

24 January 2023

Baby H

Housekeeping

DR DEWI EVANS (recalled)

Examination-in-chief by Mr Johnson

Cross-examination by MR MYERS

DR SANDIE BOHIN (recalled)

Examination-in-chief by Mr Johnson

Cross-examination by MR MYERS

Summary of interview with LUCY LETBY re [Baby H] (read)

Housekeeping

Tuesday, 24 January 2023

(10.30 am)

(In the absence of the jury)

Housekeeping

MR JUSTICE GOSS: Mr Johnson, Mr Myers, as I think you know, we will not be sitting with the jury on Monday or Tuesday of next week, and I shall tell the jury of that fact. There is now another day when we will not be sitting, which is Monday, 13 March, because I'm afraid I have to be elsewhere on that day and I ascertained that that was probably the least inconvenient day of the week to do it from everyone's point of view.

MR JOHNSON: Thank you.

MR JUSTICE GOSS: Thank you very much. I shall say that to the jury now.

(In the presence of the jury)

MR JUSTICE GOSS: Good morning, members of the jury. Can I just say something about future sitting days.

You will not be required to be here on Monday and Tuesday of next week for reasons that some of you, if not all of you, will be aware of. So you can say Monday, Tuesday, you are not required here.

Then there is another date, much further ahead, namely Monday, 13 March, when you will not be required because I can't be here on that day, I'm required elsewhere. So I'm just giving you lots of notice in relation to that. When we get nearer to the time,

I'll remind you it's Monday the 13th that you won't be required because the court will not be sitting on that day.

Thank you very much.

Mr Johnson.

MR JOHNSON: Thank you, my Lord. Dr Dewi Evans, please.

DR DEWI EVANS (recalled)

Examination-in-chief by Mr Johnson

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

EVANS: Dr Dewi Evans.

JOHNSON: Thank you, doctor. Relating to the case of [Baby H], if we may, you have written several reports; is that right?

EVANS: Yes.

JOHNSON: Can we just identify those to start with, please. Was your original sift report 16 November 2017?

EVANS: Yes.

JOHNSON: Your more substantive report, 31 May 2018?

EVANS: Yes.

JOHNSON: Did you deal with identifying the specific records in a statement made on 24 June 2021?

EVANS: I did.

JOHNSON: Then ultimately, and most recently, did you deal with a few issues that had arisen in a report dated 20 October 2021?

EVANS: Yes.

JOHNSON: Thank you. What I'd like to do, if we may, is concentrate on your report of 31 May 2018.

EVANS: Yes.

JOHNSON: There, did you record [Baby H]'s details such as her name, her date of birth, her birth weight, her gestational age at birth?

EVANS: I did.

JOHNSON: Of all the cases that you considered was this the 12th?
If look at your reference, which is "12 [Surname of Baby H]".

EVANS: Yes, it was, yes.

JOHNSON: So far as the material that you considered was concerned, did you receive medical records from both the Countess of Chester Hospital and from Arrowe Park on the Wirral?

EVANS: I did.

JOHNSON: Did the Chester records include quite a few X-rays or radiographs?

EVANS: They did.

JOHNSON: Just to put us in mind of what the chronology was, and I'm looking at your paragraph 6, did you record [Baby H]'s delivery by caesarean section at 18.22 hours on 22 September 2015?

EVANS: Yes.

JOHNSON: Her birth weight at 2.33 kilos?

EVANS: Yes.

JOHNSON: And her gestational age as 34 plus 4?

EVANS: Yes.

JOHNSON: From your examination of the records did it appear that [Baby H] had been born in good condition?

EVANS: That is correct.

JOHNSON: But that there were complications which were of note so far as the medics were concerned, not least the fact that [Baby H]'s mother had type 1 diabetes?

EVANS: Yes.

JOHNSON: Did you record the fact that [Baby H] was transferred to the neonatal unit because of her prematurity?

EVANS: I did.

JOHNSON: And that within 23 minutes of her birth, [Baby H] was mildly grunting and there were signs of some subcostal recession?

EVANS: Yes.

JOHNSON: I think you've told us before, on more than one occasion probably, that they are signs of potential breathing problems?

EVANS: Yes, they are. These are early signs of a condition called respiratory distress syndrome, RDS, and RDS or respiratory distress syndrome is a common condition in premature babies and is due to the fact that the lungs have not matured satisfactorily to allow normal exchange of oxygen, and this is because they're born before their time. So respiratory distress syndrome in the bad old days, a common condition with lots of complications and also a significant mortality, although that is no longer the case.

JOHNSON: Yes. So far as gas exchange is concerned, just to remind those of us for whom this is becoming a more distant memory, is that the mechanism that Dr Kinsey produced some diagrams to describe?

EVANS: Yes, I think so, yes. It gives you an idea of the well-being of the baby because you need to know the carbon dioxide level because if the carbon dioxide level is high then the baby's respirations are not satisfactory and so that's the main reason for checking the blood gas level at this juncture.

JOHNSON: Did you note at your paragraph 9 that by 10.50 in the morning of the following day, 23 September, [Baby H] was on CPAP and requiring a relatively low but additional rate of oxygen at 26%?

EVANS: Yes. 26% oxygen is quite a low figure. The standard management of RDS initially is additional oxygen, of course, and also this condition of CPAP, continuous positive airways pressure, where you apply a mechanism to the baby's nose to allow -- to ensure that the baby's lungs do not wholly collapse following each breath.

So CPAP in mild RDS is sufficient management.

MR JOHNSON: There's just a matter of law I'd like to raise, please, my Lord. I'm sorry.

MR JUSTICE GOSS: Yes, certainly.

Well, you'll remember I said at the very outset of the case, if an issue of law arises then I have to deal with it in your absence. You have to leave the courtroom at this stage because I deal with all the law, you deal with the facts.

(In the absence of the jury)

MR JUSTICE GOSS: Should the witness withdraw?

MR JOHNSON: There's no problem with the witness being here, my Lord. It's something that I didn't see and your Lordship's not well placed to see, but I'm told that the recently bereaved juror appears to be upset and isn't concentrating.

MR JUSTICE GOSS: Oh right, sorry. I couldn't see that because she's behind a screen from my line of vision.

MR JOHNSON: She is crying, apparently.

MR JUSTICE GOSS: What I shall do, unless anyone suggests otherwise, is ask the usher just to speak to her and say is she...

MR JOHNSON: I'm told she sort of pulled herself together by the time they were walking out.

MR JUSTICE GOSS: All right. Look, could you just discreetly and sensitively enquire of her if she is all right to proceed? You may have something you want to tell me.

(Pause)

When I say discreetly -- yes. Thank you. It's not an easy situation, but I don't want there to be any further upset caused.

(Pause)

It may have been triggered by my reference to Monday and Tuesday.

MR JOHNSON: Yes. This may make it worse again, that's the problem.

(Pause)

MR JUSTICE GOSS: There's no problem.

MR JOHNSON: Good.

MR JUSTICE GOSS: Thank you.

(In the presence of the jury)

MR JUSTICE GOSS: Sorry about that. We're in a position to continue now.

MR JOHNSON: Thank you, my Lord.

Right, Dr Evans, we'd just dealt with the position at 10.50 in the morning of 23 September, so day 2 for [Baby H].

On day 3, which is 24 September, is it right that [Baby H] was intubated at shortly after midnight, so 00.10?

EVANS: Yes. This is correct. The natural history of this condition called RDS is that CPAP isn't always effective and if the baby becomes worse, becomes less well, then you need to place the baby on ventilatory support. In other words, this is the procedure where you pass a tube into the trachea, into the lungs, and place a baby onto a breathing machine. So that took place and this is -- occurs in lots of babies who have RDS.

JOHNSON: Yes. But so far as -- so [Baby H] was being mechanically ventilated, but so far as the concentration of oxygen was concerned, having been at 26% on CPAP, what was the position with regard to the mechanical ventilation?

EVANS: Well, she initially required an increase in oxygen to 60%, but that improved after she was given surfactant.

Now, surfactant is this substance that has improved the outcome significantly with this condition and it's a substance that you place down the endotracheal tube, so it goes directly into the lungs and improves lung flexibility, so the lungs are able to breathe in and out much more effectively.

So she received surfactant and the other thing they did was they checked to rule out the possibility of a pneumothorax. We've had a lot of discussion about pneumothorax with this case, so I won't put any detail about that. But later, she was found to have reduced air entry on the left lung and on that occasion she was found to have a pneumothorax.

JOHNSON: Yes. What time was that, please?

EVANS: That was at 08.58 hours on 24 September. So she's now -- this is -- she was born on the 22nd, so it's day 3. So she's not quite 72 hours old yet.

JOHNSON: Okay.

EVANS: A pneumothorax is a life-threatening condition, untreated, because what it means is that you have sustained a puncture, effectively, of the lung somewhere and air has leaked from the lung into what we call the pleural space. The pleural space is the area between the outside of the lung and the inside of the chest wall.

Normally, the lung -- the outside of the lung fits snugly to the inside of the chest wall. There isn't a gap between the two. But with a pneumothorax, this leak leads to air getting into that space, this pleural space, and with each breath, if it's not treated, the amount of air increases and increases.

This, of course, leads to several complications.

The first, of course, is that as you get more air into the pleural space, it's more difficult for the lung, the left lung, to expand. So therefore the lung collapses on itself, cannot expand normally. As the air continues to increase, you develop what's called tension or high pressure within this space, and that interferes not only with the ability of the lung to expand, it also pushes the heart, you know, which is in the middle of the chest, pushes the heart over to the other side and, on top of that, because you've got very high pressure due to pneumothorax in the lung, this interferes with the return of blood to the heart and this is a life-threatening phenomenon which demands urgent treatment. In other words, you need to treat the pneumothorax.

JOHNSON: Did you then in your review refer to the fact that following the treatment which was offered for that condition, [Baby H] progressed through -- unremarkably, essentially -- until the early hours of the morning of 25 September, when her ET tube was removed?

EVANS: Yes.

JOHNSON: Was that tube at that time found to be blocked by what you have termed as a mucus plug?

EVANS: Correct, yes.

JOHNSON: If the jury want a reference for that event in the sequence, that's at tile 152; is that right?

EVANS: Can I...?

JOHNSON: It's all right, I'm just giving them a reference for that event. All right.

Now, following that, and I'm going to your paragraph 13, please, Dr Evans, did you note that there had been a crash call -- and we're at tile 243 if the jury want to follow it on the iPads -- a crash call at 03.24 hours in the morning of 26 September?

EVANS: Yes. Yes, there had been complications from the pneumothorax before then, but this was a crash call where -- and I've written -- I've quoted the entry at -- noting that this had occurred despite the fact that [Baby H] was not being handled.

JOHNSON: Yes.

EVANS: There was no trigger, in other words it was not clear or obvious why she should have deteriorated so strikingly, and she required quite significant resuscitation with CPR and adrenaline and atropine. This was not the result of the pneumothorax recurring, which had occurred earlier, because they did a needle aspiration, which we've heard earlier in this case.

JOHNSON: Yes. Is this the thoracocentesis?

EVANS: Thoracocentesis, yes. And they just drained 8ml of air and 2ml of fluid. Previously they'd drained far more than that. So 8ml of air would be insufficient to cause, you know, the very striking deterioration in her condition, where she had desaturated, with oxygen, to 60%.

JOHNSON: So just putting this into the context of the evidence that we heard over the last couple of days -- and this is what was described to us by Dr Ventress; is that right?

EVANS: Yes. Yes, because what my paragraph 13 also says is that the previous day she'd had 85ml of air aspirated from the chest at around 03.30 hours on the 25th.

JOHNSON: Yes.

EVANS: Now, that's a lot of air and if you have -- sorry, if you have 85ml of air in your pleural cavity that is sufficient explanation for why your condition would have deteriorated. This is what led to them -- this is what led to her requiring another chest drain.

JOHNSON: Yes, all right. Just to contextualise this, the event, the crash call at 03.24 or thereabouts in the early hours of 26 September produced, via the thoracocentesis, approximately 10% of the amount of air that had been aspirated the previous night --

EVANS: Correct.

JOHNSON: -- when [Baby H] had collapsed?

EVANS: Yes.

JOHNSON: Well, we'll come back to this in due course when we come to your opinion. But following that, was [Baby H] kept under fairly close observation? I'm looking at your paragraph 14 now.

EVANS: Yes, yes.

JOHNSON: Did you note the fact that there had been contact between the medics at the Countess of Chester and those at the tertiary centre at Arrowe Park?

EVANS: That is correct, yes. They were clearly very concerned about it, as we have heard earlier in this, yes.

JOHNSON: Yes. Did you note the fact that -- and if the jury want to find it, it's at tile 399 -- there had been further secretions obtained from the ET tube?

EVANS: Yes. Secretions are a common problem in babies on ventilatory support and, as we have already heard, they can block the ET tube, the endotracheal tube, so she was having secretions around this time.

JOHNSON: Was there a further collapse of [Baby H] in the early hours of the 27th?

EVANS: That is correct.

JOHNSON: So this is now Sunday, 27 September?

EVANS: Yes. According to my entry, this collapse occurred at 2.40 am on the 27th and the entry notes -- the medical entry notes there was no explanation for this collapse.

JOHNSON: Yes. I think, actually, the evidence was that the collapse had taken place rather earlier than that at about 1 o'clock --

EVANS: Yes.

JOHNSON: -- and that the medical notes had been written up at a later stage.

EVANS: Yes, that is correct, yes.

JOHNSON: Again, and it's recorded at tile 459, was there any obvious explanation for that collapse?

EVANS: There was no obvious explanation for this. It was unexpected. The notes note, I quote, "no explanation", but the concern was such by this time that they had made arrangements to transfer her to Arrowe Park Hospital.

JOHNSON: Yes. Given that course of events, did you then go back to the chest X-rays that had been taken of [Baby H]?

EVANS: Yes. There were loads and loads of chest X-rays carried out. We've seen most of them over the last couple of days. What the X-rays show, the early X-rays show a degree of RDS. Then it shows pneumothorax. Then a later X-ray shows what we call the butterfly needle; this is what is used as an emergency to drain air from the pleural space. Following that, she had what we call a pigtail chest drain. It's called a pigtail because it curls within the chest cavity. That was her first, let's call it, proper chest drain.

Following on from that, she had a second -- sorry, that chest drain was placed in her -- what we call the fifth intercostal space, in other words the space between the fifth -- up to the fifth rib. She then had a second chest drain. Now, this was what we call an Argyle chest drain. It's the old-fashioned type.

That is placed lower down in the chest, in the seventh intercostal space.

JOHNSON: Just to contextualise that, is that the one that was put in by Dr Jayaram?

EVANS: That's correct. That's the second drain. That's lower down than most of us would put, but I think it was put further down the chest than ideal because, firstly, the ideal place is the fifth intercostal space. Well, there was a chest drain in there already.

The needle aspiration -- this is another needle aspiration -- was carried out lower down the chest.

That's visible on one of the X-rays. So the chest drain, this Argyle chest drain, was inserted lower down the chest and it led to a significant improvement. Her oxygen requirements fell and she stabilised. So that was the second chest drain.

If we follow things sequentially by looking at the chest X-rays, there was a further deterioration caused by another accumulation of air in the pleural space and this led to her third chest X-ray and this was the one inserted by Dr Gibbs. This was the

third chest drain, I should say, not chest X-ray. This was the third chest drain that was inserted and this was her second pigtail.

So at this time she had three chest drains and this was inserted slightly above chest drain 1. So on this occasion -- and again, following the insertion of the third chest drain, her condition again improved and her oxygen requirements reduced to 30% according to Dr Gibbs' notes. In other words, these chest drains were lifesavers.

JOHNSON: Did you then, having gone through the chest X-rays, review the nursing notes?

EVANS: I did.

JOHNSON: And did you move from the nursing notes to the notes made by the staff at Arrowe Park once [Baby H] had been transported and taken to there?

EVANS: Yes, I did.

JOHNSON: All right. So having reviewed all that material, I want to turn, if I may, to the observations section of your report, which is paragraph 28 and onwards.

You've already told us that [Baby H] had RDS.

EVANS: Yes.

JOHNSON: I think you've told us that her symptoms were consistent with that particular condition.

EVANS: Yes.

JOHNSON: Was the treatment that she was given acceptable or not so far as your point of view is concerned?

EVANS: Starting off with CPAP and additional oxygen was correct. When her condition worsened, placing her on ventilatory support was correct. A couple of hours later she was given surfactant. That was correct. She was clearly unwell. They picked up the fact that she had a pneumothorax and they put a chest drain in the right -- in the ideal place, in the fifth intercostal space. That was correct.

Her condition was pretty unstable, though, despite all of this, which is why she ended up with three chest drains on the left side of her chest. It's very, very unusual for a baby to require three chest drains, but if needs must then that is what you should do. So therefore, the first -- the problem with a chest

drain is this: that when there is air in the pleural space you will see a pattern where the chest drain is noted to be -- "swinging" was the word used.

That means that the holes at the end of the chest drain are patent, they're open, and therefore air is being taken out of the space, this pleural space, and is not going back in. So if the chest drain is connected to a flutter valve, the flutter valve will flutter. If the chest drain is connected to what we call an underwater seal then you'll see the water in the tube moving up and down, ie it is swinging. That's fine and that tells you that you've inserted the chest drain and it's functioning.

The problem is this: once the lung is fully expanded there is no pleural space and therefore the chest drain will stop swinging because the lung, the surface of the lung, is full up against the chest drain. But the chest drain may also stop swinging because it's in the wrong place or not so much in the wrong place, there is air accumulating somewhere else in the lung. That's difficult and the only way to distinguish the cause of the chest drain not swinging is to do another chest X-ray and/or transilluminate the chest.

Transillumination, of course, you can do there and then. Doing a chest X-ray takes time because you've got to get the radiographer to the unit, take the photo and so on.

So therefore, managing a pneumothorax is difficult, you know. It's a difficult condition to manage and on the whole you have to rely on the well-being of the baby. If you have inserted a chest drain and the baby is improving then you know your treatment has worked.

If the baby's condition deteriorates then that is as a result of either the pneumothorax is recurring or the chest drain is blocked or both.

JOHNSON: All right.

EVANS: Therefore it's quite -- it's a difficult condition to manage and they managed it -- I think they managed it very satisfactorily.

JOHNSON: Okay. So far as the pneumothorax or pneumothoraces were concerned, were they or were they not a consequence of the RDS?

EVANS: I think they were a consequence of the RDS. I think the original pneumothorax was a complication of the RDS.

It's a well-known complication of RDS.

JOHNSON: But turning to the collapses, the two collapses that required the use of adrenaline and CPR, were they -- let's deal with them one by one. Was the collapse requiring the use of adrenaline in the early hours of 26 September the consequence of a pneumothorax?

EVANS: No, because the pneumothorax had been treated at that time.

JOHNSON: What about the collapse in the early hours of the 27th, the following night?

EVANS: Again, the same. The pneumothorax had been treated by that time, at that time, so therefore you cannot explain the collapse on the basis of the pneumothorax.

JOHNSON: We've heard from the treating doctors that they were unable to explain these two collapses. Is there an alternative reasonable explanation in your view for the collapses?

EVANS: Right. On one occasion there was a blocked tube, but there was no blocked tube during this collapse. And in my report I have gone as far as to say that the pneumothorax -- sorry, that the collapses cannot be the -- sorry, I will start again. That the collapse was not the result of a pneumothorax because the pneumothorax had been treated.

JOHNSON: Yes.

EVANS: Infection is another option.

JOHNSON: Yes.

EVANS: There's little evidence of infection.

JOHNSON: We've heard of a raised CRP level.

EVANS: The CRP level was 50-something, I think, which is a marker of inflammation and infection, but she was -- firstly, she was on antibiotics and to fast-forward a bit, once she went to Arrowe Park they did a lumbar puncture, which was normal, so no evidence of meningitis, and also once she got to Arrowe Park her condition recovered, therefore I would not expect infection -- her pattern of collapse is not what one finds in a baby whose deterioration is the result of infection.

JOHNSON: You've dealt with that particular issue in the context of other cases from time to time --

EVANS: Yes.

JOHNSON: -- as we've got to this stage of the case. But perhaps you can deal with it by answering what I hope is a straightforward question, which is: if this collapse was due to infection, would you expect [Baby H] to have collapsed in the way she collapsed in the early hours of either the 26th or 27 September?

EVANS: No, none at all. Her deterioration would have been far more gradual and, as we've discussed in previous cases, I would have expected other features, clinical features of infection, to have shown up, and this was not the case. So with infection you do not suddenly go from baby stable, chest drain or chest drains in place, and suddenly there's this crash with a huge drop in heart rate and a drop in oxygen saturation occurring very, very quickly and also requiring such intense resuscitation. You know, adrenaline, atropine. These drugs are not used -- they're required but they are not used that commonly in neonatal units and I think, as Dr Gibbs said that, so she was resuscitated very effectively, I must say, but she would not have required this degree of resuscitation if the problem was a developing infection.

MR JOHNSON: Yes, thank you. Could you wait there, please?

There may be some more questions for you.

Cross-examination by MR MYERS

MR MYERS: Just to be clear, Dr Evans, the two events that we're dealing with are 26 September 2015, at about 03.20 in the morning, and 27 September 2015 at about 00.55 hours?

EVANS: Yes.

MYERS: Those are the two key events. Just to be clear about this, you do not identify any obvious explanation for the deterioration around 3.20 am on 26 September, do you?

EVANS: That is correct.

MYERS: You don't identify any cause for that?

EVANS: No.

MYERS: And you don't identify any obvious explanation for the deterioration around 00.55 on the 27th, do you?

EVANS: No.

MYERS: No cause is identified for that?

EVANS: No.

MYERS: So far as the pneumothorax or pneumothoraces are concerned, your view is that probably they are a complication of [Baby H]'s clinical condition, would you agree?

EVANS: I think so, yes.

MYERS: Do you agree also that intubation and positive pressure through that could have made the pneumothorax worse prior to the insertion of the first chest drain?

EVANS: Yes.

MYERS: Just a point to correct if I may, if I'm right. You'd said in your report and in evidence that she was intubated shortly after midnight on the 24th. This is a correction in fact from the evidence. It's at about 8 o'clock in the morning of the 24th that [Baby H] was intubated. Just establishing one particular fact on intubation, Dr Evans, just to assist you. It's in your report at paragraph 10.

EVANS: If that's a factual error, my apologies.

MYERS: The notes are timed 08.10 and you may be you read the 8 as a 0 and put in 00.10.

EVANS: If that's my mistake, my apologies.

MYERS: Well, I'm just making sure we've got the order of events correct, that's all.

EVANS: Okay.

MYERS: In any event, once it had been put in place, intubation and positive pressure is likely to have made it worse before the first chest drain; that's correct, isn't it?

EVANS: Yes, I think that's a fair comment, yes.

MYERS: Now, we have heard elsewhere in this case that even a nappy change can cause a baby to desaturate; you heard that evidence given?

EVANS: A nappy change?

MYERS: Handling, even in the course of cares.

EVANS: Oh right. Right. It depends on the well-being of the baby, actually. But if you have a baby who's not particularly

unstable then any sort of handling can lead to a desaturation in oxygen, yes.

MYERS: A baby being ventilated with three chest drains is in a potentially hazardous situation, isn't she?

EVANS: Correct.

MYERS: You've described how it is very unusual for there to be three chest drains in one baby, haven't you?

EVANS: Yes, yes.

MYERS: And you acknowledge that managing a pneumothorax can be very difficult; is that right?

EVANS: Oh yes.

MYERS: And to do that you rely on the well-being of the baby?

EVANS: Yes. But you rely on the status of the baby, yes.

MYERS: The status of the baby. And do you accept that, if we look at [Baby H]'s position, the combination of pneumothoraces, chest drains, other clinical interventions and a history of desaturations could have contributed to her deterioration around 03.20 on 26 September?

EVANS: Right. I think this is -- this is the difficulty that I have. She was a big baby, 2.3 kilograms. She wasn't a tiny, tiny baby, and she had responded very satisfactorily to treatment with chest drains. And we know that the pneumothorax recurred because up to 85ml of air was aspirated. But if you dealt with the chest drain -- sorry, if you have dealt with the pneumothorax, infection was not a contributory factor in this case, in my opinion. It sorted out the problems with the endotracheal tube -- so she'd received surfactant, so therefore I've managed, I think, to exclude the sort of conditions that I would expect to cause a baby to deteriorate.

So I'm left with a situation that she's deteriorated and I can't explain how -- why.

MYERS: Do you accept that there were in fact recurring problems with [Baby H] throughout this period, not just on the morning of the 26th?

EVANS: Yes.

MYERS: And even after pneumothoraces had been relieved and air had been extracted?

EVANS: Yes. She had episodes of bradycardia, but nothing of this severity. That is what I found difficult to explain.

MYERS: Well, I'm going to suggest it's entirely possible that for all that she had been through leading up to that time in the morning on 26 September, that can have led to the deterioration that we're looking at.

EVANS: Okay, right. The answer to that is I don't think it was the case in this particular case and I think I need to explain why I don't think -- all the complications that [Baby H] had were very striking, very significant, very concerning. But if we look at the overall picture, first of all she was on ventilatory support, therefore she didn't have to breathe for herself. She was on intravenous fluids, so she didn't have to feed for herself. And she was on morphine throughout this phenomenon, which was giving her pain relief and sedation. So therefore, she was -- her safeguarding was well looked after during this time. That's the first point.

The second point, and I think it's a more important point is this. I mentioned the bad old days earlier where people of my generation, I think, had far more experience of dealing with pneumothoraces as a complication of RDS. In babies who are unstable what one found, sadly, from time to time, was that you would insert a chest drain, get the air out, the lung would inflate, but the baby's condition would remain unstable.

In other words, you could not get the oxygen saturations up. That is probably the result of a condition called pulmonary hypertension, high blood pressure in the lungs. That is exacerbated by hypoxia, it's made worse by lack of oxygen, and therefore, despite dealing with the mechanics of the pneumothorax, the very fact that you've got a pneumothorax and a collapsed lung means that despite treating it, the baby's condition remains poor.

Now, this turned out not to be the case in [Baby H]'s case. She had three chest drains put in and after each one her condition improved, not only improved significantly but improved quickly. In other words, her oxygen requirement dropped to 30%, which is, you know, a very low figure.

In other words, she responded well to treatment. If her condition was due to the constellation of complications that she experienced, I would not have expected that improvement to take place. So that's the second group and the most significant part of why I don't think this combination of treatments caused the collapse.

The third bit is that when Arrowe Park arrived, they found her to be stable, and her oxygen saturation was good, her urinary output, we heard yesterday, was 5ml per kilogram per hour, which is fine. Her blood pressure was fine. So all of these are good markers of a baby who is now stable. And then having moved to Arrowe Park, they ruled out a significant infection and did a lumbar puncture. They removed one of the chest drains more or less straightaway and then over the next couple of days, I think, they were able to remove the other drain and get her off ventilatory support and get her back to Chester and that is -- I would not have expected such a prompt improvement in a baby with this condition if her collapse on either day was the result of the combination of problems that Mr Myers has mentioned.

MYERS: Dr Evans, I suggest you are deliberately ignoring deteriorations in her condition and a cycle of deteriorations just as much as short-term improvements.

EVANS: No, I'm not.

MYERS: Similarly, do you accept that a combination of pneumothorax, chest drains, other clinical interventions and previous desaturations could have contributed to the deterioration at 00.55 on 27 September?

EVANS: In the absence of a pneumothorax, the answer to that is no.

MYERS: Again, I suggest --

EVANS: In other words, sorry, if the -- you see, let's elaborate a little bit more on this because it's a legitimate point. The problem with babies not responding following a chest drain is this: the first is this issue of pulmonary hypertension, which is exacerbated by the hypoxia that you get. That's the first point.

If that happens then they do not recover following insertion of a chest drain. Well, she did. That's the first point.

The second point is -- it should have been the first point -- is could the problem be due to trauma from insertion of the chest drain itself? That was not an issue here because if you get problems from insertion of the chest drain, that again is something you'd find at the time you're putting the chest drain in.

Once you've inserted the chest drain, the metal bit, the guide wire or the trocar is removed, is taken out of the chest. Therefore once you've completed inserting the chest drain what

you've got left is a big piece of flexible plastic, you know, a plastic drain, you know.

So therefore that should not cause a problem.

So therefore that would not -- so therefore the fact that there was no deterioration following insertion of the chest drain means that they did it properly and it means that the chest drain was not responsible for her deterioration some time later, yes.

MYERS: Dr Evans, you are deliberately identifying positive features and ignoring the series of problems repeatedly experienced by [Baby H] to support this allegation, aren't you?

EVANS: No, no, no, no, no. There were a series of problems that they dealt with and they dealt with it successfully and the proof of that is that she's a well little girl now. So therefore she had a series of problems. Her management, I think, was good and they dealt with everything, which is -- they dealt with the complications as they saw them. The most serious complication clearly was the pneumothorax and the fact that it recurred and they dealt with all of this. She was stable. As I've mentioned, before moving to Arrowe Park her urinary output was good, her blood pressure was good, so therefore the way that the medical team dealt with [Baby H]'s condition during these few days was satisfactory. In short, they saved her life. So that is what happened. I mean, that hopefully is what doctors are there for.

So no, I'm not ignoring anything. I recognise that she had a very challenging condition, which they treated satisfactorily.

MYERS: I make it plain, I'm suggesting to you that you are not being objective in the way you are dealing with this.

EVANS: I am being very objective about it, sorry.

MYERS: You are focusing upon a theory that really is designed to support the allegation rather than just reflect the clinical picture.

EVANS: No, I'm not dealing with theories at all. I'm dealing with clinical experience, many, many years of it.

MYERS: And what you're doing as you say things that went well for [Baby H], you're identifying bits of evidence that you can use to support what you say and support the prosecution rather than present the whole picture of what was going on with her.

EVANS: No, no, I am presenting the whole thing. Where I have come to a full stop with this case -- this is case number 8 in

this trial -- is whereas in the other cases I've identified a sequence of events that has led -- you know, I'm not going to discuss now because we've dealt with that. I can only go in this particular case as far as saying I cannot explain the collapses, the two collapses we've talked about, and I cannot explain them on the basis of the pneumothorax and infection, a blocked tube or any of these phenomena and the fact that she recovered so well -- well, she was recovering before she left for Arrowe Park, really, and then completed her recovery, I think, is a marker of clinical well-being and retrospectively an indication of -- and indicated that the care she had in dealing with her pneumothorax was satisfactory. But it doesn't explain these collapses and it's interesting that the local team -- they were there, I wasn't, we were not there -- they could not explain these collapses either, you know, and they were there.

MYERS: Do you accept there are instances where clinical care of staff at the Countess of Chester was sub-optimal?

EVANS: Well, I'm not going to make a generalised comment about that.

MYERS: You don't accept that there are any such instances?

EVANS: Such as?

MYERS: I'm asking you. You're the expert, you tell us. You have (overspeaking) the papers.

EVANS: I'm sticking with my opinion on this particular case and that's what I think we should do.

MYERS: So you don't see any sub-optimal performance that, for example, could have contributed to any complication in her condition?

EVANS: No, we're just talking hypotheticals now. I think that -- no, I... Look, let's go over this --

MYERS: I'm just asking, can you identify any?

EVANS: No, she had RDS so they put her on CPAP. Correct. Her RDS got worse, they put her on ventilation. My apologies for getting the time wrong. She didn't -- she wasn't stable, so they suspected pneumothorax. They put a drain in. That's correct. Then she got worse, the drain didn't work, so they put a second drain in. That saved her life. Oxygen value -- sorry, her oxygen requirement dropped significantly. Then her condition worsened again so they put a third drain in. That saved her life. Oxygen value dropped to 30%. Oxygen concentration I mean reduced to 30%, indicating good result. We've seen all the chest X-rays. I

am not a radiologist but the X-rays show significant pneumothoraces, several of them, and the final X-ray I've seen from Chester shows that her lungs were nicely expanded.

So I think the care she got was pretty good.

MYERS: Do you accept there's an unacceptable delay in intubation on the morning of the 24th?

EVANS: No, I don't think so.

MYERS: Do you accept there was an unacceptable delay in administering surfactant on the morning of the 24th?

EVANS: I would have given it a bit earlier. I think there was a delay of 2 hours and a bit I think. I would have given that earlier, but I think policy -- well, the policy in Chester -- my understanding, from what I heard, was that they only inserted surfactant after checking that the endotracheal tube was in the correct place. I think some of us would have put the endotracheal tube in and put the surfactant in at the time, but if that was their policy of passing the endotracheal tube, doing a chest X-ray, and then and only then inserting surfactant knowing that the endotracheal tube was in the right place -- well, if that's their policy, I have to respect that.

MYERS: Do you accept that certainly the first butterfly needle was left in her chest for far too long a period of time?

EVANS: I think they should have taken it out earlier.

MYERS: Do you accept the second chest drain was inserted in the wrong position?

EVANS: No.

MYERS: Do you accept that a chest drain may trigger a desaturation or bradycardia if it comes into contact with the heart or pericardium?

EVANS: Yes.

MYERS: Do you accept that's a possibility on this occasion?

EVANS: I think if that had happened I think it would have occurred at the insertion of the chest drain.

MYERS: Do you accept it's a possibility that some time after the insertion of the chest drain as it moved within the chest --

EVANS: Chest drains tend not to move a great deal, so very unlikely. Once you've stabilised your chest drain you are -- your baby will usually stabilise.

MYERS: I'm just looking. There's a joint report. Have you seen that, Dr Evans? You contributed to that in August of this year, didn't you?

EVANS: Is that the...? Sorry.

MYERS: The joint report dated 24 August 2022.

EVANS: Oh, the Southampton one, yes.

MYERS: Do you have a copy of that?

EVANS: Yes, I do.

MYERS: Look under "[Baby H]" and I am going to ask you to just to look at (v). It's at page 8. It's page M1264 of the statement bundle papers, my Lord.

I'm just asking about what you put your initials to.

It's your initials we're interested in, Dr Evans, and there are a number of factors here. One of them was:

"The apparent mobility of the chest drain tip may have resulted in complications, including episodes of desaturation and bradycardia."

EVANS: Yes.

MYERS: And you've agreed to that, haven't you?

EVANS: Yes:

"Apparent ability may have resulted..."

Yes. You know, trying to cover all the options but I don't think it was -- yes, you try to cover all of the options but... It still doesn't explain these two collapses, though.

MR MYERS: Right. No further questions, thank you.

MR JOHNSON: 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 in relation to this particular child. Obviously, you won't talk to anyone about

anything to do with the case until it's all over and we will see you again probably next week some time.

(The witness withdrew)

MR JOHNSON: Probably the week after.

MR JUSTICE GOSS: Possibly the week after because it's a shorter week next week.

MR JOHNSON: It's Dr Bohin next, my Lord, and if we're going to have a break, this is probably -- it is slightly early but it's probably the best time for it.

MR JUSTICE GOSS: It's probably a good time, isn't it, to have the ten-minute break and then we'll hear Dr Bohin in one piece rather than breaking off. We'll treat this as our mid-morning break. Ten minutes. Thank you very much.

(In the absence of the jury)

MR JUSTICE GOSS: It's highly likely that we're going to finish the evidence this morning, aren't we? Before 1 o'clock, I mean.

MR JOHNSON: I think Dr Bohin will take longer than Dr Evans did.

MR JUSTICE GOSS: What we'll do then, when we resume at quarter to, whoever is asking the questions when it's getting to the conventional lunch break time, choose an appropriate moment. It'll probably be you, Mr Myers, it may not be. Whoever it is, I'll leave it to you. So don't feel bound by the clock.

MR MYERS: I agree with Mr Johnson, I anticipate it will be longer with Dr Bohin.

MR JUSTICE GOSS: That's not a problem. I was alerting you to my accommodating whoever it is at that stage.

MR MYERS: Thank you.

MR JUSTICE GOSS: Mr Murphy, again, a problem with the iPad for juror number 9. I don't know whether you've identified what it has been in the past, whether it's user error or machine error. I'll leave it like that.

If it cannot be resolved in the ten-minute break, don't worry about it, because you'll have an opportunity this afternoon to do it when we won't be sitting. Thank you very much.

(11.34 am)

(A short break)

(11.46 am)

MR JUSTICE GOSS: Jury, please.

(In the presence of the jury)

DR SANDIE BOHIN (recalled)

Examination-in-chief by Mr Johnson

MR JOHNSON: Welcome back, Dr Bohin. Would you identify yourself for the record, please?

BOHIN: I'm Dr Sandie Bohin.

JOHNSON: Thank you, doctor. Have you written several reports relating to the case of [Baby H]?

BOHIN: Yes, I have.

JOHNSON: And if we deal with those first of all, please. Was the first dated 27 March 2019?

BOHIN: Yes.

JOHNSON: The second, 2 March 2020?

BOHIN: Yes.

JOHNSON: The third, 26 September 2022?

BOHIN: I have another one --

JOHNSON: Sorry, yes.

BOHIN: -- of 15/10/21.

JOHNSON: I beg your pardon, yes. 15/10/21 and then 26/09/22?

BOHIN: Yes, that's correct.

JOHNSON: The version I have didn't have a date on one of them and I've written the wrong date in. That's the explanation for my mistake.

Now, can we start just by, seeing it's so long since we've heard from you, reminding the jury of what you have set out to achieve so far as the case of [Baby H] was concerned. I say "set out to

achieve", but what was your role so far as the case of [Baby H] was concerned?

BOHIN: I was asked to peer review the statements made by Dr Dewi Evans and to give an opinion as to whether I agreed with the things that he had found in relation to this case, whether I disagreed with the things that he'd established in relation to this case, or whether I had found an alternative, if I had an alternative view, about this case.

JOHNSON: Yes. So it's not simply a case of giving him the thumbs up and saying everything he's done is right, you bring your own independent professional view to the case?

BOHIN: That's correct. I reviewed the case as if I was doing it from scratch.

JOHNSON: Yes. So far as the material that you had to consider was concerned, did you receive from the police the medical records relating to [Baby H], both from the Countess of Chester Hospital and Arrowe Park Hospital?

BOHIN: Yes.

JOHNSON: And did you also initially start by being given by the police a copy of Dr Evans' statement dated 31 May 2018?

BOHIN: Yes.

JOHNSON: I think in due course have you seen medical reports written by medical practitioners from a number of different disciplines in relation to all of these children as a matter of fact?

BOHIN: Yes, I have.

JOHNSON: And do you take all that information into account when you express your views to this jury about individual cases?

BOHIN: Yes, I do.

JOHNSON: Thank you. Can we start, please, with the chronology of [Baby H], which I'm sure we can deal with very quickly. As a matter of fact, were you able to listen to what Dr Evans said earlier this morning so far as the chronology of her treatment was concerned?

BOHIN: Yes, I did.

JOHNSON: And insofar as you will tell us where it becomes necessary, is that -- in effect, is the way we ended up with that correct?

BOHIN: Yes.

JOHNSON: All right. I'd like to turn, if we can, please, to the first incident in the early hours of 26 September. So I'm looking at -- I think, as a matter of fact, the police posed a number of questions to you, which you dealt with in that second report; is that right?

2 March 2020.

BOHIN: Yes.

MR JOHNSON: So I'm looking, for your Lordship's notes, at page 2256 on the digital case system and it's page 3 of 16 of Dr Bohin's report.

MR JUSTICE GOSS: Thank you.

MR JOHNSON: Were you posed a number of questions to consider?

BOHIN: Yes, I was.

JOHNSON: Were you asked what were the possible causes of the pneumothorax or pneumothoraces that were identified in [Baby H]?

BOHIN: Yes.

JOHNSON: Were you asked this question:

"Are there any actions consistent with the cause and, if so, what might they or that be?"

BOHIN: Yes.

JOHNSON: Were you asked for your observations on the need for three chest drains and asked whether that was common or unusual?

BOHIN: Yes.

JOHNSON: Were you asked about evidence that spoke to apparent blockages of the chest drains in [Baby H]?

BOHIN: Yes.

JOHNSON: Were you asked to consider whether there was anything appropriate to say about the repeating accumulation of pneumothoraces in [Baby H]?

BOHIN: Yes.

JOHNSON: And whether there was anything significant in the patterns of deterioration and recovery?

BOHIN: Yes.

JOHNSON: Looking at section 3 of your report, did you begin by explaining what a pneumothorax is?

BOHIN: Yes, I did.

JOHNSON: And would it be reasonable to say we've heard quite a lot of evidence about that? Is there anything you can usefully add to the explanation that's already been given?

BOHIN: No, I don't think so.

JOHNSON: Thank you. Moving on then, please, to the second issue, which was what was the cause of the pneumothorax or pneumothoraces in [Baby H]. That, I think, was dealt with at the ninth page of your sixteen-page report. What's been typed as A but in fact should be B; is that right?

BOHIN: Possible causes, I've got as A on page 7 of my report.

JOHNSON: Right. Well, it may be that --

BOHIN: And paragraph 3.18.

JOHNSON: Sorry, yes. You're quite right. What in your view was the cause of the pneumothorax or the pneumothoraces in [Baby H]'s case?

BOHIN: The fact that she had respiratory distress syndrome and that she had been -- although she'd been treated for that, she received surfactant relatively late, but the underlying cause was the respiratory distress syndrome.

JOHNSON: What was your view as to the delay, if there was a delay, in administering surfactant to [Baby H]?

BOHIN: I'm unclear as to the policy at the Countess of Chester Hospital, but in Dr Gibbs' evidence he suggested that they were waiting for a chest X-ray to ensure that the position of the breathing tube, the endotracheal tube, was in a satisfactory position before giving the surfactant. That is important because if the tip of the tube is in one lung, and it generally goes into the right lung if it's too long, if it goes into the right lung and you then give surfactant without knowing where the tip

of that endotracheal tube is, your dose of surfactant would go down into the right lung and none would go into the left lung, and that can cause significant complications.

So in some units, and the Countess of Chester may be one, it's commonplace to wait for the chest X-ray to make sure that the tip of the endotracheal tube is in a satisfactory position so that when you give the surfactant, it goes into both lungs. Most other hospitals now don't wait for a chest X-ray and you insert an endotracheal tube, listen with a stethoscope to ensure that you can hear air entry on both sides, and if you can, will administer surfactant as soon as possible. But the delay may have been because they were following their own protocol at that hospital at that time.

JOHNSON: Thank you. So going back to your report then, please, and looking at -- I just want to -- I think we just dealt with the surfactant issue, which is paragraph 3.24.

BOHIN: Yes.

JOHNSON: Did you take the view, looking at your paragraph 3.25, that the surfactant was late or that it was not late in effect?

BOHIN: I think it was given late.

JOHNSON: And what consequence is that likely to have had so far as [Baby H] was concerned?

BOHIN: Well, surfactant reduces the stiffness in the lungs that babies have when they have respiratory distress syndrome. If your lungs are stiff and you are mechanically ventilated or if you are struggling to breathe, you are more likely to develop a pneumothorax.

So if the surfactant had been given sooner, it reduced but didn't remove, but it reduced the likelihood of developing a pneumothorax.

JOHNSON: Having reviewed the records, did you reach a view as to the stage by which it was likely that [Baby H] had developed her first pneumothorax? I'm looking at your paragraph 3.26.

BOHIN: Yes, I wrote it down. I think in my view [Baby H] developed a pneumothorax by around 06.00 hours on 24 September.

JOHNSON: What effect would the fact that she was on mechanical ventilation have had on that particular circumstance?

BOHIN: If you're ventilated and you develop a pneumothorax, it's likely to exacerbate or make that pneumothorax worse, just

because you're putting pressure into the lungs at a higher pressure than a baby would achieve if they were breathing spontaneously. So you are going to make that air leak worse.

JOHNSON: Moving on to your 3.29, a treatment was given for that first pneumothorax; is that right?

BOHIN: An emergency intervention was given, yes.

JOHNSON: Yes. What was that intervention, please?

BOHIN: It's called a thoracocentesis and in essence it's using a small needle, which is inserted into the -- through a space between the ribs into the chest and air is aspirated out of that, usually by putting the -- the device is called a butterfly, it has a needle and small tube on the end of that. The needle is put into the chest. If there is air in the chest when the other end of the device is put under water it bubbles, so you can either allow it to bubble out or, as I think in this case, someone put a syringe on the end and actually aspirated air out and measured air out.

JOHNSON: What should happen to that needle once that exercise has been undertaken?

BOHIN: The purpose of doing an emergency thoracocentesis is to relieve the tension in the air leak because that's the life-threatening -- it's a life-threatening condition.

So that is a very temporary solution. You take some of the air -- you don't need it take all of the air, you just need to relieve the tension, and the second part is that this should be followed up by a formal chest drain insertion. But what should happen, once you've removed the air or released the tension, is that that needle should be taken from the chest because when you remove the tension, the lung will re-expand and there's a risk that the lung tissue will then abut the sharp edge of the needle as the lung re-expands. So once you've undertaken your emergency measure, you should remove the needle, then do your chest X-ray, or insert your formal drain and then do your chest X-ray, depending on the clinical condition of the baby.

JOHNSON: And is that what happened?

BOHIN: No, unfortunately, because we can see from the chest X-ray, the butterfly needle was left in the chest. It's very clear to see on the X-ray.

JOHNSON: For anyone's information, if they want to go to the X-ray, I'm not inviting you to deal with it now, but which X-ray are we talking about at this stage?

BOHIN: I have a list of the X-rays on the...

(Pause)

I can't find it actually.

JOHNSON: If you give me a time, I can give you the...

(Pause)

BOHIN: Unfortunately, I haven't written that in my notes.

I have just said it was left in situ.

JOHNSON: You speak at paragraph 3.26 of the pneumothorax being --

BOHIN: 06.00 on 24 September, so it would be the first X-ray after that on that date, on 24 September. Apologies.

JOHNSON: Just for the record, that's an X-ray at --

BOHIN: 8.58, yes.

JOHNSON: And that's J12656 --

BOHIN: Yes, it's 8.58.

JOHNSON: -- if anybody wants to find that.

BOHIN: Apologies.

MR JUSTICE GOSS: J what?

MR JOHNSON: 12656.

MR JUSTICE GOSS: It's been pointed out to us.

MR JOHNSON: It has, my Lord, yes.

The effect of -- you speak at paragraph 3.30 of the effect of the placing of that initial drain by Dr Harkness.

BOHIN: Yes.

JOHNSON: Did [Baby H] -- was there a positive effect so far as that was concerned?

BOHIN: Yes, the drain served its purpose. The air leak had resolved at that stage. The ventilation and oxygen requirements came down and [Baby H] was stable.

JOHNSON: I'm turning, if we can, to continue with your paragraph 3.30. You speak of events later on the 24th and, in particular, by 20.50 that evening. What did you note at that time, doctor?

BOHIN: Well, at that time it was reported that [Baby H] was struggling because she appeared to be breathing against the ventilator. So she was upset in some way and the clinical team increased the amount of morphine because they felt that she perhaps was distressed because she was in pain and also were required to increase the ventilator settings. I think in retrospect, although they didn't realise at the time, the air had re-accumulated and that was the cause for her deterioration at that time. But increasing the morphine and increasing the ventilator settings were the correct thing to do initially.

JOHNSON: Yes. Given the circumstances as you believe them to have been, would an alternative have been to, in effect, drain any additional build-up of air within the lung at that stage --

BOHIN: I think it would have been -- yes, useful to use the cold light to see if there'd been an accumulation of air plus or minus a chest X-ray and, if there'd been the accumulation -- re-accumulation, to have drained it appropriately.

JOHNSON: I think -- as a matter of fact, I think you have looked at the timings of the X-rays that we have in the records and there is no chest X-ray about this time, is there --

BOHIN: No.

JOHNSON: -- at about 9 pm on the 24th?

BOHIN: No.

JOHNSON: Have you got the times of the X-ray, the last X-ray, before that and the X-ray after that?

BOHIN: There's an X-ray at 11.24 on the 24th.

JOHNSON: Yes.

BOHIN: And there's an X-ray at 01.40 on the 25th.

JOHNSON: Yes.

MR JUSTICE GOSS: 11.24 on the 24-hour clock, morning?

BOHIN: Yes, and 01.40 on the 25th.

MR JOHNSON: So there's a period of 14 hours or so give or take --

BOHIN: Yes.

JOHNSON: -- during which time this problem started to manifest itself by the need to increase the ventilator pressures?

BOHIN: Yes.

MR JUSTICE GOSS: A period of 12 hours: 11.24 on the 24th to just after midnight on the 25th.

BOHIN: 01.40.

MR JUSTICE GOSS: 01.40. Well, that's still 13/14 hours.

BOHIN: Mm.

MR JOHNSON: Yes.

At 01.14 on the 25th -- and I'm looking now at your paragraph 3.32 -- was there an issue identified?

BOHIN: Yes. There appears to have been an acute deterioration at that time with [Baby H], a clinical deterioration. At that time the pigtail drain that was in position was no longer fluttering whereas it had been before. And to me, this means that it was either blocked, had become dislodged, or something had happened to the three-way tap which was attached to it.

JOHNSON: If anyone wants to make a note, I think that's tile 44 or thereabouts in the sequence.

Now, just taking a step back at that stage and considering the issue of the pneumothorax or pneumothoraces that had manifested themselves up to that point, did you reach a view as to what the likely cause of that or those was?

BOHIN: The pneumothoraces, I think, were caused by her respiratory distress syndrome.

JOHNSON: In that context what did the lack of an early administration of surfactant have?

BOHIN: Well, it would have exacerbated/increased the risk of pneumothoraces developing, because the lungs would have remained stiff for the period that she had not received the surfactant therapy.

JOHNSON: And did the breathing support, in whatever form it had taken up to that stage, have a part to play?

BOHIN: Well, any respiratory support, be it CPAP, but more importantly if a baby's placed on a ventilator, that will also increase the risk of a pneumothorax. So [Baby H] unfortunately had a number of factors which made her chances of developing pneumothorax higher than that of another baby.

JOHNSON: I think you've already told us that the butterfly needle had been left in as well --

BOHIN: Yes.

JOHNSON: -- with the associated risk. One of the questions that we dealt with earlier was the issue of three chest drains. Did you consider that in the context of [Baby H]'s clinical presentation?

BOHIN: Yes. Currently, with the advent of antenatal steroids and surfactant therapy, it's very unusual for babies to need three chest drains on the same side. Years ago, and certainly when I trained, antenatal steroids weren't given to mums and surfactant hadn't been invented then, so babies had very stiff lungs and it was not uncommon for babies to have as many as five chest drains. Those days are long gone, thankfully, and therefore it's now very uncommon for babies to have three chest drains in situ, particularly in one lung.

JOHNSON: So far as the -- I'm looking at your paragraph 3.41 now.

One of the issues that was explored with the treating medics was the precise place at which drains were inserted. Can you help us with that in the context of the problems as [Baby H] was presenting at the time?

BOHIN: As I alluded to, years ago it was common for babies to have lots of chest drains. Although there was an optimum position for you to place the drain, if babies need multiple drains you clearly can't put all of those drains in the optimal position. Now doctors rarely have to insert chest drains and it's now recommended that the drain, chest drain, is put in at the side of the chest rather than at the front of the chest, just by the armpit, and it's recommended that you count down the ribs and place the drain in the fourth or fifth space between the ribs.

Sometimes counting that can be quite difficult in a baby, it's much easier in an adult. So if you were just inserting one

drain, you would insert it at the side and you would place it in the fourth or fifth space between the ribs. Clearly, once you have got one drain in, you can't place the second drain in that position, so you have to place it somewhere else, and the -- and the choice is down to the clinician. But what is difficult in treating pneumothoraces is that, unlike in adults who have a chest drain, which is placed when they are sitting up, babies who are ill are lying down and so the air rises and so the air of the pneumothorax rises.

When you put the chest drain in horizontally, these tubes are very and it's quite difficult to angle them upwards to come into contact with that pocket of air if you're placing the drain in from the side of the chest.

So an alternative way of dealing with that is to place a chest drain at the front of the chest. That goes in a slightly different position, it goes in a different rib space, but is associated (a) with more complications, in that there are major vessels just underneath where you're planning to put an anterior chest drain, and (b) it causes -- all chest drains cause some scarring but it causes scarring and in a female there's a risk of it interfering with breast tissue. So it is not without its risk. As a life-saving measure of course you would do it, but there are more complications, and it would have been my own choice to have put anterior chest drain in, but I'm mindful of the fact that doctors probably now haven't been taught that technique and therefore would choose another rib space to put a lateral drain in.

JOHNSON: Okay. So there you are in effect assessing the drain put in by Dr Jayaram; is that right?

BOHIN: Yes. I mean, Dr Jayaram, I heard his evidence, he undertook a life-saving measure, he explained that he couldn't put a drain in the fifth intercostal space because there was already a drain there. He chose a rib space two below that. And he was under a lot of stress at the time. This was a life-saving procedure and he did it to save a life, and I think that was the right thing for him, particularly if he is not competent or hadn't thought of putting an anterior chest drain in.

He may never have done that and in the heat of that moment I would have expected him to do something he was competent to do.

JOHNSON: Yes.

Dealing with -- I'm turning to your paragraph 3.42 and the various deteriorations of [Baby H]. You deal there with the position immediately after Dr Harkness had put in the pigtail drain, the first drain.

BOHIN: Yes.

JOHNSON: That [Baby H] had stabilised, but that early on the morning of the 25th, so we're still before either of the counts in this case, but early on the morning of the 25th there was an acute deterioration. Can you tell us what conclusions you drew so far as that was concerned?

BOHIN: Well, what was noted was that the drain was -- I'll go back.

When a drain is inserted there are two ways you can allow the air to come out. The best way really is to attach the end of a drain and put it to an underwater seal, which the second drain -- that was the method used in the second drain.

In the first drain they used something called a flutter valve or a Heimlich valve which is not as effective at draining the air but is a recognised method. [Baby H] had a flutter valve attached to the end of the pigtail and at some point the flutter valve stopped fluttering, stopped moving. So that meant either the drain had become dislodged or had been blocked in some way which meant that there was no fluttering. If that happens then air -- if there's still a hole in the lung, air will re-accumulate and the child will clinically deteriorate.

JOHNSON: At that stage was a butterfly needle used to perform a thoracocentesis?

BOHIN: Yes, at that stage there was another thoracocentesis and 70ml of air was aspirated using a butterfly.

JOHNSON: And despite that fact, shortly afterwards -- and it's at tile 48 should anyone want to look at it -- was there a chest X-ray which showed the presence of a large pneumothorax?

BOHIN: Yes.

JOHNSON: Is that followed by a second thoracocentesis?

BOHIN: I think a third. I think there was another one with 60ml and there was a third one that yielded no air at all.

JOHNSON: Yes.

BOHIN: And that's when the chest drain number 2 was inserted by Dr Jayaram.

JOHNSON: Yes. The X-ray that corresponds to that time is the one taken at 2.29, which is tile 55?

BOHIN: Yes, that's correct.

JOHNSON: You've already dealt with the positioning of that. Is there any issue so far as the timing of the second chest drain was concerned so far as your opinion is concerned?

BOHIN: Yes, there is. There was a second -- there was a thoracocentesis, in which 70ml of air was aspirated.

There was then a chest X-ray and then a second and then a third thoracocentesis. So a long time elapsed between doing the emergency intervention of the thoracocentesis and the formal insertion of the chest drain by Dr Jayaram. It may have been that the doctor present was unable to insert a formal chest drain and that may have been why [Baby H] had multiple thoracocenteses. But that wouldn't be a usual -- that wouldn't be usual practice. Usual practice is to aspirate the air to remove the tension and then follow that up immediately by inserting a drain, not having repeated thoracocenteses or waiting for an X-ray.

JOHNSON: Thank you. Just taking a step back and looking at [Baby H]'s deterioration in the early hours of the 25th, did you reach a conclusion as to what the likely cause of her deterioration was?

BOHIN: I think that deterioration was a re-accumulation of the pneumothorax.

JOHNSON: And did that deterioration or those deteriorations that morning require anything more extreme than the aspiration of air from the pleural space?

BOHIN: No. Once the chest drain was placed, she stabilised.

JOHNSON: Moving on to the early hours of 26 September and to the first of the two counts naming [Baby H], what conclusions did you draw so far as that collapse was concerned? So the early hours of the 26th at about -- I think it's about 3.20 or thereabouts.

BOHIN: What was clear is by about 2.15 that morning, the drains were not fluttering in the case of the pigtail catheter or the fluid wasn't swinging in the underwater seal in the case of the more traditional catheter.

So it would appear that both drains were blocked and that -- there was a further accumulation of air, which caused her to clinically deteriorate. A consultant was called in again and there was a third chest drain put in, which was a second

pigtail. So by this point she had two pigtail catheters and a third chest drain and --

JOHNSON: I'm sorry to interrupt you. Just trying to put that into context of the evidence that we heard. This is Dr Gibbs' --

BOHIN: I beg your pardon, yes.

JOHNSON: Not at all.

BOHIN: By this time Dr Gibbs was the consultant that was called in and he inserted a third chest drain, which was the second pigtail chest drain. So by this time [Baby H] had three chest drains in situ. The insertion of that third drain was successful as the oxygen requirement immediately reduced.

JOHNSON: Yes. There was a much more serious desaturation later that morning at 03.22 hours. I'm afraid I'm jumping about a bit in your reports because it's necessary to do that in order to keep the sequence so far as the chronology of the events is concerned.

BOHIN: Yes.

JOHNSON: Was there a difference between what had happened up to that stage and what happened at about 03.20 on the morning of 26 September?

BOHIN: Yes, these events were different. The similarities were that there was a profound desaturation, bradycardia and poor colour, but with this event, around 03.24, when the clinical team listened to the chest they could hear air entry and it appeared to be equal on both sides, which is not what they found when there was re-accumulation of air, and also they could see chest wall movement. So when the ventilator was breathing in they could see the chest rising and when the ventilator was breathing out they could see the chest falling.

That was not the case when either there was a re-accumulation of air or if the chest drains were blocked, and in addition they could see that the chest drains were patent and they could see some fluid coming out of the drains.

JOHNSON: Okay. Just trying to understand what you've just told us, the collapse at 03.24 or thereabouts, when the medical practitioners listened to either side of [Baby H]'s chest, they could actually hear air going in and out?

BOHIN: Yes.

JOHNSON: Is that right?

BOHIN: Yes.

JOHNSON: So what does that tell us so far as whether or not there's a collapsed lung, a pneumothorax?

BOHIN: If there's a collapsed lung, the air entry would be unequal in that you would hear air going into the normal lung but you would have reduced air entry and you wouldn't hear breath sounds on the side where the lung was collapsed.

JOHNSON: So the previous collapses had been associated with a collapsed left lung?

BOHIN: Yes.

JOHNSON: Therefore you wouldn't hear air going in?

BOHIN: That's correct.

JOHNSON: Therefore you have tension or pressure from the air between the outside of the lung and the inside of the chest?

BOHIN: Yes.

JOHNSON: Therefore you don't hear any air or a reduced amount of air going into that side?

BOHIN: Yes, that's correct.

JOHNSON: But what was happening at 03.24 or thereabouts was different?

BOHIN: It was different. They could hear air going into both sides of the chest. Of course it also means that the endotracheal tube was not blocked, whereas in some of the previous problems they could not hear air entry on either side of the chest because the endotracheal tube was blocked. So this event tells me that the endotracheal tube was not blocked and that there was no re-accumulation of air.

JOHNSON: What about the consequences, the real world consequences for [Baby H]? Other than unblocking a tube and/or re-inflating a lung or deflating the tension pneumothorax, what were the consequences for [Baby H] of this particular collapse that differentiated it from what had gone before?

BOHIN: In the other collapses there appeared to be an obvious cause, either a blocked tube or a re-accumulation of air, and the clinical deterioration was rectified by intervention by the medical staff. Once the endotracheal tube was unblocked or once

the air leak was drained, [Baby H] recovered. This was very different in that [Baby H] went on to have a cardiac arrest and the interventions provided by the medical staff did not rectify the situation for some time. She required chest compressions, adrenaline and atropine, and that went on for some 20 minutes or so.

JOHNSON: So would it be fair or unfair to say that this event has very different characteristics to what preceded it?

BOHIN: This event has very different characteristics. I can find no obvious clinical or mechanical cause to account for this collapse or to account for why [Baby H] did not recover as she had done with what was routine intervention.

JOHNSON: Moving on to events of the following early morning, if we may, so we're going on to the early hours of the 27th, Sunday, 27 September. We know that [Baby H] collapsed at or about 00.55 that morning.

BOHIN: Yes.

JOHNSON: Can you tell us what the characteristics of that collapse were, please? I'm looking in general terms at about your paragraph 3.54.

BOHIN: Yes. This collapse again was heralded with a bradycardia and desaturation. The medical team listened to the chest and could hear air entry. They've bagged using the Neopuff through the endotracheal tube.

They also performed suction on the endotracheal tube because [Baby H] had previously had a blocked tube and there had been secretions, so they, as a precautionary thing, they sucked out that tube. And yet she still did not improve. Then as a result they electively removed the ET tube because of the previous history that her tubes had been blocked. I couldn't find any comment as to whether this tube was blocked or not, but it was a reasonable thing to do in the circumstances.

[Baby H] was then bagged using a Neopuff and they needed to use high pressures to try and improve her saturations and her heart rate. She then was re-intubated but that did not improve the situation and again her heart rate remained seriously low. She was in a cardiac arrest situation and required chest compressions once again, and this time required a single dose of adrenaline before she recovered.

JOHNSON: All right. If Mr Murphy would help us for a second, please, and just turn up tile 436. These are Shelley Tomlins' notes relating to that collapse. I'm just highlighting them to

deal with an issue that you've raised about whether or not the ET tube was blocked.

I think if we look at what Nurse Tomlins has noted -- and I'm afraid I'm going from my notes now so I'll just have to check first of all...

(Pause)

I think there is something in here about whether or not there was anything in the tube, but I think it's...

It relates to 00.55, so we're going to have to scroll down a bit. There we are at the bottom:

"Profound desaturation to 40% despite equal bilateral air entry and positive capnography. ET suction yielded nil secretions."

So it may be that that informs the position, does it or not?

BOHIN: It doesn't tell us whether the tube was blocked or not, but it does indicate that -- if the tube is blocked you wouldn't get any secretions if you suction, so I don't think that helps us either way.

JOHNSON: No, all right. Thank you. What view did you take of this particular collapse, please, Dr Bohin?

BOHIN: Well, again, it mirrored the previous collapse that we've just spoken about in that although there was a bradycardia and a desaturation, there was no obvious cause to account for that and no cause as to why [Baby H] did not improve with routine measures. So whether the tube was blocked or not, they took the tube out and bagged her. So you would have expected her to improve.

There had not been a re-accumulation of the air leak, but even going back prior to that, when the staff listened in they could hear air entry on both sides of the chest and the capnography, the CO2 detector at the end of the endotracheal tube, was positive, showing that carbon dioxide was coming out of the chest. So that would indicate actually that the tube was not blocked.

JOHNSON: Yes. Thank you. Can we deal with a slightly different issue, which has been explored with some of the witnesses as we've heard the evidence from the treating medical practitioners, and I think you deal with it in your statement of 26 September 2022. It's your page 4 of 6. It's my Lord's page 5520 and it's paragraph 2.7, please, Dr Bohin. It concerns the movement or non-movement of the non-pigtail drain, so the Dr

Jayaram drain, if I can call it that. It may be a name that brings it more to mind.

Were you asked to consider whether or not in your view there was evidence to either support or rebut a theory that in some way the movement of the tip of that drain had interfered either with the heart or the vagal nerve or some other structure within the body that would account for [Baby H]'s two collapses, the first in the early hours of the 26th and the second in the early hours of the 27th?

BOHIN: Yes, I was asked to comment on that. What's clear is that if the tip of a drain is abutting structures in the centre of the chest, ie the heart or nerves in the chest, that can cause -- although I have to say I have never seen it, but in theory that can cause a bradycardia, ie a fall in heart rate, and a clinical deterioration.

But although it's clear that the Dr Jayaram drain had moved on a sequence of X-rays, it didn't move after the X-ray on 26 September. The subsequent X-rays show that it's in the same position. Therefore I don't think that that drain can be the cause for [Baby H]'s deterioration with the theory offered that it may have been pressing on the heart or other vital structures and causing the collapse.

JOHNSON: It may be obvious from what you've said, but why not?

BOHIN: Because it wasn't in the position -- it wasn't moving then. It had been secured by Dr Gibbs. It had moved before, the treating clinicians told us that, and the X-ray shows that the tip is in a different position.

But once it had been secured, it didn't move and wasn't touching the heart.

JOHNSON: Yes, and yet we --

BOHIN: And yet [Baby H] collapsed.

JOHNSON: In the same way on the 27th as she did on the 26th; is that what you're saying?

BOHIN: Yes.

JOHNSON: So does it follow that because it didn't move and because therefore it can't have been responsible for the collapse on the 27th and because the collapse on the 26th was very similar to the 27th, you have taken a view that it can't be responsible for either?

BOHIN: The X-ray taken on the 26th was at 2.30 and [Baby H] collapsed at 3.24. So the X-ray showed that the tube was in a position not touching the heart, and so both the collapses occurred after we know the position of that tube was not next to the heart.

MR JOHNSON: Yes. Thank you very much. Those are all the questions I have for you at this stage. I'm sure Mr Myers has some questions.

Cross-examination by MR MYERS

MR MYERS: Dr Bohin, with regard to the event on 26 September at about 3.20 in the morning, so event number 1, you haven't identified any cause to account for that, have you?

BOHIN: No.

MYERS: And with regard to the second event, that at about 00.55 on the morning of 27 September, again you haven't identified any cause for that, have you?

BOHIN: No.

MYERS: I'm going to go through the events, if you would assist me with this, just identifying various items we've looked at, just to get things in sequence and deal with what you have told us in your evidence, so I'd be grateful for your help there.

The first point I would like to deal with this is: do you agree that the delivery of surfactant was late?

BOHIN: Yes.

MYERS: Looking in the first report you wrote at paragraph 7.6, just as to the potential effect of it coming late, you say:

"The delay is probably significant as surfactant therapy improves lung compliance and reduces stiffness in the lungs, making ventilation easier and the therapy works in minutes."

Is that correct?

BOHIN: That's correct.

MYERS: Certainly there's a delay of up to 36 hours post-birth with this, isn't there?

BOHIN: Yes, there is, but you would not normally give surfactant at birth in a baby of this gestation, but you would give

surfactant as soon as you had made the diagnosis of respiratory distress syndrome.

MYERS: Right. And it's well-known, isn't it, that early or appropriately timed doses of surfactant can reduce the risk of pneumothorax, can't it?

BOHIN: Yes.

MYERS: We know that a little after 7 o'clock on the morning of 24 September 2015, there was a desaturation that went down to the 50s? In fact, it will help if I do show some of the slides with this on so we can follow it.

Mr Murphy, could you put up T5, please? Can we scroll down a little bit further, please?

If we continue down, we're going down to the 24th if we could, please. Just to the bottom of this page.

This is an entry -- we saw it with Dr Ventress.

It's made at 8.20 in the morning on 24 September, but we can see it refers to that [Baby H] had been fine in the night, it refers to the 6 am cares, and it says that she's since deteriorated and had a profound desaturation down to the 50s. Do you see that, Dr Bohin?

BOHIN: Yes.

MYERS: So that's some time maybe just after 7 o'clock or thereabouts on 24 September. Now, as it happens, there had been a delay in intubation, hadn't there, round about this time, do you agree?

BOHIN: I don't know there'd been a delay in intubation. The SHO arrived -- this is written at 8.20. The desaturation occurred -- we don't exactly know when -- around 7 o'clock. And then she was intubated by the SHO at 8, I think.

MYERS: Yes. If we scroll up, please, and go back. We can see:

"Intubated on first attempt at 8.10."

BOHIN: Yes.

MYERS: The requirement for that having been identified round about 6 o'clock, in fact. Scroll back up, please, a little bit higher. Pausing there, please. We can see at the bottom of this note --

"May need intubation if not improved."

Do you see that, Dr Bohin?

BOHIN: Yes, but she had improved overnight and was in air so the team wouldn't have wanted to intubate her overnight.

And when she desaturated that morning, things had changed, and therefore there was a need to intubate then, but overnight she didn't need intubating and in fact she was in air, so she was fine.

MYERS: If you look in your first report at paragraph 7.4, Dr Bohin, you say this, talking about this period:

"[Baby H] continued to deteriorate. A decision was made to intubate and ventilate at 06.00 on 24 September 2015 when she was said to be gasping."

BOHIN: Yes.

MYERS: "There was a delay and this was not carried out until 07.45, which in my view is not acceptable practice."

BOHIN: Yes.

MYERS: So when I asked you whether it was a delay in this way and it was unacceptable, that comes from your report, Dr Bohin.

BOHIN: Okay.

MR JUSTICE GOSS: I must say, I understood your question to be from earlier, from the previous night, you were saying it's a much longer delay than that 1 and three-quarter hours between that time. But that was -- maybe I misunderstood -- because I don't know whether that was the reason. Anyway, she accepts there was a delay.

BOHIN: I accept there was a delay.

MR MYERS: That's why I went through those notes, my Lord, to identify the exact time and where it was said at 6 o'clock there may need to be intubation.

To be quite clear, Dr Bohin, in your report, do you agree, that was an unacceptable delay in intubation?

BOHIN: Yes, there was a delay.

MYERS: As for the pneumothorax that developed in [Baby H], your opinion is that she had almost certainly developed it by maybe about 6 o'clock on the 24th; do you agree?

BOHIN: Yes.

MYERS: Your opinion is that that pneumothorax is likely to be a consequence of her clinical condition, which was RDS, respiratory distress syndrome?

BOHIN: Yes.

MYERS: And also late provision of surfactant will have made that worse?

BOHIN: Yes.

MYERS: Looking at paragraph 7.9 of the same report, Dr Bohin, it's your opinion that:

"The air leak was probably small prior to this intubation but it increased after intubation with ventilation."

BOHIN: Yes, because we know that ventilation exacerbates air leak.

MYERS: Right. So we have the late delivery of surfactant, followed by delayed ventilation, but when the ventilation takes place, that may have made the air leak worse; is that correct?

BOHIN: It is, but they had to ventilate her.

MYERS: Yes.

BOHIN: So the treatment probably did make the air leak worse but there was no option but to intervene to ventilate her.

MYERS: Yes.

BOHIN: That was a life-saving measure.

MYERS: And that should have happened sooner, shouldn't it?

BOHIN: It should have happened sooner, yes. But if it had happened sooner, the air leak still would have been exacerbated by ventilation regardless of what time she was ventilated.

MYERS: If we move forwards now to 10.05 -- sorry, 8.35 on 24 September 2015, and we put up -- look in your second report at paragraph 6.8, please.

BOHIN: Sorry, which?

MYERS: Your first report at paragraph 6.8, Dr Bohin. My mistake, you first report at paragraph 6.8.

BOHIN: Yes.

MYERS: We're moving forward to 8.35 in the morning, still on the 24th --

BOHIN: Yes.

MYERS: -- and there was a desaturation with [Baby H] down to 54%; that's correct, isn't it?

BOHIN: Yes.

MYERS: It's at this time, isn't it, that there was a positive cold light examination on the left side of the chest and a chest X-ray was ordered?

BOHIN: That's correct.

MYERS: Keeping in mind the timings, she was now being ventilated, wasn't she, Dr Bohin?

BOHIN: Yes.

MYERS: The chest X-ray was now ordered, wasn't it?

BOHIN: Yes.

MYERS: But surfactant had yet to be given, it wasn't actually given until shortly before midday, was it?

BOHIN: That's correct.

MYERS: The whole point of surfactant is to keep -- assist with the lungs being pliable so they can move more easily during respiration, isn't it?

BOHIN: Yes.

MYERS: If we move forwards to about 10.05 on 24 September and paragraph 6.9 of your first report, Dr Bohin. 6.10.

Are you with me, paragraph 6.10?

BOHIN: Yes.

MYERS: At 10.05, there is a further deterioration whilst on the ventilator, isn't there?

BOHIN: Yes.

MYERS: And this is the point at which the first butterfly needle is inserted into [Baby H]'s chest, isn't it?

BOHIN: Yes.

MYERS: You've looked at the X-rays and looked at what happened with this first butterfly needle, haven't you?

BOHIN: Yes.

MYERS: I'm going now to look at what you say about that in your report. My Lord, it's the second report -- I apologise that we move between them, but the findings are (inaudible) critically because you are looking at different things at different times, Dr Bohin, going across different reports.

Could you go to paragraph 3.13 in your second report? That butterfly needle is introduced shortly after 10 o'clock or thereabouts; is that correct?

BOHIN: Yes.

MYERS: A butterfly needle, as you've explained to us, should be removed as soon as possible, shouldn't it?

BOHIN: Yes.

MYERS: It has a sharp tip that can tear delicate lung tissue if it's left in situ as the lung expands; is that right?

BOHIN: Yes.

MYERS: It went in shortly after 10 o'clock. Could we put up the radiograph, please, Mr Murphy, at 12658, which shows us the situation at 11.24? So a little under an hour and a half later, an hour and 20 minutes later.

Pause there, thank you, Mr Murphy.

We can see the timing of that was 11.24 on 24 September. We can see that even at this time it appears that butterfly needle is still in situ, isn't it?

BOHIN: Yes.

MYERS: That's the white line with the point at the top. It's the right of our picture but towards the top of [Baby H]'s left lung?

BOHIN: Yes.

MYERS: Your views as to the leaving of butterfly needles you express in paragraph 3.38 in that second report --

BOHIN: Yes.

MYERS: -- where you say that leaving the needle in the chest is dangerous if the lung expands for the reasons you've already explained to us --

BOHIN: Yes.

MYERS: -- and it's not currently recommended.

BOHIN: That's correct.

MYERS: And your concern as to that in this situation, Dr Bohin -- I'm looking at paragraph 3.44 in the same report -- your concern was that leaving the butterfly needles or needle in the chest for prolonged periods may have punctured lung tissue and contributed to the subsequent pneumothoraces; is that correct?

BOHIN: Yes, it may have done.

MYERS: In the same paragraph you say that:

"Had [Baby H] been given earlier and multiple doses of surfactant and was better sedated and paralysed, she would have been easier to ventilate with lower pressures and at less risk of accumulation."

BOHIN: Yes.

MYERS: Leaving a butterfly needle in situ like that is, I'm going to put it this way, sub-optimal practice, isn't it?

BOHIN: Yes, because it's hazardous.

MYERS: Moving to the next event I'd ask to look at with you, please, Dr Bohin. If we put up tile 41, please, Mr Murphy, we're moving to 8.50 on the evening of 24 September. If we just go behind that tile 41.

I hope I've got the correct reference myself.

If we go to the left-hand side, at the top, please, we've got the entry by Ms Letby at 22.34. Can you see that at the top left-hand entry?

BOHIN: Yes.

MYERS: It says:

"Desaturation to 40% at 20.50."

Can you see that? Sorry to go straight into the centre of there but I'm going to go directly to the point.

BOHIN: Yes, I can.

MYERS: When you came to consider that in your report, Dr Bohin, at paragraph 31 --

BOHIN: My second report? Paragraph 3.31?

MYERS: Yes. Give me one moment, please. Yes. Perhaps look at paragraph 3.30, just to read yourself in. You point out that after the 20.50 desaturation, the dose of morphine and the ventilator settings needed to be increased --

BOHIN: Yes.

MYERS: -- which indicates that [Baby H] was struggling and is an indication the air had re-accumulated and you say that wasn't recognised at the time.

BOHIN: No, it doesn't appear to be.

MYERS: The significance of that, Dr Bohin, is that if [Baby H] had been sedated in the way that would have been optimal, her muscles would have been relaxed and she wouldn't have been struggling against the ventilator; do you agree with that?

BOHIN: She may not have been, but it's -- recurrent pneumothoraces are very difficult to treat. So you need to do everything possible to try and reduce the risk of air re-accumulating and one of those things is to obviously keep babies settled so they are not breathing against the ventilator. But sometimes, even despite that, because of the poor compliance of the lungs, pneumothoraces will still re-accumulate. So yes, it may mitigate it but it doesn't necessarily completely remove the risk of it.

MYERS: You pointed out in your evidence earlier that there is no X-ray taken, I think it was between -- was it 11.24 in the morning of the 24th until 01.40 on the morning of the 25th?

BOHIN: That's correct.

MYERS: This occurs during that period, doesn't it?

BOHIN: Yes.

MYERS: And it may be thought that with a baby in a condition that [Baby H] was in perhaps rather closer monitoring with the radiographs or X-rays may have assisted to see what was happening in her chest with her lungs.

BOHIN: The X-ray would have helped but you really need to go on clinical findings as well. So an X-ray undoubtedly would have helped but so would just clinical observation, really.

MYERS: Right. In any event it would have been better if she had been sedated and the muscles relaxed so she wasn't struggling against the ventilation, wouldn't it?

BOHIN: I'm unsure of the policy at the Countess of Chester regarding muscle relaxing babies. It tends to be used less often now but in any case adequate sedation should stop movement, whether you use a muscle relaxant or not, and I think she would have been better placed to have had more sedation, yes.

MYERS: I'm going to move next to tile 44, please, which takes us forward to the period between 1.15 and 1.25 on 25 September. So this is several hours after what we've just looked at there. Tile 44, please, Mr Murphy. I'm also looking at your report 2, paragraph 3.32, Dr Bohin.

BOHIN: Yes.

MYERS: If we just scroll down, please, Mr Murphy, we're going to move to an entry that starts at 01.14 on the 25th.

Can we see where the entry begins, Mr Murphy, just so everyone can remember this?

It's an entry by Dr Ventress. We have looked at this. 25 September 2015. The entry was made at 3.30 in the morning. I'm just going to remind us about the extent of the desaturation. Can we see at 01.14, it describes being bleeped.

BOHIN: Yes.

MYERS: If we continue down over the page, we can stop there, thank you. We can see at 01.25 now a profound desaturation down to the 30s. Do you see that?

BOHIN: Yes.

MYERS: In your report at paragraph 3.32, Dr Bohin, you refer to this and you say:

"The pigtail was no longer fluttering, meaning it was either blocked or had become dislodged."

Is that correct?

BOHIN: Yes.

MYERS: You say:

"The lack of fluttering should have alerted staff that, for whatever reason, the drain was not functioning properly and the lack of fluttering should merit a medical review before a clinical collapse."

BOHIN: Yes.

MYERS: Still on the same note, but seeing how [Baby H] proceeded, if we carry on down to 01.45, towards the bottom of that page, [Baby H] desaturates again, doesn't she?

BOHIN: Yes, because she's got a re-accumulation of her air leak.

MYERS: Yes. If we continue down, please, to the entry at 02.40, is she down to 80% saturation at this point? It says:

"ETT removed as sats 80%."

So in effect that is a desaturation down to 80%, isn't it?

BOHIN: Yes, her saturations are reduced because the tube's blocked.

MYERS: Yes, that's where I'm going. So we find there's a blocked tube at this point after there'd been a further desaturation at 02.40?

BOHIN: Yes.

MYERS: If we move, please, to -- continue down, we can see we've got 03.00, a further profound desaturation to 26% now.

BOHIN: Yes.

MYERS: Which is a very significant desaturation, isn't it?

BOHIN: Yes, because she's got a tension pneumothorax by this stage.

MYERS: And this is the point at which the next chest drain, or round about this point, soon afterwards, when the next chest drain is inserted, isn't it?

BOHIN: Yes.

MYERS: Now, you explained earlier on, when you were giving evidence, there's a delay between the thoracocentesis at 03.00 --

BOHIN: Yes.

MYERS: -- and the chest drain being put in a little bit later, isn't there?

BOHIN: Yes. I can't see when the chest drain was actually put in by Dr Jayaram.

MYERS: If we scroll down, or if it's not here we can go to page T59 -- can we go to tile 59, please, Mr Murphy?

Tile 51 first, I apologise. Tile 51. We can see Dr Jayaram's handwriting appear in the note timed at 04.55 down in the centre of the page. Can you see that, Dr Bohin?

BOHIN: Yes.

MYERS: He charts what happened after his arrival at about 01.50.

BOHIN: Yes.

MYERS: If we scroll down, please. We need to go to the next page, tile 59, please. If we go down towards the foot of this page we can see it -- can you go up a little bit, please?

BOHIN: It doesn't say the actual time though.

MYERS: No, the note says it's made at about 04.40. It doesn't give an exact time, does it?

BOHIN: No.

MYERS: We'll see a radiograph shortly. Your observation on this, Dr Bohin, was that we've seen over the period that Dr Jayaram attended and over this incident, there were two occasions when needles were inserted to aspirate the chest, weren't there?

BOHIN: Yes.

MYERS: And you made the observation in your evidence that it would have been better to proceed to inserting the second chest drain sooner than actually happened, wouldn't it?

BOHIN: Yes, prior to the -- immediately after the thoracocentesis, yes.

MYERS: Yes, immediately after the first one?

BOHIN: Yes.

MR MYERS: My Lord, I'm going to move to the issue of that chest drain. I wonder if this is a good point to stop.

Thank you.

MR JUSTICE GOSS: Certainly.

We'll break off now, members of the jury, and continue at 2.05, please. The hour. Thank you very much.

(1.03 pm)

(The short adjournment)

(2.05 pm)

(In the presence of the jury)

MR MYERS: Dr Bohin, would you turn to your copy of the joint report, please, and page 8 of that, which deals with the bulk of what is said about [Baby H].

And if you look at point (viii), you have agreed with this, haven't you, that:

"The non-pigtail catheter [that's the Dr Ravi Jayaram catheter] was inserted, apparently in error, into the seventh intercostal space rather than the fifth. Guidelines of which we are aware would recommend that the fifth space should be used"?

BOHIN: That's correct.

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

BOHIN: Yes.

MYERS: If we put up tile 75, please, which shows the image of the drain after it had been inserted by Dr Jayaram.

We can see an X-ray taken at 4.37 in the morning and we can see the drain number 1, the pigtail drain, up around the fifth intercostal space, can't we?

BOHIN: We can see pigtail 1, yes.

MYERS: Yes. That's round about the fifth intercostal space, isn't it?

BOHIN: I can't see the actual tip, but yes, it's around there.

MYERS: We can see lower down there's a straight line going towards the centre of the chest, as it appears on the image, the drain inserted by Dr Jayaram, can't we?

BOHIN: Yes.

MYERS: Now, bearing in mind the guidelines, first of all that is too low, isn't it?

BOHIN: It's not in accordance with the guidelines, so it's lower than one would anticipate, but there was already one in the fifth intercostal space.

MYERS: We've seen later on when Dr Gibbs put a third drain in, he put that very close to the first one, didn't he?

BOHIN: Yes, he did.

MYERS: So the fact there was one of them already in the fifth intercostal space didn't mean another one couldn't go close to that, could it?

BOHIN: No.

MYERS: Also if we look at that second drain, that goes too far into the centre of the chest as it would appear, doesn't it?

BOHIN: You can't really tell on this because it's just an AP X-ray, so it's a two-dimensional film of a three-dimensional -- of the baby's chest. So what we haven't got here is a lateral chest X-ray, which would be a X-ray shot through the side, to see whereabouts it is in relation to the heart. So you can't actually tell from that X-ray.

MYERS: But for a drain coming in at that angle, from what we can see, that's going further in than would be optimal, isn't it?

BOHIN: Yes.

MYERS: And one of the dangers of a drain or the tip of the drain being too far in is that it may come into structures like -- into contact with structures like the heart or like the vagal nerve?

BOHIN: It may do.

MYERS: It may do?

BOHIN: You can't tell from this X-ray.

MYERS: You can't tell but it may be doing, you agree, do you?

BOHIN: Aside from the (inaudible) saying it's a theoretical possibility, from this X-ray I can't say that it's interfering with the heart in any way.

MYERS: Either way, looking at that drain then, it is in a suboptimal position, isn't it?

BOHIN: It is, but at the time that Dr Jayaram inserted it, this was a life-saving measure and so although it isn't in a sub-optimal position what it did do was save [Baby H]'s life --

MR JUSTICE GOSS: It is in a sub-optimal position?

BOHIN: Yes.

MR JUSTICE GOSS: I think you said it isn't.

BOHIN: Yes.

MR JUSTICE GOSS: It is in a sub-optimal position, but?

BOHIN: But he did it as a life-saving measure.

MR MYERS: Once it had been inserted, if we look at the radiographs that follow, we see it moving about between the radiographs, don't we?

BOHIN: Yes.

MYERS: I'm going to give some illustrations. This is the image at 04.27 on the 25th. Could we go next, please, to tile 137, which is 14.53 on the 25th, so about 10 hours later or thereabouts. We can see now it's moved up closer towards where the first drain is, hasn't it?

BOHIN: Yes.

MYERS: Then if we go to J12670, please, Mr Murphy, which is 17.25 on the 25th, so a few hours later. We can see this has slipped down and outwards by this point, hasn't it?

BOHIN: I don't think you can really tell how much it's moved because the X-ray isn't centred the same as the other X-ray, so the position of the clavicles, which are -- the collarbones, which would tell you whether the X-ray is centred or not is different on this one, so the film is actually slightly rotated, so that actually doesn't give you clear information. You can't necessarily compare the two because of the degree of rotation.

MYERS: Well, is it possible to put 1268 alongside 170, Mr Murphy?

BOHIN: I still wouldn't be able to give you the answer, I'm afraid, because of the degree of rotation of the film.

MYERS: Let's just see. Tile 137 alongside page 12670.

Thank you.

In fact, the one that comes first is on the right, but actually looking at that, Dr Bohin, we can see, can't we, for example, by reference to the pigtail drain, that there is a difference in position with the second drain, isn't there?

BOHIN: Again, it's a rotated film so I think you would be best placed to speak to the radiologist about where the tip of that lies.

MYERS: Can you see the tip protruding above the pigtail drain at 14.53?

BOHIN: Yes.

MYERS: Okay. There doesn't appear to be anything like that at 17.25, does there, as it happens?

BOHIN: There doesn't.

MYERS: If you look back at your -- the expert report, the joint expert report, please, the same section but (v).

BOHIN: Yes.

MYERS: I'm going to come to what you say about the end of the incident in due course, I understand what you say about that, but you say:

"The apparent mobility of the chest drain tip may have resulted in clinical complications, including episodes of desaturation and bradycardia."

Don't you?

BOHIN: Yes.

MYERS: We can take the radiographs down for the time being, although we'll be going back.

Moving forwards in time now to 16.21 on 25 September. [Nurse D] gave evidence about what took place in the late afternoon and early evening of 25 September. Did you watch that?

BOHIN: Yes.

MYERS: We can go to the tile if necessary, but I'm just going to remind us of what the evidence was. At 16.21 on 25 September, after [Nurse D] had come back from seeing [Mother of Baby H] in the Cestrian ward, there was a desaturation that took place that she said was unexpected. Do you remember that?

BOHIN: I heard her evidence, but I've heard so many incidents that I'm sorry, I can't actually remember that.

MYERS: I think that's -- I understand that. Let's put up tile 149. I'm not trying to test your memory on it.

Just so we can all follow this, this tile comes in just as we moved on from the note. The entry above this, the page before, had one line, which said:

"Went up to Cestrian to update mum at 16.00. Whilst Dr Harkness carried out a..."

And then it goes into this:

"... head scan at 16.21, [Baby H] started to desaturate."

Do you recall this now that we look at this?

BOHIN: Yes, yes.

MYERS: So a further desaturation at 16.21. It does say here, as we read on:

"No secretions obtained on suction."

BOHIN: And it says no air entry heard and no colour change on capnograph.

MYERS: Yes, so ET tube removed?

BOHIN: Yes.

MYERS: She was attended to, seems to have recovered as we read on, but we recall -- and you can see as you read through this, Dr Bohin -- this is the entry which refers to:

"Bedding noted to be wet and stained..."

Can you see that --

BOHIN: Yes.

MYERS: -- about 10 lines down?

"... probably with secretions from chest drain. Air entry good on right but none on left."

It refers to:

"Doctors contacted and Dr Gibbs then pulled it back as possibly slipped when tying in."

BOHIN: That's the ET tube, not the chest drain.

MYERS: Ah, the ET tube, thank you:

"Chest X-ray taken. ET tube in good position. Second chest drain: Tegaderm applied and chest drain tubing position altered."

And Dr Gibbs gave evidence that he had to fix that securely; do you recall that?

BOHIN: Yes.

MYERS: He timed that at about 17.45.

BOHIN: Yes.

MYERS: If you want to see the position of the chest drain, therefore, just before he fixed it, could we go again, remind ourselves, at page 12670, Mr Murphy. This is the image at 17.25. Tile 158, I'm told. Thank you, Mr Maher.

We looked at this a short while ago, didn't we, Dr Bohin?

BOHIN: Yes.

MYERS: And this is where that chest drain was at 17.25; do you see that?

BOHIN: Yes.

MYERS: It's after this, at 17.45, it was fixed securely by Dr Gibbs. I've got 17.45 it was fixed. 17.45, Dr Gibbs fixed this. So following this, it was fixed securely?

BOHIN: It was pushed in as well. Pushed in by 4 centimetres and then secured.

MYERS: Just pausing there and dealing with what [Nurse D] described and what happened at this point, could you look at your second report, Dr Bohin, at paragraph 3.48.

BOHIN: Yes.

MYERS: You say:

"From the notes it is clear that the formal drain [number 2] had moved. The nursing entry states that the drain was almost out and the poles could be seen. This is concerning as it means that, due to the pressures within thoracic cavity, air from the atmosphere could be sucked into the pleural space via the exposed chest drain holes, thus increasing the pneumothorax."

BOHIN: Yes.

MYERS: Right. Now, that measure having been taken to correct the drain, there was a further -- if we go back now, please, Mr Murphy, to the tile we were looking at, tile 149. Looking down towards the bottom of the page, there was a further desaturation at 19.00 -- we see that three lines up from the bottom, Dr Bohin -- down to 56%.

Do you see that?

BOHIN: (Reads sotto voce). Yes.

MYERS: Is that right?

BOHIN: Yes. That looks like it was because the endotracheal tube slipped because she goes on to say that when they lifted the endotracheal tube holder, the air entry improved.

MYERS: Yes, that's right.

BOHIN: So there was a cause for that desaturation.

MYERS: But so far over 2 or 3 days there's a series, aren't there, of medical interventions, including the drains and desaturations, as we proceed? Is that correct?

BOHIN: There are, but they all have a cause.

MYERS: Do you accept that the physical stress that a baby can experience just by being handled can cause a desaturation?

BOHIN: Yes.

MYERS: And do you accept that what [Baby H] was going through over a period of days amounts to quite significant physical stress for a baby, doesn't it?

BOHIN: It does, but the stress isn't cumulative.

MYERS: I'm not --

BOHIN: So babies will desaturate in response to an event or being handled, but the stress isn't cumulative.

MYERS: If there are a great number of procedures a baby experiences, that can have an impact upon the baby so that it desaturates as a result of that, isn't that correct, just of itself?

BOHIN: A baby will desaturate in response to an event, but I said it's not cumulative and it certainly doesn't cause a cardiac arrest.

MYERS: Can we look, please, at the radiograph now at 12672, which is at 10.56 in the evening. We last saw how that second chest drain was appearing in the radiograph at 17.15, didn't we?

BOHIN: Yes.

MYERS: This now is the next radiograph, which comes about 5 hours later.

BOHIN: Yes.

MYERS: Can you see by this point the chest drain is back down again in towards the centre of the chest cavity, isn't it?

BOHIN: It is because either Dr Gibbs or one of the other junior doctors pushed it in by 4cm and re-secured it.

MYERS: Dr Ventress pushed it in round about 10.15, didn't she?

BOHIN: Yes.

MYERS: So she pushed that in and we see on this X-ray where that has gone into, don't we?

BOHIN: Yes. When you push it in, you can't angle, you just push it in from the outside, but you have no way of angling it upwards, downwards or any way. All you can do it push it forward or pull it back. She pushed it in 4 centimetres. So if she has pushed it in 4 centimetres, it must -- the tip must end up in a different place to that shown on the previous X-ray.

MYERS: So if you push it in like that, you don't know where the tip is going to go then?

BOHIN: No, you don't.

MYERS: This appears to be certainly in a region where it could be close to the heart or the vagal nerve, doesn't it?

BOHIN: You can't tell from that X-ray without doing a lateral.

MYERS: No, you can't, but I'm asking: from what we see there, it could be, couldn't it?

BOHIN: It could be near the heart. I can't tell you if it's near the vagal nerve. You can't see a vagal nerve on the X-ray so --

MYERS: All right. If we put up tile 210, please, and I'm, just putting the tiles up to help and if you want to refresh your memory as you go along, Dr Bohin, rather than me just quoting times and date.

But we are moving forwards now to 23.50 on 25 September, so this is the period leading up to event 1. It's a note timed 23.50 and deals with further episodes of desaturation that took place over the 2 hours leading up to that. Can you see that, Dr Bohin?

BOHIN: Yes.

MYERS: One moment, please. At 2.15 that morning a third chest drain was inserted and that was by Dr Gibbs, wasn't it?

BOHIN: Yes.

MYERS: You accept, do you, that is an unusual state of affairs for any unit these days?

BOHIN: I think what you have to do is treat the clinical situation in front of you and if a child's got a tension pneumothorax then you are obliged to drain it whether the child's got two chest drains in prior to that or not.

MYERS: That may be so, but it's unusual, isn't it?

BOHIN: It's unusual in this day and age, yes.

MYERS: Yes. Is the use of chest drains a relatively specialist procedure?

BOHIN: I wouldn't say it was specialist, but because pneumothoraces or accumulations of fluid in the chest are no longer commonplace because of the advances in neonatal medicine, junior doctors don't get to undertake this procedure very often. So I wouldn't say it's a specialist thing but it's a -- something that's rarely undertaken now.

MYERS: Given what we see here, is there a point at which it would be better to be at a tertiary unit where perhaps they are better at dealing with a more intensive level of care than a unit like this? That's not to say that those looking after [Baby H] were not doing their best, I make that absolutely clear, but I am just looking at the level of care and whether it was optimal.

BOHIN: No. Pneumothoraces can occur spontaneously in babies, so that would mean that every baby, in case there was a pneumothorax, which is a rare occurrence now, would need to be delivered in a tertiary unit, just in case, and that would just not be practical. All doctors -- all doctors working on a neonatal unit will have training in the insertion of chest drains, even if they are not required to do it very often, or even at all, whilst they're a junior doctor. It's something that every doctor gets training in.

MYERS: Will staff at a tertiary unit have greater familiarity with using things like a second or a third chest drain if required?

BOHIN: They might if that unit also had a cardiac -- was adjacent to a paediatric cardiac unit because, by definition, babies having cardiac surgery have chest drains, so if a neonatal unit is adjacent to a cardiac unit, those doctors will inevitably have more experience. But I don't take the point that all premature babies should be delivered in a tertiary unit just in case they develop a pneumothorax.

MYERS: I'm not suggesting that, Dr Bohin.

BOHIN: Sorry, I missed -- apologies then, I missed the --

MYERS: I'm simply asking whether the level of care when it comes to treatment, intensive care with chest drains, particularly if

we start having additional chest drains, is likely to be better in a tertiary unit.

BOHIN: No, I don't think so -- and also one needs to weigh up the risk of transferring a baby with chest drains against leaving a baby in a unit where they are being cared for. There is a risk balance to be established there. So I think it was the right decision at that time to leave [Baby H] where she was.

MYERS: There had been instances of sub-optimal care of [Baby H] in the days leading up to this, hadn't there?

BOHIN: Yes.

MYERS: I've asked you about the cumulative effect, the build-up of what [Baby H] had been over (sic) 3 days. I've dealt with that. You don't accept that that explains what happened at 3.20 in the morning?

BOHIN: No.

MYERS: That's your position. I would like just to remind us of something that was said in an exchange with Dr Soni the following day and that's at tile 341, please.

Can we scroll down to point 2? We have seen this a couple of times so I'm going straight there, Dr Bohin.

It's the following morning, about 11 o'clock, Arrowe Park saying this, and the note being taken by Dr Soni:

"Possible cause for cardiac arrest could be that a drain is too close to the heart and touching the pericardium. Can put drain out if too far in. Shouldn't be close to midline [as read]."

Do you see that?

BOHIN: Yes.

MYERS: In fact on a number of the X-rays we've looked at so far it's almost bang on the midline, isn't it, the tip of the drain?

BOHIN: Yes.

MYERS: And you accepted that the movement of the drain is capable of causing bradycardia or a desaturation?

BOHIN: Not necessarily the movement itself but the fact that the tip may abut the pericardium can cause that, yes.

MYERS: Could we look at tile 229, which shows the radiograph for 2.30.

This is 2.30 in the morning now of the 26th.

BOHIN: Yes.

MYERS: We can see it's the point after which Dr Gibbs has inserted the third drain, hasn't he?

BOHIN: Yes.

MYERS: If we look, drain 2 now has moved and it's going towards the midline again, isn't it?

BOHIN: It's not at the midline.

MYERS: It's going towards it, isn't it?

BOHIN: They're all going towards the midline because they're inserted but that's not reaching the midline.

MYERS: We can see that the shape of the heart, the grey sac behind the spine -- or in front of the spine, rather -- on the upper part of the radiograph, can't we?

BOHIN: We can see the heart, yes.

MYERS: We cannot say from looking at this whether or not the tip of that drain is abutting the heart or the pericardium, the surface of the heart, or the vagal nerve, can we?

BOHIN: We can't see a vagal nerve on X-ray. You can see the heart on this X-ray. You can't tell from this X-ray whether that tip is in front of the heart or behind the heart. You just can't tell how near the heart that is.

MYERS: You can't tell if it's touching the surface of the heart, can you?

BOHIN: No, you can't, no.

MYERS: If it does touch the surface of the heart, that could be sufficient to trigger a cardiac arrest, couldn't it?

BOHIN: No, not necessarily no. You can have something that touches the heart that has no effect at all.

MYERS: Dr Soni the next day said a possible cause of cardiac arrest could be the chest drain too close to the heart and touching the pericardium, didn't he?

BOHIN: No, he was reporting information given to him by Dr Rath who said --

MYERS: Yes.

BOHIN: And I don't know if Dr Rath had even seen the drains -- seen the chest X-rays. Dr Rath was giving an opinion over the phone about [Baby H] and what they might do in order to stabilise [Baby H]. So I have no idea if he was making that comment having seen the chest X-rays or not or whether that was just a routine comment he was making to them.

MYERS: The fact is the collapse that we are dealing with in event 1 happens about 1 hour after this X-ray has been taken, hasn't it -- doesn't it?

BOHIN: Yes, it does.

MYERS: And, as it happens, it's possible in fact that whatever's happened with the tip of this drain can have contributed to that collapse, can't it?

BOHIN: No, I don't think -- I don't agree with that.

MYERS: If we don't know exactly where it is (overspeaking) --

BOHIN: No, we don't.

MYERS: -- you can't just discount it.

BOHIN: I have discounted it. I don't think the position of that drain has caused a cardiac arrest.

MYERS: And you don't regard that even as a possibility then?

BOHIN: No.

MYERS: Well, I'm suggesting to you that is discounting something on insufficient evidence, given that this is not a three-dimensional X-ray.

BOHIN: It's not a three-dimensional X-ray.

MYERS: In fact, as it happens, in the time after, you say that the chest drain didn't move after this point; is that correct?

BOHIN: Yes, I did say that.

MYERS: It's just there may be some movement. Could we just look at the next X-ray we have which is at 19.17 on the 26th, which

is tile 381, please. I'm not suggesting a great deal of movement, but there's some further movement.

If we want to be clear about that, Mr Murphy, maybe it would help if we could put up the last image, which was tile 229, alongside tile 381. Thank you.

On the right-hand side, 2.30 in the morning on 26 September, and on the left-hand side, about 17 hours later on 26 September. There certainly appears to be some movement there of the tip. Do you agree?

BOHIN: No, because the X-ray on the left is rotated -- is more rotated, so that will inevitably show the positions of the chest drain tips to be different. And you can see, because of the position -- the differing positions of the pigtail catheters as well. On one -- the X-ray on the left, they look like they're on top of one another and in the X-ray on the right they're clearly separate.

So the film's rotated, so I'm afraid if you want precise detail on the tip of the non-pigtail catheter, you would need to ask a radiologist because, to me, the rotation means that I can't interpret that.

MYERS: You can't interpret that? Right. But in fact there is therefore no basis to say to what extent the tip of the drain moved after 2.30 in the morning, is there?

BOHIN: Well, I don't think you can tell from these two that -- what I can say is that the tip of that drain is not how it was originally, which was following the line of the diaphragm. So if it's moved a centimetre here or there I think that is of no clinical relevance whatsoever.

What I can say is that that non-pigtail catheter does not follow the diaphragm, ie it's not in a very low position.

MYERS: In effect you can't say to what extent it did move though, can you, from the available evidence if it did?

BOHIN: From these two I don't think it's probably moved at all but I can't actually say.

MYERS: No, you can't say. And we only have two or three X-rays to go off, don't we, over this period?

BOHIN: Yes.

MYERS: In any event, we agree if we look at 2.30 on 26 September 2015, that's the last image we have before the event at 3.20, isn't it?

BOHIN: Yes.

MYERS: Just moving forwards then, please, moving to 26 September 2015, could we put up tile 394, please.

This is evidence that we dealt with yesterday so it may be fresher in our minds. A note made at 22.53.

If we scroll down we can see it says -- this is at the bottom of the -- sorry, two lines into the second paragraph:

"Around 20.30, [Baby H] had profound desaturation and brady."

Do you see that?

BOHIN: Yes.

MYERS: In fact, that followed the removal, about 15 minutes, of the first chest drain, didn't it?

BOHIN: Yes, but the tube was blocked.

MYERS: The tube is blocked. That's followed, isn't it, if we go on to 21.45, scroll down --

BOHIN: Yes.

MYERS: -- a desaturation to 40%; is that correct?

BOHIN: Yes.

MYERS: If we carry on to 00.55 on the 27th, it starts at the bottom of this page. 00.55:

"Profound desaturation to 40%."

And you identify there is equal air entry when they listen to the chest; is that correct?

BOHIN: Yes.

MYERS: Go over the page, please, Mr Murphy:

"ET suction yielded nil secretions."

BOHIN: Yes.

MYERS: To some extent that doesn't help us with whether there are secretions there or not, does it? It could be a moot point; do you agree?

BOHIN: Yes, it doesn't help either way.

MYERS: It doesn't help either way.

BOHIN: Except that there's positive capnography, so the lack of endotracheal secretions will either mean there aren't any or the tube is blocked and therefore you are unable to aspirate up the tube, but we know the tube isn't blocked because there's positive capnography, so we know the tube is patent. So I would assume that no secretions means -- "aspiration, no secretions" means there weren't any there.

MYERS: It is possible to have some blockage that interferes with oxygenation to some degree, isn't it? It may not be entire. There can be a partial blockage as well as a complete blockage, can't there?

BOHIN: There can, but there's positive capnography and there is equal air entry on both sides, so if the tube was partially blocked you would expect the capnography to be -- the colour change not to be as rapid if there was a partial block of the tube.

MYERS: But there could still be colour change with a partial block, couldn't there?

BOHIN: There could but it's not as rapid and we have heard in other evidence that other doctors have said it is not as rapid and they have taken the ET tube out because of that in case of a blockage.

MYERS: Again, the suggestion I make to you is that, as it happens, given all that [Baby H] had been through up to this point, the cumulative impact of that is sufficient to cause her to deteriorate in the way that we see here.

BOHIN: No, I'm sorry, I don't agree.

MYERS: Do you not consider that some aspects of the intubation or re-intubation around this period may have contributed to the problems that [Baby H] experienced at the 00.55 collapse?

BOHIN: Like what sort of thing?

MYERS: Well, I'm going to ask you to help me with something in your report. It appears first of all in report 2 at paragraph 3.55 -- 3.56.

BOHIN: Yes.

MYERS: Now, dealing with this episode what you said there was:

"The initial cause of the desaturation is unclear. It may have been secretion-related like so many others."

Correct me if I'm wrong about this, but I was reading through your report:

"Bagging with high pressures may have rectified the situation allowing safe re-intubation once the heart rate was stable. Although not explicit from the notes, I wonder if re-intubation was undertaken before the heart rate had recovered, resulting in worsening bradycardia requiring CPR."

There's quite a lot in there. First of all, that's what you put in the report, isn't it?

BOHIN: It is because I'm trying to work out why, with all that we know, [Baby H] has desaturated again and has gone on to require CPR. As I have already said, the cause of that was not clear to me at all, but what isn't clear is once the endotracheal tube was removed, the normal practice would be to bag a baby until you get good saturations and a decent heart before re-intubating. There are some times when, in order to save a life, you can't do that and you have to just get on with the job and re-intubate despite the fact that heart rate hasn't risen.

MYERS: Yes.

BOHIN: I don't know which of those occurred in this particular situation.

MYERS: But what you are considering is that it is possible that if re-intubation took place before her heart rate had recovered that could have led to a worsening bradycardia that required CPR? That's what you say.

BOHIN: It might have done but had they not re-intubated she would have died. That's what you need -- that's what they need to consider.

MYERS: I'm not asking questions at this point in terms of being critical of the staff; I have made criticisms elsewhere.

I'm looking at what you give by way of explanations for there being CPR, which is one of the factors that's been identified as making this relevant, isn't it, CPR?

BOHIN: It's possible.

MYERS: In your report, Dr Bohin, you do give a reason as to why CPR might have been necessary on this occasion, don't you?

BOHIN: No. She collapsed, needed re-intubation, and went on to need CPR. What I am saying is that the re-intubation may have occurred before the heart rate had improved.

Now, sometimes you just have to get on with it because if you don't the baby is going to die. But yes, that might -- if you re-intubate a baby before their heart rate is improved, you're likely to prolong the resuscitation. That doesn't mean that a baby will go into a cardiac arrest.

So to me the primary cause of the deterioration was still not clear regardless of when the re-intubation occurred.

MYERS: Do you agree that re-intubation may have exacerbated the situation?

BOHIN: No. She needed to be re-intubated otherwise she'd have died.

MYERS: Well, I've got what you say in the report. Do you agree that the re-intubation in some way contributed to the requirement for CPR?

BOHIN: No.

MYERS: You stand by what you said at the end of paragraph 3.55 when you say:

"Although not explicit from the notes, I wonder if re-intubation was undertaken before the heart rate had recovered, resulting in worsening bradycardia, requiring CPR"?

BOHIN: But that's speculation on my part because I'm trying to explain why she required CPR. It's not proven. There's nothing in the notes that helps me either way.

MYERS: It's a possibility, isn't it, then, otherwise you wouldn't have put it there?

BOHIN: I don't think that this caused her to require CPR.

MYERS: Are you in some way reducing the impact of what you've said in your report, Dr Bohin?

BOHIN: No.

MR MYERS: Thank you.

MR JOHNSON: Does your Lordship have any questions?

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

Thank you very much, Dr Bohin. That's it in relation to [Baby H], but obviously you'll be back again.

(The witness withdrew)

Summary of interview with LUCY LETBY re [Baby H]

(read)

MR JOHNSON: It's a very short summary of the interviews for you next, ladies and gentlemen. You'll remember that there were interviews in 2018, 2019 and 2020, so the first point.

The interview of 5 July 2018 followed the relevant

hospital notes, although Lucy Letby agreed that she had some memory of [Baby H]'s treatment. Lucy Letby recalled caring for [Baby H] because she had chest drains in and that wasn't something that Lucy Letby had seen a lot on the neonatal unit.

On 26 September 2015, Lucy Letby had been [Baby H]'s designated nurse. Lucy Letby had recorded in the notes that minimal handling was being observed with [Baby H] as "she was desaturating ++ plus in general on handling".

There was no change to her treatment prior to her collapse at 03.20.

Lucy Letby did not recall where she was when the profound desaturation took place and had no recollection of being present.

Lucy Letby presumed that she was alerted by [Baby H]'s monitors alarming, but she couldn't recall. She recalled seeing a lot of yellow, milky serous fluid from inside of the body coming out of [Baby H]'s chest drains.

She also recalled [Baby H] being a pale blue colour and Lucy Letby thought that that could be indicative of some sort of airway problem stopping her getting enough oxygen.

Lucy Letby could not recall who made the crash call, nor how long it was before the doctors arrived. From considering the

notes, Lucy Letby believed that she commenced Neopuff with oxygen and called for help.

During the interview of 11 June 2019, Lucy Letby's attention was drawn to a saline bolus administered to [Baby H] at 02.50 hours on 26 September 2015. She was unable to read which nurse had countersigned it and couldn't say that she herself had administered the drug.

She was unsure whether she or [Nurse A] had taken the lead and she was unable to explain why [Baby H] had collapsed. Lucy Letby denied intentionally harming [Baby H] and described her as a sick baby at the time.

Lucy Letby remembered little from the collapse on 27 September 2015 and agreed that she was involved in [Baby H]'s care but not as her designated nurse. She confirmed that she'd administered [Baby H]'s sucrose and cefotaxime antibiotics at 03.42 hours.

On 10 November 2020, Lucy Letby was asked about the thick discoloured secretions noted during [Baby H]'s treatment on both 26 and 27 September 2015 and Lucy Letby denied that she had either caused them or done anything to worsen them.

Lucy Letby agreed that she'd searched for [Baby H]'s mother on Facebook once but could not actually remember doing so.

My Lord, that, for now, is the evidence relating to the counts concerning [Baby H].

MR JUSTICE GOSS: Yes. I think there was due to be another witness today, but, for clinical reasons, not able to be here; is that right?

MR JOHNSON: Oh yes, sorry, Professor Rath. I didn't realise he was due to be today.

MR JUSTICE GOSS: He was, I think, scheduled to be here but couldn't be, so hence we've finished slightly earlier.

That therefore completes the evidence at this stage relating to [Baby H] that can be adduced. We will then be moving on to the next child --

MR JOHNSON: Yes.

MR JUSTICE GOSS: -- which we will do tomorrow so that the parents can be here to hear the evidence relating to their baby.

Again, it's an early finish today, members of the jury, but we'll be moving on to the next child tomorrow.

Thank you very much. Please remember your obligations, of which I've reminded you so many times now. See you tomorrow morning at 10.30, please. Thank you very much.

(In the absence of the jury)

Housekeeping

MR JUSTICE GOSS: Mr Myers.

MR MYERS: My Lord, tomorrow morning at 10 o'clock I have what should be a brief matter to deal with, which I propose to deal with on the link. It's very brief, but is something I have to deal with. I anticipate being ready for when we start at 10.30. I note that when we do start, we'll be starting with some reading and with the sequence of events. I'm grateful to Mr Driver for the schedule he's given us and for the regularity with which he does that. But I only identify that to say that if for any reason what I'm dealing with extends slightly beyond 10.30, given that we're moving to reading and the sequence of events, so long as your Lordship will indulge me in this way we can, of course, proceed with it. Mr Maher and Ms Clancy will be here. I will either try to effect an unobtrusive entrance, which is difficult, or wait until there's the break mid-morning and join us then and keep track of this elsewhere.

MR JUSTICE GOSS: Right, thank you very much.

MR MYERS: I don't want to create a disturbance, my Lord.

MR JUSTICE GOSS: That's very helpful because we obviously want to progress if we can.

MR MYERS: Yes.

MR JUSTICE GOSS: If it's apparent that it's only going to be a few minutes of delay, then if you get a message through, but if it looks as though it's going to eat into the morning session then obviously it'll be better for you not to be here and we can do that. Of course, you will be able to study the transcript in due course of exactly what is said, but you do have two competent assistants.

MR MYERS: I do. I'm grateful for that. That's just as a matter of courtesy so your Lordship understands what's happening.

MR JUSTICE GOSS: Thank you very much, I appreciate it.

MR MYERS: I'd be grateful if Ms Letby could remain for a little longer so we can speak to her before she leaves the building.

MR JUSTICE GOSS: All right, yes. I have seen nods. That's understood. Thank you very much.

MR MYERS: Thank you, my Lord.

(2.51 pm)

(The hearing adjourned until 10.30 am on Wednesday, 25 January 2023)