

6:00:27 **Dr Sumner you were asked by the coroner in Northern Ireland to investigate the case of Rachel Ferguson. When you examined the case what struck you about it?**

6:00:37 Well Rachel, it was quite obvious when I looked at the notes that Rachel had died from the condition known as Hyponatremia, delusional Hyponatremia which causes ???? and then as progression of events which means that the brain swells and then the medical terminology is conning so that the brain the swollen brain is forced down into the hole of the base of the skull and then basically the patient would stop breathing and usually would die from this unless something is immediately done to reverse the swelling of the brain. It is a condition, which is unusual but well know and has been recently quite well publicised in the medical literature. 6:01:37

6:01:38 **Is it a condition you would expect any doctor on any ward in a British hospital to be aware of?**

Well I personally would think so yes, yes I would think so.

6:01:52 **And what are the early signs of Hyponatremia, what would alert you to give you concern about a patient, especially at Rachel's age that would immediately be a red flag in terms of Hyponatremia?**

6:02:04 Well I think that there are two points here. One that is mostly fluid therapy and management of intake of fluids and output of urine and other abnormal loses. Notably aspirates or vomiting from the stomach. Sorry I have lost my train of thought.

6:02:32 ~~Will I ask you that again?~~ **What are the early signs, or what would you if you were a doctor on the ward what would be the early signs for you if a nine-year-old that is suffering potentially from Hyponatremia?**

6:02:40 Well I think the early signs would be very subtle, exactly as they were with Rachel. That she was vomiting and anyone who is vomiting is losing both water and electrolytes, sodium particularly and by a kidney mechanism potassium as well and in any case if too much water is given then the cyribil swelling starts. And in the early stages the symptoms are quite subtle, there would be possibly a headache as the brain swells, possibly more vomiting and listlessness I would think. And of course in the early stages this is exactly what Rachel demonstrated. But I think the signs the early signs are subtle, clinically what is important is of course to measure the level of sodium in the blood and that is usually routine post operative so that you can see that the sodium level has become low and then take steps to reverse it before catastrophe. Because at that stage when the brain mechanism compensation mechanism in the brain comes to an end then the mortality from this condition is tremendously high and those who survive are often brain damaged.

04:10 When you were given the notes from Altnagelvin Hospital relating to Rachel Ferguson I mean how were you struck by the notes, were they complete?

04:19 Yes, the notes the medical and nursing notes were good as they go. What was I thought was poor was the intake and output chart, they recorded the input of the dextro-solin that Rachel had been chartered for and was given. There were recordings of the fact that she had vomited and two pluses, which two out of three I would grade it. It is quite a lot and the fact that she had passed urine but no record of how much, so that on one side we knew how much she was being given but on the other side we didn't know what her abnormal losses were.

05:20 And how did those notes compare to any hospital that you have worked with?

Well slightly probably they are quite similar to a lot of hospitals but I was fortunate to work at Great Ormond Street which has had a tradition of interesting fluid balance and so we would have had a rather different intake and output chart hopefully.

A NINE YEAR OLD BOY...

05:53 ~~2222~~ go into for a very routine operation, an appendix operation I mean studying Rachel's chart that was obviously very normal, very normal routine operation. At what point following that operation did you see abnormality?

06:09 Well I would think after her second large vomit that would to my mind, that should have a raised alarm bells that there was something wrong. Maybe you know her guts had centrally stopped working so that there was a collection of fluid and so she was vomiting it instead of it going on through in the normal way. In particular she had an abdominal procedure that should really be upper most in ones mind.

06:40 So what should have happened at that point whenever Rachel did have quite a large vomit at 10.30 in the morning?

06:47 Well I think and of course it is easy to say in retro respect, but I think that even at that stage she could have had fluid replacement of saline to cover her abnormal losses and a blood sample to have been taken to see that the electrolytes were normal.

07:08 And what would that have done to Rachel if that had happened?

07:11 Well I think if that had been done, a low sodium at that stage, because undoubtedly even at that stage would have been discovered and then the normal regime of fluid replacement to cover the abnormal losses would have been undertaken.

07:33 It would have saved her life?

07:34 Yes. But her life could have been saved probably as late as early evening of that day if the electrolytes had been taken. Because she didn't really lose the cyrabil compensatory mechanisms until 30'clock the following morning when she had the seizure and then went unconscious. So even during the evening of the first postoperative day, electrolytes

have been taken and modification of the intervenes fluid regime could have saved her I think.

5:08:15 **How do you describe or characterise the treatment that she received during the day and the lack of attention to detail that you have seem to be suggesting?**

5:08:24 Well I think that they just thought she had, she was just in the routine post operative phase of an appendectomy and just, it is very easy to do. Rachel she has had appendicitis an appendectomy, it is routine we see many of these every month and they are all fine you know maybe vomit they are all fine. They obviously completely underestimated just how sick she was becoming.

5:09:01 **And the hospital had said to us in a private capacity the hospital has told us that 20/24 hours after a routine operation such as this in a child they would see vomiting. I mean is that regular in as far as you are concerned or how many vomits how many times does a child have to vomit in order for you to become concerned about possible side effects?**

5:09:26 Well I think it would depend on the extent of the vomiting and it, in my reading of the notes with Rachel that it was very extensive. It was sever vomiting and prolonged and of course it colonnaded into her having coffee ground vomits, which implies bleeding in the stomach. So that is sever vomiting and also she must have strained and strained vomiting because she had little haemorrhage marks in her neck ^{an opportunist} _{one upper chest}. So this wasn't the normal, normal post-operative vomiting.

5:10:05 **And even as early as half past ten but certainly throughout the day you say that the hospital should have become aware that this wasn't normal and should have taken the proper course of action?**

5:10:14 That is easy to be wise after the event there is no doubt about that and particularly in medicine. Because the signs are subtle, but unless there is a protocol in place for replacement of abnormal fluid loses and for measurement of electrolytes because the clinical signs are so subtle. And you really would have to there observing her all the time and have a tremendously high index of suspicion then you are going to miss the signs until the catastrophe unless you can pre-empt that by knowing what is happening to the cerium sodium.

6:10:58 **Is part of the problem here, I mean who was looking after, you have read the notes, who was looking after Rachel in those hours, those critical hours at the point between 10.30 in the evening?**

6:11:13 Well primarily the nurses of course on the ward, I mean that is always the case, the nurses that is their job of course to look, to manage the minute to minute care of the patients and of course they do that very very well indeed. But the fact is that if something is going wrong they will have to call a member of the medical staff. In truth I don't know who that was in this case and because it isn't possible to say from the notes. I

assume, as in usual practice, particularly the one I am used to it would be the young surgeons who look after the surgical patient's post operatively. But I am not sure whether this was on a paediatric ward or in an adult ward, since Rachel is 10 and therefore a little bit in between. I think she was on a paediatric ward so that and I have learnt that subsequently, she probably was also had input from the paediatricians who might not totally understand surgical, the progress of surgical patients.

12:19 **So it is hard from the notes to actually understand who was looking after her that is what you are saying it's not.....**

That isn't a fault of hospital, it is just, I mean they would have a system and that would work probably. I wouldn't necessarily be communicated to the notes.

12:42 **So if we take through the day the problem is now for us is that we have been told that Hyponatremia caused Rachel's death. What caused Hyponatremia in Rachel?**

12:54 Well Rachel became Hyponatremia, which is a low sodium in the blood because post operatively when you have, whenever we have an operation we get what is caused a stress response. Some of the stress response you can upturned by the use of analgesia and or local anesthetic or something like that. But the reaction of the hormone-vasopressin or anti diuretic hormone is not easy to upturned so we all get this reaction of what is called an inappropriate anti diuretic hormone production which causes retention of water, water particularly. So there is that and then if you give generous volumes of a solution that doesn't contain much sodium, contains mostly water then you will get dilutional hyponatremia. And of course in Rachel's case this problem was exacerbated by her vomiting which makes you lose sodium, so sadly she was on a course to get Hyponatremia because she was being given, first of all she mounted the anti-diuretic hormone response which is absolutely routine usual. She was given a very generous amount of post-operative water and she vomited, so to me it isn't surprising that after 24 hours she became ??? from this condition.

13:07 **So really it was the fact that what was happening to her went unmonitored or certainly a course of action wasn't taken as a result of her amount of vomiting that made Rachel suffer from Hyponatremia?**

15:13 I think in my view in Rachel's case is that the vomiting was crucial, the volume and the extent of the vomiting was unrecognised and I think that was a big component of the course of Hyponatremia.

15:31 **If that vomiting had been recorded properly, if it had been identified a course of treatment could have been taken which would have saved Rachel's life?**

Yes.

6:15:43 **If the hospital had of properly analysed what was happening to Rachel it could have taken a course of action, which would have meant her leaving the hospital normally?**

Yes.

6:15:58 **How early were those, in your estimation, how early were the signs that Rachel was going to contract Hyponatremia?**

6:16:10 Well this is all in retro respect of course, but we know that in the afternoon she became listless and she continued to vomit and in the evening which I mentioned earlier she had this coffee ground vomit now that is a cause for alarm. And so given that these signs are subtle I would have said the evening, that evening. And she also complained of a headache and vomited more and more. So I think having not a mechanism or a protocol for measuring the cerium sodium which many people think is routine on the first post operative day then that would probably be the earliest that they would have picked it up.

6:17:01 **Having read the notes is this hospital guilty of at least being careless and not seeing the early signs?**

6:17:09 Well I think the clinical signs are very subtle that is the problem, very subtle. So you get the information from measuring the cerium sodium and also to know that, oh this patient is vomiting it is coming to the stage of abnormal vomiting that we are only giving you know water basically intravenously we might be running into trouble.

6:17:37 **So the hospital should have spotted this?**

I think so.

6:17:42 **It should have spotted that she was vomiting heavily and that has only been replaced by water and standard knowledge would be of a medical student would be that sodium is needed to be injected into the body?**

Yes.

6:17:58 **And yet Altnagelvin missed all those signs.**

6:18:03 I think it is easy to do. I think as far as I say the signs are subtle. But if you have got a system in place where you don't fluid restrict the patient post operatively you do give them very generous quantities of hypotonic solutions. And you don't, you ignore what turns out to be pathological vomiting then you are on the course for Hyponatremia.

6:18:33 **The hospital would say that your analysis only based on a paper record and is very easy to make these assumptions as a result of a paper record, is that doing you to the service though, is that a result of the quality the paper record or is that doing....**

18:48 Well I think that when you are on a ward looking after various patients, it is very easy to have other things on your mind. I mean not other matters but other; the fact that Rachel had had an appendectomy which is by all accounts a very simple procedure for which I don't know everybody recovers from simple appendectomy. So they would have that in the back of their minds. I have got some sympathy for this view that ok Rachel is vomiting she has only had an appendectomy but she will be all right, she will be all right. And we are giving her intravenous fluids. I think we are human and you know I have got some sympathy and it would be hard to be totally condemnatory. But you see if they had a system in place where they did restrict fluids post-operatively were they did restrict fluids post-operatively were they did routinely measure the cerium electrolytes post-operatively and were they if a patient vomits then it should be regarded as abnormal.

20:00 **How abnormal is, I mean what does a normal. How much does a normal patient of Rachel's age vomit post-operatively having had an appendix operation?**

7 Well the vomiting is, it is a spectrum, she might never have vomited but on the other hand she vomited profusely and for a very long time sadly to her detriment. So there is a spectrum but nevertheless I think a patient having had an abdominal procedure and starts to vomit then I think you should be suspicious.

After one vomit?

After two vomits.

After two vomits you should begin to think about what exactly is going on.

20:59 This isn't a hard and fast rule here of course and it would depend on the vomit. I mean but it seemed to me that she was vomiting a lot since they put two pluses against the volume of vomit in the notes. And my scale would be in terms of pluses, it was discussed in Court actually, would be 3 so that is quite a lot of vomit, two pluses out three.

28 **One of the things that is very difficult for the Ferguson family to come to terms with is that not only have they lost Rachel but they have since learnt that there had been a similar case in Northern Ireland some years previously. A case which you also investigated at the Royal, the Children's the Royal Children's Hospital, how close are the similarities between what happened to that child and what happened to Rachel. And should Altnagelvin and any other hospital in Northern Ireland for that matter, learn from what happened at the Royal?**

21:57 Well again it is easy to be wise after the event, this first child died from exactly the same mechanism but there were clinical differences. The first child was a much iller child, was having a much more major procedure and the Hyponatremia occurred within the operation during the operation. With Rachel of course it was all post-operative but the mechanisms were the same, in that too much water was given in the face of losses of sodium and in the face of this anti-diuretic hormone response that we all get associated with surgery.

6:22:45 **So there are very great similarities?**

There are great similarities since they both died from exactly the same mechanism. Now the question of dispersion of medical knowledge is the problematic one and you could be in the next town and not know what is happening in. I mean here in London we probably wouldn't know exactly what is happening if I am working at Great Ormond Street and what is happening at Guy's Hospital for example. But progressively through meetings and through journal papers and so on then this sort of thing should be publicised. I think I was struck by the case, the first case and it was in response to that, that I asked Professor Harriet from San Francisco to write an editorial on the subject in paediatric annaseizia which I am the editor. But of course it is a very specialised journal and though available on med-line you would need to be looking for the article to get it. But Professor Harriet has of course publicised widely in the British Medical Journal for example, which is a very widely read journal.

24:02 **So in many ways especially with the teaching hospital such as Altnagelvin it is the responsibility of the people there to seek out current medical methods?**

24:13 Yes I think that, I don't know whether in retro respect much more could have been done after the first case to publicise this with Northern Ireland and sadly didn't seem to have happened for whatever reason.

24:36 **Could it be said that to lose one child in understandable but to lose two children of this very rare occurrence was more than careless?**

24:50 I think it is very unfortunate for reasons that the Altnagelvin Hospital didn't know about the first case that a generation of young surgeons apparently are finding fluid management you know, either boring or routine so that they are not interested in it. It is hard to say.

25:09 **I mean I think as a layman and I think the wider public interest in this case is of course that the concern is that there are doctor's coming on to wards in Northern Ireland that are not aware of something as simple as this. That water, that if a child loses water and you are not replacing it that it there can be catastrophic consequences. Would you expect a doctor coming on to a ward now to be aware of what you say to be the fairly simple facts surrounding this?**

25:57 Well I would be, I would expect them to be aware of this I would. Yes I would, it is something that is taught to every medical student and as I said in Court I mean, I was taught about the need for input and output measurements for the professional management of fluid therapy in the post-operative patient. It is a Cinderella area and I think, it is hard to say why people aren't interested in it or think it is routine and therefore things will always sort, the body will sort itself out you know.

26:39 So how surprised were you to read the facts of this case that this hadn't been spotted?

26:43 Well I think it was a very, it is a tragic case this and I was very sad actually that this series of events had been allowed to happen.

26:56 Where you surprised by them?

27:00 I suppose I was surprised. I was surprised and possibly a little exasperated that the sort of the basics, the really true basics of fluid therapy had not been understood. That you replace what is being lost and it seems to me to be totally basic to post-operative fluid management. And something that we have always taken for granted that you give a basic maintenance it can be anything you like, dextrocelim as they used in this case as long as you restrict the amounts. But we replace abnormal loses and it is very straight forward so I think exasperation but also sorrow because it resulted in the death of a child and who had only come in for an appendectomy.

28:08 At what point during the course of the day, you have spoken in your report and your evidence in Court of being of 90'clock at night being one of the critical points. At which if an electrolyte test had been down then, if a true examination of what had happened to Rachel had occurred Rachel could have survived. Over that period of when Rachel was in hospital and suffering through the vomiting during the day at what point do you see she really reached the critical point at which the hospital didn't spot what was going on?

28:39 Well I think after vomiting coffee grounds that really is abnormal, really because it implies bleeding in the stomach. It is the diagnostic of gastric bleeding because the gastric acid changes the fresh blood and it comes out to look like coffee grinds and is totally diagnostic of gastric. Not huge haemorrhage but erosions in the stomach and this, it has lots of implications in that it is something that happens in the very stressed patient for example but it is completely pathological so I think at that stage that would be the final stage in my view that something could have been done. Because they didn't have very long, I mean that was 9 o'clock by which time her electrolytes the cerium sodium and potassium and magnesium would all have been very deranged, but not too late to do something about.

29:47 She could have been saved?

29:49 I would think so at that stage, as she was basically a fit person. If she had had kidney disease that would have been different maybe not been able to save her, but because she was otherwise a normal child the detection of low sodium at that stage would be correctable.

30:08 How surprised were you then to learn that the hospital didn't spot after the coffee grinds appeared that something serious was wrong?

Well I was very surprised, very surprised.

1:30:21 **Is that elementary, would you characterise it as elementary, basic?**

It's basic yes, yes its basic, because it's at the end it wasn't a sudden vomit, she had been vomiting all day so it was the culmination wasn't it of a day's vomiting.

1:30:45 **When you look back over this case and if this had happened in Great Ormond Street or this had been your hospital, a hospital that you are the Medical Director of, what do you think, how would you react to this, how do you, when you look back at this episode how would you portray this episode?**

1:31:04 Well I would have done exactly what they did do actually. They characterised this as a critical incident, which of course it was a culminating in the death of Rachel and then they examined it, they looked at what had happened they took advice and they came up with a system of prevention. The prevention that is the crux here and I think they are to be congratulated on doing that and they had a working group of the whole, from the whole of Northern Ireland and I was asked my opinion to at the time, so even I had an input into it. And they have come up with a good working protocol, which I think is going to be modified now because some of the doctors feel it is not quite prescriptive enough. That they want to know exactly what to do, but of course guidelines are a good idea I think but maybe ridged protocols are not such a good idea but certainly they have come up with a very very good system now for Northern Ireland.

1:32:23 **How does that compare to the hospitals in London, how do those guidelines strike you?**

1:32:29 Well I mean compared to, compared with what I would consider good practice I think that the new guidelines in Northern Ireland meet those requirements for good practice. I don't know, in England and Wales it is a much harder nut to crack. I mean I don't know what is happening here, I know that in my hospital we have a good fluid regime, there are lots of interest in it and because there are a lot have sick patients so they need very very careful management. And I think this was the problem with Rachel I think it was in the back of everybody's mind Rachel had had appendicitis; it wasn't even a very severe appendicitis and it was always in the back of their mind I think 'oh she will be alright' until it was too late.

Until it was too late.

1:33:30 Until it was too late.

1:33:32 **Whereas they should have spotted it much earlier that there was something very drastically wrong with this child?**

1:33:36 Well as I have said before I think that by, after the second big vomit at 10.30 in the morning they might have decided to see how much she was losing. In this way and

probably replace it intravenously by the same volume of ciliun certainly by the evening with the coffee grinds and continued vomiting during the day, certainly then as I have said.

5:34:05 **A senior medical officer in Northern Ireland has said to us that really there wasn't that much to compare or a correlation between the Royal Victoria case and the case of Rachel Ferguson.**

5:34:19 Right, in my opinion and the verdicts at both inquests were exactly the same. Exactly the same mechanism of death, delusional hyponatremia causing cerium hydemia and then coma and death.

5:34:40 **So as a specialist in this area, there was a direct link between the two cases?**

5:34:46 Yes, because in the face of abnormal loses and in the face of this secretion of anti diuretic hormone too much water was given and not enough sodium.

5:35:04 **What does this case say about the state of our health Service, I mean there is a wider public interest in this and what does this case say about the problems we are encountering. You talk about this being a very basic knowledge and yet we are losing a patient in the year 2001 out of lack of very basic knowledge especially a child?**

5:35:23 Well I think the public has every right to be anxious about deaths such as Rachel's but on the other hand I mean doctors are only human and nurses are only human and mistakes will always be made. What we have to do is try and minimise those and so of the record, I think it is the doctors fault we have raised the publics aspirations too high but we do expect a child going in for an appendicitis to come out again as a normal lively child. I think that is right to expect that, but in other fields I think expectations have become too high and the medical profession is to blame and the media to. They publicise pictures of patients who have been brought back from the jaws of death, so everybody thinks it can always happen. But sadly it can't always and mistakes will continue to be made because we are only humans we all make mistakes. But what we have to do is to minimise them and the risks. I mean I think that you are entitled if you take your child into have an appendicitis, with appendicitis having a appendectomy I think you are entitled to expect a live and normal child to come out. 6:37:11

It didn't happen in this case.

6:37:16 No, no.

6:37:20 **I think part of the concern is here that the Ferguson family feels that there is still an awful lot that they don't know about this case, they are concerned that the hospital has closed ranks and that there is something that they haven't told them. I mean you look at the notes do you see the exact cause of death in the events that led up to it, do you think it is very clear what happened in this hospital to Rachel Ferguson?**

37:51 Well I am particular in my own mind that the course of events are as we have described them in that Rachel was vomiting during the day, and this culminated you know, loss of sodium and so on. And I think that what isn't in the notes is the fact the thought processes going through the nurses minds, which were I am absolutely sure where, Rachel has had an appendectomy all patients with appendectomy go home she will sort herself out. Ok she has had a vomit but she will be fine. And I am convinced that those were the thought processes and I think that that is hard to communicate to Rachel's mum and dad. But as far as the fact that they did underestimate the fluid loses, the abnormal fluid loses and that they were happy to keep giving this over generous amount of hypotonic cilium is all in the notes.

39:14 **Is standard practice an excuse today for losing a patient such as Rachel Ferguson?**

39:22 I don't think that Rachel Ferguson should have been lost and with a new protocol, which they have worked out, she wouldn't have been. Because the blood tests would have been done, which is now, there is a protocol in place, which I applaud and say that every patient having intravenous supplementation will get a blood test to measure the cerium electrolytes which sodium, potassium and so on.

40:00 **But you would have expected that as to be standard practice in a hospital like Altnagelvin anyway?**

I am surprised that it wasn't.

40:13 **It would have been in Great Ormond Street or any other hospital that you have worked in?**

Well I think that there has been a growing trend for routine measurement of electrolytes post-operatively had they measured it pre-operatively why not measure it post-operatively and so I think it is pretty well routine. But there is always the fact that Rachel had just had a simple appendectomy and so they all get better.

40:50 **Couple of final questions. First of all you went to the inquest and gave evidence that what we have heard today at that inquest, were you struck by anything at the inquest about a way that the affairs of the inquest were conducted?**

40:57
cot Well I haven't been to too many inquests so I, this is the second I have been to in Northern Ireland and I have been to two or three others. For maintenance in you know, you are me or whatever it would be 5mills per kilo per hour, something like that, I don't know, I am not going to, I am 75 kilos so that would be 5 times 75 and that would be my fluid requirements each hour. Post-operatively were we all secrete anti diuretic hormone in an abnormal, possibly abnormal but that is debatable inappropriately water is therefore retained. So we need to give less and 2 per kilo per hour and Rachel was given between 3 1/2 mills per kilo per hour which is almost double what and almost full maintenance.

So she is been given too much in the face of water being retained and she is losing sodium.

So it is basically, the thing that puzzles me is that obviously you know, you still contract how the cause was set more or less by the regime the regime that was in place, with that being the case how come hyponatremia deaths are still quite rare?

Well I think most people would always restrict fluids. But I do think the crux of Rachel's cause was the fact that she vomited so much, losing sodium. So she was losing sodium and she was been given too much water, so there was a reducing amount of sodium in her blood and this was being further diluted by too much water.

So the fault came with the monitoring simply?

I think that fluid restriction is the basis of early post-operative fluid management.

So therefore you shouldn't get into these problems if you have proper fluid management you shouldn't get into this?

Well the key to Hyponatremia is prevention.

Just in terms of that question again, could you put it in terms first of all the production of early age because I think there does seem to be such a difference of opinion? And then in terms of that just to draw out the different factors that led to the development of Hyponatremia in Rachel and why her case, what was it in this case that led to the...

Was Rachel's case idiosyncratic?

Well the other, it is hard to say whether there wasn't an element of idiosyncrasy associated with it, it is hard to say. Because pre pubertal girls are particularly at risk. Harriets paper very much shows that for various reasons that they are particularly at risk from Hyponatremia. But never the less post-operatively fluid restriction is the key in the first 24/48 hours to compensate for the water that is being retained because of the anti diuretic hormone which is released as a stress response to the surgery in everybody every surgical patient. And of course most patients would probably get away with it, because Rachel would have started to eat if she had been all right. She was vomiting and she was vomiting profoundly and losing sodium, I think that is, it is impossible to say whether there was an element of idiosyncrasy involved with Rachel in Rachel's case. But in the face of water being given in my opinion excessively and the additional loss of sodium through the vomiting.

The two questions are the production of ???? was abnormal in Rachel's case and the second question then is that was Rachel's case idiosyncratic, but what were the factors I suppose that led to her in supposedly a rare condition how come Rachel developed it, what made Rachel develop this condition. There are a couple of

questions there Trevor if you don't mind as well. If you could just say what was happening to Rachel whenever she ???? and what is it that they couldn't say her condition was at that point. Because you know again the parents' view with us that they feel quite angry that she was transferred to the Royal because they probably seem to think that she is brain dead. The hospital Altnagelvin actually said that she was brain dead.

Well she was certainly very; it is hard to diagnose brain death in that way without sophisticated tests, but she was certainly pretty flat because they incubated her without any drugs, so she was pretty flat at that stage.

What does that mean?

Flat,

Getting close to flat line.

Just something again just and there is a broader question as well in terms of what Rachel's parents said to her last, is that they feel particularly angry, they feel that, you know you say that the alarm bells should have been ringing whether or not she was vomiting. They are saying that they were actually themselves ringing those alarm bells and saying there is something wrong here, there is something not right and yet they weren't listened to.

Yes that was Mrs Ferguson's testimony, which was disputed by the nurses, and as I said I didn't hear that evidence in Court because it all happened after I had gone home. But I know that Mr Leggy thought, from hearing everything and reading everything I think he thought that the alarm bells should have rung earlier.

Just actually the question of actually are the patients are prepared the patients interfacing with the Health Care professional. You know there is a broader question there I suppose maybe I don't know if you feel, if you want to answer it or not about actually how these sorts of concerns should be dealt with?

Well it is hard to say I mean these are human relationships aren't they and of course often the patients are not very knowledgeable but on the other hand they do know their child. So I must say I am always very, I always listen to the parents because, especially pre-operatively because you know, you can get so much information from them. If their child isn't all that well and you are a bit anxious about it being fit for surgery for example the parents can always tell you. They say, oh he is alright, he is just getting over something you know but he usually shakes it off in a day or something, you know that sort of an example. I think they know their child.

It's just that I suppose there is a broader question about you know cultural issues between the relationship between the Health Care professionals and what they are dealing with as well, I mean do you think there is an issue there?

Well now it might be better for them to bring that out in a way or you because basically I mean, am I being recorded. Doctors and nurses are arrogant you know we are trained to be arrogant we know what is best for the patients and of course that is all changing now. But you still, if parents are sort of over anxious you say its alright, you know go away, doctor knows best and it is a cultural thing. But I do think this is changing and of course there is the whole informed consent issue now, you know, I think it has all gone too wrong, we are giving them too much information that they are scared stiff about. Because I do cardiac over these days and they are told that their child maybe brain damaged afterwards they are told it might have liver problems and they are told everything and who is going to sign the consent forms say oh, my child might be going to be brain damaged at the end of the tour. So it is a problem and it is one that is evolving but nevertheless there is often an arrogance within the medical veterinary that thinks that doctors and nurses know best.

Just one other thing actually that I want to ask. It was actually earlier on in the interview you were talking off the record and it is just at what point did you stop talking off the record basically. Earlier on whenever you made the comment you said of the record.

And what did I say, I get memory loss.

I think I remember when you came back on to something that you had said previously you made a comment then.

Oh I know what I said, I said something about.

No I think if we need to clarify that when we go back to when we are using something we will come back to you on that.

1:52:05 Was the way in which Rachel was producing ADH according to the notes that you have read and what you have examined was that abnormal?

1:52:16 It is a usual thing to happen post-operatively in every patient, it is a reaction to the stress of surgery in appropriate secretion of anti diuretic hormone, so in that respect no it is to be expected in every patient who has had an operation. There isn't any reason to think that Rachel reacted in an idiosyncratic way in my opinion, she secreted anti diuretic hormones in the way that all surgical patients do. Which is why they require fluid restriction in the first 24/48 hours, now even with the generous amount of water a solution that Rachel was given, she might not have developed Hyponatremia or clinical manifestation of Hyponatremia unless she had vomited. And I think the crux of it is that she also then lost a lot of sodium from the vomiting and this led to a low level of sodium in her blood. And because there is higher level of sodium in the brain cells, water moves from the lower level to the higher level by osmosis so the brain cells swell. And then there is a period of time when the brain can compensate or the body can compensate for this brain swelling and the symptoms during that period are quite subtle as I said earlier.

Maybe a headache maybe more vomiting as the intracranium pressure goes up, but because the as the brain swells and of course the head the cranium is a fix bone structure. The blood and the ??? spine fluid are forced out and the pressure doesn't rise very much until those mechanisms cannot cope anymore and then there is a very sudden rise in intracranial pressure and that is when the seizure occurs. The loss of consciousness changes in the pupils in the eye and then brain death because of the extrusion of brain substance through what is called the foramen magnum which is the hole in the base of the skull that the spinal cord goes through. That is the mechanism of the death, during the early phase of the rise in of the brain swelling as I said the symptoms are very subtle.

55:04 **But having said that in your estimation there is nothing particularly idiosyncratic about Rachel's death that this isn't 1 in a million. That this happens as a result of inactivity?**

55:22 Yes my view on this, is that Rachel was on a course to develop Hyponatremia for the reasons I have said because of the inappropriate secretion of anti diuretic hormone which happens, the over generous maintenance fluids and the failure to replace abnormal losses of sodium.

55:48 **In layman's terms there was nothing particular special about Rachel that would have made her contract Hyponatremia?**

No.

Nothing at all?

55:58 No, basically no. But children and young children if we can extrapolate from animal work which is very attractive to do that, younger animals are more prone to it because they already have more water in their brain cells, so it happens earlier. And pre pubital girls are thought to be more prone in the serious that have been from animal work and in the series that has been publicised by Professor Harriet in the United States.

56:30 **When you read the notes at the point in which Altnagelvin decided to transfer Rachel to the Royal Victoria Hospital for sick children, what was her condition in your estimation then?**

56:43 Well she had already become unconscious and was and had changes in her pupils implying that she had already undergone this coning process which unless active steps are taken is usually fatal. I think she was very sick indeed at that stage. It is possible that she was already in an irreversible state at the time, which was irrecoverable at that stage.

57:28 **She was brain dead?**

I think so yes.

57:34 **Would you have transferred her at that point?**

It is hard to say. It depends on the facilities at Altnagelvin Hospital compared with the facilities in the intensive care unit at the Royal Children's Hospital in Belfast.

57:58 **I mean they could have done the same stem cells.**

The same brain stem. It might have been an immediate reaction to transfer her thinking that that is Northern Ireland's prime paediatric intensive care unit I think and very good it is to. So there may have been a feeling that this is the proper place for Rachel if there is any chance of her being resuscitated from this condition. I have got some sympathy with the idea of transferring to, so that one can say well we done everything possible really having got into this condition.

7:48 **During the course of this interview you have said you have talked very frankly about the alarm bells that should have been ringing during the course of the day at Altnagelvin. Now the parents of Rachel Ferguson would say that they in fact where ringing the alarm bells, they were saying this child was sick that Rachel was vomiting heavily. What does it say about this case in particular and the interaction between parents and Health Care professionals in general when parents say that when you hear this sort of evidence?**

59:23 Well this is a very difficult area, I think one is unwise to ignore what parents have to say because they know their child and the nurses don't know their child as well as the parents. And an anxiety communicated from the parents in my view should always be regarded.

59:50 **And in this case the concern is that parents feel that they weren't being listened to, is there an arrogance attached to the Health Care System at the moment which means that sometimes parents making these things are not listened to?**

08 Well I would like to think the answer to that is no. But I think that, I think it is changing I think often medical and nursing staff think they know best, always think they know best which they may not. That was a bit weak sorry.

00:35 **The parents of Rachel Ferguson will feel. Rachel Ferguson parents would say that they were raising the alarm bells but they weren't being listened to. Is there an issue of arrogance here that parents are too easily dismissed?**

00:53 I think it is a good point, I think there is often a feeling among medical and nursing staff that they know best. In my opinion it is always very unwise to dismiss the opinions of the parents after all it is they who know their child best. And in this case there does seem to have been a failure of communication, I heard Mrs Ferguson evidence in Court and she very clearly says that she tried to alert the nurses to the extent to which Rachel was vomiting from the morning.

7:01:33

And the evidence would back up Mrs Ferguson?

7:01:36

Yes I think so because I think without the vomiting Rachel might have not developed clinical signs of Hyponatremia.

7:01:48

One of the things that the parents do say which has been contested by the hospital is that in the evening that Rachel they say was listless and lifeless in the bed, however the hospital says that actually she was up and walking about. Could Rachel have been walking around the hospital ward in the early to mid evening giving her condition?

7:02:17

I would have thought it unlikely that Rachel would have been able to get out of bed after she had the coffee grind vomit in the middle of the evening. Up until then with mild brain swelling occurring and the compensatory mechanisms that I mentioned I think it is likely that she could have walked out of the ward.

7:02:39

Up to approximately what time?

7:02:42

Well I think up until the middle of the evening when she had the coffee ground vomit. After that I think it is unlikely that she would have been wanting to get out of bed.

So tea time probably.

Oh early evening I would think that she would have been able to walk a little.

7:03:03

So by 8 or 9 o'clock though.

By that stage I think that she would probably not.

The parents would say that she wasn't able to.

Yes I heard Mrs Ferguson evidence.

And your assumption would be exactly the same?

Yes it would I think.

7:03:28

You went to the inquest; did anything strike you about the Northern Ireland system in how the inquest was conducted?

7:03:38

It was the usual sort of way that inquest are conducted. There was the coroner of course who Mr Leggy is a very good coroner and a very humane person and takes the evidence in very rational and professional way. The problems come with the confrontational attitudes of the barristers on these occasions and they are doing their job, they want to you know. They have to do their job and they sometimes come over as being over confrontational.

Finally Doctor did Altnagelvin hospital fail Rachel Ferguson?

Sorry.

7:04:52

~~Was Rachel Ferguson failed, did they?~~ Did Altnagelvin hospital fail Rachel Ferguson?

Well in that she was a normal little girl who came in for a minor procedure and then died as a result of it then I would say that was a failure.

A catastrophic failure?

A catastrophic failure?

I mean with huge lessons to be learnt.

Certainly yes, the system has been put in place to prevent Hyponatremia in Northern Ireland now following the death of Rachel Ferguson.