D81

Claire Margaret Roberts
Date of Birth: 10th January 1987

Medico Legal Report prepared
at the request of
The Police Service of Northern Ireland

Report prepared by

Dr. Rajat Gupta MBChB, MMedSci, DCH, FRCPCH,
FRCP (Ireland), FHEA
Consultant Paediatric Neurologist
9th September 2008

1.0 Examiner's Personal Statement

I, Rajat Gupta MBChB, MMedSci, DCH, FRCPCH, FRCP (Ireland), FHEA, have been working as a full time Consultant in Paediatric Neurology at Birmingham Children's Hospital since October 2004. I am currently Clinical Sub Dean for Birmingham Children's Hospital and The University of Birmingham.

I have considerable experience in Paediatric Neurology, in particular cerebral palsy, epilepsy and headache.

I have publications and presentations in the areas of cerebral palsy and epilepsy.

I am aware of the Woolf Regulations. The content of this report is true to the best of my belief and I understand my duty is to the Court.

2.0 Instructions Received

I am instructed by Detective Sergeant William R Cross of The Police Service of Northern Ireland in his letter received by me on 17th July 2008 to provide a medical report on the likely cause of Claire Margaret Roberts death. Claire Roberts died on 23rd October 1996 whilst an in-patient at The Royal Belfast Hospital for Sick Children. She was nine years and nine months old at the time.

3.0 Records Received

I am in receipt of:-

1. Verdict on inquest, dated 4th May 2006 on the death of Claire Roberts.
2. A copy of a letter from Dr. Walby, Associate Medical Director, The Royal Belfast Hospital for Sick Children dated 16th December 2004.
3. A photocopy of a statement from Mr. Alan Roberts, Claire Robert' father, consenting to doctors and others assisting police in their investigation dated 16th March 2007.
4. A copy of a statement from Mr. Alan Roberts dated 29th September 2005.
5. A copy of a statement from Dr. Ian Maconchie, Consultant in Paediatric A & E Medicine, not dated.
6. A copy of a statement from Dr. Andrew Sands, Consultant in Paediatric Cardiology dated 6th July 2005.
7. A copy of a statement from Dr. Ian Young, Consultant in Clinical Biochemistry, not dated.
8. A copy of a statement from Dr. Heather Steen, Consultant Paediatrician dated 16th March 2005.
9. A copy of a statement from Dr. David Webb, Consultant Paediatric Neurologist, not dated.
10. A copy of autopsy report dated 11th February 1997.
11. A copy of Claire Roberts's hospital case notes from The Royal Belfast Hospital for Sick Children.
12. A copy of statement from Dr. Brian Norman Harding, Consultant Neuropathologist, dated 22nd August 2007.

4.0 Details of Claire Roberts's Admission to The Royal Belfast Hospital for Sick Children on 21st October 1996 to her death on 23rd October 1996.

4.1 Claire Roberts was referred to The Royal Belfast Hospital for Sick Children by her General Practitioner from the Castlereagh Medical Centre, Belfast, on 21st October 1996. The General Practitioner referral letter reads "nine year old girl with severe learning disability and past history of epilepsy. Fit free for three years – weaned off Epilim eighteen months ago.
No speech since coming home. Very lethargic at school today.
Vomited x 3 – speech slurred. Speech slurred earlier.
O/E (On examination – RF) pale, pupils reacting – does not like light.
No neck stiffness, temp.
Tone ↑↑. R side plantar ↑↑ upgoing, L plantar ↓↓.

ENT (ear, nose and throat examination – RG) – NAD (no abnormality detected – RG)
Chest clear
? Further fit
? Underlying infection.
I would appreciate your opinion".

4.2 According to the admission sheet for the Emergency Department at The Royal Belfast Hospital for Sick Children Claire arrived there on 21st October 1996 at 18.30 hrs. She was accompanied by her mother. She was triaged at 19.03 hrs by Staff Nurse T. Blue. The nature of complaint is noted as "lethargy, vomiting and pale". The initial assessment is noted as H/O (history of – RG) off form and lethargy. GP referral with H/O ? seizure. Apyrexic O/A (on arrival – RG). Pale and drowsy O/A. H/O mental handicap". At that time Claire's temperature was recorded as being 36.9°C, respiratory rate 24 breaths per minute and her heart rate 96 beats per minute.

4.3 Claire was assessed by a doctor at 19.15 hrs. The medical notes read "nine year old girl. H/O + learning difficulties.
H/O epilepsy – no fits for three years, off anti-epileptic medication.
Today vomiting (non bilious) since this evening. No diarrhoea.
Cough, pyrexia.
Speech very slurred, hardly speaking
O/E (on examination – RG) drowsy, tired. Apyrexic. No lymphadenopathy. PERLA (pupils equal and reactive to light and accommodation – RG). No neck stiffness. Ears NAD (no abnormality detected – RG) Heart sounds normal with no murmurs. Pharynx – unable to examine. Abdomen soft, non tender, no masses, no LKKS (no liver, kidney or spleen palpable – RG), bowel sounds present.
Chest – PN (percussion note – RG) resonant. A/E (air entry – RG) good, nil added. Plantars ↓↓ R + L (plantar responses downgoing – RG) (but see GP letter). No apparent limb weakness, tone ↑. Reflexes – biceps, triceps, supinator, knee and ankle more brisk on the left when compared to the right".

The doctor felt that Claire may have an encephalitis and arranged for her to be admitted. According to the Accident & Emergency Department admission records the decision to admit time was 20.45 hrs.

4.4 Claire was seen by Dr. O'Hare, Paediatric Registrar on call on 21st October 1996 at 20.00 hrs. Dr. O'Hare's notes read "nine year old admitted via A& E.
PC (presenting complaint – RG) vomiting at 3.00p.m. and every hour since. Slurred speech and drowsy. Off form yesterday. Loose motions three days ago.

HPC (history of presenting complaint – RG) severe learning difficulties. Seizures six months to one year. Controlled by Sodium Valproate. Aged 4 x 1 seizure.
Anti-convulsant gradually weaned until Epilim stopped.
H+S (hearing and speech – RG). Speech – can speak in sentences, meaningful.
Hearing normal.
V (vision – RG) vision normal.
FM (fine motor skills – RG) scribbling – feeds herself with supervision. Cannot dress herself.
Gross M (gross motor skills – RG) walk, run, up and down stairs. Favours left side of body.
Torbank Special School, Dundonald.
..... Recently tried Ritalin – dry mouth. Then became agitated, dry mouth.
DH (drug history – RG) nil.
all (allergies to medications – RG) nil
FH (family history – RG) – two younger brothers (shown in a family tree – RG)".

On examination at that time Claire's temperature was 37°C. Her heart sounds were normal and her heart rate was 80 beats per minute. Her chest was clear. Her abdomen was soft, not tender and no masses were palpable. On examination of the cranial nerves, her fundi (the back of the eyes) were normal and her optic discs were not blurred. Her pupils were equal and reacted to light and accommodation. Examination of the 7th, 9th and 10th cranial nerves was normal. Claire was sitting up and was staring vacantly. It was felt that she may be possibly ataxic (unsteady). Her upper limb and lower limb tone was increased both on the right side and the left. Her tendon reflexes were felt to be brisk but more so on the right than the left. Her plantar responses were both downgoing but ankle clonus was present on both sides. It is noted that Claire was "not responding to parent's voice/intermittently responding (presumably intermittently responding to her mother's voice – RG), responding to deep pain".

Dr. O'Hare felt that Claire may have a viral illness. Blood was taken for a full blood count, renal profile and blood culture. Viral titres and a possible lumbar puncture were considered. Claire was commenced on intravenous fluids. Dr. O'Hare suggested that intravenous Diazepam (an anti-epileptic medication – RG) could be given if Claire was felt to be having seizure activity. Dr. O'Hare planned to re-assess Claire after she had received intravenous fluids.

4.5 Dr. O'Hare reviewed Claire at 24.00 hrs (12.00 midnight). The medical notes are "slightly more responsive – no meningism. Observe and re-assess a.m".

4.6 The next entry made in the case notes is by another Senior House Officer. I am unable to decipher the name of the doctor. He/she did

not date or give a time to his/her notes. The doctor documents the results of Claire's blood tests as follows: Na (sodium – RG) 132 ↓ (low – RG), K (potassium – RG) 3.8, U (urea – RG) 4.5, Gluc (glucose – RG) 6.6, Cr (creatinine – RG) 36, Cl (chloride – RG) 96. Hb (haemoglobin – RG) 10.4, PCV (packed cell volume – RG) 31, WCC (white cell count – RG) 16.5 ↑ (elevated – RG), platel (platelets – RG) 422,000".

4.7 At 22.00 hrs on 21st October 1996 there are nursing notes summarising Claire's presentation and admission. Subsequent to this there is a nursing entry made at 07.00 hrs on 22nd October 1996. This reads "slept well. Much more alert and brighter this morning. One further bile stained vomit. Intravenous fluids continued as listed. No oral fluids taken. Apyretic. Observation satisfactory".

4.8 On 22nd October 1996 Claire was reviewed on the ward round by Dr. Sands. The time of the ward round was not stated. The ward round notes read "admitted ? viral illness. Usually very active, has not spoken to parents as per normal. Retching. No vomiting. Vagueness/vacant (apparent to parents). No seizure activity observed. Attends Dr. Gaston (UHD) (Ulster Hospital Dundonald – RG).

Six months old seizures and Ix (investigations – RG) for this – NAD.
U & E – sodium 132. FBC, WCC ↑16.4 (full blood count, white cell count increased at 16.4 – RG). Glucose 6.6.
O/E apraxic. On iv (intravenous - RG) fluids. Pale colour. Little response compared to normal.
CNS (central nervous system – RG) pupils sluggish to light. Difficult to see fundi. Bilateral long tract signs. Ears, throat difficult to fully see.
Imp (impression – RG). Non fitting status/encephalitis/encephalopathy.
Plan. Rectal Diazepam (an anti-epileptic medication – RG). Dr. Webb. D/W (discuss with – RG) Dr. Gaston re PMHx (past medical history – RG)".

4.9 Claire was reviewed by Dr. Webb, Consultant Paediatric Neurologist at 16.00 hrs on 22nd October 1996. In the case notes Dr. Webb writes "... note – appears to have improved following rectal Diazepam 5mgs at 12.30 p.m.". When examined by Dr. Webb Claire was afebrile. There was no meningism. She was rousable. She was eye opening to voice but was not vocalising. She was withdrawing from painful stimulus. She had reduced movements on the right side. Antigravity movement was present in all four limbs. Her tone was mildly increased in both arms. Her reflexes were symmetrically brisk. She had sustained clonus at both ankles and her plantar responses were upgoing. She was sitting up with her eyes open. She looked vacantly. She was not obeying commands. Her pupils were equal and reactive to light. Her optic discs were pale but there was no papilloedema (swelling of her optic discs – RG). Her facial, palatal and tongue movements appeared normal. Dr. Webb then notes

"Impression – I don't have a clear picture of the prodrome and yesterday's episodes. Her motor findings today are probably long standing but this needs to be checked with the clinical notes. The picture is of acute encephalopathy, post probably post ictal in nature. I note the normal biochemistry profile.

Management – suggest starting iv Phenytoin (an anti-epileptic medication – RG) 18mgs/kg stat followed by 2.5mgs/kg twelve hourly. She will need levels six hours after loading dose. Hourly neurological observation. CT tomorrow if she does not wake up".

4.10 On 22nd October 1996 at 14.30 hrs calculations for the dose of intravenous Phenytoin are documented in the case notes. Dr. Webb reviewed Claire following this. The time is not noted. The notes read "still in status". A plan was made to give Claire a stat dose of intravenous Midazolam (an anti-epileptic medication – RG) followed by a low dose infusion of Midazolam.

4.11 Dr. Webb reviewed Claire again at 17.00 hrs on 22nd October 1996. Dr. Webb notes "…. She continues to be largely unresponsive. She responds by flexing her left arm to deep supraorbital pain and does have facial grimace but no vocalisation. She has intermittent mouthing and chewing movements". He notes that Mrs. Roberts reported that Claire had had contact with a cousin on Saturday who had a tummy upset and Claire then went on to develop loose motions on the Sunday with vomiting on the Monday. Dr. Webb also obtained a history of possible focal seizures with right sided stiffening on the Monday.

Dr. Webb decided to give Claire Cefotaxime (antibiotics) and Acyclovir (antiviral therapy) for forty eight hours. However he did not think that meningo-encephalitis was likely in the absence of fever and meningism. He suggested checking viral cultures for the possibility of an entero viral infection. He recommended stool, urine, blood and throat swab cultures. He also suggested giving intravenous Sodium Valproate (an anti-epileptic medication – RG) 20mgs/kg as intravenous bolus followed by an infusion of 10mgs/kg over twelve hours.

4.12 The nursing notes made on 22nd October 1996 between 14.00 hrs and 20.00 hrs state that Claire was having hourly neurological observations. Her Glasgow Coma Scale (GCS) score was between 6 and 7 out of 15. She was given the various anti-epileptic medications as prescribed/suggested by Dr. Webb. Sometime after 17.15 hrs Claire was "very unresponsive – only to pain". She was having occasional episodes of teeth clenching. The nursing notes also state that the first dose of Cefotaxime was due at 21.30 hrs.

From the prescription chart it would appear that Claire received the first doe of Cefotaxime at 17.30 hrs and the first dose of Acyclovir at 21.30 hrs on 22nd October 1996.

4.13 On 22nd October 1996 a "record of attacks observed" (seizure record – RG) was started for Claire. At 15.20 hrs she had a "strong seizure" which lasted five minutes. She was sleepy afterwards. At 16.30 hrs her "teeth tightened slightly". This lasted for a few seconds and she was asleep afterwards. At 19.15 hrs her "teeth clenched and groaned". This lasted for one minute and she was asleep afterwards. At 21.00 hrs she had an "episode of screaming and drawing up of arms. Pulse rate increased to 165 beats per minute. Pupils large but reacting to light". This episode lasted thirty seconds and she was asleep afterwards. The doctor was informed of this episode.

4.14 The next entry made Claire's medical notes was at 23.30 hrs on 22nd October 1996. The entry reads Na (sodium – RG) 121, K (potassium – RG) 3.3, Urea 2.9, Creatinine 33, Phenytoin 23.4mgs/l (10-20). Hyponatraemic (low blood sodium level – RG) - ?fluid overload and low Na (sodium – RG) fluids.
- ? SIADH (syndrome of inappropriate ADH secretion - RG).

It was therefore recognised that Claire had a low blood sodium level. The Senior House Officer who made this entry in the case notes discussed Claire with the Registrar who advised that her intravenous fluids be reduced to two thirds of her maintenance fluids and a sample of her urine be sent for osmolality.

4.15 The nursing notes made at 23.00 hrs on 22nd October 1996 read "due to U & E results 18 solution 20mmls KCL erected as ordered by Registrar. To have fluid restriction of 41 mls per hour. Hourly CNS observations recorded – temperature elevated at 10.00 p.m. – Paracetamol given by Day Staff. Other observations within normal limits".

4.16 On 23rd October 1996 at 02.30 hrs the nursing notes read "slight tremor of right hand noted lasting few seconds. Breathing became laboured and grunting – respiratory rate 20 per minute. O_2 saturations 97%. Claire stopped breathing. Doctor contacted immediately. Oxygen and suction given. Registrar attempted to pass ET (endotracheal – RG) tube but unsuccessful – anaesthetist called and ET tube inserted. Transferred to Intensive Care Unit at 3.25 a.m. No medication/drugs given".

4.17 In the medical notes the doctor writes "around 3.00 a.m. called to see. Had been stable when suddenly she had a respiratory arrest and developed fixed dilated pupils. When I saw her she was Cheyne-Stoking (irregular breathing pattern with periods of stopping breathing – RG) and required oxygen via face mask. Saturations bagging in high 90s. Good volume pulse. I attempted to intubate – not

successful. Anaesthetist colleague came and intubated her orally with 6.5 tube. Transferred to PICU".

4.18 Dr. Steen, Consultant Paediatrician, reviewed Claire on the Paediatric Intensive Care Unit at 04.00 hrs on 23rd October 1996. Dr. Steen notes Claire's history She writes "at present intubated and ventilated. Has had some Midazolam but it is no longer running. Pupils fixed and dilated. Bilateral papilloedema left more than right. No response to painful stimuli. BP 90/65. Heart rate = 100 per minute.
Plan – Mannitol (a diuretic used to reduce intracranial pressure – RG) stat, Dopamine (a drug used to improve circulation/perfusion – RG) infusion, urgent CT scan".

4.19 Dr. Webb also reviewed Claire. At 04.40 hrs he writes in the case notes "SIADH – hyponatraemia, hyposmolality, cerebral oedema and coning following prolonged epileptic seizure. Pupils fixed and dilated following Mannitol diuresis. No eye movements. For CT scan".

4.20 On 23rd October 1996 at 05.30 hrs a CT brain scan is reported as showing severe diffuse hemispheric swelling with complete effacement of the basal cisterns. No focal abnormality was identified.

4.21 At 06.00 hrs on 23rd October 1996 Dr. Webb documents the first brain stem death evaluation on Claire. He notes "... Claire fulfils the criteria for brain stem death. This evaluation should be repeated in four to six hours".

4.22 At 07.10 hrs on 23rd October 1996 Dr. McKaigue, Consultant Paediatric Anaesthetist summarises the emergency care that Claire had received. He notes that when Dr. Clarke, Anaesthetic Registrar, intubated Claire on the ward, vomitus was noted in the oropharynx. The vomitus consisted of liquid material and no solid material. Following intubation the trachea was "sucked out and a small amount of watery material was aspirated". In the Paediatric Intensive Care Unit Claire was hyperventilated and was given Mannitol 0.5gms/kg. Her pupils were fixed and dilated. A peripheral Dopamine infusion was commenced since her blood pressure was 95 systolic. Dr. McKaigue notes that the CT scan showed severe cerebral oedema. He also notes that a serum sodium level was 133 as measured on the blood gas analyser in the Paediatric Intensive Care Unit. Her arterial blood gases showed her PH to be 7.13, P02 124.5 and PCO2 79.2. The plan at that time was to "maintain circulatory support as Claire is a potential organ donor.
Dopamine infusion to maintain systolic blood pressure at around 100mms Hg.
Close check on serum sodium and serum osmolality and urine output...".
Dr. McKaigue goes on to note that a laboratory sample at the time of brain stem death showed Claire's blood sodium level to be 129. Her potassium level was 3.6.

4.23 On 23rd October 1996 at 18.25 hrs Dr. Steen writes "diagnosis of brain death protocol completed. No spontaneous resps – CO_2 70mmHg. Discussed with parents and agree that ventilation should be withdrawn. Consent for limited pm (post mortem – RG) given".

Ventilation was discontinued at 18.45 hrs on 23rd October 1996. The next note made in Claire's case notes reads "death certificate issued – cerebral oedema secondary to status epilepticus.".

5.0 Background History (obtained from Claire's Royal Belfast Hospital for Sick Children Medical Records and from the statement of Dr. Webb)

5.1 Claire had her first epileptic seizures when she was six months of age. At that time she had two episodes of twitching with no associated pyrexia. One episode lasted about two minutes and the other about ten minutes. She was admitted to hospital at the time.

5.2 Following discharge from hospital she had a further three seizures over a three day period. These episodes consisted of eye rolling and generalised jerking. She also had a harsh cry and snorting with these episodes. Each episode lasted around three minutes. She was admitted to hospital and had two further "absence attacks with no associated twitching".

5.3 She was discharged from hospital and two weeks later was re-admitted having had six generalised seizures within the one day. Each seizure lasted a minute with associated cyanosis. At that stage, on 24th August 1987, she was started on Tegretol (Carbamazepine – an anti-epileptic medication).

5.4 On 2nd September 1987 she had four seizures within the one day. These were tonic clonic seizures lasting a few seconds each. She was admitted to hospital and was given Diazepam and Phenytoin. Investigations at that time including a cranial ultrasound scan, blood biochemistry, full blood count, basic metabolic investigations and EEG were all normal. A lumbar puncture was performed but it was a traumatic tap with blood in the CSF.

5.5 Her development, according to the Health Visitor's assessment, up to the age of six months was very satisfactory.

5.6 In September 1987 when she was aged eight months she was admitted to The Royal Belfast Hospital for Sick Children under the care of Dr. Hicks, Consultant Paediatric Neurologist, for further evaluation and treatment. She was found to be developmentally delayed. She subsequently had episodes that were felt to be infantile spasms. Her EEG at that time did not show hypsarrthymia (the classical pattern of infantile spasms) but was abnormal. Dr. Hicks subsequently changed

Claire's anti-epileptic medication from Carbamazepine to Sodium Valproate. A CT brain scan performed at this stage was normal.

5.7 Claire was kept under review and was noted to have attention difficulties, hyperactivity and moderate learning difficulties. She later attended a Special Needs School. Her epilepsy was well controlled and as a result of this her Sodium Valproate was discontinued around eighteen months prior to her admission to The Royal Hospital for Sick Children on 21st October 1996.

6.0 Autopsy Report

6.1 Claire had a limited autopsy of the brain only. The comment made by Dr. Herron in the autopsy report dated 11th February 1997 reads "In summary, the features here are those of cerebral oedema with neuronal migrational defect and a low grade sub acute meningo-encephalitis. No other discreet lesion has been identified to explain epileptic seizures. The reaction in the meninges and cortex is suggestive of a viral aetiology, though some viral studies were negative during life and on post mortem CSF. With the clinical history of diarrhoea and vomiting, this is a possibility though a metabolic cause cannot be entirely excluded. As this was a brain only autopsy, it is not possible to comment on other systemic pathology in the general organs. No other structural lesion in the brain like corpus callosal or other malformations were identified".

6.2 The autopsy report and sections from the autopsy have since been reviewed by Dr. Brian Harding, Consultant Neuropathologist at Great Ormond Street Hospital. In his report dated 22nd August 2007 he summarises that there is "Brain swelling (macroscopic description). Acute hypoxic damage to nerve cells (probably terminal). No evidence of acquired or inherited disease". He goes on to say "... neuropathological sequelae of status were not present. Nor was there damage to the hippocampus which may be seen in children with chronic epilepsy".

He concludes "although the data are incomplete, in my opinion the evidence suggests that brain swelling was the immediate cause of death and hyponatraemia is the only causative factor that has been positively identified".

7.0 Review of investigations results not already mentioned

7.1 Blood cultures were negative.

7.2 Various viral studies were performed. IgM for mumps, measles, herpes simplex herpes zoster and cytomegalovirus virus were all negative. Virology for adenovirus, Q fever, mycoplasma, pneumonia, influenza A and influenza B were all negative.

7.3 Cerebrospinal fluid was obtained probably after death. The cerebrospinal fluid culture did not show any growth at forty eight hours.

8.0 Opinion

8.1 I believe that cerebral oedema was the cause of Claire's death.

8.2 I believe that the most likely cause for the cerebral oedema was hyponatraemia. I note that Dr. Ian Young, Consultant in Clinical Biochemistry in his statement is also of the opinion that "Hyponatraemia may have made a contribution to the development of cerebral oedema in Claire's case". Dr. Brian Harding in his report dated 22nd August 2007 notes that hyponatraemia is known to cause brain swelling. He also concludes that in his opinion "...the evidence suggests that brain swelling was the immediate cause of death and hyponatraemia is the only causative factor that has been positively identified". Hyponatraemia may result from recurrent vomiting and Claire did have a history of vomiting prior to and during her admission.

8.3 During her admission to hospital from 21st October 1996 it was felt that Claire may have non-convulsive status epilepticus. Although this is possible there is no clear evidence for this and I believe that this was unlikely. An electroencephalogram (EEG) if performed would have confirmed or ruled out this diagnosis. Claire did not have an EEG performed during the admission. I am not sure whether or not this was because EEG facilities were not available or if they were available there was no provision for urgent EEGs to be performed at The Royal Belfast Hospital for Sick Children at the time. During the admission Claire was treated with a number of anti-epileptic medications and there was no definite improvement in her condition with these. Claire did have some possible epileptic seizures during her admission but these may very well have been precipitated by the hyponatraemia and/or cerebral oedema.

Dr. Brian Harding examined sections of Claire's brain taken at autopsy and in his report dated 22nd August 2007 he states that neuropathological sequelae of status epilepticus were not present.

Claire's epilepsy had previously been well controlled. She had been successfully weaned off anti-epileptic medications around eighteen months prior to her last admission to hospital. Also there was no history of previous episodes on non-convulsive status epilepticus. In

addition, Dr. Harding in his report states that there was no damage to the hippocampus which may be seen in children with chronic epilepsy.

8.4 I have been asked to comment on whether I believe there is evidence of a breach of the duty of care. I believe it reasonable that non-convulsive status epilepticus was considered as a possible diagnosis in Claire during her admission from 21st October 1996. It was also reasonable for her to be treated with an anti-epileptic medication to see if this helped to improve her condition/conscious level. However I do believe that if available an urgent EEG should have been performed to confirm or rule out this diagnosis, particularly when she was not responding to the anti-epileptic medications being given to her.

I believe it reasonable that a meningo-encephalitis was considered as a possible diagnosis although it was felt to be unlikely in view of the absence of a fever and meningisms. I therefore feel that it was correct to commence Claire on Cefotaxime and Acyclovir. I note that the results of microbiology and virology investigations subsequently came back as being normal. Also Dr. Harding in his report considers meningo-encephalitis to be excluded, both by microbiology and the post mortem neuropathology.

Taking into account Claire's clinical condition and the fact that she was on intravenous fluids I believe that her blood urea and electrolytes (renal profile) should have been more closely monitored particularly as the sodium level on her initial blood tests on 21st October 1996 was slightly reduced at 132mmol/l. Following this initial blood test on 21st October 1996 the subsequent blood test was performed at 21.30 hrs on the 22nd October 1996 and the result returned to the ward at 23.30 hrs on the same day. The sodium level at this time was significantly reduced at 121mmol/l. After this blood test was received Claire's fluids were restricted to two thirds of maintenance. Claire's condition then suddenly deteriorated at around 02.30 hrs on 23rd October 1996. If Claire's worsening hyponatraemia had been detected earlier on 22nd October 1996 and appropriate changes to her fluid management made earlier then it is possible, although not certain, that the hyponatraemia may not have been as severe and cerebral oedema may have been prevented.

I note that Dr. Webb in his statement believes that Claire routinely should have had a repeat blood urea and electrolyte performed on the morning of 22nd October 1996. When he reviewed Claire on 22nd October 1996 he had "erroneously understood" the urea and electrolytes result from the evening of 21st October to be the result from the morning of 22nd October.

In the nursing notes dated 22nd October 1996 from 14.00 hrs to 20.00 hrs it was noted that Claire's Glasgow Coma Scale (GCS) scores were between 6 and 7. (The normal GCS score is 15 out of 15). Dr Webb in his statement lists the hourly GCS scores (as based on his

observations) as being between 6 and 8 over the same period of time and 6 from 21.00 hrs on the 22nd October 2006 until 02.00 hrs on the 23rd October 2006. A GCS score of 8 or less is generally regarded as an indicator of severe brain injury and as such I believe that during the afternoon of the 22nd October 1996 serious consideration should have been given about transferring Claire to the Paediatric Intensive Care Unit for ventilatory support. However, it is uncertain whether or not earlier ventilatory support and admission to the Paediatric Intensive Care Unit would have prevented Claire's death.

I believe the facts I have stated in this report are true and that the opinions I have expressed are correct and complete.

.....

Dr. Rajat Gupta MBChB, MMedSci, DCH, FRCPCH, FRCP (Ireland), FHEA
9th September 2008

10 hrs

HALL Rosemary

From: Rajat Gupta [rajgupta13[redacted]
Sent: 22 September 2008 05:03
To: HALL Rosemary
Subject: RE: : RE: : Hyponatraemia Claire Roberts investigation

Dear Rosemary,

We sent the report on the 12th Sept to Billy Cross at the address on the original letter of instruction. I hope you have received the report now. I attach an electronic copy of the report. I am in India presently and will be returning to the UK on Thurs and if you have not received the paper report by then let me know together with the correct address details and I will post another report.

Unfortunately my secretary is also on leave presently and thus I can't send a further paper copy sooner.

Best wishes,

Raj

<html><DIV></DIV></html>

Subject: : RE: : Hyponatraemia Claire Roberts investigation
Date: Fri, 19 Sep 2008 12:59:00 +0100
From: Rosemary.Hall[redacted]
To: rajgupta13[redacted]

Dr Gupta
The investigation file for the Public Prosecution Service has been completed and delivered to them. Your report can be sent on when received. Is it possible to let me know when we can expect your report, for the information of the PPS. Many thanks.

Regards
RH

[HALL Rosemary] -----Original Message-----
From: Rajat Gupta [mailto:rajgupta13[redacted]
Sent: 08 September 2008 13:38
To: HALL Rosemary
Subject: RE: : Hyponatraemia Claire Roberts investigation

Dear Rosemary,

Sorry for the delay in getting back to you. I have been on leave. You should receive the report in the first half of next week ie week commencing 15th Sept.

Best wishes,

Raj
<html><DIV></DIV></html>

> Subject: : Hyponatraemia Claire Roberts investigation
> Date: Wed, 27 Aug 2008 14:29:49 +0100

> From: Rosemary.Hall[redacted]
> To: rajgupta13[redacted]
>
> Dr Gupta
> I have posted you a copy of Dr Harding's report and also e mailed you a copy. We are currently preparing the Police file for the Public Prosecutions Service. Is it possible for you to give an indication as to when your report may be complete, for the information of the PPS.
>
> Many thanks
> Rosemary Hall
>
> **********
>
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