94587

R. Peyster

STATE OF MICHIGAN

IN THE CIRCUIT COURT

FOR THE COUNTY OF MACOMB

GEORGE NOTEBOOM, as Guardian of CAROLYN R. NOTEBOOM, a Legally Incapacitated Person, and GEORGE NOTEBOOM, Individually	:	NO. 91-5352-NH
	:	Honorable Raymond Cashen
vs.	:	
SISTERS OF CHARITY; ST. JOSEPH HOSPITAL OF MT. CLEMENS, MICHIGAN, f/k/a ST. JOSEPH HOSPITAL OF MT. CLEMENS, MICHIGAN, a Michigan corporation; CHOON SOO RIM, M.D., and HAROLD C. PAPSON, M.D.,; PROFESSIONAL X-RAY CENTER, P.C., a Michigan Corp.; HARPER HOSPITAL, a nonprofit Michigan Corp. and ROBERT E.M. HO, M.D., Jointly and Severally	:	

Wynnewood, PA, February 24, 1993

2124

FOSTER
COURT REPORTING SERVICE, INC.
1800 Architects Bldg. - 117 S. 17th St.
Philadelphia, PA 19103
(215) 567-2670

Pretrial Examination of ROBERT G. PEYSTER, M.D., held at the residence of Robert G. Peyster, M.D., 922 Bowman Avenue, at 8:00 p.m. on the above date before Patricia T. Randall, a Registered Professional Reporter and Notary Public of the Commonwealth of Pennsylvania.

APPEARANCES:

CROWLEY, OLSMAN, NOLAN & BERMAN
BY: JULES B. OLSMAN, ESQ.
(315 S. Woodward Avenue
Suite 200
Royal Oak, MI 48067)
Attorneys for Plaintiff

KITCH, SAURBIER, DRUTCHAS, WAGNER & KENNEY, P.C.
BY: STEVE N. CHEOLAS, ESQ.
(10 S. Gratiot, Suite 301
Town Square Development
Mount Clemens, MI 48043)
Attorneys for Defendant
St. Joseph Hospital

APPEARANCES (Continued):

SCHUREMAN, FRAKES, GLASS
& WULFMEIER
BY: CHERYL L. CHANDLER, ESQ.
(440 E. Congress, 4th Floor
Detroit, MI 48226)
Attorneys for Defendant
Harold C. Papson, M.D.

FEIKENS, FOSTER & VANDER MALE
BY: BRUCE A. VANDE VUSSE, ESQ.
(One Detroit Center
500 Woodward Avenue
Suite 3400
Detroit, MI 48226)
Attorneys for Defendant
Choon Soo Rim, M.D.

PLUNKETT & COONEY
BY: NICHOLAS CORDEN, ESQ.
(900 Marquette Building
Detroit, MI 48226)
Attorneys for Defendant
Harper Hospital and
Robert E.M. Ho, M.D.

INDEX

(Pyster Exhibit No. 1 marked for identification.)

MS. CHANDLER: Let the record reflect this is the discovery deposition of Dr. Peyster taken pursuant to notice and to be used for discovery purposes only.

(It was stipulated by and among counsel that sealing and certification be waived; and that all objections, except as to the form of the question, be reserved until the time of trial.)

BY MS. CHANDLER:

Q. Your full name for the record, please.

A. Robert G. Peyster.

Q. Dr. Peyster, my name is Cheryl Chandler. I represent Dr. Papson.

I am looking at a copy of your CV. Can you tell me whether or not this is current?

A. It's at least very close to the newest edition. There could be one more presentation, but I'm not sure.

Q. Can you tell me off the top of your head how many of these articles or your publications have to do with the subject matter of this lawsuit?

A. I couldn't tell you off the top of my head.

Q. Is it a subject matter you've written about, CT scanning of the brain?

A. Yes. I've written many articles about CT scanning of the brain.

Q. Specifically CT scanning in relationship to subarachnoid hemorrhage?

A. I don't know the answer. I would have to review it. I don't think. That hasn't been a major category of research, no.

I can't tell you, though, that it's not included in some of the case reports. It is certainly included in the article I wrote on CT and head trauma, but that was a different cause of subarachoid hemorrhage.

Q. Have you written specifically about CT scanning and anterior communicating artery aneurysms?

A. No. I take that back.

Q. Do you want to look at this?

A. Well, yes. I have in a sense -- the main thing that I've done regarding the topic of this deposition would be an exhibit that I was presented at the American Roentgen & Ray Society meeting. I'll give you the citation in a moment.

Let's start with a case report just because I got to that first. I wrote a case report entitled CT Visualization of Ruptured Berry Aneurysms within Hematoma, the Flip Flop Sign.

MR. VANDE VUSSE: What item number is that on the CV?

THE WITNESS: It's Item No. 32.

A. (Continued) What I am trying to locate is a citation for an exhibit that I did on CT scanning of aneurysms.

Q. Is that the title of it?

A. Basically. I'll give you the exact title in a moment.

The title was CT Visualization of Ruptured Nongiant Berry Aneurysms, and that was presented at the Radiologic Society of North America meeting in November of 1985. I believe that was also presented in Boston at the American Roentgen & Ray Society.

MR. VANDE VUSSE: What item is that on the CV?

THE WITNESS: 43, and also No. 40.

A. (Continued) That was presented at the American Society of Neuroradiology in New Orleans, the same exhibit, CT Visualization of Ruptured Nongiant Berry Aneurysms.

Q. Is that something that is published and I could go in a library and find if I wanted?

A. No. These were exhibits. The article citation was published. These you would not be able to find.

The abstracts would probably be there; but the exhibits themselves, there are too many images for the paper. It makes up four panels of exhibits. I still have it. In fact, I saw pictures of the exhibits today.

Q. So you have them? If I wanted to get them, I could ask Mr. Olsman for them?

A. Yes. The pictures are kind of small, but you could see them.

Q. Any other things on your CV directly related to the issues in this case?

A. Well, aneurysms, two presentations, two exhibits. Again, one is called High Resolution Intravenous Digital Subtraction Angiography of Intracranial Vascular Lesions, many of which were aneurysms.

Q. Which number is that?

A. That's No. 38. And also that was at the American Society of Neuroradiology meeting, and there was another presentation of that at the

ARRS also.

But there is also No. 41 for the other exhibit which was also presented at the American Roentgen & Ray Society in Boston.

So the CT Visualization of Aneurysms was presented in Chicago, Boston and New Orleans, and the other one I think was presented in two of those three. It's in here somewhere. I wouldn't say whether that's all or not without looking through.

See, I wrote a book entitled CT and Orbital Disease and Neuro-Ophthalmology, and that also includes CT of aneurysms. I mean, aneurysms are among the things that were included in that material.

I have given numerous presentations on CT scanning and neuro-ophthalmology that included discussion of giant aneurysms pressing on the optic pathways.

Q. None of those deal with anterior communicating artery aneurysms?

A. Yes. Some of those --
Q. Some of them would?
A. Some of those would.
I think that's about it.
Q. How many people in your department are neuroradiologists?
A. There are three staff neuroradiologists and one fellow.
Q. So yourself and four others?
A. Yes; myself and two other staff and then one fellow. We have been at four staff at one or two different times.
Q. What percentage of your time is spent actually interpreting films, professional time?
A. 80%.
Q. When was the last subarachnoid hemorrhage you diagnosed?
A. Today.
Q. How many do you see a year?
A. Any type of subarachnoid hemorrhage?
Q. Yes.
A. 100.

Q. Per year, you say?

A. Yes; a rough figure.

Q. Neuroradiology is a specialty or subspecialty of radiology?

A. Yes.

Q. And you have different -- are there Boards on neuroradiology?

A. Not yet. Next year or the year after.

Q. But there is an additional fellowship above and beyond your radiology training for neuroradiology?

A. Correct.

Q. Do you consider that as a neuroradiologist you are more specialized than a radiologist in interpreting CT scans?

A. The term "more specialized" is what I'm having trouble with.

I'm definitely more specialized than a general radiologist in that I only do neuroradiology, so therefore I'm more specialized.

Q. Do you believe that general radiologists can interpret CT's of the

skull or the brain as well as you, or do you believe that neuroradiologists have a different standard?

MR. OLSMAN: I'm going to interpose an objection on the basis of relevance.

Dr. Papson has already testified that he was qualified to interpret CT films of the brain and I believe also testified that he believed he was as qualified as a neuroradiologist to do so.

So to the extent that you're trying to suggest that Dr. Peyster is better trained or more skilled than Dr. Papson, Dr. Papson has already testified that he was qualified to interpret the film taken on April 3, 1990.

Q. (Continued) Do you remember my question?

A. I remember your question.

Q. Go ahead.

A. No. I don't believe that general radiologists can read these films

to my level.

That's a general statement. That doesn't mean that there aren't one or two people in the country that will be an exception to that. I just don't know them.

Q. Do you believe that there is a standard of care that's different for a general radiologist to interpret a CT scan as opposed to yourself who is a neuroradiologist?

A. No.

Q. Why not?

A. Well, the ultimate standard is good medicine. Good medicine is getting the right answer. Whatever skill or training required to get the right answer should be the standard of care.

For example, I am legally able to do cardiac surgery. My medical license enables me to do that. I would consider it very foolish for me to do that despite the fact that I had a one-year surgical internship. Because I went to the same medical school as the

cardiac surgeons; I just didn't do the additional training that they did to become very good at that.

So for the same reason, the reason that the subspecialty of neuroradiology developed and has flourished is because it's an area of radiology that is found to be very difficult for residents to develop expertise in during a standard radiology residency, and if it were otherwise no one would want to commit an additional two years to do something that they thought they learned during the first three years.

(Discussion off the record.)

BY MS. CHANDLER:

Q. Do you have criticisms in this case of Dr. Papson for reading these films?

A. Yes.

Q. What, criticisms of the fact that he is a general radiologist and read them? That's what I meant.

A. No. I mean, that's not an

issue.

Q. You're not saying that he should have called in a neuroradiologist to read the films?

A. It's an interesting question that I haven't considered in light of -- I don't think that that's something that he would have necessarily had the ability to do.

Q. So that's not going to be one of your criticisms of him today; that he as a general radiologist should not have been interpreting these films in the first place?

A. No. I can't really criticize him -- had he gotten the case right we wouldn't have been here, and I would have no criticism whatsoever.

So I think it's really just -- you know, I really can only speak to this particular case.

Q. Do you believe you're familiar with the standards of a general radiologist for interpreting these films?

MR. OLSMAN: I'm going to place the same objection on the record.

Dr. Papson has already testified, Ms. Chandler, that he was qualified to interpret the CT film that was taken of Carolyn Noteboom on April 3, 1990.

Dr. Papson has never suggested that he was held to a lower standard of care than a neuroradiologist or any other type of radiologist in reading the films. It's not an issue in this case. He's already said that.

Q. (Continued) Do you believe you're familiar with the standard of care for a general radiologist in interpreting these films?

A. Yes.

Q. Why?

A. Well, for two reasons. No. 1, they have the same standard of care.

Second of all, I have not only taught residents for 13 years in Philadelphia and then also while I was at

Harvard, but I have also had the opportunity to teach general radiologists in the community how to read head CT scans. I did that for many years on a regular weekly basis, and am therefore familiar with what they were able to learn and how much they learned and how much they knew.

Q. You said you've been teaching for 13 years in Philadelphia.

Do you teach neuroradiology fellows, or do you also teach general radiologists?

A. I teach radiology residents, neuroradiology fellows, neurology residents, orthopedic residents, ophthalmology residents.

I think that I skipped one in there. Neurosurgery, neurology, ophthalmology, orthopedics, in terms of more concentrated teaching, and then also I interact with residents in general medicine - general surgery and almost every other area of medicine.

Q. They rotate through your

service for a short period of time to get neuroradiology training?

A. The neurology residents and the neurosurgery residents do. The orthopedic residents have in the past spent time regarding teaching them spine and myelography. The other residents, the interaction is on a case per case basis or at conferences, grand round presentations, but on a more limited basis.

Q. Did you author an opinion letter in this case?

A. No.

Q. My understanding is your first contact with this case was through Dr. Winkleman who is a colleague of yours at the hospital.

A. Yes.

Q. He came to you and asked you to review some films; correct?

A. Yes.

Q. When he came to you and asked you to review the films, did he say to you "This is how I read the films.

Do you agree with me?" and did he tell you his interpretation first?

A. No. He told me nothing.

Q. He didn't tell you anything about the facts of the case? So you saw it blind?

A. He asked me to review the films and tell him what I saw.

Q. Did you after that then have a conversation with Mr. Olsman?

A. Yes.

Q. Dr. Winkleman made the initial contact and then he put you in touch with Mr. Olsman; correct?

A. Dr. Winkleman first asked me if I would be willing to look at a case. I have a recollection of looking at the films with Mr. Olsman and Dr. Winkleman.

Now, the only thing I can't tell you was whether it was just Dr. Winkleman and myself the first time I saw these or if it was Mr. Olsman and Dr. Winkleman.

I think it was Dr. Winkleman. I think with Mr. Olsman

was at a subsequent meeting with Dr. Winkleman. It was probably a month or two later. So I guess it was just Dr. Winkleman and myself the first time.

Q. Did you ever receive any written material about the case, medical records or anything like that?

A. Yes.

Q. What have you reviewed besides the films?

A. I have what probably is a complete set of medical records, and I've reviewed depositions of lots of people: Drs. Papson, Sauter, Craig Karsama; Dr. Paul, Dr. Rim, Dr. Ho.

I think that's the depositions that I reviewed.

Q. What else have you reviewed?

A. Just the medical records and those depositions.

Q. Have you been provided with summaries of any other depositions?

A. Yes.

Q. Which ones?

A. All of the depositions --

I believe all of the depositions had a summary with them.

Q. And you looked at them to prepare you to formulate your opinions and you looked at these summaries along with the depositions?

MR. OLSMAN: Which question do you want answered?

A. I read both the depositions and the summaries.

Q. Did you get a written summary without a deposition of Dr. Winkleman's testimony on Saturday?

A. No.

Q. Did Mr. Olsman tell you what Dr. Winkleman said?

MR. OLSMAN: I wasn't there.

A. No.

Q. Did Mr. Olsman tell you what he believes Dr. Winkleman said?

A. No.

Q. You know nothing of what Dr. Winkleman's testimony was on Saturday?

A. I know a little bit of what

Dr. Winkleman's testimony was from Dr. Winkleman.

Q. You've talked to him since the deposition?

A. I had about a five-minute conversation with him today outside the cafeteria.

Q. What did you talk about?

A. He said he went to Detroit to be deposed. He said that he stated his opinion that a lumbar puncture was indicated, and he said that he reviewed the films and saw subarachnoid hemorrhage.

Q. On the 4/3 films?

A. On the 4/3 films. I think that was the sum and substance of the . . . .

Q. Have you learned through any source what Dr. Hussey said on Monday?

A. Mr. Olsman discussed maybe one or two points that Dr. Hussey discussed, but we didn't discuss it in detail.

Q. What were the two points?

A. Some comment regarding menopause and migraine headache, and I am trying to think if it was -- I think he said that Dr. Hussey said he didn't see any hemorrhage on the films. I think that was . . . .

Q. On 4/3; right?

A. Yes.

Q. Anything else?

A. That's all I can recall.

Q. Did you do any literature search about this subject matter?

A. No.

Q. Have you reviewed enough to render opinions?

MR. OLSMAN: What?

MS. CHANDLER: Enough to render opinions in this case.

MR. OLSMAN: Reviewed enough what?

MS. CHANDLER: Material.

Q. (Continued) Have you reviewed enough so you feel comfortable giving your opinions?

A. Yes.

Q. Have you asked for any information that you haven't been provided?

A. Not that I can recall.

Q. Once you did speak with Mr. Olsman what did he ask you to do? Did he ask you just to look at the films and give an opinion on the interpretation of the films, or did he ask you to comment on any other aspect of the case?

A. Today or --

Q. At any point in time.

A. We have discussed almost all points of this case regarding both the films, the general practice of lumbar puncture, regarding diagnosis of subarachnoid hemorrhage and when it should be applied.

So we've actually spent -- we've discussed most of the aspects that would apply to this case at one time or another. We had a rather lengthy meeting sometime ago with Dr. Winkleman.

Q. Do you intend to give opinions about people or physicians in

this case other than Dr. Papson today?

MR. OLSMAN: No.

MS. CHANDLER: I wasn't asking you.

MR. OLSMAN: I'm just telling you for the record. Dr. Pyster has been asked specifically to discuss the CT films and Dr. Papson, period.

MS. CHANDLER: The 4/3 films?

MR. OLSMAN: And the 4/19 films --

MS. CHANDLER: In comparison.

MR. OLSMAN: -- to the extent they may bear on it, but Dr. Peyster is a neuroradiologist and he's been asked and has agreed to comment on the films and on the interpretations of the films on 4/3.

Anything else is good conversation.

MS. CHANDLER: All right. That's what I wanted to know.

Q. (Continued) When was the first medical malpractice case you

reviewed?

MR. OLSMAN: I'm sorry. When?

MS. CHANDLER: When was the first medical malpractice case he reviewed?

MR. OLSMAN: You mean when did the first medical malpractice case he reviewed occur in terms of the malpractice?

A. As an expert?

Q. Yes; as an expert. When did you first review --

A. A medical malpractice case as an expert?

Q. As an expert.

A. 1980 or '81.

Q. How did you get involved in this type of work?

A. That particular case came to me because the lawyer's brother was a radiologist in Philadelphia that knew me by reputation and suggested that he look me up.

Q. This was for a defendant

then?

A. This first case was for a plaintiff.

Q. How many cases per year do you review? Not necessarily testify, but just review. And I'm only talking about medical malpractice.

A. Medical malpractice is a very small part of my medical/legal experience. I would say I've probably reviewed 10 or 12 malpractice cases a year. Something like that. Maybe it's 15 - 10.

Q. What percentage of those over the years have been for plaintiff?

A. 20.

Q. 20% for plaintiff?

A. Yes. Maybe less. It's at least 80% defense, but put 20/80 and that would be on the side.

Q. Have you ever reviewed for a Michigan law firm before?

A. Yes.

Q. Who have you reviewed for?

A. Stern and Stern. I think

that's Ken Stern and Elliot Stern.

Q. How do you know them? Did they know you some other way?

A. I don't know how they found me. As I recall, I believe Ken Stern went to a legal meeting somewhere and told somebody that he needed a neuroradiologist.

Q. And your name popped up?

A. I think so.

Q. Anybody else in Michigan that you've reviewed for?

A. Not that I'm aware of.

Q. What other states have you reviewed cases for?

A. Plaintiff and defense?

Q. Yes; both.

A. West Virginia, New Jersey, Pennsylvania, New York, Massachusetts, Texas, Florida, South Carolina and Washington.

Q. The cases from Pennsylvania, what percentage are plaintiff and what percentage are defendant?

A. In Pennsylvania for

malpractice I've probably only looked at two or three for plaintiff.

Q. Is there any reason why that is a small number?

A. I prefer not to get involved in in-state malpractice for plaintiff unless it's -- I will look at it to advise a lawyer whether he has a case or not or whether he should drop it. I will do that, but I won't make any promises about whether I will be an expert or get involved any further.

Q. You would just prefer not to testify against your colleagues here in the state?

A. Yes. I would prefer not to testify. I have done so on cases that I've reviewed with no commitment and found the errors to be of a magnitude that I found intolerable, and there have been just two or three cases such as that.

Q. What is your charge for review?

A. For review?

Q. Yes.

A. I charge $400 an hour for time. I charge $125 for each radiologic examination included in the review.

Q. Explain to me how that works.

Say if you look at films for an hour you charge $400, and then if there are ten films you charge an additional $125 a film?

A. Ten studies, not per sheet of film. In other words, they're two separate issues.

The $400 an hour goes to preparation of a report, review of written materials, but I don't charge time for review of exams. I do that simply based on the study, just like real life.

You know, when I read a study Blue Cross/Blue Shield doesn't care how long it takes me. It's just so many dollars for reviewing the studies, so that's the same way I do it for the lawyers.

Q. When you say "study," each one of these cuts, is that a study? So it's $125 for each cut, or is it $125 for this film, this whole page of film?

A. Neither.

Q. What is it?

A. $125 for -- let's see. What do we have here?

Yes. This is a study. These 12 slices here all occurred on the same date in the same city. That's the definition of a "study." If the patient came back later in the day and had another reason to have it done again, that would be another study. Normally they're on different days.

Q. Then what is your charge for depositions?

A. Depositions are charged at $500 an hour with a minimum of two hours, and any part of any hour thereafter is an additional $500 beyond the two hours.

Q. So if I do two hours and 15 minutes, it's going to be --

A. $1,500.

Q. And it's a thousand dollars even if I only go for an hour tonight?

A. Yes.

Q. What is your charge for trial?

A. $5,000 a day plus expenses.

Q. What if you don't have to come to the city? In other words, if we come here and do a videotape deposition, is it still the same?

A. Same price as tonight. A deposition is a deposition.

Q. Are you willing to come to Detroit and testify in this case?

A. Yes.

Q. Have you ever come to Detroit to testify?

A. No.

Q. Do you request any money upfront?

A. Always.

Q. What is your upfront charge?

A. For what?

Q. For review.

A. Normally if I have a

discussion with the attorney in regard to the magnitude of what the materials I am being asked to review, I will base it on what he tells me. You know, if records are 3 inches thick and there are 12 exams, the maximum I ask for upfront is $1,500.

The usual range is between 1,000 and 1,500 upfront. Most malpractice cases I ask for 1,500 upfront because of the fact that there always seems to be telephone calls and things missing, and by the time I get done it always comes to something like that.

Q. And then for trial what do you expect upfront?

A. Everything.

Q. All of it upfront, the $5,000?

A. Yes.

Q. Are you listed with any witness procurement groups?

A. No.

Q. Do you know what I mean by that?

A. Yes.

Q. Do you advertise?

A. No.

Q. Have you ever been sued for malpractice?

A. Once.

Q. What did it involve, briefly? Failure to what, diagnose?

A. No, it wasn't a failure to diagnose. It was a procedure that resulted in a stroke that I didn't do.

Q. What happened to the case?

A. It was thrown out.

Q. Without any payment?

A. Without any payment.

Q. Did you ever lose your license?

A. No.

Q. Has it ever been suspended?

A. No.

Q. How many hours have you spent looking at this case?

A. I couldn't answer that.

Q. You said you had a long meeting with Mr. Olsman at one point.

A. Yes.

Q. And Dr. Winkleman?

A. Yes.

Q. Was that separate and distinct from the time you think that the three of you looked at the films together?

A. No; that was the time -- that's the only time that I met Mr. Olsman other than tonight.

Q. When you say a "lengthy meeting," what do you mean?

A. It was at least a couple of hours. It's hard to tell because we had dinner, so it was . . . .

Q. Did you ask anybody else to look at the films once you looked at them?

A. Not that I recall.

Q. Do you believe within the field of neuroradiology that there is going to be a variance of opinions by some of your colleagues?

For instance, if you were to show this set of films to a roomful of

neuroradiologists, do you believe that they would all agree with your opinions in the case, or do you believe that there would be some disagreement?

MR. OLSMAN: Well, before you answer the question I'm going to interpose an objection.

You are asking Dr. Peyster now to speculate on what an unknown group of individuals would say about these films. Is that what you're asking him?

MS. CHANDLER: Not in so many words.

MR. OLSMAN: I'm going to object to the question on the basis I'm not sure exactly what it is that you're asking.

Q. (Continued) Do you understand the question?

A. I believe so.

Q. Can you answer it?

A. I am going to answer it in the following fashion: I am reasonably certain that my two colleagues would come to the same findings that I would have on

this film.

I really can't speak about neuroradiologists that I don't know their level of competence. I would say that any competent neuroradiologist would come to the same findings, but I can't say that everybody in the world would come to the same findings.

Q. Because there often is disagreement among individuals in your profession as to the interpretation of films? Isn't that something that happens in medicine all the time?

A. Well, I would say that the more common issue of disagreement would be in terms of a differential diagnosis.

In other words, in general that's more common. In other words, there are a number of areas. It's much less common that we would have disagreement on the presence or absence of a finding, but the diagnosis related to that finding is more subject to discussion.

For example, a round lesion

in the brain with a hollow center could be an abscess, could be a metastatic lesion, could be a primary brain tumor, and for different reasons one of us might chose one of those over the other, but it's much less common that one of us see something and the other one doesn't see it. Even when that happens, on the rare occasions that that happens on review, the person who didn't see it usually says, "I blew it."

Q. You deal with neurosurgeons in your practice, do you not?

A. Yes.

Q. And they also look at CT scans of the brain and interpret them, do they not?

A. No.

Q. They do not?

A. They do not interpret them.

Q. Are you not aware of neurosurgeons who say that they are competent to interpret CAT scans?

A. Have I met neurosurgeons who say that they are competent to

interpret? I have met neurosurgeons who say that they are competent to read CAT scans, yes.

Q. You read Dr. Paul's deposition, didn't you?

A. I read Dr. Paul's deposition.

Q. And you're aware that he doesn't see anything on these films?

A. I'm aware of that.

Q. Do you think he was wrong?

A. Yes.

Q. So you think his opinion is dead wrong on that issue?

A. In terms of interpreting the films, yes.

Neurosurgeons do not interpret CAT scans. It's not their job. They don't get paid to do it. They have a varying degree of skill. The majority of them will see big things. I would expect not more than 1% of neurosurgeons to be able to make this finding.

Q. Didn't Dr. Paul give the opinion that he felt competent to read

these films?

A. Many neurosurgeons say that.

Q. So you're just saying it's your opinion that they are not?

A. Yes. I've worked with many of them and some of them have been outstanding neurosurgeons at Harvard, and I do not respect their ability to read the films, although several of them respect their own abilities, but they still come down to us to go over them.

Q. So you disagree with Dr. Paul's testimony and you also disagree with him that he's competent to read those films?

A. He is definitely not competent to read this film.

Q. Because he read it differently than you or because he's not competent because he's a neurosurgeon?

A. No; because he misread this particular exam. That doesn't mean he wouldn't be able to look at something else and come to the right diagnosis.

I don't know him personally,

so I really don't know anything about his abilities either as a neurosurgeon.

Q. So in this particular case anyone who doesn't read the films as you have read them misreads them in your opinion? There is no room for a gray area or there is no room for another interpretation of these films in your opinion?

A. Yes.

Q. And if there are other neuroradiologists in this case who testify contrary to your opinion, then it's going to be your opinion that they're wrong?

A. Yes.

Q. When you say "wrong," does that mean violating the standard of care, or are you still just critical that the films aren't read as you read them?

MR. OLSMAN: Which question do you want answered?

MS. CHANDLER: I thought it was only one.

MR. OLSMAN: It sounded like

two to me.

Q. (Continued) Do you understand?

A. Well, let me answer the best that I can.

The only person that could violate the standard of care is Dr. Papson because he's the only one who is taking care of the patient in doing so.

Q. You missed the point of my question. What I'm trying to find out from you is you said -- I assume we're here because you think Dr. Papson misread these films.

My question to you is: You've used the word "wrong," and I'm trying to understand what that means.

Do you believe that Dr. Papson violated the standard of care because of the way he read the films, or are you just critical because he read them wrong?

A. Well, now we have to get into

the fact that standard of care is a legal concept, diagnosis is a medical issue, so it comes down to how does law impinge on medicine. In other words, is a bad result a breach of standard of care?

So it puts an expert witness in a difficult predicament because the definition of standard of care -- I mean, to me a radiologist looking at these films for a living should make the diagnosis of subarachnoid hemorrhage. In not doing so it puts the patient at great risk for permanent problems, and that's my view of this case.

Now, as far as the legal issue, I have to say that the standard of care that I would hold myself to would be to make the right diagnosis in the case. If I were in Dr. Papson's shoes and I was being sued for this case, I would have to say to the insurance company, "I blew it. Settle."

Q. You indicated to me a little while ago that you were familiar with the standard of care in terms of interpreting

CT scans; correct?

A. Yes.

Q. So my question to you is: Are you prepared to say today that Dr. Papson violated that standard of care in the way that he read the films, or are you of the opinion that what Dr. Papson did was wrong and possibly unfortunate for the patient but you're not willing to go as far to say that he actually violated the standard of care?

MR. OLSMAN: Can you be more specific? I mean, you're asking him a very vague question. Dr. Papson provided a written report about a CT film that he read on 4/3/1990.

MS. CHANDLER: Yes; but I assume that he thinks that report is inaccurate.

THE WITNESS: Correct.

Q. (Continued) So my question to you is: Are you prepared to say that he violated the standard of care in the way that he wrote that report and interpreted the CT scan, or is it merely

your opinion that he was wrong and it was unfortunate for the patient?

A. All right. I'm going to elaborate on my previous answer because it brings in an additional issue.

Now, personally I think being wrong is a violation of the standard of care because I think being right is the standard of care. That's my view.

Q. That's for you?

A. That's my view of medicine.

Now, there is an additional issue here that we haven't discussed but I'll bring it up now, and that is that the protocol for the CT scan that was employed at St. Joseph Hospital is below the standard of care, and the radiologist is responsible for the protocol or the manner in which the CT scan is performed.

See, the radiologist does not push the buttons, but he tells the technologist how the study is to be done.

The study of the head as

conducted employed 10-millimeter thick sections through the head resulting in 12 slices on, I believe, 4/3 and probably the same number -- that says Scan 12, that says Scan 2. There are 12 here and there are 11 here.

The standard of care in 1990 and probably after, in my opinion, 1983 is to perform 5-millimeter thick sections through the lower parts of the brain: the posterior fossa through the level of the circle of Willis.

Q. From where?

A. From the foramen magnum, which is the lowest part where the brain goes through the circle of Willis, basically to the level of the frontal horns of the lateral ventricles, and then 10-millimeter thick slices above that.

The reason that that has become the widely and, to my knowledge, almost universally used -- I don't know a single university that does not employ that protocol, and I also am not involved or haven't reviewed cases at private

hospitals that I've been associated with that don't use that protocol.

The reason is two fold. No. 1, streak artifacts from the bony skull base are amplified on the thicker slices so that information in the posterior fossa and in the inferior temporal regions and in the inferior frontal regions are very limited on the thick slice exams.

Q. When you say "thick slice," you mean 10 millimeter?

A. 10 millimeter. That's the most common of the thick slice. I mean, basic common slices are 3, 5 and 10. Occasional machines use 8 and 12 from other countries, but . . . .

Now, another important issue in slice thickness is partial volume averaging, and partial volume averaging results from the loss of contrast of an area of pathology because it is a small lesion that is not vastly different than brain tissue or surrounding tissue. You could lose the definition or the

contrast resolution of that lesion entirely by employing thick slices.

I will give you an example. You use a 10-millimeter thick slice and let's say you have a 4-millimeter thick or 3-millimeter thick tumor, nodule. The slices are more or less luck of the draw where they occur, so it is therefore very possible to take your 3- or 4-millimeter thick tumor and put half of it on one slice and half of it on the other. Just cut it in two, so let's make it 4-millimeters thick.

Now we have 2 millimeters of the tumor in one 10-millimeter thick slice and 2 millimeters of it in the next 10-millimeter thick slice, so therefore the tumor only represents one fifth of the height of that slice, so the rest of that slice we can now presume is normal brain tissue or normal tissue in the area.

If that tumor was only a little bit abnormal in density or color as you might look at the films, that's

going to be diluted by a factor of four to one, and therefore it becomes invisible. So we can totally erase pathology by using thick slices.

So smaller things tend to occur in the posterior fossa, and in particular the whole issue of subarachnoid hemorrhage, which to me is of paramount importance -- we examine many, many people for headaches and it's something we never want to miss, so for that reason we normally employ -- when I say "normally," I mean always -- 5-millimeter thick slices through that area.

Q. You talked about a university standard and that's what happens in the universities.

Are you implying that it's not the same in the private hospitals, the private community hospitals?

A. I would say it may not be as uniform, but I would say that of the ones that I'm familiar with around here I don't know anybody in 1990 that is

doing 10-millimeter thick slices through the whole brain. I'm sure there are other people. I'm sure they're not the only ones, but I would say that they are in the distinct minority and therefore fall below the standard of care.

See, it's cheaper to do it this way. There is less wear and tear on the tube. Because we average 17 or 18 slices per average head case, so that's six extra slices and that's six extra exposures on the tube. It means we go over to a second sheet of film. That's another few dollars, and the patient has to stay on the table longer. So this is more cost effective.

Q. "This" meaning 10 millimeter?

A. 10-millimeter thick slices, yes. It's more cost effective, but it is not a viable alternative in my opinion.

Q. However, the discussion seems to be rather academic because even with the 10-millimeter slices on these films you were able to find something, so it doesn't matter in this case that there

were 10-millimeter slices according to you because you see something there?

A. It did matter in the sense that if there were 5-millimeter thick slices, the finding would appear on at least two of those slices and possibly three, and the contrast between the hemorrhage and the surrounding brain tissue would not be nearly as diluted and would have been far more obvious such that I don't think that Dr. Papson would have had trouble seeing it either.

Q. So if 5-millimeter slices had been used, you would have seen what, two what?

A. Well, hemorrhage is present on one 10-millimeter thick slice here.

Q. What number?

A. Scan No. 5. It says "Scan 5" in the right and the upper left-hand corner.

MR. CHEOLAS: Is that directly under scan what number?

THE WITNESS: Scan No. 5. Each picture is numbered.

MR. CHEOLAS: Scan No. 5 is under which number scan?

THE WITNESS: That's Scan No. 2, this is No. 3, this is No. 4 and this is No. 5.

MR. CHEOLAS: Okay.

THE WITNESS: It's unique. There is only one picture that has "Scan No. 5" written on it.

A. (Continued) So if blood is present on one 10-millimeter thick slice, there is no question that it would be present on at least two 5-millimeter thick slices. So the same finding would occur on more than one slice, and that makes it much easier when you see something on more than one slice. You have twice as much chance of seeing it.

But it's not only the fact that you've now doubled the number of slices it's on; you have purified the density issue. You have increased the contrast of the blood because the subarachnoid space is -- the height of

the subarachnoid space is not the full thickness of this slice. So the slice is 10-millimeters thick, but the subarachnoid space may not run for that entire 10-millimeters thick.

So therefore let's just say arbitrarily that maybe the subarachnoid space in which the blood is contained was only 5 millimeters out of a 10-millimeter thick slice. You have reduced the contrast of the blood by a factor of two.

So although it stands out to my eyes as is, it obviously didn't stand out to Dr. Papson's eyes. But if it was on twice as many slices and it was even whiter than it is here, he would have had a far better chance of seeing it.

Q. So you're saying that the protocol used at this particular hospital in your opinion was below the standard --

A. Yes.

Q. -- for a community hospital in 1990?

A. Yes.

Q. All of that last discussion came about because I had asked you the question of whether or not you felt that Dr. Papson violated the standard of care as opposed to just being wrong in his interpretation, and I still don't have an answer to that question.

Can you answer it?

A. Yes. He violated the standard of care.

Q. Who at your hospital makes a decision on what size slice is to be used? Is there a written protocol that you've just discussed with me? Is there a protocol that says what you just told me?

A. Yes.

Q. And who makes that decision as to what the protocol would be?

A. The head? Me.

Q. Because you're in charge?

A. Yes.

We do in cases alter that to even thinner slices. We sometimes use 1.5 or 3-millimeter thick slices

depending on if we're looking for something even -- the pituitary gland, for example, we study with 1.5 millimeter thick slices.

Q. But the original starting point is the 5 centimeter?

A. That's the minimum.

Q. That's where you start?

A. Right.

In other words, it never gets any thicker than that; it only gets thinner from there.

Q. If you have a patient whose only complaint is headache at 52 years of age, is that where you would start?

MR. OLSMAN: Are you referring to Mrs. Noteboom?

MS. CHANDLER: No. I'm referring in general, a hypothetical patient.

A. Yes. That would be where we would start.

Q. Would you agree with me that subarachnoid hemorrhages in the brain often are not seen on CT scans at the

early stages even at the smaller slices?

A. I would say we see between 92 and 98 percent of subarachnoid hemorrhages. 92% has been published, but that was published -- that was probably back in the '83 - '84 era.

CT scanners have become better since then, and I would say that we're probably -- I would feel comfortable in saying that we see at least 95% of subarachnoid hemorrhages at this time.

Basically it requires approximately a hundred thousand red blood cells per square millimeter to --

Q. 100,000?

A. That's a figure that I remember seeing. I mean, it's not something that is really important to my everyday work, but I remember seeing a figure of a hundred thousand red blood cells per cubic millimeter -- I think somebody did this with test tubes -- to raise the density to the point where it would be visible.

Q. On a 5-millimeter cut or a 10-millimeter cut?

A. No; on CT.

Q. Just a regular CT?

A. Yes.

When you're scanning test tubes, it's not really an issue because you would have this volume in the whole height of the slice.

Q. Do you agree with the statement that there is a high correlation between a negative CT scan and no symptoms in a patient that had a subarachnoid hemorrhage?

A. I think the answer is no, but let me -- we don't do CT scans on patients with no symptoms, ever.

Q. I'm sorry. No neurological symptoms. Say the patient just has a headache but no other neurological symptom.

A. A headache is a neurological symptom.

Q. Take a patient just with a headache.

A. Do we want to use the word "sign", "physical finding"?

Q. Okay.

A. The majority of patients with subarachnoid hemorrhage have no physical diagnostic finding. I mean, some of them are comatose, in which case you really can't do an exam.

The lower grade hemorrhages -- by definition, Grade 1 and Grade 2 hemorrhages -- have no neurological deficit. They just are lethargic and varying degrees of sleepy, and once they have a neurologic finding they're kicked into a higher grade of the Glasgow scale.

So I would say that the majority of people that we see for angiography are Grade 1's and Grade 2's, and they don't have neurologic findings.

Q. But you're saying that you believe CT scans are 92 to 98 percent accurate in picking up a subarachnoid hemorrhage?

A. Yes. I couldn't tell you

which one of those.

Q. I gave you a range.

A. Right. So if we take a 95 number we're probably okay.

Q. At no matter what stage of the hemorrhage we're talking about? In other words, no matter how close in time we are to the actual hemorrhage?

A. Well, I'm going to take a moment to clarify something that confused me in the depositions that I read, because the impression that I got from reading these depositions -- and I can't remember who posed the question -- was that the point was raised that it might be hard to see these hemorrhages early, and in fact it's quite the contrary.

The best time to see a subarachnoid hemorrhage is within five seconds of the subarachnoid hemorrhage and the chances of seeing it go down from then on. So the first 24 hours is the highest percentage. If you wait 72 hours, you will not see more than 5% of subarachnoid hemorrhages on CT. After

72 hours the blood washes away.

In the massive hemorrhages some will still be there, but in the minor hemorrhages the blood is gone within three days. Subarachnoid hemorrhage clears very rapidly. It gets reabsorbed. It goes away. It vanishes.

Q. So if someone has a subarachnoid hemorrhage and is unfortunate enough to get to a CT scanner in 72 hours after, they might have a negative scan?

A. They will almost certainly have a negative scan 72 hours after.

Q. So you wouldn't know that there had been a subarachnoid hemorrhage?

A. They have to have a lumbar puncture. You would still do the CT on the chance that you might see it, but almost all of those patients are going to wind up with lumbar punctures.

Q. Based on what you see on these films can you tell when you believe the subarachnoid hemorrhage took place?

MR. OLSMAN: Just from

looking at the films without knowing the time?

MS. CHANDLER: Yes.

A. No. Timing of hemorrhage doesn't work in the subarachnoid space.

Now, if you want an opinion, I would say this is not 72 hours out.

Q. We're within the 72 hours you think?

A. There is not very much blood here. This is the type of hemorrhage that I think at 48 hours could be trouble, and at 72 hours I think you would have a negligible chance of seeing.

Timing of hemorrhages in the subdural space is much easier.

Q. Are you saying you can or cannot tell me a range of time in which you think the bleeding in this case took place based on the 4/3 films?

MR. OLSMAN: I think he just told you that.

MS. CHANDLER: I missed it. That's why I'm asking again.

A. Well, let's just say that my best guess is within 24 hours. I would be overwhelmingly surprised if it were 72 hours. I would not believe that to be -- I would say less than half of a percent chance.

Q. But you're saying there wasn't much blood there?

A. There is not much blood there.

Q. Meaning that there has already been some reabsorption?

A. Meaning that it could be a small hemorrhage.

Q. And because of that, if you got out to 48 hours you might not even see it in this particular case because there wasn't very much to begin with?

A. 48 hours from this time. That's right.

Q. What about 48 hours from the time of bleed?

A. Well, if we can assume that this is in the first 24 hours, then -- every day your chances are going to go

down. Every 24 hours your chances are going to go down significantly.

Q. When you are looking for subarachnoid hemorrhage on a film, is there any particular distinctive characteristic that you're looking for?

A. Yes.

Q. What is it?

A. Well, there are two parameters that have to be considered.

No. 1, you have to see blood, hemorrhage. Hemorrhage on CT scan in the acute stage is high in density, meaning whiter than brain.

Q. So you are looking for white areas?

A. White areas.

The second parameter is that it anatomically has to coincide with the subarachnoid space, but you have to know where the subarachnoid space is in the brain; and if you know where that is, then if you see a white area where the subarachnoid space is, then you would diagnose a subarachnoid hemorrhage.

Q. Artifact also appears on a CT scan as a white area, does it not?

A. Artifact can actually be any color. Artifact is frequently white.

Q. So how do you distinguish artifact from blood if they're both white? What is it about the whiteness that distinguishes them, if anything?

MR. OLSMAN: Do you want him to talk in the abstract, or do you want him to show you on the film?

MS. CHANDLER: No. I just want to know generally right now.

A. Well, let's say the most common artifact on head CT scans are related to bone. They're streak artifact that are generated from a bony surface generally running to a bony surface. They're linear and they run from the bone generally to another bone, but they emanate from a bone. So there won't be any area around the artifact, between it and the bone, that is not of the same color.

Does that make sense?

Q. I think so.

A. So basically what I am saying is if you're looking within the substance of the brain or subarachnoid space that is not against the bone --

Q. Then you know it's artifact?

A. -- and the density or the whiteness is not consistent all the way to the bony surface, then it's not artifact.

So one of the problems with CT would be in the higher areas where there is lots of bone. The subarachnoid space in the higher areas for the most part is up against the bone, but in the lower areas -- the so-called basal cistern, sylvian fissures -- these areas are away from the bony surface and those are the areas that we have the best accuracy in recording subarachnoid hemorrhage.

Q. Have you ever looked at a CT scan and called it artifact and found out later it was actually hemorrhage? You personally.

A. Not that I can recall.

Q. So the main thing that is indicative of artifact is the fact that it's going to run right up against the bone and that's going to distinguish it from blood?

A. Well, that's not the only criteria.

Q. That's the main one?

A. That is a sine quanon, which means that's a given.

Q. What else then do you look for to distinguish between artifact and blood if in fact both of these things appear as white areas on a CT scan?

A. Artifact is generally streaky, meaning linear, often parallel lines that emanate from the bone. You have these linear white streaks.

I guess without demonstrating with pictures that's the best I can do in terms of descriptive terms.

Q. Is there any particular place where an anterior communicating artery aneurysm will bleed?

MR. OLSMAN: Such that it would be visible on a CT film?

MS. CHANDLER: Yes.

Q. (Continued) Well, actually my question is if they bleed, is there a place in the brain where they normally bleed into?

A. All right.

Well, first of all, the anterior communicating artery, there is one on each side. The anterior communicating artery runs between the two A-1 arteries. It's a midline vessel in the inferior frontal region, so when an anterior communicating artery aneurysm ruptures, it obviously always ruptures there.

The distribution of the blood is variable. Many anterior communicating artery aneurysms will deposit the majority of the blood in the inferior frontal midline in the region of the cistern of the lamina terminalis.

Q. Most of the blood is deposited where?

A. It's in the midline inferior frontal region.

The intrahemispheric fissure is the broader term that defines the division between the two inferior frontal lobes. The posterior aspect of that where it abuts the third ventricle is the cistern of the lamina terminalis.

So the aneurysm lives very close to the anterior third ventricle. The first place it's going to put blood is just anterior to the third ventricle.

The blood doesn't have to stay there. In fact, subarachnoid space is an open space that communicates throughout and around the surfaces of the brain, so the blood can go anywhere it wants to go, and it's also going to have gravitational effects if the patient is lying on the back of their head.

So it just doesn't work out for us. We have a reasonable chance of predicting the location of the aneurysm, but it's probably not better than 50 or 60 percent.

I mean, I've seen cases where I've bet my life that it's an anterior communicating artery aneurysm, and most of the time I'm right and sometimes I lose my life. I've also seen cases where I was sure it was a middle cerebral aneurysm, and it turned out to be an anterior communicating aneurysm that put all of its blood on the sylvian fissure. Maybe the patient was lying on the side of their back and that's where the blood wound up.

Q. You're saying most of the time, though, it was deposited where? That's what I didn't hear you say before.

A. In the midline in the frontal regions, usually below the corpus callosum, anterior to the third ventricle in the anterior intrahemispheric fissure. It can burst into the frontal lobes, inferior frontal lobes.

That's the pattern of hemorrhage that would strongly suggest an anterior communicating artery aneurysm.

However, that may account for 50% maybe of anterior communicating artery aneurysm. Maybe. I don't know. That may even be high.

The other half, if that's right, bleed in a pattern that I can't predict where the aneurysm is or I might misguess the position based on that bleed.

So we try to look at the CT for a distribution of blood to predict, but it doesn't always work out. The aneurysm can be stuck to the brain from a previous bleed that went unrecognized and then burst into the substance of the brain and present with a primary brain hemorrhage rather than a predominant subarachnoid hemorrhage, and then we think about other diagnoses and find out that it's an aneurysm after all.

Q. Why don't you put the films up on the box and show me what you see.

MR. OLSMAN: Which film do you want to start with?

MS. CHANDLER: 4/3.

MR. OLSMAN: April 3, 1990?

MS. CHANDLER: Yes.

Q. (Continued) You said you only saw blood on 5?

A. I only see blood on 5.

There are two areas. The first area, this dark area here is the anterior-inferior third ventricle.

Q. Right here?

A. The black area. Right in front of that is a white area.

Q. That little dot?

A. Yes.

Well, I wouldn't say it's a little dot. It's a couple of millimeters in size with an area of white going straight forward from it.

So we have a round area of white with then a midline linear area of white in the intrahemispheric fissure.

This area of white is in the cistern of the lamina terminalis and this area of white is in the intrahemispheric fissure. The second area is in the left sylvian fissure, the inferior aspect of

the left sylvian fissure over here. If you compare that with the other side -- this is the sylvian fissure, the inferior aspect of the sylvian fissure on the other side.

If we for a second jump to Slice No. 6 just to show you where the sylvian fissure runs, this is the sylvian fissure above it on both sides.

So this slightly curved area of low density here is the inferior aspect of the right sylvian fissure, and this area where the hemorrhage is on the other side is the inferior aspect of the left sylvian fissure.

Q. The linear lines in the cistern, how far up do they go? What do you consider all of it?

A. Well, the rounded area, I am going to put black on both sides of the rounded area. That's the area that is one that grabs my eye.

Now, if I only had that, I wouldn't be able to do much with it.

BY MR. CHEOLAS:

Q. When you say "that," what do you mean?

A. The linear area going in front of it, because it's so thin, but of course so is the intrahemispheric fissure in this patient. The patient doesn't have a lot of atrophy, so the intrahemispheric fissure is a very, very thin space.

Some people have very wide intrahemispheric fissures you can drive a truck through due to atrophy. This patient doesn't have any significant degree of atrophy in that area so that you really can't even -- you can just see little pieces of the intrahemispheric fissure on higher slices but very thin space, so therefore it's going to be just a few red blood cells lined up in a row.

However, it widens posteriorly at the cistern of the lamina terminalis, allowing for an area of wider presence of hemorrhage.

BY MS. CHANDLER:

Q. But where else do you see

white in relationship to this little dot that you've put the two brackets on each side?

MR. OLSMAN: In that area?

MS. CHANDLER: Yes.

Q. (Continued) You said there was more than one area there.

A. Well, I said I see a linear area going forward from it, but because this to me diagnostically is hemorrhage, that should be hemorrhage because it's in the location of the intrahemispheric fissure.

However, if that were the only finding on this study, we wouldn't be here today.

BY MR. CHEOLAS:

Q. When you say "that," what do you mean?

A. The skinny little area in the anterior intrahemispheric fissure. If that was the only finding, I wouldn't be here today.

BY MR. VANDE VUSSE:

Q. What do you mean by that?

It's not diagnostic of blood?

A. It would be too subtle for me to ask them to make the diagnosis.

BY MR. CORDEN:

Q. Well, then, we're here today because of the existence of what then, Doctor?

A. This and this.

BY MS. CHANDLER:

Q. "This" meaning the little dot in the center and then the white area to the right?

A. Yes; the white area in the left sylvian fissure and the rounded area of hemorrhage, which is probably only 2 millimeters in size in the cistern of the lamina terminalis.

BY MR. CHEOLAS:

Q. Does that show up as white? Is that what you're pointing at?

A. Yes. It's a whitish -- it's on the white side of gray. It's not as white as bone. I would call this white/white bone. Hemorrhage is not as white as bone but it's whiter than

brain.

BY MS. CHANDLER:

Q. You're saying the linear line in and of itself wouldn't cause you to think blood but for the fact that it is connected to this little dot. And you assume that's hemorrhage and you then assume that the linear area is also hemorrhage; is that right?

A. It is likely that that's the case because it's in the position of the subarachnoid space extending from this area, yes.

Q. At the top of this linear area is another area of white that to my eye doesn't look a lot different than what is over here in the left sylvian fissure.

A. Right. Now we get to the discussion we had before.

This is interbone artifact. It goes from the bone to the bone, and this does the same thing. This goes from bone to bone and this goes from bone to

bone.

So when it goes from bone to bone, you couldn't -- that's the typical appearance of artifact. It's actually better seen if we go to Slice No. 3 where we can see streaks of artifact emanating from the bony surfaces and going all the way to the bony surface. You can see that these streaks come all the way down to the bone.

So they emanate from the bone, and there is no space between the bone and the artifact. In other words, the artifact doesn't just start in the middle. It's caused by the bone and has to go from the bone as opposed to this area here where there is no white around it.

BY MR. CHEOLAS:

Q. What area where?

Q. On the left sylvian fissure. There is low gray, a low shade of gray tissue consistent with brain tissue between this and the bone.

BY MS. CHANDLER:

Q. Could you ever have artifact in the area of this linear line that emanates from the center of that? Is there bone there so you can go bone to bone as you say?

A. At this point?

Q. Yes.

A. No. There is no bone there. If you get higher, you get into calcified falx. That could produce -- for example, here is the calcified anterior falx. The falx doesn't extend this low. The anterior frontal lobe runs under the falx.

Q. So are you saying any time you have bone in the area of the intrahemispheric fissure that is going to be blood any time you have white in there?

A. White in the inferior aspect of the anterior intrahemispheric fissure.

Q. I'm sorry. Did you say anterior?

A. The anterior-inferior,

because the anterior intrahemispheric fissure runs all the way up and the falx runs in the intrahemispheric fissure. The falx is white.

So up here you have the bigger problem at the top of the head because the falx in middle-aged and elderly people is calcified and can actually be ossified. It's white. In an infant white in the midline would indicate hemorrhage as well because their falx is not calcified.

When you get very high, you have the sagittal sinus in the midline and that's going to be white because of blood within the sinus.

So it depends on where you are. The location in the anterior-inferior intrahemispheric fissure particularly go on to the terminalis. You should never see white unless it's hemorrhage, or if it's even whiter than that it can be calcification due to meningitis in the past.

There are other things that

are white other than blood. There are tumors that have hemorrhage in them and calcifications.

Q. But you said you should never see white --

A. In the subarachnoid space. It doesn't matter where. Anywhere in the subarachnoid space.

If you see white in the subarachnoid space, you have a presumptive diagnosis of subarachnoid hemorrhage. You have to make that diagnosis.

Q. Can we put the other film up here.

MR. OLSMAN: The April 19 film?

MS. CHANDLER: Yes; 4/19.

A. All right. Here is the 4/19 film.

Now, again 10-millimeter thick slices were employed, and what I would like to point out here is that we have blood in exactly the same location, but we have more of it and we have it in

more locations.

So let's start with the cistern of the lamina terminalis. Here is the inferior third ventricle on this scan. This is Scan No. 5 as well. So the linear low density structure there is the third ventricle, and right in front of it you have the cistern of the lamina terminalis which has blood in it. It has more blood than it did last time, but there is blood all over the place on this scan.

Now, also again on Scan No. 5 we have blood in the left inferior sylvian fissure in the same location that it was present on the other scan.

Now, additionally there is blood in the entire length of the anterior-inferior intrahemispheric fissure going straight forward, and then we see blood in the intrahemispheric fissure coming up and blood sitting in front of the corpus callosum. You see blood vaguely in some of the upper sulci. We see blood around the brain

stem. There is a ring of white and then there is also partial volume averaging effect here as well where it's whiter in some areas and in other areas it's just not as dark as it's supposed to be.

Cerebral spinal fluid surrounding the brain stem is supposed to be dark like the cerebral spinal fluid in the ventricles, and the reason that's lost is because there is admixture of blood and cerebral spinal fluid so that they come to an average density somewhere between the blood that you see here and the cerebral spinal fluid that it's supposed to be.

Now, if we go back for a moment and look at Scan No. 5 from both studies, you can see that this area circled here is the same area where we see blood on this study, and this cistern of the lamina terminalis here is the same area as here exactly. The only thing is there is just more blood. We've covered it up. We have the same thing. We have blood.

Q. If you have artifact like you say is represented up here on 4/3 No. 5, on the 4/3 Film No. 5, are you necessarily going to have it the next time you do a film?

A. Have artifact?

Q. Yes; in the same place.

A. You would have to duplicate the same slice location exactly, which means the same angle and the same slice location. That's almost impossible to do, and it hasn't been done here.

No. 2, patient motion can come into play. That will enhance artifact. Patient motion can cause artifact all by itself. It's a different pattern than the bone streak artifacts that we've been talking about. It causes a blurring, but it can actually enhance bone streak artifact.

So all things being equal, yes, you would produce the same thing every time.

Q. Why don't we see this artifact, then, on 4/19?

A. We don't have that same location. This area here is somewhere between here and here.

Q. Meaning 4 and 5 on 4/19?

A. The angle of the slices are different, so they do not have an exact match of the outer surfaces of the brain. So you have to go and look for the brain territory, which coincidentally happens to be on Slice No. 5 even though the slices front and back are not identical.

The pathology that we are looking at is nearer to the middle of the head than to the outside margin of the head, so therefore it's less affected in terms -- in other words, no matter what you do, the cistern of the lamina terminalis and this portion of the sylvian fissure will always be on the same slice because they lie so close to each other. But we can put all kinds of different stuff on that slice.

So Slice No. 5 on the previous study --

Q. On 4/3?

A. On 4/3.

-- shows completely different anatomy posteriorly. We have the petrous bone on the 4/19 study. We have no petrous bone left on the previous study. We have the midbrain more posteriorly on the 4/3 study and we have -- it's hard to say this.

I guess that is probably still midbrain. The main difference is if you look to the very front of the skull and the very back of the skull, you have the difference. The anatomy is about the same.

Q. On the 4/19 films there is an area of white that extends below the cistern.

A. That's in the ambient cistern around the brain stem.

Q. Is that blood, too?

A. Yes.

Q. We have another set of copies.

A. This is also blood here.

(Discussion off the record.)

MS. CHANDLER: We now have marked another copy of the CAT scan. The doctor has drawn a circle around an area of blood that he sees which is in the left sylvian fissure.

BY MS. CHANDLER:

Q. Correct?

A. Yes.

MS. CHANDLER: He also has drawn two lines to highlight the blood seen in the cistern --

THE WITNESS: Of the lamina terminalis.

MS. CHANDLER: And then two lines between what is a linear area of blood in the --

THE WITNESS: -- inferior aspect of the intrahemispheric fissure, the anterior portion of the intrahemispheric fissure.

MR. CHEOLAS: And these are the two little lines?

THE WITNESS: Right.

BY MS. CHANDLER:

Q. And it's inferior - anterior? Which way did it go in?

A. It doesn't matter. It's called the intrahemispheric fissure. It just happens to be the inferior portion of the anterior portion of the intrahemispheric fissure.

Q. Can you make those two lines that surround that area a little darker.

(Witness complies.)

BY MR. CHEOLAS:

Q. Do you see blood in any other portion of Scan No. 5?

A. No.

MS. CHANDLER: On the 4/3 films.

BY MS. CHANDLER:

Q. And you didn't see blood on any other section except Scan 5 on the 4/3 films?

A. Correct.

Q. For the record, Doctor, can you identify what you've just been looking at. It's the third film you've looked at tonight.

A. It's a not wonderful copy of the 4/3 CT scan of the head.

Q. And it's been marked --

A. Pyster 1.

MR. OLSMAN: It also has "Copy" scribbled in black wax pencil on the lower right-hand side; is that correct.

THE WITNESS: Yes.

MR. OLSMAN: Thank you.

BY MS. CHANDLER:

Q. We're going to show you the originals.

MS. CHANDLER: We all agree that these are the originals; right?

MR. OLSMAN: Well, that would be the question.

BY MR. OLSMAN:

Q. Can you tell, Dr. Peyster, by looking at the film that you have in front of you now that that is an original?

A. It's a copy. It can be the original copy, but it's a copy.

BY MR. CORDEN:

Q. How can you tell, Doctor?

A. See the notch impressions? This is what they're supposed to look like. The only way to get them to look like that but not be notches is to copy them.

They are supposed to be real notches like you see here. There is also a rim with black and then there is light gray around it, which means that a copy film has been used in conjunction.

I have a lot of films in my hand. Maybe we can find an original among them. This looks like it could be the original of the 4/19. This is a bone window film which is not going to be of any use to us. This is a film from 4/19 and this is a bone window, so this is not the original of the 4/3 CT scan.

BY MS. CHANDLER:

Q. Do you see blood anyplace else on this set of films?

A. No. I see exactly the same thing I saw on the other films.

BY MR. CHEOLAS:

Q. What other films?

A. All of the other films.

BY MS. CHANDLER:

Q. That were dated 4/3?

A. Right.

BY MR. OLSMAN:

Q. Other copies of the same film of April 3, 1990; correct?

A. Right.

Each one is a film. They're all copies of the original film. All of the copies show the same thing in varying degrees of quality.

BY MS. CHANDLER:

Q. To the right of the area that you marked with a circle before I see another white area that is right up against --

A. That's to the left.

Q. To the left of it?

A. Well, I'm sorry. It's the left of the patient; it's your right.

Q. It's my right. That's right up against the edge here.

A. Right.

Q. Is that artifact or is that blood, too? That's right up against the bone, isn't it, so that means it's artifact?

A. It's not blood.

Q. Why?

A. Well, let's just say we can't say it isn't because it's right up against the bone. It looks the same on two sides.

It's really not distinctly different than the brain tissue next to it.

MR. CHEOLAS: I am going to mark this. I'm going to mark the film that you are looking at as Pyster No. 2.

(Pyster Exhibit No. 2 marked for identification.)

BY MR. CHEOLAS:

Q. Pyster No. 2 is the film that you say is not an original; is that correct?

A. I say that all of the films that I've looked at are not the original.

Q. Well, is Pyster No. 2 an original film or not?

A. It's not the original.

Q. It's a copy?

A. It's a copy.

Q. How would you describe the copy quality of Pyster No. 2?

A. Well, to tell you the truth, I would have to see the original next to it to tell you how good the copy was because a perfect reproduction of the original would be a perfect copy even if the original were a poor film.

Q. How would you compare Pyster No. 2 to the film that you read?

MR. CHEOLAS: We haven't marked this yet, have we?

MR. VANDE VUSSE: It's been previously marked Hussey Exhibit No. 4, Papson Exhibit No. 1 and Sauter Exhibit No. 6.

THE WITNESS: Do we know which film I originally saw?

MR. OLSMAN: Yes.

MR. CHEOLAS: The one that

I am going to mark right now as Exhibit No. 3.

(Pyster Exhibit No. 3 marked for identification.)

BY MS. CHANDLER:

Q. We marked this exhibit Pyster Exhibit No. 3, and this was the first April 3 film you looked at tonight; correct, Doctor?

A. Yes.

Q. And this is also the film that you originally saw when Mr. Olsman came out to meet with you?

A. That's what Mr. Olsman tells me. Only he would know because I haven't had it in my possession.

Q. And you did make some markings originally on this film tonight, on Pyster No. 3?

A. During the deposition?

Q. Yes.

A. Yes

BY MR. CHEOLAS:

Q. Can you compare the quality of film between Pyster No. 3 and

Pyster No. 2?

A. I like Pyster No. 3 better. Pyster No. 2 is not quite as -- it looks like it's a little bit lighter, but it's not a world apart.

Q. And Pyster No. 3 is a copy?

A. Yes.

Q. Compare No. 3 to No. 1.

MR. OLSMAN: In terms of copy quality?

MR. CHEOLAS: Right.

A. Again, we are only comparing them to each other in terms of the general aesthetics because we don't know where the original is.

I think that the last film, which is Pyster No. 1, is the worst of the three.

BY MS. CHANDLER:

Q. I have a couple more questions for you.

What I want you to do is dictate to me what report you would have given based on the 4/3 film.

MR. OLSMAN: Beyond what he's

already told you?

MS. CHANDLER: Yes. I just want him to tell me what his report would say, what he thinks the standard of care requires the report to say about the 4/3 film.

MR. OLSMAN: Well, which question do you want answered? You just asked him three questions.

Do you want him to formulate a hypothetical report that assumes that he is reading this CT film as a radiologist in a hospital setting and what he would say about it?

MS. CHANDLER: Yes.

A. Do we have to go through all the -- you know, CT scan of the head, so many slices, this and that? Just starting with the body of the report?

Q. Yes; the body and impression.

MR. OLSMAN: Before he answers further, do we further assume for the purpose of your hypothetical report that the radiologist has been informed

about why the CT was done? In other words, that he has some idea of what he's looking at and for?

MS. CHANDLER: You mean that the woman had a headache?

MR. OLSMAN: Yes; and he understands what he's scanning for?

MS. CHANDLER: Sure.

Q. (Continued) Let me ask you something.

Is your report going to be written any differently if you know this woman has a headache or if you don't know that fact?

A. No.

Q. It's going to be the same report, isn't it?

A. It would be the same report.

Q. That's what I want to know.

A. I may incorporate the history into the report.

For example, in this particular case hypothetically I would say: Increased density is noted in the cistern of the lamina terminalis and

inferior aspect of the left sylvian fissure consistent with subarachnoid hemorrhage. No hemorrhage is noted elsewhere on this study. There is no mass effective midline shift. There is mild dilitation of the lateral and third ventricles.

That would be it.

Q. Would you recommend further studies?

MR. OLSMAN: In his hypothetical report?

MS. CHANDLER: Yes.

A. Well, it puts me in a funny position because I would say this study, if I were responsible for producing this -- I'm just reporting the findings as I see them. So I would have done the study differently, but other than that I wouldn't recommend that to myself. So we're putting myself in the position of having to read the study.

Q. What I'm trying to figure out is would you suggest that a study be done with contrast?

A. I thought that question might come up, and the answer is no.

Q. You don't think that was required in this case?

A. There are situations -- we used to do that very frequently in patients with subarachnoid hemorrhage because in the old days they used to wait prior to operating on aneurysms.

For the past bunch of years they operate on aneurysms in the first three days of presentation, but in the old days they used to wait a couple of weeks before they would operate on aneurysms.

So what was the situation at Mass. General was that we do an arteriogram early on and see the aneurysm, and then we would do another arteriogram five days later when the patient wasn't feeling as well to see if the patient had spasm, and then we would do another arteriogram before the patient went to surgery.

So I demonstrated and that's

what my exhibit that we discussed before showed; that I could see aneurysms in almost every case on CT scan if I gave intravenous contrast and used thin slices.

So in order to avoid doing the earlier arteriogram by doing a contrast CT scan and demonstrating the aneurysm, I could put the surgeon's mind at ease that in fact there was an aneurysm and he could go ahead and treat the patient for having an aneurysm and plan his course accordingly, and we got out of doing the early arteriograms in many of the cases for that reason because we established the diagnosis, the arteriogram.

They wanted the diagnosis established because there are other causes of subarachnoid hemorrhage. Not all of them are aneurysms.

So if the neurosurgeon wanted a demonstration of the aneurysm, then I would have injected the patient with contrast; but if that was not the policy

in the hospital with that neurosurgeon and that was not their protocol, then I would not have injected the patient with contrast. If it was just simply to diagnose subarachnoid hemorrhage, that would be done.

Q. So from Dr. Papson's standpoint in this case, the standard of care didn't require him to suggest contrast studies?

A. No. It might have after a couple -- the timing of this is difficult, but it has been demonstrated that in the area of subarachnoid hemorrhage you can get contrast enhancement because there is a chemical irritation of the meninges by the hemorrhage. You can actually get enhancement of the meninges that have been irritated, but that takes some time.

So for example, if you already saw the blood you would have no reason to do this, but if you were at the 72-hour stage and you didn't see the

blood and you injected the patient, you might see enhancement of the meninges. But nobody does that type of --

Q. That's not the standard of care?

A. It's not standard of care.

Q. Do you see the same amount of dilitation of the lateral and third ventricles on both the 4/3 and 4/19 films?

A. For the most part, yes. There is one slice at the top of the 4/19 film where the bodies of the lateral ventricles look a little whiter than they do on the other study, but lower down they look similiar. So I don't think there has been -- there's probably not been a significant change.

Q. Is that because of the woman's age? I mean, is that a normal finding for a woman of this age?

A. It's not enough to diagnose a communicating hydrocephalus. A mild communicating hydrocephalus may be present, but it would be by itself

acceptable.

Q. Have we discussed all the opinions that you have about Dr. Papson?

A. Yes.

MS. CHANDLER: That is all I have.

(Discussion off the record.)

MS. CHANDLER: We discussed this with the doctor, and as best as we can tell because of some certain characteristics of the xray itself we think that the 4/3 original xray is the one with all of the deposition exhibits on it and the one that is marked Pyster No. 3.

MR. CHEOLAS: Is that correct?

THE WITNESS: That's correct.

MR. OLSMAN: That appears to be the original; is that correct, Doctor?

THE WITNESS: Yes.

MR. CHEOLAS: So we're clear, Pyster No. 3 is going to remain in the

possession of Mr. Olsman?

MR. OLSMAN: Yes.

BY MR. CHEOLAS:

Q. You were at Mass. General for a while?

A. Yes.

Q. Do you know Dr. Fred Hockford?

A. I believe he was there when I was there.

Q. Was he on staff when you were a resident there?

A. I think he may have been a resident when I was a resident there.

Q. Do you know his specialty?

A. Neurology, I believe.

Q. So you really don't know him very well?

A. I remember his name. If I had to guess, he has dark hair, but it's been a long time.

Q. You don't know anything about his qualifications or anything?

A. No.

Q. I'm not clear on one thing,

and I would like to talk about the standard of practice for a minute.

Is it your opinion that the standard of practice is the same for a radiologist and a neuroradiologist?

MR. OLSMAN: For the purpose of reading a CT film like the one involved in Carolyn Noteboom?

MR. CHEOLAS: Right.

A. Yes.

Q. Is it true that a neuroradiologist, a reasonably prudent neuroradiologist, would be better equipped based on whatever -- training, education and experience -- to interpret a CT scan as opposed to a general radiologist?

A. Yes.

Q. You said something earlier in the deposition. You said that less than 1% of neurosurgeons would make these findings.

A. My opinion. That's not based on a market survey. It is based on my experience with a bunch of neurosurgeons.

Q. And you're at a major medical institution; correct?

A. Yes.

Q. It's Hahnemann?

A. It's a medical school.

Q. It's a medical school and you have residents, interns, and you teach?

A. Yes.

Q. I don't know how you classify hospitals in Pennsylvania.

Is it in the top class of hospitals?

A. Well, it's a primary university hospital, so in terms of classification, that would be a tertiary care institution. Then you have primary affiliates of medical schools and then you would have limited affiliates and then you would have community hospitals at large with no university affiliations.

Q. And you've had experience in dealing with neurosurgeons at a tertiary care facility?

A. I also have dealt with neurosurgeons at private hospitals.

Q. When you said that less than 1% of neurosurgeons would make these findings, what did you mean by "these findings"? That's the part I'm getting at.

A. I would think that that small percentage of neurosurgeons -- and if 1% is inaccurate, less than 5% --

Q. Fair enough.

A. -- would make a diagnosis of subarachnoid hemorrhage based on these films.

Q. Looking at Pyster No. 3, Scan 5 again, what is this white area down here?

A. That is the posterior falx.

Q. Is that the portion of the brain that's down here, or is that what the white thing is?

A. The white thing is two leaves of dura in the middle. That's called the falx. It divides the right and left cerebral hemispheres. It's a relatively rigid membrane, often calcified.

Q. I'm not going to be able to

describe this for the record, but what is this white line?

A. Well, there are areas of white all over the scan, so . . . .

Q. Do you see what white line I'm talking about, though? Maybe you don't see it as a white line.

MR. OLSMAN: Why don't you show him.

A. I see streak artifact coming off the frontal bone going all the way back into -- is that what we are talking about?

Q. That's the white line I'm talking about.

A. I would put that as a bone streak artifact.

Q. Can you describe that so it shows up on the transcript.

MR. OLSMAN: Well, hold on. That's your job to ask him a question that can be answered in a manner that it will show up on a transcript.

MS. CHANDLER: He just asked him to describe it. He asked can you

describe it.

MR. CHEOLAS: That's the question.

MR. OLSMAN: I don't think so, but that's all right.

A. I will do the best I can.

I see a linear area of relatively white or whitish gray extending from the posterior aspect of the anterior skull base and extending back towards the interpeduncular cistern diagonally. It's passing through the interior frontal lobe.

Q. Do you see any cerebral spinal fluid around the brain?

A. Yes.

Q. Where?

A. This is the quadrigeminal plate cistern around the midbrain and then the remainder of the cistern around the midbrain.

Now, this is an area that we didn't even get into, but since you brought it up I'll enlarge on it.

The quadrigeminal plate

cistern is this relatively W-shaped area at the back of the midbrain.

MS. CHANDLER: Which is black or dark?

THE WITNESS: It's very dark.

BY MR. CHEOLAS:

Q. And it looks like for any layman looking at that right in the middle?

A. Yes.

Now, on this slice is the midbrain. The anterior parts of the midbrain are the cerebral peduncles. They have a cleft in between them which is the interpeduncular cistern, and then the cisterns going around the anterior portions of the midbrain are called the crural cistern.

Now, this should all be cerebral spinal fluid surrounding the brain stem, so why is it that the cerebral spinal fluid in the back is very dark like cerebral spinal fluid is supposed to be, but the cerebral spinal

fluid around the cerebral peduncles is almost the same color as brain?

There are only two possible explanations. One is partial volume averaging with brain tissue above, because the slice was too thick so that we are including some brain tissue in the measurements that the computer does to generate these images, thus falsely elevating the density of the cerebral spinal fluid.

The other is that there is blood in that area mixed with the cerebral spinal fluid, and it's an additional area of subarachnoid hemorrhage analogous to what I pointed out on the 4/19 study where there were areas in the basal cisterns that were frankly white and then there were areas that were the same color as brain except we just lost the CSF like we did here.

Now, I didn't point these out as blood because I can't say it is blood. I can just say that it's not the proper density for cerebral spinal fluid

either due to improper technique or too thick slices. This is why I won't use these slice thicknesses because I will miss subtle subarachnoid hemorrhage.

You should make the diagnosis of subarachnoid hemorrhage on a properly performed study using proper thickness slices of 5 millimeters if in fact the density of the CSF is incorrect as it is here.

The problem is when you use thicker slices you bring in this other variable. Is this really abnormal CSF or not? If you see that and you've done this study, you should go back and do thinner slices to make CSF either look like CSF or turn it white like it really is or do something.

So it's just another problem area. It doesn't stand out as white as it is here, but that's the nature of --

Q. As white as where?

A. In the sylvian fissure and in the cistern of the lamina terminalis.

But you don't have to see any

white to have a diagnosis of subarachnoid hemorrhage. You just have to see the absense of dark.

This is something I should have have pointed out earlier: Is that when you start pointing at linear streaks through the brain substance, we're dealing with the contrast of brain, which is supposed to be a median shade of gray.

What has to be remembered is that the subarachnoid space is filled with cerebral spinal fluid as in the sylvian fissures higher up where we see lower CSF, just like the ventricles, and if that is altered all you need to do is raise the sylvian fissure and make it invisible.

If we have a patient who has a sylvian fissure like this on this side and it's just invisible on the other side, you have to hypothesize that there is something suggesting and you have to make a diagnosis of subarachnoid hemorrhage, and I have done so on a

number of cases.

So here we have this technical problem, and that's why I'm making an issue of 10-millimeter thick slices.

Q. Would you say in your opinion that the findings as you described when you gave us your hypothetical dictated report, those findings that you see on Scan No. 5 are subtle in nature?

A. The word "subtle" is difficult.

I'm going to walk back. I'm standing what, 20 feet from the film?

Q. A little bit more than 20.

A. I see it. I can make the same findings from here.

Now, that makes it hard for me to call it subtle.

Q. You would say it's not subtle?

A. To me it's not subtle and I think to a trained radiologist it should not be subtle, but to a doctor of

internal medicine I would say it would be extremely subtle. Somebody that is not used to looking at these for a living, it might not stand out from a distance.

Q. Can you point out the fourth ventricle?

A. Yes. The fourth ventricle is here and the upper fourth ventricle is here.

Q. So the only two scans which show the fourth ventricle are what numbers?

A. Scan No. 3 and Scan No. 4.

Q. Is there a structure or a place called the prepontine cistern?

A. Well, some people call it the prepontine cistern and some people call it the pontine cistern, but if you mention that to me, that refers to the cistern anterior to the pons.

You can see a portion of that on Scan No. 4 and you really don't see it well on Scan 3 because of extensive streak artifact between the petrous bones. That is the single worst area on

the CT scans. The inferior petrous artifact is the worse.

Q. So again, the only scans which show the prepontine cisterns are Nos. 3 and 4?

A. Yes; because the midbrain is on Slice No. 5 and the medulla is on Slice No. 2. So the only ones that have the pons on it are those two slices, so those are the ones that have the pontine cistern.

Q. I think I'm done with the film.

Do you know what type of CT scan machine took these films on 4/3/90?

A. Yes, I do.

Q. What kind?

A. It's a Somatome made by Seamans and after Somatome it says "HiO" and then it says "DB1".

They were a number of upgrades to the Somatome scanner. They started off with Somatome 1 and 2 and then they went into letters. So this is probably a third generation scanner.

Q. The scanning equipment at Hahnemann, what type of machine?

A. General Electric.

Q. Is it better, worse, equal to the machine at St. Joe in 1990?

MR. OLSMAN: You mean in terms of the quality?

Q. (Continued) In terms of its capacity to allow you to accurately read things.

A. Well, I like the General Electric personally better than the Seamans at those stages. That scanner versus the 9800 that we used in 1990 and are still using, my personal preference is towards General Electric, but there are people that are used to the Seamans and like that better.

Q. Why do you like GE?

A. I think that the scans are more aesthetically pleasing.

The argument is that the same information is on both studies and it's really the alpha rhythm in which they take the digital data and create a

picture and that they have a different approach to that. General Electric has chosen to use certain smoothing alpha rhythms and the pictures are more pleasing to them.

Q. Are all CT scan machines or have they all since 1983 been capable of 3- and 5-millimeter slices?

A. General Electric in 1981 I believe they started off with 5- and 10-millimeter thick slices. They added 1.5 millimeter thick slices in the early '80s. Probably '81 or something like that. The 3-millimeter thick slice didn't come into being until we went to the 9800 scanners. Probably in '87 - '86 we started getting 3-millimeter thick slices. '87 - '88. Something like that.

Seamans actually I think allowed 1- and 2-millimeter thick slices. They initially had 2 - 4. They had different numbers than General Electric. I think they had 2 - 4. They didn't have 5's and they had like 2's,

4's and 10's and they had 1, 2, 4 and 10. I don't know what they are today.

Q. So in your mind there is no doubt that the machine at St. Joe in April of 1990 was capable of making 5-millimeter slices?

A. For sure. And/or 2's or 3. It could be 4's, but 4's or 5's, yes.

MR. CHEOLAS: That is all I have.

BY MR. VANDE VUSSE:

Q. You made a statement that the majority of patients with subarachnoid hemorrhage have no physical diagnostic findings.

Do you remember that?

A. In terms of focal neurologic deficits? I'm not talking about lethargy or even coma. I'm talking about can't move right arm, can't move left leg. You know, focal sensory deficits, reflex changes.

The majority that I see that come to neuroradiology -- there are those that just die. They can have all kinds

of deficits, but I never see that. So the ones that we are asked to do arteriograms on that I actually have the patient, the majority of them are Grade 1 and Grade 2 without focal deficits.

I mean, once you get up to Grade 3 and Grade 4 you have focal deficits.

Q. Just review with me what you mean by a Grade 1 or Grade 2 hemorrhage.

A. There are different steps for looking at these patients. People have tried to stage the amount of hemorrhage and call them A through K or 1 through 4 on the amount of varying degrees and locations involved.

There is the clinical grading of the patient either on a Glasgow coma basis or on a --

Q. This is a 15. max?

A. That has a 15. max, and then they go down from there, or there is a grading system which is the most common one that they talk to us about, which is a 4. system. 5 may be dead.

Grade 1 patients have no neurologic deficit, mildly sleepy or mildly confused or nothing.

Q. When you say "neurologic deficit," you are talking --

A. They have no focal neurologic deficit. Grade 1, they have a bad headache and they really don't have anything else.

Q. They are alert, oriented?

A. Yes.

Grade 2's are not as alert. They are lethargic and they may have some problem with orientation.

Basically most of these scales are of alertness. The Grade 3's are close to coma or in coma and Grade 4's are in terrible shape, and when you get into the more severe varieties, it's impossible to do a neurologic exam.

Q. But when you made mention of lower grade hemorrhages and specifically mentioning 1 and 2, that is the system, the evaluation system that you are referring to?

A. Yes.

Q. You also mention this concept that over a period of time between 24 and 72 hours with the small bleed that the blood will be reabsorbed and not visible by a CT scan.

A. That is progressively less to nonvisible. In other words, it gets admixed with the cerebral spinal fluid and then gets reabsorbed away.

Q. My question to you is: Is blood detectable for a longer period of time by LP?

A. Yes, definitely.

Q. And do you know what parameters that might be? I mean, how long does that reabsorption process take so that blood would no longer be detectable on an LB?

A. Well, what happens is that the red blood cells eventually lyse, so you get cytochromia, which is a yellowish color which is measurable and actually quantifiable in the lab. So if you miss the stage where you can still see a lot

of red blood cells, you can still see cytochromia for a very long time after a hemorrhage. I mean, weeks, months. I don't know the end point.

I've had no discussion. No one really knows. I've had this discussion with neurologists and neurosurgeons. We don't have a good idea of when the cytochromia eventually goes away. I'm sure that even with a small bleed you would have no trouble making that diagnosis by lumbar puncture weeks down the road.

MR. VANDE VUSSE: That is all I have.

MS. CHANDLER: I have a question.

BY MS. CHANDLER:

Q. Do you see between the 4/3 and 4/19 films any absorption of blood? In other words, do you see that there was blood on the 4/3 films and then you don't see it on the 4/19 films?

A. No. There is more blood in the same areas on the 4/19 films.

Q. So you don't see any reabsorption?

A. Well, you wouldn't be able to say. There has been a major rebleed, so there is blood in exactly the same areas but more, and then there is blood in all sorts of other areas. So therefore, I would not be able to see that the blood has been reabsorbed.

I know that particular blood has been reabsorbed because it can't sit there, but new blood is coming and taking its place. Red blood cells are not tagged.

Q. You don't see any areas on 4/3 and then don't see them on 4/19?

A. No. There is blood in exactly those locations. I pointed it out to you.

MS. CHANDLER: That is all I have.

BY MR. CHEOLAS:

Q. Doctor, on the 4/3 scan, the white dot that we have been talking about, could that be anything in your

opinion that is benign in nature?

A. Well, blood is benign in the sense that it doesn't metastasize distantly. But could it be anything other than blood? Not that I can think of.

Q. What you described as blood in the left sylvian fissure, is that part of the subarachnoid space?

A. Absolutely.

Q. Can you show me the subarachnoid space on this film, or is that hard to do?

A. Well, I'll describe it first.

The subarachnoid space surrounds the brain entirely, so it's between the bone and the brain all the way around the head on every slice. It dips into the brain in the form of the sylvian fissures. That's one area where we see it within the brain, and also around the brain stem where we talked about the pontine cistern. It goes all the way around the brain stem.

There is a cistern that is completely surrounded by bones and the medulla is surrounded by cistern as well. So subarachnoid space -- everywhere you see brain, the brain is covered by a membrane. The pia is the membrane that is most closely applied to the outer surface of the brain. The outside of that is the arachnoid membrane, so below the arachnoid membrane and the pia is the subarachnoid space. Outside of that is the dura and then comes the bone.

MR. CHEOLAS: That is all I have.

(Witness excused.)

(Whereupon the examination adjourned at 10:30 p.m.)
