnagelvin Hospital (WRC 38). Where there are concerns around fluid prescription in children, either verbally from paediatric staff, or by the reporting of clinical incidents, these concerns are addressed immediately. A fluid prescription chart was designed and is now in use in Altnagelvin Hospital which addresses most of the concerns around calculation of rates and choice of fluid according to electrolyte measurement. It has been agreed with anaesthetic colleagues that fluids prescribed in theatre based on a pre-operative electrolyte

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measurement (WRC 39) can be given for up to 12 hours, and therefore the initial fluid management is prescribed by the anaesthetists. This essentially ensures that fluids must be reviewed at 12 hours if they are to be continued. This would be a decision made by surgical staff and requires a blood test to decide the choice of fluid. Further to a review of the critical incident meeting on 9th April 2002, Dr Fulton outlined several questions, which he wanted covered (WRC 40). I was asked specifically to address who was responsible for prescribing fluids in children and for how long. A summary of issues to be addressed and actions taken are listed in Dr Fulton's letter (WRC 41). On 1st May 2002 following the meeting, I issued guidance to all medical staff concerning the need for baseline measurement of electrolytes and that anaesthetic staff were prepared to prescribe fluids for the first 12 hours only. Thereafter, fluids could only be described on the evidence of a blood test measuring plasma sodium (WRC 42). On the same date, 1st May 2002, I wrote to the Chief Medical Officer, Dr Henrietta Campbell, asking whether or not there had been Department Guidance on the matter of fluid administration in children, following previous cases of hyponatraemia in Northern Ireland (WRC 43). I received a reply on 10th May indicating that the first incidence of hyponatraemia which had come to the attention of the Department of Health, had in fact been that of Raychel Ferguson and that there had been no guidance issued prior to this time (WRC 44). On 9th May 2002, the default fluid was revised to half strength saline (0.45% NACL in 2.5% Dextrose), and a notice to this effect was posted in the children's ward. This also stressed the need for electrolyte measurement at 12 hours if fluids were to be continued (WRC 45). A consensus statement was prepared and several drafts were circulated (WRC 46, WRC 47). On 28th May 2002 I wrote to Dr Brian McCord,

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Consultant Paediatrician, commending the protocol. Clarification of Hospital Policy on the administration of fluids in children was circulated to surgical colleagues, paediatricians and nursing staff on the children's ward on 2.5.03 (WRC 48). The Medical Director and the Clinical Director in surgery signed this letter. A letter from the Chief Medical Officer, seeking reassurance that guidelines had been implemented in Trusts throughout Northern Ireland, was circulated on 4.3.04 (WRC 49). I replied to this letter confirming that, in Altnagelvin Hospital, this was the case (WRC 50). A further reminder of the policy was circulated to all staff on 23.9.04 (WRC 51). During this process, on a date of which I am unsure, I attended a meeting in Castle Buildings to review the use of fluids in the management of post-operative children. There was discussion around the type of fluid to be prescribed. My opinion, which I stated, was that the use of No. 18 solution should cease and that this should be highlighted in any guidance produced. There was much debate around this and the feeling was that there was no need to mention any fluid specifically since the guidance on the calculation of rates would ensure the correct volume and guidance on the measurement of electrolytes, the choice of fluid to be prescribed. The guidance does not state that No. 18 solution should not be used and I think that for post-operative children, this statement should have been included. Whilst I agree that fluid administration in children requires a change in practice and not simply a change in fluids, and I state this clearly in my presentation which I prepared on the subject, I still believe that avoidance of No. 18 solution is desirable. My reason for saying this is that, if for some reason the guidelines are not followed, which clearly would be an error, then at least if the fluid contained enough sodium, hyponatraemia could possibly be averted. I discussed my

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concerns about the draft guidance being prepared by the Department of Health with Dr Fulton. This was because of the failure to specifically highlight the potential dangers of using a low sodium-containing fluid such as No. 18 solution. Dr Fulton made Mrs Burnside aware of my concerns (WRC 52). I had stressed the need for this to be made clear in the guidance from the Department of Health but no reference was made to any particular fluid. In a letter issued on 25.3.02 immediately prior to publishing the guidance, mention was made to a concern around the use of No. 18 solution but stressed that all fluids were potentially hazardous (WRC 53). One cannot argue, however, that the guidance issued by the DHSSPS is incorrect and if followed, I believe that fluids can safely be administered. However, in Altnagelvin I have with the agreement of my clinical colleagues, discontinued the use of No. 18 solution throughout the hospital. It is also my view that the new guidelines should also apply to adults. All members of staff, medical and nursing, at Altnagelvin Hospital were devastated by the death of Raychel Ferguson. Her death, following an uneventful appendectomy and apparent recovery from her surgery, was completely unexpected and shocked all staff involved with her care. Raychel's treatment was no different from any other children who required an operation and the care given by nursing staff in the children's ward is of the highest standard. The use of No. 18 solution was usual at that time and was used by most other hospitals treating children. There was no guidance concerning hyponatraemia and this was a condition not seen by the majority of staff at the hospital. I believe that Raychel had an unusual and rare response to her surgery. The incidence of vomiting post surgery is not uncommon and this did not unduly alarm nursing staff when it happened to Raychel. The assessment of vomiting can be subjective as

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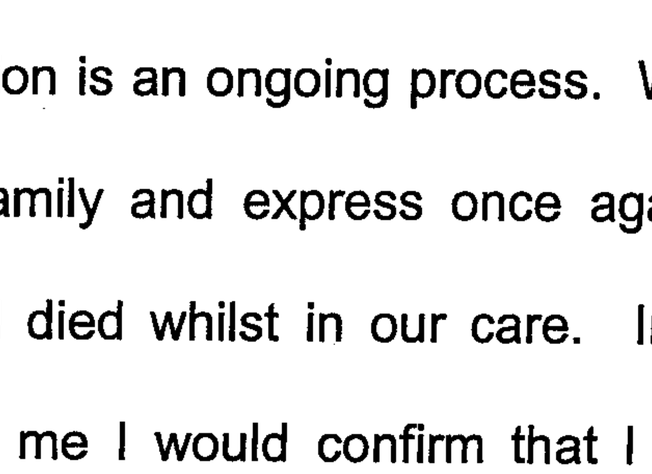
vomiting is difficult to quantify, but according to nursing staff, the amount was not out of the ordinary. Sodium loss by this route would contribute to her overall sodium level, but the dilution possibly caused by an excessive production of anti-diuretic hormone may have had an important role to play in the development of hyponatraemia. Having experienced this tragedy, Altnagelvin alerted other practitioners of the occurrence and of the dangers of hyponatraemia associated with fluid management in children. Altnagelvin has taken steps to prevent a recurrence by changing protocols around fluid management and by changing the default fluid to one containing more sodium. Measurement of electrolytes is mandatory before post-operative fluids can be prescribed and the fluid charts include the accurate estimation of body weight according to age. Attempts have been made to accurately record amounts of losses although this is very difficult. Altnagelvin Hospital is continually reviewing the prescription and administration of intravenous fluids in children. The education is an ongoing process. We have at all times been open and honest with the family and express once again our condolences and heartfelt sorrow that Raychel died whilst in our care. In relation to two specific issues which have been put me I would confirm that I am unaware of Raychel having had a blood test during the 8th and in my experience the use of a nasogastric tube is uncommon.



WRC 16

ALTNAGELVIN HOSPITAL
LABORATORY (TEL: [redacted])

Lab Number : 1747
Doctor : MR K J S PANESAR

Name : FERGUSON
Forename : RACHAEL
Clinic/Ward : ALTNAGELVIN WARD 6
Address : [redacted]
Hosp No. : AH 313854
D.O.B. : 04/02/1992

TEST	RESULT	UNITS	(Range)
Sodium	* 118	mmol/L	(135 - 145)
Potassium	* 3.0	mmol/L	(3.5 - 5.1)
Chloride	* 90	mmol/L	(96 - 108)
CO2	* 15	mmol/L	(22 - 28)
Urea	* 2.1	mmol/L	(2.5 - 6.5)
Glucose	* 11.0	mmol/L	(3.9 - 6.7)
Creat	* 43	umol/L	(53 - 106)
T Protein	72	g/L	(63 - 79)

[redacted]

095-010-046a

RF - PSNI

WRC 17

ALTNAGELVIN HOSPITAL
LABORATORY (TEL: [redacted])

Lab Number : 1742
Doctor : MR K J S PANESAR

Name : FERGUSON
Forename : RACHAEL
Clinic/Ward : ALTNAGELVIN WARD 6
Address : [redacted]
Hosp No. : AH 313854
D.O.B. : 04/02/1992

TEST	RESULT	UNITS	(Range)
Sodium	* 119	mmol/L	(135 - 145)
Potassium	* 3.0	mmol/L	(3.5 - 5.1)
Chloride	* 90	mmol/L	(96 - 108)
CO2	* 16	mmol/L	(22 - 28)
Urea	* 2.3	mmol/L	(2.5 - 6.5)
Glucose	* 9.9	mmol/L	(3.9 - 6.7)
Creat	* 44	umol/L	(53 - 106)
T Protein	71	g/L	(63 - 79)
Alk Phosphatase	* 158	U/L	(20 - 90)
Calcium	2.19	mmol/L	(2.10 - 2.6)
Phosphate	1.22	mmol/L	(0.60 - 1.50)
Albumin	41	g/L	(36 - 51)
Magnesium	* 0.59	mmol/L	(0.75 - 1.25)

[redacted]

(2)

095-010-046b

RF - PSNI

25 kg Maint = 65 ml/hr
0.0.5 2/3 maint = 40 ml/hr

PARENTERAL NUTRITION FLUIDS PRESCRIPTION SHEET

	Amount (ml)	TYPE OF FLUID	NAME and AMOUNT of ADDITIVES	Rate ml/hour	Type of pump	Serial number of pump	Prescribed by (Signature)	Batch No. Date of Expiry	Time erected + erected by (Signature)
1	1000	Soln 18.		80	IMED 960	11445	[signature]	212003 01C19BB	HRcaa S/N 12.10pm Atkins S/N.
2	1000ml	0.9% NaCl		40			[signature]		
3									
4									
5									
6									
7									
8									
9									
10									

(3)

C 01/85084

095-010-046c

WRC 18

RF - PSNI

DATE

[redacted] abscess in the brain
Taken back to the c-t scan
for contrast C-T Scan
↓
no new findings.
Neurosurgeon contacted →
Nothing surgical seen
on the scan
-Not fit to
-But for transfer to RBHSC
when bed available.

May contact Dr Hanna for
advice is on call for
paed neurology at RBHSC.

[redacted] Back to ICU

On Pressure Ventilation Servo 300 Rate 20 f
200 & FiO2 50%
SpO2 100% Chest clear

HR → 93/- BP 105/62 SR

U o/p → 100-400 ml/hr
Na ↓

[redacted] Plan:- for transfer to RBHSC when bed available
- ↑ Na gradually over 24 hrs.
- Ceftriaxone & benlen given
- IVF → 1000 ml (N) saline + 40 mmol KCl } 40 ml/hr.

WRC 20

EVALUATION SHEET

Date	Time	Prob. No.	Evaluation	Signature	B.O.	Communications/Instructions/Investigations
			Ventilated — Fluids changed to 0.9% NaCl			
			Sod to 40mls Hr			
			IM MgSO4			
			2.4mg IV Cefotaxime } 5am			
			1.2mg IV Benzylpenicillin given			
			Catheterized size 10 foley (5ml water)			
			CT Scan ordered			
			Initially sub-achnoid haemor found			
			c evidence of ICP. — Transferred to			
			ICU 7am Ventilation commenced via			
			Servo.			
			Repeat CT Scan. — taken 9am.			
			Obs (see chart) stable.			
			GCS 3. — Unresponsive Pupils			
			large fixed + dilated.			
			Bed available in Sick Children's RVH.			
			Rachael fully attended / Family informed			
			Aware of condition — RVH by ambulance			
			+ police escort 11.10am.			
			Un-eventful journey to Belfast Arrived 12.20pm	S/N [illegible]		
			Neg balance 1L Obs satisfactory			
			Hypothermic. T 33.5 on departure to RVH.			
			FBP COAG EP Bone Profile MgSO4 sent.			
			Results given to staff in Sick Children.			

Hospital Number: Ward:

HC5

(5)

095-010-046e

RF - PSNI

EVALUATION SHEET

Date	Time	Prob. No.	Evaluation	Signature	B.O.	Communications/Instructions/Investigations
9/6/01.	10:10pm		New patient age 9yrs pd RJC from WD 6 at 1am with history as follows.			
Fully attended			- admitted to WD 6 on 7/6/01 c abdominal			
Confirmed			pain. No past medical history. Δ Appendicitis.			
by Dr Mullan			Appendix removed Thursday night - mildly			
			inflamed - No problems during op.			
			on 8/6/01 - no concerns - Vomited x 6-7 times			
			during day - was able to walk. No Temps /			
			diarrhoea.			
			Check by nurses 3am - incont urine			
			- unresponsive - tonic seizure HR ↑ 160.			
			Received 5mg Diazepam P.R.			
			10mg IV diazemuls - seizure lasted 15min			
			Bloods FBP / U+E / Ca / Mg / Cultures taken			
			4.10am. Very unwell. Pupils dilated.			
			+ unresponsive HR ↑ 160 min. Brig			
			Rash ? Petechia upper chest ? 2° Vomiting.			
			? Asp. SAO_2 98% initially 98% O8L O_2			
			but sats ↓ quickly + became apnoeic			
			Intubated c Anaesthetist Size 6 ETT orally.			
			(No drugs given prior to intubation).			

Rachael Ferguson

HC5

Hospital Number: AH. 313854

Ward: ICU

(6)

095-010-046f

RF - PSNI

ALTNAGELVIN HOSPITALS HEALTH AND SOCIAL SERVICES TRUST
TRANSFER REFERRAL SHEET

Patient Name: RACHAEL FERGUSON Hospital No: AM 313254

Date of Admission: 7/6/01 Ward: WH 6

Present Location: ICU

Principal diagnosis: INITIAL – ENCEPHALITIS
HERPES ? MENINGITIS ? ENCEPHALITIS

Reason for Transfer: TO BELFAST ICU

Time of decision: 09.00 (ON FILM)

Referring Consultant: DR MESBITT

Receiving Consultant: DR. GRAHAM

Results of Relevant Investigations: ? Amb. achroid hae.

Current Drug Therapy: 2·4 mg IV Cefotaxime } TDS
1·2 mg IV Benzylpenicillin }
Iv use.

CHECKLIST:

Family informed: (Yes) / No

Was patient full attended: (Yes) / No

ITEMS TO BE SENT WITH PATIENT:

Case Notes: - Originals Yes / (No)
- Copies: Yes / No

X-Rays - Originals (Chest) (Yes) / No
- Copies Yes / No
CT XRays (not sent) Faxed ny.

Patients Belongings: Yes / (No)

Signature: NURSE S/N.

(7)

095-010-046g

RF - PSNI

WRC 23

TRANSFER RECORD SHEET

Patients Name: RACHEL FERGUSON Hospital No: A14 313854

Date: 9th June 2001. Time of Departure: 11.10 am.

PATIENT INTERVENTION / MONITORS:

Tracheal Intubation:	Yes / (No)	Size of E.T.T.:	6.0
Ventilated (Manual)	Yes / (No)	Type of Ventilator:	Dräger Portable
(Mechanical)	(Yes) / [redacted]	Mode of Ventilation:	SIMV IPPV.
Central Venous Lines	Yes / (No)	C.V.P. Monitoring	Yes / (No)
E.C.G.	(Yes) No	SAO_2	(Yes) / No
Blood Pressure (Direct)	Yes / (No)	ET CO_2	(Yes) / No
(Indirect)	(Yes) / No	Urinary Catheter	(Yes) / No
Chest Drain	Yes / (No)		

Time	11.10 am	11.25 am	11.30 am	11.40 am	11.50 am	12 noon	12.10 pm	12.20 pm				
H.R.	105	105	104	83.	105.	103	103	104				
Rhythm	SR	SR	SR	SR.	SR	SR	SR	SR.				
B.P. (Cuff pressure)	96/40	97/47	94/50	93/47	98/50	99/45	97/46					
C.V.P.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				
SAO_2	100%	100%	100%	100%	100%	100%	100%	100%				
Insp. O_2												
Resp. Rate	10	10	10	10	10	10	10					
Tidal Volume	200	200	200.	200	200	200	200.					
Airway Press.	+18	+16	+16	+16	+16	+18	+16					
Peep cms H_2O	+2	+2	+2	+2	+2	+2	+2					
ET CO_2	34	34	34	34	34	33	35					
PUPILS	E	E	E	E	E	E	E					
Right Size	7	7	7	7	7	7	7					
Right Reaction	F	F	F	F	F	F	F					
Left Size	7	7	7	7	7	7	7					
Left Reaction	F	F	F	F	F	F	F					

SIZE OF PUPIL
1 :
2 :
3 ●
4 ●
5 ●
6 ●
7 ●
8 ●

FLUID	VOL	STARTED AT	RATE	SIGNATURE
Nacl 1+4	1L	9 am	Hourly	[redacted]

DRUG	DOSE	TIME	SIGNATURE

Time of Arrival: 12.20 pm.

Tick if journey uneventful: ✓

Any Important Events Recorded. Desaturation Hypotension Arrhythmia Hypertension Other

If Yes Please elaborate:

Evaluation:

Signature: (8)

095-010-046h

RF - PSNI

WRC 24

ALTNAGELVIN HOSPITALS H&SST

Meeting held in the Clinical Education Centre on the 3 September, 2001 at 6 p.m. in the Resource Room 2.

Re: Rachael Ferguson Hospital No. 313854, DOB 4.2.92, DOD 9.6.01

PRESENT: Mrs. Ferguson, Mother of deceased child
Mrs. K. Doherty (Sister)
Mr. Thomas McMullan (Brother)
Ms. Rosaleen Callaghan (Family Friend)
Dr. Ashenhurst (Family G.P.)
Ms. Helen Quigley (WHSSC)
Mrs. S. Burnside, Chief Executive
Dr. G. A. Nesbitt, Clinical Director (Critical Care)
Dr. F. B. McCord, Consultant Paediatrician
Sister Millar, Ward 6
Staff Nurse A. Noble, Ward 6
Mrs. A. Doherty, Patients Advocate

Mrs. Burnside introduced members of staff to the Ferguson family.

Mrs. Kay Doherty said she would ask the questions and Mrs. Ferguson could speak if she felt like it.

Mrs. Doherty said Rachael was admitted with appendicitis. She was seen by the Doctor and family were told Rachael would be for Theatre but they would leave her for a time. It would be approximately 2.30 a.m. when she would be taken to Theatre. Parents decided to go home for a period but when they reached home the hospital phoned to say Rachael was going to Theatre soon.

Why? When the parents left there was no hurry in taking Rachael to Theatre.

Mrs. Ferguson said there had to be a reason for taking Rachael to Theatre sooner.

Dr. Nesbitt explained that Rachael had had tea at approximately 5 p.m. No surgery would be carried out for six hours as there was a danger of Rachael vomiting. It looked like it would be the early hours of the morning before Rachael would be taken to Theatre but then there was an earlier slot and it was thought that Rachael would go to Theatre around 11.10 p.m.

The Doctor passed Rachael ready for Theatre and explained to Mrs. Ferguson that there had been a delay as Rachael had to be fasted but would be taken at the earliest opportunity which would be approximately 11.30 p.m.

Dr. Nesbitt explained that the appendix would be removed as a ruptured appendix would be bad for a little girl. Dr. Nesbitt assured Mrs. Ferguson that the surgery was completely uneventful.

Mrs. Kay Doherty said that the parents were told that Rachael would be back within an hour but she wasn't back from Theatre until approximately 2.30 a.m.

Dr. Nesbitt explained that if Rachael went to Theatre around 12 midnight she would be prepared for anaesthetic.

Mrs. Ferguson said she went up to Theatre with Rachael and that she was knocked out at 11.40 a.m. Dr. Nesbitt explained that following surgery Rachael would be kept in the Theatre until she came round from the anaesthetic. The actual surgery would only be an hour but Rachael would not be back in the ward until she was fully recovered.

The histology report confirmed that Rachael had a normal appendix but it was better to take the appendix out.

Mrs. Ferguson said that the Doctor had said there were two blockages.

Mrs. Doherty asked, "what do you mean by blockages?"

Dr. Nesbitt explained that the appendix is a small finger like appendage on the bowel and if it gets blocked, it becomes engorged and swollen and can get red and inflamed. If the appendix bursts at this stage you can end up with a belly full of pus. A lot of people get their appendix out and many of them have a normal appendix when it is removed, but you examine the patient, make the diagnosis and remove the appendix.

Mrs. Ferguson said that when Rachael went down to Theatre she had no pain.

Dr. Nesbitt said that appendix pain comes and goes. Rachael could be fine at 11.30 p.m. but the pain could be back at 2 a.m. The appendix can rupture and the pain goes when this happens.

Mrs. Doherty asked Dr. Nesbitt if he was aware of any other problem. Dr. Nesbitt said no, Rachael was a normal healthy child with appendicitis.

Mrs. Doherty said Rachael was up on Friday morning. She was colouring in and was bright and alert. She was fine. Then she became sick, she was vomiting constantly and her face was blazing red.

Mrs. Ferguson said there must have been something wrong with that amount of vomiting. She mentioned it to the Doctor on a couple of occasions.

Mrs. Doherty said why had Rachael got a sore head. She shouldn't have had a sore head. When the sore head was mentioned to staff they said it would be normal to have a sore head during this period following surgery. The impression she got was "don't bother me". Rachael was bringing up blood when she vomited. Why was this?

Dr. Nesbitt said that when you are vomiting the back of the throat can become irritated and can bleed. There would have been nothing in Rachael's stomach and dry retching can cause some bleeding or it may be dark brown like coffee grounds.

Mrs. Ferguson said Rachael had a sore head. She was throwing up blood and her head was so sore she held her head between her hands.

Mrs. Doherty said Rachael was not a complainer. She wouldn't have complained if there was nothing wrong with her. Why did the Nurses not look about her when she was so sick and had a sore head.

Dr. Nesbitt said that on the day following surgery, the first post-op day, people can be sick and have a sore head.

Mrs. Doherty said something was wrong with Rachael. If a child is crying with a pain in her head .....

Mrs. Ferguson said, "and the amount of sickness" I thought that when her stomach was empty at least there would be no more sickness.

Sister Millar said she was on duty on Friday morning. She went off at 6 p.m. Rachael was walking in and out to the toilet and did not appear to be in pain – she was walking well. Sister Millar remarked to Rachael's dad how well Rachel was doing. Sister Millar had been aware that Rachael had vomited at around 9 a.m. but she did not see the vomit. Sister Millar did not consider this unusual as lots of children vomit. She had no major worries regarding Rachael but asked the Doctor to give her something for the vomiting. When Sister Millar went off at 6 p.m, the Doctor was giving Rachel Zofran.

Staff Nurse Noble said when she came on duty she got the report. She was told that Rachael had been sick during the day and had been given Zofran for this. She was not aware of any blood in the vomit nor of Rachael's sore head.

Mrs. K. Doherty said that Mrs. Ferguson rang her at 9.30 p.m. to say that she was concerned about Rachael – she still had a sore head. Mrs. Doherty advised Mrs. Ferguson to ask for answers; the headache was not there for nothing.

Staff Nurse Noble said that when she went down to the ward, Rachael's father was there and Rachael was dozing. Staff Nurse Noble gave Rachael Paracetamol suppositories for the headache. Staff Nurse Noble explained to Mr. Ferguson and to Rachel what she was doing. Rachael was alert at this time and then settled. Both parents left and went home. Rachael appeared settled after getting the Paracetamol.

Mrs. Ferguson queried if Rachael was sleeping.

Staff Nurse Noble said Rachael woke around 12.30 a.m. The Nurses went in to check on her. There was a mouthful of vomit on her pyjamas but she appeared to be alright.

Mrs. Ferguson said she felt that Rachael was not herself. When she looked at her eyes she felt there was something not right.

Mrs. Burnside said to Mrs. Ferguson that it was clear she knew Rachael so well that she sensed something was wrong. Something that Nursing Staff could not pick up on.

Mrs. Ferguson said she felt something was wrong with Rachael.

Mrs. Doherty said something was taking Rachael down.

Staff Nurse Noble left Rachael to settle as she felt Rachael would need the rest after vomiting all day. Children would normally settle and sleep. Most children recover while they sleep.

Mrs. Doherty said that Rachael's parents had got a phone call at 3.50 a.m. to say that Rachael had taken a seizure. When her father came to the ward, Rachael was still in the ward. Why was she still in the ward? Obviously something was wrong.

Staff Nurse Noble said they didn't always take a child to the treatment room. Sometimes they settle in the ward.

Staff Nurse Noble said she and an Auxiliary Nurse were in the ward with another child when the other Nurse heard a fissle. When she looked in on Rachael, Rachael was having a seizure.

Mrs. Ferguson asked Staff Nurse Noble how she knew Rachael was having a fit.

Staff Nurse Noble said Rachael was stiff and she noticed that Rachel had wet herself. There was a Doctor (SHO) outside who was called to see Rachael. Rachael was put on oxygen and got something to stop the seizure. She had an ECG - a heart tracing done. The Doctor ordered Rachael something to stop the seizure. It was Diazepam – Staff Nurse Noble said that is what we use – and I gave it to her. This did not settle Rachael and the Doctor (SHO) gave her Diazemuls. Rachael settled after this and staff continued to monitor her. Her pulse and blood pressure were satisfactory and Rachael appeared to be in a "post-fit" state.

Mrs. Kay Doherty said Rachael's father (Ray) arrived as Rachael was having her second fit.

Staff Nurse Noble said that Rachael's colour never changed and her pulse and blood pressure were normal. Children are not always taken to the treatment room when they fit. They get Diazemuls and usually settle and sleep.

Mrs. Ferguson said she arrived at 5 a.m. and Rachael was in the treatment room.

Dr. McCord said that when he saw Rachael he was concerned. Children have fits but Rachael looked unwell. Rachael had a faint rash and when you hear of a rash you immediately thing of meningitis. He discussed the case with his colleagues and decided to give Rachael high dose antibiotics.

When Dr. McCord got to the ward the Anaesthetist had been called and Rachael was intubated.

Mrs. K
ay Doherty said that when she got to the ward everything went up, they had everything on her. I looked at Rachael, her pupils were dilated. I thought she had passed away.

Dr. McCord said there is a strong possibility that is so. That may have been when meaningful life left her.

Rachael had a brain scan which showed swelling of the ventricles. Rachael was transferred to I.C.U.

Dr. McCord thought he could see a trickle on the brain san. Doctors in Belfast were contacted. They had a different expertise and the scans were faxed to Belfast. A second Brain Scan was requested. There were no new findings on the second scan. Arrangements were made to transfer Rachael to Belfast.

Mrs. Kay Doherty said when they got to Belfast they had to wait a while until Dr. Hanna spoke to them. Dr. Hanna said that there was no response from Rachael's brain and her brain had swollen. He did not want to give the family false hope. He said the prognosis is very, very poor. Rachael was taken up there with false hope.

Dr. Nesbitt said he did not give false hope but he wanted Rachael to have every possible chance. You were right the event in the ward was the terminal event but you have to give it all you have. I tried my best.

Mrs. Doherty said to Dr. Nesbitt you knew that Rachael wasn't going to make it.

Dr. Nesbitt said sometimes children are very ill and they can get up and walk away. We had to get Rachael to the experts and she was transferred up as quickly as was humanly possible. It was awful that you were dragged to Belfast and it was difficult for me to see you there but if Rachael had been my own child she would not have been treated any differently. I was totally devastated.

Mrs. Burnside said that it can be very difficult when a child is ill.

Mrs. Doherty said I knew then what I knew at 3 a.m.

Mrs. Burnside asked Mrs. Doherty if they felt very angry about the transfer to Belfast.

Mrs. Doherty said no, that didn't come into it.

Dr. Nesbitt said the specialist unit was in Belfast. We had to get her there.

Mrs. Doherty said they realised that.

Dr. Nesbitt said they could have wasted another hour before making the same decision.

Dr. McCord said the expertise was in Belfast and it was better to get her there.

Mrs. Doherty asked what were Rachael's sodium levels the first time they were done? What is routine? What checks do you do?

Dr. McCord said bloods are checked routinely on admission. 36 hours prior to this Rachael's bloods were normal.

Mrs. Doherty asked if they should not have been checked after the operation.

Dr. Nesbitt said that they may have to review procedures. It may be necessary to check routine admissions pre-op. and post-op. The reason why they are not done routinely is that it requires a needle into the vein to take the blood. At 3.30 a.m. Rachael's sodium was down.

Mrs. Doherty said she had looked up low sodium. Rachael had all the symptoms, vomiting, headache etc. and if it drops rapidly it can cause brain damage and death.

Dr. Nesbitt said they had also looked up the effects of low sodium and a rapid drop in Sodium was evidenced in a fit. Rachael had followed a normal course of events following her operation.

Mrs. Doherty said Rachael had deteriorated rapidly. She had all the classic signs i.e. headache.

Dr. Nesbitt said that looking back he realised that was so but it was extremely rare. Rachael had the common symptoms found in a child after operation. This is a common experience.

Mrs. Doherty said Rachael then had her blood checked regularly.

Dr. McCord said that was when she was in ICU. People are there for more intense monitoring.

Dr. Nesbitt said that is something that we might have to do, check blood six hourly. I have never seen this before.

Mrs. Doherty asked Dr. Nesbitt if on looking back, he had learned anything from this.

Dr. Nesbitt said I do think it was a low Sodium. I have been in contact with children's hospitals and we will look at ways of preventing this happening. This has made me change my practice. I was totally devastated.

Dr. McCord said the same fluids were used for children up and down the country. He felt that there had to be an innate sensitivity in Rachael's case. These fluids have the correct amount of sodium and glucose in the same amount of water. Rachael retained free fluid and this made her brain swell.

Mrs. Ferguson said Rachael's headache didn't start until Friday morning.

Dr. Nesbitt said he felt sorry for everyone on the ward. Looking back it was an awful experience for staff on the ward.

Sister Millar said she came back from days off and was absolutely devastated when she heard. She said she had been nursing for over 30 years and had never seen anything like this happen. There would be some children that you worried about but there was nothing about Rachael that caused her concern.

Mrs. Burnside said to the family that they would have more questions. It would be a long time until the inquest and we would do all we could to help them. The hospital would look at things and see if there were ways of improving care.

Mrs. Doherty asked Staff Nurse Noble if Rachael had said anything to them.

Staff Nurse Noble said that when she came back from her break the Staff Nurse told her that Rachael had had a mouthful of vomit on her pyjamas but she just wanted to sleep. She behaved as any other child. As a mother I would have phoned and let her mother know if Rachael had been asking for her.

Dr. McCord assured the family that Rachael had not felt anything and had not suffered.

Dr. Nesbitt said that death occurred when meaningful life ceases, when the brain ceases. Death for Rachael had occurred before she went for the brain scan. Once this event occurs you are not aware of anything. I can categorically say and reassure you that Rachael did not feel any pain and was unaware of anything although there were some movements. I still think it was the right thing to do, to give a person the benefit of the doubt even when you know deep down in your heart that chances are poor.

Mrs. Ferguson said that when her husband went over to the hospital, the Nurses said that the drip was all tangled up around Rachael.

Staff Nurse Noble said that Rachael was not restless. The Nurse heard a fissle of bedclothes and looked in at Rachael and called Nurse Noble.

Dr. Nesbitt said quite often children got a bit tangled up with their drip. This is normal.

Mrs. Burnside asked the family if they had any worry about the drip but none were expressed.

Staff Nurse Noble said the Nurse had been in with Rachael at 2 a.m. doing her pulse and blood pressure.

Mrs. Doherty said that Mrs. Ferguson had a fear that Rachael was looking for her and no one was there.

Staff Nurse Noble said Rachael's observations had been checked and staff were in and out of the ward almost constantly. There was a child who needed turned two hourly if she was on one side and one hourly if she was on the other side. The ward was opposite the Nurses station. If anyone had noticed anything untoward they would have said. When Rachael took the fit she deteriorated very quickly. When her pupils were checked they were equal and reacting and then the next time they were checked they were not reacting as briskly. She did seem to go down very quickly. The SHO was there.

Mrs. Ferguson asked about the trickle in Rachel's brain, in the scan.

Dr. McCord said his interpretation was that it was a bleed. He said it is very difficult to interpret a scan as it is all areas of grey, but he gave his opinion and the treatment would not have changed. She would still have been transferred to Belfast.

Mrs. Burnside asked Dr. McCord if he thought it was a bleed.

Dr. McCord explained why he thought it was.

Mrs. Burnside said so the result is a swelling in the brain.

Dr. Nesbitt said the treatment is exactly the same regardless of what the cause is. Result is swelling of the brain. Even with treatment the swelling cannot be reduced. The main thing is to get her to a center where the experts are and who can operate if necessary.

Ms. R. Callaghan, friend of the family, asked if it would be possible for the family to be informed of the result of a meeting to be held at the end of the month.

Dr. Nesbitt said that at the meeting they would be looking at fluids given to children and that the family could be informed.

Ms. R. Callaghan said Rachael was checked at 2 a.m., then at 3.40 a.m., how often are checks carried out?

Staff Nurse Noble said observations are checked at 10 p.m., 2 a.m. and 6 a.m., also at any time the staff felt they needed to check them. Nurses are constantly up and down the ward checking if a child is not sleeping or in the ward with a child requiring turns. If a child is restless the Nurses go in.

Mrs. Ferguson said she felt that there was something wrong when Rachael threw up the blood. She knew when she looked into Rachael's eyes.

Mrs. Burnside said to Mrs. Ferguson it was obvious that she knew Rachael well. She was aware of a change in her; a sense that we did not have. Mrs. Burnside said it will be a long time until the inquest. We realise this is a tragedy and devastating for you but we don't want you to feel isolated. If we can be of any help at all .....

Mrs. Doherty said Mrs. Ferguson was concerned about her other three children. What if they are sick and have to come to hospital?

Dr. Nesbitt said we all feel the same. If it was my child ..... He said the fluids used are the standard across the country. We may have to change these if children are getting too much sodium. There has to be a middle ground. Nothing we were doing was unusual.

Mrs. Burnside said she would leave the offer with the family. The door is open. She said this did not occlude any other action they might want to take.

Ms. Rosaleen Callaghan asked if it would be possible for Rachael's medical notes to be made available to the family.

Dr. Nesbitt reassured the family that they could get a photocopy of the medical notes.

Ms. Callaghan said that would be helpful.

Dr. Nesbitt said he would be happy to go through the notes, blow by blow. My involvement with Rachael was after the event had occurred. I was very upset.

Mrs. Doherty said we'll leave it at that.

Mrs. Burnside asked if it would be helpful if Rachel's medical notes were sent to Dr. Ashenhurst.

Dr. Ashenhurst agreed with the family that she would go through the notes with them.

Mrs. Burnside confirmed that a photocopy of the medical notes would be sent to Dr. Ashenhurst.

Mrs. Doherty said they were hoping to have the post mortem on the brain soon but it could take up to four months.

Mrs. Burnside agreed that four months was a very long time.

The meeting concluded at 7.15 p.m.

RF - PSNI

ALTNAGE[illegible]N [illegible]SPITAL NEO NATAL INTENSIVE CARE UNIT
FLUID BALANCE FOR I.V. FLUIDS

Name Rachel Ferguson Date 7.6.01 Wt. ..... Age 8 yrs

FB. 491

	INPUT												OUTPUT										
SPECIFY FLUID	INTRAVENOUS								ORAL														
	1		2		3		4		5		6												
TIME	Amt.	Total	Amt.	Total	Amt.	Total	Amt.	Total	Amt.	Total	Amt.	Total	ASPIRATE Amt.	VOMIT Amt.	URINE Amt.	URINE Total	STOOLS Total	LAB SUGAR	HAEMOCUE	Signature	I.V. SITE	Comments	Signatu
08.00																							
09.00																							
10.00																							
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19.00																							
20.00	NBM																						
21.00	Bank/w																						
22.00	150	—																					
23.00	150	60																					
24.00	At Theatre.																						
01.00																							
02.00	150	140																					
03.00	150	220																					
04.00	150	300																					
05.00	150	380																					
06.00	150	466																					
07.00	156	540																					

Fasting

Intravenous Total	
Oral Total	
TOTAL INTAKE	

Urine Total	
Other Total	
TOTAL OUTPUT	

095-010-046s

WRC 25

PARENTERAL NUTRITION FLUIDS PRESCRIPTION SHEET

	Amount (ml)	TYPE OF FLUID	NAME and AMOUNT of ADDITIVES	Rate ml/hour	Type of pump	Serial number of pump	Prescribed by (Signature)	Batch No. Date of Expiry	Time erected + erected by (Signature)
1	1 litre 80ml/Hour,	No 18	—	80ml/Hr	I-Med	11445	R Muh	07C19BB. 2/2000	10-15a [signature]
2									
3	~~80ml/[illegible]~~								
4									
5									
6									
7									
8									

LPC 01/85/064

(20)

WRC 26

WRC 27

CRITICAL INCIDENT PROTOCOL

Introduction
On occasions serious incidents involving patients may occur. These would include an event resulting in or with potential to develop into, serious damage, injury or death of a patient. They are usually termed Critical Incidents and are events, which will likely attract media attention.

This protocol details the procedure to be followed in the reporting and investigation of a Critical Incident. This protocol supplements the Trust Clinical Incident Policy dated February 2000.

Flow Chart
Critical Incident Process

↓

Critical Incident Occurs

↓

Clinical Notes Completed/ Clinical Incident Form Completed

↓

Inform the Clinical Services Manager/ Clinical Director and the Risk Manager

↓

The Risk Manager to Inform the Chief Executive, Medical Director, Director of Nursing

↓

The Risk Manager will arrange a Critical Incident Review meeting ASAP composing ~~In attendance will be~~ the Medical Director/ Nursing Director/ Clinical Effectiveness Co-ordinator/ Clinical Director/ CSM/ Consultant and other relevant staff.
(On occasions the Trust's Solicitors may be present.)

↓

The Critical Incident Meeting will endeavour to clarify the circumstances surrounding the incident and identify further investigations and action required to prevent recurrence.
(Staff may be asked to complete a statement, containing factual information of their involvement, to assist in the investigation).
Note these statements may be discoverable in the event of future litigation.

↓

The Chief Executive will be kept informed by the Risk Management Co-ordinator throughout the investigation.

↓

The Risk Management Co-ordinator will provide the Chief Executive with a written report, with conclusions and recommendations within an agreed time-scale.

↓

The recommendations will be sent to the relevant personnel for action.

~~026-012-016~~

095-010-046u

RF - PSNI

WRC 28

DATE 7/06/01

Dr. CUNO / Dr Jamison.

Procedure Appendicectomy.

Anaesthetic Record

Primary Technique

- Inhalational / IV ☑
- Spinal ☐
- Epidural ☐
- Local ☐
- Sedation ☐

TECHNIQUE

* Retrospective note dated 13/6/01
Patient only received 200 mls of noted fluids below when in theatre
litre bag removed prior to leaving theatre.
C Jamison (SHO)
witnessed by [signature]

Airway

- Laryngeal Mask O N
- Intubation (O) N T
- Size 8.0

- No ETT/Airway ☐
- ET ☑
- blind ☐
- fibreoptic ☐
- awake ☐
- rapid sequence ☑

(Easy) / Mod / Diff

- Bain ☐
- Circle ☑
- humidifier ☐
- O2 supplement ☐
- RR 12 x TV 810
- Raw 13.

Monitors

- ECG ☑
- BP ☑
- O2 analyser ☑
- Agent analyser ☑
- Steth pre/oes ☐
- Capnograph ☑
- Pulse oximeter ☑
- N-M blockade ☐
- Temp. ______ ☐
- CVP ______ ☐
- Art ______ ☐
- PA catheter ☐
- urinary catheter ☐
- other ______
- Warming blanket
- Fluid warmer

Fluids total
Hartman's 1L.

Blood Loss

IV Cannula
#22G

Position

Signed: [signature]

Ondansetron	4 mg			
Fentanyl	50+25 mg			
Propofol	160 mg			
Scoline	80 mg			
Cyclimorph	15 ml			
Mivacron	8 mg			1 mg
Metoclopramide	10 mg			

TIME 1130

BP – V Λ
HR – ●

Scale: 220, 200, 180, 160, 140, 120, 100, 80, 60, 40, 20

SAO2					98	97	97	
ETCO2					48	45	44	

~~020-009-016~~

RF - PSNI

095-010-046v

WRC 29

Action Sheet 12/6/01

1.	Evidence ✓ Change to Hartmans	Dr Nesbitt
2	Daily U+E all post op	Sister Miller
3	Inform junior surgical staff	Mr Gilliland
4	Monitor urinary (+ ? vomit) output	Sister Miller
5	Chart for IV fluid rates	Dr McCord
6	Fluid balance documentat[ion]	Ann Witherow

WRC 30 (2)

Dr G A Nesbitt
Clinical Director
Anaesthetic Department
Altnagelvin Hospital

Date: 14th June 2001

Dr Raymond Fulton
Medical Director

Re: Fluid management in Children

Dear Dr Fulton, Raymond.

I have contacted several hospitals including The Royal Hospital for Sick Children and made enquiries about peri-operative fluid management.
The Children's Hospital Anaesthetists have recently changed their practise and have moved away from No.18 solution (fifth normal NACL in 4% Dextrose) to Hartman's solution. This change occurred 6 months ago and followed several deaths involving No.18 solution.
Craigavon Hospital and the Ulster Hospital both use Hartman's intra-operatively and No.18 post-operatively as is our practise. The Anaesthetists in Craigavon have been trying to change the fluid regime to Hartman's postoperatively but have met resistance in the Paediatric wards where, as in Altnagelvin, they have followed a medical paediatric protocol.

In view of recent events, and papers on the subject, and the fact that the Children's Hospital no longer uses No.18 solution, I have decided to recommend that we do the same. I have spoken to Sister Miller in the Paediatric ward and also to Dr McCord who both are in agreement. Dr McCord has agreed to add this to the protocol he is developing for calculating the amount of fluid to be prescribed. He has further agreed that, pending discussion with his colleagues, fluid management in postoperative children should be under the supervision of paediatricians.

To summarise: Altnagelvin Hospital has followed what is a widespread and accepted policy of using No.18 solution for postoperative fluids. There is evidence to show that this policy is potentially unsafe in certain children who have undergone a surgical procedure. The Children's Hospital has ceased to use it and Craigavon is trying to effect a change in this direction. As from today we will no longer be routinely using this fluid in the management of surgical cases.

Yours sincerely,

G A Nesbitt Clinical Director

cc Theresa Brown Risk Management Coordinator

(24)

B26-005-066

095-010-046x

WRC 31

NOTICE

FROM NOW ONWARDS

12/6/01

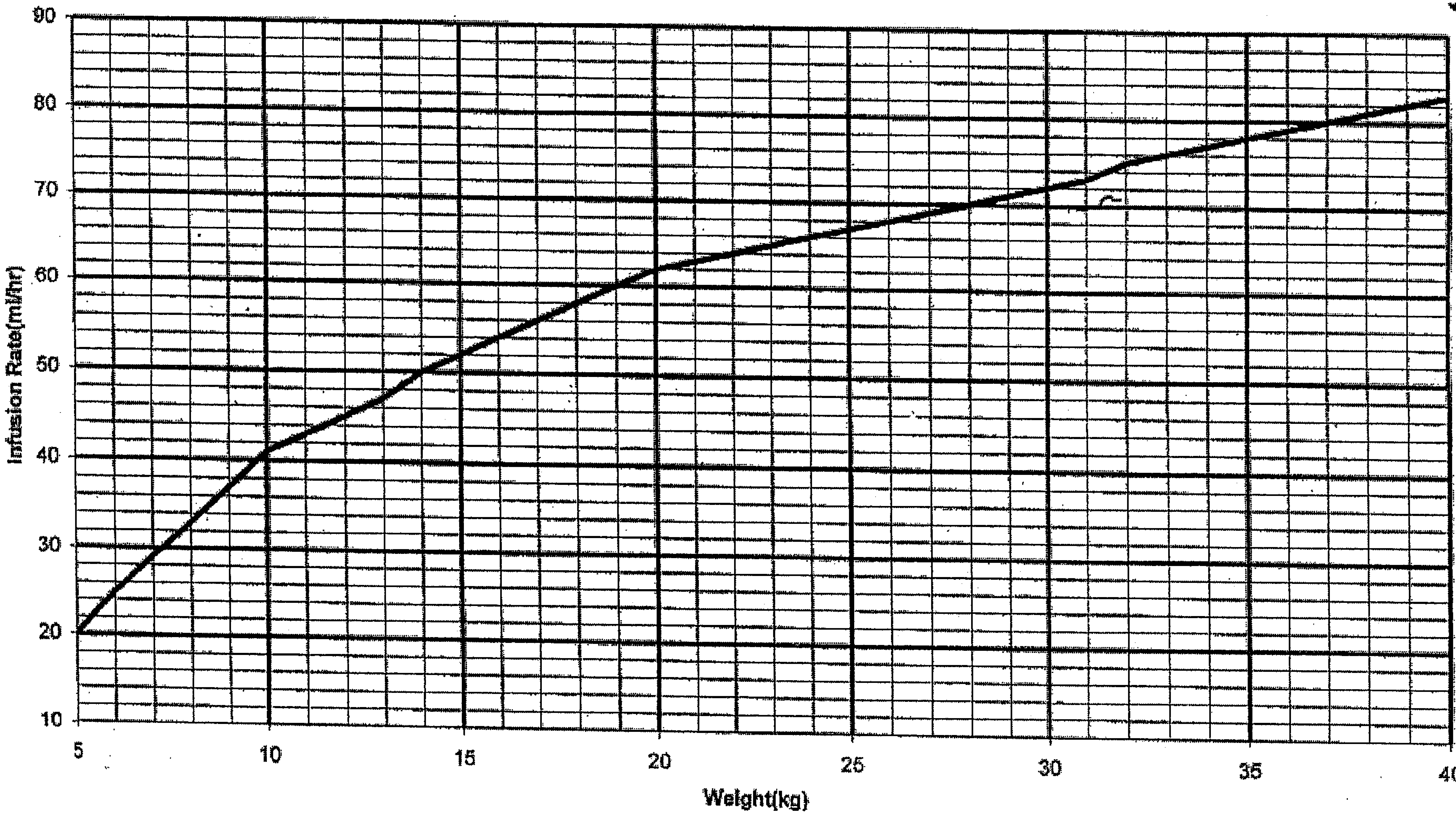
ALL SURGICAL PATIENTS (INCLUDING ORTHOPAEDIC) ARE TO HAVE IV HARTMANS SOLUTION

ALL POST-OPERATIVE CHILDREN ON IV HARTMANS SOLUTION ARE TO HAVE DAILY ELECTROLYTES & 6HOURLY B.M's

MEDICAL PATIENTS TO CONTINUE ON SOLUTION 18 OR UNLESS PRESCRIBED OTHERWISE BY DOCTOR

FOR SURGICAL PATIENT'S (guidelines).

Suggested Rates for IV Fluid Maintenance



(26)

WRC 32

~~095-000-010~~

095-010-046z

WRC 33

UPDATE FOR CHIEF EXECUTIVE
RE: CRITICAL INCIDENT MEETING 12-6-01

This is an update relating to the agreed action highlighted by Dr Fulton's note 0f 13-6-01.

1. Dr Nesbitt has had discussions with anaesthetic colleagues and has made a decision to discontinue the use of Solution 18 for Paediatric Surgical Patients. One of the Surgeons is not supporting this change. (see attached correspondence from Dr Nesbitt).

Further action required. Mrs Brown to undertake a more extensive review of the research regards the use of Solution 18.

2. Daily U&E levels will be checked on all post operative children with an IV infusion. Sr. Millar has already actioned.

3. Nursing staff advise surgical junior staff of the U&E results. Medical staff are bleeped by the nursing staff.

4. A meeting has been held with Mrs A Witherow, Mrs M Doherty, Sr Millar, Sr. Little, Nursing Staff and Nursing Auxiliary Ward 6 to discuss in detail the fluid balance management. The following has been agreed:
   a. Fluid balance sheet must be correctly completed.
   b. A record should be kept of total fluids given.
   c. Accurate recording of output. To be measured. Parents to assist.
   d. Vomit to be recorded as, small, medium or large as opposed to ++.
   e. Nursing staff to be proactive in advising medical staff regarding discontinuation of fluids.
   f. Nursing staff to be proactive in management of fluids required after 4.00 p.m. (Refill bag not just automatically put up).
   g. Sr. Millar to be involved in the training of staff in relation to e and f above.

5. Dr McCord has actioned the display of the chart detailing infusion rates.

6. The Fluid balance documentation currently in use will continue to be used The documentation will be kept under review by Mrs Witherow.

Further Action Required. Mrs Witherow to keep documentation under review.

Therese.

Note: There is a concern by Nursing Staff that Surgeons are unable to give a commitment to children in Ward 6 unless they are acutely ill and are bleeped. Could Paediatricians maintain overall responsibility for surgical children in Ward 6?

The literature need to be reviewed in relation to Adults — also

THERESE BROWN **9TH JULY 2001**

Dr Fulton → discuss with Paediatricians — Ist.

(27)

095-010-046aa

RF - PSNI

WRC 34

Dr G A Nesbitt
Clinical Director
Anaesthetic Department
Altnagelvin Hospital

3rd July 2001

Mr Paul Bateson
Clinical Director
Surgical Directorate

Re: Fluid management in children

Dear Paul,

Following the recent tragic death of a child apparently due to hyponatraemia, I have asked my Anaesthetic Colleagues to prescribe Hartman's solution instead of No.18 solution. This followed reading several papers outlining the hazards associated with the use of hyponatraemic fluids in children who retain fluid due to ADH and Vasopressin release. Children's Hospital no longer use No.18 solution, and most other units are trying to change to Normal Saline or Hartman's.

The problem in the Children's ward seemed to be that even if Hartman's was prescribed, it was changed to No.18 by default. I therefore asked Sister Miller to change this policy so that, for surgical children, the default solution became Hartman's. With agreement, it may also be possible for the paediatricians to undertake the fluid management of surgical children. Obviously this impacts on surgical care and needs your support.

Some clinicians evidently feel that No.18 solution is the fluid they wish to prescribe, and have disagreed with the regime suggested. Obviously clinical judgement is important, and I am sure that there is a place for No.18 solution, but I am concerned that my attempt to put in place a safe policy has met with resistance so quickly.

Perhaps you could discuss this urgently within the Surgical Directorate so that a regime can be agreed.

Yours sincerely,

G A Nesbitt Clinical Director Anaesthesia & Critical Care

cc Dr Raymond Fulton Medical Director ✓
Teresa Brown Risk Management Co-ordinator
Sister Miller Ward 6

(28)

~~022-098-309~~

095-010-046ab

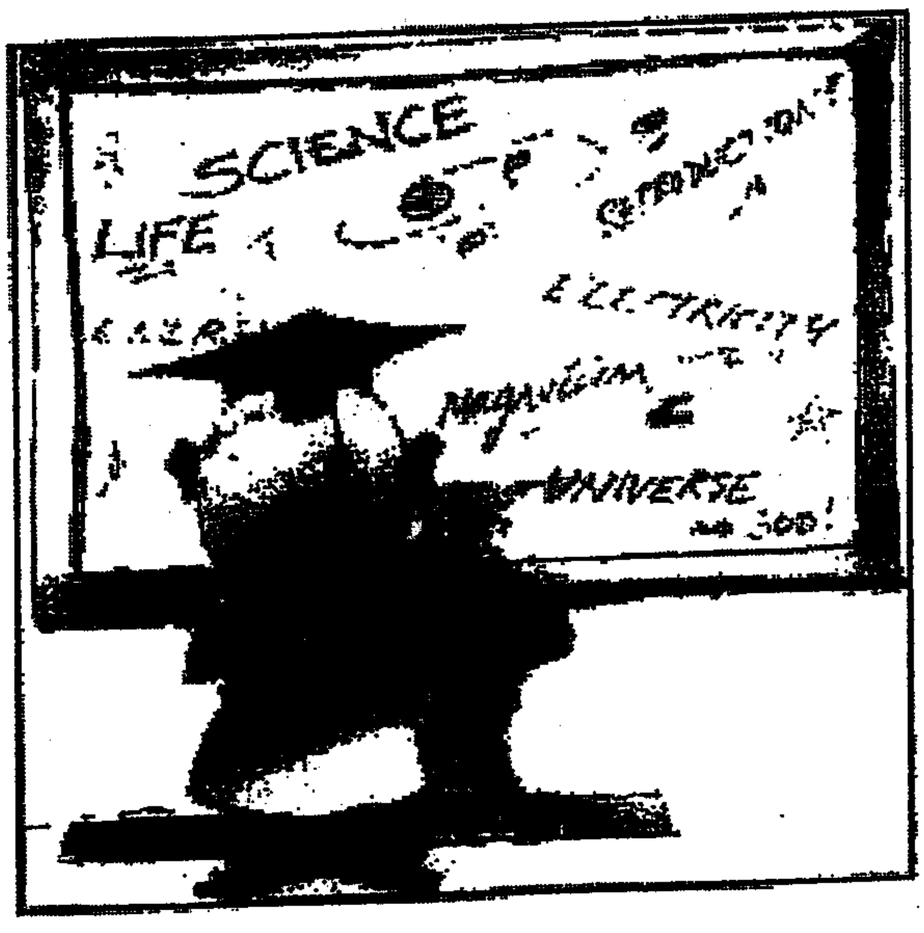
RF - PSNI

Fluid Balance

1. Renal Physiology made easy
2. A case report of Hyponatraemia
3. Recommendations for Fluid Therapy in Children (*& now Adults*)

1

Renal Physiology - is it complicated?

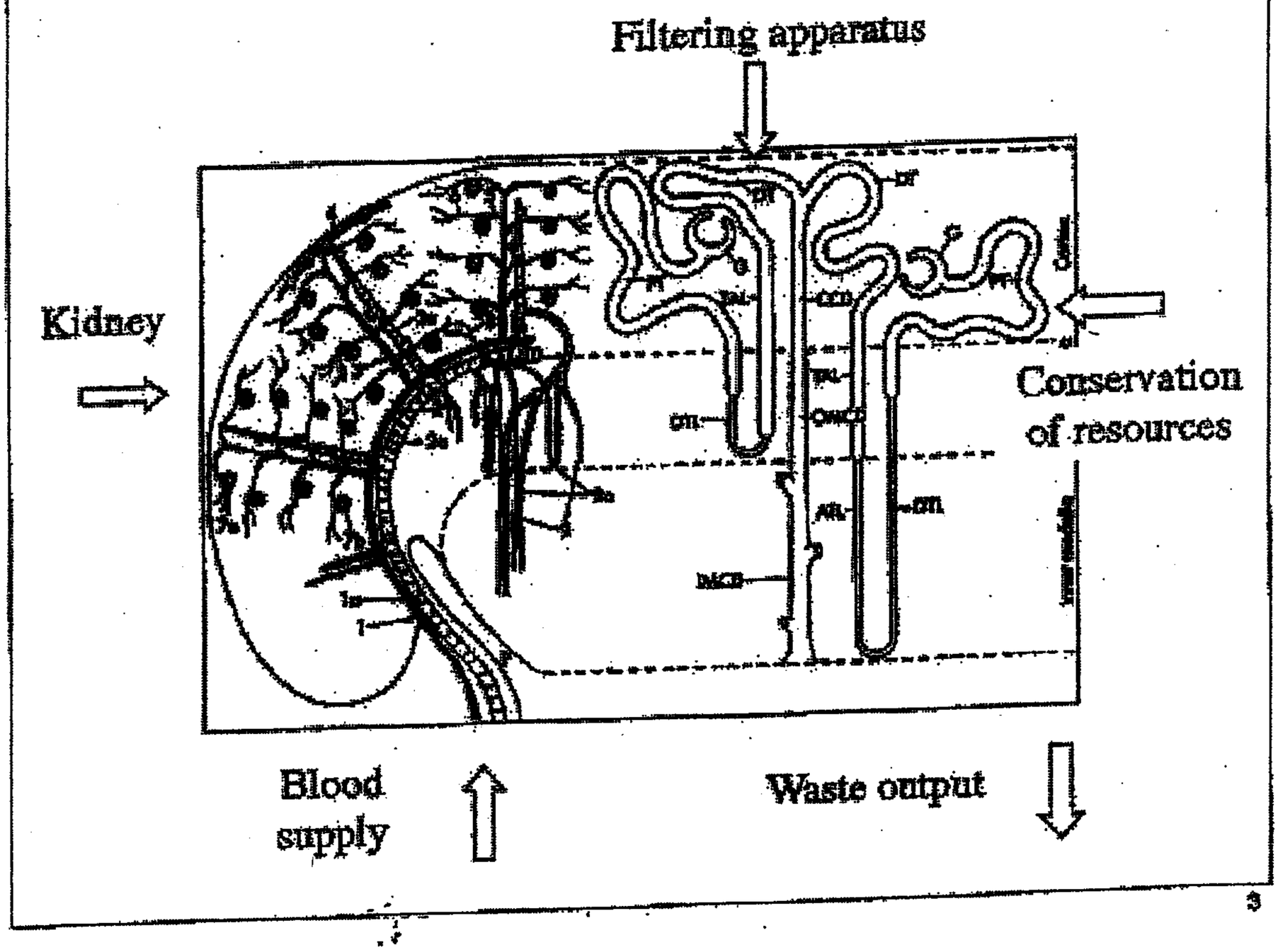


Yes it is !

2

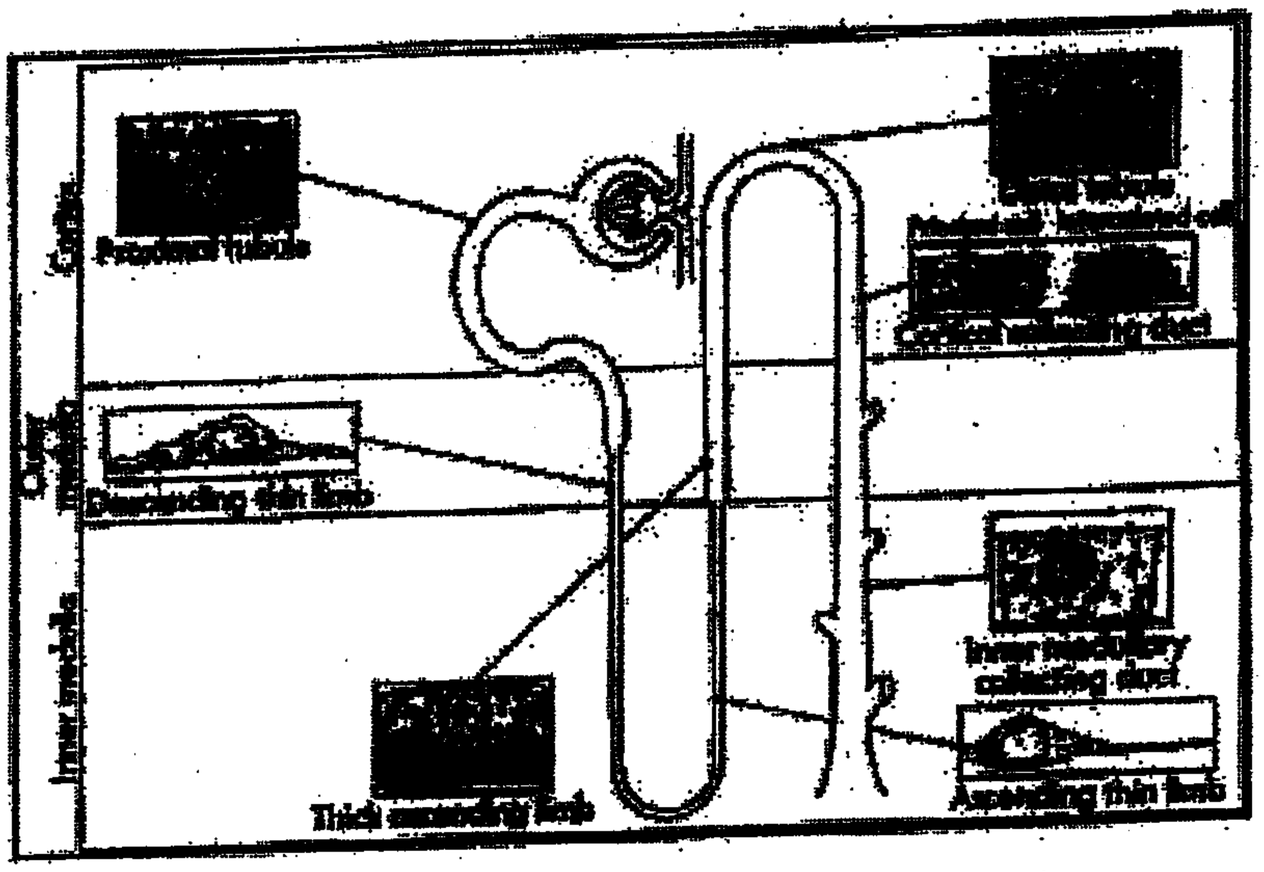
095-010-046ac

RF - PSNI



3

Complicated



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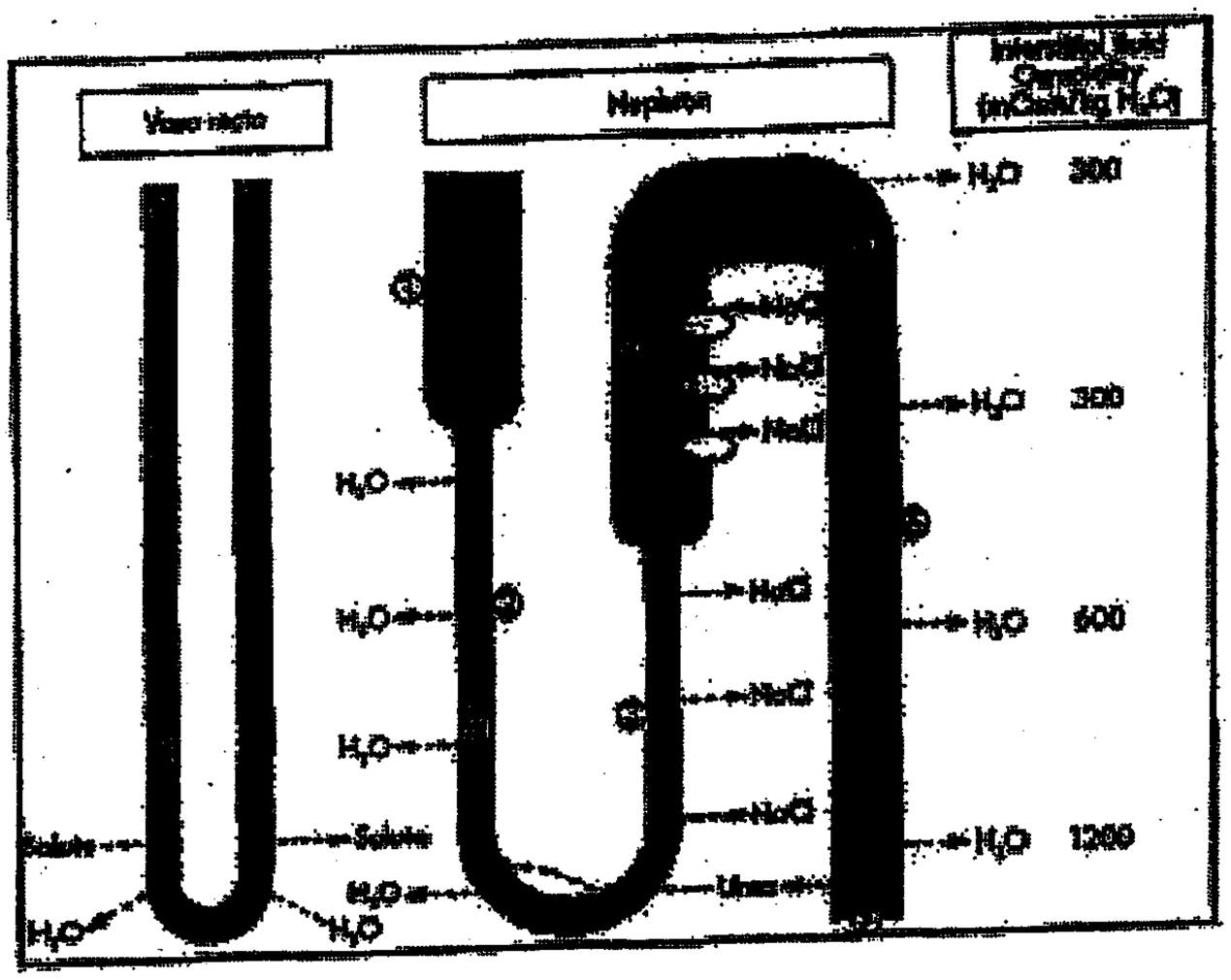
30

Very Complicated



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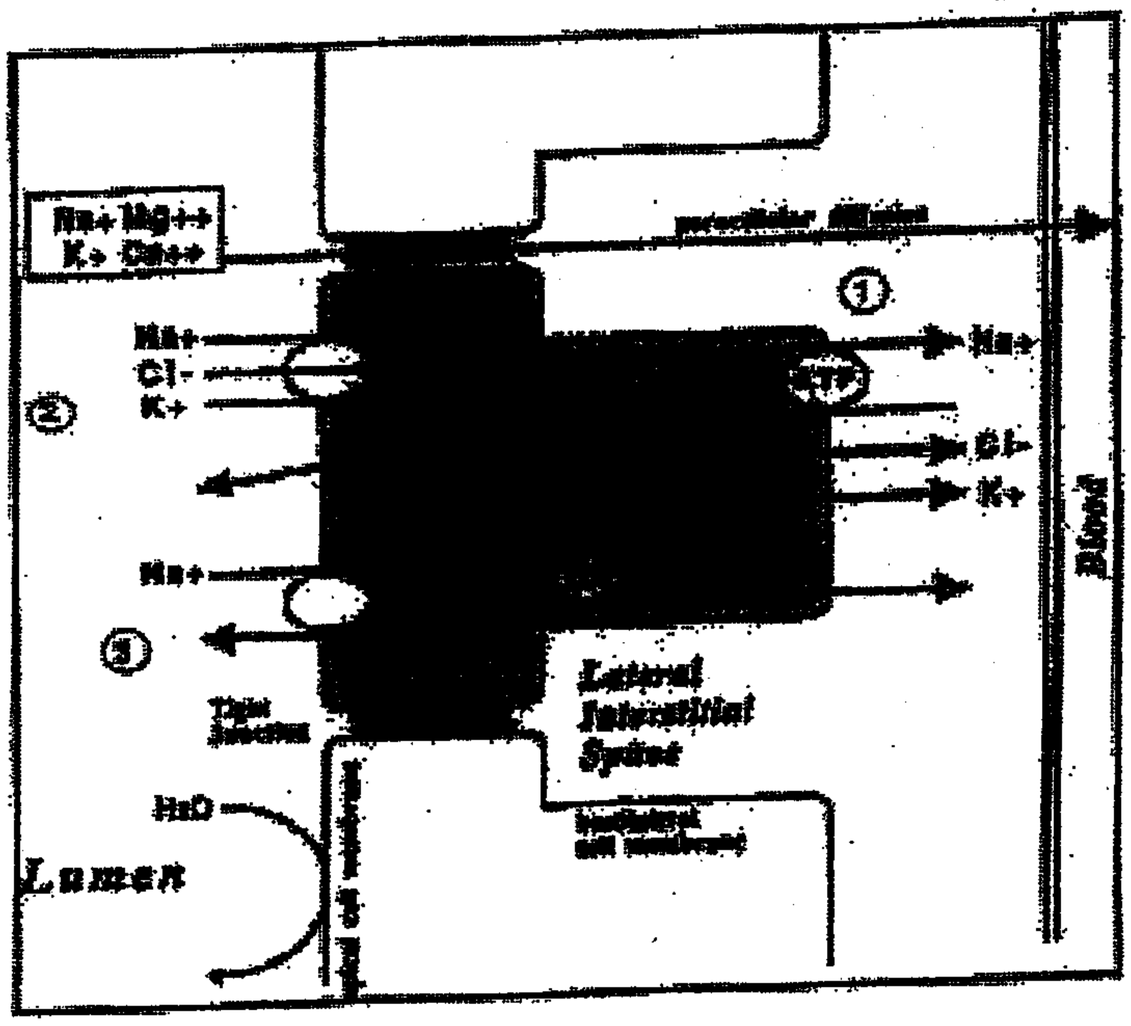
Unbelievably Complicated



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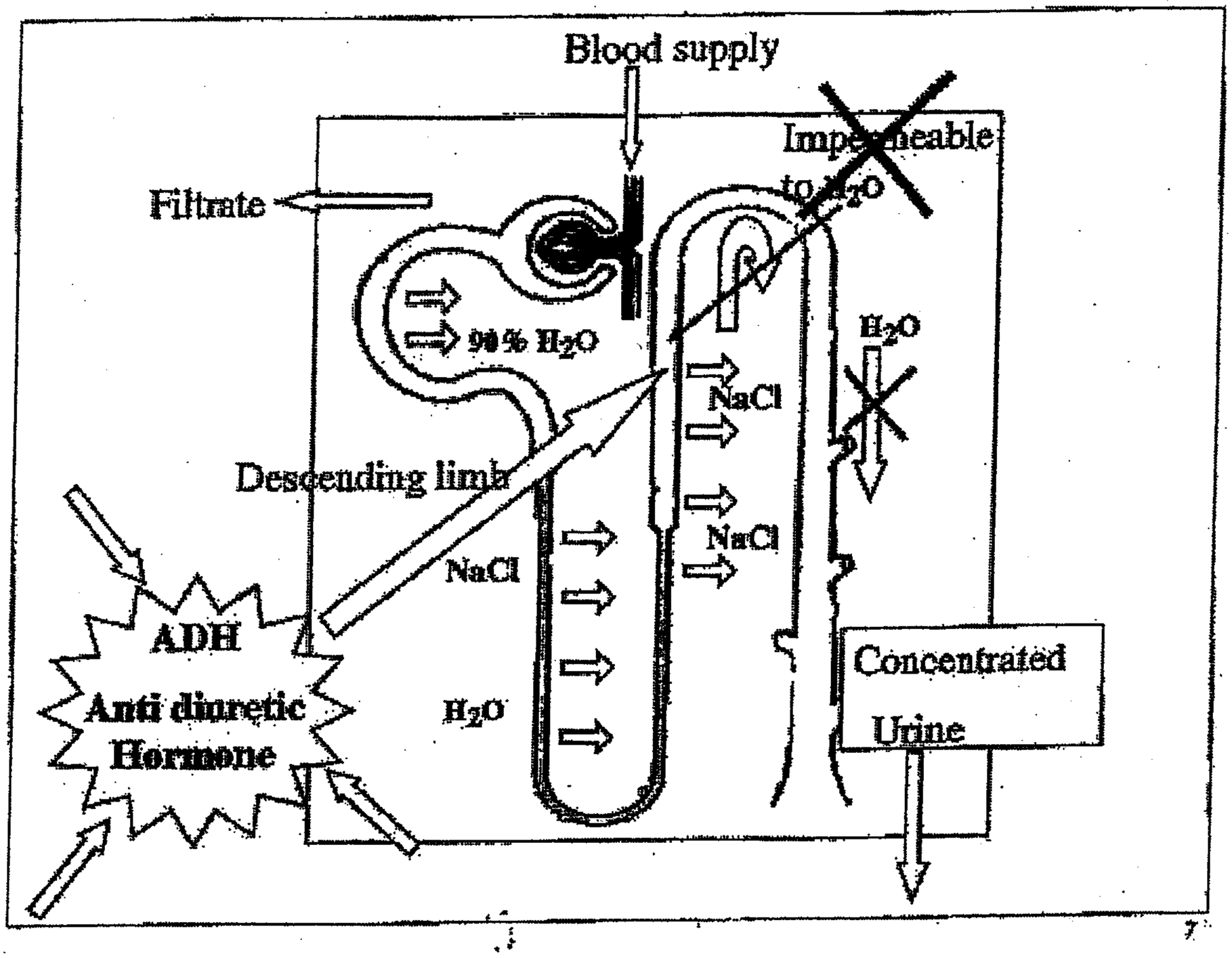
RF - PSNI



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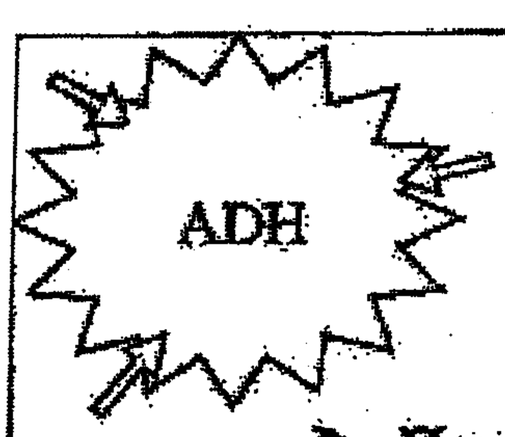


At risk patients

- Hypernatraemia / hyperosmolality
- Dehydration / shock
- Stress, nausea, pain, anxiety
- Drugs
- CNS disease
- Metabolic / Endocrine disorders

Just about every surgical patient!

8

095-010-046af

RF - PSNI

Fatal Hyponatraemia following surgery

A case report

9

- 9yr old girl. Weight 25kg
- Admitted via A&E 20.00hrs
- Diagnosis: "Suspected appendicitis"
- Treated with Intravenous Morphine and admitted to ward 6

Na 137, K 3.6, Urea 4.8, Glucose 7.2

- Seen by Anaesthetist

- IV fluids prescribed (Hartmann's 80mls / hr)
- IV fluids changed to No.18 solution 80ml / hr
  (This was the "default solution" in paediatrics)

10

33

PARENTERAL NUTRITION FLUIDS PRESCRIPTION SHEET

	Amount (ml)	TYPE OF FLUID	NAME and AMOUNT of ADDITIVES	Rate ml/hour	Type of pump	Serial number of pump	Prescribed by (Signature)	Batch No. Date of Expiry	Time started + checked by (Signature)
1	1 Litre [illegible]	No 18	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 2/2004	[illegible]
2									
3	[illegible]	[illegible]	[illegible]	[illegible]					
4									
5									
6									
7									
8									
9									
10									

11

ALTNAGELVIN HOSPITAL [illegible] INTENSIVE CARE UNIT
FLUID BALANCE FOR I.V. FLUIDS

Name: [illegible] 7/6/01 [illegible]

IV fluids disconnected for transfer to theatre

200 mls Hartmann's intraoperatively

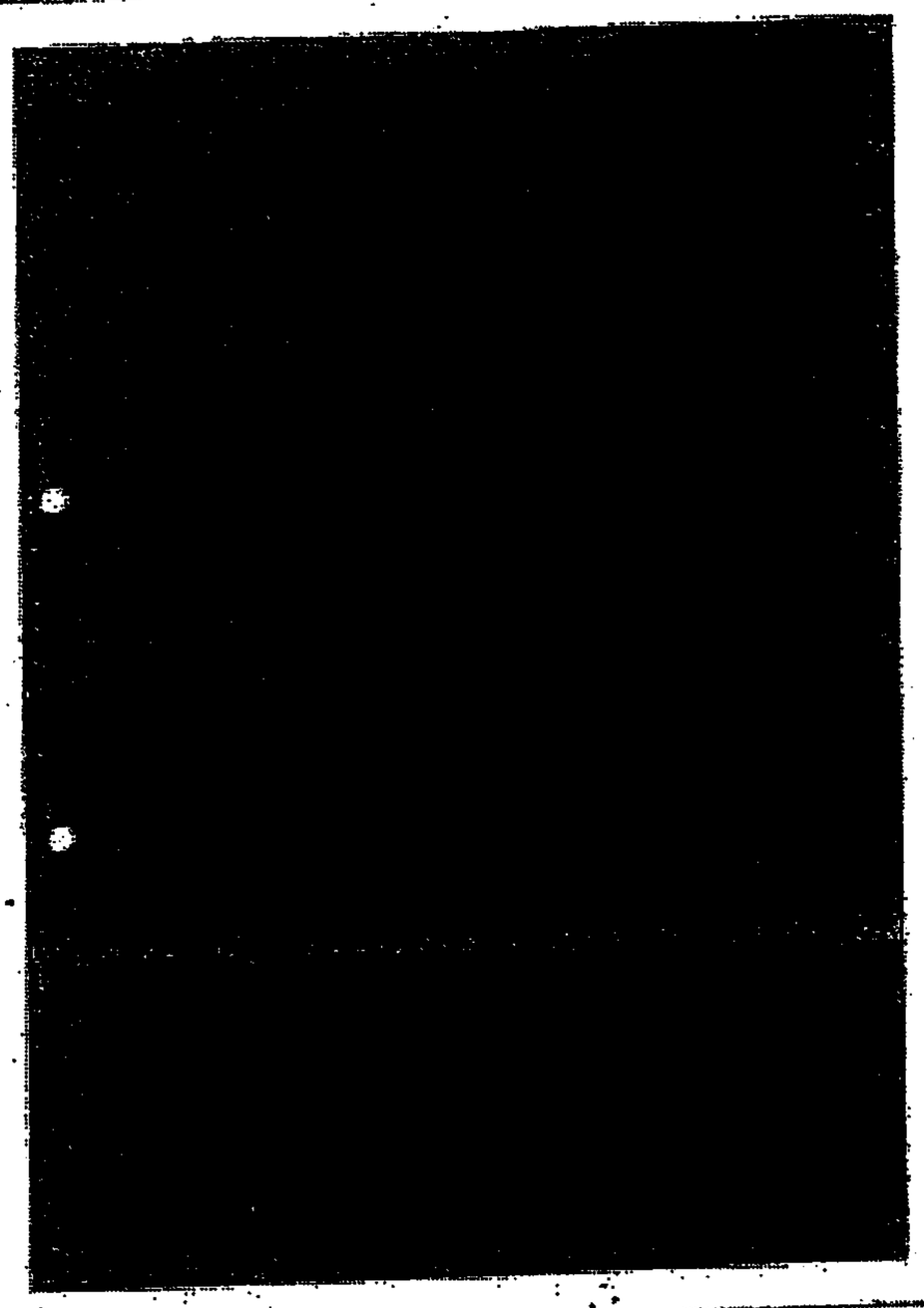
IV fluids disconnected for transfer to ward

12

(34)

095-010-046ah

RF - PSNI



13

8/6/01

ALTNASELVEN HOSPITAL NEO NATAL INTENSIVE CARE UNIT
FLUID BALANCE FOR I.V. FLUIDS

Fluids continued at 80mls /hr

14

35

History of events

- Returned to ward 02.00hrs. 8/6/01
- Seen by surgeons in am. Patient was well and being nursed by her father. Out of bed and "colouring in"
- Several episodes of vomiting
- "Seen" by several doctors throughout the day and anti emetics prescribed
- No notes and no U&E requested
- Headache at 21.30hrs. Treated with paracetamol
- Settled and sleeping 23.30hrs

15

History continued

- Further episode of vomiting 00.30hrs
- Found fitting at 03.00hrs
- Seen and treated by SHO in Paediatrics
- Check U&E

Na 118, K 3, Mg 0.59, Urea 2.1, Glucose 11

- Treated with benzodiazepines to control seizures 03.30
- Consultant paediatrician called 04.30
- Anaesthetic Registrar contacted because of desaturation
- 04.45 sudden deterioration. Anaesthetist fast bleeped
- Respiratory arrest
- Intubated and ventilated

16

CT scan & Transfer to RBHSC

- CT scan showed cerebral oedema and suspected subarachnoid bleed. 05.30hrs
- Transferred to ICU
- Re scanned at request of Neurosurgeons
- Transfer to Belfast RBHSC 11.00hrs

Diagnosis: Brain Stem death

Parents told that " the wrong fluid had been given"

(Allegedly)

17

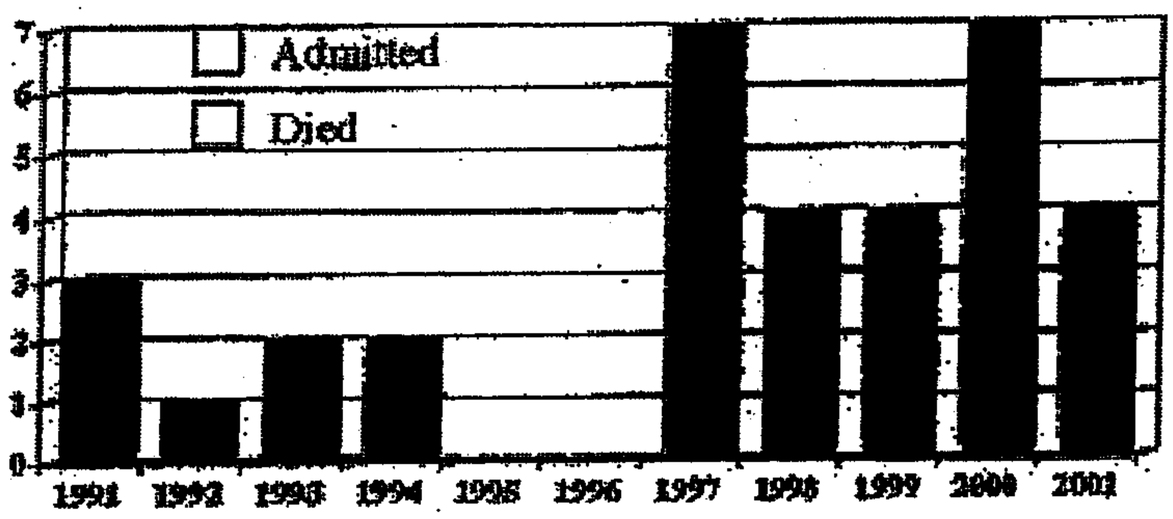
Background

- Incidence in N Ireland
- Review of literature
- Intravenous fluids & Sodium content
- Recommendations following meeting with Department of Health

18

37

Incidence of Hyponatraemia RBHSC



19

History

The traditional view held for 40 yrs…

- Paediatric fluids should be hypotonic
- Children cannot handle a salt load
- Children must be given sugar

20

38

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Evolution of the problem

- Standard solution was No.18. Isotonic containing 30 mmols/l Sodium, provided the correct amount for the day.
- Free water is produced as glucose metabolised, especially by the sick child.
- ADH /Argenine-Vasopressin secretion adds to the problem by causing water retention and excretion of small volumes of hypertonic urine.
- A fluid challenge may be tried to improve the "poor urinary output" (often with hypotonic fluids)
- Large shifts of water lead to tissue and more importantly brain cell swelling.

21

Study findings

Halberthal et Al - BMJ 2001;322:780-3

- 23 patients with acute hyponatraemia
- Median age 5years (range 1mth - 21yrs)
- 13 (57%) were postoperative.
- 18 (78%) developed seizures
- 5 (22%) died
- 1 severe neurological deficit

22

095-010-046am

Study findings

Halberthal et Al - BMJ 2001;322:780-2

- 23 patients studied
- All received hypotonic fluids
- All had plasma Na < 140 mmols/l pre- treatment
- 16 (70%) received excessive maintenance fluids

Our Case

- Received hypotonic fluids
- Had a preoperative Na < 140 mmols/l
- Received excessive maintenance fluids
- 25kgs = 65 mls/hr
- Patient prescribed 80 mls/hr

40

Study findings - conclusions

Halberthal et Al BML 2001;322:780-2

- Avoid hypotonic solutions if Na < 138 mmols/l
- Measurement of Na mandatory prior to IV therapy
- Hypotonic solutions only indicated if Na > 145 mmols/l
- Check plasma Na if child receives more than 30mls/kg fluids

25

Measure the body weight

- Measurement should be in Kg
-
- Estimate weight using formula
  - (Age + 4) x 2
  - i.e. a 2 yr old = 12kg
-
- Plot on a centile chart as a cross check

26

41

Maintenance fluids

- For first 10 kgs body weight give 4 mls/kg/hr
  - 40 mls /hr for a 10 kg infant
- For second 10 kgs body weight give 2mls/kg/hr
  - 40mls + 20 mls = 60mls/hr for a 20kg child
- For each subsequent kg give 1 ml/kg/hr
  - 60mls + 10 mls = 70 mls/hr for a 30kg child

24hr requirements: 100mls/kg for first 10kg
50 mls/kg for next 10kg
20mls/kg for each kg thereafter

27

Sodium content

- 0.18% NaCl in 4% glucose contains 30 mmols/l
- 0.45% NaCl in 2.5% glucose contains 75 mmols/l
- 0.9% NaCl contains 150 mmols/l Normal Saline
- Hartmann's contains 130 mmols/l

28

095-010-046ap

RF - PSNI

Recommendations

- Body weight measured or carefully estimated
- Total fluid not to exceed the maintenance
  - Once replacement has been given
- Maintenance should be <u>at least</u> 0.45% NaCl in 2.5% glucose
- Measurement of urine output, or serial body weight, is mandatory and should be recorded daily
- Baseline and regular measurement of blood biochemistry (Na & glucose) at least daily
- Do not use glucose containing solutions for fluid bolus or resuscitation fluids

29

A Change of Practice

Not just a change of fluid

- Regular electrolyte & Blood sugar checks
  - This means blood tests on children
  - What about "short cases" who receive fluids ?
- A review of fluid balance at 12 hrs
  - Why is this patient still requiring fluids?
- Avoidance of No.18 solution
  - Use <u>at least</u> 0.45% NaCl
  - Perhaps only use 0.9%NaCl or Hartmann's ?

30

WRC 36

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WESTERN HEALTH AND SOCIAL SERVICES COUNCIL

Notes of a meeting held in The Boardroom
Altnagelvin Trust Headquarters First Floor
Altnagelvin Area Hospital on
Wednesday 19 February 2003 at 6.00pm

Present:	Mrs S Burnside	Chief Executive	Altnagelvin Trust
	Miss I Duddy	Director of Nursing	Altnagelvin Trust
	Dr G Nesbitt	Medical Director	Altnagelvin Trust
	Mr R Rogan	Chairman	WH&SSC
	M E Friel	Member	WH&SSC
	Mrs M Hamilton	Member	WH&SSC
	Mr B Page	Member	WH&SSC
	Mrs H Quigley	Member	WH&SSC
	Mrs F Robson	Member	WH&SSC
	Mr S Millar	Chief Officer	WH&SSC

oOo

The meeting was arranged at the request of Western Health and Social Services Council to learn of the Altnagelvin Trust perspective on the death of Raychel Ferguson.

The Trust provided a copy of a Press Statement.

Mrs Burnside explained the outcome of the Coroner's Inquest which did not apportion blame to the Trust.

The Trust in the normal course of events made contact with the Fergusons to talk through the events and offer a message of sympathy and regret.

Media reporting of the tragedy and the Coroner's Inquest has led the public to a notion of negligence.

The cause of death was Hyponatraemia and swelling of the brain.

The expert medical witness at the Coroner's Inquest praised the Trust for the manner in which it had shared the outcome of an Internal Review with other hospitals across the UK including Letterkenny.

Dr Nesbitt through a PowerPoint presentation explained the circumstances of the tragedy and the reason why Raychel died. (Dr Nesbitt undertook to provide a copy of his presentation to the members present).

Mrs Burnside said in hindsight the Trust accepted the death could have been avoidable.

The issue related to an infusion. In Accident and Emergency Raychel was given a Hartmans Solution intravenously which was later replaced by a No.18 Solution.

Members had an opportunity to have clarification on aspects of the presentation.

The Trust explained they received legal advice not to talk to the media.

There are 8 media sources all competing for stories about Altnagelvin.

The members felt it was a mistake for the Trust not to share the facts with the media.

The family intend to pursue litigation.

There is misinformation about the Ferguson's Legal Aid.

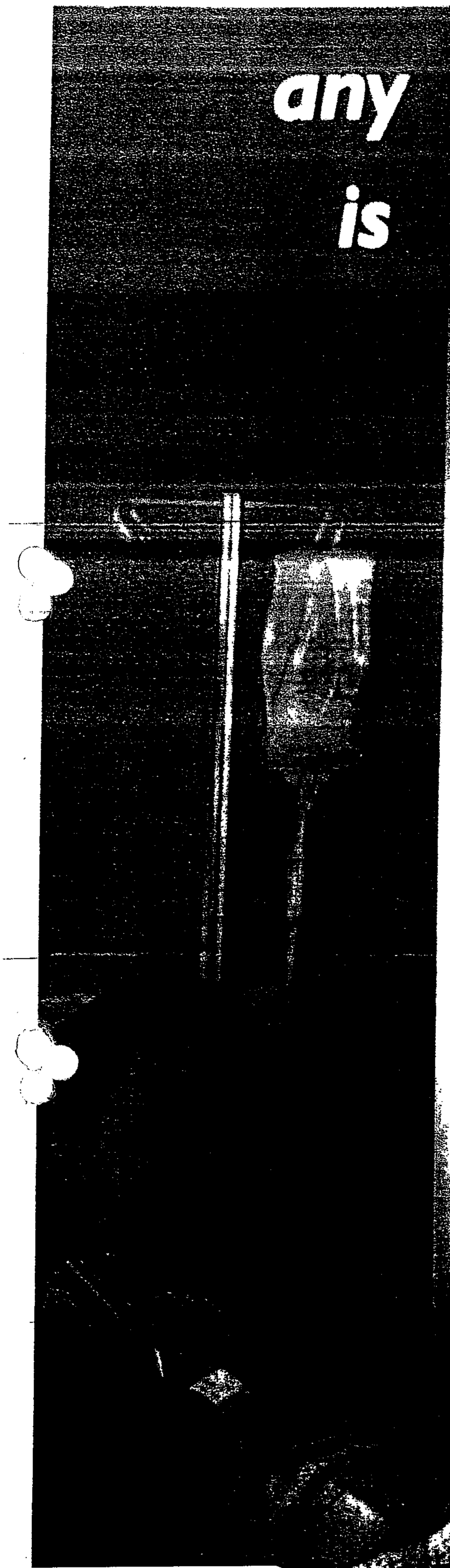
The Chairman thanked the Trust representatives for the meeting.

<u>The meeting ended at 7.20pm</u>

Miller, Wrote to Mr Leckey, Coroner on 27th Feb 2003.
whose

WRC 38.

any is HYPO



INTRODUCTION

- **Any child on IV fluids or oral rehydration is potentially at risk of hyponatraemia.**

- Hyponatraemia is potentially extremely serious, a rapid fall in sodium leading to cerebral oedema, seizures and death. Warning signs of hyponatraemia may be non-specific and include nausea, malaise and headache.

- Hyponatraemia most often reflects failure to excrete water. Stress, pain and nausea are all potent stimulators of anti-diuretic hormone (ADH), which inhibits water excretion.

- Complications of hyponatraemia most often occur due to the administration of excess or inappropriate fluid to a sick child, usually intravenously.

- Hyponatraemia may also occur in a child receiving excess or inappropriate oral rehydration fluids.

- Hyponatraemia can occur in a variety of clinical situations, even in a child who is not overtly "sick". Particular risks include:

  - Post-operative patients
  - CNS injuries
  - Bronchiolitis
  - Burns
  - Vomiting

BASELINE ASSESSMENT

Before starting IV fluids, the following must be measured and recorded:

- **Weight:** accurately in kg. [In a bed-bound child use ... estimate.] Plot on centile chart or refer to normal ...ge.

- ...take serum sodium into consideration.

FLUI

Fluid n... In dete... calculat...

Mainte...

- 100m...
- 50mls...
- 20mls... [This ... to get...

Replac...

- Must a...
- Must r... (lab an... helpfu...

CHOI...

- **Maint...** by the ... require... of very...

- **Repla...** situatic... of 130...

- **When** If a dec... normal awaitin...

- The co... also be... analysis...

Hyponat... any IV fl... for all ch...

RF - PSNI

(62)

095-010-046at...

The Department Of Health, Social Services And Public Safety. Guidance is also available on...

ATRAEMIA

EQUIREMENTS

hould be assessed by a doctor competent
g a child's fluid requirement. Accurate
essential and includes:

e Fluid

or first 10kg body wt, plus
r next 10kg, plus
r each kg thereafter, up to max of 70kg
les the total 24 hr calculation; divide by 24
ıls/hr]:

t Fluid

; be considered and prescribed separately.
fluid loss in both volume and composition
of the sodium content of fluid loss may be

OF FLUID

ce fluids must in all instances be dictated
ipated sodium and potassium
ts glucose requirements, particularly
ıg children, must also be met.

ınt fluids must reflect fluid lost. In most
ls implies a minimum sodium content
/l.

ıcitating a child with clinical signs of shock,
is made to administer a crystalloid,
%) saline is an appropriate choice, while
serum sodium.

ıltion of oral rehydration fluids should
fully considered in light of the U&E

nia may occur in any child receiving
ır oral rehydration. Vigilance is needed
ın receiving fluids.

MONITOR

- **Clinical state:** including hydrational status. Pain, vomiting and general well-being should be documented.

- **Fluid balance:** must be assessed at least every 12 hours by an experienced member of clinical staff.

  Intake: All oral fluids (including medicines) must be recorded and IV intake reduced by equivalent amount.

  Output: Measure and record all losses (urine, vomiting, diarrhoea, etc.) as accurately as possible.

  If a child still needs prescribed fluids after 12 hours of starting, their requirements should be reassessed by a senior member of medical staff.

- **Biochemistry:** Blood sampling for U&E is essential at least once a day - more often if there are significant fluid losses or if clinical course is not as expected.

  The rate at which sodium falls is as important as the plasma level. A sodium that falls quickly may be accompanied by rapid fluid shifts with major clinical consequences.

  Consider using an indwelling heparinised cannula to facilitate repeat U&Es.

  Do not take samples from the same limb as the IV infusion.

  Capillary samples are adequate if venous sampling is not practical.

  Urine osmolarity/sodium: Very useful in hyponatraemia. Compare to plasma osmolarity and consult a senior Paediatrician or a Chemical Pathologist in interpreting results.

SEEK ADVICE

Advice and clinical input should be obtained from a senior member of medical staff, for example a Consultant Paediatrician, Consultant Anaesthetist or Consultant Chemical Pathologist

- In the event of problems that cannot be resolved locally, help should be sought from Consultant Paediatricians/ Anaesthetists at the PICU, RBHSC.

FLUID PRESCRIPTION CHART FOR POST OPERATIVE CHILDREN

RF - PSNI

Post operative day 1 2 3 4 5

Date:____ / _____ / 20___

1 BASELINE INFORMATION

(AFFIX LABEL) NAME: _____ Hosp No. _____ Date of Birth_____/_____/_____	AGE	WEIGHT	HOURLY RATE (ml/hr)*	
			4 ml/kg first 10 kg = + 2 ml/kg next 10 kg = + 1 ml/kg next10 kg = **TOTAL = ml/hr**	

2 MAINTENANCE FLUIDS FOR TWELVE HOURS

	ELECTROLYTES Sample time : ____:_____hrs	FLUID TYPE & Volume **Delete if non applicable**	RATE* (ml/hr)	START TIME	PRESCRIBED BY:	ERECTED & CHECKED	BATCH ID & EXPIRY	CANCELLED BY (Signature/Time)	PUMP TYPE/SERIAL No
A	Sodium = Potassium = Chloride = Urea =	**1L Hartmanns Solution** (Sodium<136) ☐							
		500mls 0.45% Saline & 2.5% glucose (Sodium ≥136) ☐							

3 MAINTENANCE FLUIDS FOR TWELVE HOURS

	ELECTROLYTES Sample time : ____:_____hrs	FLUID TYPE & Volume **Delete if non applicable**	RATE* (ml/hr)	START TIME	PRESCRIBED BY:	ERECTED & CHECKED	BATCH ID & EXPIRY	CANCELLED BY (Signature/Time)	PUMP TYPE/SERIAL No
B	Sodium = Potassium = Chloride = Urea =	**1L Hartmanns Solution** (Sodium<136) ☐							
		500mls 0.45% Saline & 2.5% glucose (Sodium ≥136) ☐							

NOTES

This form must be used for post operative children. IV fluids may only be prescribed based on a relevant electrolyte sample. The maximum duration of any single fluid prescription is **12 hours**. Maintenance fluids for subsequent days should only be prescribed on one of these forms. If you are unclear on any aspect, seek advice before prescribing.

095-010-046av

wkc 39.

RF - PSNI

ALTNAGELVIN CHILDREN'S UNIT DAILY FLUID CHART

DATE : .....

DIET : .....

Affix Label Here or Enter
NAME:
DOB:
UNIT NUMBER:

WARD:
CONSULTANT:

WEIGHT: .....kg

	ORAL/ENTERAL		INTRAVENOUS 1					INTRAVENOUS 2					OUTPUT					BM	COMMENTS	Signature
TIME	Amt.	Type	Amt/hr	Type	Total	IV Site 1	P	Amt/hr	Type	Total	IV Site 2	P	Urine	Faeces	Aspirate	Vomit	Drain			
0800																				
0900																				
1000																				
1100																				
1200																				
1300																				
1400																				
1500																				
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0200																				
0300																				
0400																				
0500																				
0600																				
0700																				

095-010-046aw

Intravenous Total	
Oral Total	
TOTAL INTAKE:	

DAILY TOTALS

Urine	Faeces	Aspirate	Vomit	Drain
TOTAL OUTPUT:				

IV Site Key:
0 – No Pain, no erythema
1 – Pain, no erythema
2 – Pain, erythema, swelling

RECOMMENDED DAILY FLUID REQUIREMENTS:

WRC 40

QUESTIONS for 9.4.02

Dr Nesbitt – (1) Who writes up post op. fluids and you have larg anaesthetists

(2) reply from PB to letter

Mr Gilliland – What is pre-op role of surgeon for IVS ?

– What is post-op

Mr McCord – ~~who writes up~~ Are paediatrics SHO's currently supervising IVs on surgical patients ?

Sister Miller – What is your understanding of role of surgeons / anaesthetists / paed in IV therapy ?

– Are U+E's done daily ? ✓

– Are surgeons informed ? ✓

– Open prescription

WRCC 41

(b)

CRITICAL INCIDENT REVIEW MEETING 09/4/02

To review the Action Plan of the critical incident meeting of 12-6-2001 following the death of Rachel Ferguson.

1 Review evidence for use of routine post-operative low electrolyte IV infusion and suggest changes if evidence indicates. No change in current use of Solution 18 until review.

12/6/01

- **An immediate review was undertaken and a decision was taken that from all <u>Surgical</u> patients (including orthopaedic) to receive I V Hartmans Solution and 6 hourly BM's.**

2 Arrange daily U&E on all post-operative children receiving IV infusion on Ward 6.

- **This was immediately actioned by Sister Miller. The phlebotomists take the blood. It is not clear who is responsible for ordering the blood. Mrs Witherow and Mrs Brown will prepare ward guidelines**

Acion T Brown A Witherow

3 Inform surgical junior staff to assess these results promptly.

- **This was immediately actioned by Mr Gilliland. All staff are informed at induction. This information should be included in the Junior Doctors handbook. At the moment blood results come up on the computer. This does not show the normal range. Agreed that <u>all</u> bloods are to be reported to the Surgeons routinely. Anne Witherow to speak to Dr. M O'Kane to ascertain if the normal ranges can be put on the computer.**

Action A Witherow

4. All urinary output should be measured and recorded while IV infusion is in progress.

- **The fluid balance sheet has been revised to allow recording of urinary output and vomit.**

5. A chart for IV fluid infusion rates to be displayed on Ward 6 to guide junior medical staff.

- **The chart was prepared and displayed by Dr Mc Cord by July 2001.**

6. Review fluid balance documentation used on Ward 6.

- **The fluid balance sheet has been revised to show exact timing of IV Fluids, and when they have been discontinued. It was noted that there is a Regional Group currently reviewing this form. We will await receipt of the revised form.**

7. Need to agree responsibility for the prescribing and management of fluids post operatively. Agreed that Dr. Nesbitt will discuss with Anaesthetists and agree a maximum time that postoperative fluids will be prescribed by anaesthetists.

Action Dr. Nesbitt

8. Departmental guidelines received April 2002 regarding fluid management in all children have been displayed on ward 6, theatres and A&E.

R A Fulton

R A FULTON
11-4-2002

WRC 42

Dr G A Nesbitt
Medical director
Altnagelvin Hospital

RISK MANAGEMENT
07 MAY 2002
CO-ORDINATOR

1st May 2002

To all Medical Staff

Re: Hyponatraemia and fluid administration in children

Dear colleague,

Recent guidelines from the Department of Health on this subject have stated that all children receiving intravenous fluid therapy should have a baseline assessment which records U&E and body weight. The need for continuing fluids in any child after 12 hours needs to be reassessed by a senior member of the medical team. The U&E must be checked at least once in every 24 hours, but more often if excessive fluid losses occur, or the clinical course is not as expected. In such a situation a consultant decision would be required.

From a practical point of view, in surgical cases the responsibility for fluid therapy and electrolyte balance rests with the surgical team but it would be entirely appropriate that the anaesthetist should prescribe the fluids for the first 12 hours postoperatively.

This might be a good time to change the default postoperative fluid from Hartmann's to 0.45% Saline in 2.5% dextrose. This solution is now available in the hospital and is being increasingly used in paediatric practice.

Yours sincerely,

G A Nesbitt Medical Director

cc Mrs Burnside Chief Executive
Theresa Brown Risk Manager
Mrs Hutchinson Clinical Services Manager
Sister Miller Ward 6

WRC 4B1

Dr G A Nesbitt
Medical director
Altnagelvin Hospital

1st May 2002

Dr Henrietta Campbell
Chief Medical Officer
Castle Buildings
Upper Newtownards Road
Belfast BT4 3SJ

Re: Hyponatraemia in Children receiving intravenous fluids

Dear Dr Campbell,

Following the death of a child in Altnagelvin Hospital, which is thought to have followed severe hyponatraemia, many steps have been taken to ensure that such an event does not occur again. We are all anxious to learn from what was a dreadful experience and to share vital information with others. Guidance issued from your Department will help in this regard and we are grateful for the recent posters on the subject.

I am interested to know if any such guidance was issued by the Department of Health following the death of a child in the Belfast Hospital for Sick Children which occurred some 5 years ago and whose death the Belfast Coroner investigated. I was unaware of this case and am somewhat at a loss to explain why.

I would be grateful if you could furnish me with any details of that particular case for I believe that questions will be asked as to why we did not learn from what appears to have been a similar event.

Yours sincerely,

G A Nesbitt Medical Director

WKC 44

Department of Health, Social Services & Public Safety
An Roinn Sláinte, Seirbhísí Sóisialta agus Sábháilteachta Poiblí

From The Chief Medical Officer:
Dr Henrietta Campbell CB

Castle Buildings
Upper Newtownards Road
Belfast BT4 3SJ

Telephone: [redacted]
Fax:

E-Mail: henrietta.campbell[redacted]

Dr G A Nesbitt
Medical Director
Altnagelvin Hospitals HSS Trust
Altnagelvin Area Hospital
Glenshane Road
LONDONDERRY
BT47 6SB

10 May 2002

Dear Dr Nesbitt

HYPONATRAEMIA IN CHILDREN RECEIVING INTRAVENOUS FLUIDS

Thank you for your letter of 1 May regarding guidelines for the prevention of hyponatraemia in children receiving intravenous fluids.

Your letter referred to a Coroner's case five years ago in which the cause of death of a child was reported to be due to hyponatraemia. This Department was not made aware of the case at the time either by the Royal Victoria Hospital or the Coroner. We only became aware of that particular case when we began the work of developing guidelines following the death at Altnagelvin.

I would like to thank the staff at Altnagelvin for alerting me to the need for guidelines and for all the assistance which was given to their development.

With kind regards.

Yours sincerely

HENRIETTA CAMPBELL (Dr)

INVESTOR IN PEOPLE

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095-010-046bc

RF - PSNI

WRC 45

NOTICE

FROM NOW ONWARDS

9/5/02

All Surgical Children(including orthopaedics) are to have N/saline 0.45% with Dextrose 2.5%

All post operative children on IV fluids are to have Electrolytes carried out 12hrs post surgery, and every 24hrs following this until IV fluids are discontinued

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095-010-046bd

RF - PSNI

DRAFT.

WRC 46

Consensus Statement
IV Fluid Therapy for Paediatric Patients

Effective May 2002 the principal routine IV fluid solution for use in paediatric patients will be 0.45% Saline/2.5% Dextrose. A solution supplemented with KCl (20mmol/l) is also available.

Other IV fluid solutions may be appropriate in children, infants and neonates at the discretion of responsible Consultant/Ward protocol or dependent on underlying clinical condition.

The decision to use IV fluid replacement therapy should not be routine but based on clear justifiable clinical indication e.g. state of hydration, vomiting, excess fluid losses, prolonged fasting, inability to use oral/enteral route etc. Recording of indication for IV fluids should be encouraged.

Initial prescription of IV fluids should be based on a clinical assessment of state of dehydration, Urea/Electrolytes and body weight (actual weight preferred but estimated if no recent weight record). Reference charts depicting weight-based maintenance IV fluid rates are readily available on Ward 6.

IV fluid solution and rate of administration are the responsibility of the relevant Paediatric Medical or Surgical staff. In surgical patients though, Anaesthetic staff may prescribe fluids for the first 12hrs postoperatively.

Continued use of IV fluids beyond 12hrs requires re-assessment by a senior doctor. The decision to continue IV fluids should be individualised but factors worthy of consideration should probably include oral intake, continued fluid losses, urine production and nursing/medical assessment of general condition. Where the 12hr period ends after midnight, an evening assessment of likely IV fluid requirement is appropriate.

More prolonged use of IV fluid replacement therapy will require at least daily monitoring of Urea/Electrolytes and a reasonable assessment of ongoing fluid losses and urine output. More frequent assessment may be required if losses are excessive or clinical course not as expected. The responsibility for requesting and interpreting laboratory investigations remains with the patient's clinician, but Paediatric Medical staff will provide advice on fluid management on an ad hoc basis.

Based on "Prevention of Hyponatraemia in Children"
Guidance from Chief Medical Officer NI March 2002

Type 2 Diabetes
Policy for

~~Consensus Statement~~

IV Fluid Therapy for Paediatric Patients

Effective May 2002 the principal routine IV fluid solution for use in paediatric patients will be 0.45% ~~Saline~~/2.5% Dextrose. A solution supplemented with ~~KCl~~ (20mmol/l) is also available.

Sodium Chloride
Potassium Chloride

Other IV fluid solutions may be appropriate in children, infants and neonates at the discretion of responsible Consultant/Ward protocol or dependent on underlying clinical condition.

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Based on " Prevention of Hyponatraemia in Children"
Guidance from Chief Medical Officer NI March 2002

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ALTNAGELVIN HOSPITALS HEALTH & SOCIAL SERVICES TRUST
ALTNAGELVIN AREA HOSPITAL
PAEDIATRIC DEPARTMENT
LONDONDERRY BT47 6 SB
TELEPHONE – [redacted]
FAX – [redacted]

Consensus Statement
IV Fluid Therapy for Paediatric Patients

Effective May 2002 the principal routine IV fluid solution for use in paediatric patients will be 0.45% Sodium Chloride/2.5% Dextrose. A solution supplemented with Potassium Chloride (20mmol/1) is also available.

Other IV fluid solutions may be appropriate in children, infants and neonates at the discretion of responsible Consultant/Ward protocol or dependent on underlying clinical condition.

The decision to use IV fluid replacement therapy should not be routine but based on clear justifiable clinical indication e.g. state of hydration, vomiting, excess fluid losses, prolonged fasting, inability to use oral/enteral route etc. Recording of indication for IV fluids is to be encouraged.

Initial prescription of IV fluids should be based on a clinical assessment of state of dehydration, biochemistry and body weight (actual weight preferred but estimate if no recent weight record). Reference charts showing weight-based maintenance IV fluid rates are readily available on Ward 6.

IV fluid solution and rate of administration are the responsibility of the relevant Paediatric Medical or Surgical staff. In surgical patients though, Anaesthetic staff may prescribe fluids for the first 12hrs postoperatively.

Continued use of IV fluids beyond 12hrs requires reassessment by a senior doctor. The decision to continue IV fluids should be individualised but factors worthy of consideration should probably include oral intake, continued fluid losses, urine production and nursing/medical assessment of general condition. Where the 12hr period ends after midnight, an evening assessment of likely IV fluid requirement is appropriate.

WRC 50

MEDICAL DIRECTOR

22nd March 2004

Dr. Henrietta Campbell
Department of Health, Social Services and Public Safety
Castle Buildings
Stormont Estate
Belfast BT4 3SQ

Dear Dr Campbell

PREVENTION AND MANAGEMENT OF HYPONATRAEMIA

Thank you for your letter dated 4th March 2004 regarding guidance on the prevention of hyponatraemia.

I wish to confirm that the guidance issued in March 2002 on the prevention of hyponatraemia in children was fully endorsed by Altnagelvin Trust. The large laminated posters were distributed to appropriate clinical areas and a detailed protocol was developed relevant to individual specialities.

The subsequent CREST guidelines on the Management of Hyponatreamia in Adults have also been distributed throughout the Trust and are displayed in all clinical areas.

I can assure you that both of these guidelines have been incorporated into clinical practice within the Trust. Implementation of the guidance is monitored through the Trusts incident reporting mechanism.

Yours sincerely

Dr. Geoff Nesbitt
Medical Director

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095-010-046bm

RF - PSNI

WRC 51

Dr G A Nesbitt
Medical Director
Altnagelvin Hospital

23rd September 2004

To all Medical Staff

Re: Hyponatraemia and fluid administration in children

Dear colleague,

This is to remind all medical staff treating children that No. 18 solution is not to be prescribed. Prescription of postoperative fluids must be strictly on the basis of measurement of electrolytes, and with careful attention to the amount of fluid administered.

This will be facilitated by using the fluid balance chart for children, which clearly allows the prescription of either Hartmann's solution or half strength saline in 2.5% dextrose depending on sodium measurement. This chart also allows the calculation of the amount of fluid required and this should not be exceeded. Do not use any other chart and do not depart from the regime indicated on the chart.

The Department of Health has stated that all children receiving intravenous fluid therapy should have a baseline assessment which records U&E and body weight. The need for continuing fluids in any child after 12 hours should be reassessed by a senior member of the medical team. The U&E must be checked at least once in every 24 hours, but more often if excessive fluid losses occur, or the clinical course is not as expected. In such a situation a consultant decision is required.

In surgical cases the responsibility for fluid therapy and electrolyte balance rests with the surgical team but it is entirely appropriate that the anaesthetist should prescribe the fluids for the first 12 hours postoperatively.

Yours sincerely,

G. A. Nesbitt. Medical Director & Chairman Risk Management and Standards Committee.

cc	Mrs Burnside.	Chief Executive
	Theresa Brown	Risk Manager
	Bernie McCrory	Clinical Services Manager
	Jackie McGrellis	Theatre manager
	Sister Millar	Ward 6

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More prolonged use of IV fluid replacement therapy will require at least daily monitoring of Urea/Electrolytes and a reasonable assessment of ongoing fluid losses and urine output. More frequent assessment may be required if losses are excessive or clinical course not as expected. The responsibility for requesting and interpreting laboratory investigations remains with the patient's clinician, but Paediatric Medical staff will provide advice on fluid management on an ad hoc basis.

Based on " Prevention of hyponatraemia in Children"
Guidance from Chief Medical Officer NI March 2002

Signed:

WRC 52

ALTNAGELVIN HOSPITAL HEALTH & SOCIAL SERVICES TRUST

MEDICAL DIRECTORS OFFICE

MEMORANDUM

To: Mrs Burnside

From: Dr R Fulton

Date: 14 November 2001

Subject: INTRAVENOUS FLUIDS IN CHILDREN

You may have received a copy of the enclosed correspondence about intravenous fluids in children together with the draft guidelines. I have told Dr Nesbitt that I think the "choice of Fluid" section is totally inadequate considering the gravity of our local experience. As Geoff says it is a "fudge" and fails to address the use of No. 18 solution.

I firmly advised Geoff to challenge this section.

DR R FULTON
MEDICAL DIRECTOR

cc Dr Nesbitt

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RF - PSNI

WRC 48

ALTNAGELVIN HOSPITALS HEALTH AND SOCIAL SERVICES TRUST

MEDICAL DIRECTOR

MEMORANDUM

To All Surgeons, Consultant Paediatricians, Nursing Staff Ward 6

Date 2-5-03

PAEDIATRIC FLUID MANAGEMENT

As a result of some uncertainty regarding the management of Surgical Paediatric Patients I wish to advise you of the following action which has been agreed by Mr Bateson, Clinical Director.

- All surgeons will do a ward round Monday to Friday of all their patients, including paediatric patients, starting at approximately 8.30 a.m. To facilitate this it has been agreed that fixed sessions, e.g. theatres and outpatients will begin at 10.00 a.m.
- The previous day's on call surgeon will visit the Paediatric Ward first thing every morning to check the condition of surgical patients admitted during the night.
- Surgeons will direct the surgical management of the paediatric patient and will advise the nursing staff of their specific test requirements for each patient.
- The Paediatric nursing staff will bleep the surgeon, or nominated deputy, and inform them of the results when available. If the Named Consultant is not available then the On-call surgeon should be bleeped.
- Surgeons are responsible for the management of the children admitted under their care. If they require advice regarding the medical condition of the child the Paediatricians will be happy to provide assistance.

I trust you will agree with the protocol which should ensure that Paediatric Surgical patient receive the highest standard of care possible.

DR. GEOFF NESBITT
MEDICAL DIRECTOR

MR PAUL BATESON
CLINICAL DIRECTOR

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WRC 49

From the Chief Medical Officer
Dr Henrietta Campbell CB

Thank you for your letter please

Department of
Health, Social Services and Public Safety

An Roinn
Sláinte, Seirbhísí Sóisialta agus Sábháilteachta Poibl

www.dhsspsni.gov.uk

Chief Executives of Acute / Acute & Community Trusts

Castle Buildings
Stormont Estate
Belfast BT4 3SQ
Tel: [redacted]
Fax:
Email: Henrietta.Campbell[redacted]

Your Ref:
Our Ref:
Date: 4 March 2004

Dear Colleague

PREVENTION AND MANAGEMENT OF HYPONATRAEMIA

In March 2002, guidance on the prevention of hyponatraemia in children was issued to all Trusts. The guidance emphasised that every child receiving intravenous fluids should have a thorough baseline assessment and monitoring to prevent the development of hyponatraemia. An A4 sized black and white copy of the guidance is attached and it may also be accessed on the Departmental website www.dhsspsni.gov.uk . Large laminated posters were distributed to all Trusts which should now be displayed in appropriate clinical areas.

When the guidance was issued, Trusts were encouraged to develop local protocols to complement the guidance and to provide specific direction to junior staff. Emphasis was given to the need to ensure implementation of the guidance in clinical practice. It was also noted that the guidance should be supplemented locally in each Trust with more detailed fluid protocols relevant to specific specialty areas.

Following the development of guidelines for fluid replacement in children the Clinical Resource Efficiency Support Team (CREST) drew up guidance on The Management of Hyponatraemia in Adults. These guidelines focussed on the diagnosis and treatment of hyponatraemia in adults and included infusion guidelines. This was made available in the form of wall charts which were circulated widely last year. [Further copies are available if required from the CREST Secretariat [redacted] The purpose of this letter is to ask you to assure me that both of these guidelines have been incorporated into clinical practice in your Trust and that their implementation has been monitored. I would welcome this assurance and ask you to respond in writing before 16 April.

Yours sincerely

Dr Henrietta Campbell

Copied to:
Medical Directors of Acute Trusts
Directors of Nursing, Acute Trusts
Chief Executives of HSS Boards
Directors of Public Health

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IRC 53

Department of Health, Social Services & Public Safety
An Roinn Sláinte, Seirbhísí Sóisialta agus Sábháilteachta Poiblí

From The Chief Medical Officer:
Dr Henrietta Campbell CB

Castle Buildings
Upper Newtownards Road
Belfast BT4 3SJ

Telephone: [redacted]
Fax:

E-Mail: henrietta.campbell[redacted]

Theresa
CSWs

Medical Directors of Acute Trusts
Directors of Nursing in Acute Trusts
Consultant Paediatricians
Consultant Surgeons
Consultant Neurosurgeons
Consultant Anaesthetists/Intensivists
Consultants in Plastic Surgery/Burns
Consultants in A&E Medicine
Consultant Pathologists

25 March 2002

Dear Colleagues

PREVENTION OF HYPONATRAEMIA IN CHILDREN

Guidance on the Prevention of Hyponatraemia in Children has been published and will be forwarded to you under separate cover. It has been prepared as an A2 sized poster and I ask you to ensure that the posters are prominently displayed in all units that may accommodate children. The Guidance has been developed by a multidisciplinary working group established by the Department and the work has been supported and endorsed by CREST.

Hyponatraemia can be extremely serious and has in the past few years been responsible for two deaths among children in Northern Ireland. Hyponatraemia is a problem of water balance and most often reflects the failure to excrete water. Stress, pain and nausea are all potential stimulators of the antidiuretic hormone ADH which inhibits water excretion.

Any child receiving IV fluids or oral rehydration is potentially at risk of hyponatraemia. The administration of excess or inappropriate fluid to a sick child may result in serious or life threatening hyponatraemia. There is a particular concern about the use of 0.18% Sodium Chloride in Glucose among children as it has been implicated in cases of hyponatraemia. While it may pose a risk because of the relatively low sodium content no specific fluid is without risk. This has been emphasised in a recent letter received from the Medicines Control Agency which stated that while hyponatraemia is a risk with 0.18% Sodium Chloride, electrolyte imbalance is a risk with all intravenous solutions.

The Guidance emphasises that every child receiving intravenous fluids requires a thorough baseline assessment, that fluid requirements must be calculated accurately and fluid balance must be rigorously monitored. Following this simple advice will prevent children from developing hyponatraemia.

The Guidance is designed to provide general advice and does not specify particular fluid choices. Fluid protocols should be developed locally to complement the Guidance and provide more specific direction to junior staff. This is particularly important in subspecialty areas such as renal medicine, burns units and

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neurosurgery. It will be important to audit compliance with the guidance and locally developed protocols and to learn from clinical experiences.

I would like to extend my thanks to all members of the multidisciplinary group who have worked together to provide clear and practical guidance to improve the care of sick children. The Guidance is also available on the Departmental website www.dhsspsni.gov.uk.

Yours sincerely

HENRIETTA CAMPBELL (Dr)