Wednesday, 16 May 2012

(10.00 am)

(Delay in proceedings)

(10.10 am)

THE CHAIRMAN: Good morning.

MS ANYADIKE-DANES: Good morning.

Good morning, ladies and gentlemen.

MR GEOFF KOFFMAN (called)

Questions from MS ANYADIKE-DANES

THE CHAIRMAN: It's "professor", isn't it?

A. No.

THE CHAIRMAN: Just plain mister, okay.

MS ANYADIKE-DANES: Good morning. Before I start to ask you some questions, there is some business really to catch up on with other matters.

The first is that I understand, during the evidence of Dr O'Neill, he referred to a paper or a booklet. Just so that you have the reference for it, it's 301-137-002. I think the actual part that he may have been alluding to in terms of renal transplantation can be found at 301-137-011.

THE CHAIRMAN: This is from the paediatric prescriber?

MS ANYADIKE-DANES: Yes. Then when Professor Gross was giving his evidence, he referred to a number of articles. I wasn't entirely sure that you had received

those. The first is that he produced a commentary on the literature. That document can be found at 201-015-215. Then the actual articles that he referred to -- there are a group of them and they start at 201-015-237 and just proceed consecutively from there.

THE CHAIRMAN: Okay. That's us up-to-date?

MS ANYADIKE-DANES: I hope so. If there's anything else, I will deal with it at one of the breaks.

Mr Koffman, firstly, do you have a copy of your CV there?

A. Yes.

Q. This is a document that, if all of you don't have a copy of it, you'll find a reference to it at 306-053-001. There we are. I wonder if I can just take you through some parts of that. You became a consultant in 1985; is that right?

A. Yes.

Q. And you were also a director of transplantation at Guy's from 1998 to present day.

A. Yes.

Q. I wonder if you can describe something of what the paediatric renal transplantation service was like in your hospital when you became a consultant in 1985 -- just so that we have a understanding of what the service was like -- and then if you can bring us up to 1995,

which is really the period that's of relevance to Adam's case.

A. Yes. It's not that easy to go back and remember.

Q. I'm sure it's not.

A. But when I was appointed to work in the adult and children's unit at Guy's Hospital, this was, I think, the largest paediatric transplant centre in the country. I was a trainee, relatively inexperienced, and I found myself taking over a programme like that in London, which was quite a formidable task. The number of children that get transplanted every year is about 10 per cent of the adult number, so we're talking about quite small numbers throughout the country.

So the issue of surgeons doing operations on small children for transplantation purposes around the country is a major issue to be addressed and I think it's still a problem now. Over the years, I built up a bigger team and we have a team of about eight surgeons now, all of whom can do adult and paediatric transplants in London and for the surrounding hospitals that refer into us. We do about 40 transplants a year because I manage the transplants at Great Ormond Street Hospital, which is a large transplant unit, and at Guy's at the Evelina Hospital.

Q. Does that mean you're a referring hospital for complex

cases?

A. Yes, I think it's particularly the small children. I think it's commonly agreed that teenagers and older children are not so much of a problem, they're more like adults. But it's the young children, probably the under fives, I would say -- or the under sixes -- children under the weight of about 20 kilos.

Q. Does that mean Adam's roughly in that category?

A. Adam was just about on the edge of that group of patients.

Q. Yes.

A. But I would have put him in that under five category and treated him differently from the normal adult or teenage type of transplant.

Q. If you can recall, in 1995, what was the size of team that you had?

A. In terms of surgical team?

Q. Yes.

A. Just me and a trainee, that's it, to be on call all the time. There was no real rota, there was no group. It was really just providing a service for adults and children. When you are working like that, it means that you really are more of a technician than a holistic doctor. You have to rely on other members of the team to provide the input, the day-to-day input, and

management of a child.

Q. Yes, and now that you mention that, there's been quite a lot of evidence given as to the existence of or the benefits of what's called multidisciplinary teams, and that has come to mean a number of things, but in the sense I'm going to ask you now is the extent to which there was surgical input in that management or planning of the child once it was appreciated that a child had reached a stage where they were going on the transplant register and they were looking towards a renal transplant.

MR FORTUNE: Sir, before we get into that, can we establish from Mr Koffman what he means by "a trainee" in terms of how many years postgraduate experience?

MS ANYADIKE-DANES: Of course.

A. It's a variable definition really, unfortunately. It could be -- a trainee could be an overseas doctor who wanted to come to the UK and study transplantation. It could be a fellow at a fairly junior level who's doing some research. It could be an SPR on a training programme. It could be any of those. I'm talking about 25 years ago.

THE CHAIRMAN: Sorry, you're talking about 1995 or 1985?

A. Well, I'm talking about when I first started.

THE CHAIRMAN: Okay. Then there's been a slight

misunderstanding because I think the questions you were asked related to 1995. But let's just go back a little bit.

In 1985, Mr Koffman, and in the succeeding years, how would the number of paediatric transplants you were doing compare to the number you were doing 10 or 20 years later? Were the numbers much smaller because it was a developing field?

A. They were smaller because, I think, in the those days, the young children -- very young children, under five -- were not being transplanted generally in the UK. Guy's was the first place that started transplanting young children successfully from the age of about one year-old.

MS ANYADIKE-DANES: And roughly when was that that you started doing that?

A. I started it in 1985. It had been going on in London before I got there.

Q. But if we then bring your service up to 1995, in 1995, what was the team like?

A. In 1995, two surgeons, still no regular trainee, so to answer the question from the floor, there wasn't really a built-in trainee and I don't really see the relevance of the question anyway because it was led by the consultants. So whether or not there was a trainee

involved is, to my mind, meaningless.

Q. Okay. But now you have got a consultant and two other surgeons?

A. So we have two consultant surgeons, myself and a colleague, providing that service with possible trainee input.

Q. Yes. And then if you have that, then let's take the scenario where you have a child who the nephrologist team, if I can put it that way, have decided that that child really ought to go on to the transplant register --

A. Before we were interrupted, you asked me a question about teamworking and I will try and answer that.

Q. Thank you.

A. So yes, it's very important that the surgeon is part of the team. It's very important that the surgeon sees the patient beforehand and assesses the patient, talks to the family, works out how difficult the operation may be. It's clearly vitally important. As far as the preparation of the child immediately before the transplant is concerned, that's usually in the very capable hands of the paediatric nephrologists and I'm sure it was in Adam's case and it was always in the hospitals I worked in at Guy's and Great Ormond Street. So great confidence in the team managing the child on

dialysis or in preparation for transplantation, but not arriving as a pure technician from a surgical point of view, arriving with a previous assessment of the child and a discussion with the family. But that's not always possible for the surgeon to do because, obviously, if it's a team of surgeons only one person will see and assess the patient and the other surgeons would have to accept the view of that surgeon.

Q. But even if it was going to be done in that way, just so that I'm clear about what you're saying, are you saying that, of course, it would be a very good idea if the actual surgeon was able to do that, but even if that surgeon wasn't going to do that, a surgeon ought to be doing it?

A. Yes. That's what I said.

Q. Has that always been the case so far as you're concerned?

A. Yes.

Q. Thank you.

A. And it's a team, so you have to be able to trust the judgment of the person who's done the assessment. If you're a team of eight surgeons, which we are now, doing 250 transplants a year, then the patients are going to be assessed and evaluated by a number -- you know, any one of that team and any one of that team could operate

on the patient.

Q. In addition to assessing the patient, do you see the surgeon as having a role in meeting the family -- I mean not literally immediately prior to the surgery, I mean in this preparatory phase -- as well, or is that really confined just to examining the child?

A. No, no, no, it's built into our protocol that they have to be seen by a surgeon and a discussion takes place with the child and the family about the operation and its risks and benefits and complications. So it's a whole list of criteria that we discuss with the family. That's done well before the transplant. So there isn't really a need to go through this whole process again just before the transplant. It's totally unnecessary.

Q. That's just what I was going to put to you.

A. Because all the information and the education and groundwork has been done in advance. It's not good practice to leave all this discussion until the night before or the morning before major surgery because the family and the patient will not be able to take all this information in. So it has to be done well in advance, all the information given, patient given the opportunity with the family to come to education days or a day where they will learn more details about the operation. So

all this is done in advance.

The actual consent, although it is conventionally done by the surgical team now, didn't used to be. In the 1990s, I quite often did not do the consent myself. I allowed it to be done by the paediatric nephrology team, although now that is not acceptable practice.

Q. But is that why? Because by that time, the surgeons had already had their input with the family as to the risks and how the surgery might proceed.

A. Precisely, yes.

THE CHAIRMAN: You know the point that has arisen in Adam's circumstances, which are that although Professor Savage was close to the family and had treated Adam regularly, neither the surgeon nor the anaesthetist who performed the operation had seen Adam before the operation at any point, nor had they met his mother at any point beforehand.

Going back to about 1995, rather than today's practices, in 1995 that would not have been the way it was done by your team?

A. No, absolutely not. Although I said -- I was talking about consent, I would never operate on a patient without seeing them beforehand.

THE CHAIRMAN: Full stop?

A. Even if I hadn't taken the consent an hour or so earlier, I would always see the patient and the family before starting the operation.

THE CHAIRMAN: You talked about you now having eight surgeons. I presume that's for adult and paediatric --

A. So would all the other surgeons. They would always see the family before operating.

THE CHAIRMAN: So even if one of your team of eight had been the person who had met the family before or met the patient before and had done the assessment and had provided the information --

A. That might have been done six months or a year before and there are a few new issues always to discuss because, (a), it's good to introduce oneself as the surgeon doing the operation, (b), there will be issues about the kidney that you are going to use and, although that will have been discussed between the surgeons and the nephrologist, any particular aspect of the kidney that you're proposing to use for the transplant will need to be passed on to the family because if this was a kidney that you felt was more likely to give complications, then I think it would be important to mention that. I'm not sure this kidney fitted into that category, but I'm just giving you an idea of what I would discuss with the family.

THE CHAIRMAN: Yes. There are some differences about -- Messrs Rigg and Forsythe have said their inclination is they would not have accepted this kidney, but they accepted other surgeons would have accepted it. And I think you say this was an acceptable kidney?

A. This was a perfectly acceptable kidney.

THE CHAIRMAN: Okay. But even that being so, you would still want a surgeon to have discussed that with the family before the operation?

A. If there was an issue about the kidney then you would maybe want to talk to the family about it, yes.

MS ANYADIKE-DANES: I wonder if we could pull up what Professor Savage says he actually did discuss with the mother. We have his statement, 002/2, page 12. It is the answer to the question 6(b), so it's that last full paragraph. If we go a few lines down, it says:

"To the best of my recollection ..."

So in fairness, Professor Savage, of course, is doing the best he can because he readily accepts he didn't make any notes of what he actually discussed:

"To the best of my recollection, I would have informed her that it was an adult kidney which the transplant surgeon planned to use. It is likely that I informed her that a paediatric surgeon would also be involved in the surgery who had knowledge of Adam's

previous surgery. I would have explained that we needed to cross-match several units of blood because of the risk of blood loss during surgery, so that this might be replaced. I would have explained the need for the change in his normal overnight feeds so that his stomach was empty and also the plan to give him some intravenous fluids once tube feeds ceased. I do not remember in what detail I discussed the risk to Adam's life."

Adam's mother has also her view of what was raised with her, but if we just stick with what Professor Savage has said, is there anything else that in the circumstances -- you have read the papers and we have read the transcripts. Is there anything else that you think ought to have been raised?

A. To illustrate what I mean by the value of a surgical discussion just before the operation, I would accept that what Professor Savage consented, the way he did consent, was excellent, that's fine. But what the surgeon could bring to this would be the fact that you could decide which side the kidney was going to be put on, you could discuss the fact that there were two arteries to this kidney, and that immediately puts it in a slightly higher risk category. It's perfectly acceptable to use a kidney with two arteries, but there is a higher risk of thrombosis, arterial thrombosis, in

a kidney with two arteries. So I would have said there's a slightly higher risk. And Miss Strain would probably have said, "What sort of risk are you talking about?", I'd have said, "An extra 1 or 2 per cent risk of failure due to thrombosis". That's what I would have said in 1995 and I would still say that today.

So whereas that might not seem to be hugely significant, I think it's important to talk to the family about issues like that that Professor Savage would not have the knowledge to be able to discuss.

Q. Well, actually, Mr Keane, when he was asked in evidence about that, his witness statement was to the effect that he thought that Professor Savage was as capable as he was to be able to discuss the kidney and other surgical issues. We can go exactly to the witness statement if anybody wants to, but I think that's the essence of what he was saying.

A. I've just said what I said and it's not the same as that --

Q. I understand that.

A. -- so there's no point in labouring it, I don't think.

MR FORTUNE: Sir, Professor Savage did expect Mr Keane to go and see the mother before surgery took place.

THE CHAIRMAN: And both Mr Keane and Dr Taylor have expressed regret that they did not do that, which would

have been their normal practice.

MR FORTUNE: And that would have been the opportunity, in the case of Mr Keane, to have either given that information or to have answered any questions --

MS ANYADIKE-DANES: Mr Fortune, I accept that. It would have given him that opportunity, but that's not what he said he would have done. That's a different thing.

MR FORTUNE: But so far as Professor Savage is concerned, his expectation was, as he told the chairman, that both Mr Keane and Dr Taylor would see the mother.

MS ANYADIKE-DANES: I'm not sure that that is correct because -- sorry, if you'll bear with me, we'll look for it in the evidence, but Mr Keane raised the fact that he had specifically asked Professor Savage whether the mother wanted to see him so that he could explain any matters and, as I understand it -- and we'll find the relevant part of Mr Keane's evidence if necessary -- the answer that he got back from Professor Savage was: no, she didn't need to see him, he'd covered everything. And I don't think that Professor Savage challenged that view, but we can come to it. So he may have thought that Mr Keane was going to see the mother, but in terms of imparting information and consent, the evidence seems to be that he thought that he had done all that was necessary and, for that matter, Mr Keane thought that

he had done all that was necessary. But if there is an issue about it, over the mid-morning break, we will go to the evidence and see exactly what they do say, but that's my understanding of the evidence.

A. So I think, if I may just say, I think there has been a gradual change in practice over the years and I think that it's not -- it was common practice in the 1990s for the paediatric nephrologists to be really in control of everything that happened to that child and the surgical teams to be performing the technical side of the operation and having not too much input afterwards unless there were any surgical complications. That was really defined by the fact that, in this particular case, just as an example, Mr Keane was a busy urologist, he got called away to an emergency right at the end of this operation and probably had many other commitments, which meant that he would not have been able to provide round-the-clock care from a surgical point of view, to be part of that team. So at that time, he would have had to trust the paediatric nephrology team.

Q. Yes.

A. And he would have been able to because they were of the highest quality, I think, and I have no worries about that, if you're just talking about the consent and the amount of knowledge that Mrs Strain had. If we'd thrown

into the mix the possible slightly higher risk of a complication because of the two arteries, if she had said, "Would you still go ahead with the transplant?", then everybody would have said yes, I think. So I don't think it would have made any difference to whether we went ahead with the operation or not.

Q. Well, it's a matter for the chairman to determine those matters, but from my point of view, I'm simply trying to elicit what information reasonably could have been conveyed, who should have conveyed it and when they should have conveyed it. And I think we've had your view that that issue to do with the two arteries is something that you, as a surgeon, would have conveyed although you would have addressed the risk of that with the mother. But it's still information you would have conveyed, which is particularly surgical information.

If one goes to your own report at 094-007-031, where you're addressing specifically this issue of consent, not the build-up of information that could be provided in terms of surgical input, but literally the taking of consent, the signing of the form. That's what you're dealing with in the answer to that paragraph at 3.1. So you say:

"It would be normal practice for the paediatric nephrologist to do that in the mid 1990s."

Then you say:

"It would be important to view the consent form and, if possible, review the topics that were discussed with Adam's mother, including risk of death and serious adverse events from the procedure."

If I can take that in stages. Firstly, what is it that you would have expected to glean from the consent form?

A. Well, I didn't see the consent form in the notes --

Q. I appreciate that.

A. -- and the information I was given and I didn't know what Dr Savage had discussed with the family, so --

Q. Let me take you --

A. -- to simply see what --

Q. I can take you to the consent form. Its 058-039-185, but what I was trying to get from you is what information or records you thought ought to have been maintained on this form. That's it there. It's fairly straightforward.

A. Consent forms have changed a lot now. Now, you have to enumerate all the possible risks and complications and write down what you've actually discussed. This wasn't -- so I just wondered if there was any evidence on the consent form of what had been discussed, but I'm not surprised that there isn't and it doesn't mean that

this wasn't discussed; it's just not written down on the form.

Q. No, no, I'm not addressing that point. If you look at this consent form, are you able to say -- and it may be that it's so far removed from then that you can't -- how this might have compared with the consent forms that would have been used in your hospital in 1995?

A. That's pretty standard, yes.

Q. We can go to what was being proposed. We can go to it at 305-002-018. This form was attached to a guidance that came with a letter from management executive, dated 6 October 1995. It's going to be an issue for another hearing as to exactly what happened to that guidance and these specimen consent forms, but in any event, this was what was being proposed in 1995, just prior to Adam's surgery. You can see that under the section that deals with patient/parent/guardian, there's quite a bit more information being conveyed there. So even towards the end of 1995 in Belfast or Northern Ireland, it was anticipated that there would be consent with more information than was recorded on the form that Adam's mother signed, which was why I asked you how that form, as opposed to a form like this, compared to what you were using in London.

It may be that that is too far back for you to try

and remember.

A. Much too far back.

Q. I quite understand that. But the other thing that I wanted to raise with you from your report is you had referred to the risks as well. If we go back to your report at paragraph 3.1, what you say in the last part of that final sentence:

" ... including the risk of death and serious adverse events from the procedure."

What, as a surgeon in 1995, would you have been wanting to convey to Adam's mother about those two things?

A. Well, to me, this is the most important part of the consent form --

Q. I understand.

A. -- or the consent process.

Q. Yes.

A. Because I think there's a limit to what you can discuss just before a transplant, like we said, and it would not really be fair to expect a mother to take in a vast amount of information. This discussion about risk, mortality, adverse events and benefits should have taken place a long time before this in the form of information, particularly written information. That's the norm now, but of course you still have to sign

a consent form.

Q. Yes.

A. And it's appropriate that that's done just before. So it's still appropriate that risk of death would be discussed with the mother before the transplant operation and risk of complications and risk of death, statistically, would have been one in a hundred in the perioperative period, approximately, in 1995.

Risk of serious adverse events, there would have been a list of them. One of them would have been bleeding, the other would have been thrombosis of the blood vessels in the kidney with a risk of about 1 to 2 per cent of that. Risk of bleeding, of him needing a transfusion, 10 per cent risk of that I would say. And there's a whole other list of complications that I would have briefly gone through with the mother.

Q. Are you able to say what they would have been?

A. Yes, but how long have you got? I'm only here for a day.

Q. How long would you have spent taking the mother through that?

A. Well, briefly through the major possible risks.

Q. Which would have been?

A. Which would have been urinary leaking, wound dehiscence, wound infection, chest infection and acute rejection,

unless I've already just mentioned that, hyperacute rejection. So those would be the major risks, but I certainly would not have discussed the risk of death from intercerebral swelling because that is so rare, I've only encountered one case in 30 years of practice. I would not have mentioned that.

THE CHAIRMAN: Mr Koffman, if I understand you correctly, there's a limit to the amount that any parent can take in in the hours immediately before the operation and that's why it's really not a very good time to go through all this with them. That is exactly why it's an earlier part of the process from, really, the point when he's on or about to be placed on the transplant register that you start to go through this.

A. Yes.

THE CHAIRMAN: So the consent which is eventually signed is really a consent based on an accumulation of knowledge generally.

A. Yes.

THE CHAIRMAN: And then any precise additional information about the donor kidney, for instance, that although it's a minor risk, the risk arising from the fact that it had two arteries.

A. I'm sure that Professor Savage knew that these things had been discussed and the information had been given.

It was unnecessary for him to go through that again with the family.

MS ANYADIKE-DANES: Yes, Mr Koffman. My question to you was slightly different though. To be precise, if you had been taking that final consent, literally the signing of the document, that consent, what would you --

A. I would have made sure that they had been through an information-giving process beforehand. And if they had, then it was unnecessary for me to go through that again.

THE CHAIRMAN: That process would have included the surgeon?

A. Yes, it should have done, but I don't think in this case it did, but I would have expected it. In my practice, it would have involved a surgeon giving all that information at an earlier stage so the mother could decide whether she wanted her child to go on the list for a transplant with those risk factors that we've outlined.

MS ANYADIKE-DANES: Yes.

A. That would also involve discussion of the benefits of having a transplant.

Q. Of course.

A. And she would be able to make a decision: was it appropriate to do a transplant on her son at this stage? That decision would have been made. The only new information to give would be any new factors that may

have happened to Adam or any other child in the interim and any other factors involving the kidney.

Q. I appreciate that. The point that I'm trying to get at is that if you're taking that consent and your answer to me was, "Well, I would have checked that all that had been gone through with her". If you were to find that, actually, there had been no contact with the surgeon, so there had been no surgical input, if I can put it that way, into the information that she had, what would you have been telling her when you were taking her consent?

A. That information doesn't have to come from a surgeon.

Q. I appreciate that.

A. It's available. It's statistically available in published data about complication rates and so on. That's where I got my data on kidneys with multiple arteries. It's published data. And Professor Keane and his team probably would have known all this and they would have been able to give the information even if there wasn't surgical involvement.

Q. Sorry, it's a different question that I'm asking you.

I'm not saying whether all this is available to them and they could have done it. The point that I'm getting at is: if you were to find, for any reason, that all those risk factors that you just outlined to us had not been gone through -- there had been no surgical input,

as you would have it -- and thought was important, and you found yourself in the position of about to transplant this child and having the role of taking that signed consent, my question to you is: what information would you have been giving Adam's mother?

A. Well, if I --

MR MILLAR: Sorry to interrupt, professor. It's entirely artificial, this questioning, because Professor Savage we know from the evidence -- and it's important the witness understands this -- the consultant nephrologist is the person who personally took Mrs Strain through the entire process of placing Adam on the transplant list. So he has personally done all that. He goes to some length in his witness statement to describe all the matters that he discussed with her and explained to her. He personally is the one taking consent on the eve of surgery. So a scenario in which he doesn't understand in his own mind what he has done previously seems artificial. There's a continuity in this whole process, which is one of the positive things about this case. Professor Savage has been involved intimately throughout the process so on the eve of surgery he knows everything that has gone before.

MS ANYADIKE-DANES: Mr Millar, it's a continuity that is missing the input of a surgeon, which this witness had

said, in his unit, that's what would have happened and he regarded that as important. So I'm simply trying to establish, for the benefit of the inquiry, if he thinks that that was important and, if he discovered that had not happened, what would he, in discharging his duties as a surgeon, have addressed with that mother that night. That's what I'm trying to find out.

THE CHAIRMAN: Would you have felt it -- this is putting yourself back into the mid-1990s in a scenario which wasn't your scenario in London, but which was the scenario here that it was Professor Savage who had been involved with Adam and other families throughout the run-up to transplants. He regularly took the consents and there does not appear to have been a practice of involving a surgeon, whether it's Mr Keane or anybody else, at earlier stages, such as you had in London.

If you were then the surgeon coming in to do the transplant and you were aware that no surgeon had spoken to Adam's family, would you have been content to proceed on that basis or would you have thought --

A. Okay, I've got the gist of the questioning. It's a very interesting question about consent and it's still evolving. And what was acceptable in 1995 -- and I can't say it wasn't acceptable for Professor Keane to be doing this because that was what was done in lots of

other centres. It was normal practice. I'm sure Professor Keane knew --

Q. Professor Savage, I think.

A. -- better than anybody else.

Q. I think you mean Professor Savage.

A. Professor Savage, sorry, I do. But Professor Savage could not do the operation.

Q. Yes.

A. Professor Savage probably didn't know the risk or the complications. I'm just illustrating why it is good practice to have surgical input.

Okay, so back to this specific question. If I had gone in to see this child and his mother and found that she was unaware of the risks, I would have had to make a decision about whether to go ahead with the operation or give her the information briefly before asking her to verify that she was still happy to go ahead. I would have opted for the latter because I think I would have felt that this was still -- the transplant was very much worth doing and in Adam's best interests to have a transplant at this stage. I would have explained those risks that I've just outlined to you. And if she had asked my advice, I would have said, "Yes, it is worth going ahead".

THE CHAIRMAN: Sorry, Mr Koffman. That answer is based on

the proposition that you would have spoken to her and found out if she knew the risks. That isn't this scenario; this scenario is that Mr Keane didn't speak to her at all.

A. Yes. So I mean, we're talking hypothetically.

THE CHAIRMAN: Sorry, we are not talking hypothetically because, as a matter of fact, the surgeon who conducted the operation had not spoken to the mother before --

A. I'm aware of that, but we are talking hypothetically in asking me to give my opinion about a hypothetical situation. If I had been involved in the case, what would I have done? And I would have -- I have just told you what I would have done. I'm fully aware that Mr Keane did not discuss it with the patient. That is not hypothetical, but the question to me was hypothetical.

THE CHAIRMAN: What would you have done?

A. I have just told you what I would have done. I made it clear. If there's a different question, I will try and answer that.

MR FORTUNE: Sir, where are we going with this line? Because --

MS ANYADIKE-DANES: We've addressed it now, I think, if I may say so. I was just going to -- just for fairness -- put to Mr Koffman what Professor Forsythe

and Mr Rigg said. They said they would either have taken the consent themselves or they would have confirmed that those matters had been addressed, which I think may be quite close to what you're saying in the sense of --

A. Very similar to what I've said, but that was a hypothetical question as well.

Q. It was.

MR MILLAR: I think it's always difficult whenever a witness, such as Mr Koffman, maybe doesn't have the full feel of certain aspects of the evidence. But I think my learned friend should also make it clear to the witness that Mr Keane had a number of discussions with Professor Savage that night and among those discussions was a specific discussion about, "Have you seen the mother, is she happy, does she want to see me, is there any issue she wants to discuss?", and the fact that Mr Keane had been working closely with Professor Savage over a period of time in relation to these transplants.

It was quite clear, sir, from both of their evidences, the idea that Mr Keane might have had it in mind that Professor Savage hadn't bothered to go through all these issues with the mother is just something that never would have occurred to him. Not only are some of

the points hypothetical, but they're totally fictitious. They're so far removed from the reality as to make the whole thing unreal.

THE CHAIRMAN: I'm not sure that you can say so absolutely that things are quite clear from the evidence of Mr Keane and Professor Savage. That's a submission, Mr Millar, and don't make it again; okay?

A. Excuse me, chairman --

THE CHAIRMAN: Sorry, I'm speaking to counsel. Just have some patience, Mr Koffman; okay?

Don't start making submissions as interruptions to the inquiry. That's not helpful. And, I'm afraid, Mr Koffman, some of your attitude isn't very helpful this morning. People calm down and we'll get on with the questioning.

MR FORTUNE: Sir, may I suggest that we have a short adjournment for people to reflect on their positions?

THE CHAIRMAN: No, I think we'll continue, but I would like the witness to be, perhaps, a little bit less abrasive and I would like the questioning to continue.

MS ANYADIKE-DANES: Thank you, Mr Chairman.

I wonder if we can move on to the question of the surgical vein choice, which is also allied to the issue of the approach of the surgery, if I can put it that way.

If we were following sequentially through your report, you had also dealt with preoperative electrolyte testing, but I don't think there is anybody who doesn't think that that would have been a helpful thing to do and I think that Dr Taylor has conceded that, Mr Keane has said it would have been helpful and, in fact, Professor Savage wanted it to happen. So you also think it would have been helpful, so I think that everybody's in agreement about that.

So if we can move to the surgical vein choice. I think that arises in section 3.3 of your report, which is at 094-007-032. It's halfway down in that paragraph. You say:

"The principle of the surgery is the same for both children and adults ... The major decision would have been about where to anastomose the transplant renal vessels (artery and vein) to the iliac vessels, as in adults, or, because of Adam's small size, to choose larger blood vessels such as the aorta and vena cava for those anastomoses, which would entail a different approach."

Then you go on to say:

"In the event, they chose to use the iliac vessels and although this is not the approach I would normally use for a four-year-old, 20-kilogram child, it is used

by some surgeons carrying out paediatric transplants."

If we stop there. Firstly, can you explain, in 1995 -- just in case your approach has differed -- what would have been your approach for a 4 year-old, 20-kilogram child?

A. That age and weight is very much on the borderline between the small child that I outlined and the slightly more straightforward older child. But what I would have done then and now would be to use an approach to the major blood vessels, the aorta and vena cava, and I would have done an intraperitoneal approach, but colleagues I know would have done an extraperitoneal approach on to the iliac vessels.

Q. Which iliac vessels?

A. Well, there's the internal and the external and common iliac vessels. I think most people would have chosen the common iliac vessel.

Q. This may or may not help, but it's a diagram in any event which might help to locate it for those of us who are not so familiar with the anatomy. 203-004-082. It's just a rough drawing. Are you able to say what you would have done in relation to the anastomoses by reference to that diagram?

A. Yes.

Q. You can direct a pointer, I think. I think we have that

technology.

A. I think it's labelled "aorta" --

Q. Yes.

A. -- and "inferior vena cava". So I'd have used those vessels below the level of the right kidney. This right kidney is a normal-sized kidney, but in someone with kidney failure, it's almost always a lot smaller than that, so there's more room to put the new kidney in. It would either be on the aorta and IVC -- that's inferior vena cava -- or the common iliac artery and the common iliac vein. In fact, it was put on, according to the operation, on to the external iliac artery and external iliac vein.

Q. So why, if you weren't going to use the aorta and vena cava, why would you have used the common iliacs as opposed to the external?

A. It's not really which one you use, it's how big the artery and vein is, how big each of those vessels is. Because you're using an adult-sized kidney -- a 16-year-old kidney probably was nearly an adult-size kidney -- it's really to make sure there's not a big disparity between the size of blood vessels. These vessels really are quite small and to do an accurate anastomosis on to a very small vessel is more difficult.

Q. And what --

A. To use a larger vessel like the aorta actually makes it easier to do the operation.
Q. Yes, well, apart from the ease of, literally, the physical joining of the two vessels, does it have another significance to use a larger vessel?
A. Not really, no.
Q. Does it make any difference as to whether it has an adequate blood supply, does it make any difference to the size of the vessel?
A. Not really.
Q. I think the evidence from Professor Forsythe and Mr Rigg is that they would have used the larger blood vessels to ensure that the child's blood supply was getting to what was, essentially, an adult-size kidney, effectively, if I can put it that way, and therefore ensuring that it had its best chance of perfusion and so forth.
A. I think there's something in that, but it depends on the size of the vessel itself and the size of the vessel that you're joining on to it and the size of the kidney. I don't know what those are and what those dimensions are. In adult practice and teenage children practice, it's very common to use the external iliac artery and many surgeons do. I virtually never do; I always prefer to use the common iliac artery -- because it's larger --

for virtually all my transplants, but many surgeons use the external iliac artery.

Q. On children as small as this?

A. I don't know. I don't think so. I think this is -- it's unusual to use the external iliac artery for a young child and for an adult size kidney. It would be unusual, but it depends on the size of the blood vessel.

Q. I understand that. You have said that, actually, it's just easier to anastomose onto the larger vessels. Is there any other reason why you wouldn't do that if it's easier?

A. When I say it's "easier", it is easier to perform the anastomosis, which is actually where you stitch the blood vessels together. But to get access to the aorta or the common iliac artery is more difficult in preparation for that. So you have to do quite a lot of dissection to get to those vessels. It's more difficult to get to those vessels, but once you've got those vessels mobilised, it's then easier to do the transplant itself.

Q. I understand.

A. So it's a decision to make about whether to spend maybe an extra half an hour trying to get to the aorta or common iliac vessels and then making the anastomosis easier, or saving time on that and having a slightly

more difficult anastomosis to create. The other factor is that this child had had a lot of previous surgery to the lower end of his ureters, two re-implantations, and that's right at the area where the common iliac vessels are and that would have made it very difficult to get at those blood vessels. So I presume Mr Keane chose the external iliac artery because it was more accessible and he must have felt it was the right size to be able to perform the operation.

Now, in his chapter --

Q. I was just going to take you to that --

A. -- in Mary McGeown's book in 1992 --

Q. His chapter starts at 306-054-001, and there is a specific section of it that is devoted to transplantation in children. That is to be found at 306-054-010.

A. Just from reading it briefly, can I -- I think it's the next page.

Q. Yes. I think it's 5.1.2, which deals with vascular anastomosis.

A. That's the next page.

Q. Perhaps blow that up a little bit. Yes.

A. So he's saying that the adult kidney transplanted into the child:

"The vascular anastomoses don't pose any technical

difficulties, provided the graft vessels are anastomosed onto suitable sized recipient vessels, such as the common iliacs, aorta or vena cava."

Which I would totally agree with. But he used a smaller vessel -- it may have been smaller because we just don't know how big that vessel was, so we can't say it was inappropriate to use it as we did not see the dimensions of that vessel. It may have been as big as the common iliac vessel, in which case it was perfectly justifiable for Mr Keane to use it.

Q. How often does that happen in a child of that size?

A. Quite often.

Q. One of the things that Mr Keane did say in his evidence is that he wouldn't graft on to the aorta. In fact, that was one of the reasons why he said that he would not be comfortable in doing a living donor transplant because that's what would be required because you don't have the patch. At least that was his explanation. So if that was going to happen, and that's something I'm going to ask you about, the living donation, if that was going to happen, he would have recommended the child be taken to your unit in London.

How limiting is it to the conduct of paediatric renal transplants if one of the main surgeons involved in it, although admittedly there weren't that many going

on, is uncomfortable or is not prepared to carry out an anastomosis involving the aorta?

A. Well, in my view, it precludes you from doing the very young children. Adam, I think, was on the borderline. He was quite a big child for his age, but if you're going to be doing transplants in children -- you know, 10 kilos, one year of age -- then I think you have to go on to the aorta and therefore it would be appropriate to have the surgical expertise to be able to do that, yes.

Q. Can I ask you, just to have your views on the living donation point -- his view, as I've understood it, was because, obviously the donor is alive and requires certain things, so he says you don't have the benefit of the patch and then he was saying that, in those circumstances, what was required was to graft on to the aorta. That was his explanation, and he therefore wouldn't have been comfortable doing that. Does it necessarily mean you have to graft on to the aorta?

A. No.

Q. So you could do a living donor that didn't involve grafting on to the aorta or anastomosing with the aorta?

A. Of course, yes.

Q. Just while I'm asking you that: the mother had made enquiries about whether she could donate a kidney for her son and there's a separate issue to do with how that

was handled by Professor Savage. But from your point of view, in 1995, is that something that was happening?

A. Absolutely. That was the chosen method of transplantation in children of that age, a live donor.

THE CHAIRMAN: How recently had that developed?

A. 1995 -- well, from 1985, when I started transplanting in London. That was the case. We would do a live donor transplant if possible. But certainly by the 1990s it was half of our -- half of our transplants were being done from living donors.

MS ANYADIKE-DANES: Why was that?

A. Because it's a better form of transplantation because the kidneys are healthier, the data on thousands of patients published from American literature show that living donor transplants have a better outcome than deceased donor transplants if they're matched for HLA matching.

Q. Yes. Does it matter that, whatever one says about whether a 16-year-old is near adult size -- Adam's mother's kidney would have been adult size. Would that have been a negative consideration to doing it?

A. No. Not at all.

Q. The sorts of considerations that did factor into Professor Savage's guidance or advice to her, although I think he says that he didn't actually discuss it in

this way, but his thought process was that she was a single parent, although he acknowledges that she had her own parents who were supportive, that if anything happened to her, obviously, that would be devastating. If the kidney transplant itself failed, that would be devastating, she might feel guilty, and then you would have tried to do something you hadn't succeeded with. And even if it did all go well, there was a period of -- let's call it convalescence -- for her, when she wouldn't be able to be helping him in that same way as he's convalescing his transplant surgery.

So when you were discussing those things with the families in 1995, how did you address those issues?

A. These are the issues which everybody has thought about and discussed over the years and the fact is that living donor transplantation is the chosen method of transplantation for the great majority of people. If they have a live donor, then they proceed with a live donor. There are very few circumstances which would lead you to preferring a deceased donor over a live donor transplant.

Q. And so far as you're concerned, how significant is it that the family actually asked for it as opposed to just having that portrayed as a range of options?

A. Well, I think if the family asked for it, one would have

to take that very seriously and investigate the possibility. I think there was a feeling around at the time, and maybe there still is, amongst certain clinicians, that this is not ethically maybe the best way to go and it's better to proceed with a deceased donor transplant -- and that is still a very good option for anybody to have a deceased donor transplant. There are specific advantages of a live donor transplant. One is that you can have a transplant in a more timely manner than you can waiting on a waiting list.

Q. Effectively elective?

A. You can have it as an elective, planned procedure, and all the advantages that that may bring and may have brought in this particular situation if you think about it. You can have full knowledge of the donor organ, so you do all the tests that you possibly can in the donor beforehand so you know you're getting a kidney that's in perfect condition, whereas if you have a deceased donor you don't know that you're getting a kidney in perfect condition, and in this particular case there is doubt about how suitable this organ was. There's dispute about whether it was viable. There's the other kidney, which didn't function either. And even in the long-term, even if this kidney had functioned, there might be issues about whether it was damaged by the long

storage. There's a lot of question marks about that.

There are very few question marks about a live donor because it's taken out and used immediately, within a few hours. There's virtually no storage time. If you look at the statistics, the length of function of a live donor kidney is on average about 20 years. The average length of function of a deceased donor transplant is about 12 to 15 years. In 1995, it would have been about nearer to 10 to 12 years for a deceased donor and 20 years for a live donor.

Q. How significant is that if you're having that transplant in a young child?

A. Well, it's significant in anybody, really, isn't it, having a better function for a longer period of time? Like you're implying, there's virtual certainty that you'll need another transplant. So some clinicians -- maybe Professor Savage was thinking that the mother may be a suitable donor the second time around for the next transplant. And that's something that people plan to do. The big disadvantage, as you said, is that the mother has to go through a transplant operation. There's a very small risk, but that is a decision that she can make herself, based on the evidence that you give her. It's not a decision that the clinician should make about whether she can accept the risk.

THE CHAIRMAN: Mr Fortune?

MR FORTUNE: Sir, I'm concerned about Mr Koffman's statement that, even in 1995, live donation was very much at the forefront, certainly at Guy's and Great Ormond Street. That's not quite the picture, you may recall, painted by Professor Forsythe and Mr Rigg. If you go to the transcript for 3 May, to page 171, line 4, you get the impression, reading the answer from Professor Forsythe on the subject:

"We have discussed this [meaning live donation] and I think even in 1995 when live donation was perhaps not considered so strongly, as it is today, but even in 1995 we would have considered the possibility of live donation. We would have discussed that. That is another advantage, as we've hinted, of the assessment process, as the possibility of Adam to go onto the transplant list gives the opportunity to open out discussions about living donation. It is very hard, obviously, to raise that without producing some element of coercion on the potential donor."

And then further down on line 22 --

MS ANYADIKE-DANES: Perhaps we just finish the --

MR FORTUNE: Of course:

"But of course we want to make people aware of that possibility and discuss with them very openly the

positives and negatives that are associated with a live donor procedure for a child like Adam."

And then the question was asked:

"Can I ask, in 1995 how much discussion would there have been in 1995 of a live donation and what were its relative benefits?

"Answer: In 1995 [answered Professor Forsythe] I think the possibility of live donation would at least have been raised."

Now, there seems to be quite a difference in the positions between Mr Koffman at Guy's and Great Ormond Street and Professor Forsythe.

MS ANYADIKE-DANES: We can ask him about that.

THE CHAIRMAN: And Professor Savage in Northern Ireland. There seem to be three levels of this. You're saying it was your chosen method, had been so from 1985 and was certainly so in 1995 in London. Forsythe and Rigg are saying something which is less committed to live donation than that.

MR FORTUNE: And they're the experts in this case.

THE CHAIRMAN: They're not the only experts in this case. Professor Savage is saying, in terms, we weren't really using live donation but, as it happened, we began to move on to it. So it's at what stage of development they are thinking about live donation. I think the

point is that Adam's mother said that she enquired about live donation and was put off it.

MR FORTUNE: Absolutely.

THE CHAIRMAN: I think that's the real issue Ms Anyadike-Danes is getting at. It would have been perfectly acceptable for Professor Savage to say, "Look, we haven't started doing them yet or we're hardly doing them yet in Northern Ireland; if you want that as an issue, then we'll consider referring you to London". I think it was -- and you'll correct me if my recall is defective, but I think he ended up accepting that his attitude to this was a bit paternalistic.

MR FORTUNE: You're absolutely correct, sir.

THE CHAIRMAN: Of course, after the event, when everything goes terribly wrong, that looks something worthy of more criticism than it might have done if things had gone right. But there are different levels here and I think the real point is that since Adam's mum raised the issue, is that not an issue which might have been -- should have been -- considered a bit more seriously? And, I think, the gist of Mr Koffman's evidence inevitably is: yes, it should have been considered more seriously. And the gist of what Messrs Forsythe and Rigg said, at 171, was: the possibility would have been raised and, if any member showed an interest in it, we

would have wanted to give more information.

MR FORTUNE: It's not perhaps the issue of more seriously, but more fully, perhaps, sir, in the sense that --

MS ANYADIKE-DANES: In fairness, Mr Fortune, they then went on to say that, if had that happened, not only would they want to give more information, but they would have done some basic tests to see how compatible she actually was. It may be a sterile argument, if I can put it that way, because it's just not going to work out, but they would have at least gone to that stage to see if that was a possibility and that could have provoked the discussion, I think.

MR FORTUNE: I accept that because there would have to have been tissue typing, but it's the point of the discussion in the first place.

MS ANYADIKE-DANES: I understand that.

A. Can I just say that I don't think there's a massive difference between what we're saying? What I was saying was that live donor transplantation was a possibility in this case. There was no guarantee that mum was a suitable donor because we just don't know, but it was, in my view, worthy of investigation about whether she was. And it would have changed retrospectively. It might have changed the scenario to a planned procedure and a better quality kidney, but that's with retrospect.

At this time in 1995, people are at different stages in their development of their live donor programme. So people are going at different rates. I'm not criticising -- my practice may have been different from Professor Forsythe, who doesn't actually do paediatric transplantation, however. But --

Q. Well, not at the moment, but he was doing them at the time.

A. That doesn't mean to say that there's a big difference between our views on this.

Q. No, I'm not actually inviting anybody to criticise anybody. What I'm trying to do is to get some information out and I think that you all have come to a fairly common ground -- at least from Professor Forsythe, Mr Rigg and yourself -- which is that if a family member actually asked about it, then that would have been further explored. And I think where it comes down to is that if that had happened, it may be that given Mr Keane's views about what he thought that would have involved from the surgical point of view, that that might have meant that Adam and his mother went off to London for that process if she was compatible.

Before perhaps we break, maybe can I ask you this: did you have children and their parents come to

Guy's in that situation? They weren't coming from your normal constituency, but they'd been referred from another hospital for donation. Did that happen?

A. Yes. We even had children who were turned down for transplantation, told that it wasn't even possible in their centre and came to see our team.

Q. Were referred to you?

THE CHAIRMAN: Sorry, do you mean it wasn't possibly in their centre for live donors or just wasn't possible?

A. To transplant at a young age, at a very young age. Age 1, for example.

THE CHAIRMAN: Because that centre had not developed the expertise to do it whereas you had?

A. Yes. So the answer is, yes.

MS ANYADIKE-DANES: How did your unit manage with a situation where, at a time, some may have said, where you are really needed to be supported, you have the family member -- in this case it, would be the mother -- going through a major operation on her own -- that is, a major operation for her -- you have her child having a major operation for him. What was the sort of support that was provided to help that family through that?

A. Well, you're right, it's an important consideration about whether she would be able to donate, and that may be a reason why she would decide not to donate in the

end, because of lack of support. The support would have to come from her family and friends and we find that usually that can be managed.

Q. And that can be managed?

A. Yes.

Q. Actually, that was the part I was trying to get at because we will never know what she could or could not have done.

A. That's right.

Q. What I was trying to get at is your experience of families who are in that situation, and whether your unit can accommodate the need to support families through that. That is actually what I was trying to get at.

A. We commonly have donors who are single parents.

Q. That is common?

A. It's not uncommon.

MS ANYADIKE-DANES: I understand. Thank you very much.

THE CHAIRMAN: We'll break for 15 minutes.

(11.20 am)

(A short break)

(11.37 am)

MS ANYADIKE-DANES: Mr Koffman, just to finish off the questions that I was asking you about referrals, to pick up on a point you made about referrals. I think one of

your last responses to the chairman was that you or your unit quite often had children who came to you, who had been told in their own centre or the centre closest to them that they wouldn't be able to assist with a transplant, for whatever reason, whether the risks were too high or because they didn't conduct live transplants.

Can I ask you whether you know this: how did those children come to you? Was it because the centre had recognised that they couldn't help them, if you like, and had referred them on, or did the family themselves make independent approaches to your unit?

A. By about 1995, it was mostly by referrals from other colleagues. Earlier than that, it was sometimes by parents themselves coming.

Q. Were there instances when live donation was simply -- or at least for a child that young -- not something that was being offered in the centre closest to them that led to a referral?

A. Yes.

Q. There were instances of that?

A. Yes.

Q. Thank you very much. Can you recall whether there were instances of referrals from Northern Ireland to your unit?

A. I don't think so at the time. No, not at that time.
Q. Thank you. I wonder if we could move on to the subject of CVP. In your report, you deal with that at 094-007-033. You really start at 3.5 and you go on. You say that:

"The surgeons should be aware of the blood pressure, the CVP measurement and any other blood tests during the operation and may ask the anaesthetist to modify the fluid regime."

What I want to put to you is: would you be prepared to start a transplant surgery without knowing that there was a functioning -- in terms of giving accurate recordings -- CVP catheter in place?
A. Well, the patient's already asleep and anaesthetised, ready to have an operation, you can hardly pull out at that stage.
Q. So how significant would it be for you that there was a way of accurately recording --
A. It's obviously vitally important. Very important for the safe conduct of the operation.
THE CHAIRMAN: Sorry, Mr Koffman. Do I understand you correctly that the point of no return in an operation is, that if the patient's already asleep and has been anaesthetised, you can hardly pull out at that stage? So you'll go ahead with a transplant if there are

concerns only because the patient has already been anaesthetised? That can't be right, can it?

A. The patient is a transplant patient. Obviously, if there are completely critical reasons not to proceed -- and we have done this on a number of occasions, so if the patient has a heart attack or there's some instability about the patient's condition making it unsafe to proceed, we will pull out.

THE CHAIRMAN: Or if you don't know the patient's condition because there's a failure, perhaps, of some of the equipment which measures that situation?

A. With respect, chairman, you're saying "failure perhaps".

THE CHAIRMAN: Yes.

A. So is that a failure or is it not a failure?

THE CHAIRMAN: If you don't know the patient's condition. The point about CVP --

A. You know the blood pressure and you have a reading of the CVP. So you do know quite a lot about the patient's condition.

MS ANYADIKE-DANES: Sorry, Mr Koffman, that was my entry point. If you don't know what the CVP is and the reason you don't know it is because you're being told that although a CVP line has been inserted, it is not providing accurate measurements. So we just don't know what his CVP readings are and we're not going to know

unless we do something. So my question to you is: if that's what you're being told, what is your response?
A. I would find another way to get a CVP measurement.
Q. And what --
A. I would be very reluctant to start an operation, a transplant, without an accurate CVP. But there are circumstances where an accurate CVP is difficult to come by. This is one of them. There's multiple previous central lines.
Q. Well, before we go into why it might have happened in this case, if you're told that by the anaesthetist, "I've got the catheter in, I think it's in a position where I'm not getting accurate readings at all", what happens then?
A. There are other ways of putting a line in.
Q. So what would you do?
A. I would have asked him to put a femoral line in in the other leg from the one I'm going to use for the transplant. So if I was putting the transplant in on the right, I would get them to put in a right-sided femoral line. That would give you a central pressure measurement.
Q. Mr Keane has already commented on that and said that he would have been unhappy to have had that. And you'll have read the transcript of his evidence. He doesn't

think that that would have given you an accurate measurement because it's too close to where the action is, if I can put it that way, as to what you're going to do. Would you have had any hesitation about putting a femoral line in?

A. That's not the reason -- that wouldn't be a reason because it's close to the other transplant. It's not -- actually, that's irrelevant, I think.

Q. What would be a reason?

A. It's whether it's giving you an accurate CVP measurement.

Q. No, sorry. What would be a reason for not putting it --

A. Whether it's giving you an accurate CVP measurement or not, if it's not in the right place.

So if we had the patient asleep and consented and ready to go and we could not get a central line in under any circumstances, would I proceed with the operation? Definitely yes. Absolutely yes.

Q. And what would you do about ensuring that you had the kind of information that you had felt it was necessary to have the CVP measure for?

A. We would apply common sense.

Q. What does that mean?

A. Common clinical sense, and that is that there are other parameters to measure. The reason you want central

venous pressure measurement is to find out whether the patient is full of fluid or low on fluid or very full on fluid to give you a measurement of how full -- you probably have lots of experts talking about this. I'm talking from a fairly naive but practical standpoint as a surgeon.

Q. So what would you do --

A. What would I do? I would ensure that we kept up with the insensible losses and that we monitored the blood pressure carefully and we proceeded with the transplant. It's not without risk, but they did have an arterial line in to accurately measure the blood pressure and they had good venous access to give blood transfusions if necessary. So I would have replaced blood with blood. I would have given much less fluid because that would have been safe -- safer -- and if, at the time of the implantation of the kidney, there were worries about the blood pressure, I would have given some more fluid. But in a very careful, controlled way. So yes, I would not have cancelled the transplant because of no central venous pressure.

Q. But only when you have established that it's not possible to get a central venous pressure?

A. Yes, I would try everything possible to try and get an accurate measurement, but I would not cancel the

transplant because of that. This isn't the situation, with respect, that we were in. We had a reading and they didn't know how to interpret the reading.

Q. Sorry, just bear with me a moment before we get on to that. You said that you would apply common sense and clinical judgment, as I understand you to say.

A. Yes.

Q. And one of those things is that you're taking the measurements that you can and you are paying perhaps even more close attention to the administration of fluids, if I can put it that way. Does that mean that you and the anaesthetist would have had a discussion as to how you were going to manage that child in this less than satisfactory situation, if I can put it that way?

A. Precisely. We would have had a more detailed discussion than we normally would about what the parameters for infusion of fluid and blood and so on were.

Q. That was going to be my next question.

A. And it would be more detailed because we didn't have the support of a CVP measurement. But you know, this illustrates the fact that this is one measurement and sometimes you can get an inaccurate measurement in medicine. It's not a perfect science.

Q. I understand.

A. So this was a measurement which was very difficult to

interpret and then you have to use common sense to apply other criteria.

THE CHAIRMAN: Sorry, you need to let him finish. I know he's going ahead of where you want him to go, but you need to let him finish because there's too much cutting across on the record.

MS ANYADIKE-DANES: Sorry, Mr Chairman, I know that, but I want to make sure that we get the answer to this question before we proceed on to the other steps that Mr Koffman's evidence will take us to.

So where I'm at is the fact that you are having a more detailed discussion than you would normally have with the anaesthetist about a number of things, but in particular the management of the fluids. So my question to you is: would you expect to know what he was actually administering or proposing to administer?

A. No.

Q. Would it be relevant for you to know that because you then went on to say something about the amount of fluids he'd been administered? Would you expect to know that that type of fluid over that rate, that volume, is part of what's going to be administered if the two of you are trying to, in a collaborative way, manage this situation, including the fluid administration?

A. Sorry, but you are jumping well ahead because we're in

a situation where you've got, in this case, a central venous pressure measurement which was high, but you don't know whether it was an accurate measurement.

Q. You're being told in this situation by the anaesthetist that it's not an accurate measurement.

A. So we have to totally disregard it, you mean?

Q. No. He didn't totally -- in his evidence, he said that he used it as a marker for relative change. But if we go back into what actually happened on the 27th, he would have been telling you that because you're about to start, at roughly 8 o'clock that he's got a CVP catheter in, he thinks it's hard up against the vessel wall. It's gone up the wrong way, for a start, and jammed up against the vessel wall and it is not giving an accurate absolute level, but he thinks he can use it for relative change. That's what he would have told you.

The other thing though is, if you're saying that, "Well, we can't get a CVP catheter in a better position, so we'll just have to accept that, but we'll manage things", what I was going to ask you is: in that discussion about managing things, would you have wanted to know how much fluid had already been infused because, by 8 o'clock, quite a lot of fluid has already been administered to Adam?

A. Well, I think it's all hypothetical, but given that

situation, I would have carried on and urged --
I wouldn't have actually asked what fluid he was giving, whether it was fifth normal saline, half normal saline or normal saline --

Q. Or volume?

A. -- or plasma expander. I wouldn't have asked that because I would have assumed that that was his -- as an experienced paediatric anaesthetist, that would be a safe solution that he was giving. But I would have urged caution in terms of volume because I can see no reason to give a large volume of fluid that was administered over a short period of time. There can be no explanation for that, no logical explanation for that.

Q. Would you have expected to know how much had already been given?

A. Not necessarily, no.

Q. So when you say, "We would have had a discussion as to managing his fluids", what actually would that have entailed?

A. Well, if we have no central venous pressure to go on, we have to go on other parameters such as blood pressure and pulse and urine output. And the general overall condition. So at that stage of the operation, the child had been reasonably well hydrated overnight. There was

no evidence of dehydration. The blood pressure was normal, the pulse rate was healthy and there was no reason to give a large volume of fluid.

Q. I appreciate that, Mr Koffman. I'm trying to find out whether you would have expected to know that.

I appreciate that is your critique of the situation now, but if you are in that operating theatre and, in 1995, you're being told there's no accurate CVP measurement, you're having your discussion, "We'll have to manage this, we'll look at this and look at that and we'll manage his fluids", what I'm trying to find out is what you would have expected to know about the fluids that had already been infused and were proposed to, or don't you get into that part of it?

A. It's a difficult thing to say, really. We don't usually ask to know exactly how much fluid's been given and there usually wouldn't be the rapid infusion of such a high volume of fluid at the beginning of the operation. I can't see any reason to do that. An assessment of the state of the blood vessels and how well-filled they are later on in the operation may lead me to say, "I think the patient should have some more fluid".

THE CHAIRMAN: Can I ask you it in this way? I understand entirely why you do not normally ask anaesthetists how

much fluid has been given because that is his job, not yours. If you are told that there is an issue about the CVP line, which helps manage the fluid, and you then have a discussion in which you urge some caution about how much fluid should now be given, in effect you are advising the anaesthetist that he should be giving less, right? I understand this may not be something which has happened in your experience before, but in that scenario, do you not then discuss how much are you giving and what might it be reduced to?

A. Yes. Sometimes I do.

THE CHAIRMAN: So there is some level of discussion about what the volume is and what it goes down to. The complication here is that there had been far too much given in the first place.

A. The usual scenario, chairman, is that the anaesthetist is given a CVP reading that's high, is very reluctant to give more fluid, and the surgeon is usually saying, "Can you give a bit more fluid? Because we want the patient as full as possible to give the transplant the chance to work". So it's usually, if anything, the other way round. The anaesthetist is very reluctant to give fluid.

But given even a questionable CVP reading that's high, common sense would urge caution in the

administration of large volumes of fluid. If I had a situation where the CVP was high and the anaesthetist genuinely didn't know whether it was an accurate reading or not, I would not be urging him to give large volumes of fluid. I would assume that they would not be administered. I don't think the surgeon was involved in those discussions and did not know that large volumes of fluid had been given.

MS ANYADIKE-DANES: You also said something about urine output. How would you measure that?

A. And if you have a child or an adult that is passing reasonably large volumes of urine and you have no other way of measuring their vital parameters in terms of filling, then it would be reasonable to have a catheter in place and to measure the output.

Q. So sorry, just to be clear: is that something then you might have done as a response to, "We've tried everything, we can't get an accurate CVP measurement, no matter where we put this line", "Let's put in a catheter --

A. Yes.

Q. -- and then at least we'll be able to measure the urine output as well as our other parameters."

A. But a catheter is a normal thing that everybody does in a transplant. You nearly always pass a catheter into

the bladder if you can get one in.

Q. I wanted to ask you about that. In your report, you had said that -- and I think this is in your paragraph 3.8 -- sorry to skip you about a bit. 094-007-035. You said that:

"Urine output isn't normally recorded during the transplant procedure."

And you go on to talk about how actually the majority don't have that problem because they don't pass a great deal of urine. Then you say:

"A minority of patients are polyuric and the bladder may be left on free drainage in these patients."

Then what you go on to talk about is monitoring the urine. So that we're clear, you are not saying that a catheter isn't there; you're simply saying you don't normally bother to monitor it?

A. We always put a catheter in --

Q. Yes, that's what I wanted to get to.

A. -- in every case. We don't manage it like this was managed, putting a catheter in at the end.

Q. Why do you always put a catheter in?

A. Because we want to make sure that we can fill the bladder up. So we connect the catheter to a bag of saline and we can run the saline into the bladder to distend it. Many of these people don't have much urine

output. So their bladders could be small and difficult to find. So to facilitate the operation, we catheterise and we run some fluid into the bladder. If I had a situation where there was no CVP measurement or an unreliable CVP measurement, I would make sure that the catheter was on free drainage and we could measure the urine output on a quarter hourly, half hourly basis during the operation. It's just common sense.

Q. I understand that. The catheter that you're talking about that you would have inserted right at the outset -- and that's your normal practice -- that is a urethral catheter?

A. Yes.

Q. Maybe we can pull up what Mr Keane said about that.

A. In his book, in his chapter?

Q. Well, not just in his chapter, but actually in his testimony. That is his evidence -- I think it's 26 April -- and it's to be found at page -- let's start at 190 to lead into it. I think these are questions from his counsel, Mr Millar, starting at 21:

"You describe in your evidence how, in Adam's case, you had inserted a suprapubic catheter and not a urethral catheter. Was it your plan to insert a suprapubic catheter?"

In other words, was at an always what you were going

to put in. And the answer to that is:

"Answer: That was the whole point. Adam's urethra, to a consultant urologist, was never capable of accommodating a catheter fit for the task at hand.

"Question: What was that task?

"Answer: To do a transplant procedure."

Do you understand that as an objection to inserting a urethral catheter?

A. Absolutely not. There's no evidence to support the fact that he had an abnormal urethra.

Q. We know from the surgical procedures that Adam had actually previously had urethral catheters inserted by Mr Brown. But if there had been a difficulty in Adam's urethra being capable of taking a urethral catheter, is that something that you would have expected to find in his notes somewhere?

A. Yes. There's no evidence to support that at all.

MR MILLAR: Well, there is evidence to the point, sir, and the evidence is the opposite. Mr Keane's been quite clear there was nothing strange or startling about the urethra and there was no contraindication to inserting a urethral catheter. Rather, he wished to allow the bladder to distend naturally and he did not think surgically it was necessary to have a catheter. That was his evidence.

MS ANYADIKE-DANES: That is exactly correct, Mr Millar, and he then went on to express himself in slightly different terms, which is why I read that part out. His clear evidence when you were asking him questions was that he didn't think that his urethra was capable of accommodating a catheter which would have served the purpose of the transplant procedure.

A. I understand what --

THE CHAIRMAN: Just pause for a moment. Could we have page 190 up beside page 191 just to see the lead-in to this?

A. I could interpret that for you if you want.

MS ANYADIKE-DANES: Yes.

THE CHAIRMAN: Let's just pause for a moment and see the lead-in to this questioning. This is Mr Millar, who represents Mr Keane, asking him some questions. He says, at the bottom of page 190:

"Question: You described how you had inserted a suprapubic catheter and not a urethral catheter. Was it your plan to insert a suprapubic catheter?

"Answer: That was the whole point. Adam's urethra, to me, was never capable of accommodating a catheter fit for the task at hand."

A. Should I try and interpret that for you?

THE CHAIRMAN: Yes.

A. He's not talking about the urethra being abnormal; he's talking about the size of catheter that he thinks he could get in. He's thinking because he's a small child that he could only get a small catheter in and it may not do the job of draining the urine after the transplant.

MS ANYADIKE-DANES: That's exactly what he was saying.

A. I think that's what he was saying and he would rather put in a suprapubic catheter -- presumably he used a larger gauge catheter because you're just putting that straight into the bladder coming out through the skin, so there's no limit to the size of that catheter. But that's not normal practice. It's normal practice to put a small catheter into a small urethra and, in my experience, it does the job fine. So it's a possible theoretical question that he's raising and I'm not going to say he was wrong about that. But it's not what is normally done.

Q. Thank you. And not your practice?

A. Absolutely not our practice, no. Where we can get a urethral catheter in, we do. There will be patients where they cannot have a urethral catheter put in because they have no urethra at all so they have to have some sort of suprapubic catheter put in.

Q. Thank you. If we just go back to the CVP point. If

you've read Mr Keane's transcripts, which you say you have, you will know that there was quite a bit of evidence devoted to the communication that he says happened -- or at least he thinks he recalls -- between he and the anaesthetist about the CVP, what he would have started off asking him to do, how many times he would have asked him about it, how many times he would have asked him what the number was, when it was important to know what that figure was and, indeed, what he would have done had he heard certain other figures, if I can put it that way. You'll have read all of that, so I'm certainly not going to take you through all of that or the chairman, for that matter, because it's quite an extensive amount of his evidence that was devoted to that.

I wanted to ask you, in your experience, what, if any, discussion do you have with the anaesthetist before you actually commence the knife to skin surgery about the CVP?

A. Virtually none.

Q. Virtually none?

A. Yes. Unless it were flagged up by the anaesthetist, I would not interrogate the anaesthetist about the central pressure at that stage because the operation -- the actual critical part of the transplant will come

about two hours later when we're doing the anastomosis. And then I think I would have a discussion about how ... I'm usually asking, like Mr Keane was saying in his evidence, that -- I'm usually asking the anaesthetist as we go along through the first couple of hours of the operation how the patient is doing, what the CVP is, what the blood pressure is.

Q. When you ask what the CVP is, do you ask because you want to have a number, to use Mr Keane's expression?

A. Yes.

Q. Or do you ask because you generally want to know, "Are you comfortable with where we are"?

A. I'm basically asking him, in a conversational way, about the state of the patient and, particularly, the change in the central venous pressure measurement because quite often we do get spuriously high readings at the beginning and they're difficult to interpret. So it's really the change in the central venous pressure. So for example, a child of that age that has been starved overnight, a starting central venous pressure of 17, or whatever it was, is hard to believe because the child would be, quite frankly, quite overloaded with a central venous pressure of 17. He clearly wasn't.

Q. Visibly overloaded?

A. Clinically overloaded, I think. So I think there was

significant doubt about the validity of that central pressure reading and, therefore, I would have -- and that has happened to me before. Basically, all I'm saying is we would talk about the change in the central venous pressure, how much fluid had been administered, what the blood pressure was, et cetera, just to see how we were going on during the operation. That's all.

Q. I understand that. Mr Keane's evidence, amongst other things, was that he would have explained to Dr Taylor the parameters within which he wanted that CVP measurement to be at, and indicated that he would not have been prepared to start if he had been told that it was -- I think it was over 12, was his position. He also explained roughly where he wanted the CVP measurement to be before he was going to release the clamps. If we take the first one, would you have communicated to the anaesthetist where you wanted the child's CVP measurement to be before you were prepared to start the surgery?

A. No.

MR MILLAR: Sir, that wasn't Mr Keane's evidence.

MS ANYADIKE-DANES: We will pick it up.

A. I was really confused by Mr Keane's evidence because it seemed to be giving -- there were several ... I mean, the evidence seemed to change from the original

statement to the evidence he gave in this investigation.
THE CHAIRMAN: There was a lot of evidence he gave orally which was entirely missing from his written statements.
A. Yes. So I don't really know whether this was a retrospective view of what he would normally have said under those circumstances or it was actually what he did say under those circumstances. I don't know, but that's just totally speculation on my part. All I can say is I don't really routinely ask what the CVP is before I start and I wouldn't stop the operation because the CVP was rather high.
MS ANYADIKE-DANES: And do you explain or say what the range is that you would like it to be maintained within?
A. It's understood. It's understood that we want the central venous pressure round about 12 to 15.
THE CHAIRMAN: Can I ask you, when you say it's understood, is that because you're lucky enough to work with a number of paediatric anaesthetists who have experience --
A. Yes.
THE CHAIRMAN: -- doing renal transplants?
A. Yes, and it might not be ...
THE CHAIRMAN: That's the point.
A. That's true.
THE CHAIRMAN: We may not be comparing like with like.

A. No.
THE CHAIRMAN: Because you have, for many years, through your team work, worked with people who now know what each other one is doing and what the other one expects.
A. If the anaesthetist asked me what central venous pressure I would like, I would say, "I don't mind what it is at the moment, but I would like it round about 15 at the time that we are doing the anastomosis."
THE CHAIRMAN: Yes.
A. Certainly, a figure up in the 20s or up to 30 would be abnormally high. A starting CVP of 17 would be abnormally high.
MS ANYADIKE-DANES: What would your response have been if you'd been told that you, as I think it was, at roughly 10 o'clock, that it was about 30, there or thereabouts?
A. I'd be worried about that.
Q. What are the options available at that stage? As we understand it, roughly 10 o'clock is about the time that they were thinking of releasing the clamps or about the time that they did, just to benchmark it.
A. Yes.
Q. So what would have been your response if you'd reached that stage in the surgery and been told that the CVP was at 30?
A. Well, stop transfusion, unless you had to give blood

urgently. Give a diuretic, if that were possible, to get the child to produce more urine. Apart from that, there's not much more you can do, having given a large volume of fluid, apart from venesection.

Q. Okay. Apart from asking, periodically during the transplant, the anaesthetist what the CVP is or how the child is doing, do you ever look at the CVP yourself at the monitor?

A. Not -- no, because if the anaesthetist tells me what the value is, there's no point in me looking.

Q. I accept that, but do you have a look at the monitor yourself?

A. I sometimes do, yes.

Q. If you do, are you able to understand what the monitor is telling you?

A. At that stage of the operation, I never would look.

Q. Okay. You mean from the time when you're just about to release the clamps?

A. I never would. If, after I've done the transplant and the kidney doesn't look as though it's getting enough blood to it, then I would -- getting a bit worried -- talk to the anaesthetist and say, "Are you sure the central pressure is this? Are you sure you've given enough fluid?". I may even have a look myself, but there'd be no point in doing it before that really.

Q. If the child is overloaded in the way I think everybody has accepted Adam was, is there anything that a surgeon can detect about that?

A. No. The blood vessels would be full, but apart from that, you can't tell that the child's grossly overloaded. No, not during the operation, no. I'm absolutely certain about that.

Q. Just on that point as to what a surgeon may or may not be able to tell, the anaesthetist is obviously administering the anaesthetic agents and the muscle relaxants and so forth, and we have looked at the charts that show exactly when those things were administered.

One particular muscle relaxant he was using was atracurium. I'm not sure if you're familiar with that. But in any event, he was administering them periodically and then he didn't administer any further after 9.30. His evidence and the evidence of the anaesthetist expert for the inquiry, Mr Haynes, was that it has about 20 to 30 minutes' effect. The anaesthetist has provided a statement to the inquiry when he was asked directly, "Why didn't you administer any after 9.30?". Essentially, his evidence was, "Well, it's a matter of clinical judgment whether you think the child continues to require that". And the experts have given their view that you can tell to some extent whether the muscle

relaxant is ceasing to have its effect and therefore you need to administer some more, and that's something the evidence was that the surgeons are particularly keen to know to make sure that that's not happening.

A. That's true.

Q. If that's happening, to what extent can you tell whether you're reaching a situation where you're concerned about that?

A. You just are purely talking about muscle relaxants?

Q. Yes.

A. Okay, that's a big jump from my area of expertise.

Q. Oh, if it --

A. Just from a surgical point of view, if a child or any patient is not properly relaxed, then it is not uncommon for their muscles to go into spasm while you're operating. You may detect some muscle movement.

Q. Has that happened to you?

A. Oh yes, many times. You have to ask the anaesthetist to give more muscle relaxant or a deeper anaesthetic, yes. It's not uncommon.

Q. I understand.

A. But you're not saying this did happen in this particular case?

Q. No idea. We simply asked his explanation for why he didn't administer any more and, of course, it's a very

considerable time now that has elapsed. He has given his best recollection as to why he didn't, and I'm --

A. There are tests an anaesthetist can do about the need for muscle relaxation, I think. Maybe the child did not need muscle relaxation because of what was going on inside the brain swelling.

Q. That's one of the inferences.

A. I think it is and there are other parameters at the time, such as a rise in blood pressure and pulse, that would have fitted in with that condition being present at about 10 o'clock.

Q. Yes. I think in ease of Mr Millar, because I'd said it and I didn't want to mislead, I think we have a reference for where Mr Keane might have said that, at the start, anything over 12, alarm bells would ring. Here we are.

MR MILLAR: I accept entirely that Mr Keane did say that, but he did say that, had it been over 12, he would have been interested in, for example, having a discussion with Professor Savage about why it might be at that level. The objection I was making, sir, was he did not say that, prior to surgery, he discussed with Dr Taylor what he wished the preoperative CVP to be or say to Dr Taylor that, if it's 12 or over, that would be an issue. There are two quite different points. What

he said was that, prior to the operation, he would have indicated to Dr Taylor where he wished the patient to be at clamp release. In other words, what the target CVP was. There was no suggestion from him that he discussed with Dr Taylor what he wanted the preoperative CVP to be. But he did say that if it was, in fact, over 12 or if he had been told that it was over 12, he would have been concerned about that, he would have thought it was rather high and he would have wanted to have a word with the child's nephrologist about why that might be. That was his evidence.

MS ANYADIKE-DANES: Now that you put it that way, maybe I will pick that up with you after the luncheon break because there was rather a bit of extended evidence as to Mr Keane going over and standing up or sitting down with Mr Taylor at the monitor and the discussions they would have had and so on and so forth before they got started. Maybe it's better that I put that after the luncheon break and we can see where we are with that. So I won't take it any further because I think we've established the point that -- for him, anyway -- he wouldn't be starting with anything over 12.

Can we go back to your report? We had gone a little ahead to deal with urine output because you mention that in the course of how you would have sought to address

the absence of accurate CVP. Dealing with the question of how complex Adam's surgery might have been, not in abstract, but for this particular unit. So this is a unit which has a relatively small throughput of young children's renal transplants. No dedicated transplanter, although probably not too dissimilar from many other units in that way. So bearing in mind that and what you have been informed about this unit, what is your view as to how complex or challenging Adam's surgery might be? Because you don't know until you get started, but might be.

A. I think it was quite a challenging operation for them, for the team to undertake. He'd had many previous operations, access to the iliac vessels would be difficult. It was an adult kidney into a relatively small child.

Q. Can I just pause you on that? You'll have seen in the transcript there's been a bit of an issue, although not from Mr Forsythe and Rigg, but certainly from Mr Keane as to whether a 16-year-old's kidney can properly be regarded as adult size or whether there's an adolescent kidney and therefore slightly smaller?

A. It depends on the size of the donor. It was a male donor, I think.

Q. It was a female donor.

A. Sorry. It depends on the size and weight of the kidney and I don't know what those were, so it's just speculation. It could have been an adult-sized organ.
Q. Yes. But in terms of the way that you were dealing with that, what's your starting hypothesis when you're discussing things with the mother, for example? Are you dealing with that on the basis that effectively you have an adult kidney or not?
A. Yes, effectively you have an adult kidney.
Q. Thank you. I might have interrupted you just so that we have a clear view of what you consider were the likely complexities in Adam's case.
THE CHAIRMAN: I think you had said the operation was challenging because he had had many previous operations, access to the iliac vessels would be difficult --
A. Yes.
THE CHAIRMAN: -- and it was going to be an adult kidney going into a small child. Can you remember any other complications or identify any other complications?
A. It's really reasons for saying it would be, you know, anticipated to be a difficult case.
MS ANYADIKE-DANES: Yes.
A. No, I mean those are the main reasons. The other issue was the long storage time of the kidney and the likelihood that the kidney would not work straightaway.

There's a very high chance that that kidney would not have worked. The child would have continued to need dialysis post-transplantation for a number of days, if not weeks because that length of storage time usually means that the kidney will shut down and not work straightaway. So that's an extra level of -- so yes, it's a very challenging operation.

Q. Could Adam's age and weight have been relevant?

A. Yes.

Q. Does that add to --

A. Oh yes. I think that's what I said: a young child having an adult kidney is a significant challenge.

Q. You have given your evidence of the fact that you have had referrals of children from other centres. Is Adam the kind of child that you might have had referred to you?

A. Yes, I think so. I think any child under the age of 5 or 6 with weight of 20 kilograms or below represents a major challenge for transplantation and should be confined to major centres and there should probably only be a handful of those centres in the UK. And that's a debate that's still going on in children's transplantation in the UK.

Q. I understand.

A. But at that time, several units were doing the same

thing with very small numbers and even smaller numbers of small children and the difficulty in doing the sufficient volume to feel confident about the surgical management of these patients, I think, is a real issue. That's not to imply blame at all; that's just the way it was.

THE CHAIRMAN: And to be fair to the Royal in Belfast, its success rate, we are told, is not below the national average.

A. Yes.

THE CHAIRMAN: So there is a risk involved, but it's not such an obvious risk that Adam's mum should have been told, "No, we just can't deal with Adam here, he should go elsewhere".

A. I don't know what the results showed at that time, sorry, so I can't really comment on that.

THE CHAIRMAN: Okay.

MS ANYADIKE-DANES: That's an interesting question. How difficult is it to get an appreciation of those factors if some units are doing more complex surgery than others? Presumably success means two things: firstly the patient doesn't die; secondly, the graft is successful.

A. Yes.

Q. Does it make any difference how much the centre is one

that naturally attracts more complex patients in terms of those outcomes?

A. It's a very difficult question to answer.

Q. I understand.

A. You know, it's impossible to ...

THE CHAIRMAN: There are too many variables.

A. Too many variables, sorry.

MS ANYADIKE-DANES: Understood. Having just mentioned the part about the survival of the graft, I wonder if I could ask you a little bit about the infarction of the kidney. You expressed your view that you think that that kidney infarcted some time perhaps just after closure or just after the operation; is that right?

A. Yes.

Q. Both pathologists have given their evidence -- and I think that Professor Risdon, whose evidence you might have seen, has moved a little bit to take into consideration the kind of damage that might have been done by the long cold ischaemic time and also the fact that some of these kidneys do perk up or revive themselves after a while. And I think, ultimately, his view was that he thinks that either at the operation or shortly thereafter he thinks that the amount of damage indicates that the kidney died then, which may be not very far away from where you are.

One of the factors that has militated against the kidney dying before that, or not functioning properly before that, is that Mr Keane has described it as producing some urine. He's also, I think, said that he could feel the pulsatile flow of the kidney and that there had been various descriptions as to what colour it is, whether it pinked up, when it did and how pink it got.

What I wanted to ask you is -- Mr Keane is the only person who has given evidence saying that he saw some drops of urine. And the question I wanted to put to you is: is it possible to be mistaken about that and the process of handling it for some drops to be produced that might be mistaken for the production of urine?

A. Well --

Q. From the recipient's bladder if I can put it that way?

A. Mr Keane is a urologist, so I think he knows what urine looks like. But that's not what you're asking. I think there clearly was some urine coming out of the ureter, but whether that was produced before donation, before the donation process and still hanging around in the collecting system of the kidney --

Q. That's what I meant.

A. -- or whether there was new urine being produced, I don't think we can say. But the production of small

amounts of urine doesn't mean that the kidney is definitely going to work straightaway.

Q. No, no, I understand that. What I'm trying to -- you've actually, I think, now answered it. It's not possible to tell, even if it were urine, whether it's urine from the recipient's bladder, if I can put it that way, or urine from the donor's bladder?

A. Not the bladder because it is coming from the kidney.

Q. Sorry, from the kidney, yes. So it's not possible to tell whose urine it is?

A. It's not if it's just a small amount. If it's a large amount and it's shooting up into the air, then it's likely to be made by the new kidney, the kidney in response to being transplanted rather than being there from before in the donor.

Q. Then can I ask you about the pulsatile flow? Is it possible to be mistaken about that, to think that's what you're feeling and in fact it's actually not that?

A. I think so. It can be misleading. If you can feel a pulse in the artery to the kidney, then that's a good thing. But it doesn't necessarily mean it's going into the kidney, and I think Professor Forsythe --

Q. I was just taking you to that. He did.

A. That's true. So let's say, for example, there's a blockage in the artery inside the kidney, but the

artery that you have joined on to the recipient, there's a segment that is still patent before the blockage, you would still feel a pulse in that artery because that's not the bit that's blocked, but it's just not getting through. If it were getting through into the kidney, going round the kidney and coming out the vein, then you'd feel a slightly different type of flow, a different type of pulse, and you can recognise that. It can be difficult. So just the fact that you are feeling a pulse in a blood vessel that you have just joined up is a good thing. It doesn't prove that the kidney was in perfect health.

Q. Thank you. That leads us on to cold ischaemic time, which I wanted to raise with you. I think you indicate, at your paragraph 3.7, that 30 hours is a period where you might expect some acute tubular necrosis --

A. Yes.

Q. And delayed graft function --

A. Yes.

Q. -- and that delayed graft function might ultimately lead to failure?

A. The kidney is more likely to fail because of the presence of delayed graft function, yes.

Q. Yes. Professor Forsythe and Mr Rigg have said that they, taking all things in the round that were known

1 at the time, they wouldn't have accepted that kidney,
2 but I think you have a different view.
3 A. I do, yes.
4 Q. Is that because --
5 A. That's based on me doing lots of transplants.
6 Q. That's exactly the question I was going to ask you.
7 A. And from experience and the age of the donor being
8 a young donor, young kidneys can withstand ischaemia
9 much more than older kidneys. So if I was offered
10 a kidney for a child like Adam from a 50 year-old with
11 the same parameters of storage time, I wouldn't accept
12 it. But from this donor, I certainly would accept it.
13 Q. I think you started off by saying, "that's me with my
14 experience". If it's not you with your experience, if
15 you are in the position of Mr Keane, say, for example,
16 and the team that he had around him -- I'm not talking
17 about Professor Savage because he's not in the operating
18 theatre being part of the transplant team -- but the
19 team that he had and the extent of his experience of
20 paediatric renal transplants, is it a different view or
21 would you --
22 A. No, it's the same view. I've always had that view and
23 it's only reinforced by experience for this type of
24 donor. There is evidence that if you store a kidney for
25 more than 20 hours, then there's a higher chance of

delayed graft function. But it's not a sudden cut-off, ie if you go 21 hours, all the kidneys fail. It's a problem with storage. The longer you store a kidney, the more likely there is that it will be damaged. Young kidneys are very resilient to ischaemia and can recover very well.

THE CHAIRMAN: Would you categorise a 16-year-old kidney as young for those purposes?

A. Absolutely, yes. I would say up to the age of, say, 30, 30 to 40 being a young kidney. So this is a prime kidney and I would be very enthusiastic about using this. Just to underline the experience thing, I've accepted kidneys from Russia with a 48-hour storage time, from America regularly with a 90-hour storage time. I've been involved in research showing that you can store kidneys for up to seven days and still have them work effectively. So I'm pretty confident that a 16-year-old kidney with a storage time of 32 hours would be okay to use. There's no doubt in my mind that it's a reasonable thing to do.

MS ANYADIKE-DANES: Just so that people are clear about the timescale of that, when you talk about you've had kidneys from Russia and kidneys from America with quite extended cold ischaemic times, are you talking about 1995?

A. I'm talking about, yes, 1995, yes, and before that.
Q. And would you have accepted a kidney like that for Adam?
A. No, absolutely not.
Q. Can you help with how you actually calculate two things: one, the cold ischaemic time and, two, the warm ischaemic time?
A. Okay. It's fairly simple. As soon as the kidney -- let's take the cold ischaemic or cold storage time.
Q. Cold storage time, yes.
A. That's when the kidney is taken out and cooled. So immediately a kidney is -- well, when a kidney is taken out, the whole donor is cooled. So it's really when that cooling process is in place. That usually coincides with the time of cardiac arrest of the donor. If it's a living donor, obviously there isn't a cardiac arrest, the kidney is taken out then cooled. So it's when the kidney has been cooled. That is recorded and that pertains until the kidney is taken out of ice to be transplanted into the recipient.
Q. Mr Koffman, I'm going to pull up the transplant information form to see if you can help us with what these terms actually mean. 058-009-027. I'm sure you're familiar with these, but the left-hand side is the donor information. So that's taken out at 1.42 in the morning of the 26th.

A. Mm-hm.
Q. And then leaving aside the detail that it gives of its anatomical features, if we go to the right-hand side we see that it says:
"Kidney removed from ice at 8.30."
And that was on the 27th --
A. Okay.
Q. -- because it includes that underneath. So in terms of what you have just been describing to us, what does removing from ice at 8.30 connote to you on that form?
A. That means that a kidney would have been transferred in a box of ice and that was the time that the kidney was taken out of that box of ice and put into a bowl of ice to be dissected out prior to starting the implantation.
Q. So this bench work that's been referred to?
A. So that's called bench work and that may take up to an hour.
Q. But how relevant for purposes of anything to do with the condition of the kidney and what may or may not happen to it is the fact that you're told that it's taken from ice at 8.30?
A. It's not relevant. If it's still in a bowl of ice while it's being sorted out, dissected out and blood vessels tied off and so on, then it's still being cooled, it's still cold. So that should still be cold ischaemic

time.

Q. It might be warming up slightly though, mightn't it, under --

A. It won't be warming up if it's in a bowl of ice.

Q. So the fact of the atmosphere and the lights in the operating theatre have no effect?

A. No.

Q. So it is still being cooled, so when is the relevant time then?

A. The relevant time comes when it's taken out of that bowl where it's had the bench work done on it and it's suspended either in a cold swab or however the surgeon tries to do it. Then as soon as it's out and the stitching begins, then the kidney can gradually warm up over that next period of time. That is the more critical period of time because the kidney isn't warm, it's still at 6 degrees and it's still cold, but it will gradually warm up over that period of time. It will not achieve body temperature or anywhere near body temperature, but it may warm up from 6 degrees to 10 degrees or 12 degrees during that period of anastomosis. Why is it important to measure that?

Q. No, not that. Why is it relevant to know when the kidney is removed from ice if, in fact, it's still going to carry on being worked on and it's not actually

warming up at that stage?

A. That's probably an erroneous entry then.

Q. So "removal from ice" means, if you're completing this or directing the form to be completed, means when you took it up after the bench work had been done --

A. Yes.

Q. -- and you're about to anastomose it?

A. Yes. But this -- so this figure, I mean ... I don't know whether this is an accurate measurement or not. You're telling me that there was a period of time where the bench work was done.

Q. Yes.

A. But I don't know whether this was taken into account in filling that in or not. On the face of it, it could be that there were two hours where the kidney was being anastomosed. I think that's very unlikely.

Q. If it were, what is likely to be the effect of that?

A. Well, there would be significant warming of the organ, the kidney could be warmed up during that time. The average time taken for an anastomosis -- so that's really the anastomosis time, it's not a warm ischaemic time because the kidney isn't warm. So that's the anastomosis time. The average time for the anastomosis is about 30 to 45 minutes. Round about 45 minutes would probably be the national average.

Q. I think it was thought to be longer than that. I think it's about an hour or so, is Mr Keane's evidence, but we'll check it.

MR MILLAR: I think that's not corrected that it started at 10 and finished at 10.30, is the evidence.

A. If Mr Keane started the anastomosis at 10 and finished at 10.30, that would be quite a -- very acceptable anastomosis time. And it can take an hour or more to do the bench work for this kidney, to get it in because when it's taken out from the donor it is not -- it has not been ... The kidney generally has not been carefully dissected out. It's taken out en bloc, so it's taken out with a significant amount of surrounding tissue and it's specifically done so because the donor surgeon, wherever it is, doesn't want to damage the kidney in any way. So they take out the kidney plus a significant amount of surrounding tissue. So then it's the job of the transplanting surgeon to do all that bench work and I do that regularly and it often takes me an hour to do that.

MS ANYADIKE-DANES: And that would involve doing whatever you were going to do in terms of the two arteries and the one that was tied off and addressing all of that as well as trimming the fat and so forth?

A. So in this particular case, there were two arteries and

they were on what we call a patch of aorta and it was a very long patch, and that would be very difficult to use in a small child. So I think Mr Keane shortened that patch. So he chopped a bit out, joined the patch together and made it more suitable. That takes quite a long time to do that. So I don't do it the same way as this because that means he's doing all that bench work while Adam is under anaesthetic. So you could do all that bench work before you start the operation and that's what I do. So you don't -- you get the kidney, which was available from the night before, and you could start the bench work before the transplant starts while the anaesthetist is doing his job.

Q. I think the evidence from Mr Keane is that he came into the hospital at, I think, about 6 o'clock.

A. Well, I'm not saying every surgeon does this, but logically it's better to do this bench work before the operation starts because you're saving time on the general anaesthetic and it's better for the child and you know what the kidney is like --

Q. Yes.

A. -- before you start.

Q. I suppose it's always possible that you have anaesthetised a child and when you look at the kidney --

A. You can't use it, and that has happened in certain

centres. So it's good to have a look at the kidney and do the bench work before you start, but not mandatory to do that. It's the choice of the surgeon.

Q. I understand. Well, just as we're going through that form and you were explaining things --

A. So you're asking me about warm ischaemia as well.

Q. Yes.

A. Warm ischaemia is quite a damaging thing for a kidney. The average kidney could only tolerate one hour of warm ischaemia before it is irreversibly damaged.

Q. And what is warm ischaemia?

A. Warm ischaemia is when the kidney is at normal body temperature and has no blood going into it.

Q. What stage does that happen at?

A. Let's say for example -- that's usually -- well, it could happen. Let's say Mr Keane had decided that the kidney wasn't very well perfused after he'd done the operation, although it looked as though it was good immediately afterwards and then it wasn't so good. Let's say he decided he had to explore the artery again, the renal artery of the anastomosis, so he would have had to cut off the blood supply to the kidney and re-explore it while it was cold. Sorry, it had already been warmed up, so while it was warm, he had to spend more time re-operating on it, doing the anastomosis

again. That would be warm ischaemia. So the kidney would be warm. The problem with warm ischaemia is that the kidney has normal metabolism, normal requirements for oxygen, but there's no blood going through it. The whole point of cooling a kidney down is to make its metabolism slow right down so it doesn't matter that it has no blood supply for a period of time.

THE CHAIRMAN: Just to help my understanding, let's suppose you have the bench work done and the trimming done before, as it happened, Mr Keane did it here, and then you have prepared Adam for the -- you have done knife to skin, you've prepared him for the transplant. That's the point then at which you finally take the kidney, remove it out of ice?

A. No, just put it back into ice.

THE CHAIRMAN: You put it back into ice after you have done the bench work; right?

A. Yes.

THE CHAIRMAN: And then when you have Adam finally prepared to receive the kidney, is that the point you remove the kidney from the ice?

A. When you have done all the preparatory work on Adam and you have all the blood vessels ready knowing what the kidney is like, so you can tailor his blood vessels, then you take it out of ice and then you are doing the

anastomosis while the kidney is still cold, but slowly warming up. So that's not really warm ischaemic time, that's anastomosis time.

THE CHAIRMAN: In that scenario, is there any such thing as warm ischaemic time?

A. In that scenario, there may be no warm ischaemic time at all. It may be zero because there may be none at the donor end and none at the recipient end. But in certain scenarios, certain types of donors, there is a significant warm ischaemic time. These are usually the unstable donors where the donor dies and then there's a period of time before they're taken to theatre and their organs removed. That's warm ischaemic time. But that was not the case with this donor. This donor did not have significant warm ischaemic time.

MS ANYADIKE-DANES: In fairness to Mr Keane, he has explained how he interprets that and you can find that in his evidence on 26 April, page 54. Just as a bit of lead into it, starting at line 4, it's exploring the time of the vascular anastomosis. Then he explains about the kidney wrapped in the ice-soaked swabs and so forth and the true ischaemia time, when the renal vein clamp is removed to removal of the arterial clamp, "was seconds as there was no need to reapply them".

"Question: So you say, for this donor kidney, the

warm ischaemic time was seconds; is that your view?

"Answer: As I defined -- and most urologists, but perhaps not all modern transplant surgeons -- most urologists, and as I practised in transplantation, warm ischaemia time defined blood in the kidney, not, you see, up to the point I released the clamp."

A. Yes.

Q. What does that mean to you?

A. Well, he's saying about no need -- first of all, he's saying no need to reapply the clamps, and that's the scenario I was saying: if everything didn't look fine, you have to put the clamps back on and redo something when the kidney is warm, but didn't have to do that. No, what he's getting at is the definition of anastomosis time, really, whether that is cold time or warm time.

Q. Okay.

A. It's in-between time, I'm saying. I'm trying to help you think about it in the right way. It is not warm time because the kidney is not fully warmed up.

Q. Yes.

A. In fact, it's still at the cold end of the spectrum. But it's not pure cold time either because the kidney is gradually warming up. So if you take an inordinately long time to do the anastomosis, that's not good because

the kidney will be warming up and damage will be done to it.

Q. You said something else, which I wondered if you could expand on too. That is that if, as was the case in this operation, the kidney appeared to be, at least certainly to Mr Keane, to have been reasonably well perfused at the outset. There are different views about that, but if we stick with Mr Keane. From his point of view, it was well perfused at the beginning and then it became less so towards the end. I think you were just starting to address what you might do if that was the case. What does a surgeon do if you find that to be the case? What looked as if it was a fairly good situation seems to be less encouraging. What do you do then?

A. You're right, this is a surgical -- this is the nightmare scenario, really, and this happens not uncommonly. You have a kidney that looks good to start with and then is less good. I get very anxious at that stage. I will not close a patient up when I'm not happy about the perfusion of the kidney. So unless I can convince myself that the artery and vein anastomoses are okay, then I won't close up. I will re-explore them.

Q. Sorry, what does that mean?

A. Re-explore them means put the clamps back on and either take the kidney out again, cool it again and redo the

whole thing or just redo the artery if the artery is the problem. So I try to get to the stage where the kidney has good perfusion and convince myself that I've done everything I can. I have no reason to suspect that Mr Keane didn't agonise over this. It sounds as though he did, about why the perfusion was good to start with and not so good afterwards. Therefore, I can't answer that. I wasn't there. All I can tell you is what most surgeons would feel. They would feel really anxious about this and they would be worried that there was some technical issue that they could correct.

Q. If I may help in this way, Mr Koffman: I don't ask you what Mr Keane was thinking or why he was thinking. You can't possibly know that. What I ask --

A. I can know that because I've done it so many times.

Q. You can't know what he was -- what I asked you was in his circumstances, what would you do or how do you interpret the things that he did do, not why he thought any given thing. So I'm never going to ask you that question because you can't possibly know and nor can I know why he thought or did anything.

My question to you is: if you're in that situation where you find that the kidney that was looking reasonably well perfused is not -- then I was asking you what you would do, and I think you have answered that.

A. I was trying to -- I know -- I'm not saying I understand exactly what was going through his mind. I'm trying to give you some insight into what it's like being a surgeon, doing a difficult case, finding that the kidney doesn't look as well perfused as it could do and it may not be a technical issue. I've reopened blood vessels when there's been nothing wrong with them and it's just the fact that either there's not enough fluid in the patient or the kidney has some damage from storage and it takes time to recover. There's a whole variety of other reasons. But the mindset is you have to try to convince yourself that you've done everything you possibly can to make sure that those blood vessels are as healthy as possible.

Q. Yes. Before we leave the issues in relation to that form, you were taking us through and explaining what those terms meant or how they might be interpreted. In your report, you deal with the information that you think might have been recorded, whether or not on that form or in the medical notes and records. I wonder if you can expand on that. It is a rather brief note of the operation. I wonder if you can expand and say what you would have expected to find recorded and why.

A. It's a fairly standard transplant operation note, I think. It's fairly bare bones. I always draw

a diagram to illustrate what I have done and always have done and encourage all my colleagues to do that and they do now. A very careful note of the cold and warm ischaemic time and anastomosis time. So that's what's lacking in this: we don't exactly know what the storage times -- well, we know the storage time, I think. It's over 30 hours, but we don't know what the accurate anastomosis time is in this case. That would be useful retrospectively, but I don't think there's any glaring omissions.

Q. We're given a time when it is said that it was -- in fact, if we can perhaps bring that form back up again. I think it was 058-009-027. There we are. Of course, this isn't the only place where information can be recorded, but what we know from here is we know when, apparently, it was taken out of ice. We know, apparently, when it was perfused with the recipient's blood. We have those two times. What are the other times that you say ought to be recorded somewhere?

A. Well, the anastomosis time -- the implication of this is that there were two hours taken to do the anastomosis. So conventionally, a kidney removed from ice, it means when you're starting to do the anastomosis. But I don't think that's right. I don't think it did start at 8.30 -- I don't think he did take

it out at --

Q. I appreciate --

A. I think he took it out at 8.30 to do the bench work, which was in ice.

Q. This is a question that I'm being asked to put to you. Let's say it was taken out of ice at 8.30. So what's on that form is accurate, so it's not lying around on ice when further bench work was being done --

A. This is hypothetical again, yes?

Q. I'm afraid quite a bit of it has to be.

A. Okay.

Q. That's what that form says and let's assume that it is accurate. Let's then take the fact that the anastomosis might have started at 10 o'clock. That's roughly when the immunosuppressants were being administered. That's when it is thought that that might have been the start of it.

A. Sorry, what time were the --

Q. Sorry, the clamps are taken off at 10, let us say. Immunosuppressants are administered 10.

A. Is that right? Were they given at 10?

Q. I believe so.

A. Usually we give the immunosuppressants well before that.

Q. Oh.

A. Before the operation or the first part of the operation.

Anyway, it's not particularly relevant when you give the immunosuppression.

Q. Our understanding was that the immunosuppressants were given just before the clamps were taken off or -- they certainly weren't going to be given after.

THE CHAIRMAN: Sorry, does that matter?

A. Not really.

THE CHAIRMAN: They're normally given earlier in your operations, but it doesn't really matter?

A. As long as they're given before the anastomosis is opened up, yes, it's okay, I think.

MS ANYADIKE-DANES: Let's say that the clamps are taken off at 10 o'clock. So you have 8.30, clamps taken off at 10 o'clock --

A. Sorry, can I just go back to the chairman? If you're giving a drug that takes time to work and you give it half an hour before you put the organ in, then it's not going to be working. So I think there is something to be said for giving it before you just let the clamps off.

MR MILLAR: On the timings, since we're on the point, I think the best evidence we had on that was probably the marginal note, sir, from the operation note where it was recorded, "Vascular anastomosis", then a wavy line, which I think probably means "approximately", "10.30".

I think that was Dr O'Connor's note and she gave some evidence of having been in there about 10 to check on the immunosuppression. My sense of it, sir -- and it might be wrong -- was that she was in a bit earlier than that and that therefore it is likely that the drugs were administered before the clamps came off and the evidence about that seemed to be -- I'm not saying it's entirely satisfactory or accurate, but the best estimate, sir, seemed to be that that note recording 10.30 was when the clamps were coming off.

A. [Inaudible: no microphone] it just gives you one figure, it just says 10.30. So it doesn't actually give you the length of time it took to do the anastomosis.

MR MILLAR: We're not suggesting that it's a great note or it's a substitute for the type of note you are referring to, but it is some evidence of a point in time that the anastomosis was completed. It's probably the best that we have.

A. I agree. It's a question of when it started. That's the problem.

MS ANYADIKE-DANES: Sorry, we're just trying to put up the anaesthetic --

A. I'd like to ask who filled this form in, you see. Because if the surgeon ...

THE CHAIRMAN: It wasn't filled in by the surgeon, it was

filled in by the transplant coordinator.

A. The transplant coordinator wasn't in theatre. She has very little idea of what the timings were, so this is meaningless, I'm afraid. This is meaningless data. Mr Keane was the only person who knew what time he started the anastomosis and he didn't record it. That is why I said it's an important thing to put in the operation note because that tells the coordinator what the timings are.

THE CHAIRMAN: So on your approach, the anastomosis time starts at box 3, "kidney removed from ice", and is completed at box 4, "kidney perfused with blood"?

A. That's why those figures are there. That's what it's meant to imply. As I said to you, you could have taken the kidney out of ice before the operation started, put it in a bowl of ice, done the bench work, put it back in the ice and taken it out later during the operation.

THE CHAIRMAN: If you did that, you wouldn't record that at box 3 at all because that's not "kidney removed from ice" --

A. It's not been removed from ice.

THE CHAIRMAN: Okay. So boxes 3 and 4 are only supposed for anastomosis?

A. That's the implication of that. But you know, let's say there was somebody in theatre recording when Mr Keane

took the kidney out of the box of ice in the belief that that was something that was an important time, but then he put it into ice on the bench and started doing the work. That timing could have been recorded in theatre and the coordinator could have got the figure from somebody else in theatre. She certainly didn't get it from Mr Keane's operation note because it wasn't in there, the anastomosis time. So it may be a spurious reading, that, so I wouldn't attach too much importance to that "kidney removed from ice" time.

MS ANYADIKE-DANES: Well, without knowing where she got it from, I suppose --

A. We don't know where it came from. The only place you get it from is the operation note.

Q. I suppose she could have been told that. It doesn't have to be in a note to convey the information.

A. But she'd be filling this form in days later.

THE CHAIRMAN: Anyway --

MS ANYADIKE-DANES: We'll move on because I'm not sure that's correct. It doesn't matter for the matters I was raising with you. What I wanted to address was something that Mr Millar had been addressing with you, which was to try and get some best view, if I can put it that way, as to this length of anastomosis time.

I think that the thought was that the administration of

the immunosuppressants might have been a way of doing that because you certainly wouldn't be administering the immunosuppressants after you had released the clamps, I understand.

A. Mm-hm.

Q. That was one way of addressing and, and your answer is: yes, but you would have wanted to administer the immunosuppressants a little time beforehand to give them some time to be in the system, if I can put it that way, and working, so there's no point in administering and immediately doing something; is that your view of it?

A. I think that's most people's view. You don't wait until just before the clamps are released before you give the drugs. That's not normal practice.

Q. Yes. We'll have a look -- not at this minute -- at the anaesthetic record and see what time we can get for the immunosuppressants.

A. Have a look at the protocol that Professor Savage had in existence at the time. That will tell you when the immunosuppression drugs were supposed to be given, I think.

Q. I'm not sure it gives a time, but we will certainly look at that and we can come back to that point. If we pull up 058-003-005, I'm trying to see the immunosuppressant ... I'm not sure we can or I can

readily tell --

A. The azathioprine. That's the fourth one on the list.

Q. Yes. Which seems to have been given around 10 o'clock; is that right?

A. Yes. That's not the only immunosuppression that would have been given. Prednisolone would have been.

Q. Methylprednisolone was given, yes.

A. Does it have a time for that?

Q. I can't see it on this.

A. It's probably given at the beginning of the operation, I would have thought. That's when we normally give it, at induction.

Q. Right. In any event, your evidence is whenever you knew the time, it's not going to help you other than to say that the release of clamps or the anastomosis would have started some time after that. It can't be more helpful than that.

A. We're just speculating. There's not much point in it. It's going to be before the clamps were released.

Q. Exactly.

A. But you don't know at what stage it was given, at what point before, or during or whatever.

Q. That's the point I'm making. All you can learn, if you knew the time, is that the clamps would have been released some time after that. That doesn't help you

with getting this bracket of time for the anastomosis.

A. So I think where you can get an idea about the timing is if you know the exact time of the start of the operation, which is -- is it about 8 o'clock or 8.15?

Q. 8.15, 8.30.

A. I've seen it in the testimonies, but I can't remember the exact time.

Q. I think --

A. So that's 8.30. I would normally say an hour to do the dissection, get the blood vessels sorted out. That takes you to 9.30. Then you have to do the bench work, which may take half an hour. But we know that the kidney was taken out at 8.30, so I'm not sure -- you see, that's the problem. The operation didn't start until 8.30, approximately. How could the kidney have been taken out of ice at 8.30?

Q. Well, that's, I think, the -- that was the views that some people reached, that there was something that didn't quite add up.

A. So I think clearly that timing is spurious, that number 3 box, kidney out of ice, has to be wrong. It's much more likely that it was a bit later and that there was some bench work, so we're just speculating about the timing. That's why it's important to accurately record the anastomosis time in the operation notes.

Q. How significant a failure is it of the recording of the operation that we don't know these details?
A. Not very significant a failing because lots of surgeons are, I think, mistaken about how long it takes them to do the anastomosis. Some people put 30 minutes when it's 45 minutes.
Q. Yes, but you just said that that was an important detail.
A. Well, in the context of an analysis about whether this operation went -- how easy it was to do and the quality of the kidney and so on ... In this particular case, it's important, but all I'm saying is normal practice -- there is no very accurate way of recording this. It's left to the surgeon to write in what he remembers is the time.
Q. Do you record those details?
A. Yes, I do, and I try to be objective and I probably make mistakes as well. It's ideal to get someone to record it and write it down for you on the board in theatres when you start the anastomosis, when you let the clamps off, rather than just -- I mean, we always ask for the time and try and remember when it was, but it's easy to make mistakes.
Q. I understand.
THE CHAIRMAN: The effect of that, as I understand it,

is that the timings may not be absolutely accurate, but you give the best timings you can?

A. Yes.

THE CHAIRMAN: And what's missing here --

A. Is any time and we don't have any corroborative evidence to tell you when it was so we can't answer that.

THE CHAIRMAN: Thank you. Let's break until 2 o'clock. Thank you very much.

(1.07 pm)

(The Short Adjournment)

(2.00 pm)

(Delay in proceedings)

(2.13 pm)

MR MILLAR: Very briefly, Mr Chairman. This morning, when we were debating the issue of the anastomosis time, I made an interjection just to say that I had the understanding that the anastomosis had started at 10 and finished at 10.30, and I certainly said that because that was what was firmly in my mind. On further reflection, I can't put my finger on where it was that I got the 10 o'clock from and I was probably more dogmatic than I should have been. I do still have it in my mind, but I shouldn't have put it in quite such clear terms.

THE CHAIRMAN: Thank you very much.

MS ANYADIKE-DANES: Just while we're on the things that are on our respective minds, there was an issue about the CVP and whether or not Mr Keane had said to Dr Taylor what he wanted that figure to be. I can deal with that very, very quickly and, since it's been mentioned, I probably ought to. Can we pull up the transcript for 23 April, starting at page 113? I apologise, this is something I meant to discuss with you over lunchtime, but I had to address some other matters.

I think it really starts at round about line 13:

"Question: So then does that mean, in this discussion that you're having with Dr Taylor, that you would have been explaining to him roughly where you wanted Adam to be to start and roughly where you didn't want him to exceed as matters went on and to alert you if he was doing that?"

Then he says:

"Answer: Well, at the start, close to it.

"Question: Yes, at the start."

And then, after he said he would have gone through the plan at some stage, over the page -- it's not always entirely clear -- but at line 5 he says:

"Question: Both in starting and not getting any higher than or to alert you to if you did. That's what I'm trying to extract."

"Answer: Sorry, I would have said to Dr Taylor that I wanted the CVP within a physiological range."

Then he goes on:

"Anything between --"

And he has 3 to 7 millimetres of mercury as acceptable:

"I wouldn't have said anything above a CVP of 10. I accept the implication of it."

Then I ask him:

"Question: Let's just keep with what you thought you would have told him.

"Answer: I'm clear now that I've told him that I want to see --

"Question: Does he accept, in his expert opinion that, whatever the trace there is, that Adam has a CVP of within a range and tell me what that is, what is his CVP in other words?"

And I think if we go on to 115, I think he goes on ultimately to say:

"I thought that his range was between --"

Nothing higher than 12. I can't see it right there. In any event, his evidence is that he is having a discussion with Dr Taylor at the outset as to what he wants the range to be. That was simply the point that I was making: that he did have that discussion with him.

In fact, maybe it's back at 114 he says it where he says:

"I wouldn't have said anything above a CVP of 10."

So that's what he thinks he's having. Whether this is his ex post facto, whether it actually is what he remembers, but in any event something in there about a discussion with Dr Taylor, nothing above 10. It's pretty difficult to work out, but he certainly seems to be acknowledging a discussion of that sort. So that's that point.

The other thing I wanted to return to is -- in fact you were there, Mr Millar, to try and work out what is the chronology of some of these things. You, Mr Koffman, have been trying to help with certain things. There's a little bit more information that we can provide you with to try and see if we can get a sense of how long all this was taking and exactly what was going on.

Mr Keane's evidence is that he arrived in the hospital at 6 o'clock. Then if one goes to the 26 April transcript at page 45, line 17, this is his bench work. He says he is doing that at roughly -- if we go over the page at 45, he says he's doing it at 6.30 to, say, 7.30. So his evidence was that he did two bits of bench work, if I can put it that way. This was the rough work --

trimming the fat and all that sort of thing -- and then he told the chairman that he refined that later on. So at this point in time, he is doing what appears to be perhaps a significant amount of work. It's some work taking him up to between 6.30 and 7.30.

Then if one looks at another document, which is 011-026-127 --

A. Did he actually do that or is he saying what he would have normally do?

Q. I think he was saying that he did that.

A. I don't think he was.

Q. We can go back to it.

A. And I don't think he was having a conversation with the anaesthetist about a CVP of 3 to 7 when it was 17. It was 17 at the beginning.

Q. No, he was telling the anaesthetist -- he said he would have had a conversation as to what he would have --

A. But it was 17. It was actually 17 and the operation proceeded. So how could there be a conversation of between 3 and 7?

Q. Well, those are matters in the round and all the evidence that the chairman will have ultimately to determine. But in terms of was he saying that he was carrying out his first lot of bench work, he certainly is saying that. He is saying that because it starts off

actually -- if we go to page 43, how this starts is at line 5. In his witness statement, 006/2, page 5, he gives the order in which he would do things. We had actually asked him to put times to those things. He said he couldn't do that, but he could certainly say the stages of things. His order is, first, incision, identification and exposure of the vessels. Then his second one is isolation of the vessels. His third one is cleaning and preparation of the donor kidney. His fourth is vascular and ureteric anastomosis. His fifth is wound closure. Then when I'm asking him about that because I'm trying to find out how we can get times for those things, at line 16 he said:

"I would now change bullet point 3 if you asked me if this was specific to Adam."

So over the page at 44, he is explaining to the chairman what he was doing. He talks about the patch and "I would have done the actual sizing". That's at line 5, precise sizing of the patch. And then the chairman asked him:

"Question: Sorry, does that mean you start to clean and prepare the kidney before the operation starts and you finalise that during the operation?

"Answer: It's like fine-tuned, yes."

And then he goes on to explain what that means at

line 20:

"I would take a look at the kidney and take off the gross fat well before the operation ever commenced."

And then I am trying to understand a similar thing as to whether that's what he's actually saying. Over the page, 45:

"When and where was that happening?"

And then he says what he would normally do in a sterile environment and then:

"Roughly, when would you have been doing that?" His answer at 18 is:

"I would have been doing that any time between half six and half seven."

And that is referable to this operation because half 6 and half 7 isn't a general time that you're doing bench work. It's all depends on when your operation is starting. That's what he says about that.

MR MILLAR: Just to assist, while we're on page 46, I think the chairman then asks later on:

"How long does this take? Just a few minutes or longer?"

That's line 7. He says:

"In my technique of doing this, just a few minutes."

This was just the trimming of the gross fat.

MS ANYADIKE-DANES: I accept that.

MR MILLAR: So just a few minutes within that one-hour slot.

MS ANYADIKE-DANES: Within that one-hour slot. I accept that.

Then the document I was asked to have pulled up was 011-026-127. This is the document which, Mr Chairman, you have seen before. It formed the basis of his deposition for the inquest. If you see the date that he writes it, it's 11 December 1995. It's almost exactly two weeks after the operation. So it is the most contemporaneous account we have from Mr Keane of what he was doing. He's asked to put his recollection of what happened and he says in that paragraph:

"The operation started at 7.30."

Then just --

THE CHAIRMAN: Sorry, the trouble about going through all these times is there's utter inconsistency from Mr Keane because when he was asked about that on Thursday 26 April, he said -- and you asked him. He said:

"I didn't have a watch on me in surgery. I'm using approximate memory. The time is an unimportant detail as long as the patient is safely asleep."

And you had already asked him about his third witness statement to the inquiry, page 12, question 22, in which he said knife to skin was at 7.15. He said:

"I now see it was 8 o'clock from seeing the first CVP record in 2011 for the first time."

We can go through all these times and records and we will find no consistency whatsoever in what Mr Keane tells us.

MS ANYADIKE-DANES: I appreciate that. I would like to pull up one other document, though, and this is the blood loss count, which I think is 058-007-021.

A. Just before you do that, were you bringing up the issue of bench work --

Q. Yes.

A. -- expecting me to comment on that? What was the point in bringing that up?

Q. What I'm trying to get is a sequence of things and if you can help me as to actual timings that seem consistent with you. There's a second amount of bench work that he does and the only reason for putting this to you is that you were beginning to form certain views as to when other things might have been happening. That's the only reason.

A. I think I can explain.

Q. If I just put these things to you, I think it will work a little better this way. This document, unfortunately, doesn't have any time to it. But what we do have is we have -- see that line, 20.1 and 160.7? If we go

across there? That is the first entry by Staff Nurse Mathewson. She claims her entries started at 8 am.

THE CHAIRMAN: Because that is when her shift started, so she wasn't in there before 8 o'clock.

MS ANYADIKE-DANES: Yes.

THE CHAIRMAN: So therefore there's blood loss before 8 o'clock, hence the operation, on this analysis, starts before 8 o'clock.

MS ANYADIKE-DANES: This is the issue. If you can see right from the beginning -- I have no way of estimating how significant these things are, but they all seem to be much of a muchness until you get to 67, which everybody has -- and it's a matter for you to give your evidence on it, but all the others have considered that to be a significant bleed at that stage.

It's quite difficult to able to interpret what might have caused that kind of bleed, but in your experience, that would appear to be relatively early on. What could cause that kind of bleed?

MR MILLAR: I hesitate to interrupt, I think, sir, but certainly Mr Rigg, the other surgeon, said that that could be explained by a variety of things. It could have been bigger swab. He was suggesting that it could have been left longer in situ so it had become heavier

than the others. So I don't think everybody did say that it pointed clearly to a major or more significant bleed. Certainly that wasn't the evidence of Mr Rigg. He had various theories about it and didn't seem to attach much significance to it.

MS ANYADIKE-DANES: Mr Brown, who was the other surgeon there, did. Leaving that aside --

THE CHAIRMAN: Let's ask Mr Koffman. We don't need to go through it. It's proving increasingly fruitless to go back over what everybody else said in order to ask Mr Koffman for what his view is, particularly when there's no consistency to what other people said.

A. I totally concur with that. I don't think this is related to the fact that there were two periods of bench surgery as well. So that needs to be discussed, I guess, if that's seen to the relevant. So far as this is concerned, it's impossible to say, but the most likely thing is that it was mobilising the blood vessels.

Q. What does that mean exactly?

A. It means a preparation of the iliac artery and vein in order to transplant on to those vessels to do the anastomoses. That's the most likely time that you're going to get bleeding. What time is that?

THE CHAIRMAN: It's before 8 o'clock because the entry on

the middle column of 20.1 is the first entry in the handwriting of Nurse Mathewson, who didn't come on duty until 8 o'clock.

A. Right. So it's purely speculation on my part, but it's possible that that was either opening the wound up or trying to mobilise the blood vessels. It's impossible for us to say without any prima facie evidence.

MS ANYADIKE-DANES: I understand that. There's some evidence from Mr Keane that might help. I think it's 26 April and page 67. Yes, it is. If you go see at line 16, so he says:

"At 08.30 hours, we are nowhere near ready to do the final bit, so I took it out [that's the kidney] to size it so I would know when I had dissected these arteries or vessels where, within a space of 3 to 4 centimetres, I needed to release the tissues around the arteries to perform the function. What you are using there is your experience and vision of what's going to happen. Unfortunately, in Adam's case because of the fibrosis and adhesions of his previous surgery, this was going to take much longer than normal -- that part of the operation."

And then he says why he's doing it and then he says it would be ridiculous to do the procedure and find you couldn't actually place the kidney. So at line 8, he

says:

"When I have done that, I pop the kidney back into the ice and, if you like, then the real work of this up and down -- because of the technical difficulty of rupturing a vein or something, began."

And then he says:

"I can't -- after 8.30 ..."

Anyway, those two references I wonder if you might help with. Firstly, the fibrosis and adhesions of his previous surgery making things take rather longer and, secondly, the reference to the difficulty of rupturing a vein. Can you explain, technically, what he's talking about?

A. Yes, I did already refer to that in terms of the difficulty of the operation. Because of the previous surgery, there would be a lot of adhesions around the blood vessels.

Q. Is that --

A. And that's common and to be expected. It can exponentially increase the difficulty of the surgery.

Q. Can it cause more blood loss?

A. Oh yes, definitely.

Q. And at what time are you starting to sort of move your way through those adhesions, if I can put it that way?

A. Quite soon, within -- well, the opening the abdomen

process would normally take about 20 minutes and then you're straight on to mobilising the blood vessels, which can take anything from 20 minutes to an hour and 20 minutes, depending on the difficulty. So it can make it much more difficult to do the operation and I believe this is what the situation was here. We still haven't finalised the discussion about why you would look at the kidney beforehand, before you even start, and then why you may then do the procedure again in the middle of the operation.

So before you start the operation, you want to be sure that the kidney is a normal kidney and doesn't have any abnormalities such as a tumour on it or multiple cysts on it or is damaged in any significant way which would stop you from doing the operation.

Q. Yes.

A. So it's perfectly in order just to have a look at the kidney without doing very much to it, apart from removing a bit of fat, which is what he says he did.

Q. Yes.

A. Because just removing a bit of fat won't prepare it to be transplanted. It will just let you see the kidney to make sure that you think it's okay --

Q. Okay.

A. -- to use. So if he did do that, then that's not an

unreasonable thing to do. It's a good thing to do.

THE CHAIRMAN: And that fits in with your earlier description that you do all of that benching at the start and the advantage of doing it is because if you find some fatal problem, then you don't proceed with the transplant at all.

A. That's right. So I would go a bit further. I would do the rest of the bench surgery beforehand as well. It doesn't seem logical to have a look and then put it back and do the bench surgery. But it's not a major issue. He's done the safe thing, he's looked at it beforehand and done the bench surgery later, like I said, to make sure that you have enough of the child's arteries and veins mobilised so that you can put the transplant on to it. You have to see what you're dealing with to know where you're going to put it.

MS ANYADIKE-DANES: I think you had already given your evidence that you would have done all of yours beforehand. His evidence is that he would have done it in two parts. But you're not --

A. I have perfectly accepted that, yes.

Q. Just following on the blood loss point, you have given evidence as to the fact that those adhesions and so forth may not only have made it more complicated, but may have increased the amount of blood loss. In this

place over the page at page 68, when he talks about the technical difficulty of rupturing a vein or something, how does that arise? What's the context in which he's describing that?

A. I don't really know.

Q. Why would there be a technical difficulty of rupturing a vein?

A. By struggling to have space to put the kidney into. You have small child and quite a large kidney and if you're trying to do a bit of delicate stitching with very small blood vessels, it's easy to damage the vein because it's a very thin structure.

Q. Would that cause blood loss?

A. It's not uncommon to rupture -- I'm talking about the donor vein. So when you join the blood vessels together, it will leak blood. That would only be once you had completed the anastomosis. So this obviously wasn't the case at that time because he hadn't done the anastomosis by then, I don't think.

Q. So far, in the passage of the transplant, what could have happened in the early stage to cause blood loss would have been some issue to do with the adhesions?

A. Yes, and you could damage the artery or the vein trying to release those adhesions so that you had the blood vessels available. See, it's difficult for me to

explain to you and you are asking a lot of questions which I think, as much as I explain, it's very hard to understand unless you actually have seen one of these operations. I'm not being patronising, but to do the transplant you need a finite segment of artery and vein that you have actually mobilised so you can get clamps on, above and below, to stop any bleeding and you can make a hole in the artery and vein and then you can stitch on the blood vessel. So you have to have a reasonable length of artery and vein that you've actually dissected out.

Now, that process is normally fairly straightforward, but if there has been previous surgery it could become very difficult to do. I suspect it was in this case. So that's the most likely time when blood could be lost. It usually is when I'm doing the operation, anyway.

MS WOODS: Sir, just a small point while we're dealing with blood loss. In response to Mr Millar's interjection just a few moments ago when he was pointing out that not everyone agreed that the 67 represented a significant bleed, my learned friend said Mr Brown, who was the other surgeon there, did. Just so we're clear on Mr Brown's evidence, Mr Brown accepted that that would be a significant bleed if it was all at one moment. And

that's really the nub of the matter and certainly what Mr Rigg was talking about.

THE CHAIRMAN: That the swab might have been left in longer than the previous swabs and so on?

MS WOODS: Absolutely, and indeed Mr Brown also did say that whenever you can talking about those swabs, the weights that you're getting really, all it does is indicate swabs being weighed at a particular point in time.

MS ANYADIKE-DANES: Yes. The other factor, maybe, is the haemoglobin fell from 10.5 at 7 o'clock to 6.1 at about 9.30. In fact, Dr Taylor says it was that that he wanted to check with his blood gas analysis.

A. Mm-hm.

Q. What could, in your experience, cause a drop like that?

A. Two things. One is dilution, which there definitely was. One is bleeding. Most likely it was dilution or a combination of the two because if you just lose blood during an operation, your haematocrit doesn't change that much until it has been replaced. So it's probably a function of dilution rather than acute blood loss.

Q. Or a combination?

A. Or a combination of some blood loss and a lot of dilution.

Q. Yes.

A. But I think we have enough to explain that. I don't

know the -- I don't understand the line of questioning, but --

Q. The line of questioning --

A. We can explain it by a severe dilutional effect.

Q. He was administered five lots of HPPF --

A. Mm-hm.

Q. -- each of 200 ml. The first was at 8.15. Then the second was at 8.30. Why would that be being required at that early stage?

A. I don't know.

Q. What's it for?

A. To expand plasma volume.

Q. Why would you want to do that then?

A. Well, it's for the same reason you'd want to give one-and-a-half-litres of fifth normal saline, I suppose, to expand the circulating volume.

Q. Is the anaesthetist was going to do that, do you think that would be a discussion between the anaesthetist and the surgeon?

A. I would have thought so, yes. That's pure speculation, so I have no evidence for that at all. I don't know why it was given and I don't know whether there was a discussion.

Q. Just while we're on things that were being administered -- and you might be able to help --

Dr Taylor's evidence was a fairly low dose of dopamine was given at the start and then there were two small boluses of dopamine given at 10 am. In your experience, why would you be doing that?

A. Well, in my experience we always give infusion of dopamine. I don't ever give a bolus, so I don't know. I can't answer that.

Q. You have never given a bolus?

A. No, never. Always an infusion. We can increase the rate of the infusion or decrease it, but -- and it's not -- I'm not ... I'm not saying it's not acceptable to give a bolus of dopamine, but the reason ... So I don't know because I'm just speculating about it. But the reason to give a bolus of dopamine might have been because the blood pressure had gone down.

Q. What would cause that?

A. A variety of things, but bleeding would be one of them.

Q. Are you able to express a view as to how much blood loss there was from the documentation that you have seen?

A. I read the analyses about blood loss. I think the measured blood loss is probably -- or the estimated blood loss is probably an exaggeration of the amount of blood that actually was lost because I think Mr Keane says it was a mixture of urine, melted ice around the kidney and blood. Let's remember that Adam's bladder

was not drained for the first hour or two of the operation. It's not clear exactly when, but probably at least the first two-and-a-half hours. And it would have been gradually filling up and would have been quite distended. Then because there was no catheter to drain it -- and then once the anastomosis had been done, the bladder would have then been incised and urine of whatever volume would leak out around the wound and would be aspirated or collected in swabs and there could easily have been several hundred millilitres in that bladder.

Q. Do you have any experience of whether kidneys at this stage of vulnerability -- that's towards end-stage failure -- can actually shut down and not produce any urine at all during an operation?

A. I think they can.

Q. That's Dr Coulthard's evidence, who's --

A. I don't think it was his evidence. I think he thought that was a possibility. He didn't have any idea of how much urine was in the bladder at the time and neither do I. So we're both speculating. But we know that Adam was capable of passing 1,500 ml of urine at least a day. We know that he was given a lot of fluid and he may well have been able to produce more urine under that drive of more fluid and dopamine. I have seen end-stage kidneys

produce many litres of urine when normally they do not produce that. So I would disagree with Dr Coulthard about that. I think it's quite possible there were several hundred millilitres of urine in the bladder, but it's pure speculation.

Q. Understood.

A. So we're given a figure of 49 ml.

Q. Yes.

A. But that is likely to be totally erroneous because a lot of the urine will have leaked out into the abdomen, I'm quite certain about that. So whatever was drained after that, which is the 49 ml, is probably only a very small proportion of it. I see these operations day in and day out and I know that a lot of the urine, when you open the bladder, leaks out into the wound. So I'm sure that's what happened. The bladder was described as being distended. To get a bladder distended, a chap of Adam's size -- there could easily have been 100 or 200 ml in that bladder.

Q. I think the bladder may have been described as being large. I'm not sure it was described as being distended with urine at that time, just the thought was that he had a large bladder. I think that was Dr O'Connor's evidence.

A. I don't think we should get fixated on a figure of

49 ml.

Q. I didn't mention the figure myself.

A. But it's mentioned a lot, certainly by Dr Coulthard, in his discussion about how much urine was being produced. If this child did produce 1,500 ml at least a day, then -- you know, he was anaesthetised for quite a long proportion of that time. There's no indication that his kidneys would have shut down in that time. That's not a normal thing in an operation to do a transplant. It could happen, but it's not normal. Then he's likely to have produced maybe a third of that normal volume, a quarter of that daily volume in that period of time, so --

Q. How much do you think he might have produced an hour then?

A. Well, he could have produced -- I think they estimated he was producing 60 to 75 ml an hour, and if the operation was 3 or 4 hours he could easily have been four times 75, 200 to 300. That's what I believe was in the bladder. That's the likeliest thing that was in the bladder. But it is speculation, so all I'm saying is we're not sure exactly how much blood was lost.

Q. Yes. That's where we started. I was actually trying to see if you could help us with your view as to how much you thought was lost, but I think --

A. I hope I have helped you.
Q. You have helped us in the sense that you think it's actually quite difficult to measure because there's likely to have been any number of these other fluids involved.
A. That may be helpful to you.
Q. Yes. I wonder if we could deal with closing the wound. How important a process is that?
A. It's important because otherwise the bowels will fall out. So it is obviously an important process to do, just like opening up the patient. It's important to do any part of the operation in a skilful manner. But what you're really asking me is: is it important for the lead surgeon to close the abdominal wound? And the answer is: no, it isn't.
Q. No, I wasn't asking you that. I will ask you the question that I am asking you.
A. Okay.
Q. Which is: you have described earlier this afternoon about it being a large kidney going into a relatively small space. You have also said there are occasions when the perfusion isn't as good as it is previously and that, in those circumstances, you have previously lifted the kidney out to see if you could improve things.
A. Mm.

Q. And what I want to ask you is: is it possible, whenever a large kidney is put into a small child, to have, in some way, compressed or kinked any of the vessels so to have affected the blood supply?
A. Yes, it is. So what's important is -- and this is a real source of complications. So before closing up, you need to put the kidney in the position that it is going lie in --
Q. Mm-hm.
A. -- when you close up.
Q. Yes.
A. Because that will be a different position from the one that you've had the kidney in to stitch it in.
Q. Yes.
A. Because that'd be sticking up out of the wound. After you've finished, you have to place the kidney in the position you would like it to lie and then you have to close the abdominal wound. Just the closure of the abdominal wound can change the position of the kidney. It could compress the kidney and we've seen, as I say, in my statement -- we have introduced a system of scanning the kidney immediately after we've finished because a surgeon can see a healthy kidney, put it in a good position, stitch the abdominal wound up and then the scan ten minutes later, after the operation's

finished, will show no blood flow in that kidney. That's presumably because of a change of position.

Q. When did you introduce scans?

A. About five or six years ago. It wasn't in operation at this time.

Q. What would you have done, if indeed there was anything you could do, in 1995?

A. Nothing, because you finish the operation. You have no way of knowing, unless you decide to do a scan, whether the kidney is healthy or not. If it's producing large amounts of urine, then it's obviously okay, but if it's not, you would expect this kidney not to function immediately anyway for the reasons we've said. So you have no real way of knowing whether it has a blood supply or not unless you scan it. That's why we introduced the post-operative scanning.

Q. Does that mean you have to be all the more careful to ensure, so far as you can, that before you start the process of sewing up, that it's in its best position, the anastomosis is looking as healthy as you can get it?

A. Yes, but a surgeon who's just devoted hours and hours to an operation will do everything they can to make sure that the kidney's in the right position.

Q. So if --

THE CHAIRMAN: Sorry, there are two stages to this, aren't

there? The stage you described before lunch was what you said was the nightmare time is when the kidney looks good to start with and then is less good.

A. Yes.

THE CHAIRMAN: And you said you would not close if you are not happy with the perfusion, you'll re-open the vessels. That might turn out to be unnecessary, but if it turns out to be necessary, there's nothing lost. So we're past that stage.

A. Yes.

THE CHAIRMAN: You're content with perfusion.

A. Yes.

THE CHAIRMAN: It's at that stage then when the wound is being closed that it might go wrong because of the closure of the wound, on its own, might compress --

A. It might do, or --

THE CHAIRMAN: How soon would you know that?

A. How soon would you know that? You wouldn't really find out in time to save the kidney. I'm not bringing this up as a very frequent cause of problem. We looked at about a hundred of these that we did in children and adults, and we had to take two back to theatre because of poor scans and were able to rescue the kidney. So it's not like it's occurring very frequently, but it's frequently enough to justify or worry about it. Anyway,

that wasn't our practice in 1995.

THE CHAIRMAN: Okay.

A. We would have -- we didn't scan them afterwards and we did lose some kidneys because, by the time we realised the kidney wasn't functioning and did a scan, maybe 12 hours later, the kidney had no blood supply.

THE CHAIRMAN: Okay. To lose the kidney, you don't lose the patient?

A. No, exactly.

MS ANYADIKE-DANES: The fact that the act of closing may affect the position or compress vessels or something of that kind, is that something that you have learned with experience is an incidence of the transplant process?

A. I think most surgeons would say that that can happen.

Q. But if you have no experience whatsoever of transplants of any sort, is it something that you might not appreciate?

A. But I ... If you have no knowledge of transplants whatsoever, then it's an irrelevant --

Q. Well, it's not --

A. -- discussion in my view and I don't want to give an opinion about it. But we're not talking about anybody who would have no knowledge of transplants; we're talking about Mr Keane who had a lot of experience of transplants.

Q. Sorry, Mr Brown is the surgeon who closed and he had no knowledge of transplants. That's why I asked the question.

A. No, I think you're misunderstanding me. Mr Keane was there and saw the positioning of the kidney and was happy with the positioning of the kidney. Mr Brown was happy with the perfusion of the kidney and they both were and then Mr Brown closed the wound. That's perfectly okay in my view.

THE CHAIRMAN: Yes, and I understand that, and that's -- we've had that evidence from a number of witnesses, which is that that is okay. But if when closing the wound, that causes a compression of the kidney, that makes the closing of the wound a bit more sensitive and delicate than it might be in other cases.

A. I think it doesn't matter who does it. It's done in a very standard way and Mr Brown was an experienced paediatric surgeon who would have been very competent at closing a wound, I would have thought, rather than a trainee who'd never done it before. I'm sure Mr Brown had done a closure of wounds many, many times.

MS ANYADIKE-DANES: Sorry, it's not whether he was competent to close a wound, what I was trying to address with you is whether, if you hadn't been involved in closing a wound for any transplant surgery at all, let alone

a kidney where you have a large kidney in a small cavity, whether he might not have appreciated that this was a possibility and whether that is something that Mr Keane and Mr Brown could have discussed.

A. No, I don't think that's at all the case.

Q. Okay.

A. I think that the actual appearance of the kidney at the time just before closure and the positioning of it, if that's okay, if that looks okay, then I think it's perfectly reasonable for Mr Brown to have closed that wound.

Q. Then it's just a normal risk that could happen with anybody --

A. Yes.

Q. -- if that happens? So it doesn't matter whether you're an experienced transplant surgeon or not, that's just one of those things that can happen when you close?

A. Absolutely. As long as you know how to close a wound, it doesn't matter whether it's a transplant wound or any other wound.

MS WOODS: Just a small point. The question is being put whether he, being Mr Brown, might not have appreciated that, in closing the wound, compressing the kidney was a possibility. We actually do have evidence on this from Mr Brown and his evidence was that he said closing

the first layer is the critical one because if you're going to get pressure, you're going to get it from the first layer. So we have evidence that, in fact, he was very aware of that risk.

THE CHAIRMAN: Thank you.

MS ANYADIKE-DANES: Okay. I just would like to ask you now, having read all that you have read, what is your view as to how this surgery was carried out?

A. Well, given the reason that we're having this inquiry is hyponatraemic-related death, this clearly was a hyponatraemic-related death and it was not a death due to --

Q. Sorry, that's a different point.

A. -- surgical competence or not. The conduct of the whole operation relates to the teamwork, the whole team approach. So clearly, the operation was a disaster because the child died. A child died because of overinfusion of dilute fluid. He did not die because of the success or failure of the actual transplant operation.

Q. Right.

A. Even if the transplant operation had been done perfectly and the kidney had worked immediately, the outcome would likely have been the same because the problem was the early stage of the operation.

Q. Yes.
A. So it's important to bear that in mind. But as far as the operation was concerned, there were many aspects of it that would worry me.
Q. What are they?
A. Well, we've discussed virtually all of those in quite a forensic way. If I were to summarise them, it would start at the beginning by the failure to see the patient or the relative. It would start with the issue of the central line and a policy to deal with that, which would be likely to have been to restrict the amount of fluid rather than to give a large amount of fluid with a CVP that's already elevated, whether that's erroneous or not. The conduct of the transplant. I would have done it a different way. I would have gone to a more major blood vessel and I would have used a catheter in situ at the beginning and possibly monitored the urine output because of the problem with the CVP. I probably would have asked the assistant to close the wound with me in the operating theatre writing the operation notes at the time, including the anastomosis time, carefully transcribed, but I'd be quite happy to let one of my colleagues close the wound and we would have done a scan afterwards. And given the terrible circumstances of this case, the like of which I have never seen before,

during a transplant operation --

Q. Sorry, what do you mean by that?

A. What I mean by that is a hyponatraemic death due to cerebral oedema. I have never seen a case like that occur so rapidly in the operating room and immediately afterwards. Given that horrendous outcome, I would have made it my business to talk to the family.

Q. And over and above talking to the family, would you have wanted to have any discussion, debriefing, review as to how this actually happened?

A. Absolutely.

Q. When I think back over your CV, you were clinical director at some stage, so you may have some experience of how you conduct those.

A. Now I am.

Q. What would you have done in relation to --

A. You don't need to be a clinical director to do that. I mean, this is such a terribly adverse outcome that it should immediately have triggered a review of this particular case and a plan for future management of these children. This should have come -- I don't know, it may well have done -- internally and would have been a multidisciplinary meeting. So that would have been to inform the family about what went wrong and to inform them what we've learned from it and what steps. This is

taking place now, but it's 15 years later.

Q. Yes. Could you go back to 1995? Because in 1995, it might have been a different environment for how those things would have been done. Given that this did happen in 1995, what would you have expected by way of review and investigation into what had happened and how it had happened?

A. Given that the death happened, you mean?

Q. Yes.

A. So I would have stopped the transplant programme instantaneously and I would have had an urgent review with an external person reviewing it because, like I say, in 20 or 30 years of clinical practice, this is such an unusual event. It would have had to be sorted out before you could safely plan another transplant. That's what I would have done. And the very least you would need to have done would have been to carry out a rigorous review of the actual operation, how it was conducted and find a cause of death. I think it would have been fairly straightforward to do that because there's clinical evidence and pathological evidence of brain swelling and brain death. There was a link, a clear link to the volume of hypotonic solution used in the operation and I think that practice could have been changed straightaway or very quickly.

I think the wider issue that you've been addressing over the last few hours -- and is well worth addressing -- is the constitution of the team to take the transplant programme forward in small children. So I think that would have triggered a review of how that is handled. I don't know. All these things may have taken place, so far as I know, but that's what I would have done.

THE CHAIRMAN: The problem is they didn't or many of them didn't. In particular, Mr Keane, who at that time, I think you know, worked for a different trust which was a short distance away in different premises.

A. Yes.

THE CHAIRMAN: In essence, his position was he expected there to be an urgent review, but that he went back to his hospital and, in terms, waited for the phone to ring and it never did. Now, if the phone doesn't ring from the Royal to the City asking Mr Keane, it's not beyond him to lift the phone. Sure it isn't.

A. I agree with you. That's disappointing. Could I just tell you about one case? The only other case where I've seen anything like this was a case we did at Great Ormond Street. I won't give great details, I'll be very quick. This was a 10 year-old child. I did the transplant. It was a living donor transplant from his

mum. Everything went fine, the operation was fine. The kidney was working, the child woke up afterwards, was passing very large volumes of urine in the order of 500 to 900 ml an hour and had fluid replacement with half normal saline, which was the recommended fluid for replacement -- not fifth normal, half normal, which is the right stuff.

He developed brain swelling and died about 1 o'clock in the morning, so about six hours after the end of the operation. Having regained consciousness, he then lost consciousness because of hyponatraemia because of the rapidity of the change. He was losing a lot of sodium and we weren't giving him enough sodium even though that was our protocol. So that's the only other case that I've seen that's remotely like this.

MS ANYADIKE-DANES: Tell me if you can't say because it might identify the child, but can you tell us what year that happened?

A. It was about 2005, something like that.

THE CHAIRMAN: I think you said five or six years ago.

A. Yes, about five or six years ago. The reason I'm bringing that up is because what we did immediately is to have a review of what happened. We got an external specialist to come and look at what we did and we made changes in the protocol based on that. We've never seen

a case since, but it made me review the literature and I discovered that hyponatraemia was quite a common problem in many areas of -- as you probably know from this inquiry, chairman, there are other cases that are not related to transplantation. So this isn't really about transplantation, this is about hyponatraemia and how easy it is to induce that in a child, even a child with normal kidney function. It's amazingly common.

MS ANYADIKE-DANES: Can I ask you: just on that point, I think what you had been struck by was the speed with which it happened --

A. Yes.

Q. We're not entirely sure what Adam's serum sodium level was when he went in, but it had been 139 at about 9.30 the previous evening. I think it was about 133 at about 11 pm, so nobody's entirely sure, but whatever it was, given all his other vital signs, it doesn't seem from the evidence it would have been too far out of normal range. Yet by the time you get to 9.30 am, it's 123 and even if that isn't entirely accurate, roughly, by the time you get to his blood at 11.30 am, it's 119 from the laboratory tests.

A. Yes.

Q. So my understanding of what you're saying is that the speed with which all that happened did surprise you.

And what I want to ask you is: if that had happened in your unit and that rapidity of development of acute cerebral oedema had occurred, to what extent would you have wanted to consider the issue of hyponatraemia generally or simply looked at it in terms solely of a surgical problem, if I can put it that way?

A. Well, if it was in the context of a transplant operation, then we would really need to look at the protocols and how we managed the intraoperative fluid balance in the child because most of the protocols, including ours, don't lay down clearly what is given during the operation. That's flexible.

Q. Mm-hm.

A. So I would have said, "We need to carefully look at that and make strong recommendations for a protocol that governs what fluids are allowed to be given during the operation and what are absolutely forbidden". So fifth normal saline would be totally forbidden. And it is now and everybody's -- a great majority of people around the world are aware of the dangers of giving dilute solutions to patients.

Q. In fairness to Professor Savage, it did actually cause him to revise his protocol and he and the newly appointed consultant paediatric nephrologist, Dr O'Connor, actually revised the protocol and as far as

it appears from their evidence, to all intents and purposes ceased using the original protocol, although they didn't publish the revised version until 1996. And you'd have seen both those protocols.

A. Yes.

Q. But I think what you're suggesting is that that was a good thing, but it didn't address what you, as a surgeon, would have been concerned with, which is sufficiently [sic] the perioperative fluids, if I can put it that way?

A. Mm.

Q. Is that --

A. Yes. Because I don't think the protocol did govern that intraoperative management.

Q. Can I ask you something else that Professor Gross, who's another expert for the inquiry, had said? He wondered whether, had the kidney transplant been successful -- it would appear at some point, I'm not entirely sure when, that Professor Berry and Professor Risdon feel that the kidney failed and they have that quite close to the end of the operation. Professor Gross postulated that if that hadn't happened and it was working and if it was capable of and, indeed, doing so, producing urine, to what extent that coupled with the other steps that were being taken to effectively encourage the

production of urine -- whether that would have been a factor. Do you have any views on that?

A. It's interesting to speculate as to whether, if the kidney had worked immediately, if it would have been in time to offload all the fluid that he had. But I suspect not.

THE CHAIRMAN: There was an awful lot to offload, wasn't there?

A. I suspect not for two reasons. It was too late, the damage had already been done to the brain and it was swelling. Secondly, because the kidney will lose quite a lot of sodium as well, so it may not help the situation. It may actually have made it worse because it's difficult to say exactly how much sodium would have been lost in the newly functioning kidney because they don't function normally, as Dr Coulthard's pointed out many times.

MS ANYADIKE-DANES: Yes. Mr Chairman, we're approaching 3.15. I have virtually finished, but I do have some questions that were given to me by others and I wondered if I might take a few minutes to recap that and then see to what extent --

THE CHAIRMAN: Okay. We'll break in one moment. I need to ask you one other thing, Mr Koffman. Trying the best you can to put yourself back to 1995, one of the

concerns that I have is about Dr Taylor. Let's assume for a moment that Dr Taylor is a perfectly good anaesthetist who had a terrible day. Okay? We know that there was an inquest in 1996, the finding of which he rejected. How comfortable would you be continuing to operate with Dr Taylor, who seemed unwilling or unable to recognise what he'd done wrong? Because we know from the evidence that he did continue to work and, in fact, he did more paediatric renal transplants. Do you have any observation on that?

A. Well, I just wonder what fluid regime he would have used in subsequent transplants, because --

THE CHAIRMAN: I should say, in fairness to him, there's no evidence that anything went wrong in subsequent transplants. But what do you do if you have an anaesthetist, whose input is clearly central, who doesn't or won't recognise what he did wrong?

A. Well, there's -- I mean, you said he wouldn't accept the coroner's verdict; is that right?

THE CHAIRMAN: Yes.

A. The coroner's verdict obviously has to be taken enormously seriously and it has to be addressed and there has to be a medical inquiry into that. I'm not sure exactly who gave testimony to the coroner's inquiry, but if there was a lot of medical input into

that -- presumably there was to make that diagnosis -- then that's a diagnosis one would have to accept and it's the right diagnosis in retrospect as well. So the corollary of that would be that the anaesthetist would have to accept that and learn from it before he would be allowed to practice in my view. I would not support his continuing to do transplants without accepting that verdict and without saying, "I realise that the use of large volumes of dilute fluid is not the right way to approach transplants", and, "We'll agree a better protocol".

THE CHAIRMAN: You see, the evidence given by Dr Haynes was this might work at three levels. One is that somebody, perhaps a clinical director, needed to speak to him informally and immediately --

A. Yes.

THE CHAIRMAN: -- to explore what went wrong. But if he didn't accept what went wrong, that informal discussion would need to be formalised --

A. Yes.

THE CHAIRMAN: -- through the hospital hierarchy.

A. Absolutely.

THE CHAIRMAN: His third level was that, ultimately, if there was still a refusal to recognise what went wrong, that should lead to the hospital referring him to the

GMC. The objection to that from Mr Fortune on behalf of Professor Savage was that that was not the culture in 1995 for doctors to report each other or for employers not to report consultants to the GMC.

MR FORTUNE: I made a distinction between doctors and, in fact, the medical director representing the hospital. There is a difference and, in our submission, there was a difference then. It's more common these days for doctors to report other doctors.

THE CHAIRMAN: Well, sorry, that's helpful because that means you're not suggesting that there wasn't a culture for the trust to report a doctor to the GMC?

MR FORTUNE: That did happen, but not individual doctors.

THE CHAIRMAN: We know in this case, therefore, that there was no culture at the time. Sorry, based on what you are saying, there was no culture at the time that prevented the Royal from reporting Dr Taylor.

MR FORTUNE: No.

A. I think it's fairly simple. If the coroner's verdict was that this was an avoidable hyponatraemic death, it has to be accepted by the team. If you don't accept that, you cannot be part of that team. So I would immediately say he could no do transplant work. But the problem with hyponatraemic illness is that it could relate to any operation; it's not just specific to

transplantation. So that is why there is a wider connotation. That is why a clinician not accepting a coroner's verdict would not be acceptable.

THE CHAIRMAN: In fact, we know from this inquiry, it doesn't need surgery at all.

A. Exactly. It can just be a medical illness that needs fluid replacement. Absolutely. Many of them are with tonsillitis and diarrhoea and so on.

THE CHAIRMAN: I want to pause there for a few minutes. The system is that questions are put to Ms Anyadike-Danes to see if they can all be put through her. We will take a break for ten or 15 minutes and hopefully your evidence will be complete very soon after that. Thank you.

MS ANYADIKE-DANES: Just one quick question before you rise, Mr Chairman: you said the coroner presumably had medical expertise. He did; he had Ted Sumner as the consultant paediatric anaesthetist who was advising him on those issues.

A. Yes, sure.

THE CHAIRMAN: That just adds weight to the coroner's verdict.

A. So it was a very sound verdict, absolutely correct, and one which should have been acted upon.

MS ANYADIKE-DANES: Thank you very much.

(3.16 pm)

(A short break)

(3.31 pm)

MS ANYADIKE-DANES: There aren't any questions, but I have just been asked to, if you like, make this point, which is that there have been observations or statements in relation to what Dr Taylor did and didn't accept. There are others who, I think, may be feeling that perhaps there is an implication that maybe they knew or they didn't know what Dr Taylor's position was.

I think they would refer for those matters to be dealt with during governance and I think that's probably, properly, where we are going to deal with them. So the extent to which the other clinicians involved did or didn't know or should or should have known what Dr Taylor's position was in relation to the verdict and what they should or could or have done about that, that's a matter Mr Chairman, which I know that you will appreciate we're going to explore during the governance hearing. I think they just wanted to feel that because they weren't standing up and making that observation, it didn't mean that it wasn't a live issue to be explored later on.

THE CHAIRMAN: Yes. But we have evidence from Professor Savage and Mr Keane on what they knew about him not accepting the verdict.

MS ANYADIKE-DANES: Well, I think what they're wanting -- well, we can have it now if you like, but I'm not sure anybody thought this particular witness could assist with their position and I think it was felt a fuller exploration of that whole issue would occur during the governance issue.

THE CHAIRMAN: Sorry? We are going to come back to it in the governance hearing, but this witness was being asked about the various concerns which he had.

MS ANYADIKE-DANES: Of course, yes.

THE CHAIRMAN: And he then said: given the horrendous outcome, I would have made it my business to talk to the family and I would want a debrief to work out what went wrong and so on.

MS ANYADIKE-DANES: I don't think there's any difficulty about that, Mr Chairman. I, for one, am very happy to have Mr Koffman's evidence about that and I rather hope he would give it with the benefit of his experience. That's not the issue. The issue is, if one goes on and considers whether any other clinician should or should not have done anything in relation to Dr Taylor's position, I think it's hoped that we will address those matters in greater detail -- which we will -- in the governance hearings.

THE CHAIRMAN: Yes. Okay. Does that bring an end to

Mr Koffman's evidence?

MS ANYADIKE-DANES: It does.

THE CHAIRMAN: You are free to leave, Mr Koffman.

(The witness withdrew)

Ladies and gentlemen, unless there's anything that needs to be raised now, we will adjourn until 10 o'clock tomorrow morning. We have Dr Campbell by video link and Mr Peter Shaw. That's tomorrow's evidence. Thank you.

(3.35 pm)

(The hearing adjourned until 10.00 am the following day)

I N D E X