IN THE COURT OF COMMON PLEAS

OF CUYAHOGA COUNTY, OHIO

KARLA SPEHAR, A MINOR, ETC., et al.,

Doc. 424

Plaintiffs,

vs.

Case No. 157883

JEFFREY J. ORCHEN, DDS, INC., et al.,

Defendants.

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Deposition of SARA SPAGNUOLO, M.D., the Witness herein, called by the Plaintiffs for examination under the statute, taken before me, Vivian L. Gordon, a Registered Professional Reporter and Notary Public in and for the State of Ohio, pursuant to notice and stipulations of counsel, at the offices of The Cleveland Clinic Foundation, 9500 Euclid Avenue, Cleveland, Ohio, on Monday, October 29, 1990 at 9:30 o'clock a.m.

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ORIGINAL

APPEARANCES:

On behalf of the Plaintiffs:

Ziegler, Metzger & Miller, by

TIMOTHY M. BITTEL, ESQ.

1900 Huntington Building

Cleveland, Ohio 44115

781-5470

On behalf of the Defendant Sherwood Medical Co.:

Baker & Hostetler, by

PATRICK J. JORDAN, ESQ.

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621-0200

MR. JORDAN: I spoke to Deirdre Henry on Friday and she indicated that she would not be present today. Even though she was aware of the deposition, she felt our interests were similar in this regard since Dr. Spagnuolo is actually our joint expert and that the deposition could proceed in her absence,

SARA SPAGNUOLO, M.D., of lawful age, called for examination, as provided by the Ohio Rules of Civil Procedure, being by me first duly sworn, as hereinafter certified, deposed and said as follows:

EXAMINATION OF SARA SPAGNUOLO, M.D.

BY-MR. BITTEL:

Q. Doctor, good morning. My name is Tim Bittel as I told you off the record, I represent Karla Spehar and her family in a litigation matter. Do you understand that?

A. Yes.

Q. I am going to take your discovery deposition this morning concerning certain opinions you have relating to malignant hyperthermia.

Have you ever been deposed before?

A. Once.

Q. Once. Have you ever testified in court?

A. No.

Q. All right, If you want to break for any reason to talk to Mr. Jordan or any personal reason, tell me and I will be happy to break, I don't want to make this unpleasant in any fashion.

A. Thank you,

Q. The procedure as you probably know from your one previous experience is that I ask questions and you give answers and Vivian records the questions and answers, okay?

A. Fine.

Q. I will be asking for your opinions concerning certain medical matters and I ask that if you state an opinion you do so within the grounds of reasonable medical probability, okay?

A. Fine. Thank you.

Q. If you can't state an opinion within a reasonable medical probability, tell me and we will deal with that issue as it may arise, all right?

A. Fine.

Q. I don't have a copy of your CV, so perhaps just tell me. You are an anesthesiologist; correct?

A. Yes.

Q. You are a medical doctor?

A. Yes.

Q. Very briefly just outline for me where you went to college, medical school and your residency training, et cetera.

A. I graduated from high school in 65, graduated from Hiram College in 69. I went to University of Pennsylvania for a year in graduate arts and sciences between 69 and 70. Started medical school at Jefferson Medical College in 1971, transferred in 1973 to Case Western Reserve, graduated from Case Western Reserve with a Doctor of Medicine in 1975. I interned at University Hospitals of Cleveland. I stayed there until finishing internship, two years of residency and a year of fellowship and joined the staff there as assistant professor.

Q. The staff at?

A. University Hospitals.

Q. UH?

A. Of Cleveland.

Q. Okay.

A. Remained on staff there until May of 1988 when I came to the Cleveland Clinic, At present my title is assistant staff and medical director of presurgical services.

Q. Assistant staff and medical director of presurgical --

A" -- services.

Q. Your specialty training in anesthesiology was taken where?

A. University Hospitals of Cleveland.

Q. Okay. And your duties as an assistant professor beginning at UH in 19 -- well actually that was at Case Western Reserve University, right?

A. Right.

Q. Those began in 1979 and continued to the present?

A. Until 1988.

Q. All right. And what were you teaching at the medical school during that time period?

A. I was teaching mostly the anesthesia residents the training program. I would give occasional lectures to the dental

school and to medical students coming through, rotating through our area. And to other surgical fields, like orthopedic surgery and urology and ophthalmology, they would ask me to speak specifically on malignant hyperthermia.

Q. Okay. You are board certified?

A. Yes.

Q. Okay. And when did you obtain your specialized interest in malignant hyperthermia, or when did khat begin, I guess is a better question?

A. January 3, 1980. My first case.

Q. You had -- well, tell me about that. Tell me what happened on January 3, 1980.

A. I was asked to come help a colleague at 7:00 o'clock at night to help resuscitate an 18 year old young man from a malignant hyperthermia crisis.

Q. Okay.

A. And ever since that time I have read everything I can get my hands on on malignant hyperthermia. I began to lecture on the subject first at Case and then for nurse anesthesia conferences, two of them, and went

to the University of Michigan as a visiting professor once. But after Mark, this patient who had a full blown malignant hyperthermia expert --

Q. You said expert. You mean -- you said the word expert.

A. Interest in malignant hyperthermia,

Q. Okay.

A. Happened at that time and I just read everything I could about the disease, any books I could get ahold of, all the articles in the literature.

Q. Have you ever -- strike that.

Does your practice involve the administration of anesthetic?

A. Yes.

Q. Clinically?

A. Yes.

Q. What percentage of your practice finds you in an operating room actually administrating anesthetic?

A. It used to be 100 percent.

Q. Okay.

A. Now it is 20 percent,

Q. Okay. When did it go down to 20

percent?

A. When I went part time in May of 1988.

Q. Are you part time here at the Cleveland Clinic?

A. Yes.

Q. How many hours a week or what is your commitment here at the Cleveland Clinic?

A. I work four days a week about anywhere from 35 to 38 hours a week.

Q. Okay.

A. I am only in the operating room on Tuesdays and occasionally on Friday if a colleague has to go out of town, then I will work on a Friday.

Q. Okay. What do you --

(Recess had.)

Q. Have you ever in your experience as a physician had a patient to whom you have administered anesthetic have a malignant hypertliermia reaction?

A. Oh, yes.

Q. How many times have you had your patients have malignant hyperthermia reactions?

A. Well, I was always called at

University when someone had a reaction, so I have probably 15 patients on file and maybe lour or five other patients that T neglected to keep records of though the consults that I wrote are in their charts.

I had one full blown case that was my own and then about three other cases that were probable malignant hyperthermia cases,

Q. Are you finished?

a. Yes.

Q. T don't want to cut you off, What I am trying to understand is this. As an anesthesiologist, you have had experiences whereby obviously you give a patient, administer anesthetic to a patient during a surgical procedure.

How many times have you gone into a surgical procedure, administered an anesthetic and while you were the physician, the anesthesiologist in charge of that case had a malignant hyperthermia event?

A. Just let me think. I would need my list to know which ones exactly were mine and no one else's. Maybe three or four that were mine.

Q. And then in addition to the three or four that were yours, your patients, you were called as a consultant to help another anesthesiologist whose patient had suffered an MH event in surgery'!

A. Correct.

Q. And approximately -- and I understand that you may not have the exact record here -- but approximately how many other cases fall. into that category where you were called as a consultant to help and assist another anesthesioloyist whose patient had an MH event?

'A. I have probably been involved in 19 or 20 cases. You need to know that these include biopsy proven and suspicious cases, not in every situation where the parent is willing to go for muscle biopsy. So in these particular situations some of these patients have probable but not diagnosed malignant hyperthermia.

Q. All right. So that my record is clear, your testimony is that in your career you have treated on. a hands-on basis approximately 19 or 20 people who either were

MH probable with a history of a probable MH event or MH positive by way of muscle biopsy?

A. Correct.

Q. Okay. And of the -- strike that,

Approximately could you estimate for me how many patients in total in your career have you administered anesthetic to? I mean hundreds, thousands, tens of thousands?

A. Oh, my. Throughout residency three years maybe 800 a year. Through fellowship, another three or four hundred, and every year I am not sure records are kept on how many. I would say thousands. I would say several thousand.

Q. Okay.

A. I have been doing anesthesia since 1975, 76.

Q. Okay. What percentage of your professional practice today is devoted to the act of clinical practice of medicine as opposed to administrative duties that you may have here as the assistant staff medical director of presurgical services?

A. I think I have about five percent administration and 95 percent patient care.

Q. Okay. What information have you reviewed about the Karla Spehar case before today?

A. I reviewed the chart, the anesthetic record, the post-op notes.

Q. By chart you mean the Metro Hospital, Metro General Hospital chart?

A. Right.

Q. And all of the post-op notes from Metro Hospital?

A. Uh-huh.

Q. Have you reviewed any depositions of any witnesses in this case?

A. No.

Q. Okay.

(Discussion between witness and counsel out of the hearing of the reporter.)

A. Yes, the whole -- yes, I did review a deposition record. I didn't think -- of course that's what it was.

Q. It obviously didn't make a great impact on you.

What deposition did you read?

A. The deposition of --

THE WITNESS: Was that the

dentist? Neurosurgeon?

MR. JORDAN: Do you remember his name?

A. Dr. Indresano.

Q. Do you know Dr. Indresano, by the way?

A. No.

Q. Are you married?

A. Yes.

Q. Is your husband a physician?

A, Yes.

Q. Does he practice at Metro?

A. Yes, he does.

Q. What area does he practice in?

A. Infectious diseases.

Q. Do you maintain a file on Karla Spehar on your testimony matters in this case?

A. I do somewhere.

Q. Okay. Do you have it here? Do you know what is in the file?

A. I know I have my letter in the file and somewhere I have a Xeroxed copy of her chart.

Q. Okay. You didn't keep a copy of Dr. Indresano's deposition?

A. No.

Q. Okay. It's my understanding that you are not going to testify as to any opinions concerning the dental., the oral surgical or the possible metallurgical aspects of this litigation; is that true?

A. Correct.

Q. Your opinions are limited solely to the issues relating to malignant hyperthermia?

A. Correct.

Q. It's my understanding that malignant hyperthermia is a syndrome that consists of a distinctive set of signs and symptoms that may occur in susceptible individuals on exposure to certain drugs to produce general anesthetic or relaxation of the muscles during surgery. Would that be a correct statement?

A. Correct.

Q. The only thing that would be relevant to whether Karla sustained a malignant hyperthermia episode that you have reviewed would be her chart that you have identified and Dr. Indresano's deposition; correct?

A. Correct.

Q. From everything that you have seen, which is only Dr. Indresano's deposition and Karla's chart, is it your opinion that she probably did suffer a malignant hyperthermia episode at Metro on October 7, 1987?

A. She had a very good clinical picture for malignant hyperthermia. If she had had a CPK drawn 12 to 18 hours after the event and if it had exceeded 20,000, there would have been no question that she had malignant hyperthermia and biopsy would not be necessary.

From chart review only one CPK did I find which was 666 or so, 600 something, and I am not clear exactly what time it was drawn, but you really have to get a CPK at the peak, which is 12 to 18 hours after the crisis, so right now she is just a possible malignant hyperthermia susceptible individual and really needs to be biopsied or have one of her parents biopsied to prove the diagnosis.

Q. Okay. Well, I guess my question, though, and you may not have -- my question is this. Can you say that she probably suffered a malignant hyperthermia episode on October 7,

1987, and probably means more likely than not, or can't you say that?

A. The diagnosis bears such weight for the family that you really don't want to say absolutely yes she does until you can confirm with biopsy. But from what I read in her chart, I thought she had an excellent case presentation and in my opinion she probably has malignant hyperthermia.

Q. Okay. I am asking for your opinion and I am not asking for a hundred percent certainty, but from the clinical picture that you saw, it is probable that she did have a malignant hyperthermia episode on October 7, 1987, true?

A. I believe that she very easily could have. You need to know also there is severe full blown classic malignant hyperthermia and then there are cases that are picked up early enough that they never develop the full blown, okay. And that's what I think that this was, early malignant hyperthermia.

Q. By that you mean the surgical team reacted to it promptly and avoided the increase of symptoms and the seriousness of the

condition?

A. Correct.

Q. Okay. And again, I need to explain, I am sure Mr. Jordan did but I will explain on the record that what we deal with in a legal system, in our system of litigation is to ask experts, including physicians as yourself, opinions within a reasonable degree of probability. And the law has defined that to mean that which is more likely than not. From a statistical standpoint it would be that which is at least 51 percent or more than 50 percent likely, And what you had said earlier, I think you used the word could. And in our system of medical proof, could does not mean probable.

A. Okay. I would say more than 50 percent I feel this child has malignant hyperthermia, and I am convinced enough that I recommended medical alert bracelets for the child and the family and that they contact Malignant Hyperthermia Association of the United States and that they go for further counseling on the issue of malignant hyperthermia.

Q. Okay.

A. If this was my child, I would be concerned that the child has malignant hyperthermia and that child should never receive triggering drugs again.

Q. Okay. If I would tell you that the parents did shortly after this event in October 1987 contact the Malignant Hyperthermia Association and get information, publications, from that organization, and that they do have the child wearing medical alert bracelets indicating she is MH susceptible and that they have notified their treating people at Kaiser and the various school authorities --

A. Good.

Q. -- on the medical, you know, authorizations that parents have to sign for school, they have notified the school authorities, would those all be appropriate actions by the parents?

A. That's exactly what I would counsel them to do.

Q. Okay. Regarding the issue of the muscle biopsy, how many muscle biopsies have you participated in?

A. I don't usually do them, I do the counseling for them, and my colleagues, Dr. DeBoer and Dr. Tetziaff do them.

Q. Okay.

A. Rut I have only done two. They do probably 50 a year, maybe 35. This year it may be SO. Last year I think it was 35 or 36.

Q. Okay. They have only been doing that here at the Clinic for a short period of time, isn't that true?

A. That's correct.

Q. The Clinic, Cleveland Clinic just became a malignant hyperthermia resource in what, 1989?

A. Yes.

Q. Okay. So would it be by way of extrapolation, would I be reasonably correct if I say the Clinic has only done maybe a total of 70 or 80 muscle biopsies since it's been an MH resource?

A. That's probably all that we have done.

Q. Okay. You do counseling about MH -- excuse me, about the muscle biopsies? Yes?

A. We do the preoperative evaluation and the counseling too.

Q. Okay. What criteria do you apply for -- strike that.

Is one of your functions as a counselor here at the Clinic to recommend, yes, I think you should have a muscle biopsy or, no, you shouldn't have a muscle biopsy in my opinion?

A. Yes.

Q. Okay. Now, the only thing -- well, is there some age or physical size criteria that is ordinarily applied by medical doctors in determining whether or not a child should have a muscle biopsy?

A. Our center prefers over five years of age, but the literature especially recently has documented biopsies done in children as young as two and three.

Q. Okay.

A. I am not completely in agreement on that. In fact, I counseled a child, a family of a little girl with a questionable reaction, counseled them not to have a biopsy., The little girls get a nice big scar and up the

road is the potential for genetic analysis from a simple noninvasive blood test. Chromosome 19 has been implicated as the MH, an isolated gene from malignant hyperthermia. That chromosome 19 would be very nice, This particular family, 1 said if this was my daughter, I would wait three or four years, see if this test becomes the new gold standard and not have a scar on my little girl's legs.

Q. Okay.

A. So 1 basically like to do for other people what I would want to see done for my four daughters with what 1 know about their anesthesia records.

Q. Okay. In the case of Karla Spehar, knowing what you have gleaned from her chart at Metro General Hospital, and from Dr. Indresano's deposition, and knowing or assuming as I am asking you to assume that the parents have gotten information from the MH Association and they do have the girl wearing a medical alert tag, and assuming further that they have notified the medical authorities that they deal with at Kaiser and notified the general dentist who treats the child that she ha-s MH, and

notified the schools that she has MH, if those things are true, would you recommend that Karla undergo a muscle biopsy at this time or would you recommend not?

A. I would recommend that she waits just a few more years, If the parents need to know right now to isolate it to one side of the family or the other, then they can have muscle biopsies, they can he done safely and we could find out. It is possible that Karla has another myopathy. It is very abnormal for her to have a CPK of 600. Under 200 is normal. She never had an intramuscular injection, she never received succinylcholine, she never was cut, had any muscles cut. For her to have a CPK of 666 when usually children around that age have a CPK around 50 means either she had malignant hyperthermia or another clinical myopathy. If a neurologist was evaluating her and felt; it important that she have, if she had other signs of a myopathy, weakness --

Q. I am sorry, I didn't hear that last part?

A. Weakness, hypertonia, other things, then the neurologist might recommend a muscle

biopsy. The families really need to know to isolate to one side of the family or the other. Since the majority of cases are autosomal dominant, which means they are passed directly through the family, would mean if this is MH, that one of Karla's parents have it and half of her brothers and sisters have it and one of their grandparents. It passes that way through the family.

Q. Okay.

A. Then I would want to know. I would have my husband have a biopsy. If it was negative, I would have a biopsy. If it was negative, then we would just go from there.

Q. Okay. But the last comment you made was a hypothetical opinion concerning how you would deal with it for -- deal with a situation if one of your children had the events such as Karla had and how you would deal with the sequelae of that concerning yourself and your husband. Is that what I understood you to be talking about?

A. I would always like to have it isolated to one side of the family or another. I also like to see the diagnosis laid to rest,

because if she does have malignant hyperthermia, and as I said, I think there is easily well over 50 percent chance that she does, then we do need to do special things when she has anesthesia in the future. And many centers put them, put these patients in the intensive care unit overnight. It's safe but it's a big deal.

Q. Okay.

A. And for that reason it's awfully nice to have the diagnosis, But I know, you know, before the chromosome 19 thing I would liave recommended a biopsy when she was a certain age, old enough to undergo local anesthesia. Though she could have general too and my colleagues have done generals on young adults, children before.

Q. Okay. But the bottom line is that today your opinion based upon everything you know about Karla Spehar is that your opinion would be that she not have a muscle biopsy, correct, today?

A. She should have a diagnosis confirmed. I would like to see genetic analysis in a noninvasive way to make the

diagnosis, and I just see it only a few years away. And if that's the case and she were my child, I would say keep her on medical alert bracelets, treat her as if she has it when she needs elective surgery or emergency surgery and see what happens in a few years. She is only Five now anyway, is that correct, or six?

Q. She is six and she will be seven in February, I believe.

A. Okay. I would still wait a couple years.

Q. Again, understand, I am trying to understand -- we are involved in a litigation proceeding, but I want to understand your opinions. I think it is necessary for this case.

So that, you know, the muscle biopsy involves a surgical incision to the thigh?

A. Correct.

Q. On the front of the thigh?

A. Correct.

Q. And it causes somewhat of a scar?

A. Yes.

Q. Okay. You remove a piece of

tissue, I believe the literature indicates about the size of the tip of a little finger?

A. It is actually about a postage stamp size, but several millimeters, maybe five or six millimeters thick.

Q. Five or six millimeters would be about a quarter of an inch?

A. This is in an adult.

Q. Okay.

A. And I have not observed how big it is in a child. I don't imagine they would take as big a piece in a child.

Q. Okay. I mean it is reasonably major surgery?

A. No, I wouldn't call it major surgery, but it is surgery.

Q. Okay.

A. Plastic surgeons tell us that children overscar between the ages of five and 15 and they really don't like to see plastic surgery on little children because they have bigger scars also, so I keep all this -- you have to realize I am less aggressive than my colleagues and most MH people nationwide, because I feel that if you can treat them like

they have it and they may not even have elective surgery until they are 15, and why put a scar there.

Q. Okay. Well, what I am getting to is this. There has been -- you are not critical of the parents because they have elected to this date not to have a muscle biopsy?

A. Correct.

Q. Okay. And you think from what I have told you about their actions and notifying people that she is MH susceptible and using the MH alert bracelet they are acting in an appropriate fashion?

A. Yes.

Q. Is there anything else that you can think that they could do that would protect this child until the chromosome 19 test became available?

A. I think they have done everything khat's reasonable that can be done,

Q. Okay.

(Recess had.)

Q. Is it true that malignant hyperthermia is a known but rare complication

of the administration of anesthetic agents during surgery?

A. Correct.

Q. Is it true that malignant hyperthermia is a serious and potentially life threatening medica1 condition?

A. Correct.

Q. I believe the literature generally refers to malignant hyperthermia as the anesthesiologist's nightmare; is that true?

A. Yes.

Q. Has that changed?

A. Definitely.

Q. It's a horrible experience for an anesthesiologist as I understand?

A. Correct, but for an anesthesiologist who hasn't dealt with it and sees it for the first time it's life changing, but --

Q. Obviously it changed your life.

A. But I am not that uncomfortable anymore. The mortality presently is quoted at seven to ten percent for all patients undiagnosed before their episode, and if I can just tell you what one of my cases look like,

Does it have to go in here?

Q. No, keep it on the record. Go ahead.

MR. JORDAN: Why don't you just answer a question.

Q. Let's talk about that. My understanding is that malignant hyperthermia has only been diagnosed, I think it was first recognized, what, in about 1970?

A. 1961.

Q. 1961. And it wasn't categorized as a condition until 1979? When was it really coined?

A. The name malignant hyperthermia was coined in the mid 70s. It was known as malignant hyperpyrexia, but anesthesiologists knew that there was a certain group of patients who by heredity did not do well with anesthetics since it was reported in the Lancet and that particular case was a 21 year old young man with a fractured femur who had had ten family members die under anesthesia. And the anesthesiologist said this is probably either fever that they had because they all had Cevers, lie said we will use halothane which is

a new drug out and the young man got a full blown MH episode and he survived and it was published in the Lancet.

Q. The Lancet being the Journal of British Medical Society?

A. Right.

Q. My understanding is that malignant hyperthermia will not subside by itself; is that true?

A. No, it subsides by itself in a significant number of cases. A number of the patients that I managed had two and three previous uneventful anesthetics. In the record and the literature is a patient who near died on his 13th general anesthetic without any evidence with 13 previous anesthetics that he had malignant hyperthermia.

Q. I am not sure if you understood my question or if I stated it correctly.

My question is this. Once a malignant hyperthermia reaction begins in a patient, it won't subside by itself, isn't that true?

A. If you remove triggering agents, there are circumstances where it will just

resolve by itself. If you never had enough of a triggering drug, succinylcholine wasn't used, it can actually get better on its own and does -- I wish I could tell you the exact quote -- in at least a third of the cases.

A full. blown episode does not get better just with withdrawing triggering drugs, and an article about five years ago showed that in these full blown MH reactions, if dantrolene was withheld, there was a 75 percent mortality. Tf dantrolene was given, immediately, there was a zero mortality, Therefore those are the statistics that existed before 1979. It was considered to have a 75 percent mortality at that time,

Q. Okay.

A. But there are 25 percent that would yet. better spontaneously with just withdrawing triggering agents.

Q. So that in the majority of cases once a malignant hyperthermia reaction begins, it won't subside by itself; is that true?

MR. JORDAN: Full blown?

A. Full blown with all the signs and symptoms, 25 percent of the time you will get

off.

Q. Okay.

A. 75 percent of the time the patient will go on to death if something is not done.

Q. Well, let's talk about Karla Spehar's case. From what you saw of the events taking place with Karla in the operating room and postsurgical, what symptomatology did she experience indicating a malignant hyperthermia episode?

A. One thing that I mentioned is that she may have had mild rigidity after induction with halothane, She was difficult to intubate. Three year olds are easy to intubate and this took three attempts. Usually trismus or rigidity occurring after succinylcholine. She did not receive succinylcholine, So it is possible that she just had, it was a difficult intubation or it's possible that she had some mild rigidity that made it more difficult for them to open her mouth. That is very subjective. I am just saying it is unusual to have to take three attempts to intubate a baby, a three year old.

Her heart rate was 95 when she,

when the case began, and it went up within 15 minutes to 150, and it stayed there. And it is significant that no atropine was given. Atropine is a drug that speeds up the heart rate. Light anesthesia can increase a heart rate, but this child had probably a dental block in. They weren't doing anything stimulating or painful. to her, and yet she had a pulse of 150, about 15 minutes after halothane was started.

Q. Would that be one of the factors indicative of an MJJ episode?

A. One of the early warning signs.

Q. Okay.

A. And that went on actually for an hour and a half when they started noticing her temperature rising to 39.9.

THE WITNESS: Do we have an anesthesia record that I can look at? It seems to me I remember that it was a rapid rise, You can warm children, especially three year olds, if they are on a warming blanket and hat on and all under drapes it's possible for their temperature to go up. I have seen it happen many times.

But do we have records?

MR. JORDAN: I don't have any.

Q. Don't you have your file here?

A. Don't ask. It is somewhere over there, You wouldn't want me to look. All my patients are over in the H building and I think Karla's chart is over in the H building.

Q. Okay.

A. Okay. She felt warm to the touch. They got a blood gas within about ten minutes. Now, this wasn't a terrible combined metabolic and respiratory acidosis, but it was definitely a combined metabolic and respiratory acidosis which is also one of the things, one of the primary things that you see in a malignant hyperthermia reaction.

Another thing of interest is that she was given dantrolene, switched to the safe drugs, and within ten minutes of dantrolene --

Q. The Versed?

A. And Fentanyl.

Q. Okay.

A. Within ten minutes after receiving dantrolene the pulse began to return to normal and the temperature began to fall. Dantrolene

works on skeletal muscle. It doesn't work centrally, so to give it, and watch the temperature go down, increases your suspicion that something is going on in the skeletal muscle and it's been corrected by dantrolene.

Tylenol, which works centrally, had no effect on her elevated. temperature. She continued to have metabolic acidosis, and then this high CPK. I don't recall exactly when it was drawn, but I also know that the worst case that I ever saw in a normal CPR, and this was a patient with total body rigidity, and the patient had a normal CPK, and I was so distressed that he had a normal CPK that I called Beverly Britt and John Ryan and asked them how can you have rigidity like that and have a normal CPK, and they said, they both said 25 percent of our patients who are biopsy positive have a normal CPK. The earlier you treat with dantrolene the less muscle damage there is, they said. So you. can see just like triple normal CPKs. That was a. very abnormal CPK, but it is not 20,000.

Q. What is a normal reading for a CPK? What would you expect in a. child like

this?

A. Normal is less than 200 but in a child who hasn't begun her growth spurt I have seen maybe a hundred CPKs on children her age and they are like 30 to 50. So you see a CPK like this if she was beaten up, if she had an IM injection and even that wouldn't increase it to 600, and she didn't have one. After succinylcholine, which she wasn't given, or in a myopathy which she could have or in an MH crisis, so there is not too many things that you can see a CPK like that.

Q. Okay. The question you are still answering is what are the symptoms that she experienced or she exhibited indicating MH? Are you finished or is there something else there?

A. Full blown MH case requires tachycardia or fast pulse, tachypnea, fast breathing, combined metabolic and respiratory acidosis, which she had. It was moderate, it wasn't severe. Then you need central venous hypercarbia and central venous desaturation. No one drew a central gas on her and no one sent off a venous and arterial- gas, so

I don't know what these things were, She was never described as mottled or cyanotic and this was before pulse oximetry in --

Q. Before that was available?

A. Right. This is 87?

Q. Yes, ma'am.

A. Pulse oximetry was just brand new in 87. Many, many hospitals did not have it yet.

Q. Okay.

A. So for all those reasons I am suspicious that she has MH.

Q. And again, so that my record is clear, she probably does have MH from what you liave seen; is that true?

A. Greater than 50 percent chance.

Q. Okay. When you talk about a full blown MH episode, from what you have seen about Karla Spehar, which we have just talked about, do you believe that it is probable that she would have, she would have developed into a full blown MH episode had not the surgical team changed to the fentanyl and versed and administered the dantrolene?

A. Full blown MH episodes involve the

duration of time they are under anesthesia, the amount of drugs and the combination of triggering drugs that they would have received. So I can't tell you, you know, if they had gone on for three hours if she would have developed a full blown malignant hyperthermia reaction.

What I saw here is suspicious. Not documented -- she needs documentation. You can't label her forever, though she needs protection as she has had for future anesthetics until either the parents are biopsied or the chromosome test is perfected.

Q. Well, what I was asking is this, Lhough, and again not with a hundred percent certainty, but --

A. Greater than 50 percent.

Q. But probably had the physicians in the operating room with Karla not changed the triggering anesthetics, changed the anesthetics and had they not administered dantrolene would it be probable that she probably would have continued to a full blown episode, MH episode?

A. If it went on long enough, she could have.

Q. Okay. And again, the word could is difficult for lawyers to deal with. Would she probably have done that greater than 50 percent probably?

A. Another hour of anesthesia, I would say, or maybe even not that much. With more than 50 percent probably, she could have -- you don't like the word.

Q. The word could bothers me.

MR. JORDAN: Objection. You are asking a hypothetical, She is saying that only if the anesthesia had continued to go on for a period of time, And you are asking in this particular case, I don't know which question you are asking.

Q. Let me reask the question and make it simpler. Had this procedure continued on without the dantrolene and without the change to Fentanyl and Versed, do you believe that she would probably have developed into a full blown MH episode?

A. She may not have.

Q. Okay. And do you think she probably would have, however?

A. Don't record this,

(Discussion off the record.)

A. I can't guess that and all I can any she may have been one of those 25 percent that would have gone on and have complete recovery without it.

MR. JORDAN: So say I don't know if you don't know.

A. I don't know.

Q. See, a lot of the popular Literature -- strike that.

There is an elevated temperature when somebody has a malignant hyperthermia episode; correct?

A. Correct.

Q. The elevated temperature, however, is not, is only a symptom of what is going on inside the body; correct?

A. It's frequently the last thing to change.

Q. What I am trying to understand and make a record over is what is going on inside the body during the malignant hyperthermia episode. And basically my understanding is that: there is a chemical reaction within the patient's muscles; is that correct?

A. What is abnormal in a malignant hyperthermic patient or in our animal model, the pig, is an organelle in every muscle in the body called the sarcoplasmic reticulum. That particular organelle is responsible for kicking out calcium when we want to do something, run., or have muscle contractions and it is responsible for pulling that calcium back when we have finished whatever voluntary motion. we are making.

With the malignant hyperthermic patient, every fiber of skeletal muscle in their body is abnormal, in that the sarcoplasmic reticulum continuously leaks calcium and isn't really good at pulling calcium back.

If you give a drug like succinylcholine that blasts calcium out of the sarcoplasmic reticulum, and if you give a drug like halothane that blocks its reuptake so that the whole muscle is bathed in calcium, calcium initiates muscle contraction in. about five diEferent steps. And what happens is you have a muscle that can't relax.

Now you may not be able to see the

rigidity clinically. You may not even be able to feel it. Sometimes the skin is fine but underneath it is like cast iron. But what is going on is with all that calcium inside the muscle fiber, all the reactions for contraction are going on giving off lots of heat, using up a lot of oxygen, giving up a lot of carbon dioxide and over the course of time --

Q. Also acid waste products?

A. Also with the course of time increasing lactic acid. A clinical parallel would be if you ran the Boston marathon, you would be sweaty, you would have a racing pulse, you would be breathing like a host of fire, and you would have severe muscle cramps the next day from the lactic acid that was built up during sustained muscle effort. So having a malignant hyperthermia episode is not quite like running the Boston marathon, but all the by-products of hyper accelerated metabolism in terms of heat, carbon dioxide and oxygen consumption are all there. That's why the pH drops, that's why the muscle breaks down. If you allow it to go on. In pigs -- strike it.

Q. Well, from what you have seen,

Karla has not had any lasting or long term damage because of this event that she suffered in the OR on October 7, 87, is that true?

A. She didn't have a chance to have a problem,

Q. Because it was terminated, at the operative procedure was terminated early enough?

A. Correct,

Q. Okay. The medical profession still does not know the etiology of this disease, of this disease process; is that true?

A. The etiology is suspected with pathology in the sarcoplasmic reticulum and all clinical studies have shown that there is increased calcium floating around in MH muscle, and with triggering drugs there is phenomenal increase, and that dantrolene blocks the release of calcium at the microscopic level. So even though no one knows for sure, all evidence points at the present time to a problem with the sarcoplasmic reticulum and that's generally accepted.

Q. There is still research ongoing to determine the exact nature of the problem in

that area, to determine the etiology of this condition; correct?

A. Correct.

Q. And you talked before, for example, about one patient that had extensive muscle rigidity that you saw that had a normal CPK; correct? Remember that?

A. Yes.

Q. That example highlights the fact that not all symptoms of MH appear at all times in all patients; is that true?

A. That's correct.

Q. Okay.

A. There are six things that you see in over 90 percent of the cases, and we have gone over them before: Tachycardia, tachypnea, metabolic and respiratory acidosis, central venous desaturation, and central venous hypercarbia.

Q. And of those six symptoms, Karla had how many?

A. She had the four that they actually tested for.

Q. Okay.

A. There are many other signs and

symptoms of malignant hyperthermia that you may or may not see, and one of which is an elevated postoperative CPK, cyanosis, profuse sweating, unstable blood pressure, arrythmia, all those things you can see but not in every case.

Q. Okay. You have never seen or treated Karla, is that true?

A. Correct.

Q. And from what you know about her history, she was a healthy and a normal child with no significant allergies or health problems other than some remote history of urinary tract infection?

A. From what I read, that was true.

Q. And of course the urinary tract infection problem is totally unrelated to anything we are doing in this case; is that true?

A. Correct.

Q. Now, I think we indicated before when I asked in this area of inquiry, malignant hyperthermia is known to medical science as one of the risks of administering central nervous system anesthetics; correct?

A. Say that again, please.

Q. Malignant hyperthermia is known as a rare but yet present risk of the administration of central nervous system anesthetics to patients?

A. It is a risk of anesthesia.

Q. And the occurrence of malignant hyperthermia is a known and foreseeable risk of the administration of anesthesia?

MR. JORDAN: Objection.

A. It's a potential risk.

Q. Okay.

A. With all patients.

Q. Now, as far as you could see from the records of Karla's treatment at Metro, you don't have any criticism of the surgical team or of the anesthesiology that she received at Metro, do you?

A. No.

Q. And I think your report says that they handled the malignant hyperthermia event well and adequately?

A. Yes.

Q. All right. Now, does your experience now include the administration of anesthetics to people who like Karla are

probably afflicted with malignant hyperthermia?

A. Yes.

Q. Okay. I think you have indicated before that -- well, strike that.

The general accepted degree of mortality currently is seven to ten percent?

A. When we don't know about it.

Q. When you don't know that the person bas MH; correct?

A. Correct.

Q. So that at the time of October 7, 1987, when Karla went into the operating room at Metro, and assuming that no one knew that she was MH susceptible, then she fell in the approximate range of seven to ten percent of being at risk of death from that surgery and reaction to anesthetic; correct?

A. That is all patients. They are a little more susceptible during your late adolescent years to having a more severe reaction, then it gets better. It has something to do with hormonal changes in the muscle itself.

MR. JORDAN: He is just asking about Karla.

THE WITNESS: Fine.

Q. Is there a commonly accepted mortality risk for people of Karla's then age, three?

A. People that we know have malignant hyperthermia where dantrolene is available and the anesthesiologist is skilled have a zero percent mortality.

Q. My question -- I am going to go back to Karla.

A. Okay.

Q. Before we knew she was MH susceptible, I think that the accepted range is seven to ten percent mortality for people who are not known to be MH susceptible; correct?

A. She is more on the seven percent.

Q. Okay, that's what I am trying to get to.

Now, how many times have you in your career as a physician administered anesthetics to people who are known MH susceptible?

A. At least a dozen.

Q. All right. So that you say at least a dozen. Is there a higher number that

you want to bracket it to be fair? Like between 12 and X, X being some number you want to think is reasonably correct?

A. Probably the most that I would guess would be maybe 18.

Q. Okay.

A. Or so.

Q. So that in your career in the range of 12 to 18 times you have administered anesthetics to people like, similarly situated to Marla who are MH probable susceptible people; correct?

A. Correct.

Q. Okay. And that would be of your several thousands or more than several thousands experiences in giving anesthetics; correct?

A. Correct.

Q. From your experience being here at the Cleveland Clinic, could you give me some approximate reasonable accurate approximate number of how many times others of your colleagues at the Clinic have patients here who obtain treatment with anesthetics who are known MH susceptible like Karla?

A. I would rather ask my colleagues than give you a number because I really don't know.

Q. What I am trying to understand is this. MH is -- strike that,

The Cleveland Clinic is one of a handful of institutions in the world that is set up to diagnose and to actively treat and counsel people who are MH susceptible like Karla, correct?

A. Correct.

Q. And even the Cleveland Clinic has only had that capability since approximately 1989; correct?

A. For caffeine and halothane contractions your fresh muscle biopsy. They did another form of muscle biopsy which was not accepted around 1988 and the program was disbanded for a year until -- they did a skin Ciber muscle contracture study that was widely accepted until about 88, and then an international conference on standards for diagnosis said too many false positives and false negatives, we need muscle, fresh muscle and that's what we do now.

Q. So that the Clinic's, do I understand that the Cleveland Clinic's MH department, is that the right word, was terminated for a short period of time until you could reorganize and get organized for the muscle biopsy procedures?

A. It was never terminated. Glenn DeBoer continued to counsel, but he would send patients elsewhere for biopsy until we -- and I just came in 88 and Dr. Tetziaff came in the end of 88 or early 89, so we all had a vested interest, we all had an interest in malignant hyperthermia and we have been asked to be on the hotlines as Dr. Rosenberg may have told you.

Q. What I am trying to understand is this.

You know, the Cleveland Clinic is a huge facility and would I be correct in saying that probably central nervous system anesthetics are administered here thousands of times a week?

A. Uh-huh.

Q. By various members of the anesthesiologist staff; correct?

A. Correct,

Q. And of all of the administrations of anesthetics at the Cleveland Clinic, the only people who specialize in MH susceptible individuals are yourself, Dr. DeBoer, and Dr. Tetziaff; is that true?

A. No.

Q. There are others?

A. The neurologist, adult neurologist, Dr. Mitsumoto; pediatric neurologist, Dr. Bob Cruise; and Gieselle Burge I think is her last name, the technician for the muscle biopsy. And we have surgeons who are also part of the team and technicians who are part of the team.

When we have a patient come for counseling they will see a pediatric or regular adult neurologist. They will see an anesthesiologist, they will see a surgeon if we elect to have them go on for muscle biopsy. They don't always see a surgeon if we feel that there wasn't enough clinical evidence for malignant hyperthermia. We get all kinds of calls and we don't biopsy all the people who call us. Many times we get the information over the phone.

I had a nine year old about a month ago who got chicken pox right after a high fever, and it was very clear he didn't have MH from his anesthesia record, but he brought it with him. He came for counseling, so you can see that -- I know -- we don't biopsy everybody that comes.

Q. Are you finished? I don't want to cut you off.

A. That's fine.

Q. What I am asking is this. Is it probable that if a patient came into the Cleveland Clinic today for surgery who was MH susceptible, you and the other physicians who are involved in the MH program here would know about it?

A. Yes.

Q. And is it probable that you and the other physicians involved in the MH program here at the Cleveland Clinic would be interested in that patient because of your specialized interest in MH?

A. Of course.

Q. Okay. And can you -- using that as a criteria, using your interest in the MH, from

the time that you have been here at the Cleveland Clinic, can you tell me how many patients you can recall either yourself or Dr. DeBoer or Dr. Tetziaff providing anesthetic to who were known MH susceptible?

MR. JORDAN: If you can't answer for the other doctors, you don't have to. Just say how many for yourself.

A. Okay. As I mentioned, I am only in the operating room once a week at this point. So I don't have the volume that 1 used to have at University.

In addition, they don't have as many children having surgery here as they do at University, so it's much more likely to be seen where you are doing many children,

The incidence in children is one in 15,000, some people say one in 7,000. The incidence in adults is one in 50,000, so that we do more adults than children here. And I have precise numbers for you, for Dr. DeBoer and Dr. Tetziaff, and they do a lot more patients than I do now, because of my work situation.

Q. Okay. Well, let me get a couple

things. Is it commonly accepted that the incidence of MH in pediatric surgeries is about one in 15,000 administrations of anesthetic?

MR. JORDAN: For children?

A. For children.

Q. For children?

A. There are reasons for that, but some people say as low as one in 7,000.

Q. What do you believe? What do you believe is the most probable incidence of malignant hyperthermia events in the administration of central nervous system anesthetics to children?

A. Somewhere between one and 7,000 and one and 15,000.

Q. All right. And so that I am clear, and my notes, I misplaced my note, you in your experience have given anesthetics to known MH susceptible patients like Karla I think you said on how many occasions?

A. At least three.

Q. At least three. And up to approximately?

A. Personally it's three or four that had full blown reactions in my hands.

Q. My question was and I think I recall the answer. My question was that after you knew a patient was MH susceptible like Karla, you have then gone ahead and in other surgical procedures provided anesthetic I think you said in the range of 12 to 18 times?

A. Correct.

Q. In your career?

A. In my career.

Q. Okay. And that 12 to 18 times includes experiences here at the Cleveland Clinic and at other -- at University?

A. I may have just done one or two here. The rest are at University.

Q. All right.

A. Sometimes I would do whole families and then like there is one family where I have done the son three times after his MH crisis. He is biopsy proven. I did his brother twice. I did a local stand-by on the sister, you know what; I mean.

And then another family that was biopsied positive, I did the mother who is the one that had the positive biopsy and I did her identical twin sister, gall bladders and knee,

and I mean, so if I thought back, I mean it is at least a dozen times because sometimes in a family I have done it three or four times.

Q. Okay. So that when you have done it between approximately E2 and 18 times, it being the administration of the central nervous system anesthetic to people who are known MH susceptible, that doesn't mean 12 to 18 different patients, because sometimes --

A. They were the same patient with a repeated anesthetic.

Q. Okay. On different days and different occasions and different surgeries; yes?

A. Correct.

Q. Is there some increase of surgical complication to people like Karla who have the administration of anesthetics now?

A. I spoke to Sue Gallimore who was the former head of M House, and I am sure you got these statistics from Dr. Rosenberg. Since the advent of dantrolene, there have been zero. Now this is about a year and a half ago, and I have certainly not seen any evidence in the literature that people have died. There

has been zero mortality for malignant hyperthermia when known biopsy proven malignant hyperthermics have had general anesthesia with nontriggering drugs.

Q. Okay. Dr. Rosenberg told me that he felt that there was approximately a five percent increase of surgical complications to people like Karla stemming from problems that might arise because of uncleanliness and anesthesia equipment, possible complications. Would you agree that there would be at least a five percent risk of some adverse consequence to Karla if she now had surgery?

A. I would love to talk to Dr. Rosenberg to see where he got that figure. I would say that in a properly conducted. anesthetic her chance for having any serious sequelae would be zero.

Q. Okay. By zero, you mean it would be no higher than any of the other risks attendant to the surgery?

A. correct.

Q. And by *aero* you mean you refer only to the risks of anesthetic, not to the risks of the surgical procedure itself?

A. Correct.

Q. Okay. And so that I understand, with regard to Karla, you are not expressing any opinion about the probability of any nerve damage that she might experience from the removal of the needle, are you?

A. I can't comment on any of that because I don't know.

Q. You don't have any comment about any possible bleeding consequences from the jugular vein or the carotid artery, true?

MR. JORDAN: Objection,

A. I am saying that's out of my field. I haven't seen X-rays, I haven't talked to experts about it, and so I could not comment. I know that we leave metal in people all the time.

Q. Okay. My comment, my question, though, is that what you are saying is that you believe that Karla with the diagnosis now of malignant hyperthermia has essentially the same risk of anesthesia as does a nonMH patient; is that my understanding?

A. For this procedure, yes.

Q. Which procedure?

A. If she was to have the needle removed. I mean, they recommended that she is more than likely to have damage if they do than if they leave it there.

Q. Right. But so that I can be clear, you are saying that the risks of anesthesia are for Karla the same as they are for a nonMH person?

MR. **JORDAN:** Asked and answered.

A. Yes. Unless she is a multiple trauma. A multiple trauma and anesthetic slightly higher risk.

Q. Okay. What kind of multiple trauma do you refer to?

A. Automobile accident. That kind of thing.

Q. How would that affect her risk in surgery?

A. Because a major physiologic stress can increase your stress hormones, your epinephrine and norepinephrine enough to, how can I say this -- this was a controversial issue among MH people, is there a stressed induced form of MH -- I should have just said -- or isn't there. And in our animal

model there definitely is. And in some people I think there definitely is. Karla, I doubt it, but --

Q. Well, what you are saying, what you are highlighting is the fact that medical science doesn't know -- strike that. What you are highlighting is that there is much from medical science yet to determine about malignant hyperthermia, true?

A. Correct.

Q. There is a school of thought that does say people can have a stress induced type of reaction to MH?

A. That can trigger it without anesthetics, and certainly administering another physiologic stress may be additive if you have to give anesthesia after a multiple trauma. This is not multiple trauma. I feel Karla has zero risk in terms of her MH if she needed elective surgery.

Q. Right. I am trying to understand the whole package that affects Karla's condition and her life would be that there is a school of medical thought that would say, that does say if Karla were involved in a traumatic

incident such as a serious automobile accident, and then was required to be anesthesized that she would be at higher risk for a MH episode; is that a fair statement?

A. That's my belief. Not all MH experts agree with that, There is a divided camp.

Q. All right, And I am not deposing the other MH experts, I want to understand your belief. I am trying to understand your opinions from your experience and your training. And you believe that there is probably some increased risk to people when they have multiple trauma because of the sequelae from the stress related event?

A. Correct.

Q. And if Karla were subjected to stress, then she would have some increased risk of surgery; is that your opinion?

MR. JORDAN: Objection. I think you have to clarify what you mean stress.

MR. **BITTEL:** All right,

MR. JORDAN: Because she has quantified stress as a multiple trauma induced stress.

THE WITNESS: Correct.

Q. And that's the kind of stress you mean?

A. Right. I don't mean being a little nervous.

Q. Oh, no. You are talking about a major physical trauma?

A. Right.

Q. Such as a smack, a major car accident, some major physical trauma that would cause tissue and/or bone injury?

A. Correct.

Q. Okay.

MR. BITTLE: Doctor, I don't have any other questions. Do you want to waive signature?

MR. JORDAN: No, We won't anyhow.

(Deposition concluded at 11:15 a.m.)

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CERTIFICATE

The State of Ohio,)

SS:

County of Cuyahoga.)

I, Vivian L. Gordon, a Notary Public within and for the State of Ohio, duly commissioned and qualified, do hereby certify that the within named witness, SARA SPAGNUOLO, M.D., was by me first duly sworn to testify the truth, the whole truth and nothing but the truth in the cause aforesaid; that the testimony then given by the above-referenced witness was by me reduced to stenotypy in the presence of said witness; afterwards transcribed, and that the foregoing is a true and correct transcription of the testimony so given by the above-referenced witness,

I do further certify that this deposition was taken at the time and place in the foregoing caption specified and was completed without adjournment.

I do further certify that I am not a relative, counsel or attorney for either party, or otherwise interested in the event of this action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at Cleveland, Ohio, on this 9th day of November, 1990.

Vivian L. Gordon

Vivian L. Gordon, Notary Public within and for the State of Ohio

My commission expires May 22, 1994.