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Summary of interview with LUCY LETBY re [Baby O]

Wednesday, 15 March 2023

(10.30 am)

(In the presence of the jury)

MR JUSTICE GOSS: Yes, Mr Driver.

[Dr A] (recalled)

Examination-in-chief by MR DRIVER

MR DRIVER: [Dr A], could I invite you to state your full name for the recording, please?

DR A: It's [Dr A].

DRIVER: [Dr A], as I'm sure you appreciate, you're still bound by the oath or affirmation you took when you first gave evidence and you are here today to provide evidence in relation to the baby [Baby O].

For your information, because the timetable, as you appreciate has been a little disrupted, the jury have already heard a statement read from your former colleague [Dr D]. Dr Cooke has already given evidence and yesterday both Drs [Dr B] and Brearey gave evidence. So although your statement deals with a lot of [Baby O]'s clinical history as dealt with by some of those doctors, that evidence is already before the jury.

So if I may, I'll move immediately to your first dealings with the baby and invite Mr Murphy to put up tile 165 and click on to the original document, please, which records how at 12.10 on 23 June -- if we could scroll down to the middle of the page, please -- you, together with your colleague, [Dr B], reviewed a cranial ultrasound that had been undertaken on baby [Baby O], I think the previous day. Do you recognise your note?

DR A: Yes, I do.

DRIVER: What was the consequence of that review?

DR A: The images that were captured as part of the ultrasound are printed off. We'd looked at those, there's a set pattern of images that is taken, and [Baby O]'s cranial ultrasound was normal. What we were looking for particularly was any evidence of haemorrhage or any evidence of dilatation of the ventricles which would be abnormal.

DRIVER: So there are set markers that you seek out but they were absent --

DR A: That's right.

DRIVER: -- in this case? Thank you.

So that's 12.10 on the 23rd. I'm going to move now to 13.15 hours on that same date. Mr Murphy, if you could please take us to tile 168 and click on the middle page for now.

It would seem that at that point you were asked to see [Baby O]. Does that accord with your recollection?

DR A: Yes, it does.

DRIVER: Can you remember who and how you were asked to see [Baby O]?

DR A: No, I don't, I'm afraid.

DRIVER: Do you recall why you were asked to see [Baby O]?

DR A: There were concerns that his abdomen was distended and that he'd vomited. The reason for being asked to see him would be that that vomiting was unusual.

DRIVER: If we could go back, please, to tile 167 so we can provide some context to this vomiting.

We're now going to look at the neonatal unit fluid balance chart, paper copies of which the jury have.

We are not going to dwell on it very long so we'll just use the screen for now.

Your note informs us, and we'll look at your note in detail in a moment, that your invitation to see [Baby O] was taken up at about 13.15 hours. So if we look at the feeding regime that preceded that, we can see that at 10.00 and 12.00 hours he, [Baby O], was provided with donor-expressed breast milk that was given to him via a nasogastric tube and we can see the quantities and the running aggregate amount.

If we look down at the bottom of the page, we can see the initials of the nurse who has recorded those feeding events.

MR JUSTICE GOSS: Sorry to interrupt you, Mr Driver.

There's a very annoying clicking sound coming from somewhere.

MR DRIVER: I think it might be me leaning against this screen.

MR JUSTICE GOSS: No, it's not, it's coming from over here.

(Pause)

You can't hear it? It's just me, is it? It's very distracting for me, I'm afraid.

(Pause)

Anyway, the clerk has very helpfully solved the problem. Sorry, it was just distracting me.

MR DRIVER: Not at all.

MR JUSTICE GOSS: It's resolved.

MR DRIVER: Thank you.

So [Dr A], we can see the record of [Baby O]'s feeds at 10 am and noon that day. Before we look at your note in detail, if we could go then, please, to tile 169, Mr Murphy, and if we look at the corresponding nursing note. If we look at the original document, please.

If we look to the upper left, please, we can see a reference to you, [Dr A], reviewing the patient at 13.15 hours, it having been reported to you, and does this accord with your memory, that [Baby O] had vomited undigested milk?

DR A: Yes.

DRIVER: That is an entry made by Nurse Letby. Having looked at the fluid balance chart, having looked at that nursing note, does that serve to prompt your recollection as to who it was that asked you to review [Baby O] this afternoon?

DR A: Yes.

DRIVER: Thank you. So next, if we go to your original clinical note then, which is at tile 168. That's your handwriting, I anticipate, towards the bottom of the page?

DR A: Yes, it is.

DRIVER: The opening line is self-explanatory. You were asked to see the patient re vomiting and does that say "abdominal distension"?

DR A: It does.

DRIVER: You thereafter, as was your practice -- do you set out the relevant history?

DR A: It's a summary of the events because I hadn't seen [Baby O] earlier than that day.

DRIVER: Thank you. Did you appraise yourself of the feeding regime?

DR A: Yes.

DRIVER: We can see that data and then we get to the line that begins "trace aspirate". Could you help us with the rest of that line?

DR A: Certainly. So it's a trace of aspirates recorded from the NG tube, but they were -- I've put there "no bile".

So this was milk or undigested milk but without any green colouring that would suggest that fluid had passed back up from the next part of the digestive tract.

DRIVER: Thank you. What does the use of the word "trace" in this context inform us of?

DR A: That it's not a significant volume. So when a syringe is attached to the NG tube and a volume of -- or are pulled back on that syringe, a trace of aspirates is pulled back into the syringe rather than a large volume of sitting milk.

DRIVER: Thank you. The next line, is this a continuation of your note of things as reported to you?

DR A: Yes.

DRIVER: And what was reported to you?

DR A: One vomit post-feed, so there's no indication of the time since the feed there, but that will have been as it was told to me when I went to see him.

DRIVER: Thank you. In this context the use of "vomit", is that of any significance?

DR A: It suggests that [Baby O] has expelled the milk rather than it just sort of trickling out of his mouth as a normal posset.

DRIVER: So something more significant than reflux, for example?

DR A: Yes.

DRIVER: Is this in itself an unusual or exceptional event in a baby on day 3 of life?

DR A: It could be, but it can also be normal. That's why I was asked to see him.

DRIVER: Thank you. Let's just complete the report as received by you.

DR A: So no blood PO or PR. So none has come up through the digestive tract, either through the NG tube or in the vomit and he had passed no blood per rectum into his nappy. There's a small meconium plug at the anus. So [Baby O]'s now 3 days old and the meconium, which is a sort of hard tarry stool which is usually passed fairly quickly after birth, will have been slightly delayed in [Baby O] because he wasn't fed, he was put on IV fluids initially. The fact that he's passed meconium tells me that his digestive tract is open and working.

DRIVER: And his gut is moving?

DR A: Yes.

DRIVER: If we could continue, please, to consider the rest of the note or is that the extent of it behind this tile, Mr Murphy?

DR A: The last bit of the previous page was the initial observations.

MR JUSTICE GOSS: "On examination", I think. You just passed over the first part.

MR DRIVER: I did and I was in error to do so.

So "on examination". So now we've moved from report received to observations made?

DR A: That's right.

DRIVER: Thank you. And they were?

DR A: His heart rate is elevated, it's 160 to 170 beats a minute. I would expect [Baby O] to be 150 or just below. His oxygen saturation, I'm assuming in room air at this point, is normal at 100%. His femoral pulses are palpable on both sides of his groin, suggesting that his cardiac output is normal and his respiratory rate is 40 breaths per minute, which may be slightly elevated but not unusual. His temperature is normal for a baby in an incubator.

DRIVER: Sorry, Mr Murphy, stay where we were. Let's deal with those features in turn. So cardiologically, what was your assessment?

DR A: His heart rate is elevated and I don't yet know why.

This could be because he's just had a vomit. It could be because he's sore, with some sort of acid reflux following that vomit. It could be the herald of an infection starting. There could be another cause.

That's why I'm there to examine him.

DRIVER: What was your overview of the respiratory position at the time?

DR A: His respiratory rate is slightly elevated. I would have expected him to be at about 30 breaths per minute just now. Again, this is shortly after a vomit and this could just be him settling back down.

DRIVER: The capillary refill time?

DR A: Less than 2 seconds. As pressure is placed on the skin, it refills normally and it suggests that his blood pressure and fluid status is normal.

DRIVER: Thank you. So considering all of those observations globally, at this stage was there anything in particular to provide you with concern?

DR A: Based on those observations there, I would like to know why he's got a fast heart rate. I would like to know why that respiratory rate is elevated. But I think I lead on to that on the next page.

DRIVER: Indeed. Let's progress through the note then. Did you then examine his abdomen?

DR A: I did.

DRIVER: What did you find?

DR A: It was distended, as I was asked to see him, that was one of the reasons. His umbilicus is normal, there's no flare or erythema at the umbilicus. Redness around the umbilical cord or the stump or... a little bit like a gas flame. If you were to see something that looked like a flame-shaped discolouration around the umbilicus that would suggest that there's infection at that point.

DRIVER: So that's something that you particularly look out for.

And in that regard what did you find?

DR A: It was normal. He had no hernias on either his femoral sites or at his umbilicus, and his bowel sounds were normal. His liver, kidneys and spleen were not unusual in their palpation, they felt normal.

DRIVER: So as part of this abdominal examination, you palpated, you pressed around those vital organs, you tried to seek out enlargements?

DR A: Yes.

DRIVER: But there was none?

DR A: That's right.

DRIVER: Next, I believe you've given your shorthand overall impression.

DR A: One of the things with abdominal distension and vomiting, especially in a young baby, would be whether this represented the early signs of necrotising enterocolitis, so an infection, inflammation of the gut.

There is a staging system for it and observation of [Baby O] and the physical parameters that are measured on his examination suggested that that was unlikely. He didn't quite reach the first stage of the Bell score.

My impression is this was most likely distension, secondary to passing a meconium plug, and he'd had one so far, there may be a little bit more to pass.

DRIVER: Let's take those in stages. The Bell score, is that a set of established parameters against which --

DR A: Yes, it is.

DRIVER: -- you measure a baby's presentation to seek or to enable you to arrive at a preliminary diagnosis for NEC?

DR A: Which would then start you on a treatment course, yes.

DRIVER: His symptoms didn't take him very far up that chart?

DR A: No. They were suggestive of it, but not yet at a point that you would act upon it.

DRIVER: Thank you. Why is it that the passing of a meconium plug might cause abdominal distension?

DR A: So in order to pass any stool that's sort of solid or firm, extra effort and extra pressure is required and he may have been taking large breaths in order to then splint his diaphragm so that he can get extra pressure to push that stool out. He may well have swallowed some of that air.

DRIVER: Is that any more complicated than straining?

DR A: Not really.

DRIVER: Whilst we're with his abdomen, at that point did [Baby O] have a UVC central line fitted; can you recall?

DR A: No, he didn't have one at that point.

DRIVER: So having reviewed him in this regard, what were your conclusions and what actions did you deem it necessary to take?

DR A: I'd been asked to see him so there was obviously some level of concern about how he was looking at that point.

So my plan was to do a blood gas now and then there are some criteria set out below that if he has temperature instability, if he has apnoeas, pauses in his breathing, or episodes of

bradycardia, blood in his aspirates or passing it per rectum, then it would be time for an abdominal X-ray.

DRIVER: So first instance, take a blood gas. Secondly, conditional upon other indications of problems, X-ray?

DR A: That's right.

DRIVER: So the blood gas was taken, we can see, because there you have listed, I assume, the results of that blood gas test.

DR A: That's right.

DRIVER: Taking them in the stages. The pH value?

DR A: It's lower than expected. I was expecting that to be above 7.25. Carbon dioxide is again -- it's on the higher side of normal. Again, I wasn't expecting that, especially with a respiratory rate of 40 breaths a minute. I would have expected him to be blowing off that carbon dioxide with that increased respiratory rate.

DRIVER: Taking those two readings together, what did they inform you of or concern you about?

DR A: [Baby O]'s blood is more acidic than I was expecting and the combination of factors below lead to that and it's now a case of working out why that is the case.

Bicarbonate is the next line. That's okay, it's on the lower side of normal but it is okay. His base excess, which is the measure of how much he's compensating, is greater than I expected. It's normally between minus 2 and plus 2.

His glucose is normal but his lactate is elevated.

The lactate is suggestive of a metabolic component to that gas. I would normally expect the lactate to be no greater than 2.

DRIVER: So looking at it, the gas results globally, where did they lead you?

DR A: The elevated lactate and the raised base excess suggest that there is a degree of underfilling, so [Baby O] now has a 10ml per kilogram bolus of normal saline and will then be started on IV fluids. And based on that gas, rather than waiting for the criteria set out above, now is the time for that abdominal X-ray.

DRIVER: Was there at this stage, prior to an abdominal X-ray, an identifiable cause for these imperfect gas results?

DR A: No.

DRIVER: What was your working case management thesis at this point?

DR A: So at this point [Baby O] has a metabolic acidosis.

In the short-term I can remedy that with a fluid bolus.

I don't know what's precipitated that. So it's time to do a little bit more. And I think we come to that next.

DRIVER: Yes. I think we'll see that at tiles 191 and 192. If we click on 192, please, Mr Murphy.

Does this tend to show that antibiotics were provided?

DR A: That's right.

DRIVER: Would that have been, in [Baby O]'s case, a second line of antibiotics?

DR A: They are because he was started on antibiotics -- previously on antibiotics because of his prematurity.

DRIVER: And that first line of antibiotics, because of prematurity, is that just a standard conservative management approach of preterm babies?

DR A: There will have been a reason for starting them and that may have been, in not [Baby O] but in either of his siblings, but because they had all shared a common blood supply prior to delivery, if one is started on antibiotics shortly after birth then the other two receive the same treatment and screening.

DRIVER: Thank you. Forgive me if it's an invitation for you to state the obvious, but what would be the purpose of introducing second-line antibiotics to [Baby O] at this point?

DR A: Metabolic acidosis with some queries about abdominal distension. My concern is that this is an early infection, be that necrotising enterocolitis or something else that's not declared itself yet. So start these antibiotics and then go looking for the cause.

DRIVER: Thank you.

MR JUSTICE GOSS: "Clinical indication: sepsis [query] cause" we can see there.

DR A: Yes.

MR JUSTICE GOSS: So you're just being cautious?

DR A: Absolutely. It's preferable to start the antibiotics early and then stop them rather than not start them early enough and regret it.

MR DRIVER: So that was your examination and response at around 13.15 hours on 23 June. At that stage did you feel the need to move [Baby O] from where he was currently being housed or did he remain where he was or can't you recall?

DR A: I know that he moves from nursery 2 to nursery 1 at some point. I don't recall whether it was after this event or after something else.

DRIVER: I think we may reach it in due course. Let's move forward in time then to 14.40 hours and, on our presentation, tile 199.

Click on the middle tile for the moment. We can see that our summary of your note indicates that you were called to see [Baby O] at around 14.40 hours.

DR A: Yes.

DRIVER: Of course we'll look at your clinical note in a moment, [Dr A]. Before doing so, do you have any actual memory of the circumstances that took you to [Baby O]'s side at this point in the afternoon?

DR A: I don't remember being called, but I do remember walking with the incubator from nursery 2 to nursery 1. I think I was controlling his airway at that point.

DRIVER: So you recall a feature of attending upon him?

DR A: Yes.

DRIVER: But you don't recall precisely why?

DR A: No.

DRIVER: Or how?

DR A: No.

DRIVER: Let's look at your note behind this tile then, please.

This is a long note. It goes over more than one page, which has entries, if we look to the left column for the moment, that are recorded as per rather precise times over the next hour or more.

My Lord, we could leap tile to tile, but it probably makes better sense to stay with the page and as and when I will make reference to the corresponding tiles if anybody cares to note it.

MR JUSTICE GOSS: I think that will be more helpful, so we've got a narrative, and if you would make the references as well so people can note them if they choose to.

MR DRIVER: Certainly.

So you were called to see [Baby O]. How was he upon your arrival?

DR A: I was called to see him at approximately 14.40 because of desaturation and low heart rate and a mottled appearance. He was bagged up, he was in the Neopuff circuit, and transferred from nursery 2 to nursery 1 but he required continual breathing support on that moving.

That was the bit that I recall. He required 100% oxygen to maintain normal saturations at that point. His heart rate was between 80 and 90 beats per minute and I would have expected that to be usually greater than 130, 130 to 150. That's in contrast to his high heart rate an hour and a half beforehand.

Using that Neopuff circuit in 100% oxygen we were maintaining saturations of only 50% to 60%. The oxygen was increased to 100% with an increased pressure or an increased inflation pressure on the Neopuff circuit and I would say a slightly increased expiratory pressure on the Neopuff circuit. Cefotaxime had been given and the 10ml/kilo bolus of normal saline been given and a further 10ml/kilo bolus was decided upon there. That takes us as far as 15.03.

DRIVER: It does. So let's pause there and review that entry and the events that you have recorded. Do you recall who was present with [Baby O] when you attended upon him or not?

DR A: I recall there was a student nurse and Nurse Letby.

DRIVER: Were they in the nursery with [Baby O] or elsewhere?

DR A: In nursery 2, I recall. That bit is a little bit fuzzy.

Certainly I remember moving from nursery 2 to nursery 1, but the bit just into nursery 2 is a little vague, I'm afraid.

DRIVER: Thank you. Could I ask you just to keep your voice up.
You're quite softly spoken.

MR JUSTICE GOSS: Don't rely on the microphone. Natural voice.

DR A: Thank you.

MR DRIVER: Thank you.

Why is it that you deemed it necessary for [Baby O] to be transferred from one nursery to another at this juncture?

DR A: So [Baby O]'s needing 100% oxygen, he's needing active support with his breathing, and he's got a low heart rate that's not normal for a three-day-old baby. He needs more intervention and it's likely that he's going to need intubating and mechanical ventilation. That needs to be in an intensive care setting.

DRIVER: Thank you. Did you at this point, at around 14.40, obtain a measure of the level of desaturation and the extent of bradycardia?

DR A: Only the line there that says: "Heart rate 80 to 90, sats 50 to 60."

DRIVER: And on the great scale of things, how significant a fall in heart rate and a reduction in desaturation are those?

DR A: Left without intervention, this is a peri-arrest event.

DRIVER: Would you define peri-arrest?

DR A: This will lead to a cardiac arrest, a stop in circulation.

DRIVER: As to the mottling or mottled, as recorded in your note, are you able to expand upon that?

DR A: No. It's unusual compared to the previous time that I'd seen him. So previously he'd had abdominal distension but no mottling, and at this point, an hour and a half later on, his skin looked unusual. With that low heart rate and low oxygen saturation, that may well be a cause for the mottling because he will be trying to conserve oxygen for essential organs.

DRIVER: So he being in a state of peri-arrest, no doubt your response was an urgent one?

DR A: Yes.

DRIVER: And I know you've taken us through the data but could you tell us in terms what that response was at this point?

DR A: I will have been at the head end of the incubator, the perspex lid will have been taken off the incubator, and I will be supporting his airway. So I'll be using my left hand to put his neck in the right position, I'll be doing a little bit of jaw thrust with a second finger just to bring his jaw up and pull his tongue forward, and in my right hand I'll have the Neopuff circuit which I'm stabilising with my left thumb and forefinger and I will be actively squeezing the bag, delivering 100% oxygen.

DRIVER: Was this being done as he was wheeled from one nursery to another?

DR A: Yes, the oxygen cylinder on the incubator will have been connected until we can get him to nursery 1 and use wall oxygen again.

DRIVER: Does that effectively take us to your note timed at 15.03?

DR A: Yes.

DRIVER: Which, if anybody cares to make a note of, which event features behind our tile 205, but we'll stay with this page. So the entry at 15.03, which records the intubation, are these events that took place now in nursery 1?

DR A: Yes.

DRIVER: So did it begin by the provision of pre-intubation medication?

DR A: Yes. So morphine, atropine and suxamethonium, as was the scheduled intubation drugs in the neonatal unit.

DRIVER: Were they designed to provide comfort to the baby?

DR A: Sedation and muscle paralysis so that the tube can be inserted, again without resistance from [Baby O] and with a degree of comfort and sedation.

DRIVER: Your note suggests that you were successful at the first attempt.

DR A: Yes.

DRIVER: Can you tell us about the size of the tube and the position of the tube, please?

DR A: It's a 3.0 diameter Portex ET tube. Portex is the brand. It's secured at 7.5 centimetres, measured at the lips. The tubes have centimetre/half-centimetre indicators on the side and the tube clamp will have been locked at 7.5 centimetres and then the ties from a ventilator hat will have then been secured to the clamp.

DRIVER: Were you satisfied as to the appropriateness of the tube size for the baby?

DR A: The tube's appropriate for a baby of that age and weight. There will always have been alternative size tubes prepared, ready just in case his anatomy was unusual, but a 3 is perfectly sufficient. Once that tube was in, I suspect prior to it being secured, the capnograph was put just on to the little blue connector at the end of the tube, which then shows a colour changes as carbon dioxide passes through it. It confirms that it's in the tubes to the lungs and that it's -- carbon dioxide is being exhaled through it.

DRIVER: So two tests for the same thing. The position as to the lips, ie 7.5 centimetres, is what you expected --

DR A: It's calculated on his age and his weight.

DRIVER: But the proof of the pudding, as it were, is the capnograph?

DR A: That's right -- that and listening for air sounds.

DRIVER: Which you did --

DR A: Yes.

DRIVER: -- via your stethoscope, did you?

DR A: Yes. So good colour change on the capnograph and good bilateral air entry on auscultation.

DRIVER: So it shows that both lungs are functioning?

DR A: That's right.

DRIVER: Looking at all those factors together, what was your assessment as to this intubation process?

DR A: The intubation has been fairly seamless, without having to try again and again. On the first attempt the tube is secured,

he will be connected to the ventilator, and at that point I will have waited for usually half an hour or so and then done a blood gas just to check that that ventilation is adequate. Again, minute by minute alterations will be made to how much oxygen is required. That's usually left to the nursing staff to make those alterations.

DRIVER: Did you attend upon [Baby O] continually? As we go through your chronology here, can we read that, between the times that you were with him, at all times?

DR A: I think after this intubation attempt, I will have gone to speak to [Baby O]'s parents. They were on the post-natal ward that sits above the neonatal unit.

I will have explained that there's been a deterioration, he has been moved back to nursery 1, and commenced on a ventilator whilst we're waiting for investigations to sort of provide some results.

DRIVER: In terms of your assessment of [Baby O] and therefore the nature of your communication with his parents, what was the terms of that assessment and the tone of the communication that you were sharing with them?

DR A: So I will have explained that this is not an expected event but it's not unusual and that he's now commenced on second-line antibiotics and he is being supported for breathing with more observations being taken of his usual parameters. I will have reassured them as much as I can that this is not an unusual event, but I will have also explained that we're not in the same place that we were at the time of the morning's ward round. Again, it's a fine line between giving information and falsely reassuring or upsetting them, which may -- in 36 hours there may be negative blood cultures and he's just ridden this out.

DRIVER: Thank you. We can see from your next entry, timed at 15.51, which in isolation appears behind our tile 219, but we'll stay with this page, that you record that you were fast-bleeped to the intensive care unit.

DR A: Yes.

DRIVER: Do you recall receiving that fast-bleep notification?

DR A: I do.

DRIVER: In what circumstances?

DR A: I was walking -- I'd come downstairs from speaking to [Baby O]'s parents and I was walking back towards the neonatal unit and I met [Dr B] in the corridor as we were going and I briefly updated her as to what had happened prior to me going up to speak to [Baby O]'s parents. And as we were discussing that, the crash bleep went off and the voice message was along the lines of, "Neonatal arrest: attend the neonatal unit".

DRIVER: Thank you. We'll come to your note in a moment.

Could you confirm that when making your witness statement in regard to these events you also appraised yourself of a note made by [Dr B], which covers the same events?

DR A: Yes, and I think the documentation for this, the events from here, was a combination of mine, [Dr B]'s, and I suspect that Dr Brearey may also have made some notes.

DRIVER: If anyone here cares to note [Dr B]'s corresponding notes, which we considered yesterday, they are behind tile 218. We'll stay with [Dr A]'s note.

You were fast-bleeped to the intensive care unit and no doubt responded as quickly as you could?

DR A: Yes.

DRIVER: What did you discover upon arrival?

DR A: So [Baby O]'s oxygen saturations were down to approximately 35% with a corresponding drop in heart rate. Listening to him, he had good air entry. As I have not made any note that it was unequal, I will assume that it was good air entry on both sides of his chest.

DRIVER: Can I ask you to keep your voice up again, [Dr A]?

DR A: Sorry. Then the Neopuff circuit had been attached to the tube and he was being bagged through the tube with minimal success.

And at 15.58, he was given a morphine bolus and the endotracheal tube was removed and I re-intubated with the same size tube to the same distance with good colour change and I have done that to ensure that there was no mechanical problem with the ET tube.

DRIVER: Let's deal with that in its component parts if we may.

The fact that you've recorded he was being bagged through the ETT tends to suggest that he had been removed from the ventilator.

DR A: That's right.

DRIVER: Had that occurred before or after your arrival?

DR A: I suspect it will have been done before my arrival, but I can't say for sure.

DRIVER: Are you able to say whether the desaturation to 35% or thereabouts, whether that desaturation occurred before or after he was removed from the ventilator?

DR A: From that note, I can't say, but I would suppose that if that desaturation had been ongoing, just to exclude a problem with the ventilator tubing or the ventilator itself then he will have been removed from the ventilator circuit and attached to the Neopuff circuit.

There's much more manual control with a Neopuff and you get to actually feel the resistance through the tube.

DRIVER: Thank you. And likewise with the associated bradycardia?

DR A: The bradycardia will have followed the desaturation because there's not enough oxygen to sustain a normal heart rate.

DRIVER: Understood. He was bagged through the tube. Did you do the bagging?

DR A: It doesn't say there who was doing it. It would have been natural for me to move to the head end of the baby and take over the airway, so I suspect that he was being bagged by the nursing staff in nursery 1 and that I will have moved myself to the head end so that I can take over there.

DRIVER: Thank you. Could you expand upon the phrase "with minimal success"?

DR A: [Baby O] had required rather larger than normal pressures on the Neopuff circuit when he was moved from nursery 2 to nursery 1. I will have looked at the ventilator settings -- and that's just the paragraph above -- that he'd been set on a pressure of 24/5 and if that ventilator pressure hadn't been adequate to deliver oxygen to him, I'm likely to have increased the pressures on the Neopuff circuit in order to open that chest up a little bit more with each inflation breath.

DRIVER: Thank you. A further dose of morphine was delivered.

What was the purpose of that, the objective?

DR A: If [Baby O] was unsettled or fighting the ventilator, an extra bolus of morphine will work quickly to sedate him more. At this point I'm obviously planning to remove the tube and re-intubate him.

DRIVER: Do we necessarily read into that that he was unsettled and/or fighting the tube or was that --

DR A: It's quite likely. That would be the reason for doing it. If he'd been perfectly settled and flat there would be no need to administer any additional sedation.

DRIVER: For the court's note, that morphine bolus is also recorded behind our tile 221.

Let's move on to your note at 16.01, which also features behind tile 223 but we'll stay with this page.

The ETT was removed?

DR A: Yes.

DRIVER: Can you explain why?

DR A: The ET tube is the interface between the ventilator and the baby. It is susceptible to becoming blocked with secretions. It's susceptible to kinking or bending.

The plastic of an ET tube is flexible but it's semi-rigid and it naturally has a slightly curved shape to it. So my presumption will be that there are secretions that have been in the lungs or in the mouth and they have been sucked on the exhalation part of the breath up into the tube and then coated or lined the inside of the tube. The easiest thing to do here is remove the tube and replace it.

DRIVER: For the avoidance of any doubt, I'm sure everyone is on to this, but where your note simply reads "ETT removed and re-intubated", that would be re-intubated with a different tube?

DR A: Absolutely, yes.

DRIVER: Do you recall whether you actually examined the tube that was removed?

DR A: I know that I wanted to examine the tube that was removed. I don't think I had the opportunity to do it.

I think as the rest of the resuscitation progressed, waste kit was disposed of in clinical waste bags.

Normally, if this was not progressing on to a further resuscitation, it is common practice to look at the removed tube and comment on whether you can see a blockage with secretions or anything else, blood occasionally.

DRIVER: But in this case you're simply not able to assist the jury as to whether there was a blockage --

DR A: No.

DRIVER: -- or a distortion of the tube or any of the other factors that you've already informed us were of potential interest. So the re-intubation process was again successful at the first attempt. Same size tube and to the same position as before. What were the indicators as to how well or otherwise that tube was functioning?

DR A: Again, the little capnograph that goes between the tube connector and the ventilator or the Neopuff circuit was attached and there was good colour change. I put, "Capnograph colour change [tick]".

DRIVER: So carbon dioxide on the way out and, you having satisfied yourself that this kit was all correctly in place, did you then reattach the kit, and therefore [Baby O], to the ventilation?

DR A: Yes. I have said that we've recommenced continual mandatory ventilation at the same settings, so he will have been back on 24/5 with a rate of 60 breaths a minute. And as he's connected to the ventilator, there's good air entry on both sides of his chest.

DRIVER: So albeit with mechanical assistance, all the indicators shortly after 16.01 would tend to suggest that his respiration is functioning?

DR A: That's right, yes.

DRIVER: Did you remain with [Baby O] at this point or...?

DR A: I will have been present in nursery 1. That will have been for a number of reasons. I will have had to have -- the morphine will have been given, I presume, as a verbal instruction. That will have then needed prescribing. There will have been tidying up to do from the bits and bobs of kit that were left around afterwards, and also I will have wanted to keep an eye on him.

DRIVER: We can see there is another note made some 14 minutes later, timed at 16.15 hours, which event is behind our tile 224,

but again we'll stay with this page. Tell us what happened 14 minutes or so after his reconnection to the ventilation.

DR A: We have another episode of bradycardia and desaturation.

[Baby O]'s heart rate had fallen to 60 beats a minute and his oxygen saturation was down to 50%.

DRIVER: You told us earlier in your evidence that readings in that range are indicative of a peri-arrest?

DR A: That's right.

DRIVER: So how did you respond?

DR A: [Baby O] was again taken off the ventilator, the ventilator circuit was disconnected from the ET tube, and he was then hand ventilated using the Neopuff circuit.

DRIVER: Is that for the same reasons as you indicated earlier, that it just gives you a better feel?

DR A: That's right.

DRIVER: And more control?

DR A: Yes.

DRIVER: Is the remainder of the doctor's note behind this tile, Mr Murphy, or do we have to move? And if so, let's move to tile 228, please.

We've simply gone overleaf to the next page of your clinical notes here, [Dr A]. So it's effectively a continuation of your note of events timed at 16.15, which you left off informing the reader that you were hand ventilating him using the Neopuff circuit. How was he presenting at this point in time?

DR A: [Baby O] still had a heart rate of 60 beats per minute and 60 beats per minute is where chest compressions or cardiac massage would be started; that was started at 16.19. Following that, then adrenaline was given twice at 16.22 and 16.26. Then I go on to document other medication that's given over the next 10 minutes or so.

DRIVER: So in those five lines -- four lines, I should say -- are you informing us that the resuscitation process kicked in?

DR A: Absolutely.

DRIVER: Were you the only medic on hand at this point, can you recall?

DR A: No. So I... I think I recall that I was still at the head end of the incubator. I will have been taking care of the airway and the bagging. [Dr B] was still on the unit and I recall that Dr Cooke was still around, but I don't recall exactly where they were placed as this event over 4 or 5 minutes took place. If they hadn't been there then they would have been called to come as a matter of urgency.

DRIVER: We know from the last page that this episode, the beginning of this episode, was timed at 16.15 and we can see your various notes as to when compressions began, ie 16.19, when the adrenaline was given, 16.22 and 16.26, sodium bicarbonate 16.30, at which there was some improvement, I think you'll tell us, at 16.30; is that correct?

DR A: Yes.

DRIVER: What was noteworthy at 16.30?

DR A: At 16.30 [Baby O] had a spontaneous return of his circulation, so his heart rate was picking up and he was no longer needing chest compressions. At that point he was still noted to be poorly perfused. So he had a cardiac output that was measurable and because of that poor perfusion, he was given another fluid bolus of 10ml per kilogram of normal saline; that was given at 16.47.

DRIVER: If we look at the note that says, "Spontaneous circulation", could you read the third word on that line, please?

DR A: "Re-established."

DRIVER: Re-established. Does that imply that it was lost or that it was poor and then improved?

DR A: In order to start chest compressions, that can be done at -- the indication to start is a heart rate of 60 beats per minute because that won't supply adequate circulation and perfusion to the baby's organs. The restoration of spontaneous circulation means that the heart rate had picked up above the 60 beats per minute and was heading in the right direction. Even though that spontaneous circulation had been re-established, he was still noted to be poorly perfused, so there is always that worry that this is a short-term restoration in part due to the two doses of adrenaline and the small bolus of sodium bicarbonate.

DRIVER: And is that sodium bicarbonate -- is that your note at 16.47?

DR A: No, the sodium bicarbonate is given at around 16.30.

DRIVER: Apologies. Then at 16.47?

DR A: Another fluid bolus of normal saline.

DRIVER: Thank you. Was that to seek to address the poor perfusion?

DR A: That's right.

DRIVER: At this point in the sequence of events, how was [Baby O] as a consequence?

DR A: He was in a better position than 16.19. So he was now maintaining his own heart rate and even though he was looking poorly perfused, interventions had been put in place that will take a few minutes to see how he responds, and we are certainly heading in the direction for him to be returned back on to the ventilator and the resuscitation effort is ready to stand down.

DRIVER: What other measures were deemed necessary at that point?

DR A: So a period of time will be left before performing another blood gas. His perfusion will have been poor over the last 15 minutes and a gas will need to be done in about half an hour to an hour's time. I think, collectively, we've had a look at [Baby O] and realised that his venous access is not going to be adequate for a further attempt or a further deterioration, so whilst he's stable now is the time to get more venous access in place, which is the next part that we come to.

DRIVER: And why would it have been deemed desirable to get further venous access?

DR A: Over the last 15 minutes, [Baby O]'s had two doses of adrenaline, one of bicarb, and a fluid bolus. I suspect he only has one cannula in place at this time. If that one goes then there is no way of administering venous medication to him. This is the time to get ahead.

DRIVER: So these interventions are best done whilst the baby is stable?

DR A: That's right, yes.

DRIVER: So what was done in that regard?

DR A: There are three attempts made for further venous access and the left great saphenous vein is cannulated by [Dr B].

DRIVER: Is that by the ankle?

DR A: It is. Following that, [Baby O] is returned back to mechanical ventilation and despite -- knowing that it's going to be a poor gas, we had been unable to get any sample for a blood gas measurement at that point.

DRIVER: Sorry, can you explain? Knowing that it's going to be a poor gas, unable to... Help me with that?

DR A: Because [Baby O]'s ventilation has been poor over the previous 15 minutes, it is likely that his blood gas will have a low pH, even though his carbon dioxide may now be back to normal, but what will be of interest and of note here is what is his lactate doing. If that lactate has gone up compared to the previous lactate then this is indicative of more of a metabolic cause.

DRIVER: Where it reads: "Blood gas unobtainable on several attempt." What was unobtainable?

DR A: The sample for the blood gas measurement.

DRIVER: So blood?

DR A: The blood, yes.

DRIVER: Blood was unobtainable. Is that a reflection of the state of his circulation at this point?

DR A: It is. That again goes back to that poor perfusion noted at around 16.30. Because of that, preparations are made for an umbilical venous catheter to be inserted.

DRIVER: We know from your evidence earlier that there wasn't a UVC. You confirmed preparations were made. Was a UVC inserted?

DR A: I don't recall whether it was managed or not.

DRIVER: Again, I'm invited to invite you to keep your voice up, [Dr A].

DR A: Sorry.

DRIVER: Thank you. Your next and final entry on this page, does that effectively invite the reader to consider Dr Brearey's note from here on in?

DR A: That's right, yes.

DRIVER: Can you recall why it was that you broke off from recording events at this point in time?

DR A: At this point I will have been going to find all the equipment necessary to insert and secure the umbilical venous catheter. So that will have been a move off to one of the storerooms to collect all of the sterile kit needed for that insertion and it will have been also to get all of the gowns and drapes needed to make this ideally a sterile procedure.

DRIVER: And are you aware of any note that suggests that that procedure was in fact undertaken or did events overtake it?

DR A: I suspect that events overtook it. It would be impossible to do a further resuscitation whilst trying to insert a UVC.

DRIVER: And do you recall any further direct personal involvement in any resuscitative attempts in response to [Baby O]'s condition?

DR A: Yes, so there was another collapse following this event, but I would have to read Dr Brearey's notes to sort of give you any indication of my part in that.

DRIVER: Were you a participant in that regard together with Dr Brearey?

DR A: And [Dr B].

DRIVER: And I think Dr Gibbs?

DR A: Yes, I think Dr Gibbs was the consultant who will have been on call overnight and as this was after 4 pm, Dr Gibbs will have had a handover and will have come along to the neonatal unit, knowing that there was a resuscitation taking place.

DRIVER: My Lord, we heard from Dr Brearey yesterday in great detail about this process and I don't intend to take [Dr A] through those events minute by minute. But suffice to say, [Dr A], were you there participating until [Baby O]'s sad demise?

DR A: Yes.

DRIVER: Having reviewed [Baby O] on more than one occasion during that day, having been with him until the very end, what, if any, conclusions did you draw on that day about those events?

DR A: This was incredibly unusual and it was unexpected. The ward round that took place at 9.30 in the morning recorded a

well baby and, as the afternoon progressed, [Baby O]'s clinical condition deteriorated in a way that is indicative of a process, potentially sepsis.

I believe that Dr Brearey had been invited to come along in order to perform an echocardiogram on [Baby O], just to ensure that there wasn't a cardiac cause for this.

Heart malformations often declare themselves on day 3 of life, but I don't recall Dr Brearey's echo findings, if he actually had the chance to do it.

DRIVER: Following [Baby O]'s death, did you take an interest in the subsequent blood culture results and the like?

DR A: Those blood culture results will have taken 36 to 48 hours to reveal their results, which will have had them being available for reporting -- I think on the Saturday of that week. I may well have looked at them, but as his notes weren't open or available to write in because he was then deceased, I wouldn't have had the opportunity to record that in the notes.

DRIVER: Finally, [Dr A], in the course of the notes you made that we've considered, there's reference to X-rays. Can I just take you to two X-rays that were undertaken in relation to [Baby O] on this date. Firstly, if we could go to tile 197. We don't need to go to the X-ray itself. This X-ray, I think, is not timed or dated.

But was an X-ray undertaken as part of your plan? Do you recall reviewing the X-rays on the day?

DR A: So the X-ray machines have a small screen on them. It's for the radiographer to just check that it's an adequate position and quality of image. As this was a rapidly evolving sequence of events and I will have looked at that X-ray on the machine itself and observed that there was no air under the diaphragm indicative of a perforation and I will have reassured myself that there was nothing on the lower aspect of the chest to suggest a pneumonia.

The report that's come back from Dr Wright afterwards is a much longer version of what I will have looked at and mentally recorded.

DRIVER: Are you referring us to the entry that's been summarised here as "no free peritoneal air"?

DR A: That's right, yes.

DRIVER: Then Dr Wright goes on to say that: "The appearance is non-specific, but NEC cannot be excluded."

DR A: If this had been an evolving NEC, there would have been other views and other X-rays in line with his clinical deterioration.

DRIVER: Thank you. If we go to tile 246, please. This is a post-intubation X-ray designed, amongst other things, no doubt, to enable you to form a view as to the appropriateness or otherwise of the tubes' position?

DR A: Yes.

DRIVER: What, if anything, does this description of the X-ray inform you of?

DR A: So the endotracheal tube for the ventilation is in a satisfactory position. The NG tube, which was being used to feed him and also for decompressing his stomach during the resuscitation, is sitting a little high and would be suitable to advance for another 1 to 1.5 centimetres. Dr Wright here says that: "The cardiac size and the contour of the heart [he defines as] normal." There is some evidence of respiratory distress syndrome, so the normal black and white contrast of a chest X-ray is slightly greyer here and that suggests that there's a little bit of fluid within the lungs, which is recorded as respiratory distress syndrome.

It's common in newborn babies. This may well explain or be a contributor to that elevated respiratory rate at 1.15.

Then Dr Wright goes on to comment on the bowel, which is less distended than the abdominal film earlier on, again no evidence of perforation or obstruction.

DRIVER: If we just note the time, this is timed at 16.46, and to give that context, your last set of notes that we considered began at 16.15 and went onwards from there as to the attempted resuscitation of [Baby O].

DR A: Yes. So this assesses and comments on the position of the second endotracheal tube.

DRIVER: The overall conclusions that you gave evidence about a few minutes ago, are they in any way altered or affected by reconsideration of the contents of this radiological report?

DR A: So this suggests that it's not a respiratory cause to [Baby O]'s decline. The fact that there is less bowel distension, I presume is due to the fact that the NG tube will

have been left open so that any air can be freely ventilated, sort of by gravity.

DRIVER: We've heard others refer to the term free drainage.

DR A: Essentially, yes.

MR DRIVER: Thank you, [Dr A]. Could you remain there and answer any further questions?

Cross-examination by MR MYERS

MR MYERS: [Dr A], you attended [Baby O] for the first time round about 13.15 on that day; is that right?

DR A: That's right.

MYERS: I'll come to that shortly. But then after you dealt with [Baby O], there came a point, did there, when you left the unit; is that right?

DR A: Yes. That was sort of just after, about 3.15, or thereabouts.

MYERS: All right. But then you were called back round about 14.40?

DR A: Yes, that's right.

MYERS: And when you returned at 14.40 or round about 14.40, was that a situation that was significantly more serious than the situation you dealt with at 13.15?

DR A: Yes.

MYERS: I'm going to just ask you some questions about the 13.15 one first of all, [Dr A]. Could we put up tile 168, please, Mr Murphy, and pop behind that. This is just for your assistance and ours in case you want to refresh your recollection from it.

DR A: Thank you.

MYERS: We'll just go behind it to the actual note, please.

Scroll down. If we scroll down to the bottom of the page, we can fit that on there.

By way of general points, you'd been called to see [Baby O] because of a report of vomiting and a distended abdomen; is that correct?

DR A: That's right.

MYERS: So far as vomiting is concerned, your observations on that, [Dr A], was that it may be unusual, it may not, it depends on the circumstances?

DR A: That's right.

MYERS: But certainly vomiting can be a normal event, can't it?

DR A: It can be.

MYERS: It can be. So far as a distended abdomen is concerned, there may be various reasons for that, but one of them I would just like to ask you about, can that be linked to swallowing air, taking extra breaths?

DR A: Yes.

MYERS: The reason I ask is an answer you gave so I just want to deal with that. You described how a baby may create extra pressure to pass a stool by taking extra breaths and create internal pressure, in effect as it was put, directly straining.

DR A: I don't think it's an intentional mechanism to swallow air to help you pass a stool. But the movement and the breathing pattern of trying to strain may inadvertently make you swallow some air that's within the mouth.

Again, that NG tube is there as a means of relieving that pressure.

MYERS: Was [Baby O] on Optiflow as far as you can recall at this time?

DR A: I haven't written down that he's on Optiflow. I've only recorded there that his oxygen saturation is 100%.

It would be my normal practice to record whether there is a machine giving assistance to breathing.

MYERS: Just to help us with that, to assist us all, if you look at the observation chart, please. That's at tile 55.

Just scroll down there. If we go down towards the bottom of the chart, [Dr A], perhaps so we can keep track, we can see if you look in the column on the left where there's handwritten entries, right down on the left initials, then there's empty columns then there's something that says humid or humidity and then Optiflow.

Can you see that --

DR A: I can.

MYERS: -- on the left?

DR A: Yes.

MYERS: Again, as it happens, there are entries for Optiflow going certainly quite some way across that chart.

Can you see that?

DR A: Yes, I can.

MYERS: If we take the last one that's recorded here, if we go to that one and scroll up, we can certainly see to what point those are being recorded. That's up to 14.30.

DR A: Yes, it is.

MYERS: No one is expecting you to have perfect recollection of things that there were, but that's just to help us with that.

DR A: Yes.

MYERS: So it appears he was on Optiflow. We'll come back to your note if we may, please, [Dr A], at tile 168.

We'll scroll down.

Your assessment, [Dr A], when we look at the heart rate at 160 to 170, and a little below that on examination, the next to last line at the bottom, respiratory rate of 40, those seem to be a little elevated; is that correct?

DR A: That's right.

MYERS: And it's something which may or may not indicate an underlying problem; is that correct?

DR A: Yes.

MYERS: So that's one of the reasons that your view was that it would be necessary to do some further examination?

DR A: That's right.

MYERS: Okay. So they are signs that you identified as potential markers depending on how everything fitted together?

DR A: Yes.

MYERS: If we carry on scrolling down into the note, please.

Thank you, Mr Murphy.

You took a blood gas reading. You've recorded the way -- you arranged for it to be taken and you recorded that in your note, haven't you?

DR A: Yes, I have.

MYERS: Scroll down so we can see that blood gas. You've identified the readings that aren't normal, I am not going to go through all of them again, because you have said that, but can we just keep in mind at this point there's been no actual desaturation by [Baby O], has there?

DR A: No.

MYERS: And his oxygen was at -- was it at 100%?

DR A: His oxygen saturations, yes.

MYERS: All right. But as it happens, when we look at those blood gas readings, they indicate a metabolic acidosis or the possible start of a metabolic acidosis?

DR A: Yes.

MYERS: Would you agree with that?

DR A: That's right.

MYERS: Particularly because of the lactate and the base excess?

DR A: Yes.

MYERS: They indicate that. Can it sometimes happen that for a baby that's being fed or fed milk, there can come a point when a baby's received that much milk that that in effect can trigger a metabolic acidosis? Is there a correlation between a milk feed and metabolic acidosis? I'll expand on that if you like. There has to be a certain amount of milk to actually create acidic conditions. Is that anything you're familiar with or not at all, [Dr A]?

DR A: It's not something that I would consider in usual day-to-day practice.

MYERS: All right. Could you identify any reason for why there would have been a metabolic acidosis in [Baby O]?

DR A: At this point, no, which was why that led on to those further investigations.

MYERS: But certainly, looking at his position at 13.15, there was raised readings by way of heart rate and respiratory rate; that's correct, isn't it?

DR A: That's right.

MYERS: And there appeared to be a metabolic acidosis taking place or commencing?

DR A: Yes.

MYERS: Where we've got down at the bottom the arrow and it says "IV", could you just repeat what the word is that follows IV?

DR A: "Fluids."

MYERS: IV fluids, right. Do you recall whether or not he was on a IV line at this point when you first examined him or is that something that went in after you had examined him?

DR A: I don't recall. There will have been a cannula recently because he'd been on those first line antibiotics when his siblings were started on them. Whether that cannula was still in situ or whether I had to re-cannulate him, I don't recall.

MYERS: I'll come to that in a moment. In terms of what was going to take place, did you prescribe that he received sodium chloride and further antibiotics?

DR A: Certainly there, the intention is for a 10ml per kilogram bolus and, as we saw earlier, the cefotaxime was started.

MYERS: Right. I'm just going to ask you to see a message which is put up, which comes from you to Ms Letby. It's at tile 183, please, Mr Murphy. It's just on the subject of cannulation to help us with this.

I think we've seen material which shows that Nurse Letby had been dealing with [Baby O] --

DR A: Yes.

MYERS: -- at the time you were called. This is a message that you send to her at 14.20 hours.

DR A: Okay.

MYERS: So this is after you've first attended on [Baby O] and had reviewed him. You put: "Doesn't look like it does." And then you put: "Cannula in. Sorry, may have" --

MR JUSTICE GOSS: Sorry, sorry: "Doesn't look like it, does it?" We don't know what that's a reference to. But then there's a winking emoji and then, "Cannula in". Sorry, it's just --

MR MYERS: No, thank you. I was going between the actual typed one and the written one and missed the -- thank you, my Lord: "Doesn't look like it, does it? Cannula in. Sorry, may have dripped a little on his sheet? You might have to teach me how to change an inc." Where I was going to was this. Where it says: "Cannula in [at 14.20]. Sorry, may have dripped a little on his sheet ..." Does that help with regard to what you may have done so far as [Baby O]'s cannula was concerned?

DR A: Yes, so I will have cannulated him at that point and with the usual process of cannulation, there is often some blood that drips back out of the connection end of the cannula, and clearly I've been a little bit careless and it's dripped on to the sheet.

MYERS: Can you assist us with whether that was a re-cannulation or an entirely fresh cannula going in where there hadn't been one beforehand?

DR A: It would be unusual to re-cannulate the same site again because there will be a degree of possibly bruising, possibly discolouration. It would be normal to look for a vein in a site that was fresh.

MYERS: So you put the cannula into a fresh site?

DR A: Yes.

MYERS: And do we take it from this that Nurse Letby wasn't with you when you did that process from the look of this?

DR A: It looks like she wasn't, that's right.

MYERS: That cannulation would have taken place in nursery 2?

DR A: Yes.

MYERS: Which is where [Baby O] began, so she wasn't there with you at that point?

DR A: Not from the look of that, no.

MYERS: Then we know that at some point you left the unit.

DR A: Yes.

MYERS: But you were recalled, bleeped, for the event at 14.40; that's correct, isn't it?

DR A: Yes.

MYERS: Just a couple of points on that, please. I'm going to ask if Mr Murphy would put up tile 199. Just looking at the first lines there, [Dr A], where you have put: "Called to see [Baby O] at 14.40, desaturation, bradycardia and mottled, bagged up and transferred to nursery 1." Where there is a low heart rate, there is poor circulation of blood, is that a situation in which you might well encounter mottling on the skin?

DR A: Potentially, yes.

MYERS: Because of poor perfusion, as it's put?

DR A: That's right.

MYERS: And perfusion is the way that blood is getting round the body?

DR A: Yes.

MYERS: If we just scroll down, please, in fact to the following page, there's one -- sorry, this page. Can you see the entry at 16.01? I just want to confirm something you said in your evidence earlier.

DR A: Certainly.

MYERS: The entry says: "ETT removed and re-intubated." And there's reference -- is that to a gauge 3 ETT?

DR A: That's correct, yes.

MYERS: When you were answering questions about that, the issue of secretions was brought up or touched upon.

DR A: Yes.

MYERS: Could you just explain what the relevance of that was to what was going on at 16.01 and what you were saying about secretions?

DR A: Well, at this point, [Baby O]'s oxygen saturations were not normal and, as I said earlier, the interface between the ventilator circuit and the baby is that ET tube.

Now, we've just read from Dr Wright's report of the chest X-ray that there was RDS there so it's likely there was some small amount of fluid within the tissue of the lungs and my concern would have been that some of that has come up and either coated or blocked to a certain extent, partially or otherwise, the ET tube, so it was replaced.

MYERS: But as it happens, although it had been your intention to examine that tube, it appears it was disposed of before that could ever take place?

DR A: That I believe so, yes.

MYERS: So you don't actually know whether or not secretions had any part to play in that?

DR A: No, I don't.

MYERS: The final thing I wanted to check was this. It was something that was an observation in your witness statement and in fact, just to help you, and us, I'm going to ask if you could be shown page 3504 of the statement. Sorry, it's page 3504 of our statements, it's page 5 of your statement, [Dr A].

It's just a comment you make. If we scroll down the page, Mr Murphy. You referred to speaking to [Baby O]'s parents. Do you remember? There's a paragraph here that says: "Now at this point I went to speak to his parents." If you would read that to yourself, there's something I want to ask you about once you've read it.

DR A: (Pause). Yes.

MYERS: You were asked about how [Baby O] seemed and how this was a dramatic deterioration in his condition from how he appeared first thing in the morning so far as you could tell.

DR A: That's right.

MYERS: And I'm not disputing that. But you make reference when you're talking about him, you say that: "It is not unheard of for preterm babies to have problems after a 24-hour honeymoon period when things are going well." It's something you said in the statement when dealing with this. First of all, could you explain what you mean by that or what that relates to?

DR A: Preterm babies have a degree of resilience and it's commonly observed that babies that you would expect to have problems due to their prematurity or other circumstances often do well in the first 24 hours, so you have to be mindful that a deterioration may occur after that point. Unfortunately, I don't recall which day of life -- was this day 3 for [Baby O] now?

MYERS: He was born on the 21st at 14.24, so this is in fact day 2., about 48 hours old.

MR JUSTICE GOSS: No, no. Day 1 is day of birth.

MR MYERS: I see, right. I'm counting forwards from 24 hours and I've got --

MR JUSTICE GOSS: Exactly.

MR MYERS: I've got the date of birth here as 21 June at 14.24.

MR JUSTICE GOSS: It's about 48 hours, but actually day 3, but 2 days of time.

MR MYERS: That's my calculation, my Lord, 48 hours in, yes.

Sorry, you said you were unsure which day it was.

DR A: Yes. [Baby O] had done well. He'd moved from nursery 1 with his siblings to nursery 2. They'd all been given antibiotics and we were now beyond that 24-hour honeymoon period or that recognised period of resilience, and I was open with his parents, we did not know, I couldn't give them a name for what was going on at the moment, but it was only right that they were told why he had been moved and that he was now requiring extra breathing support that he hadn't needed shortly after birth or on his move from nursery 1 to 2.

MYERS: So it follows from that, whatever the reasons for the cause for what happened with [Baby O] and his deterioration, as a matter of general clinical experience, a baby may have an initial 24 hours which go well, but that is no guarantee that things will not go well in the period that follows; is that correct?

DR A: That's right.

MYERS: And the reason for that, amongst other reasons to be considered, we all recognise that, is that the baby may have a natural resilience that carries him or her through that first 24 hours, which will not be so powerful once you have got past that period?

DR A: Yes.

MR MYERS: Thank you, [Dr A].

Re-examination by MR DRIVER

MR DRIVER: Just picking up on that last question and answer, are they truisms that you took into account when expressing your surprise about [Baby O]'s sudden decline earlier in your evidence?

DR A: Yes.

DRIVER: Changing topics, dealing with the chronology of your attendance upon [Baby O] and the method of communication that led you to attend upon him. Firstly, you told us that you went to see him at 13.15 in the afternoon.

DR A: That's right.

DRIVER: You then went to see him at 14.40.

DR A: Yes.

DRIVER: I think it may have been a slip of the tongue, but having looked at the transcript of the cross-examination, my learned friend put to you that you left him at 3.15. Went to see him at 13.15 and the word used was that you left him at 3.15. Probably an error.

MR JUSTICE GOSS: Yes. It's the confusion of the 24-hour clock and the AM/PM clock. I'd assumed that was a slip of the tongue.

MR DRIVER: Of course. I recognise that. Just to note.

So you saw him at 13.15, saw him again at 14.40 --

MR JUSTICE GOSS: Sorry, could I interrupt you then at that point? Do you have any recollection now of about how long you saw him at about 13.15/1.15 pm?

DR A: I don't recall the exact time, but for the documentation that was there and the examination it will have been around about 15 minutes, maybe 20.

MR JUSTICE GOSS: All right. So you would have left at about 13.30 to 13.35?

DR A: Yes.

MR JUSTICE GOSS: Thank you.

MR DRIVER: You saw him again at 14.40?

DR A: Yes.

DRIVER: And then saw him for a third time at about 15.51?

DR A: Yes. That's right.

DRIVER: If we work backwards, let's go to 15.51 first, tile 205.

You told us that at that point in time, you were with [Dr B], you were on your way back to the unit having spoken to the parents and that you received and responded to a fast bleep.

DR A: Yes.

DRIVER: So time, 15.51. Communication by way of fast bleep to attend upon [Baby O]?

DR A: That's right.

DRIVER: Can you recall what caused you to go to him at 14.40?

DR A: Um... Not... Would it be possible to see that entry in the notes?

DRIVER: Certainly. That's at tile 199. The language used here is "called to see".

DR A: Yes.

DRIVER: You've been shown your statement. I wonder whether you may care to refresh your memory from page I3512 of your statement in this regard, Mr Murphy, just for the witness, his Lordship and the lawyers.

At the bottom of page I3512, please, Mr Murphy. The bottom two paragraphs. Refresh your memory from those two paragraphs, please.

Firstly, having refreshed your memory, can you remember the method of communication that caused you to attend upon [Baby O] at 14.40?

DR A: It is likely -- not the actual method, but as I was in nursery 3 it's likely that somebody will have popped in and said, "Can you come to nursery 2?" Anybody could have done that, the healthcares, one of the other nurses.

DRIVER: In fairness, I don't want to take a false point, in your statement you suggest you're unsure, you say it may have been one nurse, but then again it may have been another?

DR A: That's right.

DRIVER: And while we're here, let's go to the reason why you attended upon him at 13.15. If you look -- if Mr Murphy would scroll up the page, we can see the paragraph that begins: "I can confirm..." Do you see that?

DR A: Yes.

DRIVER: That relates to the 13.15 --

DR A: That's right.

DRIVER: -- examination, doesn't it? And could you confirm the method of communication that caused you to see [Baby O] at 13.15?

DR A: It will have been a verbal request.

DRIVER: By whom?

DR A: By Nurse Letby.

MR DRIVER: Thank you.

MR JUSTICE GOSS: Again, you thought, you believed, you weren't sure, but you think you were in nursery 3 at that time as well -
-

DR A: Yes.

MR JUSTICE GOSS: -- when you were asked?

DR A: Yes.

MR DRIVER: My Lord, that's the re-examination. Does your Lordship have any questions?

MR JUSTICE GOSS: No, I don't, thank you very much.

MR DRIVER: My Lord, before we move on to the next phase of this evidence, there is one statement to read from a Dr Rackham. That can be done in [Dr A]'s presence, my learned friend's agreed to that, or it can be done after a break.

MR JUSTICE GOSS: We're going to have to have a break.

We're overdue our normal break but I wanted [Dr A] to complete his evidence if at all possible before we broke off because we would then have to have another break.

We'll have the break now. [Dr A] will be returning?

MR DRIVER: Yes.

MR JUSTICE GOSS: That completes your evidence for today, [Dr A]. Thank you very much for coming. You're obviously free to go when the court is emptied. Please, as I've said to you before, don't talk to anyone about anything to do with this case before you return to see us. Thank you very much.

Te-minute break then, please.

(In the absence of the jury)

MR JUSTICE GOSS: Please remain there. Other people will leave the courtroom and then you'll be told when you can leave.

(12.09 pm)

(A short break)

(12.19 pm)

(In the presence of the jury)

(No audio feed from court)

(12.22 pm)

Witness statement of DR OLIVER RACKHAM (read)

MR DRIVER: -- "and access to the Countess of Chester records supplied to me by Cheshire Police." It's a long statement, not all of which is relevant for our purposes, members of the jury. So if I move forward to page 81, please, my Lord, which focuses upon [Baby O]. Then at page 82 Dr Rackham narrates: "I received a telephone referral from [Dr B], paediatric consultant at the Countess of Chester Hospital, on 23 June 2016 at 16.55 hours.

"This was for a request for uplift to intensive care because of an unexpected collapse of unknown cause.

I was given the history. I phoned [Dr B] to ensure that the endotracheal tube was in an optimal position and then to review the ventilatory requirements depending on this and further blood gases.

"I advised her to start dopamine, which is a medication used to improve the blood pressure and to gain further vascular access via the umbilical vein and umbilical artery as [Baby O] prior to that had just one peripheral intravenous cannula in situ.

"No neonatal intensive care cot was available within the Cheshire and Merseyside, and so we were arranging for a cot for [Baby O] in Manchester." That concludes the relevant part of Dr Rackham's statement.

MR JUSTICE GOSS: Thank you.

MR DRIVER: I'll hand over now to Mr Johnson if I may.

MR JOHNSON: Dr Evans, please.

DR DEWI EVANS (recalled)

Examination-in-chief by MR JOHNSON

MR JOHNSON: Welcome back, Dr Evans. For the sake of the record, would you please identify yourself?

EVANS: Dr Dewi Evans.

JOHNSON: Thank you, doctor. Turning to the case of [Baby O], if we may, please, can we deal first with the several reports that you have written.

EVANS: Yes.

JOHNSON: Was your original sift report dated 21 November 2017?

EVANS: Yes.

JOHNSON: And in your series this was number 26; is that right?

EVANS: Yes.

JOHNSON: Thank you. Was your second and more considered report dated 2 June 2018?

EVANS: Correct.

JOHNSON: Your third, 25 March 2019?

EVANS: Yes.

JOHNSON: A fourth in which you made a correction of a name, 17 April 2019?

EVANS: Yes.

JOHNSON: Your fifth, 18 October 2021?

EVANS: Right. There's one before that, 24 June, correcting paginations, et cetera. 24 June 2021.

JOHNSON: Sorry, that was out of order.

EVANS: Then 18 October 2021, yes.

JOHNSON: Thank you. The June one, the version we have isn't dated, hence my mistake. And finally, was there one just dealing with some initial information that you were sent, dated 11 September 2022?

EVANS: Yes.

JOHNSON: Thank you very much. Can we deal, if we may, primarily with your report of 2 June 2018?

EVANS: Yes.

JOHNSON: As you did with every other case, did you start by setting out the circumstances of the child's birth?

EVANS: I did.

JOHNSON: As with all other cases, did you list a description of the material that you had been sent by the police in order to reach or to consider your conclusions?

EVANS: I did.

JOHNSON: In this particular case, and I'm looking at paragraph 3 of the report, page 2 of 13, were they medical records from the Countess of Chester Hospital?

EVANS: Yes.

JOHNSON: Post-mortem medical records from Alder Hey Hospital near Liverpool?

EVANS: Yes.

JOHNSON: Which included some images?

EVANS: Yes.

JOHNSON: An index, X-rays from the Countess of Chester?

EVANS: Yes.

JOHNSON: But did any -- were you ever sent the witness statement of [Baby O]'s father, [Father O]?

EVANS: I don't think so, no.

JOHNSON: No. I'm going to paragraph 6 of your report, please, or section 6. You recorded the circumstances there of [Baby O]'s birth; is that right?

EVANS: Yes.

JOHNSON: The timing of the first clinical entry by the medics at 15.55 on 21 June?

EVANS: Yes.

JOHNSON: You then refer to [Baby O]'s progress through to 23 June; is that right?

EVANS: Yes.

JOHNSON: Was there anything unusual or remarkable about his medical condition during that time up to midnight of the 22nd into 23 June?

EVANS: Not particularly. A stable baby.

JOHNSON: Yes. Did you then refer to [Dr A]'s -- I'm looking at your paragraph 9 -- entry at 13.15, which he has just given evidence to the jury about?

EVANS: Yes.

JOHNSON: Then subsequent medical entries written by [Dr A] --

EVANS: Yes.

JOHNSON: -- concerning the events at 14.40?

EVANS: Yes.

JOHNSON: And then [Baby O]'s subsequent collapse and untimely death later that afternoon?

EVANS: Yes.

JOHNSON: Did you refer in the context of that material to Dr Brearey's note relating to the "small discoloured [query] purpuric rash" on the right chest wall?

EVANS: I did.

JOHNSON: And did you then refer to the efforts and results of the attempts made to resuscitate [Baby O]?

EVANS: Yes.

JOHNSON: Did you refer to the blood gas records --

EVANS: I did.

JOHNSON: -- which were completed that day?

EVANS: Yes, I did.

JOHNSON: Of course the jury has those in hard copy format behind divider 20 in the jury bundle.

Did you also refer to the X-ray records?

EVANS: I did.

JOHNSON: And indeed to the nursing notes that were made during the same period of time?

EVANS: Yes.

JOHNSON: Did you refer to a report of a post-mortem examination that was conducted at Alder Hey Hospital, which in particular referred to an injury or findings on [Baby O]'s liver?

EVANS: Yes.

JOHNSON: Thank you. Moving on to the observations section of your report then, please, Dr Evans, which is paragraph 29 onwards. In general terms, what conclusion did you draw as to the circumstances of [Baby O]'s collapse on 23 June?

EVANS: Right, well, all his markers were stable on the day before and they were also stable at the beginning, the early hours of the 23rd. But what I noticed was that although the results were normal in the early hours, there was an increase in heart rate. And although there was an increase in the heart rate, the heart rate remained within normal values, but there was a trend, a slight trend, where the heart rate went from 130 to 150 and then to 175 from the norm at around 01.00 hours up until about 1 pm, 12 hours later.

JOHNSON: Let's just look at this because sometimes, if only for me, it's helpful to see this in a picture as well as to hear you

describe it. If the jury wouldn't mind looking behind divider 20 in jury bundle 2. It's page J23658, which is the second page behind that divider.

J23658. We can see in the top left-hand corner of the chart the date, 22/6 (inaudible: coughing) above the time 14.00 hours. As one reads across from left to right, the date then appears to be 23/6, and the first time noted during that day is 01.00 hours.

EVANS: Yes.

JOHNSON: You've just referred us to the recorded readings from that time 01.00 through to, I think you said, about 13.00 hours; is that right?

EVANS: Yes. I think if we can zoom into the heart rate bit of it, I've got my little mouse here.

JOHNSON: If you just let go of the mouse for a second.

EVANS: Okay. Can I...

JOHNSON: Yes.

EVANS: Doctors always mention the importance of looking at trends in assessing patients. As a general principle, in other words a trend in rate of heart rate is far more important than a one-off measurement. The other principle is that one also needs to look at the association, if any, between these trends in heart rate, for instance, and other markers of a patient's well-being.

So if we look -- for instance, if we go all the way back to the 22nd, we've got a heart rate here of 160, 170, settles to a nice normal 130/140, all the way through until about 1 am. So this is absolutely normal.

If you then follow this trend from 1 am, you see a slight increase at 05.00, a slight increase at 07.00, but all within normal range, all within the normal range. Now, on its own, this trend would mean -- would be of no clinical significance. But then you have a more significant increase here (indicating), which is at 13.30 hours, to 175. Again, strictly speaking within the normal range, but we now have a trend.

So if we go back to the main sheet and look at the bottom piece, so that piece (indicating), and zoom that up. I think what we can find is that for the first half of this chart, we have oxygen saturations of 99, 98, 100%, all the way to here (indicating), more than three-quarters of the way across.

JOHNSON: That's the 14.30. If one looks at the paper version that everyone has open, one can read up that column and see that that (inaudible: coughing).

EVANS: And as well, the baby is in air, so on the row below, the baby is in air. So therefore although we've got this trend in heart rate, of itself it doesn't tell me very much, but it's something one needs to look at because, of course, when I was reviewing these notes in 2017, I was aware that the baby had experienced a deterioration at 13.15 hours and, sadly, had died within 5 hours after that.

So therefore, when you are looking to causes of collapses and causes of death, you don't start where the collapse occurs, you need to see if there are any markers indicating something had gone wrong prior in the minutes, hours or even days before the collapse occurred.

So therefore, what I found was that the increase in heart rate from 01.00 hours was -- if we can go back to the full sheet -- was something that was worth noting given what happened with [Baby O] later. But in isolation, the key marker was the increase in heart rate at 13.30 hours because that is around the time when he experienced what I would consider the first significant clinical event.

JOHNSON: Okay. I just want to go back to your report then, please, Dr Evans, taking up the chronology just before then if we may. So back to paragraph 8 of your report --

EVANS: Yes.

JOHNSON: -- which is page 4 of 13. You noted the fact that [Baby O] at that stage, so I'm looking at the second part of paragraph 8, 9.30 hours on the morning of 23 June, there were no concerns at that stage, and that coincides, I believe, with the evidence that we heard from Dr Cooke a few days ago.

EVANS: That's correct. This is a well baby. He was well, so...

JOHNSON: You then deal with what's at tile 165, which is [Dr B]'s review at 12.10 of the ultrasound scan of the head.

EVANS: Yes.

JOHNSON: And you move -- and if we can just remove what's on the screen, please, so others elsewhere aren't distracted by the chart.

You move on to the entry at 13.15, which we heard from [Dr A] earlier today was the time that he was called to review [Baby O]

because he was told that [Baby O] had vomited frank milk and had a distended abdomen.

EVANS: Correct.

JOHNSON: We know what [Dr A] noted at that stage because he's told us this morning and it's all at tile 168.

EVANS: Yes.

JOHNSON: And there was then a further collapse -- sorry, not a further collapse. There was a collapse at 14.40 hours --

EVANS: Yes.

JOHNSON: -- which led to [Baby O] having to be intubated by [Dr A] under the supervision of Dr Brearey?

EVANS: Yes.

JOHNSON: There was a yet further collapse which followed the fast bleep to [Dr A] at a time when he was with [Dr B], having just spoken to [Baby O]'s parents?

EVANS: Yes.

JOHNSON: Dr Brearey again helped in treatment of [Baby O]?

EVANS: Yes.

JOHNSON: Dr Brearey then noted the small discoloured purpuric rash on the right chest wall?

EVANS: Yes.

JOHNSON: If anyone wants to find the note, it's at tile 206. You then set out the circumstances of the efforts to resuscitate [Baby O]; is that right?

EVANS: Yes.

JOHNSON: You've already referred us to the observation chart.

We have referred to the blood gases.

EVANS: Yes, we have.

JOHNSON: So far as the X-rays were concerned, was there anything of concern in there so far as you were concerned? I'm just looking at the bottom of your page 6 and the top of page 7.

EVANS: Right. Which paragraph?

JOHNSON: It's paragraph 19.

EVANS: Thank you. Yes. There were three X-rays. Now, I'm not a radiologist but I am used to looking at X-rays of babies. The ones I saw were not in the correct order, but they were... And what I thought was that the second X-ray showed lung findings consistent with RDS. This is respiratory distress syndrome, which is a condition that premature babies have. And also: "Moderate gaseous distension of bowel loops throughout the abdomen."

JOHNSON: Yes.

EVANS: And the third one, I'm quoting here, the report from the radiologist: "Mild bilateral changes of RDS. The lungs appear hyperinflated..." In other words, overdistended: "... but there is no evidence of pneumothorax." So no evidence of collapsed lung, in other words, and the bowel is reported as being considerably less distended by comparison with the previous X-ray.

JOHNSON: Yes. Just taking up on that latter remark, that's referred to by the radiologist at the time because when she reported on the first X-ray, she had already seen the later X-ray?

EVANS: Yes.

JOHNSON: All right. You're dropping your voice, Dr Evans. If you could keep your voice up, please.

You then refer to the nursing entries and I'm not going to take you through those. As I've said, you went on to deal with the post-mortem and we have dealt with the vital signs as recorded on page 23658.

EVANS: Yes.

JOHNSON: So taking all that information into account, I would now like to deal with the observations that you reached in your report of 2 June 2018, please.

EVANS: Yes.

JOHNSON: In particular, you were considering in this context the findings of the pathologist relating to the haematoma or haematomas to [Baby O]'s liver.

EVANS: Yes.

JOHNSON: What conclusions did you come to so far as that finding was concerned in the context of [Baby O]'s collapse?

EVANS: From the information I had at the time, it is my feeling that the haematomas, the blood found in the liver, was responsible for his collapse. And at the time, I thought that this was the result due to trauma. In other words, there was some trauma to the liver which had led to the collapse.

JOHNSON: Okay. So one of the issues may be, we'll see, but it may be whether the bleeding or the haematoma to the liver caused the collapse or whether the bleeding to the liver was the result of the collapse. So were you considering those two possibilities?

EVANS: I was and in my opinion it was the bleeding to the liver that caused the collapse.

JOHNSON: What was the reason for you favouring that above the alternative possibility?

EVANS: Well, there was no reason why -- there was no other reason why this baby could have collapsed and not only collapsed, but where resuscitation was unsuccessful.

Any bleeding to the liver would destabilise the baby because bleeding will compromise a baby's well-being, but resuscitation would have led to his improving. So therefore, my feeling was that what came first was the liver haematoma, in other words the liver trauma.

The other point to make is that, of course, [Baby O] required chest compressions when he was resuscitated.

We've heard from the local medical and nursing team about the chest resuscitations they carried out in this case and other cases. Chest resuscitation carried out appropriately by experienced doctors doesn't get near the liver, so therefore any CPR, in other words cardiopulmonary resuscitation or pressing on the chest to get the heart going, would not traumatise the liver and would not be responsible for the liver bleeding.

JOHNSON: In the context of the liver bleeding before or after CPR, if I can invite the jury to continue through divider 20 and get to page 23667, which is the blood gas chart. It's the penultimate document behind divider 20.

J23667.

In timing the bleeding in the liver, did these blood gas results help at all?

EVANS: Possibly, possibly. There are eight blood gas values and the first six of them are broadly satisfactory.

JOHNSON: Okay. Just pausing there for a second, that takes us from shortly after [Baby O]'s birth at the time of the blood gas 14.58 on 21 June, the sixth, to which you have referred as being the last in that sequence, is 23 June at 05.32.

EVANS: Yes.

JOHNSON: So broadly satisfactory is how you've referred to those as a composite?

EVANS: Yes.

JOHNSON: But what is it about the seventh reading on the 23rd at 13.20?

EVANS: This is the 13.20, so it's about 8 hours after the previous one. It's a venous sample and it shows what we call a moderate metabolic acidosis and I'll explain that. This was the gas that was carried out following [Baby O]'s episode of vomiting and bradycardia, which [Dr A] described earlier today. It shows a pH of 7.20, which is indicative of a moderate acidosis. The CO₂ is 7.09, which is slightly raised. The bicarbonate is 20, which is very slightly low. And the base excess is minus 0.8 -- sorry, minus 8.4, which again is moderately outside the norm. And the lactic acid is 5.1, which also is above.

So therefore, what we have is a picture of a moderate metabolic acidosis. We know from the clinical notes that just before all this occurred, the baby had had this episode of vomiting, abdominal distension and also bradycardia, his heart rate had dropped. So this was a significant event and if you have a significant event then any blood gas carried out soon afterwards will give you a picture like this.

JOHNSON: At this stage, and just to remind the jury, we are talking about June 2018, did you in the context of the liver pathology have any consideration for what Dr Brearey had described as seeing on the chest?

EVANS: No, no, no. All I knew was what was written down about the query purpura at this time.

JOHNSON: Yes, but what did you -- I'm just looking at your report, Dr Evans, at paragraph 34.

EVANS: Oh right.

JOHNSON: What significance did you give to what Dr Brearey had noted in the context of the liver injury?

EVANS: Right. If this was a purpuric rash -- purpura is the term we use to describe little blood spots under the skin. Those little blood spots under the skin are purpuric spots. If this was purpura there had to be a cause for it and there are a number of causes for purpura or bleeding, and my consideration was that in the context of knowing about the liver haematoma that the purpura was indicative of direct trauma, in other words -- bruising, in other words, especially as the purpura was found over the area of the liver. So that was my interpretation at the time.

JOHNSON: At that time, all right.

EVANS: Yes.

JOHNSON: So far as the X-rays were concerned, did you come to any view so far as any air in [Baby O]'s stomach or any part of his intestine?

EVANS: I thought that the air in the abdomen was excessive and could indicate air having been infused, injected in other words, into his stomach via the nasogastric tube and this had tracked into the intestines, causing abdominal distension.

JOHNSON: As I've said more than once, that was June 2018. You were then sent some additional information by the police; is that right?

EVANS: I was.

JOHNSON: The additional information, which I'll deal with in a second, resulted in you writing the report of 25 March 2019; is that right?

EVANS: Correct, yes.

JOHNSON: In particular, were you told that Dr Mayberry had examined [Baby O]?

EVANS: Yes.

JOHNSON: And that Dr Mayberry hadn't found any concerning pathology?

EVANS: Correct. This was about 7.30 on 23 June.

JOHNSON: Yes.

EVANS: If we recall, Dr Mayberry was called away and didn't write a note about it, but around about that time, yes.

JOHNSON: Were you also told that Dr Cooke, who had conducted the examination of [Baby O] at 9.30, so about 2 hours or so after Dr Mayberry, had expressed a similar point of view?

EVANS: Yes. She carried out a good examination and showed -- and there were no concerns.

JOHNSON: Yes. Did you then return to what Dr Brearey had noted concerning the area of discoloured skin on the right side of [Baby O]'s chest wall approximately 1 to 2 centimetres in diameter?

EVANS: Yes, yes, I did. What Dr Brearey had said in the report I received much later was that the rash -- he'd noticed the rash and then a short time afterwards the rash had disappeared.

JOHNSON: So far as the difference in the information you were acting on in the 2018 report and this report in 2019, the rash, you now understood, had disappeared?

EVANS: Yes. This makes a big difference to the interpretation of the rash because if it's a purpuric rash, ie bleeding under the skin, the purpura will last quite some time, several hours, days. Whereas if it comes and goes over a period of an hour or two, then it cannot be purpuric.

JOHNSON: Yes. We've heard that many times.

EVANS: Yes.

JOHNSON: Did that cause you, and I'm looking now at the observations section of this report, Dr Evans, to go back to the vital signs as charted for [Baby O] on 23 June.

EVANS: Yes.

JOHNSON: So turning back if we may to the second page behind divider 20, it's J23658, and looking at your paragraph 10, what observations did you come to at that stage?

EVANS: We're now back to 23 June and the fact that at 7 in the morning, his heart rate is 145, which is within the normal range, up from 125 the night before, but within the normal range. It increases to 160 at 12.30. That's just after noon. And

again, significantly to 175 at 13.30 hours, so 1.30 in the afternoon of the 23rd.

The other observation I made was that [Baby O]'s respiratory rate was a nice, steady, normal -- throughout most of this time but it went above 40 between 8.30 in the morning and 12.30, and then it increased to above 50 at 13.30 hours and 14.30 hours.

So therefore there was an increase in heart rate during the early afternoon and an increase in the respiratory rate during the early afternoon, but this had occurred prior to any change or fall in oxygen saturation. So according to the notes, as late as 14.30 hours, [Baby O] did not require additional oxygen and his oxygen saturation was 100%, which of course is normal.

JOHNSON: So putting those pieces of information together and looking at your paragraph 11, what conclusion did you draw if any?

EVANS: My conclusion was that a gradual increase in heart rate and respiratory rate could be seen as a clinical marker noting some kind of clinical problem. The increasing trend, heart rate and respiratory rate, is probably as useful an indicator of some kind of change in his well-being as the actual measurements of heart rate and respiratory rate. So these are markers that something's going on here, but it doesn't tell us what's going on to cause these changes.

JOHNSON: We then have, and you remarked on, at your paragraph 13, the deterioration of [Baby O] at 14 -- shortly after -- well, you said he was breathing in air at 14.30, is the way you described it. That's what we can see, of course, in the chart, isn't it? But we then have the fairly precipitous collapses thereafter.

EVANS: That's right. This is something that one does tend not to find in babies, for instance, who are sickening for infection. You tend not to go from breathing in air with oxygen saturations of 100% at 2.30 in the afternoon and then by 4.30 in the afternoon you are requiring 100% oxygen and your oxygen saturations are below 80%. So that is a very precipitous pattern of deterioration.

JOHNSON: Putting that deterioration into the context of the apparent rash, which then disappeared, what conclusions did you draw?

EVANS: I then drew from my reading of the literature and considered that the rash was consistent with [Baby O] having received an injection of air into his circulation, into his blood circulation. I quoted the paper by Lee and Tanswell that

we've discussed in the past in this trial and which I'd noticed from case 2 in this trial, where I'd noticed in [Baby B]'s case a deterioration with a very peculiar rash, and therefore this was repeating the pattern that I had seen from the second case in this series. So I saw -- therefore, it seemed to me that [Baby O] had been given an injection of air and this actually was the cause of his collapse.

JOHNSON: Yes.

EVANS: Sorry, had contributed to his collapse.

JOHNSON: So far as the liver injury was concerned, at your paragraph 18, did you give your point of view but defer to a pathology opinion?

EVANS: Yes. It's more difficult, of course, because as the clinician I don't have access to as much information or as much experience as the pathologist. So I still -- my paragraph says: "I remain of the view that [Baby O] may have sustained some sort of trauma." But added: "His sudden collapse is likely to be the result of air embolus and that the bleeding within the liver and into the peritoneal cavity [that's the abdomen] would have contributed to the collapse." So the bleeding would have destabilised him, but I think it's the air that led to the failure of resuscitation.

MR JOHNSON: So looking at your opinion then, please, Dr Evans -- my Lord, I know I am trespassing slightly into the normal...

MR JUSTICE GOSS: No, please continue.

MR JOHNSON: Looking at paragraph 22, did you invite the police to obtain an expert pathologist's view on the cause of the liver haematoma to [Baby O]?

EVANS: I did.

JOHNSON: And in particular, to ask the pathologist whether in the pathologist's view it was likely to be the result of trauma?

EVANS: Yes.

JOHNSON: So far as the precipitous collapses were concerned, though, what conclusion did you come to?

EVANS: My opinion was that [Baby O]'s terminal collapse is consistent with him being the victim of an air embolus.

That was the -- yes. And you know, I couldn't find any evidence where this could have occurred accidentally.

MR JOHNSON: I think in later reports you broke down timings and that sort of thing, but I'm sure that if your opinion is disputed, that will be explored with you by my learned friend Mr Myers.

My Lord, for that reason, I'd propose to ask no further questions at this stage.

MR JUSTICE GOSS: Yes. Thank you very much.

MR MYERS: We may not be exploring specific timings, so if there is any material the prosecution need, perhaps --

MR JUSTICE GOSS: They should lead it.

MR MYERS: I may not want to deal with that at all, I may not regard it as necessary for exploration. I don't know yet.

MR JOHNSON: I'm not going to.

MR JUSTICE GOSS: There we are. We'll break off now then and resume at 2.05, please, members of the jury, which is the hour. We've gone back to the conventional hour.

Yesterday was an exception. Thank you very much.

(1.04 pm)

(The short adjournment)

(2.05 pm)

Cross-examination by MR MYERS

MR MYERS: Dr Evans, I've got the reports that we've referred to today in front of me and you've got the reports too, haven't you?

EVANS: My reports?

MYERS: Your reports, yes.

EVANS: Yes.

MYERS: The first report that's referred to, as others have been, as a sift report is 11 pages long, isn't it?

EVANS: Yes.

MYERS: And the second report, that was described as more considered, is 13 pages long, isn't it? In fact it goes up to 12 of 13 confusingly, so maybe it is 12 pages long.

EVANS: My first report in my copy is six pages long and the second report is six pages long and my third report is four pages long. If we stick to paragraphs, I think that makes it easier.

MYERS: The fonts may be different. What's been called the sift report sets out the material that you received, doesn't it?

EVANS: Yes.

MYERS: Which includes the medical records and the medical records from the Countess of Chester in particular; that's right, isn't it?

EVANS: Yes.

MYERS: What's been called the sift report then goes through a summary of what you've identified as the main features to be found in those medical records, doesn't it --

EVANS: Yes.

MYERS: -- the clinical and the nursing?

EVANS: Yes.

MYERS: And then what's described as the sift report sets out your observations, doesn't it?

EVANS: Yes.

MYERS: And it sets out, at the end, your opinion?

EVANS: Yes.

MYERS: And actually that's the same format that's followed for what was described as the more considered report, isn't it?

EVANS: Yes.

MYERS: So that we're not under any misapprehension, they are both formal reports prepared by you, aren't they?

EVANS: Yes.

MYERS: Inevitably, you've been with the case for longer and may have seen other material by the time you come to write the second one?

EVANS: Correct.

MYERS: Yes. But in fact, both reports are considered, aren't they, considered reports?

EVANS: Well, yes.

MYERS: You wouldn't put things in them if you hadn't considered carefully what you were putting down?

EVANS: You have to rely on the information you've got and, as we heard earlier, some of the information that I considered crucial I received 18 months later, so you know...

MYERS: You consider carefully all the material that is available to you at any point that you're writing a report, don't you?

EVANS: That is correct.

MYERS: Yes. So lest we be in any doubt, both are considered reports, aren't they?

EVANS: I'm not sure what you mean by considered reports but they are my reports.

MYERS: I am just saying it because the prosecution introduced your second report as "the more considered report".

That was their wording, not mine. Remember?

EVANS: That's fair enough. I think that would apply to all of my -- all of the cases I have done, actually.

MYERS: And the point I'm making is that your first reports are as much reports with you doing your best as any other reports that you author, aren't they?

EVANS: Not really. I did about 30 reports in a very short period of time, so I think that needs to be borne into consideration.

And I think the other point is that the medical records -- clinical records that Cheshire Police received from the hospital management were in poor order, they were not in date order, they were not chronological, et cetera, so that made life far more difficult in terms of interpreting things. So -- and I think with every report I've done, not just in this trial but every time I've prepared a report -- I think I used the word "evolve"

on one occasion because, this is not a criticism, the information one gets in preparing cases of this kind is quite often piecemeal, it comes in months followed by further months, et cetera.

So anyway, they are all my reports and I would concentrate on my, as we did this morning, on the June 2018 report.

MYERS: June 2018, what was called the more considered report; yes? All right.

EVANS: Well, yes. Sorry, there's an awful lot of additional information in my 2019 report.

MYERS: I'm going to the report you have just referred to, the second one you did, the June 2018 report. Paragraph 30.

The first thing I'm going to ask you about is the point of what you've described as a "key clinical change in [Baby O]'s condition". Going to paragraph 30 of that second report, the June report, what you say is: "There is a key clinical change from around 01.00 on 23 June when there is a significant increase in both his trend of heart rate and respiratory rate. The increase in heart rate and respiratory rate occurred before any change/fall in oxygen saturation."

EVANS: That's correct.

MYERS: And you identify there 01.00 as the key clinical change?

EVANS: Yes.

MYERS: That means that's the point from which you plot the deteriorations that then follow, doesn't it?

EVANS: No, it does not. What it says is that it's from around 1.00 hours and what I mean by that is that I used 01.00 hours as the baseline, as we discussed earlier, looking at heart rate specifically and respiratory rate earlier. What I do in all of my reports, I look at all of the evidence. What I knew at the time, what we knew about [Baby O]'s collapse at 1.30 pm and we knew about his deterioration later that afternoon therefore -- and I knew about the liver haematoma. Therefore I need to look to see if there is any clue to what could have led to his deterioration.

I looked at things from 01.00, as we discussed this morning, and also, as we discussed this morning, there was an increase in heart rate between 1 am and 1 pm, let's put it that way, but this was an isolated change, there were no other changes. And as I've said in this report and others, one looks at trends, that's

important from a clinical point of view, and one also looks to see if there are other markers that would give me some kind of clue to what led to [Baby O]'s deterioration. So therefore I go back. One has to go back as far as possible to see if one can find anything.

Up until -- from about 1 am until 8 am, the only change, key change, was the increase in heart rate, but despite the increase in heart rate, his heart rate remained within normal limits. Okay? It was 130, then it went up to 150, then it went up a little more. And the respiratory rate stayed stable until -- I'll have to check on it there. Just a minute. I've got it on there. It remained stable until either 12.30 or 13.30.

It's not quite clear.

So therefore, I look at trends, I always do, and that's as far as I could get with that information.

MYERS: What you do in the course of these reports, Dr Evans, I'm going to suggest, is to chop and change things that you say and endeavour to work in details that you have come up with as you go along to come up with a mechanism that supports this allegation. That's what's actually happening, isn't it?

EVANS: That is incorrect. I apply my clinical experience to the evidence I have in front of me.

MYERS: Well, we have looked in that second report where you mark the key clinical change as 01.00. Now --

EVANS: Sorry, I need to correct you there. There's a key clinical change from around 01.00 hours. Okay? You need to put the whole word in. And the fact it's "from around" is a significant difference from what you just said, "Key clinical change at 01.00 hours".

MYERS: Okay. From around 01.15, then, 01.30?

EVANS: No, no, from 01.00 hours all the way up until the baby died, really.

MYERS: Now, in your first report, paragraph 31, I'm going to suggest to you, you try to link or you endeavour to link the deterioration with the liver haematoma.

EVANS: I did.

MYERS: So this is what's said in this report, having had the clinical notes and the details. At paragraph 31, you say: "It is my opinion that his collapse did not cause the subcapsular

haematoma to his liver and in my opinion the subcapsular haematoma caused the collapse."

EVANS: Correct.

MYERS: I'm putting that there for completeness but that's not what I'm focusing on, I am focusing on this. You go on to say: "I also note the comment regarding the petechial discolouration over the right side of the liver (over the liver)..." This is what Dr Brearey identified --

EVANS: Yes.

MYERS: -- that mark: "... noted by one of the doctors who conducted [Baby O]'s resuscitation." You then say: "This suggests that [Baby O] sustained some form of trauma which initially led to his increased heart rate and increased respiratory rate from around 01.30 hours on 23 June and which eventually led to a tipping point where the effects of the bleeding led to his collapse and subsequent death." So what you were doing there, Dr Evans, was to link what you say was the key clinical change from around 01.00 with the discoloured mark to the haematoma.

That's what you were trying to do in that first report, isn't it?

EVANS: The discolouration was not recorded, was recorded late -- in the late afternoon of the 23rd. There was no discolouration during the early hours recorded, it was late afternoon.

MYERS: I'll just repeat it: "I also note the comment regarding the petechial discolouration over the right side of the chest noted by one of the doctors who conducted [Baby O]'s resuscitation.

This suggests that [Baby O] sustained some form of trauma which initially led to his increased heart rate and increased respiratory rate from around 01.30 hours on 23 June." That's what you said.

EVANS: Well, if you look at the record, there was an increase in heart rate, as I've noted. The increased respiratory rate occurred far later.

And as for the petechial haemorrhage, which turned out not to be petechial haemorrhage, that was recorded late afternoon on the 23rd.

MYERS: And before we come back to the second report, just staying with the first one, lest there be any doubt, in your

opinion, at page 10 of 11 pages, paragraph 33, you said: "[Baby O]'s collapse is consistent with inflicted trauma some time during the early hours of 23 June 2016." And you describe the trauma in the abdomen and then you say: "The presence of the suspected purpuric rash noted over the right chest wall is an important superficial marker noting the external site of the trauma." Do you see that, Dr Evans?

EVANS: I have.

MYERS: At that point you were seeking to link the changes in the early hours of 23 June with the rash as demonstrating trauma that is consistent with the collapse. That's what you were doing then, wasn't it?

EVANS: That is incorrect. The purpura was noticed in the afternoon. That's not clear in my opinion. As I've noted it was my sift report and this is why one needs to concentrate on my later report.

MYERS: When we come to your later report, paragraph 32, page 11 of 13, we have already identified where you make the reference to key clinical change from around 01.00; that was at paragraph 30. At paragraph 32 you say this. You make reference to deferring to what the pathologist's opinion is going to be.

EVANS: Yes.

MYERS: And you say three lines down: "In my opinion, the subcapsular haematoma (bleeding from the liver) caused the collapse." Then you say this -- this is in your second report, the June 2018 report: "I also note the comment regarding the petechial discolouration over the right side of the chest (over the liver) noted by one of the doctors who conducted [Baby O]'s resuscitation. This suggests that [Baby O] sustained some form of trauma which initially led to his increased heart rate and increased respiratory rate from around 07.00 hours on 23 June and which led eventually to a tipping point where the effects of the bleeding led to his collapse and subsequent death." So that's what you say, isn't it, Dr Evans in that report?

EVANS: That is what I've said and, as I've said, the petechial haemorrhages were noted far, far later.

MYERS: What you do there is you seek to link the petechial haemorrhage with the collapse and say that this comes out of some form of trauma sustained around 07.00.

That's the time, that's what you say, isn't it?

EVANS: No. Again I say from around 7.00 and I was based -- I based that opinion on the belief at the time that the rash was a petechial rash, which turned out not to be the case. So I cannot form an opinion on information that turns out to be incorrect. The information I had at the time was inaccurate. Once I heard it was inaccurate, I changed my opinion. Simple.

MYERS: Well, you certainly had the information which led you to say there were key clinical changes from around 01.00, didn't you?

EVANS: We've discussed that.

MYERS: Yes. You had that. You seek to link -- we have the note from Dr Brearey which actually described the rash later that afternoon and you had that (overspeaking) --

EVANS: No, I didn't.

MYERS: -- the clinical notes.

EVANS: No, I didn't.

MYERS: You had the clinical notes.

EVANS: Yes, I know, but the notes I had, which were written in retrospect by the way, by Dr Brearey, that's not a criticism, related to his discovery of the rash.

I didn't know the timing of the rash at the time, not accurately anyway. It's only later -- it's only later, as we heard from Dr Brearey yesterday, that, first of all, I discovered that the petechial rash was not petechial and it's only later that I discovered that the -- sorry, that I was able to confirm that the rash appeared and disappeared around the afternoon of the baby's death.

So I did not have that information in 2017 and I did not have that information in 2018.

MYERS: Can we put up tile 243, please, Mr Murphy? Go behind that and look at the notes.

There are maybe half a dozen pages of clinical notes before this one and that include the notes from [Dr A] and other doctors, all of which you had at the time of writing both of these reports, didn't you, Dr Evans?

EVANS: Yes, yes.

MYERS: Right. The first time there is any reference in these notes is in the retrospective 18.00 note by Dr Brearey that we have here.

EVANS: That is correct.

MYERS: That's right, isn't it?

EVANS: Yes.

MYERS: This is the first time there's any reference to a small discoloured, question mark, purpuric rash on the right chest wall.

EVANS: It is.

MYERS: Right. Nothing to suggest it was any earlier than that?

EVANS: As far as I know, no.

MYERS: No. And you have taken this and tried to weave it into the clinical findings that you say are key from around 01.00 and link that to the haematoma that was present at the time of collapse. That's what you've tried to do, Dr Evans, isn't it?

EVANS: No.

MYERS: That's why in your more considered report at paragraph 32, you say: "I also note the comment regarding the petechial discolouration over the right side of the chest [you add 'over the liver'] noted by one of the doctors who conducted [Baby O]'s resuscitation. This suggests that [Baby O] sustained some form of trauma which initially led to his increased heart rate and increased respiratory rate from around 07.00 hours on 23 June and which eventually led to a tipping point where the effects of the bleeding led to his collapse and subsequent death." You have tried to knit all of that together to create some sort of mechanism there, haven't you?

EVANS: No. We've clarified that the first entry regarding the petechial rash was in the afternoon of the 23rd.

I should have put that in my report, that the rash was noted first of all in the afternoon of the 23rd but I didn't because it wasn't clear. It's now very, very clear indeed.

MYERS: And you conclude, so far as the haematoma, the trauma is concerned, you conclude the second report, the June report, at paragraph 34 -- let's go to that -- with this. Having made reference to the value of pathology, you say: "His [[Baby O]'s] collapse is consistent with some incident some time during the

early hours of 23 June 2016." And you say: "The presence of the suspected purpuric rash noted over the right chest wall is an important superficial marker noting the external site of the trauma." And you say he may have sustained blunt trauma to the abdomen over the area of the liver, that causing bleeding.

But even there at the conclusion of that report on this issue, you link, you say the collapse is consistent with an incident during the early hours of 23 June, don't you?

EVANS: We've just agreed that the purpuric -- that the rash, whatever it was, was present, not present in the early hours, we've agreed that the rash was noted during the afternoon of the 23rd June.

MYERS: We've got what Dr Brearey says about this rash on our screens, we can see the full extent of it; yes?

EVANS: Yes.

MYERS: Do you see that, Dr Evans? "Small, 1 to 2 centimetres..." He gave that in evidence, it doesn't say that here: "Small discoloured rash on chest wall." First of all, nothing here suggests that is in the location of the liver, does it?

EVANS: The liver is located under the right chest wall. That's where the liver is.

MYERS: The right chest wall covers quite an area, doesn't it?

EVANS: That's the right chest wall and that's the liver

(indicating). It's under the right chest wall. That's where the liver lives.

MYERS: The chest wall extends higher than just the bottom of the ribs, doesn't it?

EVANS: I think we know where the liver is.

MYERS: You told us that this mark is over the area of the liver. That was in your evidence this morning.

EVANS: If it's under the -- sorry, if it's over the right chest wall, that's where the liver is.

MYERS: You have again tried to knit one piece of evidence to a mechanism to support this allegation, haven't you?

EVANS: No, I have put together the clinical findings I had in 2018 to explain what I think happened. I did not make it clear

about the timing of the purpuric rash or the suspected purpuric rash and, once I got more information, I was able to give a more definitive opinion regarding the cause of this little baby's collapse and demise.

MYERS: There's nothing about a purpuric rash which indicates that is the site of trauma at all, is there?

EVANS: If it's over the right side of the chest, and the liver is under the right side of the chest, then that's -- you can put the two together. The fact that the rash disappeared -- Dr Brearey said this -- the fact the rash disappeared in a couple of hours means it's not a purpuric rash. So whatever, it was not a purpuric rash. Okay?

MYERS: What happened during the course of your explanation, your account (inaudible) to put it together, what happened was by the time we get to your third report on 25 March 2019, you had actually received a statement from Dr Brearey, hadn't you?

EVANS: Yes.

MYERS: Yes. When you read that statement, you saw that he described how this small discoloured purpuric rash had vanished.

EVANS: Yes.

MYERS: And you realised it was impossible in that case to suggest that this is a bruise over a site of trauma; that's what you realised, isn't it?

EVANS: Correct.

MYERS: At which point you just automatically switched to air embolus, didn't you?

EVANS: I didn't automatically switch to air embolus. What I did was, having realised that this rash was a short-lasting rash and that this is something that had been published in literature, scientific papers in the past and also found in other cases in this trial, so we had this pattern of this peculiar rash and the collapse and the failure of resuscitation, so therefore this is far more consistent with this baby collapsing and dying from the effects of air embolus, but had been destabilised by trauma to the liver.

MYERS: Nothing about a small discoloured rash on the right chest wall matches any description in the literature, as you put it, relating to air embolus, does it?

EVANS: No, I'm relying on what Dr Brearey said.

MYERS: No, this doesn't match any description of an air embolus.

EVANS: I'm describing what Dr Brearey described and it's not just that, it's the fact the baby collapsed and resuscitation was unsuccessful.

MYERS: Let's deal with this piece of evidence here because this is with regard to an attendance at intubation with [Dr A] round about 3 o'clock that afternoon. You're saying a small discoloured purpuric rash on right chest wall is evidence of air embolism.

EVANS: No. No, there's no connection between a purpuric rash and air embolism. The pattern that we have described in these previous cases in relation to the discolouration in the skin, that is associated with air embolus, varies according from one case to another, but what is consistent is that it's sort of -- it lasts a short time, disappears, and interestingly, I've lost count of the number of local medical staff who said they had never seen anything like this before and they have never seen anything like it since. As paediatricians we see purpura on a regular basis, so therefore there is a very unusual pattern to this particular baby's -- to this baby's particular rash, as there is to the other babies.

And once Dr Brearey -- once I received this additional information from Dr Brearey it was clear to me that the original description, ie this purpuric rash, was incorrect.

MYERS: Let's not for the time being get hung up on the word purpuric, which refers to the blood vessel underneath and might suggest a bruise or some impact in that way.

What you are doing is taking the description that is given by Dr Brearey here and trying to convert that into something that can support an air embolism. That's what you're trying to do, isn't it?

EVANS: It's consistent with an air embolus.

MYERS: A 1 to 2-centimetre mark on a right chest wall is consistent with air embolism, is it?

EVANS: It -- well, it's not just that. The baby was in a collapsed state and failed to recover, so that adds to my clinical suspicion regarding the association between this discolouration and subsequent events, in other words, the death of this baby.

MYERS: Let's look at this discolouration: a 1 to 2-centimetre, that big (indicating), discolouration, you say is consistent with air embolus in one part of the chest wall, is it?

EVANS: It's consistent, it's part of the overall collection of diagnostic features that led to this baby's death.

MYERS: You will seize on whatever you think you can to try to prop that up, won't you, Dr Evans?

EVANS: No, I'm sticking with my clinical experience and the clinical evidence in scientific papers and the fact that this baby's recovery -- sorry, demise -- and the fact that this baby died. And as we heard from Dr Brearey yesterday, he did not think that the bleeding from the liver would have been sufficient to cause his death, cause his... cause his... I've forgotten the word...

would have made him unwell but he would have responded to resuscitation. That was Dr Brearey's opinion, I agree with it. So therefore we have, as in other cases, a combination of features here.

MYERS: You endeavour to try to link what happened at 1 o'clock in the morning to what happened to the liver.

EVANS: No.

MYERS: I suggest that when you got Dr Brearey's statement and read it before your report in March 2019, you saw this had vanished within an hour or two, you had to come up with something else and that's what you did?

EVANS: It's not a matter of coming up with something else, it's relying on the information you receive. That's what Dr Brearey says. It's up to the members of the jury to believe if what he said he saw -- you know, fine. But having read his report, he's an experienced paediatrician, he's never seen anything like this before or since, so there, that is -- and this baby died, remember, so it's... You know...

MYERS: So we can be quite clear, your expert opinion is that a 1 to 2-centimetre rash on the right chest wall is consistent with air embolus. Let me be clear: is that what you're saying? Is that right, Dr Evans?

EVANS: It's a feature one associates with air embolus.

MYERS: How does that fit in with good perfusion, which we know means that the blood supply and the oxygen is working well? That's part of it. Where does that fit in with good perfusion?

EVANS: Where's good perfusion?

MYERS: This is the next words. This is material you've had for a long time. Good perfusion, how does it fit in with that?

EVANS: If the rest of the skin looks normal then the rest of the skin is normally perfused.

MYERS: That doesn't sit with an air embolus, does it, Dr Evans?

EVANS: Yes, it does actually.

MYERS: You've got a 1 to 2-centimetre spot and good perfusion.

EVANS: We've discussed this 1-centimetre rash, I have given you my opinion. I don't know how many times I can repeat it but that's my opinion.

MYERS: Good perfusion. Is that something you encounter in the course of an air embolus?

EVANS: Yes, it is. We've discussed this in terms of the anatomy of it. Where the air will go will vary. If the air went to a particular part of the abdomen or the chest wall, then you will find the abnormalities there.

But if the air does not go to other parts of the body then those other parts of the body will be normally perfused. That's the way it is.

MYERS: Right. So this air embolus found a 1 to 2-centimetre spot to go to; is that right?

EVANS: Sorry?

MYERS: Throughout the whole of the bloodstream, that's where it goes to, to a 1 to 2-centimetre spot?

EVANS: It can go anywhere. It can go anywhere.

MYERS: You are working this together as you go along, aren't you, Dr Evans?

EVANS: No, I have put it all together over 5 years ago. I'm simply looking at the clinical notes without access to discussing it with local staff or anyone else. I've had to amend my view on receipt of additional information but in this case and in other cases where I have flagged up the diagnosis of inflicted injury -- right? This baby suffered from inflicted injury. In fact, he suffered three inflicted injuries in my

opinion. The air embolus is one. The trauma to the liver, which I defer to the pathologist by the way, so I'm not going to go down that road, and I think the vomiting was a concerning issue as well.

So these are three separate events, all of which can be explained by inflicted injury. None of which can be explained on the basis of complications that affect stable and well premature babies.

MYERS: Just so it's clear --

EVANS: That is my view.

MYERS: We're looking at your mechanisms. You have said there are three mechanisms and in fact your first one was trauma at 1 o'clock -- around 1 in the morning wasn't it?

EVANS: I've told you about my sift reports, I've told you that I've had to add to information. This is my opinion as we are here.

MYERS: Your next one is that on the basis, particularly of this mark and good perfusion, this is air embolus? That's the second one, isn't it?

EVANS: I'm sticking with that. I'm sticking with that. But given that we've all confirmed that the rash was found some time in the afternoon of the day he died, a few hours before -- shortly before he died, that is consistent with the cause of his death, yes.

MYERS: It's recorded at this point by this doctor when it went.

EVANS: Mm?

MYERS: As for --

EVANS: That's a factual issue. Either he saw it -- either what he saw was what he saw or not. It's a factual issue.

That's for the members of the jury to decide if what he saw is what he's described in his statement in 2019.

MYERS: As for his terminal collapse, you concluded your evidence by saying that was air embolus and gave us no particular detail. That's because it's something you're throwing in as you go along.

EVANS: I am not throwing anything in at all. This is a baby who should not have died. This is a baby whose -- if his

deterioration was due to one of the common causes, like infection, he would have responded to resuscitation. He did not. He was destabilised by the trauma to the liver and I think the air was what finished him off, if I could put it in that awful way.

MYERS: The question --

EVANS: It's awful.

MYERS: -- is what is there that can make us sure that terminal collapse is due to an air embolus, Dr Evans. Right? And you have identified nothing at this point that goes together to demonstrate there was an air embolus operative at that point, have you?

EVANS: I have -- the baby died, the resuscitation failed.

We've discussed this rash for long enough. The little baby died. I've explained how I looked at all of these cases in isolation, in other words let's not look at the other -- this is case 15, let's not look at the other 14 cases. If this was a single case and I had access to all of the information from the beginning then there would be one substantive report from me saying what I'm telling you on oath in this court today.

MYERS: You --

EVANS: I did not have all the information at the beginning and therefore inevitably, one amends one's opinion as a result.

MYERS: You had what we see on the screen from the beginning, Dr Evans, didn't you?

EVANS: Yes, purpuric rash.

MYERS: We can take that down, please, Mr Murphy.

You have told the jury that chest compressions don't get near to the liver. That's what you have said to them.

EVANS: They do not.

MYERS: They don't?

EVANS: No, the liver --

MYERS: Where is the liver in relation to the chest, please?

EVANS: The liver is found at the bottom end of the right chest wall. Cardiac compressions are over the sternum, in other words

of the middle of the -- over the middle of the chest and at the upper end of the chest wall.

(indicating). I'm a bit bigger than these babies but the liver is here, the cardiac compression is here, and we're talking about experienced paediatricians who would know how to resuscitate little babies. And they've had plenty of experience of it, as we have heard in this trial. There's no other information I know of any other baby who had liver haematoma either as a result of chest compressions or anything else. So chest compressions will not cause --

MYERS: When we come to consider this (overspeaking) --

EVANS: Sorry --

MYERS: You have motioned towards the central area of your chest. Is that where you say chest compressions are performed on a baby?

EVANS: Yes, I mean, I don't have a baby doll here where I could demonstrate it. Anyway, it's over the front -- it's over the centre of the chest.

MYERS: I'm going to suggest that you well know chest compressions are performed just in the area or just below the sternum, almost over the area where the liver is or very close to that. That's where they are performed, isn't it, Dr Evans?

EVANS: I'm not -- I know exactly where it's performed and I don't know any baby who was resuscitated by experienced people who either died and where the post-mortem showed liver trauma, as we described here, and I know of no case where babies were resuscitated successfully where cardiac compression was required but where subsequent investigation noted the liver haematoma as described here. Okay? So I don't know any of that in any case.

MYERS: What I just asked you -- it was a simple question, I apologise for having to repeat it -- was that chest compressions on a baby are performed in the area over -- just below the sternum, around the sternum or over and very close to where the liver is. That's what I asked you. Are you going to answer that?

EVANS: No, it's over the top of the sternum. You're pointing in the wrong direction. It's over here (indicating) and the liver is down here (indicating), down here.

MYERS: It is entirely possible for there to be some injury to the liver from vigorous chest compressions to a baby, isn't it?

EVANS: I think that's very unlikely but the more important point is this: this baby collapsed, which is why he needed chest compressions in the first place. So what's the cause of his collapse? My initial view was that the collapse was due in the main to trauma to the liver, which caused the bleeding to the liver, which bled into the abdomen. That was my initial opinion because I knew nothing about this rash that had come and gone in a couple of hours.

So that was -- so it fits in with the clinical impression that I had at that time. As for the early hours, the only thing I had to go on was that the heart rate had gone up, that he was in air, breathing, you know, with normal saturations. So therefore I looked at all the options, that doesn't fit, that doesn't -- that's insufficient to explain his collapse.

MYERS: There's no --

EVANS: Sorry. Therefore his collapse can only be explained for the reasons we've just discussed.

MYERS: Just so it's quite clear, the process as you know, is we're looking at what you're suggesting; okay?

EVANS: Sorry?

MYERS: We're exploring the basis for what you suggest as mechanisms. Do you understand that?

EVANS: Yes.

MYERS: Yes. And I'm suggesting to you that vigorous chest compressions can cause or are capable of causing haematoma or injury to the liver.

EVANS: Never seen it.

MYERS: Never seen it. Are you agreeing or disagreeing?

EVANS: I have never seen it, I have never read about it. It's not something I've heard of in any of the other babies in this series of 17 cases.

MYERS: And with regard to the abdominal distension, which is the third thing you are adding, and I suggest you're putting that in as an additional feature just to try to support the allegation, aren't you, rather than to reflect the evidence?

EVANS: No, no, it's not supporting the allegation, it's reflecting the evidence. If we look at the evidence of the abdominal distension, what we've got is that the baby, who had

13ml of fluid -- sorry, of milk, I should say, around 12.30, and there was no aspirate, in other words the rest of the fluid he had taken -- now 13ml is a tiny amount of fluid. Okay? It's a tiny amount of fluid. Half a shot. I don't drink shots, but it's a small amount. And he vomited and his abdomen blew up.

Now, if you've had 13ml of fluid every 2 hours and -- your abdomen isn't going to suddenly distend.

It's only going to distend if you have either far more than 13ml of milk or -- and/or milk plus air.

We heard from the WhatsApp evidence the other day of the -- the WhatsApp evidence was that his abdomen blew up in the afternoon. That was the evidence from Nurse Letby in her WhatsApp thing, the abdomen blew up in the afternoon.

So you cannot explain the abdominal distension on the basis only that he had 13ml of milk.

MYERS: There is --

EVANS: You can not do that. If he vomited and if the vomiting was due to -- sorry, if the abdominal distension was due to milk only, then by vomiting, the abdomen would have gone down, wouldn't it? It didn't. Therefore, the abdominal distension cannot be explained on the basis of his having had 13ml of milk 45 minutes earlier.

MYERS: You're a very experienced expert witness, aren't you, Dr Evans? Aren't you?

EVANS: Well, I've been in court a lot, yes.

MYERS: Mm. Is it your belief that if you keep talking and using up time when I ask straightforward questions, somehow that will distract from my questions, I'll get bored or I'll stop asking questions? Is that what you're trying to do?

EVANS: I think that's being discourteous to me and I don't think that's necessary.

MYERS: You choose to hold forth upon topics at length as you like when you are asked questions, don't you?

EVANS: No.

MYERS: And you choose not to answer the questions that you're asked, don't you?

EVANS: No.

MYERS: There is nothing about the abdominal distension in this case that indicates, for example, an abdomen was being splinted, is there?

EVANS: I never said that, no.

MYERS: There's nothing about the abdominal distension in this case that shows that it was capable of or did interfere with the respiration of [Baby O], is there?

EVANS: There was a bradycardia there, I think. I think the heart rate dropped. That's the first point. The second point, it was sufficiently concerning for a doctor to be called to attend to the baby. So it was a concerning event, okay? It was a concerning event.

MYERS: There's --

EVANS: Sorry, little babies will bring up bits of milk, nurses will deal with that, they won't call doctors. But this was sufficient for -- the heart rate dropped, that's concerning, the vomiting was sufficient for the doctor to be called. That's a significant event. All right?

MYERS: When the doctor was called at 13.15, the event you're talking about, that was not regarded as a serious event in terms of a deterioration to be expected like the one that followed, was it?

EVANS: Sorry, which one are you talking about?

MYERS: When the doctor was called at 13.15 with the vomiting and with some abdominal distension, nobody suggested that that was an event that was going to lead to anything like this, did they?

EVANS: Oh no, they -- it was a significant event, but I would not have anticipated that as a result of that event the baby would have deteriorated.

MYERS: And breathing support is capable, as it happens, of causing some degree of abdominal distension, isn't it?

EVANS: CPAP can lead to a bit of air going into the stomach.

MYERS: We've heard plenty of evidence in this case, Dr Evans, haven't we, about CPAP belly and distension, abdominal distension?

EVANS: He wasn't on CPAP.

MYERS: He was on Optiflow.

EVANS: Yes.

MYERS: Similar mechanism?

EVANS: No.

MYERS: Optiflow is capable of causing it?

EVANS: It had dropped from 6 litres to 4 litres of Optiflow when this happened. Optiflow is used all over neonatal units. You don't get these sudden collapses with Optiflow.

MYERS: There is no basis to suggest that the ultimate collapse, sadly, in the case of [Baby O] arises because of abdominal distension, is there?

EVANS: Oh, it didn't.

MYERS: Right.

EVANS: The abdominal distension did not cause his ultimate collapse. I've explained to you what caused his ultimate collapse. But it compromised him. That's the word I was looking for earlier. The abdominal distension compromised him.

MR MYERS: I'm not going to ask any further questions, my Lord.

Re-examination by MR JOHNSON

MR JOHNSON: Just one area I would like to deal with, please, Dr Evans, if Mr Murphy could help me out by putting up on the screen Dr Brearey's notes. They are pages J23582 to 3.

You have been asked at some length about what you knew about the query purpuric rash. Would it be right to say that you were saying to Mr Myers that the reason for you introducing the issue of air embolus is because you were given information at some stage that the purpuric rash had disappeared?

EVANS: Correct.

JOHNSON: Right. So let's look at the information you actually had to start with on which you were linking it to the liver injury. This is Dr Brearey's note. If you could just read it to yourself, please. You scroll down when you get to the bottom of the page and you see if you can find there in the note the fact that the rash disappeared.

EVANS: I've been through this before, but no, but there's nothing in the record to say the rash had disappeared.

JOHNSON: So that isn't information that you were given at the beginning, is it?

EVANS: Correct.

JOHNSON: That's right. And you were first given that information a couple of years later; is that right?

EVANS: Yes.

JOHNSON: And that was in your report of 25 March 2019, which you made clear this morning?

EVANS: Yes.

JOHNSON: And that is the point at which you connected the disappearing rash with the issue of air embolus; is that correct?

EVANS: Correct, yes.

JOHNSON: Is that your explanation to the issue that Mr Myers was asking you about?

EVANS: Yes.

MR JOHNSON: Yes, thank you.

Does your Lordship have any questions?

MR JUSTICE GOSS: No, I don't, thank you very much.

Thank you, Dr Evans. That completes your evidence at this stage. You will, of course, be coming back to give further evidence, so the usual rules apply.

EVANS: Yes.

(The witness withdrew)

MR JOHNSON: Thank you. Dr Bohin, please, my Lord.

DR SANDIE BOHIN (recalled)

Examination-in-chief by MR JOHNSON

MR JOHNSON: For the recording, would you identify yourself, please?

BOHIN: Yes, Dr Sandie Bohin.

JOHNSON: Were you asked or were you instructed on behalf of the prosecution in the case of [Baby O]?

BOHIN: Yes.

JOHNSON: And were you instructed on the same basis as in every other case that we've dealt with so far?

BOHIN: Yes, I was.

JOHNSON: Did you write one substantive report, which is dated 4 December 2020?

BOHIN: Yes.

JOHNSON: I would like just to take you through a few of those details, please, starting at your paragraph 2.3.

BOHIN: Yes.

JOHNSON: Were you sent a raft of material to consider, which included the following: medical records from the Countess of Chester; X-rays from the same source; post-mortem medical records and images from Alder Hey Hospital in Liverpool; a coroner's report; Dr Arthurs' report dated 19 May 2020; Dr Marnerides', the pathologist, report, dated 24 January 2019; and three reports written by Dr Evans, dated 2 June 2018, which was in fact his second report, 25 March 2019, which was the report where he was introduced to Dr Brearey's evidence that the rash disappeared, and then Dr Evans' report dated 7 April 2019?

BOHIN: Yes.

JOHNSON: Did the medical records that you received consist of 521 pages?

BOHIN: Yes.

JOHNSON: And it was apparent to you that some of the material was missing, but did you have enough to form an opinion?

BOHIN: Yes, I did.

JOHNSON: Thank you. You approached this on the basis of a peer review; is that right?

BOHIN: Yes.

JOHNSON: If you can reacquaint us with the concept of a peer review, please.

BOHIN: A peer review is to look at the salient facts of the case concerned but also take into account what someone else has done before and I was asked to look at what Dr Evans had reviewed, what Dr Evans' opinion was, and to comment on whether I agreed with his opinion, whether I disagreed with his opinion, or whether I came up with a new opinion that he hadn't considered.

JOHNSON: Yes. You've been accused in the past in this case of simply rubber-stamping what Dr Evans did. As a matter of interest, did you agree with everything Dr Evans said in this case?

BOHIN: No.

JOHNSON: Right. Let's deal with the chronology then, please.

You set out the circumstances of [Baby O]'s life from his birth on 21 June through to his death on 23 June; is that right?

BOHIN: That's correct.

JOHNSON: Taking up at your paragraph 4.5, please, on the day of [Baby O]'s death, namely 23 June, did you set out a summary of the nursing note that we have heard about at 07.32?

BOHIN: Yes.

JOHNSON: And the consequent examination by Dr Mayberry, which was, as we know, noted in the nursing note rather than the medical records?

BOHIN: That's right. The nursing staff asked him to review the abdomen because the abdomen was described as loopy.

I heard his evidence that he was called away so was unable to write an entry.

JOHNSON: Yes. Did you, at your 4.7, summarise what Dr Cooke had found?

BOHIN: Yes, Dr Cooke undertook the ward round, routine ward round, on the morning of the 23rd, and she concluded that although [Baby O] was on 4 litres a minute of Optiflow, he was on no oxygen and had no increased work of breathing. The remainder of her examination was unremarkable.

JOHNSON: Did you next refer to the observation chart which the jury saw this morning before the break?

BOHIN: I did.

JOHNSON: Did you observe what you describe as the steady increase in heart rate and respiratory rate from 01.00 hours to 13.30 hours on 23 June?

BOHIN: That's correct.

JOHNSON: Did you refer to the fluid balance chart, Dr Bohin?

BOHIN: Yes, I did.

JOHNSON: What did you find there, please?

BOHIN: That [Baby O] had been started on feeds. These had steadily increased over the course of his life, but by the 23rd he was receiving 13ml of expressed breast milk via nasogastric tube every 2 hours. And that his last feed was at 12.30 on 23 June, which was a nasogastric tube feed.

JOHNSON: Yes. Now, just pausing there for a second, if you wouldn't mind, if you could go to jury bundle 2, and go to the very final page behind divider 20, please.

BOHIN: Yes.

JOHNSON: Here we have the feeding chart, is that right, at page 23676?

BOHIN: Yes.

JOHNSON: We can see Lucy Letby's notes of feeds given at 10.30 hours and 12.30 hours?

BOHIN: Yes.

JOHNSON: And before that, we can see notes made by other nursing staff earlier in the day?

BOHIN: Yes.

JOHNSON: Is it there that we see this quantity of 13ml being given every 2 hours?

BOHIN: Yes. Well, early on it was 10 and it went up to 12 and then 13 --

JOHNSON: Yes.

BOHIN: -- in accordance with the medical staff's directive that the parenteral nutrition be reduced and that the fluids be increased.

JOHNSON: Yes. So we have heard this evidence, but just to remind us, we see towards the top of the chart the TPN, total parenteral nutrition. That, as you say, is being reduced from 2.3 down to 0.9ml per hour to nothing at all at 4 am?

BOHIN: Yes.

JOHNSON: And a consequential increase in the amount of enteral milk being given via the NGT while that reduction was taking place?

BOHIN: That's correct.

JOHNSON: So to 10 to 12 and then to 13 at 08.30 hours; is that right?

BOHIN: Yes, that's correct.

JOHNSON: Do we also see that the aspirates were trace aspirates so far as the entries at 8.30, 10.30 and 12.30 were concerned?

BOHIN: Yes, they say trace. Before that there's a note of aspirates but it doesn't actually give you any indication of the volume.

JOHNSON: Yes. I think Sophie Ellis, the jury will remember, gave us evidence about that and was asked a number of questions about that.

BOHIN: Yes, that's correct.

JOHNSON: So taking up the chronology then. After that final feed is noted apparently by Lucy Letby at 12.30, did you note at your paragraph 4.10 an event at 13.15?

BOHIN: Yes. There was a vomit of undigested milk and a development of abdominal distension.

JOHNSON: That was what provoked Registrar [Dr A], [Dr A], being called and the events which he recounted to us this morning?

BOHIN: That's correct.

JOHNSON: We see then at your 4.11 that blood gases were taken; is that right?

BOHIN: Yes, it is.

JOHNSON: We see that on the preceding page in the jury bundle, 23667.

BOHIN: Yes.

JOHNSON: We can see Lucy Letby's entry there at 13.20. Can you help us with those blood gases, please?

BOHIN: Yes. The gas at 13.20 was a venous gas. The pH is low at 7.2. The CO₂ is a little high in the context of a baby breathing quite quickly, but is not terribly high. The oxygen, the PO₂ we can ignore because it's a venous sample. The bicarbonate, again, is a little bit low. The important thing here is that the base excess is minus 8, which is higher than one would expect. So looking at that part of the gas, that shows us this baby has got a metabolic acidosis, which I think other people have spoken about already this morning.

Then moving across to the lactate, the lactate is 5.1, which is abnormal, and that would indicate that there is an untoward metabolic process going on. It doesn't tell you what's going on, but it tells us, really, that you need to take note of that and to perhaps look a bit further than you originally thought because this is an abnormal gas.

The other thing on this gas is it says here "Optiflow 4 litres" and then there's an arrow saying "CPAP" and then "air". And I actually couldn't find anything in the notes that suggested that [Baby O] had moved from 4 litres of Optiflow back on to CPAP.

JOHNSON: No.

BOHIN: But this gas says that that's what happened. But there's nothing in the nursing notes or the medical notes to suggest that he went back on to CPAP.

JOHNSON: So this is a note made by Lucy Letby suggesting that this child was put back on to CPAP, which isn't replicated anywhere else in the notes; is that right?

BOHIN: That's right.

JOHNSON: As a matter of fact, would CPAP normally, potentially, explain a distended abdomen?

BOHIN: Potentially it would. Because CPAP is, as we've heard before, air or oxygen, so gas, blowing down the nose, it can help to keep the airways open but can also distend the gut. But it's a matter of degree, I guess. This whole concept of CPAP belly is a matter of degree. It can cause mild abdominal

distension, but in my experience it does not cause severe abdominal distension.

JOHNSON: What about Optiflow?

BOHIN: In my experience Optiflow does not cause a huge abdominal distension, and in fact the amount of gas put in -- the flow of Optiflow used can be quite high and so at very high levels, I guess in theory there'd be more chance of having gas going into the gut. But actually, [Baby O] wasn't on high levels of Optiflow at all, he was only on 4 litres a minute, so that would not be sufficient to cause a sudden blowing up of the abdomen, as was described.

JOHNSON: If the decision was taken to move a child from Optiflow to CPAP, is that a medical decision or a nursing decision?

BOHIN: It's a medical decision.

JOHNSON: Yes. So it's not a decision a nurse would be making?

BOHIN: No, because it's a change in respiratory support. So it's a step up, it would mean that a child had required an increased amount of support, and that would not be done by a nurse on her own.

JOHNSON: And there is no note of that in [Dr A]'s notes, is there?

BOHIN: There's no note of that anywhere else.

JOHNSON: No. Thank you.

Moving on, please, you note next at your paragraph 4.14 that there was a profound desaturation at 14.40 hours.

BOHIN: Yes.

JOHNSON: Is that right?

BOHIN: That's correct.

JOHNSON: And that [Baby O] was described in the nursing notes as "mottled ++"?

BOHIN: Yes.

JOHNSON: You repeat that information from [Dr A]'s perspective in your paragraph 4.15, which equates to tile 199; is that right?

BOHIN: That's correct.

JOHNSON: At that stage [Baby O] had to be bagged with a Neopuff; is that right?

BOHIN: He was bagged with a Neopuff in 100% oxygen and in fact needed high pressures in order to get some clinical improvement. [Dr A] explained that this morning: with normal pressures they couldn't actually get the saturations back, so the pressures were increased to 28/6 in order to get good saturations and chest expansion.

JOHNSON: Thank you. At your paragraph 4.16 did you next note events at 15.03 when [Baby O] was intubated and ventilated?

BOHIN: Yes.

JOHNSON: That's evidence that we heard from both [Dr A] and Dr Brearey.

BOHIN: That's right.

JOHNSON: At your 4.17 did you next note the part of Dr Brearey's notes where he referred to a "small 1 to 2-centimetre discoloured [query] purpuric rash on the right chest wall"?

BOHIN: Yes.

JOHNSON: Thereafter, your 4.18, and this is all in the sequence at tile 218 onwards, did you note [Baby O]'s further desaturation at 15.51?

BOHIN: Yes.

JOHNSON: Combined with a bradycardia?

BOHIN: That's correct.

JOHNSON: That there was good chest movement with bagging but his saturations and condition did not improve?

BOHIN: That's correct, they stayed -- his saturations stayed at around 70% to 85%.

JOHNSON: You recorded his re-intubation at 16.01; is that right?

BOHIN: Yes.

JOHNSON: Despite that, and despite the fact he was being given 100% oxygen, his saturations remained defiantly low, between 72% and 86%?

BOHIN: That's correct.

JOHNSON: Did you record next the fact that discolouration of the abdomen was also noted by the nursing staff?

BOHIN: Yes, the nursing staff in their account of this particular period around the re-intubation noticed discolouration -- had mentioned discolouration of the abdomen.

JOHNSON: Yes. If we can just remind ourselves of that evidence, please, at tile 252. This is Lucy Letby's account in the nursing notes. Pretty much in the centre, it says: "Placed back on to ventilator." So let's go just up the page. We've got the event of 14.40 with "mottled ++" and "abdomen red and distended"; is that right?

BOHIN: Yes. My mouse isn't working, I'm sorry. Where it says "placed back on to ventilator", it mentions, second line in on that paragraph, discolouration of abdomen.

JOHNSON: That's where I was about to come to. Thank you.

So four paragraphs down, as you say: "Placed back on to ventilator. Dopamine commenced." Then missing out a line, effectively, it says: "Discolouration to abdomen." And then: "Unable to obtain heel prick blood gas due to poor perfusion." Okay?

BOHIN: Yes.

JOHNSON: Thank you. Did you, at your paragraph 4.20, note that at 16.05 hours, so at pretty much the time we've just been looking at in the notes, there was a further deterioration?

BOHIN: Yes.

JOHNSON: And CPR was commenced at 16.19?

BOHIN: Yes.

JOHNSON: That adrenaline, saline and sodium bicarbonate were given?

BOHIN: Yes.

JOHNSON: That spontaneous circulation returned at 16.30 hours?

BOHIN: Yes.

JOHNSON: And then you note: "Perfusion was poor and the rash on the chest and abdomen persisted and is noted by the registrar and the consultant."

BOHIN: Yes.

JOHNSON: And you have also, have you not, heard the evidence of Mr [Father O], the father of [Baby O], as to what he saw at this time?

BOHIN: Yes, I heard the evidence of [Father O] in court.

JOHNSON: At your 4.21, at 16.46, did you record the fact of the X-ray and what you thought it showed?

BOHIN: Yes. The bowel gas on the X-ray had reduced from that shown on the previous X-ray.

JOHNSON: Yes. That at 17.15, [Baby O]'s saturations fell to 35%?

BOHIN: Yes.

JOHNSON: That's tiles 266 and 267.

That the rate of the dopamine was increased, he was given six doses of adrenaline, two of bicarbonate and further fluids to support his circulation?

BOHIN: That's correct.

JOHNSON: Did you then record the use of the intraosseous line?

BOHIN: Yes.

JOHNSON: And the fact that, as a result of that, some further blood gases were taken, which -- are they what we can see -- if we've still got the page open in the jury bundle 2, are they the final line that we see signed by Lucy Letby?

BOHIN: Yes, they are. Elsewhere in the -- obviously, on this gas it's an abnormal gas, the metabolic acidosis is much worse than the gas taken at 13.20. This says C, for capillary gas, but we know from Dr Brearey's evidence that actually it was from the intraosseous fluid. This gas was taken because they couldn't get capillary gases, which was the whole point of putting in the intraosseous line.

So this gas was taken from the intraosseous fluid.

It says lactate and glucose are unavailable, but the actual printout that is elsewhere in the notes, which is a bit like a

supermarket till printout, also shows that the haemoglobin had dropped significantly by this point and was only 8.6. That's very different from the previous haemoglobin on the previous gas. So on the charts that the Countess of Chester Hospital use for the recording of blood gases, it just gives you the blood gas, it doesn't give you the other parameters that those machines are capable of giving. But actually, if you look at those, they do show a big drop in haemoglobin down to, I think, either 86 or 89.

JOHNSON: Yes. You referred next to the insertion by Dr Brearey of an intravenous cannula at McBurney's point?

BOHIN: That's correct.

JOHNSON: And the fact that he obtained blood from that?

BOHIN: He did. But as he said yesterday, only a small amount of blood. I wouldn't like people to suspect that there was a huge amount of blood there. He told us that he only obtained a small amount of blood.

JOHNSON: Yes. Then finally, in this section, the fact that the resuscitation of [Baby O] was unsuccessful at 17.43 and, sadly, his death was confirmed at 17.47?

BOHIN: Yes, that's correct.

JOHNSON: Did you next address the findings of the pathologist at Alder Hey Hospital?

BOHIN: Yes.

JOHNSON: In particular, the findings concerning abnormalities, if I use that relatively neutral phrase, to [Baby O]'s liver?

BOHIN: Yes, that's correct.

JOHNSON: And also you refer in your report, and we'll have to wait for him to hear this, to Dr Marnerides' opinion concerning the cause of [Baby O]'s death?

BOHIN: Yes, that's correct.

JOHNSON: Did you consider additionally Dr Arthurs' opinion, which the jury will hear tomorrow, concerning the X-ray taken after [Baby O]'s death?

BOHIN: Yes.

JOHNSON: Just so that the jury has a hint of what's coming, the fact that gas was detected within the great vessels of the abdomen, in other words either or both of the aorta and the vena cava?

BOHIN: That's correct. He will tell you himself, I'm sure tomorrow, that he was not clear which of the great vessels the gas was in or indeed if it was both.

JOHNSON: Yes. So can we move on, please, Dr Bohin, to your opinion and comment. Can you tell us, in the light of all that information which we've summarised, together with your reading of the records and having heard the witnesses' evidence over the last few days, what is your opinion concerning the collapses and death of [Baby O]?

BOHIN: Well, [Baby O] was a slightly premature baby who was a triplet, but he was well. He was very well. He was fully fed. He was receiving minimal support and was not giving the clinical team any cause for concern until he vomited at 13.30 on the 23rd.

Although there was a trend to an increase in heart and respiratory rate, this was not thought to be significant by the clinical team treating him at that time and they decided that they would watch and wait to see what happened.

They subsequently undertook an X-ray which showed a huge amount of gas within the abdomen and my reviewing of that X-ray, and I'm not a radiologist, showed something that wasn't compatible with CPAP belly, which we have heard of before, and [Baby O] hadn't been bagged at the time that X-ray was taken, so I couldn't find an easily explicable natural reason for that amount of gas being within the abdomen.

My conclusion that the cause for that degree of abdominal distension in that circumstance was exogenous, so outside, administration of air via the nasogastric tube into the stomach of [Baby O].

JOHNSON: If we can pause there for a second to just put a time on that X-ray. I would like the jury -- if the jury could have what we have on the screen in their papers copies that would be helpful. For your Lordship's reference it's divider 20, page 23667.

It's the penultimate document behind divider 20.

Can we go to tile 197, please, Mr Murphy.

We had earlier, and the jury will recall, the explanation from Mrs Tyndall as to why this entry had been put in just before or at the time of [Baby O]'s collapse at 14.40. So it was the context of the references that caused her to put it in at this time.

So is this the image that you are referring to, Dr Bohin?

BOHIN: Yes.

JOHNSON: I'll ask Mr Murphy to show us the image so that there's no room for mistake. This is the image the jury may recall isn't actually timed on the film.

BOHIN: That's right.

JOHNSON: Just going back to the gas chart, please, that the jury have at 23667. This image, if Mrs Tyndall has got the timing right, is an hour and a half after Lucy Letby has written into the gas chart that this child has been put on to CPAP when there's no other evidence to support that suggestion.

BOHIN: Yes.

JOHNSON: Yes. All right. So can we go back to your report then, please, Dr Bohin. I think you considered the possibilities or alternative natural cause type possibilities for excessive gas; is that right?

BOHIN: Yes. There was no evidence of bilious vomiting, no other evidence that would be compatible with necrotising enterocolitis, which we have heard about this morning.

Subsequently, Dr Wright's report mentions consideration of a mid-gut volvulus, which is a condition where the actual gut twists on itself and can cause abdominal distension, but it also causes a baby to become profoundly unwell and they vomit bile and, certainly in life, [Baby O]'s presentation was not compatible with that and certainly we know from the post-mortem that he didn't have a mid-gut volvulus.

JOHNSON: No. I'm sure the jury will remember that mid-gut volvulus was an issue that raised its head with the other [Baby O] in this case, didn't it, [Baby C]?

BOHIN: Yes.

JOHNSON: Just going back to that X-ray then and your paragraph 5.5, did you consider "innocent" causes for what you regarded as an unusually distended abdomen?

BOHIN: Well, of course I had to consider all possible causes, but I couldn't think of any cause that would cause that degree of abdominal distension and destabilise a baby that were innocent causes. So babies who are breathing quickly because they're in pain wouldn't cause that sort of distension. So I was at a loss to think of any natural, innocent causes, yes.

JOHNSON: Yes. We can see as a matter of fact from the X-ray report there that, according to the radiologist Dr Wright, the NG tube was in a satisfactory position?

BOHIN: Yes.

JOHNSON: If that NG tube had been on free drainage, would it or would you expect it to have relieved the distension to the gut at this stage?

BOHIN: It depends what caused the distension in the first place. The tubes are very small, so if air or gas goes into the abdomen very slowly, if you take off the end of the nasogastric tube, the abdomen will decompress very slowly. If air is put into the abdomen acutely then it will take quite a -- well, a long time for air to come out because the calibre, the bore of the nasogastric tube is very fine, so it will only decompress very slowly if the build-up is very slow.

JOHNSON: What was your conclusion as to the cause of this distension to [Baby O]'s stomach at this time?

BOHIN: Because I couldn't think of or find any evidence for any natural causes for this, my conclusion was that the abdominal distension and subsequent vomit was caused by excessive air put down the nasogastric tube.

JOHNSON: Thank you. At your 5.6, doctor, do you then record the fact that in effect [Baby O] had what you've described as a series of collapses between 14.40 hours and his death at 17.47?

BOHIN: Yes.

JOHNSON: At your 5.7 do you record the finding noted by Dr Brearey?

BOHIN: Yes. He attended to help [Dr A] or assist, rather, [Dr A] with intubation and noted abdominal discolouration. At the time when he first saw it, he thought it was a purpuric type mark, but as it had disappeared later on that day, it couldn't have been purpuric or it wouldn't have gone.

JOHNSON: Yes. Do you record the fact that "no detailed description of the mark" was provided by anyone?

BOHIN: Yes. The nursing staff mentioned discolouration of the abdomen but don't go into any detail. Dr Brearey likened the discolouration, the mark on the chest certainly, to purpura, but latterly, as he said in his evidence yesterday, he said it couldn't be purpura because it had disappeared by 17.15 and purpura would not do that, purpura lasts for days and days.

JOHNSON: But have you now heard the description given by [Father O]?

BOHIN: The description given by [Father O] is a very graphic description, both in the things he said and the way he gestured. Clearly the description he gave was of a rash that was coming and going. I think they were the words he used, something that was coming and going. And there was discolouration, which I think he likened to hives, so a nettle-type rash, which I think if you're a layman is probably a reasonable term to use.

JOHNSON: Moving on, did you then refer as part of your conclusions to Dr Arthurs' report, confirming the intravascular air within either the aorta or the vena cava?

BOHIN: Yes.

JOHNSON: And did you -- I'll leave Dr Arthurs' opinions to him if I may. But did you also refer to the fact that, as we heard, I think this morning from [Dr A], [Baby O] had neither a UVC nor a UAC?

BOHIN: Yes, that's correct. One of the issues, if one is trying to ascertain how air arrives in blood vessels, is: was exogenous air given by a UVC? And we know that actually that can't have happened in [Baby O]'s case via a UVC because he didn't have one.

JOHNSON: So by contrast to, say, the cases of the [Babies A & B] twins, who did have either a UVC or a UAC, [Baby O] was a child who did not have such a potential point of entry for air?

BOHIN: Well, he didn't have a UVC or UAC but he did have peripheral cannulae, so he did have venous access.

JOHNSON: We have heard there was the access being used all afternoon, then I think -- I can't remember which of the doctors --

BOHIN: [Dr B] put in a long saphenous line, which is a line into a big vein inside of the ankle.

JOHNSON: Thank you. Therefore what conclusions did you draw, please, Dr Bohin, from all that material?

BOHIN: My conclusions were that [Baby O] had signs that were compatible with an air embolus, ie the discolouration of the chest, the ongoing discolouration of his abdomen, his collapse that wasn't -- where he didn't respond to routine resuscitation and the fact that he had a cannula in situ. Coupled with the fact that air was seen at post-mortem, I felt he had an air embolus.

JOHNSON: Could you conceive of any "innocent" cause for an air embolus in the context of the treatment that [Baby O] had received?

BOHIN: Not an innocent cause, no.

JOHNSON: I'd just like to go to your paragraph 5.17, given that you have been accused repeatedly of rubber-stamping Dr Evans' opinions. Could you spell out for us, please, the respects in which you agree with Dr Evans and where you disagree with him?

BOHIN: Yes. In my final paragraph I have said that I agree with Dr Evans that the abdominal distension and X-ray findings are due to excessive air being administered via nasogastric tube. I agree with Dr Evans that the collapse at 14.40 was a result of an air embolus.

I agree with Dr Evans that neither the rupture of the subcapsular haematoma or the collapse at 14.40 was due to trauma secondary to vigorous resuscitation.

JOHNSON: Pausing there, you're agreeing with Dr Evans that CPR wouldn't account for the liver injury, putting it in more day-to-day language?

BOHIN: Yes. I do not entirely agree with Dr Evans that direct and deliberate trauma was inflicted to the right side of the chest, as I think the signs can be accounted for by air embolus.

JOHNSON: What were you referring to there, please?

BOHIN: I didn't think that [Baby O] had suffered direct trauma to his chest which had then caused any problems with his liver. I didn't think those two things were connected.

I thought the rash on the chest or the mark or purpura, whatever we agree to call it, was because of the air embolus and not because of trauma.

JOHNSON: Thank you. So far as the injury to the liver was concerned --

BOHIN: I wrote that: "I suggest an alternative causation for the ruptured subcapsular haematoma/liver trauma be explored. For example, could this be iatrogenic trauma secondary to attempts at decompressing the abdomen with a cannula?" This refers to Dr Brearey, who, as a last-resort life-saving measure, decided to try and decompress the abdomen by inserting a cannula at McBurney's point. And as we heard from him, he got a small amount of blood from that.

I looked at the post-mortem photographs and felt that the puncture mark I saw was not at McBurney's point and therefore felt that it may -- was it possible that a cannula inserted there could have caused any damage to the liver? But of course the photograph I saw was at post-mortem and the landmarks would have changed because the air may well have deflated from the abdomen. So McBurney's point may well have been in a different place on the photographs I saw to the position in life that Dr Brearey saw when he inserted that cannula.

So I just raised that as a question because that was beyond my area of expertise to answer that.

JOHNSON: So are you offering an explanation or a further clarification of that in the --

BOHIN: I don't think it had anything to do with it. It clearly didn't hit the liver. You know, he inserted the cannula, that was exactly the right thing to do. It clearly didn't puncture the liver and was not the cause of the ruptured subcapsular haematoma.

MR JOHNSON: Thank you very much. Would you wait there, please? There may be some more questions or there may be a break first.

MR JUSTICE GOSS: I didn't want to interrupt the witness's evidence. We're late having the break, but we will still have a break before Mr Myers cross-examines.

Ten minutes then, please.

(3.30 pm)

(A short break)

(3.40 pm)

Cross-examination by MR MYERS

MR MYERS: Dr Bohin, it was said several times when you were giving evidence that you've been accused of rubber-stamping. That was an expression that you used to me. Just to be quite clear, I'm not suggesting you are rubber-stamping, but I am suggesting it's something rather more subtle than that and I'll repeat what I've suggested before so we can deal with this.

First of all, I suggest that although this is called peer review, as a fact you haven't performed an assessment of any of these cases independently of knowing Dr Evans' opinions, have you? Not independently of knowing his opinions.

BOHIN: Well, I've had opinions from Dr Arthurs, Dr Marnerides and all sorts of other people provided to me when making these reports. But I made my own independent assessment, but of course his reports were sent to me in the same way as other experts' reports were sent to me.

MYERS: So the first thing is we don't have reports from you that have been made without prior knowledge of what other experts have said, do we?

BOHIN: That doesn't mean I can't make my own independent assessment.

MYERS: Secondly, I've suggested to you, more than once, that you have agreed, so far as you are able, in general with Dr Evans. You have agreed, so far as you're able to, with what he says?

BOHIN: I haven't always in every case. As I have pointed out in this case and there are other cases where I did not agree with things that Dr Evans said. But in fact, the very fact that I may have agreed with him just means that that was probably the truth and that's probably what happened.

MYERS: We were taken, as an example of whether or not you agree with him, to your paragraph 5.17 in this report.

Page 3699 of the statements. In dealing with this, the prosecution took you there. So let me see what you said.

First of all, on the subject of abdominal distension, you say: "I agree with Dr Evans that the abdominal distension and X-ray findings are due to excessive air being administered via a nasogastric tube." So actually you agree with that, don't you?

BOHIN: In my instruction from Cheshire Police I was asked to peer-review these cases and I was asked specifically to answer the questions in the way I have set out in paragraph 5.17. That is why they are set out in that way.

MYERS: The prosecution took you there, which is why I'm going there on this issue. On the question of air embolus you say: "I agree with Dr Evans that the collapse at 14.40 was as the result of an air embolus." So you agree with him on that?

BOHIN: Yes.

MYERS: You say: "I agree with Dr Evans that neither the rupture of the subcapsular haematoma nor the collapse at 14.40 was due to trauma secondary to vigorous resuscitation." So you agree that resuscitation does not explain subcapsular haematoma; yes?

BOHIN: It does -- vigorous resuscitation does not cause rupture of a subcapsular haematoma.

MYERS: You say: "I agree with Dr Evans that neither the rupture of the subcapsular haematoma nor the collapse at 14.40 was due to trauma secondary to vigorous resuscitation."

BOHIN: Yes, so I don't think that vigorous resuscitation causes the rupture of a subcapsular haematoma.

MYERS: And on the subject whether you agree, you did agree with that, didn't you?

BOHIN: Yes.

MYERS: Then this: "I do not entirely agree with Dr Evans that direct and deliberate trauma was inflicted to the right side of the chest as I think the signs can be accounted for by air embolus." Is that an example of you actively disagreeing with Dr Evans?

BOHIN: Yes.

MYERS: You do actually try to agree with that, don't you?

BOHIN: No.

MYERS: You do try to agree that it could be deliberate trauma, don't you?

BOHIN: No, I didn't find any evidence of deliberate trauma so I don't agree with him.

MYERS: Right. Just go to your page 3698. Your paragraph 5.16.

At the bottom of that, you say: "The bruised area to the chest could have been the result of direct trauma or resulted from the skin changes seen with an air embolus. I do not think it was due to resuscitation. I have some reservations about direct and

deliberate trauma being the case and think this is most probably due to an air embolus." Yes? So what you do there, Dr Bohin, is actually try to ride both horses at once rather than actively disagree, don't you?

BOHIN: No, because I have said it's most probably due to an air embolus, so I think I've not sat on the fence at all.

I think I have come down and said it was due to an air embolus.

MYERS: What does, "The bruised area to the chest could have been the result of direct trauma" --

BOHIN: In theory, a bruise to the chest could be caused by direct trauma, but that's not what I found evidence for in this case.

MYERS: So actually, you go as far as you can not to actively disagree with Dr Evans, don't you?

BOHIN: No.

MYERS: You say -- "I do not entirely agree" is the way you put it, isn't it?

BOHIN: Well, I don't agree with him.

MYERS: We've seen what you actually said. In your report you say it could be trauma, don't you?

BOHIN: It could have been the result of trauma, but I've also been very clear that in theory it could have been trauma, but I was very clear that this was most probably due to air embolus.

MYERS: You agree with just about everything apart from one matter that you, I suggest, try not to disagree with?

BOHIN: I have agreed with him because I do agree.

MYERS: Can I be clear? Are you suggesting -- let's be clear about this. That mark to the chest, is there any basis for that being deliberate trauma?

BOHIN: I can't find any basis for that being deliberate trauma.

MYERS: Right. So although we have "it could be", that's not what you're saying?

BOHIN: In theory, a mark on the chest could be caused by deliberate trauma. I did not find any evidence to back that up, which is why I said I thought it was down to air embolus because

there are other things in the history, along with that mark, that would make me conclude that this was air embolus.

MYERS: On the subject of air embolus, you were asked about the report of Owen Arthurs and you indicated that's something you'd taken into account.

BOHIN: Yes.

MYERS: And you have said that's a matter for his evidence but you also said air at post-mortem is something which you bore in mind when dealing with air embolus; is that correct?

BOHIN: Yes.

MYERS: We will hear from Dr Arthurs tomorrow. But in fact, for the reasons he gives, he doesn't actually conclude air embolus in this case, does he?

BOHIN: No, I did.

MYERS: Yes. So no one gets the wrong idea of Dr Arthurs' evidence, which we haven't heard yet, you may, but he doesn't put it that way, does he?

BOHIN: No, he doesn't. What I took from Dr Arthurs' report was that there was air found in the great vessels.

MYERS: Mm.

BOHIN: And so that, along with the clinical situation in life, led me to conclude that this was an air embolus. No, he didn't say it was an air embolus --

MYERS: He doesn't, does he?

BOHIN: No.

MYERS: And you're not a paediatric radiologist, are you?

BOHIN: No, but he wouldn't be able to say it was an air embolus. What he said was that there was air in the great vessels. He didn't say it was an air embolus. He can't say it's an air embolus because he's not a neonatologist. So he can give you a list of things that might cause air in the great vessels, but as I am not a radiologist, he's not a neonatologist, so he wouldn't be able to fit the clinical situation that we've been asked to look at with -- you know, he doesn't see air embolus, he doesn't treat children, so he he's not going to be able to say, it's an air embolus. He will give you a list of possibilities.

He didn't actually say that. It was me that said I thought it was an air embolus given the clinical findings.

MYERS: That's the point. We will hear from Professor Arthurs tomorrow but in fact air embolus is not on his list for various reasons, is it?

BOHIN: Well, he mentions air embolus in a UVC, but he doesn't mention anything else because the child didn't have a UVC.

MYERS: I'm just making sure, before we get to Professor Arthurs tomorrow, that we understand where his evidence or what you rely upon when you talk about his evidence. All right? And he does not come down saying air embolus is a reason for air in the great vessels in that report, does he?

BOHIN: No, no, I just used his report to say there was air in the great vessels, it was my interpretation of that not his.

MYERS: As for the 1 to 2-centimetre bruise described by Dr Brearey, that is in no way diagnostic of an air embolus, is it?

MR JUSTICE GOSS: It's not a bruise. Everyone says it's not a bruise.

MR MYERS: The rash, the discolouration.

MR JUSTICE GOSS: The discolouration.

MR MYERS: As for the 1 to 2-centimetre discolouration described by Dr Brearey, that doesn't establish air embolus in any way, does it?

BOHIN: Not on its own, no.

MYERS: Not only that, but something so small is not even consistent with what we have by way of discolouration and air embolus is it?

BOHIN: Well, I think it can be, which is why I concluded this was an air embolus.

MYERS: I would suggest that is an example, Dr Bohin, of you doing your best to support an allegation as far as you feel you're able to. That's what you're doing by saying that, isn't it?

BOHIN: No.

MYERS: And good perfusion but for that 1 to 2-centimetre discolouration is not consistent with air embolus in terms of the discolourations we've looked at, is it?

BOHIN: It can be because at that point there was no collapse.

With an air embolus the discolouration is dependent on where the air ends up and if it ends up in a small area of skin, and it's a small air embolus, the baby will survive and not necessarily collapse. So it is compatible with air embolus.

MYERS: You've just tried to use any bit of discolouration to you come across to support you with this, Dr Bohin, where you think you can, don't you?

BOHIN: No.

MYERS: Dr Brearey described going over to where [Baby O] was between 14.40 and 15.00 on the 23rd and he described the 1 to 2-centimetre mark that he saw. Do you recall he said that there was nothing from the monitors or the observations that was a cause of concern?

BOHIN: Yes.

MYERS: That is utterly inconsistent with a collapse brought about by an air embolus, isn't it?

BOHIN: Not after he'd collapsed. He collapsed.

MYERS: In fact, he didn't, he vomited and his abdomen was distended, and then later there was a collapse.

BOHIN: When Dr Brearey saw the discolouration, there had been a collapse. That was a long time after the vomiting and distended abdomen.

MYERS: When he marks the rash, that's at the time of the intubation, isn't it (overspeaking) --

BOHIN: Yes, that was a long time -- that's over an hour after the vomits and the abdominal distension.

MYERS: He was there between 14.40 and 15.00?

BOHIN: Yes.

MYERS: Intubation took place between 15.03 and 15.08, so we're talking about a period of 10 minutes or thereabouts, 20 minutes at the maximum, something like that?

BOHIN: Yes.

MYERS: At the end of that process his evidence is: "There was nothing from the monitors and no observations that caused concern."

BOHIN: Well, that's his evidence.

MYERS: And that, I am suggesting to you, as we piece these things together, is inconsistent with it being air embolus that caused that collapse?

BOHIN: I'm sorry, Mr Myers, I don't agree. I think this was an air embolus that caused this collapse.

MYERS: Just so it's clear, the reason I ask the questions in that way is, putting together evidence by you and Dr Evans as to the features of an air embolus, I'm seeking to have things we can measure that against that are constants. Do you understand?

BOHIN: Yes.

MYERS: So far we don't have any constant description of any discolouration, do we?

BOHIN: Not in this case.

MYERS: Across the whole of this trial we don't have a constant by which we can measure air embolus, do we?

BOHIN: I think what's come out across the whole of this trial is a huge variation on the types of skin changes seen by parents, practitioners, nursing practitioners, doctors of these children. And certainly the medical and nursing personnel are very clear that they have not seen changes like this before or since, but that the changes appeared quite graphic. And so although there is not one single thing that you can say is definitely pathognomonic of air embolus, that is a bit like saying that all chickenpox rashes are not different. They are, but you still have chickenpox regardless of whether you have two spots or 500, you have got chickenpox and the rash varies. And so the rash with this will vary as well. It will not be identical every single time. That would be clinically impossible.

MYERS: I'm not going to get caught up in chickenpox, but I am going to suggest that we all know what chickenpox rashes look like.

BOHIN: They vary enormously.

MYERS: We don't confuse them with an air embolus, do we?

BOHIN: No.

MR JUSTICE GOSS: I don't think that's an appropriate comment really, Mr Myers. There we are.

MR MYERS: I don't mean to be inappropriate, my Lord. I'm trying to make the point about the difference with rashes that we're being told.

We don't have any standard course that an air embolus follows, do we, in this case?

BOHIN: We do in that the child has a lesion, a skin lesion, and collapses and requires resuscitation.

MYERS: So far as other people are concerned, I'm not going to go through an analysis of what everybody has had to say about this, but for example you were taken to the note by Ms Letby. It's at tile 109. Can we go there, please? It's in the central part. Could we look there, please. If we can go left, please. Scroll up a little bit.

So we looked at: "Placed back on to ventilator, dopamine commenced." Can you see that?

BOHIN: Yes.

MYERS: And we had: "Flecks of blood from NG tube, discolouration to abdomen"; yes?

BOHIN: Yes.

MYERS: That discolouration to abdomen doesn't give any particular description of anything, does it?

BOHIN: No.

MYERS: But you rely on that, do you, in saying this could be an air embolus?

BOHIN: No, I don't rely solely on that. I rely on the constellation of descriptions from Dr Brearey, the fact that clearly the abdomen wasn't normal or else Nurse Letby wouldn't have written it in the notes.

There are lots of things that are omitted from entries in the notes, but that was included. So regardless of whether there was any detail about the discolouration, it's clear that she felt it was important enough to write in that note.

MYERS: And yet we have no discolouration from any of the clinicians who are present that we can identify as linking with that Lee and Tanswell description, do we?

BOHIN: We don't have to link it to the Lee and Tanswell description. Dr Brearey wrote -- he didn't know that I would be here saying that this was an air embolus, he wrote what he saw. It was me that has concluded that this was an air embolus, so of course he wasn't going to relate it to a Lee and Tanswell paper.

MYERS: I'm not going to go back to Dr Brearey, I've dealt with that. That would be going round. I'm going to move on from that.

Subcapsular haematoma and the damage to [Baby O]'s liver. In fact, Dr Bohin, resuscitation in adults or neonates is capable of causing damage to a liver, isn't it?

BOHIN: I have never seen it.

MYERS: Is that not well documented?

BOHIN: It's documented, but not well documented, I would say.

There are a small series of people that claim that there's damage to the liver. I have never seen it and I have had -- I've been to many, many resuscitations in over 35 years of neonates, including working in a major cardiac unit, and I have never seen it. If it was so common we would all know about it and I would say it isn't well-known about because it isn't common. It's vanishingly rare, if it occurs at all.

MYERS: I'm not suggesting it's common, I suggesting it's an acknowledged consequence, sometimes, of vigorous resuscitation, isn't it, sometimes?

BOHIN: I don't know of it in neonates.

MYERS: You say you have no experience of it --

BOHIN: No.

MYERS: -- but you accept that it is documented elsewhere?

BOHIN: It may well. I don't know of any documentation. It may well be. I have no knowledge of it being documented in neonates.

MYERS: You do raise in your report the possibility that the needle that was used by Dr Brearey may in fact have caused damage to the liver, don't you?

BOHIN: Yes, I considered that.

MYERS: Yes. You considered it. You said that, first of all, inserting a needle into the abdomen, it's wiser to put to the left-hand side rather than the right. It's at paragraph 5.12 of your report.

BOHIN: Yes.

MYERS: You say the needle should go to the left-hand side rather than the right to avoid the liver, don't you?

BOHIN: Yes.

MYERS: And you also say in the paragraph that follows, working from the photographs you had, that: "The puncture mark on the right-hand side does appear to be quite high."

BOHIN: It didn't appear to be at McBurney's point, but as I explained when I was speaking with Mr Johnson, if the abdomen is very distended when someone attempts to put the needle in, the landmarks may well be obscured compared to the landmarks that I saw at post-mortem when the abdomen is likely to be more decompressed. So I certainly wasn't saying that Dr Brearey caused the liver damage, it was something I felt needed to be considered.

MYERS: You thought it was a possibility, didn't you?

BOHIN: No, I thought it should be considered.

MYERS: You wouldn't ask it to be considered if you thought it was not a possibility, would you?

BOHIN: It depends on where the liver was and how low down the liver was. Usually, the liver isn't very far down so it's nowhere near McBurney's point. So the liver wouldn't normally be anywhere near McBurney's point, but this child had had a lot of resuscitation, had a distended abdomen, and so it was not clear where the liver was. So I put it out there as a consideration that it needed to be excluded and that was something that could easily be done by the pathologist.

MYERS: You understand that the reason I ask you those questions is because I am directing you to what you said in your report, Dr Bohin?

BOHIN: Yes.

MYERS: As for abdominal distension and excessive air, in fact there was some issues with the size of [Baby O]'s abdomen from the period overnight into the morning, weren't there?

BOHIN: It doesn't mention that. Dr Mayberry was asked to see him early in the morning, but before handover, so I don't think there was any mention overnight about it.

If there was, I've forgotten. But Dr Mayberry was asked to review in the early morning.

MYERS: Well, let's just look at the note. I can summarise.

Sophie Ellis referred to the abdomen being full at one point in the early evening. I am not suggesting that constitutes distension --

BOHIN: That's not the same as distended.

MYERS: In the morning she said it was full and loopy --

BOHIN: Yes.

MYERS: -- and requested assessment at that point, didn't she?

BOHIN: That was in the early morning -- that's the assessment I'm referring to when Dr Mayberry was called away and couldn't make an entry.

MYERS: Some time before 7.30, isn't it, something like that?

BOHIN: Yes, so not overnight.

MYERS: As it happened, lactate had been moderately raised during the night, hadn't it?

BOHIN: No, it had been 2.3, I think.

MYERS: That's moderately raised, isn't it, in fact?

BOHIN: No. Depending on which lab you use, between 2 and 2.5 is the normal range but even if you took 2 as your upper limit of normal, 2.3 on its own would not mean anything at all.

MYERS: That's why I said moderately raised.

BOHIN: Moderately raised to me would be 4 or so but okay.

MYERS: [Baby O] had been on CPAP and then Optiflow, hadn't he? We know that.

BOHIN: Yes.

MYERS: You have identified, or it's been pointed out to you, where there's reference apparently made by Nurse Letby to CPAP around about 13.30. We have seen that in the paperwork, haven't we?

BOHIN: Yes, I pointed out that yes.

MYERS: In any event, whether it's CPAP or Optiflow, both are capable of forcing air into the intestines, which can then go into the bowel, aren't they?

BOHIN: The amount of flow used on a CPAP circuit is far in excess of a flow used in Optiflow. So this was about as low a flow of air into the gut as you could possibly get, whereas with CPAP the gas flow is much higher so the chances of air getting into the gut with CPAP are much higher. But even with CPAP the degree of abdominal distension is not as great as we saw in [Baby O]'s X-ray.

MYERS: You said it was a huge amount of gas.

BOHIN: Yes.

MYERS: Those were your words, "a huge amount of gas"?

BOHIN: Yes.

MYERS: Could we put up, please, tile 197, which is the abdominal X-ray, which we've decided, with the assistance of Mrs Tyndall, is 14.40 or thereabouts.

We can see the image. This is the one we looked at?

BOHIN: Yes.

MYERS: If we scroll down to read what the radiologist wrote dealing with this at the time. We've seen many distensions in this case and we've seen many reports by radiologists. This one actually says, "Moderate gaseous distension of bowel", doesn't it --

BOHIN: Yes.

MYERS: -- "throughout the abdomen"?

BOHIN: Yes, it does.

MYERS: No reference to a huge amount of gas?

BOHIN: That was my interpretation of it, the huge amount of gas. The radiologist's is moderate. I have to respect their opinion.

MYERS: They're the person looking at it at the time and that's what they identify, aren't they?

BOHIN: No, they're not looking at it at the time, they look at it the day after.

MYERS: They're looking at the X-ray, okay. They are looking at the X-ray closer in time to when these events took place. But there's nothing remarkable about a moderate gaseous distension of the bowel is there?

BOHIN: There isn't if it doesn't cause any clinical concern but there is if it causes a collapse and an abnormal gas, so yes, there is if it causes clinical compromise.

MYERS: Why did you call this a huge amount of gas?

BOHIN: Because to me it looks like a huge amount of gas.

MYERS: That's an example of you saying something which puts it in a way which has the effect of supporting the allegation beyond what we have on the facts here, doesn't it?

BOHIN: No.

MYERS: And CPAP or Optiflow are perfectly capable of causing a moderate gaseous distension to the bowel, aren't they?

BOHIN: CPAP and Optiflow do not cause distension of that degree. CPAP can cause abdominal distension, I've already discussed that. Optiflow at 4 litres per minute will not cause that amount of abdominal distension -- and we have to remember that [Baby O] was originally on 6 litres of Optiflow, which went down to 4. He'd not blown up his tummy any time before that and he was on CPAP prior to that and he had not blown up his tummy at any time before that either.

MYERS: There had been a report of abdominal distension at 13.15, hadn't there?

BOHIN: No, there'd been a report of a full abdomen then.

MYERS: A full abdomen there, all right. But that could be consistent with it expanding, couldn't it?

BOHIN: But it didn't cause him any clinical problem.

MYERS: Can we look at tile 46 (sic), please, which is the radiograph from 16.46, 2 hours later. Tile 246, please.

We'll just look at this for the sake of completeness.

You can see the image first if you like, although it's not as clear on the abdomen. Then we can scroll down just to see what the radiologist has said. At this point it says: "The bowel is considerably less distended by comparison with the image earlier in the day." Do you see that?

BOHIN: Yes, except it's not an abdominal X-ray, is it?

MYERS: No, but there's certainly no basis on what we have there to regard abdominal distension at this time compromising [Baby O]'s position so that it contributes to his collapse or how ill he was, is there?

BOHIN: I think you need to ask a radiologist that because I'm not sure you can comment on the amount of gas in the abdomen when you haven't actually taken an abdominal X-ray; this is a chest X-ray. So yes, you can see the very upper part of the abdomen but you can't see all of the abdomen, not on here, unless there's another X-ray.

This say: "[This is] considerably less distended by comparison with the previous image earlier in the day. No evidence of perforation or obstruction. No intramural or portal vein gas demonstrated." You can't actually see that unless you've got an abdominal X-ray because on that chest X-ray you can't see the liver or the portal system, so that makes me think that this report relates to not that X-ray or there's another X-ray because you can't see any -- you can't see the portal tree on that X-ray.

MYERS: I'm relying upon what we've been provided by the prosecution and what's in these papers. You understand that, Dr Bohin? And this is what we have. Now we've got this, can you point to any evidence which shows that compromise or collapse round about this time or in this period is contributed to or caused by abdominal distension?

BOHIN: Sorry? Can you ask the question again? I'm sorry.

MYERS: Can you point to or identify any particular piece of evidence which shows that collapse or deterioration around about this time is caused by abdominal distension?

BOHIN: Can the X-ray be scrolled down?

MYERS: Yes, we can look at it.

BOHIN: Sorry, I thought that's what you wanted me to look at.

There's still gas -- abdominal distension here. You can see --

MYERS: No, I wasn't clear, I didn't mean on this X-ray.

BOHIN: Oh, I see, I beg your pardon.

MYERS: I'm saying with regard to the assertion that abdominal distension has compromised or caused collapse in some way, can you identify what evidence that is based on?

BOHIN: Well, the baby was fed and then vomited and collapsed.

MYERS: At around this time, around this point, 16.46, Dr Bohin.

BOHIN: No. But what we do know is that the baby was destabilised prior to that. I'm not suggesting that air was inserted then, but the baby certainly was destabilised and we know that this baby had bleeding from a ruptured subcapsular haematoma. So that would fit with the observation chart showing the increased heart rate and respiratory rate and the drop in haemoglobin that we have seen from the blood gases, which was presumably the final event for [Baby O]. But up until then the abdominal distension, I think, was caused by air being placed into the nasogastric tube around the time of the feed.

MR MYERS: I have dealt with that. There's nothing else I need to ask. Thank you.

MR JOHNSON: I have no re-examination. Does your Lordship have any questions?

MR JUSTICE GOSS: No, I don't.

Thank you, Dr Bohin, for coming to give your evidence. You will be returning to give evidence again.

Thank you very much.

(The witness withdrew)

MR JOHNSON: There remains the interview summary.

MR JUSTICE GOSS: Yes.

Summary of interview with LUCY LETBY re [Baby O] (read)

MR JOHNSON: If Mr Murphy would just put up tile 201 so we can bear that in mind, please. This is the nursing note from 14.40. The top of the page there. Thank you.

During the interview on 5/7/2018, Lucy Letby explained that she'd been the designated nurse on 23 June for both [Baby O] and [Baby P] in nursery 2.

She recalled that [Baby O] was on Optiflow for respiratory support. She was present when [Baby O] began vomiting after his feed and eventually he was moved to nursery 1, where Ms Letby continued to care for him.

Lucy Letby remembered that his abdomen became quite distended and how the doctors intubated him and put a drain into his abdomen. From the notes, [Baby O] had feeds at 10.30 and 12.30, which were unproblematic, apart from his tummy appearing a bit full.

Lucy Letby said that [Baby O] was on Optiflow and that could sometimes give baby a full tummy as they could gulp in air and swallow it from the Optiflow. She would have remained present throughout those feeds, which would have taken only a few minutes. Lucy Letby thought that [Baby O] vomited and [Dr A] was called immediately after 1.15 pm.

MR JUSTICE GOSS: I think "immediately after, at 1.15 pm".

MR JOHNSON: I beg your pardon.

[Dr A] was already on the unit. Lucy Letby did not recall if she was present when [Baby O] vomited.

Lucy Letby said she discovered a collapse at 14.40 hours after hearing [Baby O]'s monitor sounding.

She could not recall anyone else being present in the room at the time and, as far as [Baby O] was concerned, he was mottled all over with a red, purply, blotchy red rash and red on his abdomen.

Lucy Letby explained that a mottled presentation was something seen regularly in neonates, although not normally to this extent. She said the mottling could indicate infection or poor perfusion. Lucy Letby did not know whether she or another nurse called the registrar.

[Baby O]'s final collapse was at 15.51 hours.

Lucy Letby was in the nursery with him at the time and [Dr A] had left to update [Baby O]'s parents.

Lucy Letby was shocked and upset by [Baby O]'s death.

She just remembered his abdomen kept swelling up and they ended up doing a drain and an intraosseous access, which were not nice things to see. She described his death as unexpected.

Lucy Letby described the day as particularly busy.

The doctors were back and forth, being pulled in various directions. Usually if there was a ventilated baby, they'd be round a little bit more. Lucy Letby said each time you'd have to call the registrar to come, there's an element of delay, but she did not feel that the initial collapse at 14.40 could have been prevented.

Lucy Letby said after the profound desaturation at 14.40 hours, it was a bit more clear that [Baby O] was unwell. He was ventilated and left by the medical team.

In the interview on 12 June 2019 Lucy Letby confirmed that she was [Baby O]'s designated nurse. She could not remember if she had been left alone in the nursery when [Baby O] first collapsed. She agreed that she had administered a saline bolus to [Baby O] at 14.40 hours and that his collapse must have been within a short space of time after. She denied deliberately causing him harm.

At the time of [Baby O]'s second collapse at 15.51, he was in nursery 1. Lucy Letby agreed that she was in the nursery at that time and that [Dr A] had left to speak to [Baby O]'s parents. Lucy Letby questioned whether the damage to [Baby O]'s liver was caused during the course of resuscitation. She denied physically injuring [Baby O] and denied introducing air either intravenously or via the nasogastric tube. When asked who had harmed him, she replied, "It wasn't me".

She couldn't recall a Facebook search for [Baby O]'s mother on the anniversary of his death in 2017 and she could not explain why she would be doing it.

Lucy Letby was reminded that on her first day back from annual leave, she'd messaged Jennifer Jones-Key to say that she would be "back with a bang". She didn't know whether Jennifer Jones-Key had said something about how busy the unit would be with the arrival of triplets.

After [Baby O]'s death, Lucy Letby messaged [Nurse E] to suggest that the cause of death may have been sepsis or necrotising enterocolitis. She said that is what she thought at the time as it was a discussion they had all had.

My Lord, can I just give a word of explanation about tomorrow?

MR JUSTICE GOSS: Yes.

MR JOHNSON: We would, of course, normally go straight into [Baby P]'s case, which we are going to do, but Professor Arthurs will be here at noon. We have to accommodate his evidence tomorrow. So I'll speak to Mr Myers about precisely how we manage this, but one proposal is that we deal with parts of the sequence of events for [Baby P], in particular probably the critical events and the radiographs, then call Professor Arthurs so that he can deal with [Baby P]'s case as well, and then we may have to return to the sequence of events to do a more comprehensive review.

MR JUSTICE GOSS: All right. I'll leave that with you, but obviously Professor Arthurs must be accommodated in the sense that he should give his evidence as soon after midday as possible.

MR JOHNSON: Yes.

MR JUSTICE GOSS: All right, members of the jury, that's it for today. Thank you very much. 10.30 tomorrow.

(In the absence of the jury)

MR MYERS: We would be grateful if we could have the opportunity to speak to Ms Letby. Thank you, my Lord.

MR JUSTICE GOSS: Yes, it's been agreed to. Thank you.

Were you ever given copies of the non-sitting days?

MR JOHNSON: No, we don't think we ever actually had them.

I know what the days are.

MR JUSTICE GOSS: I've failed. The jury, they were given these as well? They've got them. Good. Everyone's got them. It's when you waved that document, it made me think. Right.

MR JOHNSON: Can I hand this forward and explain what it is?

(Handed)

There is a degree of crossover, inevitably, between the sequences for [Baby P] and [Baby O]. There's quite a lot of material in [Baby O]'s that isn't reproduced in [Baby P]'s and there is a degree of similarity as well. The point of this -- I'm sure it's obvious -- is that it explains in simple terms where the crossovers are, not least, for example, taking as an example tile 11 in [Baby P]'s sequence.

MR JUSTICE GOSS: The relevant ones in [Baby O]'s case are 21 to 26, 28, 29 and so on. It's just a reference document?

MR JOHNSON: It is and it is not put forward as an admission or anything like that. It'll speed up the process of going through [Baby P].

MR JUSTICE GOSS: As long as that's made plain to the jury that they are given it for that purpose and that is the purpose of it and there's nothing else, no other purpose to be attributed to it. Good. Thank you.

(4.19 pm)

(The court adjourned until 10.30 am on Thursday, 16 March 2023)