Wednesday, 10 May 2023

(10.00 am)

(Delay in proceedings)

(10.29 am)

DR KERRYANNE SHEARER (continued)

Questions from MS GRAHAME (continued)

LORD BRACADALE: Ms Grahame.

MS GRAHAME: Thank you very much. Dr Shearer, yesterday at the end of the day we had move on to look at your final post mortem report, you will still have the hard copy in front of you, and that is PIRC 01445 and we had started looking at the conclusions section on page 15.

So I think yesterday, just to recap, you had explained your role as a forensic pathologist: you were trying to identify an explanation for the death of Mr Bayoh. And you had taken us through the information about the circumstances that you were furnished with and you took us through the post mortem examination itself, plus the further investigations that were carried out: toxicology, virology, these things, and radiology. You had talked about the skeletal survey, the x-ray, the CT scan and you put all of that information together and this section, pages 15 to 17 of your final report, essentially brings all of that information together, and then you drew your conclusion as to the explanation for

Mr Bayoh's death. When I say "you", I also mean you and your colleague, Dr Bouhaidar, who -- it was a double-doctor post mortem as you said?

A. Yes.

Q. You both agreed on that conclusion?

A. Yes.

Q. Thank you. I would like to look today at those sections of the report, so pages 15 to 17 if you may. And I am particularly interested in trying to draw out the factors that you thought were significant.

When the Chair comes to considering your evidence in light of all the evidence he has heard, he will wish to consider whether something played a part in the death and to what extent it maybe played a part.

So if I may, I would like to begin by going through these pages by identifying things that you said didn't have any role to play. So these are things presumably that you were satisfied in your examination that could be dismissed, so the Chair can maybe take the view that they can be dismissed.

A. Okay.

Q. So looking first of all on page 15, paragraph 2 on that page, the first paragraph is just your summary of the circumstances which you have described yesterday.

A. Yes.

Q. Paragraph 2 says:

"Post mortem examination showed no evidence of natural disease that would have played any role in death here. The thyroid gland was enlarged but not to such an extent that it would have caused airway compromise."

I think on the previous pages of your report, pages 12 and 13, you have gone through various results from tests, you've looked at areas in the body where there may have been natural disease, pre-existing natural disease, you've considered the results of the investigations, the virology, the histology, the microbiology, that type of thing and I think yesterday you said you couldn't find any natural disease that would explain Mr Bayoh's death?

A. That's correct, yes.

Q. And the two things we specifically talked about yesterday, the enlarged thyroid, but you explained that the results didn't indicate any significant issue with that?

A. Uh-huh.

Q. And I also asked you quite a number of questions about whether he had heart disease and I think you excluded that as a possibility?

A. Yes.

Q. And the Chair's got your evidence on that yesterday.

The second thing as I understand it that you looked for but couldn't find, and I think you sum that up in paragraph 3 of page 15, and if we can look at the very final sentence there, you said:

"Notably there was no evidence of injury to the body that would account for death here."

A. Yes.

Q. I think yesterday you talked about examining the body for some sort of primary injury, primary cause, blunt-force injury or sharp-force injury --

A. Yes.

Q. -- that could have been a complete explanation for his death?

A. Yes.

Q. There was no signs of that at all?

A. No.

Q. I think we went through yesterday in quite some detail, pages 5 to 8 were external, the external examination and pages 8 to 10 of your report were the internal examination.

A. Yes.

Q. So thorough inside and out, no signs whatsoever --

A. Yes.

Q. -- of an injury? And then the third thing that I think you note, and this is actually on page 16 of your

report, and if we look at paragraph 3, so you also considered -- and this related to CS and PAVA spray?

A. Yes.

Q. You explained yesterday on page 4 of your report you detailed the circumstances and you noted from what you had been told about the events at Hayfield Road that Mr Bayoh -- officers had discharged their CS and PAVA sprays and they had tried to spray him with those chemicals.

A. Uh-huh.

Q. I think let's look at this paragraph on page 16 then. You say you considered:

"With regards to the role PAVA and/or CS sprays may have played in death~..."

You had mentioned the information, that you had been provided that police officers had used these substances and they:

"... had no immediate effects on Mr Bayoh."

A. Yes.

Q. Obviously the evidence -- the Chair has heard a lot of evidence about the circumstances but presumably you would agree that he will have to consider what he thinks happened --

A. Absolutely.

Q. -- at the scene and that would be a relevant factor for

the Chair in deciding how he views the impact of PAVA or CS?

A. Absolutely, yes.

Q. Then you have also said -- you have commented on evidence of one civilian witness, and then you say:

"From the literature available, it would appear specific side-effects include bronchospasm and ..."

Forgive me the pronunciation of this:

"... laryngospasm ..."

A. Bronchospasm and laryngospasm, yes.

Q. "... and patients with pre-existing respiratory disease (which did not appear to be the case here) are more at risk from severe effects."

Tell me, in relation to those conditions, did you look for signs of either of those conditions?

A. There was no evidence that Mr Bayoh had any pre-existing conditions that would have led to these side-effects and I wasn't given any information in either the general practice notes or the medical notes so suggest that you had previously been diagnosed with anything. Conditions like asthma and bronchitis are the kind of classical ones.

Q. So you looked at the GP and the hospital notes as I understand it?

A. Yes.

Q. Did you find anything in those that indicated he had a pre-existing issue with his respiratory system?
A. No.
Q. Yesterday you talked about the lungs. I think we referred on page 9, you talked about -- let me see ... you talked about the chest on page 9 of your report, you talked about various areas but in the first paragraph under, "Chest", on page 9 you said:

"The lungs ..."

You talked about the weight of the right and the left, you talked about them being congested, but you said there was no evidence of any pulmonary thromboembolism and I think yesterday, if I'm right, you said there was no evidence of any disease process taking place there?
A. Yes.
Q. If we also look at page 13, under, "Histology", you will see an entry "Lung", and you say:

"There are extensive congestive features in areas of pulmonary oedema, there are widespread areas of subpleural chronic inflammation and pigment laden macrophages."
A. Yes.
Q. Is there anything in that from the histology that would give rise to any concerns on your part that there was

pre-existing problem?

A. No.

Q. Can you tell me, if you are looking in a post mortem for signs of the bronchospasm or the laryngospasm are there signs that would be obvious to you, either on examination or through further investigations and tests that you could point to, that had he suffered from anything like that?

A. Not necessarily, it is not something that is very easy to diagnose at post mortem. It basically is a -- the muscles around the cartilage of the neck and the throat go into a spasm and the muscles in the lungs go into a spasm, so it is very much the person becomes very, very breathless, can't breathe, becomes very, very wheezy. So there is a very kind of clear clinical pattern that is involved with it that wasn't reported in this case.

Q. So there was nothing from your consideration of any of the information you were given which indicated there had been breathlessness or wheezing noted in relation to Mr Bayoh?

A. If people have chronic problems, what we can see down the microscope are specific changes in the cells, we can see changes in the muscles, and changes in the lung cells which wasn't present in this case.

Q. So nothing like that that you could find?
A. Yes.
Q. We may hear further evidence about the impact of sprays on a person but from your own perspective as a forensic pathologist could you find anything at all?
A. No.
Q. Then the fourth issue which you raise is on page 16, and it is paragraphs 4 and 5. This relates to excited delirium. So this is the fourth area, and if we could have that on the screen, 4 first. You have said here:

"Given the circumstances provided, toxicological findings and lack of another cause of death at post mortem, the possibility of excited delirium syndrome has been considered in this case."

So this was something that you did consider as part of your overall assessment?
A. Yes.
Q. Is that correct:

"It is however a psychiatric and not a pathological diagnosis~..."

Could you explain to the Chair what you meant by that, it's a psychiatric not a pathological diagnosis?
A. It's a psychiatric syndrome that needs to be diagnosed by a psychiatrist, it is not a diagnosis that I can

prove pathologically. I can't relate anything to the cause of death unless I can prove it pathologically, unless I have pathological evidence, and this isn't because it is very much based on information that you have about the case and things that you are finding, but you can't tie it all together pathologically, so it's in the psychiatric community and not something that we would diagnose.

Q. So in terms of your external examination of the body, is there anything you could find that would be an indication of excited delirium?

A. No, no.

Q. And from your internal examination of the body, is there anything you could see?

A. No, no.

Q. And from any the tests that you instructed to be carried out, and the further investigations, is there any sort of result or anything that could indicate that that had occurred?

A. The reason it's discussed in the first place is because of the toxicological results because often this syndrome is described with a background of someone who is intoxicated with particular drugs, particularly stimulant drugs, so that is one of the reasons that it has been discussed in the first place because of what we

have found toxicologically and because of the circumstances that we have been given surrounding the case. That is the main reason for discussion.

Q. So you have talked about the toxicological results and the Alpha-PVP and MDMA. Because those were found in the samples carried out and tested, that has resulted in your mentioning this at all in this part of the report?

A. Yes.

Q. But essentially there is no test that you personally could carry out as part of the post mortem or further tests that could identify excited delirium as a condition?

A. No, I would never diagnose it as a pathologist.

Q. So is that why you say it's psychiatric and not pathological?

A. Exactly.

Q. Then you go on to say there in that paragraph:

"... there is some debate in the forensic community with regards to its application as a cause of death."

Could you tell us about that?

A. Mainly in America forensic physicians or pathologists may use this as a cause of death whereas in the UK no forensic pathologists would use it as a cause of death so that is where the difference in the forensic community and the application comes from.

Q. So there is a clear distinction between the practice in America and the practice in the UK, you say?
A. Yes.
Q. Not just in Scotland?
A. No, no, in the UK as a whole.
Q. I wonder if you could have a look at something for me. It's WIT 00025. It will come up on the screen. This is guidance I would like to ask you about at this stage. So this is released -- at the top it says "Forensic science regulator", and the Royal College of Pathologists; is the Royal College a UK-based Royal College?
A. It is, yes, all pathologists should be a member of the Royal College of Pathologists.
Q. Sorry, did you say all?
A. All pathologists who are practising, so I am a member of the Royal College of Pathologists, yes.
Q. Is that all pathologists in the UK?
A. Yes.
Q. Can we just move down the page please. We see this is the guidance from the Forensic Science Regulator and it says, "The use of excited delirium as a cause of death". Issue 2, and so -- as a member of that Royal College do you have regard -- are you informed about these --
A. Yes.

Q. -- guidance notes?
A. We know about the guidelines, yes.
Q. Do you have regard to them, do you follow that guidance?
A. Yes, we should do, yes.
Q. So if we can move up the page, please. It's only seven pages long but I will take you to some of the paragraphs I would like to refer to. Stop there for a second. We see it is published in -- just move up a little bit -- published in 2020. So this didn't exist at the time in 2015 when you were doing the post mortem?
A. No.
Q. It has been issued subsequently. If we can move down first of all to paragraph 1.1.1, section 1. It says:

"The Forensic Science Regulator ... became aware of concerns, raised outside this jurisdiction, about the use, and potential misuse, of 'excited delirium' as a cause of death. Advice was therefore sought from the Forensic Pathology Specialist Group ... and the Forensic Pathology Speciality Advisory Committee ... of the Royal College of Pathologists."

It goes on to say:

"It is clear the term 'excited delirium' has relatively rarely been used as a sole cause of death in this jurisdiction but it appears that it has occurred."

Is that something you are aware of, that it has been

used in Scotland?

A. Not in Scotland, no. I'm not aware that it had been used in Scotland. I don't know of any colleagues that would use that term as a cause of death.

Q. If we can move up the page, please. At 1.1.4 it says:

"After the consideration of this issue was underway it became clear that the Independent Review of Deaths and Serious Incidents in Police Custody chaired by Rt Hon Dame Elish Angiolini ... might address concerns about this issue. The report published by the review~... did address this issue and made the following recommendation.

"'Excited Delirium' should never be used as a term that, by itself, can be identified as the cause of death. The use of Excited Delirium as a term in guidance to police officers should also be avoided'."

So it would appear that was a recommendation from a review by Dame Elish Angiolini, and this was considered, was it, by the Royal College of Pathologists?

A. Yes, it's one of their guidelines.

Q. It is likely that we will be hearing further evidence about this at a later hearing so I won't ask you to go into that in any detail. Can we move down, please, I would like to look at 2.1.1. It says:

"This guidance ... applies to forensic pathologists in England Wales and Northern Ireland."

It doesn't mention Scotland.

A. We have our own Code of Practice that is currently being updated. It is not dissimilar, to be fair. The reason it has to be separate is because we have a different legal system and a lot of the legalities are mentioned in the Code of Practice so we do have a separate Scottish Code of Practice. But I am aware and have read the English Code of Practice and there is some crossover in the people who input to both. So it's not dissimilar to the English and Northern Ireland Code of Practice.

Q. You just said in any event you would follow guidance from the Royal College; you are a member?

A. Absolutely, yes.

Q. I see at 3.1.1, this:

"... became effective on 31 October 2020."

Can we look at section 5 now, please. 5.1.1 says:

"The use of the term 'Excited Delirium' as a sole cause of death should not be used."

From the perspective of a forensic pathologist I note in the cause of death you have given -- we have touched on this yesterday -- in your final post mortem report, the words "excited delirium" do not appear as the cause of death.

A. No.
Q. So in effect were you -- is this a phrase or the words -- you wouldn't use that as a cause of death?
A. No, no.
Q. So you have been following that advice even before this guidance came out?
A. To be fair, I can't remember what the guidance was back in 2015 but chances are it probably wasn't dissimilar. But I can't remember what that possibly was, but it has never been a syndrome that forensic pathologists in the UK should have generally used, and we are educated during training that it is not something you use as a cause of death.
Q. Thank you. It goes on to talk about:

"The term has caused controversy~..."

We have certainly heard it is a controversial term in this hearing, we will hear more about that I think from another witness, and it mentions particularly in North America. Is that what you were --
A. That is the cases I am aware of, yes.
Q. So:

"... in North America, where it has been applied in some cases where other important pathological mechanisms, such as positional asphyxia and trauma may have been more appropriate descriptions. It is

recognised that the physiological condition characterised by physical agitation and altered mental state commonly brings individuals into contact with police and other emergency personnel, and is an acutely life threatening one. This conditions which is usually drug induced needs to be recognised and treated."

Do you want to talk about that at all?

A. I have put -- that is a very similar paragraph, I have said exactly that in my confusion -- sorry, in my conclusion. Individuals suffering from this condition because they are very agitated they become very aggressive, they are very difficult to manage, they are often -- they come to the attention of medics, and police have to be involved because they are a danger to themselves and a danger to other people.

So often they come into that scenario and police are involved and a restraint is required and that is often why they then come to our attention and we have found, and the literature will show, that in the vast majority of these cases they have drugs in their system that may explain their behaviour also, and why they have come into contact with the police. So this is why it's a very particular scenario, and why in this case the circumstances entirely fitted with that particular scenario hence why the discussion had to be had in the

conclusion, but would never have been involved in the cause of death.

Q. Thank you. Then it says at 5.1.3:

"Formulating the cause of death in these circumstances can be difficult. The regulator and the Royal College advise pathologists to consider an approach where the central cause of the fatal clinical condition is offered as an immediate cause of death and, where appropriate, used in conjunction with a term capturing the altered physiological and psychological state. Examples could include 'amphetamine intoxication with acute behavioural disturbance' or 'cocaine cardio-toxicity and psychosis."

I just wanted to talk to you about that suggestion. When it says advises pathologists to consider an approach where the central cause of the fatal clinical condition is offered as an immediate cause of death, was that what you were talking about yesterday as having the main cause of -- the physical cause of death at the top, number 1?

A. Yes. Uh-huh. In these cases, and I think you can probably see that with what their suggestions are, it is very, very difficult to give a 1a, 1b, 1c cause of death, it just doesn't fit in that system because there are so many issues involved and there's so many things

going on. So in these cause of deaths ideally what we try to do is to give a narrative cause of death, so it tends to be a sentence that includes everything that we think is important because it doesn't fit into the usual pattern.

Q. Can you explain why excited delirium doesn't appear anywhere in the cause of death that you certified after the post mortem, not even on line 2 or anything?

A. Because it is not a pathological diagnosis, it's a psychiatric diagnosis. So it's not a diagnosis that I can make, so I would never put it in my cause of death.

Q. Thank you. Looking at 5.1.4 it says:

"Discussion of Excited Delirium may better be covered within the commentary section of the post mortem report."

Is that in fact the section you have called "Conclusions"?

A. Yes.

Q. Where you do raise it and you discuss it there?

A. Yes, exactly.

Q. And that is what you have done. Thank you. We can move back to page 16, please of your final post mortem report. We were on paragraph 4. Just carrying on there you say:

"That said, there is a great deal of literature looking at this syndrome especially with regards to the circumstances described in this case, but it has to be remembered that it should be considered in conjunction with circumstantial information (namely a history of restraint) and toxicological findings."

Can you help the Chair understand what is the significance of these circumstances and the toxicological findings?

A. When people come into -- when people have this sort of kind of presentation with the agitation and the aggression and they come into contact with medical personnel and often police, then they will be managed in a particular way which normally will be a degree of restraint for their safety and for the safety of others. But that restraint in itself can pose problems depending on how it is undertaken in terms of how the person is restrained, if that affects their airway, if that leads to a degree of positional or mechanical asphyxia, as we discussed yesterday. So I have to take into consideration the background circumstances and what I am told has actually been happening in the whole situation and look at the witness statements, and then what I'm finding at post mortem to support or exclude exactly what may have happened with regards to the restraint.

Then in addition to that you have the toxicological information because often with toxicology, with particular drugs, even just having those drugs on board in the first place can kill someone regardless of them being involved in this whole situation. So it's very much a bigger picture scenario where you have to have all of the information with all of the findings at the post mortem, all of the toxicological tests, in order to come to a conclusion as to what has been the significant factors in someone dying.

Q. So would your evidence be that when the Chair is considering what happened here and what caused Mr Bayoh's death, that it will be necessary for him to look at all of the circumstances, what happened, including the results from your post mortem and the investigations you did?

A. Absolutely.

Q. And not to simply look at your evidence in a vacuum?

A. No. No.

Q. Thank you.

A. My post mortem again takes into account the information that I had been given about the background circumstances, so that is incorporated into kind of everything I have done and especially into the conclusion and the cause of death, so I needed that

information in the first place.

Q. It has been an integral part of your process in reaching a conclusion about cause of death?

A. Absolutely.

Q. And you think that is much to commend it?

A. Uh-huh.

Q. Let's look at this next paragraph 5 on page 16:

"Excited delirium syndrome is described as a life-threatening condition that has a variety of causes but is largely associated with drug intoxication~..."

You have mentioned earlier the significance of the association with drug intoxication. I'm interested in this comment about it being a life-threatening condition that has a variety of causes. Can you tell us a little bit more about that?

A. It can result in sudden death. There is a reasonable amount of literature surrounding this where people who are involved in this sort of situation with drugs on board can die suddenly in the process of them being restrained or not. So it is a life-threatening condition that has to be considered and it is -- it will be something that's taught to medics as well for people who are presenting because people can die from this and they will see people dying in hospital. It has -- the

variety of causes is kind of based around again the circumstances, the drugs on board, what happens to them when they present, how they're managed after they present, so there is a number of things surrounding that that again have to be taken into consideration if they do die suddenly.

Q. So a life threatening condition with a variety of causes, and you say largely associated with drugs:

"... in particular stimulant drugs~..."

And you have noted that MDMA and Alpha-PVP are both stimulant drugs?

A. Yes.

Q. If it is a life-threatening condition associated with drug intoxication and we have those stimulant drugs present in the samples that were tested, you told us that yesterday, is there anything that can be seen in the post mortem externally, internally or in terms of the toxicology, for example, that would allow you to say: this person's presentation is such that I can see signs in my post mortem examination that they were about to drop down dead suddenly?

A. No. And that's the thing about drug deaths is often they just present dead, there is no kind of -- nothing leading up to that, and on post mortem examination the main thing that we find are drugs in the system, we

don't often find anything to say why they've died at that particular time, it's we have to assume that the drugs have a significant effect on their heart and can cause a sudden cardiac arrest. So we don't -- we often don't find anything that I suppose backs up that drugs have been the cause of death here, but that tends to be because they die very, very suddenly from that.

Q. In terms of the suddenness of the death, from your experience as a forensic pathologist, have you seen any signs -- on cases where people have died suddenly, have you sign any signs in the examination or from the results which are commonly seen in cases where people die suddenly?

A. Not commonly. People with -- who die -- are we talking specifically stimulant drugs or in general drugs?

Q. We could look at the stimulant drugs MDMA and Alpha-PVP.

A. So specifically with stimulant drugs often you won't see anything. If you do, what you can sometimes see is if they have chronically used such drugs you can see chronic changes in the heart or in the coronary vessels. If there has been a period of resuscitation beforehand what you can also see sometimes is some damage to the heart muscle, very, very early damage. When the heart is going into cardiac arrest and kind of behaving erratically there is very much a surge of adrenaline and

noradrenaline going through the system and this can cause damage to the heart that we can sometimes see microscopically but it is very, very rarely that we see that. The vast majority of our stimulant drugs-related cases we probably won't see anything at the time of the post mortem. Ultimately nine times out of ten they are in younger people who have a negative post mortem and it's the toxicology that will then gives the answer.

Q. When you say toxicology will give us the answer, in what way does toxicology give the answer?

A. So we will look for a variety of drugs, and the results from that will be a drug or several drugs that we know can kill someone acutely if they have taken that drug. So if we have nothing else at post mortem that can explain the person's death, and a certain kind of set of circumstances that fits as well, then we have to conclude that the person has died because of the drug toxicity.

Q. And in terms of what you would expect if a person has died exclusively from drug toxicity, stimulant drug toxicity, what would you expect to find in terms of readings in relation to that stimulant drug or is there no commonality?

A. Again, it varies depending on the individual because different drugs will affect different people in

different ways. With stimulant drugs in particular you don't necessarily have to have a high level of the drug in your system for it to cause ill effects. Stimulant drugs in particular are not dose-dependent, are not level-dependent so you can have a reasonably low level of drugs like ecstasy or cocaine, amphetamine, and it doesn't necessarily mean that the drug hasn't killed them, whereas there are other drugs that kill people in different ways that we look for particular levels that maybe are in toxic and fatal ranges and we have various kind of medical papers and research that we can use to kind of look at that. But from a stimulant point of view it very much is not dose-dependent and what -- a level that can kill someone may not kill someone else. It is very person-dependent as well.

Q. So there is no fatal dose that as soon as you get to that concentration the risk is there of dying suddenly?

A. Not a fixed one for every person. It is so variable from individual to individual. There will be papers that will have looked at cases of various drugs and what their levels have been in their toxicology when they have died, so there are published papers and there are very good books that look at ranges of therapeutic, toxic and fatal levels of various drugs which we do use on a regular basis. But when it comes to stimulants, if

they are there, then they could potentially have killed someone.

Q. Even at a relatively low dose?

A. Yes.

Q. You mentioned a moment ago in certain cases you might see chronic changes in the heart?

A. Yes.

Q. Did you see any of those here?

A. No.

Q. You mentioned that resuscitation, if that had taken place, might cause damage to the heart. Did you see any signs of that here?

A. No.

Q. And you also mentioned adrenaline and noradrenaline can cause damage to the heart. Did you find any signs of that here?

A. No.

Q. Moving back to paragraph 5 on page 16. Continuing to read there:

"It can include paranoid and aggressive behaviour as was reported in this case and has no pathognomonic ..."

I will leave you to say the long words:

"... no ... findings at post mortem."

Can you explain what that means?

A. That is what I was talking about, as in a pathological

diagnosis as opposed to a psychiatric diagnosis. There is no -- there is nothing specifically that we can see at post mortem that can support this diagnosis.

Q. Thank you. Then it says:

"Individuals suffering from this condition, due to their behaviour often come to the attention of police services and often die during or shortly after restraint, as was the case here. However, it is not completely understood why such individuals die."

Is this -- when you say it is not completely understood, can you explain what you mean by that?

A. The literature is just not clear as to the actual mechanisms of death in these cases, so it's not understood exactly why their heart stops.

Q. So is this a situation where medical science has not provided all of the answers?

A. Yes.

Q. As to the exact mechanism?

A. Yes.

Q. Thank you:

"A number of studies have been undertaken to look at the effect of restraint on breathing, but the full physiological effects of restraint in general is not fully understood."

Can we talk about that element, the possible effect

of restraint on breathing.

A. So there have been studies that have been done but obviously in life -- in a controlled environment, looking at people if a particular level of restraint is put to them, to see how it affects their breathing, to see how it affects their oxygen levels. But as you can imagine this is a completely false scenario, it's not what is actually happening when it's happening in real life and these people are actually dying, so it's difficult to take kind of any conclusions from these studies hence why we just don't know because it is -- to get the actual answers is not studies we would be able to perform for ethical reasons, obviously.

Q. So studies would have -- it would be limited what you could learn from them because you are not replicating the exact circumstances that a person finds themselves in?

A. Exactly.

Q. So again would that -- would you recommend to the Chair when he is looking at this that he has to look at the exact circumstances and the evidence he has heard about that?

A. Absolutely, yes.

Q. In terms of the effect of restraint on breathing, any studies that might be published in the literature will

have limited correlation with the reality that a person might experience?

A. Exactly, yes.

Q. Then you say:

"This condition is associated with a range of clinical findings and typically in such cases a high temperature is documented, however that was not the case here, with his temperature in hospital noted as being 35.8 [degrees Celsius]."

A. So often in these cases they get a degree of hyperthermia, so they get a very, very high temperature and it is one of the things I think that the psychiatrists look for when they are looking at this diagnosis. So~... but in this case I kind of looked quite hard to find if we had a temperature because taking someone's temperature is not something that would be routinely done in this scenario but a temperature was undertaken in the hospital setting by a nurse, which was 35.8.

But again we have to remember that Mr Bayoh had gone through a series of resuscitation by that point, to all intents and purposes was beginning to die, so it is difficult to know how accurate that temperature would have been. Would it have been higher beforehand? I don't know. But that is the only temperature that we

have to kind of document in the whole scenario.
Q. I think yesterday when you were talking about narrating the circumstances, part of your report does mention a statement you had seen from a nurse who recalled taking the temperature in hospital?
A. That is why it's in the background circumstances.
Q. But as far as I am aware, and I will be corrected if I'm wrong, there is no information available to the Chair about the temperature of Mr Bayoh at Hayfield Road?
A. No. No. I went through it, all of the information I was given, and that was the only temperature that I could find.
Q. Thank you. The Chair has heard evidence last year from people talking about the weather, and the weather conditions on that day at the time Mr Bayoh was in Hayfield Road, and the fact he was wearing a T-shirt, a short-sleeved T-shirt, others were wearing further clothing. It wasn't necessarily the nicest May day. Would you recommend to the Chair that he bear that in mind when he is considering temperature or the significance of temperature to the overall situation?
A. I have absolutely no knowledge if that would mean that his temperature was higher just because he wasn't wearing the same clothes as anybody else, pathologically

that is not something I could comment on.

Q. All right. Thank you. So those were the -- as I understand it, those were the areas where you looked for signs in the post mortem and investigated them, considered them and took the view that they didn't have anything to do with the actual pathological cause of death?

A. Yes.

Q. Is there anything that I have missed?

A. I don't think so, no.

Q. Let's move on then to look at the signs that you found which I think you concluded were indicative or factors that could play a part in the cause of death. I'd like to begin by looking at your paragraphs on toxicology, if I may. So that is page 15. If we can move down to paragraph 4 on that page. It starts with toxicology and we will look at that and the next paragraph, the final paragraph. Here you say:

"Toxicology revealed in hospital blood, post mortem blood and post mortem urine the presence of MDMA~... MDA and Alpha-PVP."

We spoke about this yesterday, I am interested in you explaining MDA for us today if possible?

A. So MDA is a metabolite of MDMA and can also exist as a drug on its own, so it can be a separate drug to MDMA.

But the levels present here, given the level of MDA was much lower, would suggest it is probably a metabolite of the ecstasy as opposed to being a second drug. So we have -- I think one of the main drugs that have been found is MDMA, which the kind of street name for that would be ecstasy or what the public would be aware of as ecstasy.

Q. You helpfully detailed all of the specific measurements and drugs on pages 11 and 12 of your report.

A. Yes.

Q. That was taken from the toxicology report that you had been provided with?

A. Yes.

Q. The other thing that I noticed in your own report is you mentioned some of the blood was preserved and some of it was unpreserved. I wondered if you could explain to the Chair the distinction between those two.

A. Preserved blood is taken in a separate sample pot that has a preservative in it, and it is basically used for mainly alcohol because it is produced after blood because it stops -- it reduces further production of the drug. It is also useful in other drugs like cocaine and digoxin because again it can stop further production of the drug or breakdown of the drug after the person is dead.

So we use it specifically for certain drugs, so that the information that we're getting in terms of levels can be as accurate as possible, because that, as I explained yesterday, can change after death with the breakdown in the body and the post mortem redistribution.

Q. So on page 11 and 12 of your report you have highlighted what the results were from the preserved blood and the unpreserved blood?

A. Yes, and specific things will be checked for in the preserved blood and then specific things will be checked for in the non-preserved blood.

Q. So can we look at page 11 for the moment and just the first two entries preserved blood we see the Alpha-PVP at 0.31 and then we see the unpreserved blood has MDMA and Alpha-PVP as well and at different levels. And the MDA. Can you explain why preserved blood would only find the Alpha-PVP but the unpreserved would have all three present?

A. It's a very small sample size that we give for preserved blood, it's just a few millilitres, whereas unpreserved blood we normally give as much as we possibly can so it can be kind of 10 to 20ml, so they would have looked for the parent drug in the preserved because that is the important thing, the metabolites are not as

important, it's important to know exactly if the parent drug is present and at what level. So they would have looked in the preserved sample for that in particular and then rechecked it in the unpreserved as a comparison and done the metabolites in the unpreserved. So it's the amount of sample that is available and the importance of the -- and what kind of -- what needs to be done first.

Q. Right. Then with the urine sample, again that is preserved and unpreserved. Is that the same position that the preserved contains a preservative within it?

A. Yes, uh-huh. In this case I have sent two lots of urine. I would only normally send one preserved urine sample, I wouldn't normally send an unpreserved but the reason the extra urine was sent was because we were looking for steroids to check for nandrolone for the anabolic steroids. But yes, it's exactly the same. The urine sample would have gone in a very small preserved bottle which has the preservative in it and then there would have been a larger amount sent separately.

Q. What do we see present in the unpreserved urine?

A. So we have the MDMA, which is the ecstasy, and then you have the metabolite so it's -- and kind of other metabolites of that.

Q. So in terms of the urine which was preserved, it only

came up with Alpha-PVP but again was that to do with the amount, the sample?

A. That is probably all that would have been checked for in that urine.

Q. Then we see three hospital bloods samples listed. I think you said in the earlier part of the toxicology section there were four hospital blood samples.

A. So one of them wouldn't have been analysed, they don't analyse all of them. Not all of them are of a quality that can be analysed or they have enough volume from the other samples that they don't require to analyse. That would be a question for the toxicologists.

Q. Again, we see here the presence of MDMA, the metabolite MDA and Alpha-PVP?

A. Yes.

Q. And all other analyses were negative. I think you said yesterday there were a lot of other tests done?

A. Yes.

Q. But you would only mention in your report what was actually positive?

A. Yes.

Q. Then if we can move down that page, please. You talk about the urine sample and say they showed the presence of nandrolone and metabolites consistent with the recent admin of anabolic steroid nandrolone, and I think you

gave evidence about that yesterday?

A. Yes.

Q. Thank you very much. You have mentioned MDMA, you have mentioned the Alpha-PVP. Can you help the Chair understand the impact of these drugs on a person, or is that more for the toxicologists?

A. No, I can give certainly an explanation of how people may behave clinically and certainly how they can cause someone's death. That would be probably more my remit than the toxicologists' remit.

Q. Would you be able to help us with that please?

A. They are both stimulant drugs, and by stimulant drugs I mean they can have an effect on the cardiovascular system so they can cause an increase in heart rate and an increase in blood pressure and they can also cause arrhythmias. Yesterday I was talking about the conduction system of the heart and how the conduction system involves the beating of the heart, so they can affect that system, and they can result in a cardiac arrhythmia that is not kind of conducive to life, basically the heart can't beat properly and the heart then stops, and causes a sudden cardiac arrest. So any stimulant drugs, that is one of the kind of extreme complications of that.

The Alpha-PVP is a drug that can cause alterations

in someone's behaviour. It can cause euphoria, it can cause agitation, hallucinations, delusions, so often we get a history of people behaving very bizarrely and completely out of character beforehand, and that is the type of drug that they tend to have on board. But ultimately both drugs have a similar mechanism of action in that they both stimulate the heart in adverse ways and can cause the heart to stop in a sudden cardiac arrest.

Q. Would they both cause the heart rate to increase?

A. They can do, yes.

Q. Would they both cause the blood pressure to increase?

A. Yes.

Q. And both can cause an arrhythmia?

A. Yes.

Q. Would it be the arrhythmia that would cause the sudden death, where the heart would be unable to pump oxygen around the body?

A. Exactly, yes.

Q. And ultimately if that -- if the heart stops, that will be the point at which they die?

A. They are in cardiac arrest at that point, yes.

Q. That is the impact on the heart. Can you explain to us what the impact on your respiratory system is, if there is one?

A. With these drugs it is difficult to be specific about the respiratory system. There are other drugs that can cause a degree of depression of breathing, they are more drugs like heroin and codeine and things like that, whereas these two types of drugs seem to be more stimulant-related. Although, if you are -- if your heart is not working properly, if your blood pressure is going up, if your heart rate is going up, then everything is having to work harder, so that would have a knock-on effect with your lungs having to work harder and a degree of kind of damage to the lungs that could present adversely.

Q. If your heart is working harder, and what is the -- what are the visible signs on your respiratory system, if any?

A. You could be a bit more breathless. There may be no signs at all. You could be a bit breathless. That is probably the main thing. You could have some pains in your chest potentially, from both the heart problems and the kind of lung problems.

Q. When you say these drugs can have a -- can they cause harm to the respiratory system; can that damage or that harm be seen by a pathologist?

A. No. It's all -- kind of all very acutely so there wouldn't be anything to see down the microscope or

grossly. You can -- the congestion and oedema that I spoke about yesterday is another possible sign of the lungs but again, as I said yesterday, in the scenario here there are so many different things that could have fed into that congestion and oedema that it is impossible to be specific as to what exactly has caused that.

Q. So again, another area where a forensic pathologist such as yourself cannot explain why those lungs or how those lungs might be affected by consumption of these stimulant drugs?

A. Yes.

Q. Returning to your report, please, on page 15. We were looking at the toxicology. You've talked about the metabolites of MDMA:

"MDA is also a metabolite ... but can be encountered on its own~..."

I think you have just told us that:

"... or as a constituent of ecstasy tablets. If its level in blood is lower than that of MDMA, as was the case here, it is likely to be present as a metabolite of MDMA, rather than a separate drug on its own."

Is that what you were saying earlier?

A. Yes.

Q. Then it says, final paragraph on this page:

"MDMA is a stimulant drug that can result in sudden death from a fatal cardiac arrhythmia and/or a seizure, albeit there was no history of a seizure in this case."

Is that something you would be aware of from the circumstances or something you could find in the post mortem?

A. No, it's something that I would have to be made aware of from the circumstances. You can't diagnose a seizure at post mortem.

Q. But nothing that you were able to find from the circumstances and your consideration of the medical records to indicate there is any problem that way?

A. No.

Q. "Alpha-PVP is a substituted cathinone and the Database on New Drugs reports a number of health risks associated with this drug including neuropsychic (euphoria, psychomotor agitation, hallucinations/delusions, seizure/tremor and paranoia)~..."

I wonder if you could explain what those are?

A. So these are how people may present if they take this drug, so euphoria is a -- I suppose they appear kind of high, not quite themselves, they can be very, very agitated, very paranoid to people around them, they can hallucinate, so they can see things or hear voices that are not necessarily there. And they can also have

tremors, so kind of shaking and things like that. So these are all I suppose clinical symptoms that people that take these drugs can present with.

Q. Then you mention:

"... cardiovascular (hypertension, tachycardia).

What does that mean?

A. Hypertension is high blood pressure and tachycardia is a high pulse.

Q. And neither of those would be apparent to you on a post mortem?

A. No. No.

Q. "This may explain his behaviour prior to his death. With regards to this drug there is limited information about acute intoxication and fatal cases but its effects appear similar to that seen in acute cathinone toxicity."

Is that essentially what you have been talking about, that this can cause a sudden death because of the toxicity of the drugs themselves?

A. Yes.

Q. Then just finishing off that paragraph:

"Cathinones have stimulant effects similar to amphetamine and as such could also result in a fatal cardiac arrhythmia."

Is that what you mentioned earlier?

A. Yes.
MS GRAHAME: I am conscious it is 11.30 am.
LORD BRACADALE: Very well. We will have a 20-minute break at that point.
(11.30 am)
(A short break)
(11.57 am)
MS GRAHAME: Thank you, let's go back to page 16, if I may, we have been talking before the break about things that you were able to find and positive results from your investigations.
We had been talking about toxicology and just to complete this section, in paragraph 2 of page 16 you say:
"The toxicology also revealed in the urine nandrolone and metabolites~..."
And that was:
"... consistent with recent administration of anabolic steroid. Given there was no evidence of heart disease, this drug is unlikely to have played a role in death here."
So again, something else you have been able to exclude as part of the overall picture?
A. Yes.
Q. Then moving on to page 17, if I may, I would like to

look at another factor and you consider here the impact of restraint. So the restraint of Mr Bayoh by the police officers.

If we look at paragraph 1 on page 17 it says:

"In terms of the history of restraint here, Mr Bayoh was reportedly face down with his hands cuffed in front of him (this is supported by the presence of injury 16), his legs were tied around the knees and angles and at least four officers were restraining him."

Is that a summary of your understanding of the circumstances?

A. Yes.

Q. Then you say:

"Post mortem examination showed the presence of petechial haemorrhages~..."

We spoke about those yesterday:

"... within the eyes and whilst these are not specific and can be seen in someone who has been resuscitated, they could indicate a degree of asphyxia."

So am I correct in saying your view was that the presence of those petechial haemorrhages that you described in evidence yesterday could be indicative of a degree of asphyxia?

A. Yes.

Q. And:

"In this case, given the reported circumstances, possible causes of asphyxia would include positional (the position of the body interferes with breathing) and mechanical (something impeding the body's ability to use muscles for breathing)."

I think you explained those yesterday in evidence.

A. Yes.

Q. I would like to look at the issue of restraint in a little bit more detail. When the Chair is coming to consider the importance or the impact of restraint on Mr Bayoh and the circumstances that existed at the scene, I'd like to be clear exactly what factors you have considered significant to your own conclusions.

I think you mention -- on page 15 of your report, if we look at paragraph 3 that there are a number of blunt-force injuries. You've detailed a number of these here. You've given evidence in detail yesterday about all the injuries that you found, both externally and internally.

A. Uh-huh.

Q. And the Chair can consider that in due course. But you've said that there were injuries -- a number of injuries you detail here: abrasions, lacerations, I don't want to go through them all again, but you also say there was the internal examination that revealed

a fracture to the left first rib, we talked about that yesterday and this could have been sustained whilst he was being restrained. So that is one of the possible mechanisms whereby that injury could have resulted in Mr Bayoh ...?

A. Yes.

Q. Albeit the possibility of it occurring during resuscitation cannot be completely excluded?

A. It would be very, very rare but I couldn't say definitively 100% that it has not been caused by resuscitation.

Q. I think in your Inquiry statement you say it would be rare if CPR and the attempts at resuscitation had caused an injury to the first left rib?

A. Especially an isolated injury with no injuries elsewhere that could be related to resuscitation.

Q. I think yesterday you said there were no injuries to the second rib?

A. No.

Q. And you also said on the trunk, including that area, there was no external bruising or injuries or anything of that sort?

A. No.

Q. No lacerations or anything?

A. No.

Q. So the injury, the fracture to the first left rib is underneath the skin with no surrounding external injuries associated with it?
A. Yes.
Q. "Notably, in keeping with the history of him being restrained there was an injury to the left wrist~..."
And you detail the specific injury:
"... with corresponding bruising into the subcutaneous tissue."
So is that an injury that we talked about yesterday, injuries to the wrist, I think you said they were consistent with handcuffs?
A. Yes.
Q. So if handcuffs had been applied during the restraint, those injuries would be consistent with that?
A. Yes.
Q. And I think you also mentioned yesterday injuries that would be consistent perhaps with leg restraints, or baton strikes?
A. Yes.
Q. And specifically I think you talked about injuries to the shins could be more consistent with baton strikes, I think you said yesterday?
A. Yes.
Q. So again, all of those injuries would be consistent with

a restraint having been carried out?
A. Yes.
Q. And I think yesterday you said also the struggling against the restraint as well?
A. Yes.
Q. Then yesterday you talked about injuries which were perhaps consistent with skin scraping along the ground?
A. Yes.
Q. Some were consistent with over clothing -- without clothing being present on the lower parts of the arms, some underneath a T-shirt would still be consistent, the one on the left trunk?
A. Yes.
Q. Again, those injuries which you detailed yesterday, again were they consistent with a restraint having been carried out?
A. Consistent with him being on the ground. I don't think they are related to restraint specifically but certainly him being on the ground.
Q. And consistent with him struggling on the ground?
A. Yes.
Q. And consistent with the circumstances that you're aware of?
A. Yes.
Q. As happened in Hayfield Road.

A. Yes.
Q. Then there was some description by you yesterday about the injury on the left forehead. Was that also potentially an injury consistent with the circumstances that you know about, as occurred in Hayfield Road?
A. Yes.
Q. And also use of batons, consistent with blunt-force injury?
A. Potentially, yes.
Q. So you detail those there, you talk about:
"Internal examination of the head and face showed several areas of bruising in keeping with blunt-force impacts to these areas (and could be in keeping with being sustained as a consequence of baton use)~..."
A. Yes.
Q. You still agree with that?
A. Yes.
Q. "... but there was no evidence of fracturing of the skull or facial bones."
A. Yes.
Q. You talked yesterday about the level of force and how it might be indicative, if bones are fractured, of a more severe level of force?
A. Yes.
Q. If bones are not fractured is that indicative of a less

severe level of force?

A. Routinely, yes.

Q. Then you say:

"Neuropathology was undertaken which showed changes consistent with evolving global ischaemic brain injury secondary to cardiac arrest with resuscitation and short survival period but no other significant abnormality~..."

Was that the evidence you gave yesterday about the neuropathology results and the investigations that had been carried out?

A. Yes.

Q. Again, they would be consistent with the circumstances as you understand them as to what happened at Hayfield Road?

A. Yes.

Q. Then -- yes, we dealt with the final sentence. So those are all the injuries, those appear consistent with your understanding of the events at Hayfield Road. Can I ask you about some other aspects of evidence that we've heard and you can explain to the Chair if they would also be significant in the context of this -- or consistent with a restraint and the events at Hayfield Road or not.

Signs that perhaps force had been applied on to the

back of Mr Bayoh, so we talked yesterday about you examining the back and I'm interested were there any factors that you could say were relevant to a question of force being applied to his back?

A. I think on examination of the back there was one area of haemorrhage over the left upper back which is indicative of a degree of blunt-force trauma. There was nothing externally on the skin that was obvious and just one area internally, so there certainly wasn't anything kind of pathologically that would signify a severe degree of force being applied to the back from those findings.

Q. What about weight being applied to his back, the weight of someone perhaps leaning or lying across his back; any signs of that?

A. If that had occurred it hadn't occurred in any significant injuries to confirm that.

Q. We may have heard evidence about Mr Bayoh attempting some sort of press-up manoeuvre to try and remove officers and the weight of officers off his back. Any signs of that in the post mortem that -- or signs that could be consistent with that having happened?

A. Not from the findings. But you wouldn't necessarily need to see anything for that to have happened.

Q. Anything that you could identify that may be consistent with an officer rolling down the legs of Mr Bayoh,

rolling -- turning from the upper thigh or above the knee area down to the ankle area with a view to stopping movement of his legs and helping with the application of leg straps? Anything that you could see that would help in that?

A. No.

Q. Is the -- the Chair has also heard evidence about the duration of these events. He has heard evidence about the Airwave transmissions that were being made at certain moments in time and he has looked at CCTV showing the police arriving and the period of time before Mr Bayoh was on the ground. Is the duration of any significance to your role as a forensic pathologist?

A. I think knowing about the duration, knowing as much about the circumstances is important because the longer it is happening and the longer he may be in a particular position, the more likely that there might be an adverse outcome. So it is important to know how long it's all been happening for and what has been happening in that time.

Q. Are there any cut-off points that you are aware of that make things more dangerous or less dangerous?

A. Not specifically.

Q. Nothing you know of. Thank you. You've mentioned a lot of these factors, can I ask you again about the

petechial haemorrhages, they are consistent with the circumstances that --

A. Yes.

Q. -- you are aware of?

A. They can be seen in deaths that are related to asphyxia but as I said yesterday there's a number of other reasons that they can be seen as well, so they are not specific to those types of deaths.

Q. Would you -- in relation to helping the Chair, would you say that he shouldn't look at anything in isolation but consider all of the evidence available?

A. Absolutely, yes.

Q. So your evidence is -- and your findings, that's part of the whole picture for the Chair to put together?

A. Yes.

Q. Is there anything I have missed in relation to the restraint that you think is an important factor that the Chair should be aware of, that I've not mentioned to you?

A. No, I think the restraint is -- is there and is in the cause of death because of the information that I had been given in the lead-up to Mr Bayoh's death in addition to the findings at post mortem. You often, in such cases of restraint, you may not find a huge amount at post mortem examination. Petechial haemorrhages are

one of things that you can see, depending on the mechanism of constraint. With positional asphyxia you may see a very congested kind of bloated face. That is difficult in this case because of the colour of Mr Bayoh's skin as well. So my consideration of the restraint and the importance of it in this case is very much based on all of the information I have been given in the lead-up to his cardiac arrest in addition to what I have been able to identify or not identify at the time of the post mortem.

Q. From everything you have seen and all the results and tests you have done was there anything that caused you to think: I've got this wrong?

A. No, no.

Q. Anything missing that absolutely should have been there that you think: if that isn't there, I must be getting this wrong?

A. No, no, I think I had all of the information I needed.

Q. Thank you. You've been asked a number of questions as part of the Inquiry statement process but before I move on to that I just want to look at the final section of your conclusions on page 17.

These are your conclusions:

"Taking everything into consideration, death here was sudden in nature. In summary, there was no evidence

of gross or histological natural disease that would account for death. Toxicology revealed MDMA and Alpha-PVP and these drugs could potentially have caused sudden death at any time due to a fatal cardiac arrhythmia. That said, it is recognised that restraint in itself can be a cause or contributing factor in some deaths and given the circumstances, in that this man was restrained at the time of his respiratory arrest and post mortem examination showed petechial haemorrhages that may represent a degree of asphyxia, it cannot be completely excluded that restraint has also had a role to play in death here."

So you are not excluding the fact that restraint could have had a role to play:

"Overall it is not possible to be sure what has been the most significant factor in death here and as such the cause of death is best regarded as being: sudden death in a man intoxicated by MDMA ... and Alpha-PVP, whilst being restrained.

"There were no other significant findings.

"The cause of death should therefore be amended to ..."

And that is amended from your initial report which was "unascertained"?

A. Yes.

Q. To:

"1a. Sudden death in a man intoxicated by MDMA~... and Alpha-PVP whilst being restrained."

A. Yes.

Q. That was your conclusion, that was your certification of the cause of death, your explanation from all of the work that you did --

A. Yes.

Q. -- in investigating Mr Bayoh's death.

Now, I think subsequent to this in your Inquiry statement you were asked -- I think it was suggested to you that another expert had suggested perhaps the struggle should not be excluded from that.

A. Absolutely, yes.

Q. That the struggle as well as the restraint were both significant.

A. Yes.

Q. Do you want to comment on that now?

A. So during these types of struggles with how the deceased may have behaved and moved, they would have been using a great degree of kind of muscle strength, and whilst doing that it kind of -- it is such intensity you can get a breakdown of proteins in the muscle that produces acids, and you can get something that we call an acidosis, so you get acids circulating in the blood

stream. Those acids, because of their chemical structure, can cause irritation of the heart and can irritate the conduction system I was talking about and can also lead to cardiac arrhythmias and cardiac arrest.

So again, it is something that -- it's impossible to prove pathologically, I don't see anything at the post mortem to confirm this. But again, it is taken in consideration with the circumstances that are described, and that certainly is -- if I was revisiting and I have had cases subsequently to this case in recent years where I have put "whilst struggling", or "being restrained", into the actual cause of death because I think the struggle is a major part of it as well.

Q. So is that a sort of integral part, being restrained and struggling against the restraint?

A. It is something that definitely has to be considered as being important in the whole scenario.

Q. Thank you. In terms -- you have talked about examination. Is there any test that can be carried out to show if there's acidosis or acid in the system?

A. There are some tests we can do pathologically for specific acids and we did do in this case acetone and beta-hydroxybutyrate, which are both acids that weren't there. But the acid that tends to be seen in these cases is a lactic acid and that is not something that we

can test for at post mortem. It is the acid that is produced if you are kind of working out in the gym, if you are lifting weights and you get pain in your muscles, that is your lactic acid being produced and that tends to be the acid that is produced in these sort of scenarios when it's the muscle that is breaking down.

Q. How quickly does lactic acid leave the system or leave no trace, or is it just simply that you don't -- medical science or science hasn't quite --

A. I don't know how -- I wouldn't be able to answer about how quickly it leaves the system but from a post mortem point of view I don't have a lab that I could get to analyse for lactic acid.

Q. So these are tests that simply cannot be done by you?

A. Yes.

Q. Thank you. But ultimately if there is a build-up of that acid it could irritate the heart and the conduction system?

A. Yes.

Q. Thank you. You've mentioned -- if we can move back down the page slightly, you say:

"Overall it's not possible to be sure what has been the most significant factor in death here~..."

For the public listening, is there a way you can attribute percentages to different things, such as MDMA

was 20% the cause of death and Alpha-PVP was 10%? Can you do that sort of assessment?

A. No. No, I can't. I can't with any degree of certainty say exactly what has been the more significant factor. Certainly not putting percentages on anything, it is impossible. The drugs were both there, they both have a similar mechanism of action so regardless they both pathologically would have been important as each other.

Q. When you say it is not possible to be sure what has been the most significant factor, how as a pathologist do you assess what factors become relevant to your explanation for the cause of death, and which you ignore and say are not relevant? How do you go through that process?

A. I think the easiest way to do it is look at them individually. So if I had a case where the only thing I was finding was ecstasy, then that would be my cause of death. If I had a case where the only thing I was finding was Alpha-PVP that would be my cause of death. If I had a case where I was given a particular scenario of restraint and had all the circumstances ticking the boxes that required but the post mortem examination revealed nothing else, no other obvious cause of death no other toxicological cause of death or natural cause of death, then that would be my cause of death.

So that is how I tend to look at it: if it exists on

its own, could it have been responsible for this person's death? And in this case all of these individual factors could have, if they just existed on their own with the correct set of circumstances. So that is how I have come to that conclusion.

Q. In this situation there are a number of different circumstances that could combine to cause death. That is certainly what you have concluded.

A. Exactly.

Q. So in that case do you even endeavour or attempt to distinguish between the causes of death, the factors here? Do you try and assess the difference between the level the drugs made and the level the restraint made?

A. I do try but certainly in this case there is nothing in all of the information I have and what I have found at post mortem with all the ancillary investigations to separate out these different factors so they are all in the primary cause of death hence why it's given as a narrative explaining them all.

Q. So that you mentioned the important parts as far as you are concerned?

A. Exactly.

Q. Of course including what you now say is the struggle?

A. Yes, yes.

Q. We may hear other evidence and the Chair may hear

submissions about things that are de minimis, a Latin phrase. Have you got an awareness of de minimis and the fact it's something so trivial so as not to take into account?

A. Yes.

Q. Do you dismiss anything that you would class as de minimis?

A. I would do, I would always discuss it if I have that information, but with the caveat that it has not played a significant role in death. So for example natural disease in this case, I would discuss it but there is nothing to suggest that there is anything there that would have been significant. If there had have been it may have been something very, very minor that would have been possibly in part 2 of the cause of death as not significant. But there wasn't in this case. So we would consider everything but have to exclude certain things depending on the information.

Q. So in terms of your own conclusions, the cause of death was -- the explanation for Mr Bayoh's sudden death was due to both the drugs, the intoxication from the drugs that you have listed, and the fact he was being restrained at the time?

A. Yes.

Q. Thank you. I would like to move on to what happened

after your final report because I understand there were further investigations carried out. Could we look at a supplementary report that you prepared. It's COPFS 00040. You will see here it says, "Supplementary report", and this was on 3 October 2017. If we can just move down the page, please. We will see again it relates to Mr Bayoh and it's exactly the same sort of front sheet if you like as you had before. If we can move on to the next page. We see it says:

"Following a request, post mortem blood was submitted for testing for sickle cell disease."

So was this a separate later request that was made --

A. It was.

Q. -- to have this checked?

A. Yes.

Q. And it -- I wonder if you could explain what sickle cell disease is?

A. It's a blood disorder where you get abnormal shape of the red blood cells, which reduces the blood cells' capacity to carry oxygen. So people with this disease can have problems with their blood kind of matting together and can have pain and problems with -- kind of chest pain and breathing and things like that and can become hypoxic with low oxygen because the blood is not

circulating properly in their body.

Q. I think earlier you said you had looked at medical records and had there been any reference at all to anything like that in the medical records?

A. No.

Q. So this was requested, and was further post mortem blood taken at that stage or was it the original?

A. It was the original --

Q. The original?

A. -- that had been stored.

Q. Stored. Then it says:

"This confirmed Mr Bayoh was a carrier of sickle cell disease and therefore had the trait but not the disease."

A. Yes.

Q. Would you explain that for us, please?

A. So carriers of sickle cell disease can go through life with no problems whatsoever and are often undiagnosed, and it doesn't cause them any ill harm, it doesn't cause them any problems. In specific situations, which are normally quite extreme situations, things like a member of the army is on -- doing an expedition in the desert so they are doing lots of very, very tough exercise in very high temperatures, in that sort of scenario where they really are requiring a really high oxygen capacity,

they don't -- the trait becomes apparent in that the blood cells may begin to sickle, so cause this abnormal shape which affects the oxygen carrying capacity and those people can become quite ill and can actually die.

So, whereas the disease is someone who has in very kind of little scenarios can be very unwell and these people often present repeatedly with pain and being unwell and require regular medical management, so these people it affects their life and it won't go undiagnosed, it will probably be diagnosed reasonably early in life because they will have clinical symptoms and will present to medical staff. Whereas with the actual trait it doesn't tend to present unless these people are put in an extreme situation that affects their oxygen carrying capacity in an extreme way.

Q. So you have already said there were no signs in the medical records of anything resembling sickle cell disease. When you are thinking about an extreme situation that would affect oxygen carrying capacity, so for someone who has the trait, the sickle cell trait, can you give us another example of what type of extreme situation you mean. For someone who isn't in the army working in the desert, what would an extreme situation be?

A. Someone who has climbed a mountain, so used a great deal

of energy to climb that mountain, got to the top and as you know at altitude the oxygen levels are much lower than when you are not at altitude so your requirements increase but they wouldn't be able to substitute for that, they wouldn't be able to change their physiology for that, so that would be another extreme situation.

Q. How quickly can sickling occur?

A. Again, I don't know from a medical point of view. I would have to refer to a kind of haematology expert. It's not within my --

Q. We may hear other evidence about this that we can explore. From your awareness is it something that you can see -- if the sickling has occurred, can a pathologist identify that?

A. It's not something I have ever seen as a pathologist. It is not -- I have never come across any patients with sickle cell trait or disease. It's one of those things that it's very, very difficult to diagnose at post mortem because after someone dies or even prior to them dying, the body will have a degree of hypoxia and you can see sickle cells in a post mortem setting of people without the trait or without the disease. So it's very difficult to know how important it is because of the post mortem changes that you may see anyway. But my practice, I have never seen sickling -- certainly

significant sickling from a post mortem point of view. I've never been involved in any cases that have had either sickle cell disease or sickle cell trait before, hence why I didn't think about it in this case, which I probably should have done. There are genetic predispositions and it does happen in particular races as well so it is something that I am now aware of that I would certainly look for in the future in the correct race.

Q. So not something you have seen yourself in any of the post mortems that you have done?

A. No, and this case was obviously reviewed by Dr Bouhaidar and all of the members of my department, and none of us at the time thought this is something that we should be thinking about.

Q. Now has your practice changed in relation to that?

A. It will do. As I say, I haven't had the opportunity for it to require changing but it is certainly something that is now in the memory to consider, if it's in the correct set of circumstances.

Q. I think in your Inquiry statement at paragraph 108 you say that was a learning point for us all.

A. Definitely, yes.

Q. Yes. You have also -- have you had a chance -- you have been asked, I should say, about the significance, if

any, or whether that sickle cell trait has had any impact on the explanation for the death of Mr Bayoh. I think you've been advised that other experts have considered this, Dr Elizabeth Soilleux and Professor Lucas?

A. Yes.

Q. We may hear further evidence from Lucas in due course in this hearing but can you tell us from your perspective what impact this element had in your consideration. It's obviously a new piece of information provided to you and I am interested in what you have made of that in terms of your original conclusions and the final post mortem report?

A. When you consider the circumstances of this case in terms of we are talking about the kind of acidosis and there is also information provided that Mr Bayoh was maybe -- before he came in contact with the police was running for a period of time which would also have used oxygen, would've started for his muscles to break down, and then during the period of restraint again with -- there would be increase in oxygen requirements as kind of more acid is produced, so certainly from the scenario it is possible that a degree of sickling could have occurred. It is not something I can prove pathologically and I will defer to the professor who

sees a lot more of these cases --

Q. Lucas?

A. -- Professor Lucas. He sees a lot more of these cases because his practice is out of London and there are a lot more people who have this trait in that area. But -- so I think it definitely has to be considered in the cause of death but in terms of the importance of it, kind of referring back to what I was saying about how I look at what is important in causing death in terms of the drugs, the restraint, if I took everything else out of the equation would they still be involved in causing death, then potentially yes. Whereas sickle cell doesn't come as high in that sort of level of priority because had this -- had Mr Bayoh not been involved in this whole scenario with drugs and with restraint, the sickle cell wouldn't have mattered at all. It has only come into play because of everything else that is happening. So it's certainly not as important as the other factors because if you take the other factors out of the equation this man has not died because he has sickle cell trait.

So that is kind of where -- it's certainly important and it's very useful to know, especially from a family point of view, from a genetic point of view and genetic screening, but I don't think it is as important as those

other factors.

Q. Thank you. Yesterday you used an example of where someone has diabetes, an underlying health condition which doesn't directly add much to the explanation for their death.

A. Yes.

Q. You wouldn't put it in number 1a, b, c or d but you would put it in as number 2 to provide a full picture of that person's health?

A. Yes.

Q. In terms of sickle cell and the importance of sickle cell are you saying you would put it into number 2?

A. Yes, I would ideally put it into part 2 as opposed to adding it to the narrative in part 1.

Q. So in light of this new information, if you were being asked to comment on your cause of death in your final post mortem report would it be 1a, as it exists, subject to adding in the struggle, and 2 would be the sickle cell trait?

A. Sickle cell trait, yes.

Q. Thank you.

Two things I would like to say. I want to ask you about Professor Lucas' comments in a moment but in terms of your understanding of what Mr Bayoh was doing in the

lead-up to arriving at Hayfield Road, you've talked about him running and you have mentioned the sort of exertion of that. Would it make a difference to your assessment importance of sickle cell trait if you knew that some people had described him as walking, some people had described him as running but for short periods, some people had described him as chasing cars.

The Chair's heard a lot of evidence from eyewitnesses, who have described walking briskly, walking with purpose, have used different expressions. I don't recall anyone describing the sort of exertion that would equate to climbing a mountain or running a marathon or anything like that. Would that make any difference to your assessment of sickle cell being at number 2?

A. If there was less information to say that he had undergone extreme exertion then I am not sure I would take it out of cause of death because it is still just a possible factor, it's not definitive. It is there, he definitely has it, so it probably wouldn't alter what I would say in terms of the cause of death but it may kind of to my mind make it even less significant than what I was thinking.

Q. Thank you. The Chair will hear more evidence about sickle cell but that, from your perspective as

a pathologist it would be less significant in the overall cause of death?

A. Yes, because the important thing is how he has been, how his overall system has been affected by whatever activity he has been undertaking, because ultimately that is when the sickle cell will begin to have a problem in his blood cells. So if that is not actually there in the first place then the problem wouldn't happen.

Again, like I say, the diagnosis of it at post mortem is very, very difficult because you can get sickling, even in normal scenarios.

Q. Just to turn to what Professor Lucas has been saying. We have an Inquiry statement from him. We've not heard his evidence yet but I would like to read out something he said, and see if you agree with this. So he says:

"I don't think sickle cell trait is quite as important as I thought it was perhaps back in 2018, partly influenced by lots of discussions I had with coroners in England about how we should be phrasing causes of death, what is important and what is less important, what goes into part 1 (which is the main thing) and what goes into part 2 as a contributor. If I was doing this case again now I would move reference to sickle cell trait to part 2 of the death certificate,

I would not frame the entire story of his death around sickle cell trait, I would just simply put that in on the end and as a small extra factor."

That was in paragraph 25, which we will hear about in due course.

A. Yes, I think that is very sensible and that's exactly --

Q. Would you agree with that?

A. I would agree with that completely, yes.

Q. Thank you. Before I leave Dr Soilleux and Professor Lucas can I ask you one thing. Dr Soilleux -- you were asked about this at paragraph 159 of your Inquiry statement -- she appears to have said at an earlier stage she thought that positional asphyxia was unlikely due to the short time period between Mr Bayoh's contact with the police and the commencement of his unconsciousness and the fact that sufficient other contributing factors to death were known to be at play for death to have occurred as a consequence of those contributing factors in the absence of positional asphyxia.

Can we look at your Inquiry statement, please, paragraph 159. And that is SBPI 00304. I think you say here in response to questions about this matter:

"I would completely disagree. You cannot take positional asphyxia out of equation, especially when you

have it in the context of all the other things that are going on. So, it might require less to be in that position for a reduced period of time because your heart is already under strain due [to] the drugs taken, and because you've already run around for a period of time and got a build-up of lactic acid. This is a multifactorial death, and we do not know what the main factor has been. I think all of the forensic pathologists that have been involved in this case would completely agree with that and have all completely agreed with that."

Is this perhaps a distinction between your experience as a forensic pathologist and perhaps Dr Soilleux's experience, which is in relation to sickle cell trait?

A. Yes, I'm not sure that she is a forensic pathologist --

Q. She is not?

A. -- I am not sure of what her qualifications are. So absolutely, there have been several forensic pathologists that have agreed that you cannot take the positional asphyxia away in this case. So I would completely disagree with her comments.

Q. Thank you. I would like to move on to one or two other things that have been raised by experts, just to ask you to comment on them, and we've already dealt with these

in your Inquiry statement, just so the Chair is completely clear.

Can I ask you about some comments made by Steven Karch and I would like to look at your Inquiry statement, really paragraphs -- if we say paragraphs 122 to 126. So if we go to just 121, let's just put this into context. I think you were given sight of a report by Dr Steven Karch, the reference is there, I won't take you to it, it's quoted in paragraph 121:

"I have been asked to comment on the following paragraph [at page 4]: 'High doses of nandrolone elicit cardio-toxic effects including cardiac remodelling and injury. There is also laboratory evidence that they may provoke arrhythmias. As myocardial remodelling of both ventricles was apparent on my examination of the heart it seems only reasonable to conclude that nandrolone contributed to that process, as did all of the other stimulant drugs. There is also evidence that by methods yet to be determined nandrolone facilitates the occurrence of myocardial arrhythmias, the apparent cause of Mr Bayoh's demise'.

"I completely disagree with what he says~..."

This is the start of paragraph 122:

"... we did not see what he was seeing in the heart, the heart was completely normal histologically."

To summarise, as I understand from Dr Karch he thought there were problems with the heart, pre-existing problems that he considered he could see in Mr Bayoh's heart.

A. Yes.

Q. I think your position is that you disagree with that and I think yesterday you gave evidence that you felt the heart was normal?

A. Yes.

Q. I would just really like you to explain why you disagree with Steven Karch?

A. He is basically seeing -- saying he is seeing changes down the microscope that show evidence of chronic drugs misuse. That is one of the reasons that we did such a detailed examination of the heart, as I detailed yesterday. The histology -- I look at heart histology, as I detailed yesterday, on pretty much every case that I do and will do that several times per week on cases. The heart histology I took was reviewed by myself, by Dr Bouhaidar, the second doctor on this case, by the other three forensic pathologists in my department, and was also reviewed by other witnesses including a professor of cardiac pathology, Professor Mary Sheppard, and none of us have seen what Dr Karch has seen. So I am not sure what he is looking

at but I categorically disagree that there is any chronic changes in the heart.

Q. So if there is any suggestion that there were histological abnormalities that were apparently overlooked at the original autopsy what would you say to that?

A. I'd say that that -- they have been checked and double-checked by several experts, one being a professor in cardiac pathology, and no one has seen any of those changes. So I think it has been triply, quadruply checked that what he is seeing is not present.

Q. I think we mentioned Professor Mary Sheppard, who is a professor in cardiology, and I think she has provided an Inquiry statement to the Chair. I understand she says she has looked at 7,000 hearts and says this was a normal heart.

A. Yes.

Q. Is that the lady you're talking about?

A. Yes, uh-huh.

Q. Then I think -- can I ask you to look at 126, please. Can we just check -- can I just check 124. Yes. Keep going, thank you. 126:

"In Dr Karch's report he is asked the question: what is the physiological effect of the restraint of the deceased in the circumstances of his arrest? And his

answer is that 'Given the details of this situation, the effect of physical restraint would have been de minimis'."

I described that earlier as something that is very trivial, very minor:

"He further considers that the restraint is irrelevant when considered in combination with the drugs and CS spray/PAVA."

You have already talked to us about those two elements:

"I'm asked to comment on this. Pathologically I cannot say whether the restraint used was adequate or excessive. However, at the end of the day he was restrained. He was in a position that would've hampered his breathing, hampered his heart, and he was intoxicated with drugs. As such, there was a combination of factors that all would've interplayed with each other and it was difficult to say what has been the more important factor. I think all of them together is important. They have all happened together and resulted in his death. It would be interesting to know what his actual qualifications are and background to be able to say such things."

If the suggestion is made that the restraint could be taken out of the picture completely, described as

de minimis, trivial, of no consequence whatsoever, what is your position on that?

A. I would completely disagree.

Q. Is that for all the reasons you've given earlier today?

A. Yes.

Q. Thank you. One final thing that I would like to ask you. We hope to hear from a Dr Cary at the end of this hearing. We have not heard from him yet but we have an Inquiry statement from him. I just want to ask you in relation to something he said. He has not given us a full explanation yet, but I would like to ask you about it.

So it's at paragraph 143 of your Inquiry statement, please. We can use that as a starting point. You will see you have been asked questions about Dr Cary's report here starting at 142 and you have been -- comments have been made about that. If we look at 142, this is a quote from Dr Cary's report:

"In terms of any role for restraint, this cannot be separately considered from struggling. As is commonly the case in acute behavioural disturbances the deceased displayed remarkable strength and stamina. Ongoing restraint and struggling in these circumstances is very likely to lead to significant metabolic disturbances with early breakdown of muscle releasing potassium,

which can precipitate cardiac dysrhythmias and the development of metabolic acidosis."

Now we can see some elements there that are coming through already. We have talked to you about struggle, the significance of struggle, and you have commented on that. This is your response to that comment, paragraph 143:

"I have been asked whether I agree with this statement. Yes, definitely. I am asked whether Sheku Bayoh was at particular risk of metabolic disturbance and the development of metabolic acidosis due to his muscular build. I do not know if having more muscle bulk increases the chance of your breakdown to lactic acid. Common sense would say it probably does, but pathophysiologically I do not know if that would be the case. Perhaps a clinician would probably have to answer that absolutely categorically."

So in terms of your role as a pathologist, that is not something you can comment on?

A. No.

Q. And you have already explained you can't do a test for lactic acid or the levels of lactic acid in a person?

A. No, and we can't do a test for potassium levels either, as Dr Cary has indicated. That will -- those will be released from the cells but after death your cells begin

to break down and potassium is automatically released. So it's impossible to know definitively what someone's potassium level has been when they've died.

Q. Then can we look at paragraphs 150 to 151 of your Inquiry statement. You have been asked to explain what type of matters are normally put in part 2 of a death certificate:

"Things that are potential factors but not necessarily directly related. 'Potential contributing factors' is the best way of describing it."

That is what we have been talking today in relation to your diabetes example from yesterday and the sickle cell today?

A. Yes.

Q. "Potentially may have played a role in death but not as important, or we don't think are as important, as things that we have put in part 1. Those are the really important things that we put in part 1. If I was going to change the cause of death, even if it was going to be in part 1, it would probably be with a narrative as in what we have but 'in a man with sickle cell trait'."

Then further on:

"So often with part 1, if you like, if you take that out, would the person still have died? With this case it is multifactorial. Could Sheku Bayoh have died just

from the restraint? Potentially, yes. Could Sheku Bayoh have died potentially just because of drugs? Yes. Could Sheku Bayoh have died just because he had sickle cell trait? No."

I think earlier today you said if all you had was a person who had been restrained and they had died, that could be a cause of death?

A. Uh-huh.

Q. And if all you had was a person who had taken drugs and they had died, that could be a cause of death?

A. Yes.

Q. But here you see both contributing and you can't separate them out --

A. Yes.

Q. -- in terms of their importance?

A. Yes.

Q. But you don't think sickle cell trait of itself would be an explanation for the death?

A. Yes.

Q. I think there was one thing I should've asked you yesterday and I didn't, and I would like to do that before I finish. I asked you about the fractured rib and whether you would defer to Professor Freemont on the timings and that type of thing in relation to the rib. Would you also defer to him in relation to his

experience and the extra stainings that he did in relation to the most likely mechanism?

A. Potentially, because the mechanism will depend on the timings as well. So, yes.

MS GRAHAME: Thank you. Could you just give me a moment, please. (Pause).

Thank you very much. I have no further questions.

LORD BRACADALE: Are there any Rule 9 applications? I am going to rise to consult with my Assessors in case there is anything further to be raised. I will let you know whether we can do that before lunch or whether we have to wait until 2 o'clock.

(12.53 pm)

(The Inquiry adjourned until 10.00 am on Thursday, 11 May 2023)

INDEX

1

2