State of Ohio)
County of Lorain)

- - -

IN THE COURT OF COMMON PLEAS

- - -

James J. Armstrong, Executor of
the Estate of Nancy Armstrong,

Plaintiff,

Case No. CV126180

vs.

EMH Regional Healthcare System,
d/b/a Amherst Hospital, et al.,

Defendants.

Annapolis, Maryland

Tuesday, May 21, 2002

Videoconference deposition of

DAVID CHARLES BRANDON, M. D.,

called for examination by counsel for Plaintiff, pursuant to Notice, at the offices of Video Communications, 222 Severn Avenue, Suite 3, Annapolis, Maryland, 21043, commencing at approximately 6:45 p.m., before Suzanne Giles, a Notary Public in and for the State of Maryland, when were present on behalf of the respective parties:

On behalf of the Plaintiff:

THOMAS E. CONWAY, ESQUIRE
DONNA TAYLOR-KOLIS, ESQUIRE
Friedman, Domiano & Smith Co., L.P.A.
Sixth Floor - Standard Building
1370 Ontario Street
Cleveland, Ohio 441 13-1704

On behalf of the Defendant, Briccio Celerio, M.D.:

RONALD A. RISPO, ESQUIRE
Weston Hurd Fallon Paisley & Howley L.L.P.
2500 Terminal Tower
50 Public Square
Cleveland, Ohio 441 13-2241

On behalf of the Defendant, Paul Bartilucca, M.D.:

MARK FRASURE, ESQUIRE
4518 Fulton Drive, NW
Post Office Box 35548
Canton, Ohio 44735-5548

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EXHIBITS

(Exhibits attached.)

PROCEEDINGS

Whereupon,

DAVID CHARLES BRANDON, M D

was called for exainination and, having been first duly sworn, was examined and testified as follows

EXAMINATION BY COUNSEL FOR PLAMTIFI'

BY MR. CONWAY

Q Dr Brandon, my name is Toni Conway I'm one of the attorneys, along with Donna Kolis, who represent the Armstrong family in this case I'm going to be taking your deposition

Would you please state your full name for the record, spelling your last name for the court reporter7

A David Charles Brandon, B-r-a-n-d-o-n.

Q Dr Brandon, this is going to be my only opportunity to speak with you prior to trial and ask you questions regarding your opinion and your understanding of this case

I would ask that you do not answer any question which you do not understand If you do not understand a question, please ask me to rephrase it or

restate it. And I will do so If you do answer a question, I will assume and rely upon the fact that you understood the question. Is that fair?

A Yes.

Q If at any time you need to take a break, let us know We'll be glad to accommodate you. And if at any time you feel like changing, supplementing, deleting an answer that you've previously given, feel free to do so, okay?

A Okay.

Q And you understand that you are under oath. Everything you say is being taken down by the court reporter, and it has the same legal effect as if you were in front of a judge and jury in the actual trial of this case You undeistand that?

A Yes.

Q Doctor, I noticed on the Internet that there is a Web site called David Charles Brandon, M D., Anesthesia Is that a corporation?

A I didn't even kiiow **that that Web site was there. Is that in conjunction with ExpertPages.com?**

Q Yes

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A I don't know whether that's a corporation or not.
Q Okay. I guess I'm just wondering if you have your own corporation set up to handle expert-witness matters in connection with ExpertPages.com.
A No.
Q All right. I assume that your name and your Web site is on the Internet with your permission. Would that be correct?
A Yes.
Q All right. And it indicates in your Web site that you will be able to back up anything you say from commonly accepted textbooks or journals. I take it that you are responsible for putting that sentence into your Web site. Would I be correct?
A Yes.
Q All right. How did you first become associated with ExperlPages.com and begin your advertising as an expert witness?
A I saw their ad in a magazine, and I called them up to see what it was. And they encouraged me to give it a try.

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Q How much do you pay to be associated with Expertpages com?
A I don't know the exact fee, but it's an annual fee. And I think it's a couple of hundred dollars.
Q And what's the procedure for how you actually get customers? Do they contact you? Or do they go through ExpertPages com?
A They contact me directly.
Q And do you work out whatever the fee arrangement will be with your customer? Or does Expertpages com get some of that money?
A ExpertPages.com doesn't get anything. And I work out the fee arrangement independent of ExpertPages.com.
Q Now, are you familiar with the organization or the corporation ExpertPages com?
A I'm not really familiar with it, no.
Q Did you look into their background and organization prior to deciding to advertise in connection with them?
A I asked them a bunch of questions, and I was

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satisfied with their answers.
Q What were the bunch of questions that you asked?
A I don't remember anymore. It was a couple of years ago.
Q Do you have a contract with them that you signed?
A I don't think so, not that I know of. I think they just send me an annual bill.
Q How many customers have you gotten off of your Internet Web site?
A I don't know exactly. I would say probably ten or 15 maybe over the last two or three years.
Q So you've advertised on there approximately three years?
A I think I started with them -- yes, it's probably been about three years. I don't actually remember, to be honest with you.
Q Do you market yourself or advertise in coiiiiectioii with any other type of organization other than ExpertPages.com?
A The only other thing that I know of at this

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point is Guy Saponaro. I guess it's called Saponaro, Incorporated. I'm not sure where they are. They're in the Midwest somewhere. He refers attorneys to different experts in all kinds of fields. And I think my name is with him also.
Q Okay Do you know a Dr Burkons? He's another expert witness in this case that also uses Guy Saponaro
A I don't think I know him.
Q And how many cases have you gotten thiough Guy Saponaro over the years?
A I don't know, but I would say it's probably four or five.
Q Are you a member of the American Society of Anesthesia?
A Yes.
Q Do you think that's a reputable organization?
A Most of the time.
Q When isn't it, to your knowledge?
A Excuse me?
Q You said most of the time When isn't it

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reputable?
A I don't really know for sure. I wouldn't know any specific reasons to think they are not reputable.
Q Okay. I was just wondering by your answer. It indicated on your c v that you were the chief of the Department of Anesthesia and director of surgical services at a Sacred Heart Hospital from 1995 through 1998 Did I read your c v. correctly?
A Yes. Well, it's not through **1998.** I think it was up until **1998.**
Q How many bed hospital is Sacred Heart Hospital?
A I think it was 250.
Q What town was Sacred Heart Hospital located in?
A Cumberland, Maryland.
Q What month and what year did you leave Sacred Heart Hospital?
A I think it was June of **'98.**
Q Did you leave as a result of any problem, disciplinary action or the like?

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A No.
Q You left there Where did you go then?
A I did a short stay at Saint Mary's Hospital in Saint Mary's County, Maryland.
Q What's the closest city to Saint Mary's Hospital?
A The closest big city would probably be Washington, D. C. It's southeast of Washington.
Q By how many miles?
A Probably 30 or 40.
Q And it's my understanding you were a locum tenems there?
A Well, that's what I call it, because it was less than six months.
Q And what was your position there?
A I was an anesthesiologist, and I also did pain management.
Q Why did you leave Sacred Heart Hospital in June of -- did I get that right? -- June of 1998?
A That's correct. I left there. My wife started a master's degree program in Baltimore. Well, she was accepted to one and **was** going to start one the

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coming fall. And we wanted to move closer down to what we thought would be an easy commute to Baltimore.
Q And you stayed at Saint Mary's Hospital for how long?
A I think 1 was there about four months.
Q And why did you leave there?
A I wanted to move up closer to D. C. And I got a job at Washington Hospital Center in Washington, D. C.
Q How many bed hospital was Saint Mary's?
A I don't remember, but it wasn't very big. I think it was probably less than 200.
Q And you went to a hospital in Washington, D C What was the name of that hospital?
A Washington Hospital Center.
Q Am I missing that? Is that on your c v ?
A I don't have my c.v. in front of me, but I'd be surprised if it's not on there. It's called Washington Hospital Center in Washington, D. C.
Q And how long were you there?
A Just under two years.
Q And why did you leave there?

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A I got a job at Providence Hospital, also in Washington, D. C., that I thought was going to be a better position.
Q Did you go to that position?
A Yes.
Q And how long were you there?
A About six months.
Q And you left there. And why did you leave there?
A We decided to move out of the city altogether and moved over to the Eastern Shore of Maryland. And so I left that job and started a new one over here.
Q Where at? It says you were at Southern Maryland Hospital Center, locum tenems, in June of 2000. Were you at Southern Maryland Hospital Center?
A June of 2000, I think I did a week there as a locum tenems. That was while I was still at Washington Hospital Center.
Q Where are you currently at, Doctor?
A Right now I'm at Chesapeake Surgery Center in Salisbury, Maryland.

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Q Is that a hospital?
A It's an outpatient surgery facility.
Q Do you have hospital privileges anywhere right now, Doctor?
A I have not stopped my privileges at Washington Hospital Center and Providence Hospital, but I don't go there anymore.
Q Doctor, have you ever been discipliiied by either a hospital or any medical organization --
A No.
Q -- for any reason?
A No.
Q So your job right now is at Chesapeake Surgery Center?
A Yes.
Q And where is that located?
A Salisbury, Maryland.
Q Is that an outpatient facility?
A Yes.
Q Do any patients at this surgery center ever spend the night?
A No.

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Q So they come in for same-day surgery, and they leave. Is that correct?
A Yes.
Q And when did you first start? What was the exact date, Doctor, if you can recall?
A I think it was early May of 2001.
Q Do they do pain management at Chesapeake Surgery Center?
A Yes.
Q What's your percentage of pain-management patients at that center versus anesthesiology patients for surgery?
A I would say that it varies from time to time, but it probably averages roughly 20 percent pain management.
Q How many patients do you see a day, approximately?
A On an average, probably eight a day.
Q What kinds of surgery do they do at Chesapeake Surgery Center?
A They do pediatrics and adults, both healthy and sicker patients, for just about any kind of

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procedure where they should be expected to go home that day.
Q 1want to limit it to gynecological or obstetric type surgeries. What type of obstetrical or gynecological surgeries are done at Chesapeake Surgery Center?
A We do laparoscopic examinations. We do laparoscopic tubal ligations, D and C's, hysteroscopies, exams under anesthesia.
Q Anything else?
A And I think that would probably be about it.
Q Well, you don't do total abdominal hysterectomies there, do you, Doctor?
A No. That wasn't in the list I just gave you.
Q Right. And I just wanted to confirm that you don't do those procedures at Chesapeake Surgery Center where you've been employed since May 2001. Is that correct?
A That's right.
Q Are you an employee of Chesapeake Surgery Center, part owner, independent contractor, what?

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A I am an independent contractor.
Q Who owns Chesapeake Surgery Center?
A Peninsula Surgical Group.
Q Are you an employee or a part owner of that group'?
A No.
Q Doctor, did you pass your board certifications on the first attempt?
A Yes.
Q Have you, Doctor, ever become familiar with the American Society of Anesthesiology standards?
A I have looked at them from time to time.
Q Have you had an opportunity to look at them within the last week?
A I don't think so.
Q Did you discuss those with Mr. Rispo at any time prior to this deposition?
A I don't remember whether I have or not.
MR. CONWAY: Did he discuss this with you, the ASA standards, before the deposition?
MR. RISPO: No.
BY MR. CONWAY:

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Q Doctor, approximately how many depositions have you given, Doctor, duriiig the course of your expert-witness career?

A I would say that I am in the upper 30's, but I don't know the exact number.

Q And how many times have you testified in trial, Doctor 7

A **1** believe six or seven.

Q Obviously, from your deposition testimony, it's clear that you do the (audio gap) amount of testifying for (audio gap) --

A Are you still there?

(Off the record while the connection is reestablished.)

BY MR. CONWAY:

Q Doctor, caii you hear me, Doctor?

A ***Yes.***

Q Doctor, is it true that you do the majority of your expert-witness testimony on behalf of doctors and/or hospitals?

A **No.** I do **the** majority of my work on behalf of the plaintiff.

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Q And that's your testimony under oath, Doctor?

A Yes.

Q What percentage do you testify that you do expert-witness review on behalf of the plaintiff,

A Probably **90** percent.

Q Have you kept recoids associated with your expert-witness enteiyrise which would substantiate those numbers?

A I don't really **have** records or logs. But I can tell you all of my defense cases, which aren't very many. And I must have at least ten times as many plaintiff cases.

Q Doctor, have you done work for a law firm that Mr Rispo is a partner with, Weston, Hurd in Cleveland, Ohio?

A I don't think so.

Q Have you done work for Jeffrey Van Wagner in Cleveland, Ohio, with another defense law firm?

A ***Yes.***

Q And Jeffrey Van Wagner -- I believe he's with Oiner and Burn. How many cases have you been an expert for him?

A **I** thinkjust one.

Q That particular case, that was Metro Health Center of Cleveland, Ohio, correct?

A I don't remember exactly. I think that's what it was. But I was more on the defense on the anesthesiologist, and I don't remember his name.

Q Okay. But that case in Cleveland you were an expert witness for a defendant doctor. Is that correct?

A Yes.

Q Are there any cases in Cleveland where you can think of that you were an expert for the plaintiff?

A Yes, except I can't remember the name of the plaintiff. But I think that the attorney's name was Cohn. C-o-h-n I think is the way he spelled it.

Q Doctor, have you done any defense work for any other Cleveland law firms?

A I'd have to go back and look. There is another defense case that way somewhere, but I don't remember whether it was Cleveland or not.

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Q How did Mr Rispo come to get your Web page, address, or name or information about you?

A **I** don't know.

Q Did he ever indicate to you how he found out about you?

A He may have, but I don't remember. I just assumed that it probably came through Van Wagner's office.

Q Why would you assume that?

A Because they are both in Cleveland.

Q Doctor, you're not board certified in critical care medicine, are you?

A **No.**

Q Have you ever taken the boards?

A **No.**

Q Are you board eligible?

A I don't think I ani, no.

Q How much did you charge Mr. Rispo for your review of the case?

A I charge $250 dollars an hour, and I don't know how many hours I have in it altogether.

Q And how much are you going to charge to come

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and testify live at trial',
A I charge $2400 dollars for the day, plus I like to have my expenses taken care of.
Q So $1,000 dollars an hour plus expenses, is that right? Or am I, like, total -- $100 dollars an hour plus expenses?
A Well, if you break into a 24-hour day, I guess it would be $100 dollars an hour. But I hope it's just an eight-hour workday.
Q Okay I thought I was going to be able to impeach you with even higher than that I mis-added How many hours have you put into your review of this case up until now, Doctor?
A I didn't look at that before coming over here, so I guess I'd have to get back to you on that. But it's probably in the area of about ten hours altogether.
Q And you're charging the plaintiffs how much per hour to take your deposition, Doctor?
A I'm not charging by the hour. I'm just charging for the whole deposition as one fee.
Q All right And how much are you charging?

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A $1400 dollars.
Q So if we took a two-hour deposition, that would work out to a non-refundable $700 dollars an hour Is that correct"
A That's right.
Q Doctor, you havc --
MR. RISPO Excuse me But I think to set the record straight, the doctor had to drive two and a half hours to get to the meeting site and has to return home two and a half hours after this deposition That time should also be included in that rate.
MR CONWAY We'll take that up afterwards, all right? At $700 dollars an hour I want him to do the talking
MR RISPO Well, now let's be fair
MR CONWAY We will be fair afterwards We'll discuss all of that He's got his money for this, and we've paid these people So, I mean, we can take that up later
BY MR CONWAY
Q Doctor, do you have your file in front of you right now?
A Yes.
Q All right You tell me --just give mc an itemized list of what materials you have in front of you.
A I have the office records from Paul Bartilucca or Bartiluca -- I'm not sure how you say his name -- the office records of William Richardson, the death certificate of Nancy Armstrong, the Amherst Hospital records from the hospitalization starting August 7th, 1999. I've got something called the Complaint in the Court of Common Pleas for Lorain County, Ohio. I've got my report dated July 10th, 2001. I've got a report of Allen Kravitz. I've got the deposition of Dr. Celerio. I've got a report of Dr. Lyons, a report of Dr. Mendelson, the deposition of Dr. Bartilucca, a report from Dr. London, a couple of reports from Dr. Smithson and his deposition, a report of Dr. Watts, a report from Dr. Burkons.
Q Anything else?
A I've got two articles, one called "Sudden death in a patient with amyloidosis of the cardiac

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conduction system" from the British Heart Journal, 1984; and one, The American Journal of Medicine, Volume 62, "The Conduction System in Cardiac Amyloidosis."
Q Anything else, Doctor?
A No.
Q Do you have the deposition of Dr. Richardson?
A Yes, I do. I'm sorry; I had that underneath his office file.
Q Do you have any correspondence from Mr. Rispo to you, including enclosure letters?
A 1do, but I don't have those with me.
Q Why wouldn't you bring those with you, Doctor?
A Because they didn't have any influence over my opinions; and I just brought the records, so I wouldn't have a lot of extraneous things on the desk here.
Q Doctor, how inany pieces of correspondence to you estimate that you forgot to bring with you or chose not to bring with you to this deposition',

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A Probably five or six. With each thing I got, I got a little letter that said, "Here's the thing you're getting."
Q Doctor, you have those at your office. Is that correct?
A Yes.
Q And obviously if we made a -- I believe we sent a notice out with this deposition for your entire file. Doctor, you'd be in a position to make those available to Mr. Rispo so he could provide those to us, would you not?
A I never got a notice like that, but I don't mind providing them to anybody.
Q Doctor, how many drafts of your report did you make?
A Just the one that I submitted.
Q Did you write out any notes regarding your review of the depositions or the medical records?
A **No.**
Q These two articles -- could you hand those to the court reporter, so she could mark those as exhibits, please?

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THE WITNESS: (Complying.)
MR. CONWAY: Let's mark the British article Plaintiffs Exhibit Number 1.
(Whereupon, the document was marked Plaintiffs Deposition Exhibit Number 1, for identification.)
MR. CONWAY: And we can mark the second exhibit -- what journal was that from, Doctor?
THE WITNESS: The American Journal of Medicine.
MR. CONWAY: Why don't we mark that as Exhibit Number 2?
(Whereupon, the document was marked Plaintiffs Deposition Exhibit Number 2, for identification.)
THE WITNESS: I did have one piece of correspondence.
MR. CONWAY: We can mark that Exhibit Number 3.
(Whereupon, the document was inarked Plaintiffs Deposition Exhibit Number 3, for identification.)

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BY MR CONWAY
Q What's that piece of correspondence that you happened to bring?
A That's a facsimile cover sheet for the two articles that I received by fax from Mr. Rispo.
Q Oh, I'm sorry I was under the impression you had done some medical research Those articles were actually provided to you by Mr Rispo?
A Yes, at my request.
Q What date is that fax cover letter?
A **5-10-02.**
Q Did you have a phone conversation with Mr Rispo before he faxed those medical articles to you?
A Yes.
Q And why don't you tell me about that conversation?
A I asked him if there were any articles that anybody else might be relying on or using for this case that might have any interest. And he said he thought there were a couple of them. And I just asked him to fax them to me.
Q Who did Mr Rispo tell you was relying upon

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these two articles?
A He didn't tell me anybody was relying on them. I just asked him if he had any that other people may have been using or he used himself. And he didn't give me any names at all.
Q Did you do any medical literature research on your own in this case?
A No. I didn't really need to. The issues were fairly basic to me.
Q Are you, pursuant to you advertisenient, backing up your opinions with any medical literature other than what Mr Rispo has provided you?
A Not really. I don't think I need to.
Q Did you need the things Mr Rispo sent you in order to formulate your opinion in this case?
A No. I only got these about ten days ago. My opinion was already fairly solid. Actually it was totally solid at that point, and the articles actually didn't help me at all.
Q Did they help Mi Rispo at all, if you know from your conversation with him?
A I don't know.

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Q Doctor, how much a year do you generate in expert-witness income from your business as an expert witness?
A I don't know.
Q Approximately how much, Doctor?
A I don't have any approximation on that.
Q Doctor, I don't mean to be difficult But you just would have filed your income tax for this year Do you have an approximation you can give me as to -- you can do it one of two ways, Doctor, either how much you generated in dollars for your expert-witness business; or you can give me a percentage of your overall income that you generated as a result of your expert-witness business You give me whatever is your pleasure I don't mean to pry
A I think that around **15** percent of my overall income would have been from expert witnessing.
Q Doctor, what's your Social Security number'
A I don't give that out, but I'll be happy to give you my tax ID number if you want that.
Q That's fine You can give me your tax ID number

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A It's **522312872.**
Q Doctor, you had an opportunity to read the coroner's verdict in this case, didn't you?
A Yes.
Q And in that coroner's verdict, the coroner in this case had a finding that Nancy Armstrong was suffering from massive cardiomegaly with pericardial effusion
A That's right.
Q Based upon your review of the medical record and what the testimony has been in this case, would you agree with that anatomic diagnosis of massive cardiomegaly with pericardial effusion?
A Yes.
Q All right What is massive cardiomegaly, Doctor?
A That is an enlarged heart that is more enlarged than the usual enlarged heart.
Q Okay Now, for someone the age of Mrs Arinstrong in this case, how much should hei heart have weighed if it was normal size?
A I don't know the exact number for that, for

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the range of numbers.
Q Is massive cardiomegaly in a patient an absolute contraindication to putting them under general anesthesia?
A No.
Q What kind of patient, Doctor, would you as an anesthesiologist -- what kind of surgeries would -- strike that.
What kind of surgeries, Doctor, would you put a patient under when that patient is suffering from massive cardiomegaly with pericardial effusion?
A I don't think there are any surgeries that I wouldn't do if I counseled the patient to their additional risk because of that and also if I had the appropriate equipment that I would need to safely put them to sleep.
Q Doctor, would it be below the standard of care for an anesthesiologist not to counsel a patient with massive cardiomegaly with pericardial effusions about her condition prior to putting them under7
A It depends on the doctor-patient relationship that they have and how much information

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the patient actually wants to know.
But in general it's --the usual standard of care would require some discussion of risk. Whether or not the specifics are something that the patient wants lo know would be something that I can't tell in this case.
But sometimes patients just don't want to know anything about what's wrong with them. They just want to what their risk is. And sometimes they don't even want to know that.
So the standard kind of varies. You can't force them into a conversation. But you should **at** least tell them their relative risk under anesthesia in order to have a complete informed consent.
Q Well, Doctor, would you agree that there is a difference in risk between a patient with massive cardioinegaly and a patient with a normal-sized heart, all otlicr things being equal?
A I'm not sure what you mean by all other things being equal. If all other things are normal, then the risk would be greater with the patient with massive Cardiomegaly.

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Q And why is a patient with massive cardiomegaly more at risk when surgery entails putting them under completely with anesthesia?
A Because the size of the heart versus the amount of blood flow that it can receive for its own nutrient and oxygen consumption is proportional -- or actually inversely proportional. The larger the heart, the harder it is to feed.
So if you have a stressful situation like under anesthesia in the operating room, then you can expect more difficulty in feeding the heart, so to speak, if you've got larger heart, especially --
Q In -- oh, I'm sorry Go ahead, Doctor
A I was going to say especially because the time frame that most of the heart relies on for blood flow is during the diastolic phase, the resting phase, of the heart, in which case the peripheral vascular system, its elasticity and contractility -- it's the ability to do those things which improves the blood flow to the heart, back flow, that is, to the heart.
So all things being equal, if you've got normal vasculature, then a larger heart would be

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expected to suffer more than a smaller heart.
Q Doctor, putting a patient under general anesthetic is a significant stress upon that patient's heart, isn't it?
A I think it's a stress on the heart. I think the degree of significance is related to the kind of health that the patient is in. Some patients, I don't really think it's much of a stress at all. But other patients, it's extremely stressful.
Q Patients who might be suffering from an ongoing myocardial infarction -- would that be stressful to them to put under a general anesthetic?
A Yes.
Q Patients suffering from amyloidosis involving the heart -- would that be stressful to those patients to be put under anesthetic?
A Yes.
Q Doctor, if you knew that a patient was suffering from amyloidosis involving the heart, would you put that patient under full general anesthetic for a total abdominal hysterectomy?
MR RISPO Let the record reflect the

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objection There is no evidence whatsoever in this case that anybody knew of the patient's condition of amyloidosis before she was induced into surgery or anesthetic And questions along that line are totally unfair
MR CONWAY You may answer the question, Doctor Could you please repeat that, Madam Court Reporter?
(Whereupon, the Reporter played back the tape, as requested)
MR CONWAY You may answer, Doctor
THE WITNESS The question was whether or not I would be willing to put a patient with amyloid heart disease under general anesthesia And the answer would be yes
BY MR CONWAY
Q For a total abdomiiial hysterectomy, Doctor')
A Yes.
Q What type of iiiduchon agent would you use, Doctor?
A Well, there would be things that I would be doing before induction if I actually knew somebody had

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amyloid heart disease. So --
Q Rut my question is what agent would you use to put a patient who's suffering from primary amyloidosis under general anesthesia?
A Well, I think that that question --I can't answer that without telling you what I would do preoperatively, because it wouldn't make any sense to put them to sleep with amyloid heart disease without --
Q Okay Tell me what you would do preoperatively, then, Doctor
A Well, first of all, I would examine the patient thoroughly, and I would look at their available medical records if I had any. And I would counsel them thoroughly to talk about their risks under anesthesia, which would be significant.
And then they would require some invasive monitoring, which would include an arterial catheter and a pulmonary-artery catheter. And then I would put them to sleep.
Q What agent would you use, Doctor?
A Well, it would depend on what else they had

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wrong with them. So if you can give me more details about the rest of their medical problems, I can be more selective about the medications that I would use.

Q Okay How about they have cardiomegaly, massive cardiomegaly; they have pleural effusions, they have shortness of breath upon minimum exertion, they have edema of the feet Let's start with that What kind of agent would you use with a patient who -- oh, they have just had an EKG which is read by a cardiology group to be a possible MI, age undetermined.

Giving you those set of circumstances, Doctor, in a hypothetical, you being the anesthesiologist, what type of agent would you use to put that patient under?

MR RISPO Let the record reflect a continuing objection based upon this hypothetical, asking the doctor to assume the patient had amyloidosis of the heart and all these other conditions, when those conditions were not in fact known, and the same objection as relates to cardiomegaly, when in fact that was not known at the

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time the patient was put under anesthesia

MR CONWAY Okay And I'd like to go on the record -- and I'm not going to start a fight But the proper way to object is to object There are no speaking objections

And if you want to instruct him to not answer a question, if you feel you have the right to do so, please do so or object But please don't coach the witness

BY MR CONWAY

Q Anyway, Doctor, given that --

MR RISPO If you ask a fair question, then we won't have problems

BY MR CONWAY

Q Given that hypothetical, Doctor, your putting yourself in the position, what agents would you use for that particular patient?

A Well, first of all, that patient would be a very high risk of problems under anesthesia; and they would have to know that and accept those risks, knowing that their survival rate wasn't anywhere near as good as a normal person coming into the operating

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room.

If they really wanted the operation and were willing to undergo the risks, it wouldn't be an impossible case to do. it would just be extremely risky.

And I would use as an induction agent most likely Etomadate or a very low dose of Pentothal. And I would titrate those on carefully and slowly and watch how things go.

Q And I think you mentioned in there that if you had concerns about different risk factors for a given surgery, you would make the patient aware of those risk factors, so they could make an inforincd and voluntary consent to that surgery. Would that be correct?

A Yes. That would also be after knowing for sure that the patient was optimized for surgery. I simply wouldn't just take somebody to the operating room unless I knew for sure that they were as good as they were going to get.

If the patient had no chance of getting any better or any healthier and still needed the

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operation, then I would be willing to do it.

But the risk and the assumption of that risk would be on the patient, and I would counsel them about that.

Q Okay

A I've taken patients to the operating room a lot sicker than this lady.

Q Okay And I would assume that you explained exactly what all the risk factors and possible problems were associated with their conditions and the administration of anesthesia, correct?

A I would tell them as much as they really wanted to know. If they wanted to know everything and they wanted me to sound like a textbook, I would be happy to do that for them.

Or I would just tell them that their chances of dying were pretty darned high, but I would do my best to keep them alive if something bad happened.

Q Doctor, would you agree that the American Society of Anesthesia's statements on preoperative laboratory and diagnostic screening are reasonable and prudent standards?

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A I'd have to see exactly what you're talking about. But generally most of those standards that they put out are reasonable and prudent.

Q Doctor, would you agree with the proposition that individual anesthesiologists should order tests when, in their judgment, the results may influence decisions regarding risks and management of the anesthesia in surgery?

A Yes.

Q Do you agree that relevant abnormalities in the patient's condition should be noted and action taken if appropriate?

A Somebody was rattling some papers. I couldn't hear the first part of that question.

Q Would you agree that relevant abnormalities in a patient's condition pre-surgically should be noted and then actioii taken if appropriate?

A Yes.

Q Would you agiee, Doctor, that minimal patient care should include preoperative instructions and preparation?

A To whom?

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Q From the physician to the patient

A Yes.

Q Do you agree that minimal patient care shouid include appropriate pre-anesthesia evaluation and examination by an anesthesiologist prior to anesthesia and surgery?

A Yes.

Q Do you agree that minimal patient care should include, in the event that non-physician personnel are utilized in the process, that the anesthesiologist must verify the information and repeat and record essential key elements of the evaluation7

A I'm not sure what they mean by repeat. But if it's something that is an easily repeatable thing like listening to lungs or heart or airway exam, then I would agree with that.

But I wouldn't repeat a lab just because it's essential if the one that I've got is already good enough.

Q Would you agree that minimal patient care should include preoperative studies and consultations as medically indicated?

A Yes.

Q Would you agree that an anesthesia plan developed by an anesthesiologist and discussed with and accepted by the patient is a requirement of the minimal patient care that should be provided by the anesthesiologist to the patient?

A Yes.

Q Doctor, going to the standards that the American Society of Anesthesiology puts forth, to your knowledge and belief, do you feel that these standards are reasonable and prudent standards7

A I think you asked me that earlier. And I think that they are.

Q Okay. I was talking about there were certain guidelines that I was referring to that the ASA issued. Now I'm speaking of certain specific standards that they've issued, okay7

A The thing that I think is important is guidelines are guidelines. They're not exactly rules. They are things that are suggestions.

The ASA standards are things that the

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society has decided are the way things should be done. But guidelines are simply there to guide you, not to tell you what to do.

Q Do agree with standard number one of the standards of the American Society of Anesthesiologists, which states that, "An anesthesiologist shall be responsible for determining the medical status of the patient, developing a plan of anesthesia care, and acquainting the patient or the responsible adult with the proposed plan"?

A Yes.

Q Do you agree that the development of an appropriate plan of anesthesia care is based upon, one, reviewing the medical record, two, interviewing and exaininiiig the patient to discuss the medical history, previous anesthetic experiences, and drug therapy, and being assessed those aspects of the physical condition that might affect decisions regarding perioperative risk and management? Do you agree7

A Yes, to the extent that the patient really wants to know or cares.

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Q Do you also agree that the development of an appropriate plan of anesthesia care includes obtaining and/or reviewiiig tests and consultations necessary to the conduct of anesthesia?

A Yes.

Q Do you agree that the standard for an anesthesiologist includes that the responsible anesthesiologist shall verify that all of the above items that we've discussed, Doctor, have properly been performed and documented in the patient's record? Do you agree with that, Doctor?

A I think that they should all be performed. I'm not so sure about the documentation part of it, because sometimes if the record is well documented already, I don't see anything wrong with saying, "See labs," or, "See H and P for more details," or something like that.

But there ought to be some sort of reference, if you found somethiiig abnormal, to where you would go to get more information.

In other words, as an example, if there was a cardiac clearance, on my preoperative sheets I just

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write -- there is a box on there that I can check off "cardiac clearance done, medical clearance finished." And I write the guy's name down, so I know where I can go to get that or where I can find it in the chart rather than --

Q But you would -- right, I follow that, Doctor But you would have verified the results of that pre-cardiac clearance prior to in short form initialing off on it, correct?

A I verify it one way or the other. It can be either verbal or a written statement that I've gotten in advance.

Q From the physician, correct, who did the clearance?

A Yes. I always get it from a --well, it doesn't have to be from the physician that did the clearance. It can be through another physician that has gotten the clearance for their own patient or something like that.

Q In this particular case, Nancy Armstrong, during the perioperative time period of this surgery, meaning before the surgery as well as duriiig the

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surgery, was a patient of Dr Celerio's, correct?

A She became a patient of Dr. Celerio's as soon as the informed consent was given. And she decided to allow him to anesthetize her.

That's when I think you actually become somebody's patient.

Q Would you agree that pre-anesthetic evaluation and prepaiation means that an anesthesiologist reviews the chart, interviews the patient to discuss medical history, including anesthetic experiences and drug therapy, and performs any examinations that would provide information to the anesthesiologist that might assist in decisions regarding risk and management? Do you agree with that7

A Yes.

Q Do you agree that the anesthesiologist has a duty to record his or her impressions formed in connection with the patient's presurgical anesthesiology evaluation in the patient's chart?

A Say that again, please.

Q Okay We're at the preoperative

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anesthesiology clearance phase of the case prior to the patient's being put under, okay?

A They've already gone through preadmission testing, and their pre-anesthetic visit'?

Q Right Well, we're dealing with the time period where the anesthesiologist is actually making the pre-anesthetic or presurgical visit, okay?

A Okay.

Q Do you agree, Doctor, that the anesthesiologist has the duty to record his impressions in the patient's chart?

A I'm not sure what you mean by impressions. But I think the anesthesiologist has a duty to write something in the chart. And that can be something as simple as "healthy for general anesthetic."

I don't write everything that's normal. I think the word "normal" is good enough sometimes. That can encompass a whole range of things.

Q Do you put abnormalities into the chart, Doctor, and your impressions regarding the significance of those abnormalities?

A I don't always put the impressions, because

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when I do my own pre- -- if I was doing a preoperative visit for somebody else, I may put my impressions there.

Rut if I'm doing it for myself and for minutes later I'm putting the patient to sleep, I don't need to put down the impressions. I put down the abnormalities, and 1know in my brain how that affect what I'm getting ready Io do.

Q Doctor, have you ever seen the X-ray showing Mrs Armstiong's cardiomegaly?

A No.

Q You can read plain X-rays, correct?

A Well, I'm not a radiologist, but I can look at an X-ray and find abnormalities on it. And I can find what I'm generally looking for from an anesthesiology point of view.

Q And if you had a case involving a patient who had an X-ray showing an enlarged heart, you would be able to look at that X-ray and be able to observe the enlarged heart, correct?

A Yes.

Q All right And the standard of care would

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require a reasonable and prudent anesthesiologist to be able to look at a plain-film X-ray and see a case of massive cardiomegaly, correct?

A I don't know if the standard of care would require you to have that ability or not. I think the standard of care in anesthesiology would require you to know what to do with a patient that has a massive cardiomegaly, not necessarily interpret raw data. Rut you ought to be able to know how that affects what you're getting ready to do.

Q What would the standard of care in this particular case, assuming Dr. Celerio became aware that Mrs. Armstrong had cardiomegaly -- make that assumption, that he became aware of that. What would the standard of care have required him to do?

MR. RISPO: Objection. Go ahead.

THE WITNESS: The standard of care would have required him to inquire -- if that's all he knew about her, he would need to inquire about why she may have a cardiomegaly.

Probably 95 percent of patients with cardiomegaly -- and by the way, I put cardiomegaly

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patients to sleep almost every day. It's extremely prevalent. Almost all the long-term hypertensive patients have it.

And that would be what you would ask, whether or not you've ever had hypertension, whether you still have hypertension, whether you've ever been known to have any sort of cardiomyopathy or any history of any cardiac disease, that kind of thing, and then talk about the additional -- or at least keep in mind the additional risks and things that you need to be looking for on an EKG intraoperatively and how to avoid trouble with an enlarged heart. It's not that unusual of a problem.

Q And it's not that unusual to have cardiomegaly that's accompanied by pleural effusions?

A It's much more unusual to have cardiomegaly with a pleural effusion.

Q Because what can pleural effusions indicate to you, Doctor, as a trained anesthesiologist, if it comes in connection with an enlarged heart?

A Probably the most common cause of pleural effusion is some sort of an inflammation of the

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pleural lining either of the lung or the chest wall, which is sort of the same kind of lining that goes around the heart, the pericardium, the pericardial lining, that is.

And it gives you an idea that there may be some kind of inflammation somewhere in the chest that causes fluid to accumulate there.

Q Would you as a reasonable anesthesiologist look further, investigate into that situation, prior to putting a patient under?

A It depends on the size of the pleural effusion. A lot of patients actually have little pleural effusions over in the far corners of their chest X-rays, so to speak. And they are not really of that much significance.

We see them a lot, especially in older people. On the chest X-ray they're called blunting of the costophrenic angle. And it's usually from a little pleural effusion. A lot of that is just old age.

So if they had a large pleural effusion, I would investigate that further. If it's small and

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inconsequential to the patient and it hadn't gotten any worse and they are no **worse, then I may not do anything about it at all.**

Q what was the cause, in your opinion, Doctor, of the infiltrates that showed upon Mrs Armstrong's chest X-ray?

A I believe that the infiltrates were felt to be some sort of atelectasis, which is collapsed alveoli in the lungs.

Q Looking at things retrospectively from the perspective of hindsight, do you have an opinion as to what those apparent infiltrates were in actuality?

MR RISPO Objection to hindsight

THE WITNESS It's almost impossible to tell for sure what those were after the patient went through CPR and so forth It really messes up the lungs

But it would probably still most likely have been some sort of atelectasis She may not have taken a full deep breath at the time she had her chest X-ray Some people actually breathe in and out of atelectasis with deep bieaths Their lungs collapse

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Their small airways and alveoli I mean.

So it may be something that she has chronically, aiid it was just a poor inspiratory effort, which on chest X-ray will give you the atelectasis effect.

And it can also add to the illusion of a cardiomegaly, because cardiomegaly is based on the size of the heart in conjunction with the rest of the chest.

If she didn't have a decent inspiratory effort, it could have been part of that.

But I would say it's probably atelectasis mainlyjust from not moving around very much. She probably doesn't take too many deep breaths -- or didn't then anyway.

BY MR. CONWAY:

Q Doctor, as an anesthesiologist, is it important to know whether a surgical patient has a heart condition oi heart problems prior to putting a patient under general anesthetic?

A Yes.

Q Doctor, is it important to know whether or

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not a -- strike that

Would you agree that prior to Nancy Armstrong's surgery she exhibited various symptoms of a heart condition?

MR FRASURE At what point, now?

BY MR CONWAY

Q Within a week of her surgery, she was exhibiting different signs and symptoms of **a** heart condition

A She had been exhibiting different signs and symptoms that could have been consistent with heart problems for months. And she had some ofthe similar complaints over the week or two prior to surgery.

Q Doctor, it's important for an anesthesiologist to know whether or not a patient has a bad heart prior to the adininistration of general anesthetic, since the administration of a general anesthetic to a patient with a bad heart can cause the patient's death, correct?

A Yes.

Q Doctor, in this particular case, we know now, looking back, that Mrs Armstrong was suffering

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from primary amyloidosis, correct --

A I believe --

Q -- on August -- go ahead I'm sorry

A Yes.

Q Specifically on August 7, 1999, correct?

A Yes.

Q Would you agree that, had Dr Celerio not given Mrs Armstrong anesthesia on August 7th, 1999, she would not have died on August 7th, 1999? Would you agree with that?

A It would depend on whether or not there was another anesthesiologist at that hospital who would have put her to sleep. But --

Q Good answer, Doctor Okay, let me rephrase it, then

Doctor, I want you to -- once again, Doctor, you would agree that in retrospect Mrs Armstrong had primary amyloidosis, correct?

A Yes.

Q Isn't it true that if she would not have been given general anesthetic on August 7th, 1999, she would not have died on August 7th, 1999, correct?

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MR RISPO Objection to hindsight
THE WITNESS I don't know whether or not she would have died on that day or not
BY MR CONWAY.
Q Do you think it's more likely than not she would have lived through August 7th, 1999, had she not been given general anesthetic on that date?
A I think that the likelihood is that she probably would have lived through that day.
Q Okay So can we agree, to a reasonable degree of medical probability, which you as an expert witness know means more likely than not -- can we agree, Doctor, that to a reasonable degree of medical probability Mrs Armstrong would not have died on August 7th, 1999, had she not been given anesthetic by Dr Celerio?
MR RISPO Objection to hindsight
THE WITNESS I don't know the exact answer to that But I would say that the fact that she got an anesthetic and died shortly after induction would lead me to believe that the induction of anesthesia had something to do with her death

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BY MR. CONWAY:
Q Well, Doctor, she wouldn't have died on that day but for being anesthetized, correct?
A Well, I don't know for sure. I think it's less likely that she would have died on that day, but I can't tell you a hundred percent.
Q I'm not asking you a hundred percent, Doctor. You've testified in Ohio before in medical malpractice cases, correct?
A Yes.
Q You are then familiar with the degree of certainty that a doctor must have in an opinion in order to be able to testify in an issue, correct?
A That's right.
Q All right. In Ohio you're aware, if the existence of a fact is more likely than not, all right, that means that it exists to a reasonable degree of medical probability? You would agree with that, correct?
MR. RISPO: Objection.
THE WITNESS: I would say yes.
BY MR. CONWAY:

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Q Okay, Doctor. If--
MR. RISPO: Let's go back to the hypothetical, and let's agree that what you're asking is whether she would have died with the combination of primary amyloidosis and anesthesia at the same time. She wouldn't have died with one or the other, but she would have died with both.
MR. CONWAY: Well, you ask whatever you want, Ron.
BY MR. CONWAY:
Q My question is -- I thought it was pretty simple, Doctor. More likely than not, isn't it a fact that, had Mrs. Armstrong not been given anesthesia on August 7th, 1999, she would not have died on that date?
MR. RISPO: And it's equally likely she would not have died --
MR. CONWAY: Please --
MR. RISPO: -- if she didn't have primary amyloidosis. Now, the question is totally unfair.
MR. CONWAY: You know, I'm putting up with a lot. Please, this is my deposition. If he can't

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answer the question, fine. He's going to have to answer it eventually anyway.
MR. RISPO: Ask it in a fair way.
BY MR. CONWAY:
Q Doctor --
A Yes?
Q -- do you believe that Mrs. Armstrong would have died on August 7th, 1999, had she not been given anesthesia, in light of the fact that she had an underlying condition of amyloidosis?
MR. RISPO: Thank you.
THE WITNESS: I think that if Dr. Celerio or any reasonable anesthesiologist knew that she had amyloidosis in particular of the heart and vascular system, it is unlikely that she would have died in that operation.
BY MR. CONWAY:
Q Okay. But that's not my question. My question is, Doctor, in light of the fact that Mrs. Armstrong had an underlying condition of amyloidosis, isn't it a fact that if she had not been given anesthesia on August 7th, 1999, she, to a reasonable

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degree of medical probability, would not have died on that date, correct?
A I think that the way I understand the question is I think that she would not have died on that date if she did not have amyloidosis of the heart with this induction of anesthesia with what Dr. Celerio knew. Did that answer your question?
Q No, it didn't, Doctor. But we'll move on to something else, since I'm paying $700 dollars an hour Doctor, would you agree that an anesthesiologist has an independent duty to clear a patient for surgery?
A I actually think that the only person that can clear a patient for surgery is the anesthesiologist or anesthesia provider if there is no anesthesiologist there.
Q So in this particular case, it would have been Dr Celerio's obligation to clear the patient for surgery, correct?
A Well, I think that the best thing I can do right now is answer your question. But first I have to preface it with what I think is the definition of

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clearing somebody for surgery.
Q Okay.
A Clearing somebody for surgery is actually saying they are ready for surgery, and they are doing about as good as they can get for this particular surgery on this date with its degree of urgency. And nobody can do that besides the person that's actually giving the anesthetic.
Q And that's the anesthesiologist, correct?
A Right. We often talk about internal-medicine people or cardiologists clearing patients. But they're not really clearing them. They're just telling us that they're as good as they're going to get. And as far as they're concerned, they're not going to get much better.
And knowing those risks with whatever the patient has going on with them, go ahead and do your anesthetic. They're not saying that the patient is in perfect condition.
Q This was not an emergency surgery, was it, Doctor?
A I think it was described as urgent but not

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an emergency.
Q Right And I believe one of the doctors, possibly Dr Bartilucca, testified that this surgery could have been done at a later point in time Would you agree with that?
A I don't remember his exact words. But most urgent procedures can be done at a later time.
Q Doctor, you're board certified in anesthesiology, correct?
A Yes.
Q What's the significance of being boarded in anesthesiology?
A The basic answer to that is, after you finish your training, you can answer the questions.
Q Well, you obviously at some point determined it was worthwhile to become board certified in anesthesiology, correct, Doctor?
A Yes.
Q And what was the reason you thought it was worthwhile to become board certified in anesthesiology?
A I wanted to, first of all, know for myself

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that I was able to answer the questions. And that way I thought that I would have done my best in training.
And also there was a financial incentive, since I was in the service. They give you an extra $2,000 dollars a year.
Q Okay So obviously your employer at that time, U S service, whatever branch you were in, felt it worthwhile to have an employee who was board certified in anesthesiology, correct?
A Yes. It was the U. S. Navy that I was in at the time.
Q Doctor, are you familiar with the guidelines for perioperative cardiovascular evaluation for non-cardiac surgery which was issued by the American College of Cardiology, the American Heart Association task force?
A I've read up on various things like that over the years as they come out. I guess you'd have to ask me a specific question about it, because there's new guidelines all the time from different sources. And I don't remember who did what.
Q This was a report issued in 1996 It was a

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task force on the practice guidelines issued by the Committee on Perioperative Cardiovascular Evaluation for Non-Cardiac Surgery

At any point do you recall having read this report?

A I don't recall specifically reading it, but I'd be surprised if I have not read it somewhere over the years.

Q Doctor, I presume that you read very carefully the deposition summary of Dr Celerio?

A Yes.

Q Or deposition transcript -- I'm sorry You have read Dr Celerio's deposition transcript?

A Yes.

Q Then you're aware that Dr Celerio has various criticisms against Dr Bartilucca?

A I don't remember exactly what his criticisms are. But I didn't get the sense that -- well, I guess I can't say anything. I don't remember his criticisms.

Q All right Doctor, were you aware that Dr Celerio is not board certified in anesthesiology?

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A I think I either read that or heard that somewhere.

Q Are you aware that he is not even board eligible in anesthesiology?

A I didn't know.

Q Do you have Dr. Celerio's deposition in front of you, Doctor?

A Yes.

Q Starting at page 23 of his deposition and going through page 24 of the deposition, does that refresh your recollection as to the criticisms that Dr. Celerio had of -- some of the criticisms Dr. Celerio had of Dr. Bartilucca?

A Let me just skim it real quick.

Q Sure, take your time.

A (Perusing document.) Okay, I've read it.

Q All right. My reading of those pages as well as other pages in Dr. Celerio's deposition -- it appears to me he's putting forth -- I mean, it appears that Dr. Celerio is putting forth four criticisms of Dr. Bartilucca, okay? Do you see those criticisms in there?

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A I see criticisms.

Q All right. Do you think those are reasonable criticisms Dr. Celerio is making of Dr. Bartilucca in this case?

A I think they're only reasonable if Dr. Bartilucca knew of any of the previous medical or physical conditions that the patient had. If he did not know of them, then the criticisms are unreasonable.

If Dr. Bartilucca knew them and didn't tell Dr. Celerio, then they are reasonable.

Q All right. What about the criticism that Dr. Celerio made against Dr. Bartilucca regarding Dr Bartilucca's failure to tell Dr. Celerio of the patient's brain tumor? Do you think that that's a reasonable criticism?

A I don't think it had anything to do with this case at all. So I'm not so sure that it makes any difference.

But if Dr. Bartilucca knew of the brain tumor, it should have been in his H and P. He doesn't necessarily have an obligation to tell Dr. Celerio

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about it. But if he knew about it, it should have been in his history and physical exam. And Dr. Celerio should have read that and seen it if it were there.

Q Well, Dr Celerio indicates that the reason it was important to him was that he would have postponed the operation had he known of that brain tumor That's what Dr Celerio's testimony is, correct?

A Yes. I remember reading something about that.

Q All right So if Dr Celerio felt that it was important enough to postpone the surgery, do you agree that his criticism is reasonable, his criticism of Dr Bartilucca is reasonable?

MR FRASURE Objection

THE WITNESS I don't think that my answer to the last question changes any based on that But the only reason why any reasonable anesthesiologist would want to cancel a patient that has a brain tumor is if that brain tumor hadn't been fully described and nobody really knew what it was and how it was

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affecting the patient
In this particular case, that wasn't the case So it really doesn't make any difference in this case
BY MR CONWAY
Q And that's, I guess, my question, because you're being hired as an expert on behalf of Di Celerio
I'm asking you whether or not you agree with Dr Celerio's old criticisms in this case of Dr Bartilucca I take it you do not agree with that criticism
A I, quite honestly, don't care who I'm being hired for when I do any expert cases. i simply go after the truth. And whichever direction the truth takes me, that's where I'm willing to work.
in this particular case, i don't see why he's critical of Dr. Bartilucca at all, knowing in retrospect that this tumor was a benign meningioma that really has no effect on this patient's anesthetic in reality. So I don't know why he's criticizing him.
Q If in the patient's chart, which was

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available to Dr Cclerio pre-surgically, there was an indication that the patient had a brain tumor, should Dr Celerio have at least been aware of that chart note indicating the presence of Mrs Armstrong's brain tumor?
A I think that if any patient has a brain tumor, the anesthesiologist should be aware of it.
Q Did Dr. Celerio fall below the standard of care in not recognizing from his review of the chart pre-surgically that Mrs Armstrong had a brain tumor?
MR RISPO Objection How could he fall below the standard of care without knowing the facts?
BY MR CONWAY.
Q Can you answer that question, Doctor?
A I think that the standard of care the way I understand it is what a reasonable person would do under similar circumstances.
1 don't think there's anything unreasonable about what he did, whether he knew about the brain tumor or not, so --
Q Doctor, I'm talking -- I'm not asking about the overall -- excuse me I'm not talking about the

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overall conduct of Dr. Celerio in my questions to you. I'm asking you about one specific action.
Sliould a reasonable and prudent anesthesiologist read through thoroughly a patient's chart prior to putting the patient under anesthesia?
A I don't know if I like the word "thoroughly." But I think that the important portions of the chart should be read. There are lots of portions of the chart that I don't read, aiid I know I'm not outside the standard of care.
So I guess the answer would be no. If he did in fact read the important parts of the chart for what he was getting ready to do and he missed it, then he would simply have missed it.
I'm not so sure that makes him outside the standard of care. But it does mean that he missed something that he should have picked up.
Q Doctor, are you aware of some medical records that Dr. Bartilucca received froin Dr. Boy-Doe prior to the surgery?
A I know that there are records in Dr. Bartilucca's office-record section that I got. I

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don't know exactly when he got those. But there is talk in the deposition of Dr. Celerio that these things may have been available prior to this operation or this attempted operation.
Q The reason I asked you that, Doctor, is Di Celerio had a second criticism of Dr Bartilucca, that Dr Bartilucca had never made him aware of the fact that at one point in her medical history Nancy Armstroiig had been on the drug Redox And Dr Celerio indicated that, had he been made aware of that by Dr Bartilucca, he would not have gone forward with the surgery Are you aware of that criticism?
A Yes.
Q Do you feel that that's a reasonable criticism of Dr Bartilucca by Dr Celerio?
A It would have been reasonable if the patient was still on Redox. But since I think it had been two years prior, then it really doesn't make any difference at this point.
Q Dr Celerio also ciiticized Dr Bartilucca for not telling him that a prior doctor had recommended that in a prior surgery of Nancy

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Armstrong's that she be given a cardiac consult. Do you recall Dr. Celerio's criticism on that point?
A I don't remember it exactly, but I do remember something to that effect, yes.
Q Do you feel that that was a reasonable criticism of Dr. Bartilucca by Dr. Celerio?
MR. FRASURE: Objection.
THE WITNESS: I think that if Dr. Bartilucca knew that somebody in the past had some suspicion that the patient may have some sort of cardiac impairment and he knew about that, he had an obligation to tell Dr. Celerio.
So I think that that's a reasonable criticism of Dr. Bartilucca.
BY MR. CONWAY:
Q Do you believe that Dr. Bartilucca would have been below the standard of care for a surgeon not to give that information to the anesthesiologist, Dr. Celerio, if in fact he possessed that information?
A I think that standard-of-care questions for surgeons you ought to get from them.
But I would find it highly inappropriate for

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a surgeon to possess information that may be important to me and have them not give that to me in anticipation of surgery.
Q Do you recall Dr Celerio's testimony that, had he been given these pieces of information by Dr Bartilucca, that a cardiac consult would have been appropriate?
A I think I remember something to that effect. I don't remember his exact words.
Q Do you agree with him that, had these various pieces of information been known to Dr Celerio, he would have been reasonable in postponing surgery and getting a cardiac consult for Mrs Armstrong'
MR FRASURE Objection
THE WITNESS I think that there's a couple of different courses that could have been taken That would have been the more difficult one and not necessarily the appropriate one I think the appropriate -- go ahead
BY MR CONWAY
Q What do you feel would be the appropriate

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course if not the course that Dr. Celerio felt was appropriate?
A The appropriate thing to do under that -- I've been in that exact situation before more than once. And the thing that I recommend and that I do is I just call the primary care or the cardiologist.
And I either get copies of the most recent notes, or I just talk to the guy. Or I find out whether the surgeon has talked to the cardiologist or the primary care, whoever has been responsible for the patient's care.
And if the answers that I got in those conversations were reasonable and matched what I was seeing in front of me in terms of the patient and whatever lab data that I had, then I would go ahead with the case.
I wouldn't necessarily demand a cardiac clearance, because again I'm the only one that's going to clear the patient. And I would want to know what data was available if I was under any suspicion that there might have been something more to the patient's history than I was getting. And if somebody knew

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about it, that's the avenue that I would take.
I deal with a very sick population where I work right now. And I'm up against this kind of things all the time.
Q What kind of very sick people do you deal with in that surgery center?
A I get a lot of ASA 3's, some ASA 4's, that have simple things getting done to them. But they're very, very ill. And I get a lot of cardiac patients there.
And that's one of the reasons why they like me there actually, because I have a cardiac background. And I can sort through a lot of this stuff and get the patients safely off to surgery and wake them up so they can go home.
I'm in a different kind of situation there. I need to know that I'm going to be able to get somebody to go home that day. So I have to be very good at evaluating their hearts.
And I don't necessarily rely on what everybody else is telling me. I have to use my own judgment. In other words, I do the clearing.

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Q Doctor, when is the last time you put a patient under anesthesia for a total abdominal hysterectomy?
A April or May of 2001. No, let me restate that. It would be March or April of 2001.
Q Doctor, did Dr. Celerio have an obligation to tell Mrs. Arnistrong about the results of the chest X-ray?
A I think that you have an obligation to discuss laboratory data with the patient to the extent that they are interested. Some of them don't care, and they just don't want to know. And you can't force that information on them.
But I think it's important, if you find an abnormality on the chest X-ray, to ask them if they've ever had that before. Can they tell you anything more about that? -- and question it further.
Q Doctor, you're familiar with the EKG of August 5th, 1999, in this case, correct?
A Yes.
Q Do you have a copy of that in front of you?
A Yes. I've got to find it. Okay, I have it.

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Q Is that an abnormal EKG?
A Yes.
Q What's abnormal about that EKG, Doctor?
A There is a slight area of ventricular conduction delay. The wave forms aren't exactly normal. There is a hint of what might be Q waves in the anterior leads. And there is a left-axis deviation.
Q All of that taken together, do those findings have a bottom-line significance to you, Doctor?
A Well, the significance would be that there is something wrong with the EKG basically. And that would lead me to think that there may be something wrong with the electrical conduction system in the hear that may be either old or new. And the only way to know that for sure would be to look at old **EKG's.**
Q Now, Doctor, someone with electrical disturbances in their heart, they are greater risk for death when induced with general anesthesia, correct?
A Yes.
Q In this particular case, are you aware from

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your reading of the medical records and the depositions that a cardiology group had over-read this particular EKG?
A I'm not sure what you mean by over-read. Do I have another copy of it, do you mean, that's read again?
Q No, no. Are you aware that at one point Dr. Bartilucca's office was in contact with a cardiology group who had communicated their reading or findings of this particular EKG to Dr. Bartilucca's office?
MR. RISPO: Objection.
THE WITNESS. 1don't remember for sure I don't think 1knew that But you might be able to refresh my memory
BY MR. CONWAY:
Q There is a cardiology group that read this EKG, faxed a copy of it to the hospital, and then the hospital faxed a copy of the EKG to Dr Bartilucca's office prior to surgery Are you aware of that chronology?
A That rings a bell. I don't remember the exact sequence, though.

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Q Ringing that bell and looking at the top of that EKG, it indicates as a summary it's abnormal. And there is handwriting in there, "MI, age" -- or it says, "Consider anterior myocardial infarction," correct?
A Right. Mine's not in handwriting, though. Typed do you mean?
Q Yes. I'm sorry. In typed it says, "Consider anterior myocardial infarction," correct?
A Yes.
Q And then it has, "Summary, abnormal," correct?
A Yes.
Q Then you'll notice under, "Consider anterior myocardial infarction," written in in longhand, it says, "Age undetermined," correct?
A I don't have that on mine. That's all mine has, what you said before.
Q Okay. You have Dr Bartilucca's chart with you, don't you?
A Yes.
Q His record, all right. If you'll look at

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Bates stamp 001, I believe you'll see the copy that Dr. Bartilucca has of that EKG. It should be right at the beginning, Doctor.

MS. KOLIS: Might be under X-rays or diagnostics. I'm guessing.

THE WITNESS: Did you say on the back of his deposition or in his chart?

BY MR. CONWAY:

Q No. Well, you know what? It's also at the back of his deposition as a deposition exhibit, Plaintiffs Exhibit F. That's probably the fastest way to go.

A Bartilucca you said, right?

Q Yes.

A (Perusing document.) Oh, yes, I've seen that before.

Q Okay. And the copy that Dr. Bartilucca has, based on information his office received, someone in his office wrote, "Age indeterminate," under the, "Consider anterior inyocardial infarction."

Or what's your understanding of how that got written in?

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A It looks like Parker or something like that. Somebody read the EKG and put in a correct interpretation. The computer is often correct, but it's occasionally incorrect or only partly correct. So they are often corrected.

Q So what we have here is we have someone froin the cardiology group, correct, reading this EKG and adding to consider myocardial infarction They put in "Age undetermined," correct?

A Yes.

Q Did Dr Celerio have the obligation to tell Mrs Armstrong the iesults of this August 5th, 1999, EKG?

A If he had had -- well, any EKG he has the obligation to talk to her about lab results, what's abnormal, and ask her if she knows anything about those abnormalities and how long they've been around.

And then again that would change the risk status. And in terms of informed consent, you would want to talk to the patient about how that changes their status going into the operating room.

Q You had indicated earlier that if you weie

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-- aiid correct me if I'm wrong -- that if you were confronted with an abnormal EKG, you would want to go back and check prior EKG's so that you could compare them to the current one Is that what you stated, Doctor?

A Yes. And that's actually what I did in this case, too.

Q Doctor, does the anesthesiologist, Dr Celerio in this case -- does he have the obligation to go back and get or review the prior EKG's of Mrs Armstrong and compare them to this EKG prior to putting her under anesthesia?

A Well, remember I also said that sometimes a verbal consultation over the phone or with somebody that knows the patient is often good enough. If he had access to those older records, he would have an obligation to look at them if he knew about it.

Or if he talked to somebody that may have already seen them or knows the patient, he would have an obligation to do that.

He would have to do one or the other. And he would want to make sure that the patient's cardiac

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system was at least optimal for surgery. It was as good as it's going to get, especially for elective or only urgent surgery.

Q Is there any evidence, Doctor, that Dr Celerio checked with the cardiac group who read this EKG prior to putting Mrs Armstrong under general anesthetic?

A I don't know if he asked specifically about this EKG. But he did check to see whether or not she had been cleared by her primary care or whoever Dr. Hichardson was in relation to this patient. And he was told that she was cleared for the surgery.

Q Doctor, we'll get back to Dr Richardson. My question was, is there any evidence whatsoever that Dr Celerio coiitacted the cardiology group who actually read this EKG which was taken on August 5th, 1999?

A I don't know whether he did that or not. But I'm not sure he actually ever saw this handwritten interpretation either.

Q Did Dr Bartilucca have the obligatioii to tell Dr Celerio about this EKG report?

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A I think that he had an obligation to talk to Dr. Celerio about the patient's cardiac condition if he knew of one.
Q Well, you have no doubt in your mind, do you, after having read Dr. Bartilucca's deposition, that he had this particular document in his file prior to his discussing this case with Dr. Celerio, correct?
MR. FRASURE: Which document are we talking aboutnow?
MR. CONWAY: I'm talking about the EKG of August 5th, 1999.
THE WITNESS: Right. I think he had it in his file.
BY MR. CONWAY:
Q All right. Didn't he have an obligation to tell Dr. Celerio about the report that the cardiology group had issued regarding this EKG?
A I don't know if he has an obligation to tell him that or not. I think that a reasonable surgeon would think that the anesthesiologist already knew about it.
I don't think that my surgeons or any of

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them that I've worked with over the last 15 years hardly ever tell me anythiug about labs unless I come to them with questions. They just assume that I'm doing my best job for the patient.
Q So Dr. Bartilucca would have assumed that Dr. Celerio already possessed this EKG, correct?
A I'm saying that that's a possibility. The other thing is, if he knew of some knowledge that Dr. Celerio did not know about with this EKG, in that case he would have had an obligation.
If he knew that this EKG was different than what Dr. Celerio may have seen preoperatively, then he would have an obligation to say, "Hey, that was reread," or, "I've got a different interpretation."
Q How would he knew what Dr. Celerio has seen unless he talks to him about what he's seen, though, Doctor?
A Because Dr. Celerio came up to him and asked him whether or not the patient had been cleared. And that would have opened the door and allowed Dr. Bartilucca to say something about the EKG if it in fact had been determined to be of any importance by

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Dr. Richardson.
Q Doctor, have you had an opportunity to read the depositions of either of the nurses, of any of the nurses that were taken in this case?
A I've listed the people that I've read the depositions of.
Q None of those are the nurses, correct?
A That's correct.
Q And you feel comfortable issuing an opinion as to what occurred in this case without having read those depositions?
A First of all, I didn't even know those depositions existed. But second of all, they wouldn't change my mind about what was the cause of death with this patient whatsoever.
Q I'm not asking you whether it would have changed your mind about the cause of death, Doctor Could they have possibly changed your mind regarding whether or not any of the defendant doctors deviated from the standard of care?
A I don't know the answer to that. I think that the likelihood that their depositions would have

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anything to do with the standard of care of an anesthesiologist would be very remote. So I doubt that it would have had any influence over me at all. But I would find them interesting reading.
Q Doctor, did you have an opportunity to read Dr. Richardson's deposition?
A Yes.
Q Would you agree that Dr. Richardson testified under oath that he did not surgically clear Mrs. Armstrong for the August 7th, 1999, surgery?
A I agree that that's what he said in his deposition.
Q Do you believe him to be credible when he testifies to that?
A I don't know whether he's credible or not. I find it surprising that he says he didn't, when two other physicians say that he did. And --
Q What --
A Let me finish. And I also find it surprising that he actually discussed the medical treatment of the patient intraoperatively and assumed that that had nothing to do with him.

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If he discussed the intraoperative management of a patient without having cleared the patient, I think that he would have put a stop to it had he had the opportunity, if he wasn't clearing the patient.

So I'm not so sure how credible his witnessing was on this.

Q Doctor, Dr. Celerio has no firsthand knowledge whatsoever that Dr. Richardson supposedly cleared Mrs. Armstrong for surgery, correct?

A He didn't have any communication directly with Dr. Richardson, that's correct. But he --

Q He's relying up on Dr. Bartilucca's representations, correct?

A Yes.

Q If Dr. Bartilucca is wrong about whether or not Dr. Richardson cleared Nancy Armstrong for surgery, it would be Dr. Bartilucca who would be below the standard of care, correct?

MR. FRASURE: Objection to the term "wrong."

THE WITNESS: I can't tell you anything about the surgeon's standard of care. But I can't

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find any reason in Dr. Richardson's record why the patient wouldn't have been cleared anyway So I'm not so sure it really makes any difference.

BY MR. CONWAY:

Q So you think that if you were Dr. Richardson and had received a call from Dr. Bartilucca on August 5th, 1999, you would have cleared Nancy Annstrong for surgery?

A Yes, knowing that she had just made it through a fem-fem bypass graft with no trouble, and she had an extensive cardiac evaluation prior to that which really wasn't all that bad compared to a lot of patients that we take to the operating room.

I would have taken her to the operating room just knowing those things were wrong with her. That wouldn't have stopped me or a lot of reasonable anesthesiologists.

Q So you don't feel that Dr. Richardson was below the standard of care in this case, then, correct?

A I think that if he had cleared the patient, it wouldn't have surprised me. This patient was

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actually pretty healthy compared to a lot of things that 1have to anaesthetize.

And by the way, the EKG that Dr. Celerio had really isn't that different than the one that was done four or five months earlier. It still showed those anterior Q waves. So it's basically an old MI. It has significance but only that you know that it's there and you watch out for it.

So there was nothing in Dr. Richardson's extensive cardiac evaluation that would have stopped me from taking her to the OR. I would have been more careful.

Q So my question of you is that you don't have any criticism of Dr. Richardson in this particular case, correct?

A The only criticism I have would be in his deposition where he seems to be denying having any conversation of having to do with talking about how the patient is ready for the operation, when he's making major medication changes in terms of her anticoagulation.

Nobody would ever do that unless they

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thought the patient was ready for surgery. It would actually be sort of foolish. So he knew she was going to the operating room. He thought she was good enough to go to the operating room. He actually thought she was good enough to reverse her anticoagulation, albeit for a short period of time before she got on heparin.

And so I don't really believe that he didn't know she was going to the operating room and that he thought she was as good as she was going to get.

And actually I think she was as good as she was going to get anyway. And she really wasn't really that bad on her cardiac evaluation. That's why they did the bypass surgery. Nobody --

Q Doctor--

A Nobody would take the patient to --

Q -- wouldn't it --

A --bypass surgery if they were really that sick. It's a lot more stressful than this hysterectomy ever would have been.

Q Doctor, when Dr. Richardson received that phone call froin Dr. Bartilucca on August 5th, 1999, wouldn't he have been reasonable to think that Dr.

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Bartilucca had already taken appropriate steps to have Mrs Armstrong cleared for surgery, since the surgery was going to be on August 7th, 1999?

MR FRASURE Objection

THE WITNESS I don't know what he would have thought, to be honest with you But it wouldn't surprise me that he was actually involved in the thought process on the days leading up to the surgery, and he just doesn't remember it very accurately, because not very much gets past the primary cares nowadays

So I don't know what to think about that

BY MR. CONWAY

Q Doctor, based on your extensive reading of the depositions and medical records, on what date did Dr Richardson do the medical examinations and testing to clear her for surgery?

A Like I said earlier, he doesn't do the actual clearing. The anesthesiologist does. But oftentimes if you are familiar enough with the patient, a simple conversation over the phone about that patient, if the surgeon and the primary care and

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the cardiologist are all on the same page, is good enough.

I put patients to sleep that need to be sort of, quote unquote, cleared for surgery that are seen frequently enough by the cardiologist that calling them up and looking at old data and having them look at it is good enough for me, especially if I can coordinate that with what I've got in the record and what the patient is telling me.

Q Doctor, you didn't answer my question And, quite frankly, I've got to kind of pinpoint you down, 'cause it's getting late

Do you have any evidence as to a particular date where Dr Richardson did any testing, evaluation, or examinations in connection with medically doing any type of presurgical clearance?

A The only decent data on that would have been prior to the bypass surgery that she'd had a couple of months earlier. But he didn't specifically see her for this surgery, at least not in his notes.

Q Right And we have no evidence by anybody, including him, Dr Bartilucca, or the Armstrongs that

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they saw Dr. Richardson in connection with this suigery on August 7th, 1999, correct?

MR FRASURE Objection The testimony in deposition is contrary But go ahead

MR CONWAY Okay, Mark, whatever That's your interpretation

BY MR. CONWAY

Q Do you have any evidence, Doctor?

A There is no evidence in the medical records other than what is in those depositions.

Q Would you agree that the last office visit Dr Richardson had with Nancy Armstrong was on July 6th, 19997

A That's the last one that I have in the records that were sent to me.

Q Would you agree that Dr Bartilucca recommended surgery to Nancy Armstrong on July 22nd, 1999?

A I don't remember the exact date, but that sounds about right. I know that it was later on in July.

Q Would you agree that Dr Bartilucca first

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contacted Dr Richardson about this proposed surgery on August 5th, 19997

A I think that that's the date that I flagged in here.

Q Now, Doctor, keeping all those dates in mind and keeping in mind the assertions by both Dr Celerio as well as Dr Bartilucca that they were relying upon Dr Richardson to clear this patient for surgery, didn't either or both of those doctors have the obligation to bring to Dr Richardson's attention the August 5th, 1999, abnormal EKG indicating a myocardial infarction, age indeterminate, and the chest X-ray report of August 5th, 1999?

A If they had brought the EKG to his attention, he would have told them if there was an April EKG that was basically identical and that that shows no new significance.

The chest X-ray -- it would be very unusual for me to call -- or I don't think the standard of care would require an anesthesiologist to call the primary care to tell him that there is atelectasis on the chest X-ray. I think that would be a little bit

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of a stretch.
The anesthesiologist would have to determine in his own mind whether or not he thought that that was of any significance in terms of being able to safely execute the anesthesia.
Q But, Doctor, if both Dr Celerio and Dr Bartilucca are saying that it's Dr Richardson's responsibility in this case to clear the patient for surgery, to be fair to Dr Richardson, don't they have the obligation to update him as to new medical information that's come in and let Dr Richaidson handle the analysis of that information?
A Again, no is the answer to that, because the anesthesiologist would be the one that would determine whether or not that information had any significance in terms of putting the patient to sleep.
If in fact he thought that it did and the patient should be canceled, at that point he would call the primary care or whoever is responsible for the patient outside of this arena and tell them, "I'm canceling the surgery because they've got an infiltrate," or atelectasis or whatever your complaint

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is. And maybe you'd want to take another look at that.
If you determine it's not an issue for your anesthetic or your case, then yon don't have any obligation to call the primary care about it at all.
You might put it in your H and P that you send them afterwards with your operative report. But you don't get permission from them to do the case. You determine that on your own.
Q What happens, Doctor, if Dr Celerio and Dr Bartilucca had made Dr Richardson aware of these two new findings, the EKG of August 5th and the chest X-ray of August 5th?
Would Dr Richardson have been within his rights to recommend that the surgery be postponed?
MR FRASURE Objection
THE WITNESS I think that it would have been within his right to recommend anything he wanted But the first thing he would have done is refer to his medical recoids that he had right there in front of him that show an old history of an enlarged heart and EKG changes that were exactly the same four months

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earlier.
I could easily interpret that EKG four months earlier as an old anterior MI. Actually I don't really think that that's what it was. It didn't show up on autopsy.
It's just an electrical rhythm disturbance, probably consistent with amyloid heart disease. That's why she has that arrhythmia, because she does not have a myocardial infarction on her autopsy.
They did three-millimeter sections all the way through the myocardium. There isn't an MI there. So in retrospect, from my point of view, it really doesn't make a bit of difference.
BY MR. CONWAY:
Q Do you think that was a thoroughly complete autopsy, Doctor? Are you happy with that autopsy?
A I think three-millimeter sections through the heart is what I usually see on autopsies. Sometimes they make them even bigger. So it looked like that part of it was pretty thorough.
Also, the coronary arteries are completely patent. You know, it's hard to have a myocardial

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infarction without having some sort of coronary artery occlusion. And also that rhythm disturbance was in existence four or five months previous. Yon can see it in her chart. There is no change.
And that's what Dr. Richardson would have said. "She's had all of this for a long time. Her complaints haven't changed. It's up to you guys." That's exactly what would have come out of his mouth probably, that, "She's okay as far as I'm concerned."
Q Doctor, the bottom line is the autopsy is totally inaccurate regarding the cause of death, correct?
A It misses the amyloidosis, but it doesn't really miss the cause of death, which was an arrhythmia. She did not die of a myocardial infarction. She died of an arrhythmia and a cardiac arrest, which is a different thing.
You don't have to have dead heart tissue to have a cardiac arrest, but you do to have a myocardial infarction, which is why that patient had Q waves on the anterior leads. At least that's what everybody thought.

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Q Doctor, would you agree that prior to surgery Dr Celerio was faced with a patient who had an abnormal EKG, a chest X-ray with positive findings, a history of difficult breathing with exertion, and leg swelling?

A I think that all of those things were somewhere in her record over time and that she had had those problems.

Q Do you agree that the preoperative chest examination revealed decreased breath sounds in the right base?

A Yes.

Q Do you agree that Dr Celerio had available to him, if he chose to read or look at them, the August 6th, 1999, chest X-ray report, final, the August 5th, 1999, chest X-ray, and the prior EKG's of Nancy Arnistrong through the Elyria Memorial Hospital record system?

MR RISPO objection Go ahead

THE WITNESS I doii't know how their record system works I think that if -- I don't know whether the hard copy of the X-ray film was available to him

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or not

I don't think it's the standard of care to go look at it I guess he could have if he had wanted to He would have been one in a million anesthesiologists that would have bothered They would have relied on the report that they got

He did have an opportunity to wait for the final reading But to be honest with you, 99 999 percent of the time it doesn't really change And if it does, it's something minor The big things usually jump out at them on a wet reading

And by the way, the reason why they call it a wet reading, which nobody seems to know in this case, is because the X-ray film used to actually be wet when it came out of the machine. And they hung it up and looked at it while it was still wet. So that's why it got the nickname

BY MR CONWAY

Q Well, Doctor, actually I did know that But I haven't had my deposition given yet, so you didn't find out my state of knowledge

And by the way, just in case there was

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confusion, the Elyna Memorial Hospital system had available through its records department prior EKG's Would you agree with that from Dr Celerio's testimony?

A 1 don't know. It wouldn't surprise me if they do. But I'm not so sure that an old EKG that shows an old MI and new atelectasis on a chest X-ray are absolute contraindications to anesthesia anyway. So I'm not so sure why these things seem to be so important to you.

Q Doctor, the chest X-ray report itself was available as of August 6th, 1999, wasn't it, Doctor?

A 1 don't remember the exact date. 1'11 take your word for it.

MR. RISPO: Objection to the stateinent that it was available The evidence is it was not in the chart.

THE WITNESS. I think that the standard of care would support reading a wet reading for your pre-anesthetic assessment

BY MR CONWAY

Q Doctor, are you in charge of the pre-

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anesthetic work-ups at the surgery center where you works

A Yes.

Q Are you familiar with the different forms that you use as the anesthesiologist in charge of the pre-anesthetic work-ups at your surgery center?

A Yes.

Q And if you were presented with some medical review or some forms to look at, you would know whether or not you had everything that customarily was in the file in front of you, correct, patient history, tests, examinations, results that you had to look at before putting the patient under?

A Yes. I know --

Q You would know --

A I know where to find those things, yes.

Q All right And you would know if you were missing something, correct?

A Even at a glance.

Q Doctor, how many beds at this surgery center'?

A I don't know. We don't keep people

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overnight, so we don't really count it that way. But there are four operating rooms.
Q So how many beds?
A I don't know. We don't really count it that way. There are four operating rooms, so I guess there's – but there's about 20 beds, 'cause we roll them all over the place.
We do about 1200 general anesthetics a year there. Maybe that helps you.
Q You state in one of your paragraphs on page 2 that, "This patient died from a sudden, unpredictable, and unavoidable cardiac collapse," correct?
A Let me look at my exact words. What page are you on?
Q The second page of your two-page report, paragraph three.
A (Perusing document.) Yes.
Q The caidiac collapse would have been avoided on August 7th, 1999, had not Mrs. Armstrong been given anesthesia, correct')
A If she had not been given anesthesia, it

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would be more likely than not that she would not have had a cardiac collapse, that's right.
Q All right Now, you indicate there is no cure for amyloidosis
A That's right.
Q How do you know that without doing a literature search, Doctor?
A I know that from general medical knowledge. There has never been a cure, and I have no knowledge of any new cures that have come along.
Q And other than putting Mr Rispo to work doing your medical literature search, you have done no medical literature search yourself Is that correct?
A I don't think I put him to work doing any medical literature search for me at all. Like I said earlier, the concepts in terms of the anesthesia in this thing are very basic.
And I didn't need to do a medical search. I just wanted to see if anybody else was looking at articles. But --
Q Have you ever --
A But –

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Q Have you ever administered anesthesia to an amyloid heart patient7
A I don't know whether I have or not. To be honest with you, I don't think I would have remembered that. But it wouldn't surprise me that I have over the years.
Q Have you ever had a patient die under anesthesia that you have administered to them?
A I've had patients die in the operating room but not from anesthesia causes. I did a lot of trauma anesthesia, and those patients died. But it wasn't from anything I ever did.
Q Have you ever been sued for malpractice, or has any hospital in which you were a care provider for a patient beeii sued or a group which you've beeii a member of beeii sued for any patients you've been involved in the caie and treatment of?
A **No.**
MR CONWAY If I could have one minute, Doctor --
(Off the iecord)
BY MR CONWAY

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Q Doctor, you're not critical of any of the nursing care and treatment in this case, are you?
A None that I know of. I guess if I ever saw those depositions, I might become critical of something. But I don't have anything to criticize right now.
Q Do you have anything to criticize based upon your review of the medical records? Do you have any criticism of the nurses based upon your review of the medical records?
A No.
Q And you're aware that neither Dr. Bartilucca nor Dr. Celerio criticized any of the nurses. You're aware of that, correct?
A Yes.
Q The answer would be correct, then, correct?
A That's correct.
Q Are you critical of Dr. Bartilucca for anything in this particular case?
MR. FRASURE: Note my objection. Standard of care --
MR. CONWAY: No.

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BY MR. CONWAY:
Q Do you have any criticisms, Doctor, of Dr. Bartilucca's involvement in this case?
A Nothing that I know of. But, like I said earlier, if he was aware of something that nobody else was and he chose to keep that to himself, I would be critical of that. But I have no proof of that, so I really don't have any criticisms of him.
Q And you don't have any criticism of -- or I'll put it this way. You do not believe that Dr. Richardson was below the standard of care, correct?
MR. RISPO: Objection.
THE WITNESS: No. I don't think that he really was.
BY MR. CONWAY:
Q All right. Doctor, you've issued a report, July 10th, 2001, directed to Mr. Rispo. Are these still your opinions that you hold in this case?
A Well, let me just read it to make sure real quick. (Perusing document.) I have additional opinions that I guess I talked about during this deposition that aren't --

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Q What are those additional opinions, Doctor?
A That the evaluations that had been done previously by Dr. Richardson and referral doctors that were in his chart showed that the patient would have been okay for surgery if there was no change in her symptom complex in between those, that she had undergone a successful stressful bypass surgery of her lower extremities, and her EKG really wasn't all that different than it was months before, so that it just strengthens my opinion that there was really no deviation in the standard of care by Celerio.
And had he had a full, formal written, quote unquote, clearance by Dr. Richardson, she still would have been cleared for surgery. And she probably still would not have revealed herself to have been an amyloidosis patient and that the likelihood of the outcome would have been somewhat the same, not knowing that she had amyloidosis.
I can tell you why she died, if you're interested.
Q Sure, shoot
A The induction of anesthesia on this patient

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was actually very reasonable, and it wasn't an overdose. It was titrated on with 150 milligrams of Propofol and then either 50 of Lidocaine or Xylocaine, like it says there, or an additional dose of Propofol, which means he titrated it on either way.
So he didn't see the response that he would normally want to see. And then she had a profound vascular and cardiac collapse because of the amyloidosis within her vascular system and her heart.
It's just not able to contract like a normal system would, especially in the face of 50 milligrams of ephedrine. That will bring back almost anybody unless their vascular system does not have the ability to contract.
And since your vascular system can't contract when it's full of amyloid, the cardiac filling during diastole, which relies on that contractility of the arterial side of the system to squeeze blood back against that closed aortic valve, she was not able to do that. And that's why she basically just spiraled down.
Even if she had had a massive cardiomyopathy

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that was not amyloid and ongoing ischemia, she still would have responded to that 50 milligrams of ephedrine. But somebody with amyloid heart disease is not going to respond.
So at least the initial part of this resuscitation was perfectly appropriate under this circumstance on what looks like a fairly routine and low-dose or at least average dose of Propofol for a patient in this similar situation.
I don't see anything wrong with this induction at all, even if I had known everything that was in her cardiac history except for the amyloidosis.
So that's why she died. She had an inability to respond to resuscitative agents because of her amyloid vascular system and heart. She had no chance of living once she collapsed, because she couldn't respond. It's as simple as that. She just didn't have a chance.
Q So did you even evaluate the resuscitative efforts by Dr. Celerio?
A Yes.
Q Are you telling me you don't have any

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problems whatsoever with his involvement in the resuscitatioii?
A I think that the resuscitation that he started was a perfectly appropriate resuscitation and that I guess he turned over the resuscitation to somebody else that came into the room that he felt was a better person to run the code.
There is nothing wrong with turning over a code to somebody else that you think might do a better job than you. There are people out there like that. I'm not one of them, but there's nothing wrong with that.
And knowing what drugs they did give and the efforts that they did try and knowing what was wrong with her that nobody knew about, it really wouldn't have made any difference anyway.
Q At the time that this other doctor came in to take over handling the code from Dr Celerio, that doctor had none of the background information regarding the patient that Dr. Celerio had, correct?
A Not on entering the room, he wouldn't. But I'm sure Dr. Celerio immediately revealed everything

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that he knew up to that point. Otherwise, the guy wouldn't want to take over the code. He'd be starting from zero for no good reason.
So unless there was an inability to communicate at all, Dr. Celerio would have told him everything he knew up to that point.
Q Doctor, is there anything other than what we have specifically spoken about this evening as well as what's in your report of July 1Oth, 2001 -- are there any additional opinions you have?
A No. The only other thing that I would like to mention is that I have asked for the medical records of the April admission for the bypass surgery, because that will give me even more information about her.
And after I review that, I may have something additional. I don't think so, since I've got everything from before and after that. But it would be nice to see that hospital admission record, in particular the evaluations that went on from the anesthesia point of view.
Q Doctor, did I hear you correctly? You have

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not looked at those records as of today's date?
MR. FRASURE: Which records, now?
MR. CONWAY: The ones you've just --
THE WITNESS: I don't think anybody has those records, as far as I know.
BY MR. CONWAY:
Q When did you first ask to review those records, Doctor?
A Sometime about in the last week or so.
MR. FRASURE: He's talking about the admission for the fem bypass.
MR. CONWAY: I'm aware of what he's talking about.
MR. RISPO: I don't have them.
BY MR. CONWAY:
Q Doctor, I see that the last paragraph on page 2 indicates that, "If more documents become available, I will be happy to read them and reserve the right to alter my opinions accordingly."
A Yes.
Q Correct?
A That's right. And I'll stick by that even

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to this day.
Q Oh, I'm sure you do, Doctor I've read your other depositions
But my question regarding this final sentence is that you sent this letter to Mr Rispo on July 1Oth, 200 1, correct?
A Yes.
Q And after sending Mr Rispo this letter on July 10th, 2001, at no time after that did you receive the deposition transcripts of any of the nurses, correct?
A That's right.
Q You didn't receive the medical records of the April hospitalization surgery, correct?
A Correct.
Q I don't have anything further, Doctor Oh, I do
Do you have any criticisms of any other physician in this case or any physician in this case?
A I don't. I have a comment about one of the physicians in this case. I'm not sure it's a criticism, because I'm not sure what their standard

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would be.
But I think if the patient died of an amyloid heart issue, I'm surprised that it wasn't on the original autopsy. But I don't know that they usually assay for that or stain for it.
So that would be my only comment. I don't know what their standard is, though. So I really can't say anything beyond that.
Q Other than that comment regarding the autopsy, you don't have a criticism of any doctor Is that your tesbmony, Doctor?
A I don't have any criticisms other than the things that I talked about earlier, no.
MR CONWAY I don't have anythiiig further, Doctor
EXAMINATION BY COUNSEL FOR DEFENDANT, PAUL BARTILUCCA, M D
BY MR FRASURE
Q Real briefly, Doctor, five minutes -- Mark Frasure on behalf of the gynecologist -- would you expand briefly on why the femoral bypass surgery that this patient had in April would be more stressful than

Page 119

the surgery that was to be done here in August?
A Because it's a well-known fact that vascular and in particular bypass surgery is more stressful on the heart and the entire system than an abdominal hysterectomy.
Q Is it important to your opinions in this case that she had this femoral bypass surgery only about three months earlier and came through --
MS. KOLIS: (Conferring with Mr. Conway.) We submitted all those records to --
THE WITNESS: I'm sorry. I'm getting a lot of voices at once.
MS. KOLIS: Oh, we're sorry. We were just talking about something. Accept our apologies.
BY MR. FRASURE:
Q Is it important to your opinions in this case that Mrs. Armstrong had had the femoral bypass surgery about three months earlier and come through okay?
A I think it was three or four months earlier, and she had done okay as far as the records that I got pointed out.

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Q Is that important to you in your opinions?
A Yes.
Q You were also asked about getting a cardiac work-up or something to that effect. Are you aware that this patient had a 2-D echo in June of 1998 that was normal? Did you see that in the Dr. Richardson records?
A I remember seeing lots of tests that weren't really all that bad. Let me look at that one to get the exact wording. Yon said what month was that?
Q June of '98, 2-D echo. I think that would be in the records of the West Shore Primary Care office records, which includes Dr. Richardson.
A (Perusing documents.) I remember seeing two echoes, and one was slightly abnormal. I'm just looking through my records right now, since -- I don't know if you can see me, but I can't see you.
Q Oh, I'm sorry.
MR. CONWAY: Mark, would you like to come down here?
MR. FRASURE: Sure. I've been waiting for you to ask.

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MR. RISPO: I don't think he's seen those records.
THE WITNESS: I don't think I have that.
MR. FRASURE: Okay.
THE WITNESS: But I had a perfusion scan, which is similar.
BY MR. FRASURE:
Q What was the date of that? Do you recall?
A 1just put it away. (Perusing document.) It was in April of '99.
Q A stress test --
A Yes.
Q -- with thallium?
A Yes.
Q Is that part of a cardiology work-up?
A It looks like it. These only get done by cardiologists anyway.
Q Did you see Dr. Richardson's record of July of '99, a month before she passed away, office visit?
A I remember it, yes. Do yon want me to look at it?
Q Yes, sir, please.

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A July 6th?
Q I believe that's right
A (Perusing document.) Okay, I'm looking at it.
Q Where she reports that her chest pain is worse, she gets out of breath when she walks up steps -- aiid then about halfway down, he says, "These pains have been the same character and quality the last three years. Patient admits this is nothing new." Is that significant, in your opinion?
A Yes.
Q Why?
A Because it shows that the patient actually hasn't gotten any worse and may be at sort of a stable point in her physical status. And it gives me an idea of what she's able to tolerate.
Q And what does Dr Richardson say his suspicion is of her having an MI or a PE, under assessment, plan?
A He says, "Whereas, she is at risk for MI and PE secondary to" -- that's what that "to dot" means -- "secondary to protein-C deficiency, my suspicion is

Page 123

low; and I think her anxiety is contributing greatly to her symptoms. Follow-up MRI of the brain next Friday -- I," something, "to call me back if dyspnea." "I asked her," I guess that says.
Q All right You're licensed to practice in Maryland, are you?
A Yes.
Q And what percentage of youi professional time do you devote to the active clinical practice aiid teaching of medicine?
A Well, right now I'm not teaching medicine at all. But a hundred percent of my work time is spent in the clinical practice of anesthesia.
MR FRASURE Okay, thank you, Doctoi That's all I have
MR CONWAY We have nothing further Thank you, Doctor You have the right to review and sign the deposition If you want to take advantage of that, it's up to you
THE WITNESS I'd like to
(Discussion off the record)
MR CONWAY If we can go on the record just

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for one second, so this is clear -- obviously I'm making a request for the correspondence that went between you and Mr Rispo If you could get that together and forward it on to him, I'd appreciate it, okay?
THE WITNESS Okay
MR CONWAY And if you would fax eveiytliing to Mr Rispo, he can get it to us, okay?
THE WITNESS Okay
MR RISPO Let me make this offer I have copies, obviously, of everything I've sent out to him Do you want me to just give you my copies7
MR CONWAY Well, I'd like to see his, because a lot of times -- I just want to be clear that -- I mean, sometimes people write notes on it, whatever
So I'd like to have all your copies of the correspondence, okay, Doctor?
THE WITNESS Okay
MR CONWAY Thanks
(Signature not waived)
(Whereupon, the taking of the deposition was

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concluded at approximately 9:22 p.m.)

State of Ohio)
County of Lorain)

IN THE COURT OF COMMON PLEAS

James J Armstrong, Executor of)
the Estate of Nancy Armstrong,)
)
Plaintiff,)
) Case No. CV126180
vs)
)
EMH Regional Healthcare System,)
d/b/a Amherst Hospital, et al ,)
)
Defendants.)

Annapolis, Maryland

Tuesday, May 21,2002

ACKNOWLEDGMENT OF DEPONENT

I, David Charles Brandon, M D , hereby acknowledge that I have read and examined pages 4 through 125, inclusive, of the transcript of my deposition and that:

(Check appropriate box)

( ) the same is a true, correct, and complete transcription of the answers given by me to the questions therein recorded

( ) except for the changes noted in the attached Errata Sheer, the same is a true, correct, and complete transcription of the answers given by me to the questions therein recorded

Date Signature

CERTIFICATE OF NOTARY PUBLIC

I, Suzanne Giles, the officer before whom the foregoing deposition was taken, do hereby certify that the witness whose testimony appears in the foregoing deposition was duly sworn by me; that the testimony of said witness was taken stenographically by me and thereafter reduced to typewriting by me or under my direction; that said deposition is a true record of the testimony given by said witness; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this deposition was taken; and, further, that 1am not a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of the action.

Suzanne Giles
Notary Public in and for the
State of Maryland,
County of Anne Arundel
My Commission Expires:
November 1, 2004.

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Br Heart J 1984; 51: 233–36

Sudden death in a patient with amyloidosis of the cardiac conduction system

D C ALLEN, C C DOHERTY

From the Histopathology Laboratory and Department of Nephrology, Belfast City Hospital, Belfast, Northern Ireland

SUMMARY A 54 year old man had generalised systemic amyloidosis secondary to bilateral basal bronchiectasis of the lungs. He died after an unexpected asystolic cardiac arrest. Necropsy showed extensive amyloid deposition in the cardiac conduction system.

Cardiac amyloidosis is a well established but uncommon cause of haemodynamic and electrocardiographic abnormalities.[1–11] Several workers have incriminated to varying degrees the presence of amyloid deposits within the cardiac conduction system as the underlying pathophysiology.[3–11] We report a case of systemic amyloidosis occurring in a 54 year old man secondary to bilateral basal bronchiectasis, who died after a sudden asystolic cardiac arrest due to direct amyloid deposition in his conduction system. An abnormal electrocardiogram was recorded eight months before death.

Case report

A 54 year old man was admitted to Belfast City Hospital for evaluation of chronic renal failure. He had a history of bronchiectasis, and nephrogenic diabetes insipidus had been diagnosed two years previously after investigations for polyuria. The cause of his renal failure was considered to be renal amyloidosis since gastric and rectal biopsy specimens stained positively with congo red. Since his creatinine clearance was 11 ml/min an arteriovenous fistula was created in anticipation of the need for haemodialysis. A 12 lead electrocardiogram recorded at this time showed a sinus rhythm of 65 beats/min with first degree heart block (PR interval 0·28 s; QRS interval 0·11 s) and incomplete left bundle branch block (Fig. 1). An unspecific ST/T wave abnormality was also present. He was readmitted to hospital eight months later complaining of breathlessness and neck swelling. Examination showed sinus rhythm, no signs of heart failure, and a diffuse goitre. Renal function was little changed with a creatinine clearance of 10 ml/min, a serum urea concentration of 16·9 mmol/l (1·0 g/l), and a serum potassium concentration of 3·7 mmol (mEq)/l. He was treated for exacerbation of bronchiectasis, but despite initial improvement sudden cardiac arrest occurred 24 hours later. His electrocardiograms showed asystole, and resuscitation was unsuccessful.

Requests for reprints to Dr Derek C Allen, Histopathology Laboratory, The Laboratories, Belfast City Hospital, Belfast BT9 7AD, Northern Ireland.

NECROPSY FINDINGS

Necrapsy showed enlarged emphysematous lungs with pronounced bronchiectatic changes in both bases. The peripheral airways were dilated and congested, and the overlying pleural cavities contained fibrous adhesions. The other organs were affected to varying degrees by amyloid infiltration. The kidneys and parathyroid glands showed ad obvious waxy pallor, and a pronounced amyloid goitre (110 g) was evident. Histological examination showed involvement of the liver, spleen, skin, other endocrine glands, and the gastrointestinal tract. Lung deposition was minimal.

The total heart weight was 580 g, and there war moderate biventricular dilatation and hypertrophy. The aorta and coronary arteries contained only a minimal amount of atheroma, and wide lumen patency was maintained at all points. The pericardium was translucent, and the valves were not thickened. Histological examination did not show any recent or long standing ischaemic myocardial damage. The ventricular interstitium and its vessels contained small amounts of congo positive amyloid. The subendocardial aspects of both atria contained focal amyloid deposits, but the cardiac valves, pericardium, and epicardial vessels and nerves were not affected.

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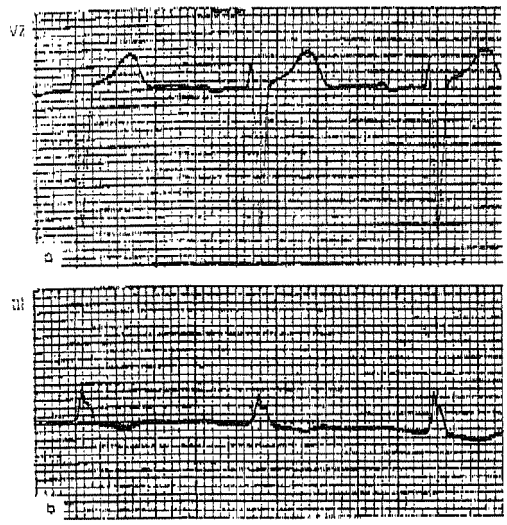

Fig. 1 *Twelve lead electrocardiogram showing (a) a prolonged PR interval (0·28 s) and (b) incomplete bundle branch block.*

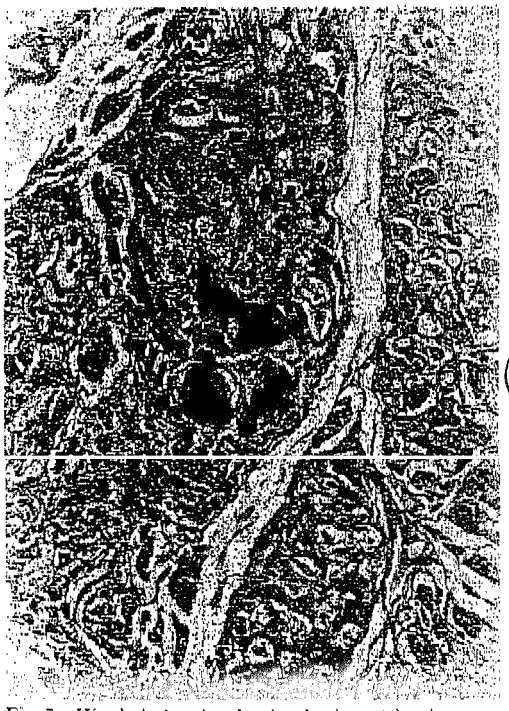

Fig. 2 *Histological section showing the sinoatrial node containing extensive amorphous amyloid deposits both surrounding and replacing conducting myofibrils. (Haematoxylin and eosin ×300 original magnification.)*

The sinoarrial node contained extensive amyloid, and the branches of its supplying artery were diffusely thickened (Fig. 2). The main nodal artery was not involved. Amyloid had also been deposited in the atrioventricular node, the Hie bundle as it penetrated the central fibrous body (Fig. 3), and the left main bundle branch. The myofibrils were intimately mixed with homogeneous eosinophilic amyloid. The absence of appreciable nodal and conducting element fibrosis was confirmed using a sodium alcian blue stain. It was interesting to note that amyloid deposition was notably heavier in the conduction sysrem than in the myocardium.

Discussion

Dissection of the main components of the human cardiac conduction system is well documented.[12] The sinoatrial node lies at the crest of the right atrial appendage where it joins the superior vena cava. The atrioventricular node lies anterior to the coronary sinus beneath the tight atrial endocardium, and the main His bundle runs forward and down through the central fibrous body below the membranous septum. Serial blocks and examination at multiple levels are required. The paraffin processed tissue sections in this patient were stained orange-red with alkaline congo red, and these amyloid deposits showed an apple green birefringence under polarised light. Presence of amyloid was confirmed by staining with sodium alcian blue, and with thioflavine T viewed for fluorescence under ultraviolet light (Fig. 3b). The sections were also sensitive to potassium permanganate decolorisation, a feature considered by some to be histological confirmation of secondary amyloid.[13]

Cardiac amyloidosis is classically thought of as an infiltrative cardiomyopathy with subsequent cardiac failure which may be refractory to conventional treatment. It may mimic the clinical picture of constrictive pericarditis and the electrocardiographic changes of healed infarction.[1 3] Unspecific electrocardiographic abnormalities such as low voltage and axis deviation have been noted. James asserted that the "disturbance of cardiac function and conduction are in a significant amount due to the amyloid infiltration directly" (that is, of the conduction system). He found heavy sinoatrial node deposits and atrial fibrillation in two of his five cases. Others have since reinforced his comments,[9 10] but sinus rhythm has also been reported in the presence of severe conduction system infiltration.[8 9] Prolongation of the

documented in amyloid heart disease. Bharati [illegible] reported a case of recurrent ventricular fibrillation and extensive cardiac conduction system deposition of

In 1960 sudden death occurred in *two* cases

Fig. 3 *Histological section shou intimately mixed with conducting His bundle with the central fibrou light ×400 original magnification*

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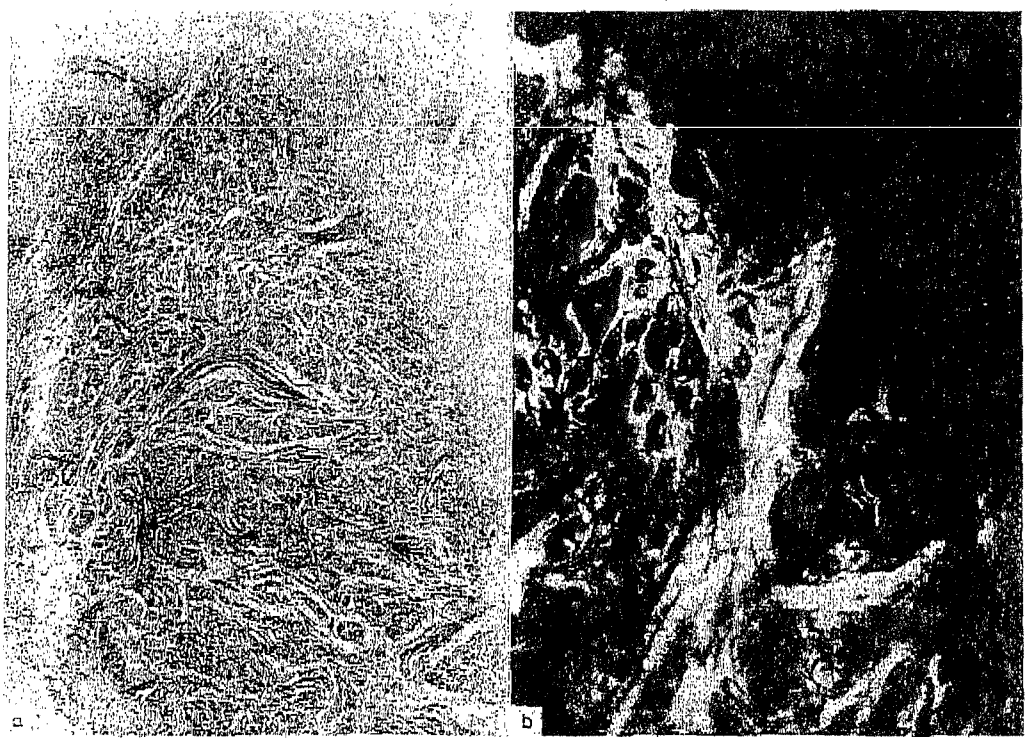

Fig. 3 *Histological section showing the main His bundle penetrating the central fibrous body and extensive amyloid deposition intimately mixed with conducting elements (haematoxylin and eosin ×125 original magnification); and (b) a higher power view of the His bundle with the central fibrous body in the top right corner; abundant amyloid is confirmed (thioflavine T viewed under ultraviolet light ×400 original magnification).*

of primary cardiac amyloidosis associated with atrioventricular node and His bundle infiltration.[4] In a series by Wright and Calkins[13] 30% of their patients with primary amyloidosis died suddenly, probably from arrhythmic cardiac involvement. This danger had been noted elsewhere but not substantiated by conduction system dissection in either case.[13] Sudden death occurred in our patient in the absence of severe atheromatous disease or electrolyte abnormalities and in the presence of conduction system amyloid infiltrates.

Two main aetiological factors have been suggested for dysfunction in amyloid heart disease. The coronary or intramyocardial vessels may be thickened causing ischaemic lesions,[1] and the amyloid deposition may atrophy the parenchyma directly. The latter mechanism leads to a less compliant and contractile myocardium with haemodynamic disturbances. Our patient had amyloid throughout his conduction system, increasing the functional implications of the deposits. This was confirmed by an abnormal electrocardiogram showing first degree heart block and incomplete left bundle branch block.

This case therefore illustrates the potential hazard of sudden death from conduction system disease in patients with generalised systemic amyloidosis.

We thank Dr J D Biggart for his advice on the pathological specimens and Dr M E Scott for reviewing the electrocardiogram. We also thank Mr John Orchin for his technical and photographic expertise.

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Notice

British Cardiac Society

The Annual General Meeting for **1984** will take place in Leicester on 11 and 12 April **1984**, and the closing date for receipt of abstracts was 3 January 1984.

The Autumn Meeting in 1984 will be held on 3 and 4 December **1984**, and the closing date for receipt of abstracts will be 15 August 1984.

Correspondence

Modified Blalc polytetrafluorc

Sir,

The article P H Kay *et al* (with an important and contro and infant congenital cardiac pulmonary and subclavian a polytetrafluoroethylene graft considerations. A further pr of pulmonary oedema after completely satisfactory smal theric graft is not yet polytetrafluoroethylene possi for this type of surgery. Long days) is the major factor in t pulmonary shunt procedur leave the impression that the polytetrafluoroethylene graf this (p 363): "Indeed, th difference in shunt patency b 6 mm grafts at two years." I state in Table 2 that, of the fo had a 6 mm shunt (state of s two 4 mm shunts (both occ shunt (patent), and one had mm in size (state of shunts from an analysis of Tables complicated shunts were 4 r for example, (Table 3) in the mm, three were 5 mm, and The two cases of late graft with 4 mm grafts. The num Figs. 2 and 3 also do not should for an actuarial curve

In our experience, most p with 4 mm conduits. This fa out by de Laval *et al*.[1] The 5 the best 1000 day patency ra 4 mm grafts had only a 66· McKay *et al*.[2] in their study Taussig shunts also showed was highest in 4 mm polytet The internal diameters of t nary arteries are the most im the haemodynamics and flow Taussig shunts. banding ha necessary in the convention

February 1984 Vol 51 No 2

British Heart Journal

A monthly journal of cardiology published in association with the British Cardiac Society

British Medical Association

The Conduction System in Cardiac Amyloidosis

Clinical and Pathologic Features of 23 Patients

REN L. RIDOLFI, M.D.
BERNADINE H. BULKLEY, M.D.
GROVER M. HUTCHINS, M.D.
Baltimore, Maryland

Cardiac amyloidosis is frequently associated with major electrocardiographic conduction disturbances; but that these disturbances are due to infiltrative destruction of *the* conduction system by amyloid is unclear. We studied the conduction systems in 23 autopsy patients with cardiac amyloidosis (*group 1*) (mild in *seven*, moderate in five and severe in 11), 21 (91 per cent) of whom had had abnormalities of conduction or rhythm during life. For comparison, we examined the conduction system in 23 control subjects matched in age and heart weight [group 2).

Of the 23 patients in group 1, only three had extensive amyloidosis of the conduction system; in all three, electrocardiograms showed *first* degree atrioventricular block and left anterior hemiblock. A more common morphologic abnormality of the conduction system was severe sinoatrial node fibrosis present in seven (30 per cent) patients, and idiopathic atrophy *and fibrosis of the* bundle branches present in six (26 per cent) patients. None of tho patients in group 2 had severe sinoatrial node fibrosis; but two (9 per cent) had idiopathic atrophy and fibrosis of the left bundle branch. Marked fibrosis of the sinus node was more frequent in patients with severe or moderate amyloid, but fibrosis of the bundle branch did not appear to be related to the amount of amyloid elsewhere in the heart. Varying degrees of atrioventricular and bundle branch block were also present in six patients with no morphologic abnormalities of the conduction system. Thus, conduction and rhythm disturbances are frequent in cardiac amyloidosis, but direct amyloid infiltration of the specialized conduction tissue of the heart does not account for the majority of these disturbances. Whether the increased incidence of fibrosis of the conduction system in group 1 compared to that in group 2 relates to the infiltrative myocardiopathy is uncertain.

From the Departments of Pathology and Medicine, the Johns Hopkins University School of Medicine and Hospital, Baltimore, Maryland. This study was supported by Grant P17-HL-17655-01 from the National Institutes of Health, Public Health Service, Department of Health, Education and Welfare; and the Stetler Research Fund for Women Physicians. Requests for reprints should be addressed to Dr. Grover M. Hutchins, Department of Pathology, The Johns Hopkins Hospital, Baltimore, Maryland 21205. Manuscript accepted August 18, 1976.

Amyloid heart disease may be associated with a wide variety of cardiac arrhythmias and conduction *disturbances* [1–15], but whether or not the frequently associated electrocardiographic abnormalities **are a consequence** of amyloid Infiltration within the conduction system has been a subject of controversy. Extensive amyloid in the specialized conduction tissue correlating with associated electrocardiographic disturbances has been found by some investigators [16] but not by others [17,18] **These** studies have been limited to a Few selected patients with *severe myocardial* amyloid involvement **and** leave unclear

Pl. Dep. Ex # 2
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whether or not direct amyloid infiltration accounts for a large or small part of the conduction abnormalities seen frequently in patients with cardiac amyloid.

To determine the importance of direct conduction system involvement by amyloid to the development of arrhythmias and conduction disturbances, we studied the clinical and pathologic features of 23 patients with cardiac amyloidosis. The sinoatrial and atrioventricular conduction systems were examined in detail with specific reference to electrocardiographic abnormalities during life. The findings were compared among groups of patients with mild, moderate and severe cardiac amyloidosis, and a group of control patients.

MATERIALS AND METHODS

The records of 23 patients with cardiac amyloidosis (group 1), taken from the autopsy files of The Johns Hopkins Hospital, whose hearts were available for examination were

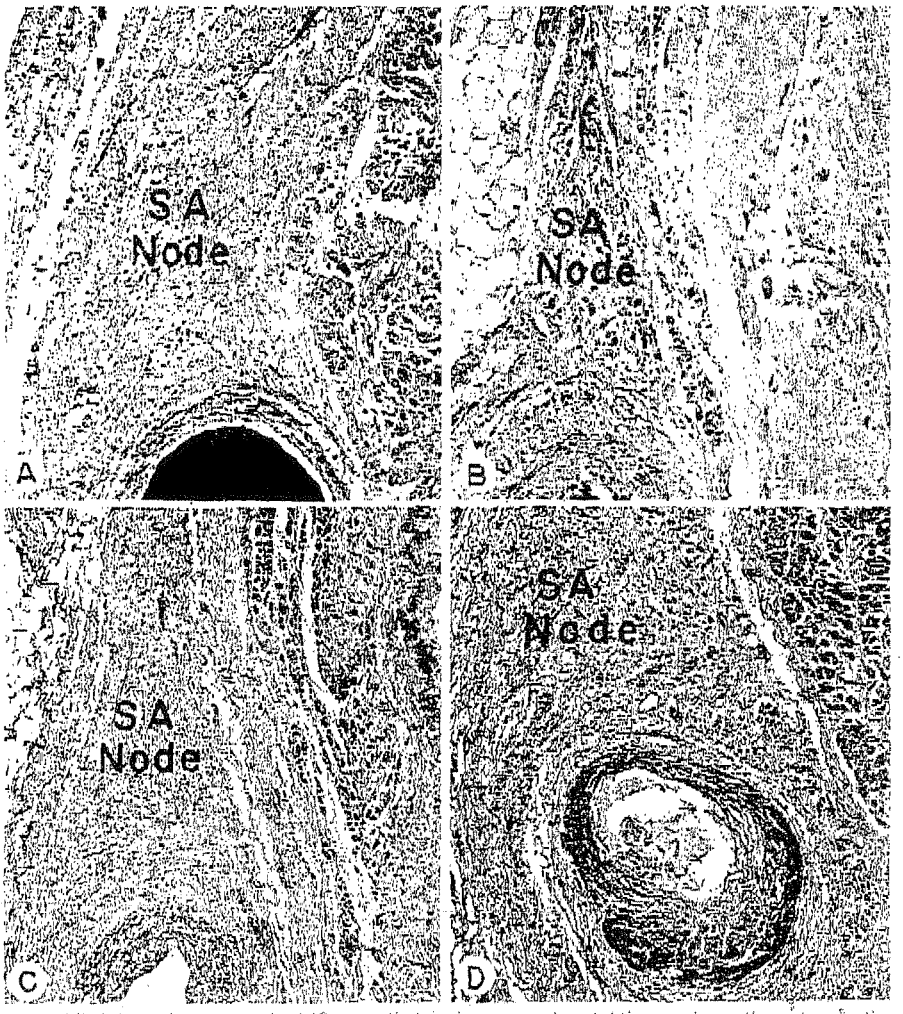


Figure 1. A, sinoatrial (SA) node from patient (Case 11) showing normal nodal tissue above the artery to the sinoatrial node. The artery is filled with dark staining injection mass. Nodal fibers are admixed within a delicate connective tissue background. B, portion of a mildly fibrotic sinoatrial node from patient (Case 15) in which there was severe cardiac amyloidosis. Part of the sinoatrial node artery is at the bottom left. There is focal fibrous replacement of nodal fibers within the midportions of the node. The atrial myocardium at the right shows severe amyloid deposition but there is none within the node tissue itself. Electrocardiogram showed left anterior hemiblock but no atrial rhythm disturbance. C, portion of sinoatrial node with severe fibrosis but no amyloid deposition from patient (Case 10). Only rare nodal fibers are present within the scarred node. The sinoatrial node artery is below and the endocardium with heavy amyloid deposits at the upper right. Electocardiogram showed no atrial rhythm disturbance. D, portion of the severely fibrotic sinoatrial node from patient (Case 12). The sinoatrial node artery shows mural amyloid deposits (dark in this stain) but the lumen is patent. The atrial myocardium at the right is unremarkable. Electrocardiogram showed sinus bradycardia. Hematoxylin and eosin stain (A, B and C), Congo red stain (D); original magnification X 90; reduced by 5 per cent.

studied, and their clinical histories were reviewed. The hearts were examined grossly, and histologic sections were taken from both atria and ventricles. The presence of amyloid was confirmed by *Congo red staining* and dichroic birefringence in histologic sections of myocardium [19]. At least 50 sections of myocardium, including *the left* and right ventricle, and atria in each patient, were examined. The atrioventricular node and bundle branch networks were removed in a single block [20]. The blocks were serially sectioned at 8 μ intervals and every 15th section was retained; two of every three retained sections were stained with hematoxylin and eosin or aldehyde fuchsin-elastic, respectively, and every third section was *stained* as indicated with either Congo red, cresyl violet, Vethoeff-van Gieson elastic or Masson's trichrome. In 22 of the 23 hearts the sinoatrial node was present; it was removed in a single block as described by Hudson [21], subdivided and *sectioned* for *histologic study*. Blacks which contained sinoatrial node tissue were further serially sectioned and stained in the manner described.

Amyloid involvement of the myocardium was graded mild, moderate or severe on the bask of the findings on combined *gross* and microscopic examination of the hearts. The grading was based on an estimate of the amount of amyloid present-mild if less than 10 per cent. moderate if approximately 10 to 40 per cent and severe if greater than 40 per cent of the myocardium was amyloid. With moderate and severe involvement, amyloid was evident by gross inspection. Within the specialized conduction system alone, amyloid involvement and fibrosis were graded on a scale of 1+ *to* 4+, ranging from mild to severe involvement, respectively (Figure 1).

The conduction system of 23 control patients (group 2) matched for age within two years were studied in a fashion identical to that described. Electrocardiographic abnormalities were recorded in each case.

RESULTS

Clinical Findings. The average age of the patients in group 1 (Table I) was 75 pears (range 44 to 88 years); 19 of them were 70 years of age or older. Eighteen of the 23 patients had what has been termed a "senile" pattern of amyloid distribution. In senile amyloidosis, amyloid is deposited mainly in the heart, involvement of the vessel walls, lung, pancreas and other *organs* is less severe [22,23]. In 10 of the 18 patients with senile-type, amyloid was confined entirely to the heart, One of the 18 patients with senile-pattern amyloid also had active meningovascular syphilis (Case 4).

Of the remaining five patients with cardiac *amyloid*, three had a plasma cell dyscrasia (Cases 2, 12 and 22), one had generalized amyloidosis in a familial pattern with prominent renal involvement (Case 7) [24], and one has a primary distribution with prominent nerve involvement (Case 21). The hearts ranged in size from 350 to 800 g with an average weight of 551 g. Coronary artery disease was minimal: only one *of* 23 *patients* had

TABLE I Clinical and Pathologic Features of Patients with Cardiac Amyloidosis (Group 1) and Control Patients (Group 2)

Features	Cardiac Amyloidosis (Group 1)				Control Group
	Mild	Moderate	Severe	Total	No Amyloid
Clinical					
Patients (no.)	7	5	11	23	23
Age (yr)					
Range	52–78	75–84	44–88	44–85	46–09
Average	69	80	78	76	76
Sex (no.)					
Male	5	3	7	15	14
Women	2	2	4	8	9
Congestive heart failure (no.)	7 (100)*	5 (100)	10 (90)	22 (96)	9 (39)
Systemic hypertension (no.)	5 (71)	2 (40)	5 (45)	12 (52)	6 (26)
Electrocardiographic					
Atrial arrhythmias (no.)	3 (43)	2 (40)	4 (36)	9 (39)	3 (13)
Atrioventricular block (first degree, second degree, complete heart block)	3 (43)	2 (40)	5 (45)	10 (43)	4 (17)
Bundle branch block (no.)	3 (43)	2 (40)	2 (18)	7 (30)	2 (9)
Low voltage (no.)	2 (29)	1 (20)	5 (45)	8 (35)	0 (0)
Poor precordial R wave progression (no.)	1 (14)	1 (20)	5 (45)	7 (30)	5 (22)
Pathologic					
Heart weight (g/average)	570	420	599	551	570
Sinus node (no.)					
Amyloid (severe)	0	0	2 (18)	2 (9)	...
Fibrosis (severe)	1 (14)	2 (40)	4 (36)	7 (30)	0 (0)
Atrioventricular node-bundle branch (no.)					
Amyloid (severe)	0	0	2 (18)	2 (9)	...
Fibrosis (severe)	2 (29)	1 (20)	3 (27)	6 (26)	2 (9)

* Figures in parentheses represent per cent.

greater than 75 per cent lumenal narrowing of one or more of the major extramural coronary arteries.

Twelve patients (52 per cent) had a history of systemic hypertension, defined as a recorded blood pressure level of 140/90 mm Hg or greater. In five of these patients, four with severe amyloid in the heart, hypertension disappeared in the latter part of their clinical course.

Congestive heart failure was present in 22 patients (96 per cent): New York Heart Association class III and IV in 17 and class I and II in five. The group with class III and IV failure included 10 patients with severe cardiac amyloid and seven with mild or moderate cardiac amyloid. Hypertension and/or renal disease may have contributed to the congestive failure in at least 15 of these 22 patients. Some form of stable electrocardio-

TABLE II Electrocardiographic and Pathologic Findings (Group 1)

Case No.	Age (yr) and Sex	Type of Amyloid	Rhythm and Conduction Disturbances*	Sinus Node	A-V Node	Main Bundle	Left Bundle	Right Bundle
			Mild Cardiac Amyloidosis (7 Patients)					
1	64, M	Senile	PVC; complete heart block	...	...	...	1 + F	...
2	78, M	Plasma cell dyscrasia	1° AVB, RBBB	...	...	...	...	...
3	65, W	Senile	Atrial fibrillation LBBB, we	1 + F	...	...	4 + F	...
4	70, M	Senile	PAC	4 + F	...	...	...	...
5	78, M	Senile	LBBB	...	...	...	4 + F	...
6	76, M	Senile	1° AVB, PAC, atrial fibrillation	...	...	...	...	...
7	52, W	Familial	None	...	...	...	...	...
			Moderate Cardiac Amyloidosis (5 Patients)					
8	75, M	Senile	PAC, PVC, 1° AVB, LBBB	...	...	...	4 + F	...
9	81, M	Senile	PVC	1 + A 2 + F	...	...	...	1 + A
10	82, M	Senile	LAH, RBBB	1 + A 3 + F	...	...	...	...
11	84, M	Senile	Intermittent CHB (with myocardial infarction)	...	...	...	...	...
12	81, W	Plasma cell dyscrasia	Sinus bradycardia	4 + F: 4 + A in sinus artery	1 + A vessel	3 + A vessel	3 + A vessel	3 + A vessel
			Severe Cardiac Amyloidosis (11 Patients)					
13	72, M	Senile	PAT, PAC, PVC, 2° HB, escape nodal rhythm	1 + A 3 + F	...	...	...	...
14	73, M	Senile	Atrial fibrillation	1 + A 2 + F	...	...	...	2 + A
15	88, M	Senile	PAC, PVC	1 + A	...	...	1 + F	1 + A
16	84, W	Senile	LAH	1–2 + A 2–3 + F	...	...	1 + A 4 + F	1 + A
17	81, M	Senile	None	1 + A 1 + F	2 + A vessel	2 + A vessel	3 + A vessel	...
18	83, W	Senile	1° AVB, LAH	3 + A	...	...	2 + A	1 + A
19	85, M	Senile	Escape nodal rhythm	2 + A 4 + F	...	1 + A	...	...
20	68, W	Senile	1° AVB, LBBB	1 + A 1 + F	...	...	4 + F	1 + A
21	44, M	Primary	1° AVB, LAH	3–4 + A	4 + A	4 + A	4 + A	4 + A
22	76, M	Plasma cell dyscrasia	Atrial fibrillation LBBB	Not studied	...	...	4 + F	...
23	86, W	Senile	1° AVB, LAH	3 + A sinus artery 4 + F	4 + A	4 + A	4 + A	4 + A

*A = amyloid; AVB = atrioventricular block; F = fibrosis; LAH = left anterior hemiblock; LBBB = left bundle branch block; RBBB = right bundle branch block; PAC = premature atrial contraction; PAT = paroxysmal atrial tachycardia; PVC = premature ventricular contraction.

graphic abnormalities was present in all 23 patients, documented within a period of three months before death: nine had atrial arrhythmias, including four with atrial fibrillation; eight had first or second degree block; seven had complete left or right bundle branch block; five had left anterior hemiblock; and two had complete heart block. In two patients the only abnormalities were nonspecific changes in the S-T segment or T wave. Additional electrocardiographic findings were low voltage in eight patients, and delayed R wave progression across the precordium suggestive of old myocardial infarcts in seven. In each instance there was no clinical evidence of digitalis toxicity to account for these electrocardiographic abnormalities.

Autopsy Observations. Group 1. Mild cardiac amyloid: Findings in the seven patients with mild deposition of amyloid within the heart are summarized in Table II. Two patients had atrial fibrillation, two had first degree heart block, one had complete heart block, and three had right or left bundle branch block. Despite these disturbances, direct amyloid deposition within the sinoatrial node, atrioventricular node or remaining distal conduction tissues was absent or negligible in all patients. Focal scarring, however, was present in portions of the conduction system of three patients that may have accounted for electrocardiographic abnormalities: one patient with premature atrial contractions had severe fibrosis of the sinus node unassociated with amyloid within the node or sinus node artery; two patients with left bundle branch block had atrophy and fibrosis of the proximal left bundle (Figure 2).

Moderate cardiac amyloid: Five patients had moderate amyloid infiltration of myocardium. Despite the presence of premature atrial contractions, first degree atrioventricular block, left bundle branch block, left anterior hemiblock, right bundle branch block, intermittent complete heart block and sinus bradycardia among these patients, amyloid deposition within the specialized conduction tissue accounted for none of these disturbances (Figure 1A). Fibrosis within the conduction system was present in three patients (Figure 1C). Scarring of the sinus node in association with [illegible] amyloid deposition within the sinus node artery and other intramural coronary arteries was present in one patient whose only electrocardiographic abnormality was episodic sinus bradycardia (Figure 1D). One other patient had moderate scarring and mild amyloidosis of the sinus node, with no documented associated arrhythmias. A third patient with left bundle branch block had atrophy and fibrosis of the proximal left bundle, which was entirely free of amyloid deposits (Figure 3). In one of these five patients complete heart block developed after an acute inferior myocardial infarction, but the sinoatrial and atrioventricular nodes and bundle branches were free of ischemic damage.

Severe cardiac amyloid: Eleven patients had extensive deposits of amyloid throughout the myocardium (Table II). Conduction disturbances present in this group of patients included escape nodal rhythms in two patients, atrial fibrillation in two, premature atrial contractions in two, first degree heart block in four, left anterior hemiblock in four and left bundle branch block in two. Although small focal deposits of amyloid were present within the conduction tissue in 10 of the 11 patients, the conduction tissue was markedly spared relative to the involvement of the surrounding myo-

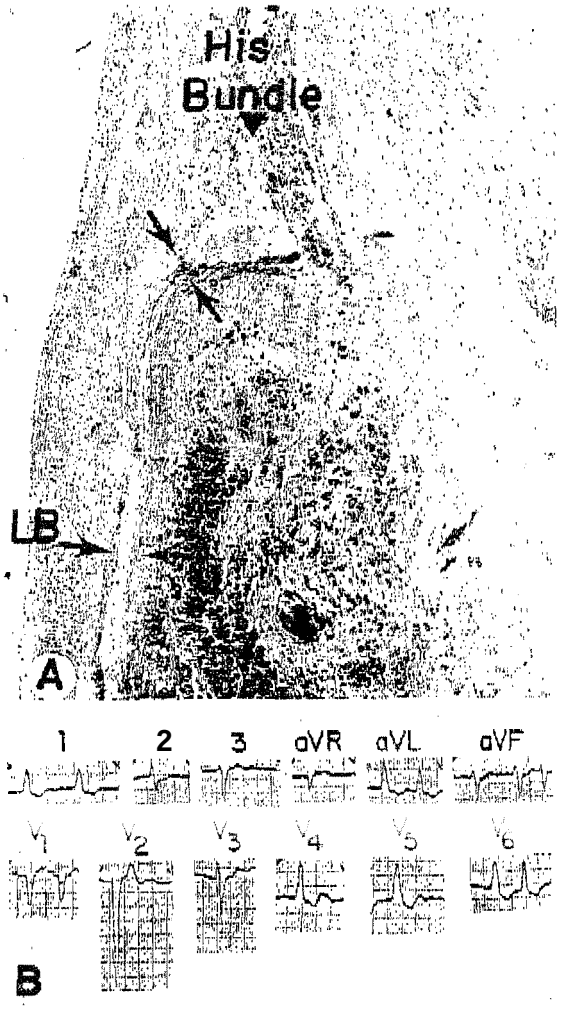
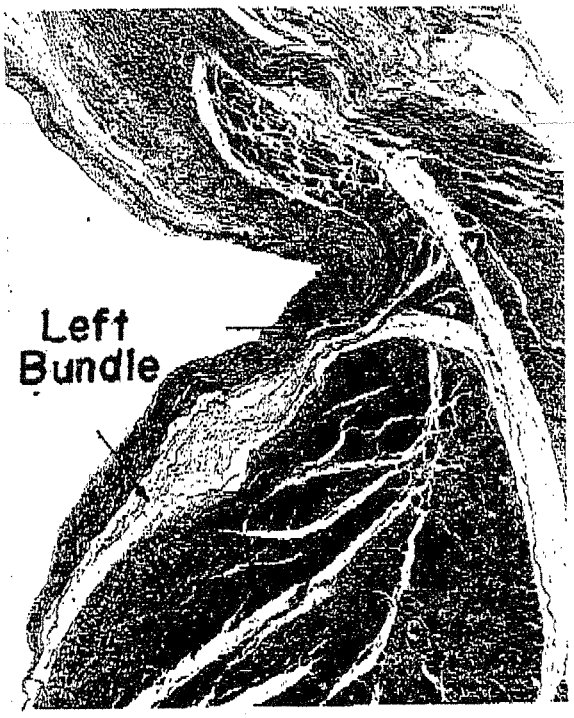


Figure 2. Case 3. A, atrophy and fibrosis of the proximal left bundle (LB) extending over the segment between arrows. His bundle is above center and continuation of left bundle at lower left. Hematoxylin and eosin stain, magnification × 60. B, electrocardiogram showing atrial fibrillation and left bundle branch block.



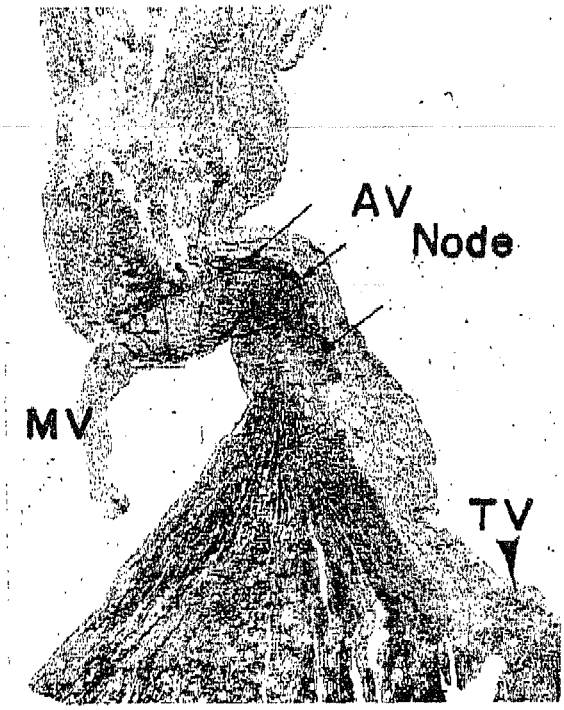


Figure 3. Case 6. Atrophy and fibrosis of the proximal left bundle branch in a patient with moderate cardiac amyloidosis (arrows) with normal His bundle above. Electrocardiogram showed left bundle branch block. Hematoxylin and eosin stain, magnification × 30.

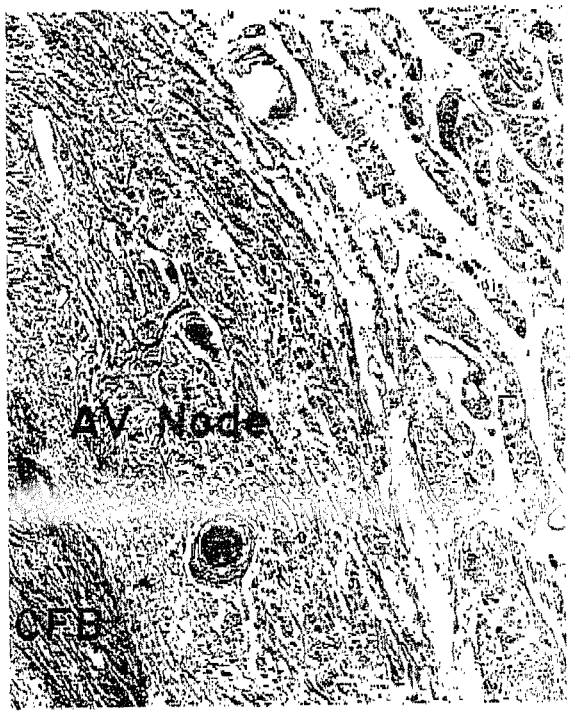


Figure 4. *Histologic section from patient (Case 15) with severe cardiac amyloid at the level of the atrioventricular (AV) node (arrows) shows absence of amyloid deposits within this structure. The atrial myocardium above is almost entirely replaced by amyloid and the ventricular wall below is severely involved by amyloid. The remainder of the conduction system showed similar sparing of amyloid deposition. Electrocardiogram showed premature atrial and ventricular contractions. MV = mitral valve; TV = tricuspid valve. Hematoxylin and eosin stain, magnification × 6. NOTE: This and subsequent photographs of the atrioventricular node and bundles are oriented as one follows the system from its proximal (posterior-inferior) to distal (anterior-superior) location. Hence the tricuspid valve is on the right.*

Figure 5. *Histologic section from patient (Case 18) with severe cardiac amyloid at a level within the conduction system similar to that shown in Figure 4 which demonstrates sparing of the atrioventricular node (center) in the presence of massive atrial amyloidosis (right). The central fibrous body (CFB) is at the lower left. Hematoxylin and eosin stain, magnification × 60.*

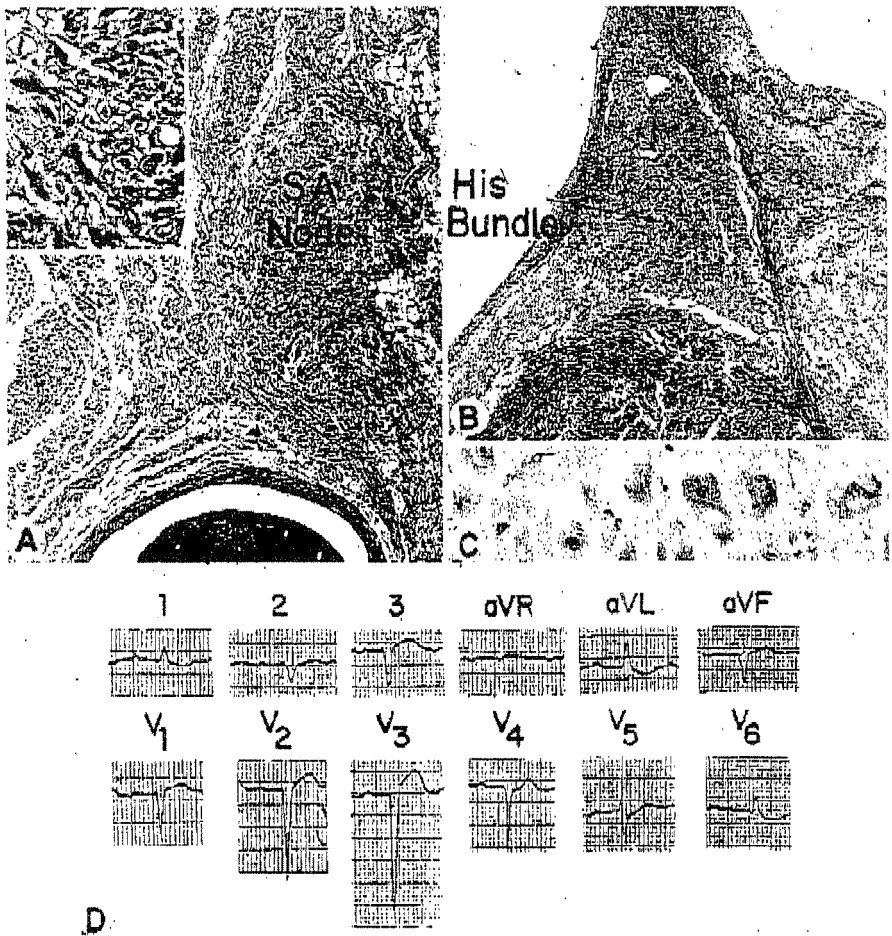


Figure 6. Case 21. Patient with severe myocardial and conduction system amyloidosis. A, the sinoatrial node with good preservation of architecture. The injected sinoatrial node artery is at the bottom. Inset shows the amyloid (lighter stain) encircling individual muscle cells of the sinoatrial node. There is no increase of fibrous tissue. B, His bundle with massive amyloid replacement. C, severe myocardial amyloid shown surrounding muscle fibers. D, electrocardiogram showing first degree heart block and left anterior hemiblock. Hematoxylin and eosin stain, magnification × 60 (A); × 300 (inset); × 30 (B) and × 300 (C).

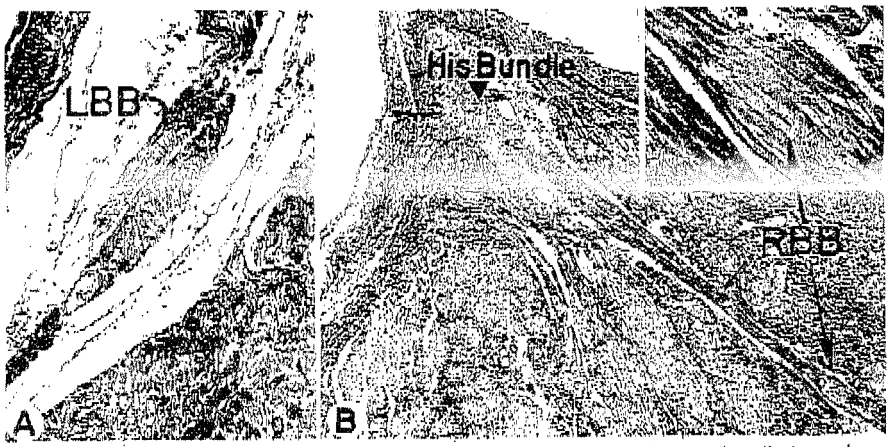


Figure 7. Case 18. Patient with severe cardiac amyloidosis and focal deposits within the bundle branches. The electrocardiogram revealed first degree heart block and left anterior hemiblock. A, left bundle branch (LBB) with lighter staining amyloid deposits interrupting the bundle. B, Overview showing His bundle at top and the right bundle branch (RBB) (arrows). Inset shows the nodule of amyloid (lower arrow) which partially interrupted the right bundle but was unassociated with a corresponding electrocardiographic abnormality. Hematoxylin and eosin stain, magnification × 125 (A and inset) and × 25 (B).

cardium (Figures 4 and E). Only three of the 11 patients had extensive amyloid deposition within portions of the conduction system. In two patients (Gases 21 and 23), involvement of the sinoatrial and atrioventricular nodes, and both bundle branches was associated with first degree block and left anterior hemiblock (Figure 6); In the third patient, whose electrocardiogram also showed first degree and left anterior hemiblock, the deposits were limited to the sinus node and to focal areas within the left and right bundle branches (Figure 7) sparing entirely the atrioventricular node and main bundle.

Despite the paucity of direct amyloid infiltration of the specialized conduction fibers, mild to severe focal fibrosis was present in nine of the 11 patients with severe myocardial amyloid; in five of them the fibrosis may have been clinically significant. In two patients (Cases 13 and 19), severe fibrosis of the sinus node was associated with escape nodal rhythms and atrioventricular dissociation. In three patients (Cases 16, 20 and 22), fibrosis interrupted all or part of the left bundle: electrocardiograms showed left anterior hemiblock in one and complete left bundle branch block in two.

Comparison group: For comparison with the patients with amyloid (group 1), 23 patients without cardiac amyloidosis [group 2] were selected for conduction system study. They were matched for age within two years of the patients with amyloid and heart weight. These patients were chosen without knowledge of their electrocardiographic findings or cardiac disease.

These patients ranged in age from 46 to 89 years, with an average age of 76 years; 19 were over 70 years old. The electrocardiographic abnormalities in these patients documented within a period of three months before death were as follows: three had atrial arrhythmias including two with atrial fibrillation; atriaventricular block was present in four, including a first degree block in two, second degree Mobitz II block in one and complete heart block in one; left bundle branch block was present in one and left anterior hemiblock in one. The overall incidence of rhythm or conduction disturbances among these 23 patients was 39 per cent, in contrast to 41 per cent among the patients in group 1.

The conduction systems in these patients were examined by the method described herein. Specific findings were mild sinoatrial node fibrosis in two (9 per cent) patients, each unassociated with an electrocardiographic rhythm disturbance, and none had severe sinus node fibrosis; idiopathic atrophy and fibrosis of the left bundle branch in two patients (one with complete heart block and one with left bundle branch block); and mild fibrosis of the proximal left bundle branch in three patients who had no evidence of conduction block on electrocardiogram. Thus, severe sinus node fibrosis was not present in any of the patients in group 2, but it was present in 30 per cent of the patients in group 1; severe fibrosis of the atrioventricular node or bundle branches was present in 9 per cent of the patients in group 2 and in 26 per cent of those in group 1.

COMMENTS

The most striking finding within each group of patients with different degrees of cardiac amyloidosis was the marked sparing of the specialized conduction tissue relative to the deposition of amyloid elsewhere in the heart. Of the 23 patients studied, only three had severe amyloid infiltration of the sinus node, atrioventricular node, bundle of His or its major branches. Amyloid infiltrates were extensive in the sinus node of two of these patients, and the sinus node artery in the other patient with associated sinus node fibrosis. In all three patients amyloid deposits within the atria and ventricles were severe and even more extensive than ths deposition of amyloid within the sinoatrial node itself. In none of these patients, however, was the amyloid *infiltration* of the sinus node reflected in an electrocardiographic abnormality; all three patients ware in stable sinus rhythms. Diffuse amyloid infiltration of the atrioventricular node, bundle of His and bundle branches in two of these three patients, and focal deposits in the bundle branches of the third were associated with electrocardiographic evidence of first degree heart block and left anterior hemiblock in each.

Although amyloid in the conduction system can explain rhythm and conduction disturbances in some patients with cardiac amyloidosis, it clearly dlS not account for the majority of these disturbances in this study. In group 1 all 23 of our patients had abnormal electrocardiograms, and 21 (91 per cent) had some abnormality of rhythm or conduction including first and second degree heart block, complete heart block, bundle branch block and escape nodal rhythms with atrioventricular dissociation. As already indicated, in only three patients (13 per cent) were conduction disturbances accounted for by direct amyloid infiltration of the specialized conduction tissue of the heart, but eight patients (36 per cent) had sinoatrial or atrial rhythm disturbances and 13 (57 per cent) had evidence of atriaventricular or bundle branch block.

Examination of the conduction systems in our patients provided other explanations for the frequent electrocardiographic disturbances. Severe sinus node fibrosis was present in seven patients (30 per cent), although observed with all degrees of cardiac amyloidosis, appeared more frequent when amyloid deposits were moderate or severe (Table I). Fibrosis within the sinoatrial node may be seen in association with a number of disease processes including pericarditis, uremia, scleroderma, rheumatic heart disease, idiopathic myocardiopathies and ischemic heart disease [21, 25–27]. Fibrous tissue does not appear to increase

within the sinoatrial node with age in adults [28]. Furthermore, we did not observe severe sinoatrial node fibrosis in any of 23 age-matched patients in group 2. Thus, the explanation fw nodal fibrosis in group 1 remains unclear, but it likely is related to the infiltrative amyloid myocardiopathy. Sinus artery involvement by amyloid, which could possibly produce ischemic and nodal fiber atrophy, was absent in all but two patients.

Idiopathic atrophy and fibrosis of the proximal left bundle branch (4+ fibrosis) was present in six patients (25 per cent) and was more than twice as frequent as direct amyloid infiltration. Unlike sinus node fibrosis, the lesion was found with equal frequency in patients with mild, moderate and Severe cardiac amyloidosis, and was found three times as often as in the age-matched control group. Atrophy and fibrosis of the left bundle system, variably named "sclerosis of the cardiac skeleton" and "idiopathic bundle branch fibrosis" [29,30], has been shown to be the most frequent cause of longstanding complete heart block [31], and it may be associated with isolated left and right bundle branch block and left anterior hemiblock [32–35]. The pathogenesis of this entity remains unclear, but it has been suggested that it is an exaggerated aging process related to mechanical stress in this region [30], that it is a degenerative or myopathic entity [29] or that it is a sequelae of previous damage due to myocarditis [36]. Whatever the came, atrophy and fibrosis within the bundle branches and not direct amyloid infiltration most often accounted for conduction block in our patients.

Atrioventricular and bundle branch block were also present in six patients without accountable pathologic findings in their conduction systems: three had first degree heart block, and in one it was in combination with right bundle branch block; one patient had right bundle branch black and left anterior hemiblock; and two patients had complete heart block. In the latter two patients, complete heart block developed shortly before death in the setting of an acute pulmonary embolus in one and an inferior myocardial infarction in the other. The clinical conduction disturbances in the four other patients were entirely without morphologic or clinica explanation. Amyloid infiltration of surrounding myocardium did not account for the conduction disturbances as two had only mild and two moderate myocardial involvement. It is possible, however, that in patients with severe cardiac amyloidosis such infiltration of the atrium and ventricles might produce internodal or peripheral conduction blocks.

The high frequency of conduction abnormalities in our group 1 has been recognized by others [1–6]. Detailed studies of pathologic examination af conduction system in amyloid, however, are few and have reached conflicting conclusions. James [16] described five patients with severe cardiac amyloid and extensive deposits of amyloid within the conduction systems: he noted greater involvement of The sinus rather than the atrioventricular node, and corresponding electrocardiographic changes. Davies [18], in a detailed study of three patients with cardiac amyloidosis and rhythm disturbances, however, failed to find amyloid deposits io fully account for the electrocardiographic abnormalities, leading him to conclude that fibrous scarring of the myocardium, possibly related to amyloid vessel involvement, was the factor that caused conduction and rhythm abnormalities in these patients.

Our 23 patients in group 1 represent a wide spectrum af amyloid heart disease ranging from mild to severe, and patients similar To those described by both James and Davies may be found within this spectrum. In three patients extensive amyloid did involve the specialized conduction system, but the findings in the other 20 patients seem to indicate that the high incidence of rhythm and conduction disturbances in the majority of patients with cardiac amyloidosis are not a direct manifestation of amyloid within the specialized conduction tissue of the heart Fibrosis of the sinus node, and idiopathic atrophy and fibrosis of the atrioventricular conduetion network more frequently accounted for conduction disturbances than did amyloid in our patients. Whethor the fibrosis Is related to amyloid elsewhere in the heart or to some other cause is as yet uncertain.

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Re; Annstrong v. Celerio

Sir,

I have been asked to review the medical records and other related documents concerning the anesthesia care Nancy Armstrong received on August 7, 1999. I was asked to determine if the standard of care was breached during her anesthetic on 8/7/99. On that date, the patient was admitted to Amherst Hospital to have a hysterectomy for pelvic pain.

Her anesthesiologist was Dr. Briccio Celerio. Preoperatively, Dr. Celerio was faced with a patient who had an abnormal EKG, a chest X-ray with positive findings, a history of difficulty breathing with exertion, and leg swelling. The patient denied a history of cardiac disease or heart problems, and had been cleared for surgery by her primary care physician. The preoperative chest examination revealed decreased breath sounds in the right base but was otherwise unremarkable. Based on the data that Dr. Celerio was able to elicit from the patient and her surgeon, he decided to proceed with a general anesthetic. Dr. Celerio relied on his own judgment and his assessment of the patient in conjunction with the available data at the time. X-Ray Report WAS AVAILABLE X-RAY WAS AVAILABLE

It is my opinion that Dr. Celerio did not deviate from the standard of care in his preoperative assessment and that he had a right to rely on the referring physicians to give him accurate objective medical findings and data. Dr. Celerio also had a right to rely on his patient (to the best of her ability) to accurately outline her medical conditions and participate in his assessment in order for him to administer an anesthetic that would fit her individual needs. Prior EKGs were available.

Should he have used a different anesthetic what?

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An abnormal EKG and an abnormal chest X-ray are not absolute contraindications to receiving an anesthetic, particularly if the anesthesiologist is lead to believe that the patient has been optimized medically for the procedure.

Given the preoperative data available and Dr. Celerio's physical exam, the patient was given a safe induction of general anesthesia. Shortly after the patient was asleep, she became hypotensive For unknown reasons and eventually arrested and died.

The patient died from a sudden, unpredictable, and unavoidable cardiac collapse. This was caused by amyloidosis in the heart. This disease was undetected at the time but became rather apparent on her post mortem examination. The patient's heart was in such a condition that it could not be resuscitated when stressed because cardiac muscle and the heart's electrical conductance system do not respond normally when there is a gross infiltration of amyloid deposits in the tissues. There is no cure for amyloidosis.

The patient's death can not be attributed to her anesthetic. She is quite simpiy the victim of sudden death and even though the death was untimely and unfortunate, there is no evidence, in the records, that a deviation in the standard of care for anesthesiologists caused this mishap.

My opinions are based on my training, education, research, and experience. If more documents become available, I will be happy to read them and reserve the right to alter my opinions accordingly.

Sincerely,

David C. Brandon, M.D.