THE STATE of OHIO,
: SS:
COUNTY of CUYAHOGA.

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IN THE COURT OF COMMON PLEAS

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TAMMY TOLLIVER, administratrix :
of the ESTATE of ASHLEY
JANE CARR, deceased,
plaintiff,

vs. : Case No. 288780

UNIVERSITY HOSPITALS of
CLEVELAND, et al.,
defendants.

Telephonic deposition of ELIAS CHALHUB, M.D., a witness herein, called by the plaintiff for the purpose of cross-examination pursuant to the Ohio Rules of Civil Procedure, taken before Constance Campbell, a Notary Public within and for the State of Ohio, at the offices of Donna Taylor-Kolis Co., LPA, 1015 Euclid Avenue, Cleveland, Ohio on TUESDAY, MARCH 11TH, 1997, commencing at 4:30 p.m. pursuant to agreement of counsel.

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Computerized Transcription
Computerized Litigation Support
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I N D E X

WITNESS: **ELIAS CHALHUB, M.D.**

(FOR COMPLETE INDEX, SEE APPENDIX)

(IF ASCII DISK ORDERED, SEE BACK COVER)

MISS KOLIS: Mr. Crandall, can you and I stipulate we waive any objection based on the irregularity of this particular proceeding, that being the court reporter is here in Cleveland, Ohio in attendance with myself?

MR. CRANDALL: Of course.

ELIAS CHALHUB, M.D.

of lawful age, a witness herein, called by the plaintiff for the purpose of cross-examination pursuant to the Ohio Rules of Civil Procedure, being first duly sworn, as hereinafter certified, was examined and testified as follows:

MISS KOLIS: Dr. Chalhub, by way of identification for purposes of this record, my name is Donna Kolis. As I'm quite certain you are aware, I have been retained to represent the Estate of Ashley Carr.

CROSS-EXAMINATION

BY MISS KOLIS:

Q. It is my understanding that you are going to be offering expert testimony at the trial of this lawsuit; it that accurate?

A. Yes, that is accurate.

Q. Briefly, Doctor, I have in front of myself a report which is apparently authored by you, dated May 20, 1996; do you have the same report in front of yourself?
A. I do.
Q. Is that the only report, written report which you authored in this matter?
A. That's correct.
Q. I also have in front of myself which will likewise be marked an exhibit a CV which I believe is current and correct, faxed to Mr. Crandall according to the date across the top October 17, 1996.
A. That may be an old one. We will get you another one.
Q. This one looks pretty current. 1 have no way since we're not physically present with you, of showing you what I have, We may want to talk a little bit about that today also.
A. Fine.
Q. Dr. Chalhub, in anticipation of writing this report on May 20th did you generate any handwritten notes?
A. No, I didn't.
Q. So other than the written report, that is the

sum and substance of your file, exclusive of all the documents you've reviewed?
A. That's correct. I have a lot of documents.
Q. Do you still have in your possession the initial letter which you would have received from Mr. Crandall engaging you for this purpose?
A. No, I don't. I don't usually keep cover letters.
Q. That's what I thought. You didn't in the past, still don't keep cover letters, right?
A. I don't see any reason to so I don't have any.
Q. Can you tell me, Dr. Chalhub, when you were initially contacted in this matter?
A. Gosh, probably at least a year go. 1 can't tell you exactly when.
Q. Shortly before you wrote the report?
A. Probably a little bit before that, not shortly. I can't tell you, sometime first of last year I guess perhaps.
Q. Have you billed Mr. Crandall for your services?
A. I have.
Q. Would reference to the bills that you sent to him refresh your recollection of when you were

initially contacted in this matter?
A. I don't think so.
Q. Wouldn't it say the initial contact and time you began working on it?
A. No, it wouldn't say that. It would say I have spent X number of hours reviewing this case, $200 an hour, please reimburse me.
Q. Let me ask you that question since you just brought up the hourly rate. It's my understanding you are billing me $250 an hour for the deposition time; is that accurate?
A. Yes, ma'am, that is correct.
Q. Will you be charging Mr. Crandall $250 an hour for your trial testimony?
A. I charge 1500 per day.
Q. Enough of that.

Doctor, I would like to refer your attention initially to the report that you wrote. It lists items A through J that you reviewed prior to writing the report, correct?
A. Correct.
Q. Since the time that you authored that report, have you received additional material?
A. Yes.
Q. What have you received?

A. I have received depositions of Dr. Cohen, I have let me see what else, Dr. Cohen, the x-rays reports. I have the deposition of Dr. Cohen and deposition of Dr. Barnes.

Q. Have you seen the deposition of Dr. Cullen?

A. Yes, I have.

Q. So you've seen that. Have you seen the deposition of Dr. Redline?

A. No, I haven't.

Q. Has any of the additional testimony that you've reviewed since writing this report on May **20, 1996** added to any opinion that you have?

A. What do you mean, added?

Q. Changed your opinion in any way?

A. No, I don't think there is any question as to what this child had.

Q. Have you seen the expert report of Dr. Winston?

A. No, I have not.

Q. I assume you didn't see his deposition testimony since we just took that yesterday?

A. That is correct.

Q. Let's deal first with your CV briefly if we can.

Doctor, I reviewed the document I

have in front of myself, would I be accurate to state you have made no contributions to the literature, medical literature since 1986?

A. That's probably true.

Q. I note that contrary to the last time I saw a CV of yours, you are now in private practice, have been so since the Spring of 1994; is that accurate?

A. Yes, that's correct.

Q. You left the Mobile Infirmary administrative job you had in March of 1994; is that right?

A. Yes.

Q. Please explain to me in detail the nature of the private practice which you are currently engaged in.

A. My practice is not only child neurology, adult neurology, 1 have four partners, three full-time offices, one part-time office, I see patients on an acute basis as well as in my office.

I am head of the Child Study Center, which is a volunteer center that deals with children with complex problems. I am a clinical professor of neurology pediatrics, University of South Alabama residents that rotate with me two to three times per year.

Q. Let me try to break that out a little bit better.

You are now once again in private practice, correct?

A. That's correct.

Q. You had been out of private practice for about five years; is that right?

A. Actually was practicing during that time, not a great deal.

Q. Like about 5 percent of your time was spent actually practicing during your tenure I guess I'm going to call it, at the Mobile Infirmary, correct?

A. That's correct, but I continued to give the Boards in neurology and also to attend the appropriate meetings, I was current as a physician.

Q. Your licensure always remained current; is that correct?

A. Correct, I never stopped practicing medicine.

Q. Dr. Chalhub, this private practice that you are involved in, what percentage of your patient population is children?

A. 60 to 70 percent.

Q. What kinds of neurological deficits or problems are you dealing with in your private

practice?
A. I deal with children with neonatal problems, with developmental malformations, brain tumors, headaches, serious infections, learning disabilities, peripheral neuropathy, the full spectrum of child neurology.
Q. I thought I heard you say you were dealing now with patients on an acute basis. Are you now an attending physician at a hospital?
A. Yes, I deal with patients on an acute basis and chronic basis. I see individuals in the emergency room as well as in the hospital, as well as in my office.
Q. That was not the question I asked. Let me ask it more directly for our purposes.
Are you currently an attending physician at a hospital?
A. What do you mean by "an attending physician"?
Q. You don't know what I mean when I say the words "attending physician"?
MR. CRANDALL: I think that is what he said, Donna.
A. I don't understand what you mean by it, explain to me, I'll try to answer.

MR. CRANDALL: Are you asking if he has privileges at a hospital?

Q. That's a different question.

You don't have a hospital based practice, it is a private office, right?

A. I also have a hospital based practice too. We have people -- I have people in the hospital all the time.

Q. What hospital do you currently have privileges at?

A. Providence Hospital, Mobile Infirmary, Springhill Memorial, University of South Alabama.

Q. Are those privileges for the purpose of you admitting private patients?

A. Yes.

Q. Are you on call at the hospital? In other words, if I came to the hospital with a child who was acutely ill, are you on the board as a neurologist who will be called into the hospital to see the child?

A. Yes.

Q. At which hospital do you serve that function?

A. All of those hospitals.

Q. Doctor, you indicated somewhere just shortly ago that you're still examining for the neurology

Boards, I looked at your CV, on your CV the only year that I can discern that you were actually an examiner in child neurology was **1980** to **1981**; is that accurate?

A. No, there has been a revision of the CV. In fact, I'm going in May to give the Boards again in New York. I've examined virtually ever year since **1980**.

Q. If you examined every year since **1980** in child neurology, why isn't it on your CV?

A. Sometimes they are not accurate. I can't help it, that is why from time to time they are revised, sometimes they are in error.

Q. If I tell you I have five other CV's that you have generated in five other years, none of them list you as an examiner for the child neurology Boards except that one year, how would you explain you didn't fix your CV in five years?

A. I can't explain it. You can certainly call the Board, ask them. I did examine every year, 1 also examined adult Boards. Certainly --

Q. That isn't my question. I see all the years you are listed as an adult examiner.

A. Don't interrupt each other, okay? Let me finish my answer, okay?

I examined last year and the year before, the year before that. The CV isn't necessarily kept current. I have revised this in February, I think. I will send you a copy of that.

Q. I would certainly appreciate you giving a copy to Mr. Crandall.

A. I'll do that.

Q. You've not been a director of a child neurology program; am I correct?

A. That's not accurate.

Q. Tell us when and where.

A. I was in charge of child neurology at the University of Arkansas 1976 to 1978. Also in charge of child neurology University of South Alabama 1978 through about 1981, '82.

Q. Did you list that on your CV that you were director of the department of child neurology during those years?

A. Yes, I was head of the child neurology, I think that is listed. I don't have my CV in front of me.

Q. I guess your CV will speak for itself, won't it?

A, You can ask me the question, Miss Kolis, I'll be glad to answer it. If you don't understand, if

you don't believe that, you can verify. I'm telling you what is accurate.

Q. At the time you wrote this expert report you had not yet read the deposition of Dr. Warren Cohen; isn't that accurate?

A. Doctor who?

Q. Dr. Cohen?

A. No, I hadn't, that's correct.

Q. You subsequently read it because Dr. Cohen has no notes in the chart; isn't that accurate?

A. No, I subsequently read it because Mr. Crandall sent it to me.

Q. Let me ask you, Doctor, how do you know what Dr. Cohen's thought processes were if he had no notes in the chart?

A. Whatever his thought processes were really have no bearing on what this child had, to the problems the child had. I'm not sure what you mean by that.

Q. Just asking a question.

A. It really has no bearing in terms of what this child had, what caused this child's difficulty.

Q. So I gather that irrespective of the fact there is not one writing by Dr. Cohen in the chart,

that you were able to determine that he did not deviate from the standard of care?

A. I said in my expert report that there does not appear to be a causative contributor between the care rendered and the demise of the child. That remains to be the same.

Just because somebody didn't write a note in the chart has nothing to do with whether somebody's thought process is causally related to a child's demise, at least in my understanding.

Q. Dr. Chalhub, do you agree or disagree that a physician's failure to document their examination in a chart deviates from the accepted standard of medical practice?

A. I disagree. Charts are for physicians, to jog their memory, put things down they wish to put down. Particularly in teaching institutions we rely on resident's notes, whether they are countersigned or add anything to it is up to the individual. Charts are not for legal proceedings. That is to take care of patients in the practice of medicine.

Q. Dr. Chalhub, may I ask you today do you have a recollection of ever having testified in another matter that a physician's failure to document their

examination in a chart is a deviation of the standard of care?

A. No, I have no recollection that I've testified to that.

Q. If at trial I produce testimony that has been given by yourself that in fact that is a deviation, will you recant your prior testimony?

A. No, I would be happy to look at the deposition and the case, see what context that was taken at. As I recall, I've not made that statement.

Q. Do you recall that you previously testified that a note written by a resident, not countersigned by a physician, should not be given a great deal of weight?

A. No, I don't recall saying that. I'll certainly be glad to look at it, what context it was put in, what the situation was.

Q. Just asking if you recall it.

A. What?

Q. Just asking if you recall that you testified to that.

A. I don't recall that.

Q. That's fine.

Doctor, where in this medical chart

is there an assertion by an attending physician that Ashley Carr is suffering from a viral infection prior to her death?

A. I don't know whether there is an assertion. There is certainly an assertion she is suffering from an infection, which is what she is being treated for. Most of the time when treating children we assume that they have a bacterial infection, put them on antibiotics, while they may be viral, so really the record speaks for itself.

Q. The record speaks for itself in regard to what, Dr. Chalhub?

A. What I just said.

Q. In terms of what you just said? Answering my question do you see any documents?

A. You've got to let me finish. I don't want to be rude, I need to finish. Is that okay, can I do that?

Q. You can talk all you want, Doctor.

A. Really all I want to do is answer the question. I can't do it if you won't let me finish.

Just opening the record here on 6-4 they are talking about encephalitis which is a viral infection. Obviously they were concerned

with that. They were treating the child for an infection. Encephalitis is usually viral.

Q. The reference you are making, I don't know what page you are looking at, the first time the word encephalitis appears is after Ashley Carr has arrested; isn't that right?

A. Yes. I'm not sure what difference that makes.

Q. You might not be sure, I'm asking a question.

The question I asked was did you see anything documented by either one of the attending physicians prior to Ashley's arrest that they suspected she was suffering from a viral infection?

A. No, I couldn't tell you I remember every single note by heart, so I don't think I can answer that question.

Q. Doctor, you did know I was going to take your deposition today, didn't you?

A. Yes, Miss Kolis, I did.

Q. Wouldn't you think it's fair for me, considering I'm paying for your time, that you would have reviewed the notes?

A. I have reviewed the notes, Miss Kolis, I

don't think this is a memory contest. I think these are voluminous records, I don't think anybody is required to have them memorized.

Q. I didn't ask you to memorize them. I thought it might be important that you note if either of the doctors indicated in any fashion that they thought this child may have a viral infection?

A. What is important to you and me may be somewhat different. I told you I answered the best way I can.

Q. How long did it take you to review this voluminous chart before you reached your conclusion, Dr. Chalhub?

MR. CRANDALL: For his expert report?

MISS KOLIS: Yes.

A, Five or six hours.

Q. At the end of that five or six hours, you decided this child had an overwhelming viral infection; is that what you concluded?

A. Yes.

Q. Please with specificity, tell me how you arrived at that conclusion.

A. Well, the child presented with a fever on the 21st, has a seizure, goes home, comes back with

further seizures, continues to have a fever. Then on the 23rd after the child had improved, clinically, then has a respiratory and probably ischemic arrest and the child has a precipitous drop in the white count to 1,400. The child has a significant cerebral edema that developed on the 24th, which results ultimately in a hypoxic ischemic event, encephalopathy, results in this child's death.

There are not too many things that I know of that produce this other than overwhelming -- in this case, most likely viral infection.

Q. You think that produced this HIE?

A. No, that produced this clinical course associated with a white count of 1,400.

Q. What time is that white count you are referring to?

A. Hold on, I'll tell you.

6-23 the white count is 3.1; 6-24, 1.4. That was 2330 hours on 6-23, 0500 hours on 6-24.

Q. What was the white blood count on presentation to the emergency room at RB&C?

MR. CRANDALL: On the 24th,

Donna?

MISS KOLIS: No, I said on presentation to the emergency room, initial admission **6-22.**

A. The white count on the chart is 4,600.

Q. That is on what date and time?

A. **6-22, 1200** hours.

Q. Is that white count of 4.6, I don't have my labs right in front of me, is that precipitous in any way, in other words does it say anything about the child's condition?

A. A little bit on the low side, suggesting perhaps a viral infection.

Q. A little on the low side. In fact doesn't that come up in the next blood draw?

A. No.

Q. It doesn't come up?

MR. CRANDALL: He said he it does.

Q. Went to **6.3** on **6-22?**

A. Yes, that is what the record shows.

Q. If in fact the child was suffering from a viral infection, how did the white blood count go to 6.3 on June 23rd?

A. The child has not developed viral sepsis.

The child had viremia or a virus.

Q. That is your explanation for why the white blood count was better on **6-23**; is that right?

A. No, that is not what I said.

A. It's not a matter of better or worse. That is no, what I said.

What I did say was when one gets precipitously neutropenic, usually it represents an overwhelming infection in a child, viral, bacterial.

This certainly occurred precipitously on **6-23**, on **6-24** which is the time the child has her acute event. You can be that neutropenic, you can be viremic, not be septic, with decreased perfusion to the body and central nervous system.

Q. When did she develop her viremia?

A. I suspect when she had her temperature on the 21st.

Q. If she developed viremia, then why once again did the white blood count go up?

A. It's the body is trying to respond to infection. It only went up to *6.3*, not very high.

Q. **6.3** is normal range, isn't it?

A. Yes, *so* what?

Q. Doctor, I get to ask the questions, isn't that great, you get to answer them.
A. I'll do the best I can, Miss Kolis,
Q. Obviously.
What terrible infection did Ashley Carr have?
A. I can't tell you the exact one. I think Dr. Wendolyn suggested it's HHV6. Could be that virus, that is a virus that can cause acute cerebral edema, that type of situation. Could be an adenovirus, could be Coxsackie, could be a number of viruses that could do this.
Q. Well, let me ask you something you just said, I'm trying to listen to you as you speak: You have indicated that you think, you said I think or believe, that HHV6 is associated with cerebral edema?
A. Right.
Q. Is that what you said?
A. That's correct.
Q. Can you please tell me the basis for that opinion?
A. Well, I think there are reports in which that as well as multiple viruses can be associated with cerebral edema. I don't know the exact mechanism,

whether that is indirect or direct -- most likely indirect as a result of sepsis, because generally speaking what happens is the virus effects the body which then produces mediators of inflammation, which then produces either ischemia or a change in the blood/brain barrier, which causes cerebral edema.

Q. Prolonged seizures can result in cerebral edema, can't they?

A. Prolonged seizure meaning? Could you clarify that for me?

A. Sure.

Q. What do you mean by prolonged seizure?

We don't have to ask in a general sense. In the situation which is documented in the set of hospital records that you received on this child, being in status for that length of time can also carry with it the risk of development of cerebral edema; do you agree with that or disagree?

A. I disagree with that.

Q. Why do you disagree with that?

A. It's not right.

Q. What is not right?

A. Can I explain?

Q. Sure you can.

A. First of all -- now I've forgetten the question.
Q. I'm asking you would you state that seizures of the length that Ashley had, are documented in the chart, couldn't create cerebral edema?
A. Talking specifically about this case or seizures in general?
Q. No, Doctor, we will start with this case.
A. First of all, the reason I don't believe that it causes cerebral edema in this particular case is that the child eventually had her seizure, improved both level of consciousness and clinically, that is not what one would expect with somebody who is having progressive cerebral edema from continued seizures.

Certainly the first CT scan we can read as normal. 1 think the people in retrospect looking, they have the scan to compare that with; however, again, I would look at that scan and probably read it as normal.

Back to your question, in this particular case, no, I don't think the seizure in this particular case caused the cerebral edema.
Q. When did you think the cerebral edema began to develop in this child?

A. On the 23rd.
Q. When on the 23rd?
A. I can't tell you exactly. Certainly sometime late in the afternoon or early evening, associated with this child's crashing.
Q. Associated with her what?
A. Crashing acutely.
Q. Crashing?
A. Right.
Q. We thought you said thrashing.

Let's go backward, Dr. Chalhub, in your report you state the following: That the evidence which you find in the chart that supports your contention she had overwhelming viral infection you said first is reflected in the history and physical; am I reading that correctly?
A. Correct.
Q. Tell me how the history and physical supports a diagnosis of viral infection.
A. Well, the child has febrile seizures, then has multiple seizures, then is hydrated, treated for infection, there were no bacterial cultures obtained. Then the subsequent clinical course is consistent with it as we've already gone over.
Q. Is that what you are going to say at trial?

A. Yes.
Q. Just limited like you just said it, nice and general, is that what you are going to say at trial?
A. Am I going to say what?
Q. The nice short general nswer you just g ve how the history and physical were consistent with?
MR. CRANDALL: I don't know what you are asking, Donna.
MISS KOLIS: I know that you don't.
MR. CRANDALL: What?
MISS KOLIS: I know you don't.
Q. Please specify what about the history and physical was consistent with viral infection.
A. I told you the best I can answer, Miss Kolis.
Q. What about the laboratory work in this chart supports your contention?
A. We've gone over that the child has an initial white count which is on the low side, certainly consistent with a viral profile. The child continues to have some temperature, then the child suddenly develops leukopenia associated with a

significant change in the vital signs, associated with a cerebral edema ultimately.

Q. The significant leukopenia you are discussing, those are lab values taken after her arrest, correct?

A. Yes. These are a reflection of why the child arrested. Tell me how often that occurs.

Q. Guess what, Doctor, once again I don't have to answer your questions. I'm trying to ask you some questions.

Would you not suspect that a child who has an arrest which is caused by a brain herniation simply by virtue of stress upon the body would become leukopenic?

A. No, just the opposite. Stress produces epinephrine, which stimulates the white blood cells. You would expect a marked increase in the white count due to stress. That is what is even more important in this particular case, there is nothing surprising about the child's bone marrow. Cerebral edema herniation certainly doesn't do that.

Q. In addition to fever we discussed the white blood count, did the fact she had seizures lead you to believe she has a viral infection?

A. That is certainly consistent with viral infection, sure.
Q. Did Ashley Carr have a stiff neck?
A. No.
Q. Did Ashley Carr have a bulging fontanelle?
A. I'm not sure that was remarked on, no.
Q. Did Ashley Carr have a positive lumbar puncture?
A. What do you mean by positive?
Q. What were the results of the lumbar puncture?
A. I'll read them for you. There were no white blood cells, the glucose was 80 and protein was 12.
Q. What do those numbers suggest to you, if anything?
A. That was on 6-22 at 1915. That suggests that the spinal fluid is normal at that time.
Q. I should have used the word normal versus positive. I understand your difficulty in answering my question.

Did Ashley Carr have a rash?

A. No, I think she had petechiae on one arm.
Q. What about the notation in the hospital chart -- Ann Garson is here with me finding pieces of paper -- there was I think it says

maculopapular, macules in the diaper area; what does that mean to you?

A. Red marks on the diaper area.

Q. A few red macules in the diaper area, does that mean anything related to virus?

A. Probably not.

Q. On physical examination by whatever doctor, do you note an increase in the size of the liver, an abnormal liver?

A. No, I don't.

Q. Is there any notation of any distention or increase in size of the spleen?

A. No, not to my recollection.

Q. Is there any notation in this chart whatsoever prior to this child's arrest of abnormal clotting factors, PT or PTT?

A. NO.

Q. Does Ashley Carr prior to her arrest have any elevated liver function studies?

A. I don't believe so.

Q. I'm going to ask you about your contention that radiological results somehow aid and assist you in determining this viral infection; that is a fair assessment of what you said in this report, right?

A. Wait a minute, I'm not sure I --
Q. You said the medical evidence that supports is written in the history, physical, lab and radiological reports.
A. That's correct.
Q. What about the radiological results, Doctor, supports that there is an overwhelming viral infection?
A. Well, the child had a probably normal scan on **6-22**. The child on **6-24** has diffuse cerebral edema with evidence of herniation.

In a child with this picture and temporal profile that is consistent with an overall septic event, that the radiologic picture is consistent with an overwhelming viral infection.
Q. Diffuse cerebral edema with herniation can be consist with things other than viral infection, can't it?
A. If the facts are different, the temperature is different, white count is different, the child's clinical course is different, sure,
Q. Doctor, were there any calcifications on the brain you saw on the CAT scans?
A, No. Why would you expect to see them?
Q. Doctor, once again I don't mean to be rude to

you, I'm going to ask the questions, you get to answer them. If you want to have a conversation with me some day unrelated to this case, that is fine.

My simple question was --

A. I'm trying to be nice.

MR. CRANDALL: Go ahead, Donna.

Q. My simple question, Dr. Chalhub, was did you see any calcification in the radiologic scans?

A. No.

Q. Thank you very much for that answer.

Doctor, you read the autopsy, have you not?

A. I have.

Q. Since you believe that this is overwhelming viral infection, have you an opinion that you can reason through with me as to why the autopsy does not find viral infection at the time of autopsy?

A. Because that is not the mechanism of the cerebral edema.

Q. What do you mean by that?

A. Just what I said.

Q. I don't understand what you mean.

A. Well, I'm sorry. What do you want me to

explain?

Q. Let's do this different. I'm going to ask you a completely different question.

Doctor, this is not the first case that you've testified in where you are attributing a child's --

Let's put it this way: You've testified about children and viral infection prior to this one, haven't you?

A. I'm a virologist so, yes, I have.

Q. Your virology was limited to a two year experience, isn't it?

A. Yes, that was a Fellowship.

Q. That's right, you are not out practicing as a virologist, you did a two year Fellowship, chose to go into a different discipline of medicine, didn't you?

A. No, the only people who practice as a virologist, Miss Kolis, are not just in the laboratory. Most physicians need to deal with infection over a period of time. 1 have over my career definitely, specifically with infection of the central nervous system.

If your question is do I have a Fellowship, continued experience and expertise in

the area of viral and bacterial nervous system infections, yes, I do.

Q. If I tell you or ask you I suppose is a better way to frame it, in every case where you have treated a child's chronic long-term problem with viral infection, all of those children were alive, does that refresh your memory about your prior involvement in cases with viruses?

A. I guess 1 don't understand what you mean chronic long-term. We're not talking chronic long-term problems in this particular child, this is an acute problem.

Q. I'm asking if you recall the general circumstances of other cases where you have offered testimony, indicating that the problems with those children were caused by viral infection, that is the first part of the question?

A. I don't recall what you are talking about unless you get specific.

Q. Do you recall in those cases which you've testified about viral infections that the evidence of the viral infection which you claimed caused their problems would be found at autopsy in the brain tissue?

A. It can be, depends on the virus and nature of

the clinical course. Could be, sure.
Q. So now that you are saying yeah, it can be, I'm asking you why they didn't find the viral infection at autopsy?
A. I don't think this child had encephalitis.
Q. What do you think this child had?
A. Viral sepsis which resulted in ischemic injury to the brain, hypoxic ischemic injury to the brain, which is what the autopsy describes.
Q. In what way does the autopsy describe the child has viral sepsis?
A. It says hypoxic ischemic changes to the brain, which was what the mechanism is when you decrease your perfusion as the result of sepsis, of which this child had an overwhelming example of.
Q. Doctor, I would like for you to name for me as a clinician what you do to investigate a presumed viral infection.
A. Now could you just be more specific with that question, as what kind of physician or what circumstances, what child, what issue, I'll be glad to do that. I can't do it that way, it's too general.
Q. Sometimes we need general information to see how much you know. My question is, if a child

presents in a hospital setting, there is a suspected or presumed viral infection, is it within your subspecialty to tell me how to test for the viral infection?

A. Yes, I'm still not sure I understand the question.

Q. Tell you what, I'll make it easier for you.

If you are present when a child, as a pediatric neurologist, you think that the seizure activity may be caused -- first of all do you think Ashley's seizures were caused by a viral infection?

A. Yes.

Q. You do think that.

So if you think that the seizures are not a what we're going to call traumatic cerebral edema febrile seizure, instead there is a virus that has caused the seizures, in terms of determining whether or not there is, would you agree with me you could do cultures?

A. First of all, I don't agree with your statement. I can't answer that question.

Q. What part of the statement don't you agree with?

A. It's inaccurate. It paraphrases me inaccurately, that is not what I said.

Q. What part of you did I paraphrase inaccurately?
A. You did.
Q. I have no idea what you are referring to.
A. You made a statement in the question I said this and this.
Q. Dr. Chalhub, tell me how I mischaracterized your statement.
A. The viral infection caused this child's seizure, I never said that this was a febrile seizure. You never asked me that.
Q. Let's separate it out then.

Initially you answered that you do believe it is a virus that caused her seizure, correct?
A. Right, a virus causes fever, fevers cause sepsis, causes ischemia, the child has ischemia, hypoxic ischemic encephalopathy, cerebral edema and dies.
Q. Do you believe this is a typical febrile seizure?
A. No. I don't know what you mean by typical. I think this child has a high temperature up to 39 degrees, had a seizure, had seizures the next day.

Q. Should the doctors have been concerned about a virus prior to the time that Ashley arrested?
A. I think they were. They were concerned about infection, whether viral or bacterial. Nothing you can treat the virus with other than supportive care.
Q. Can you treat cerebral edema even if you don't know what virus is existent in the child?
A. No, I don't know that you can treat cerebral edema from a viral infection well.
Q. Why are you not sure?
A. We're not sure cytotoxically. Adenogenic edema doesn't respond, other than bacterial meningitis.
Q. Is that based on the literature?
A. Based on literature, experience, continued practice as a physician.
Q. What literature are you relying upon?
A. Neurological literature, infectious disease literature.
Q. Textbook names, please?
A. Figen and Cherry, the AB Baker Clinical Neurology, Swayman and Wright textbook of neurology. Dr. Bell's textbook on infection and nervous system, That is just to name a few.

Q. Anyways, back to my question about what you can do to investigate.

First of all, let's back this up a little bit. You've named a number of viruses that you thought might be implicated in this situation, correct?

A. Correct.

Q. So do you think this child has roseola?

A. I don't know. I think it's possible.

Q. Would you, based upon the clinical picture presented, have diagnosed roseola?

A. Not initially, no.

Q. When would you have diagnosed roseola?

A, Excuse, me?

Q. Was there some point in time after initially that you would have diagnosed roseola?

A. No, I don't generally diagnose roseola, I don't practice general pediatrics. I would leave that to somebody who does that.

Q. So, as a pediatric neurologist, someone Boarded in pediatrics, you don't feel capable of making that diagnosis or you let someone else make it, is that what you are trying to tell me?

A. I don't see children generally for temperature unless they involve the nervous

system.
Q. Going back to the search for the cause of the virus, do you agree with me depending on what virus it is, there are some agents that you can use to treat viruses that will reduce the -- I'm going to call it the risk of viremia or sepsis occurring?
A. The only one I know of is herpes, I don't think this child had herpes.
Q. When you say herpes HSVI, HSVII?
A. I don't know on HSVI, HSVII.
Q. Both of those you agree there is treatment for?
A. There is treatment for HSVI, HSVII, whether it's successful remains to be determined.
Q. You don't think the literature determines it reduces the risk of viremia?
A. No. Reduces it, it may reduce the risk of cerebral necrosis and infarction.
Q. Doctor, tell me as a child neurologist, that's what I'm going to call you, pediatric neurologist if you will, you are familiar with what seizures due to children, correct?
A. Yes.
Q. What happens to cerebral blood flow while a child is seizing?

A. Generally increases.
Q. What does that do to the cerebral function?
A. I don't know. I don't think it does anything to cerebral function.
Q. What untoward medical effect can the increased blood flow to the brain have?
A. In general?
Q. In general.
A. Increased cerebral volume causing hemorrhage. I guess that's about it.
Q. In the general scheme here in terms of HIE, if you've got increased blood flow, at what point does glycolysis occur?
A. Say that again, I don't think I understand that.
Q. Sure. If you've got increased blood flow in the brain, does glycolysis occur, can it?
A. Does glycolysis?
Q. Yes.
A. I don't think I don't understand that. I can't answer it.
Q. Can't answer it.
What is glycolysis?
A. Glycolysis is the breakdown of glycogen.
Q. How does that occur?

A. Well it usually requires insulin, usually requires enzyme changes.
Q. What causes enzyme changes?
A. 1 don't know. The stimulus of being hypoglycemic, resulting in the further breakdown of glycogen to make glucose.
Q. Doctor, since 1994, how frequently have you reviewed medical/legal matters?
A. I review about 20 to 30 cases per year.
Q. You're still predominantly doing that for the defense?
A. Yes. I have a number of -- I review a number of plaintiff's cases each year.
Q. Have you testified in any plaintiff's cases last year by deposition or at trial?
A. Excuse me?
Q. Did you testify in any plaintiff's cases last year either by deposition or at trial?
A. No, I wasn't asked.
Q. Is your commitment to doing medical/legal work still about 10 percent of your income?
A. About 10 to 20 percent.
Q. Doctor, what are the causes of decreased blood flow to the brain?
A. In general cardiac arrest, shock, sepsis,

cardiac tamponade, pulmonary embolus.
Q. Is that it?
A. Yeah, that is it for right now.
Q. For right now, are you going to try to think of some more?
A. I'm trying to answer your question as quickly as I can.
Q. You don't have to answer it quickly, we're not under any time constraints.
MR. CRANDALL: 1 am.
MISS KOLIS: I understand you are, Steve, I have to take this deposition.
MR. CRANDALL: To be honest, Donna, what he is saying is he gave you a list of all the things he can think of now. If one or two more pop up in his head I don't think that is inhuman, Just be reasonable.
Q. Doctor, define hypoxia.
A. Decreased oxygen content.
Q. Define ischemia.
A. Decreased blood flow.
Q. Define for me, describe the causes that you know of hypoxia.
A. In general in an event?
Q. Yes.

A. Could be pulmonary, can be pulmonary infection, can be pulmonary hemorrhage, pulmonary rupture, trauma, can be metabolic disease, disorder of carbohydrate metabolism, fat metabolism, protein metabolism, general systemic infection, sepsis, can be acute edema, either from hemorrhage or lysis, can be hyaline membrane disease, congenital heart disease, pulmonary hypertension. I think that is enough.

Q. Define cerebral edema.

A. Is swelling of the brain.

Q. Doctor, what were Ashley Carr's blood gases when she presented at RB&C?

A. I think normal, let me look back.

A. $FIo2$ on 6-23 was 100; pH, 7.50; pCO_2, 23.

Q. What do those blood gases indicate to you?

A. She was alkalotic.

Q. Doctor, does hypoxia occur during seizure activity?

A. It can.

Q. It can, can't it.

Does ischemia result from seizure activity?

A. What situation?

Q. Any situation, is that something that you

have to look for?
A. General ischemia doesn't occur during the seizure. There are some specific situations, generally it doesn't.
Q. Children in general can sustain the appearance of hypoxia and ischemia for extended periods of time without brain damage; isn't that right?
A. Depends on whether newborn, premature or older individual.
Q. What about someone who is 11 and three quarters months old?
A. Not very long.
Q. Define not very long.
A. They certainly can't sustain ischemia for more than two or three minutes. Hypoxia perhaps a little bit longer.
Q. Can you be hypoxic or anoxic without being ischemic?
A. Sure. Not anoxic, you can be hypoxic.
Q. Doctor, if you had a virus, we can't name which one, in general, if you are infected with a virus is there a risk of developing an encephalopathy?
A. In general, sure.

Q. You have never read the testimony of Ashley Carr's mother I presume?
A. No, I haven't,
Q. Doctor, do you agree with me that a child who is arching their back, the top part of their back, neck is arching up, that can be a sign of decerebrate posturing?
A. I think that is possible, sure,
Q. Under what circumstances is it possible?
A. Well, without anything more than you said, it's just possible. It can be a number of things.
Q. What other things could it be?
A. Meningismus, infection, a seizure, can be a number of things,
Q. Referring you to the morning of June 23, 1994, you can look under the progress notes if you want, it's not going to help with the answer, you might need some basic information out of them, you do understand from reading Dr. Cohen's deposition that he saw the child on the morning of June 23rd, correct?
A. Yes. I don't have the deposition in front of me, yes.
Q. His counsel will tell you that's what he testified to, he did see her. Under the

circumstances where the child was initially admitted to the pediatric intensive care, they are now asking for a neurologist to examine the child, explain to me in detail what a complete neurological examination of this child with this clinical picture should have consisted of.

A. Really that is up to the individual's ability, training. Observation, one could observe a great deal by observing a child. One does a brief general physical examination, an exam of the cranial nerves, motor system, sensation or coordination.

Q. If the child is asleep when you come in to do the examination, can you do an examination?

A. Yes, you can check a lot of reflexes, you can check for tongue, number of things. You can check cranial nerves up to a certain extent. You cannot check level of consciousness when somebody is asleep.

Q. In a child who has just experienced a prolonged seizure such as Ashley, you would want to observe the level of consciousness, wouldn't you?

A. I think you would. The 23rd the child woke up, responding appropriately the note says.

Q. The note of who?

A. Dr. Lowrie.
Q. Dr. Lowrie. Once again we don't know what Dr. Cohen's situation was because there is no note in the chart, right?
A. No, I mean we talked before about notes, Miss Kolis, notes are placed in the charting, the physician reads the note, there is no reason to add anything different, unless there is something different.
Q. Did you read Dr. Cohen's testimony that he did not intend to come back to the hospital to examine the child that day after she was admitted to his service, he merely came back because the parents called to express concern over the condition of the child?
MR. CRANDALL: What was the question?
MISS KOLIS: If he was aware of Dr. Cohen's testimony he in fact did not intend to come back to the hospital on the 23rd, merely came back because the parents called with a concern.
MR. CRANDALL: What time are you talking about?
MISS KOLIS: On the 23rd.

MR. CRANDALL: What time on the 23rd?

MISS KOLIS: He saw her in the morning, right? That's his testimony. I'm asking if the doctor reviewed the portion of Dr. Cohen's testimony that he did not intend to come back to the hospital that evening to examine the child.

A. It was a long deposition, if that is what he said, I have no problem with it.

Q. Do you think that a doctor who has just taken over the care of a child who has been in status, who has some sort of infection going on, should come back and see that child?

A. That depends on the situation, Miss **Kolis**. If you see the child, you have residents, interns taking care of the child, the child is improving, then no, may not be necessary to come back.

Obviously if there is a concern, somebody calls you, wants you to come back, obviously you should.

Q. Dr. Chalhub, if a child is taken off the ventilator, has good color, such as this child did after being taken off the vent, that simply means her oxygenation got better, doesn't it?

A. Well, it could be, that is one of the reasons.
Q. What else does it mean?
A. Means maybe the child is generally improving in general.
Q. The fact that the child was able to get off the ventilator doesn't necessarily mean that she was getting better, does it?
A. Certainly a good indication.
Q. Now Doctor, back in around 1990 or so, I think we talked briefly about that period of your life, you were not working as a primary care physician, you were a consultant in the area of pediatric neurology, correct?
A. I have never been a primary care physician, Miss Kolis.
Q. So when you say you've never been a primary care physician, what do you mean by that?
A. I don't practice general pediatrics.
Q. Have never practiced general pediatrics?
A. No, only as an intern and resident.
Q. Doctor, someone does not have to be Boarded in pediatric neurology to be a pediatric neurologist; isn't that accurate?
A. That's correct.

Q. Define lethargy.
A. Decreased level of consciousness, still arouseable to appropriate responses,
Q. If a person is lethargic, it should alert a doctor to a potential problem with the central nervous system; do you agree?
A. When improved from being intubated, or lethargy from awake state, suddenly becoming lethargic, depends on where you are coming from.
Q. In this situation, when Ashley Carr was found to be lethargic the entire day beginning at 6:00 a.m. in the morning on the 23rd until the time of her arrest?
A. I don't think that in usual after a child has seizures the day before, been on multiple medications, had documentation of continued improvement.
Q. During the day she had continued improvement?
A. Yeah, sure, in the morning she did.
Q. Did she have continued improvement in the afternoon, Dr. Chalhub?
A. Yes, up until that evening when she had her respiratory, probably some cardiac involvement, arrest.
Q. Is **it your** contention a viremia that is **this**

overwhelming would be silent all day long, the first sign would be an arrest?

A. That is what sepsis is, Mr. Kolis, this is how it is.

Q. Viral encephalitis is untreatable, that is what you told me today?

A. No, I never said that at all.

Q. I'm flipping through my notes. I know Steve wants to make his airplane.

MR. CRANDALL: Take as much time as you want.

Q. I think that we've basically covered this. I want to make certain that I don't get surprised at trial.

Your conversance with HSVG is -- first of all, have you ever treated a child with diagnosed HSV6?

A. No.

Q. Never?

A. No.

Q. Your conversance with HSVG is based upon your review of the literature; is that right?

A. Correct.

Q. Do you at this point in time hold an opinion HSV6 has been scientifically proven to infect the

central nervous system?
A. No, I don't have an opinion on that.
Q. We've talked a little bit about the CT. Have you reviewed those films yourself?
A. I have.
Q. Are you stating that they are unequivocally normal?
A. Both of them unequivocally normal, no.
Q. The **6-22** CAT scan?
A. I would say in looking at that, without looking at the subsequent scan, I would say that can be interpreted as normal, yes.
Q. Did you come to know what the wet reading was on that CAT scan?
A. I can read it in the chart, if that is what you are talking about.
Q. Do you know when you received a copy of the wet reading, if you've ever seen it?
A. No, I don't.
Q. Do you happen to recall today that the wet reading indicated that the radiologist's interpretation of the **6-22** scan said there was findings that may be consistent with general cerebral edema?
A. Sure. Radiologists will read a number of

things. You have to correlate that clinically. That is what we do in medicine.

Q. How do you make a clinical correlation of cerebral edema?

A. A child that has cerebral edema that at least you are contending goes on to worsen suddenly, herniated from, it doesn't improve in the interim, Miss Kolis.

Clinically I would have to tell you that the question of mild generalized cerebral edema, that is probably just an observation. You can also present the scan to multiple other individuals who agree that was absolutely normal.

Q. Did you read it as normal or abnormal?

A. I read it as normal.

Q. Do you recall that you have testified in other matters, that you are not a neuroradiologist?

A. I'm not. I'm still not.

Q. I know you are not. Do you recall that was your testimony?

A. Sure. I'm a neurologist who treats children and adults with neurological problems, interprets scans as part of what I do every day.

If you hold it, 1 need to answer one thing, put you on hold one second.

MISS KOLIS: Sure.

(Brief recess had.)

Q. Please tell me, Doctor, what the clinical signs are for increased intracranial pressure.

A. In what situation?

Q. Any situation, Doctor.

A. You have to tell me what situation, you know you've done that acutely, chronically, a baby, adult, after trauma, what situation, I can't answer it otherwise.

Q. Then why don't you just not answer it. That's fine with me.

Is there any medical reason you can think of, Dr. Chalhub, that Ashley Carr could not have undergone a repeat CT on the morning of June 23, 1994?

A. Is there any medical reason, no. I think that if somebody felt it was justified she could have undergone that.

Q. In the past you have testified about several textbooks, I want to briefly go through a couple of them with you to see if you still find them to be useful or authoritative as you testified. Minekey

on child neurology?
A. Yes, I think it's a textbook that may be useful.
Q. Do you have an opinion on the opening pressure which was found at the time that this child had her lumbar puncture?
A. The opening pressure was **20.5** centimeters which is really just borderline, could be normal, could be slightly elevated.
Q. Would you lean more towards the slightly elevated opening pressure knowing that the child had been sedated prior to the examination?
A. No. Really depends on the physician, how much pressure was being put. There is a number of factors. All you could say is **20.5**.
Q. In a child who has just experienced protracted seizure activity, would then wake up for a brief period of time during the night, is found to be lethargic all day, do you agree or disagree that pupillary checks should be conducted?
MR. CRANDALL: Object to the hypothetical.
Q. If you can answer it, Doctor, if you can't that is fine.
A. 1 think that really depends on the physician

or observer, what they are considering. I think like any child should be observed based on what clinically is indicated. If the child is improving, that may not be necessary.

Q. Can you tell if a child is improving if they remain with their eyes closed all day?

A. Excuse me?

Q. Can you tell if a child is improving in this situation if their eyes remain closed all day?

A. You are talking hypothetical?

Q. No, I'm talking about this situation.

A. Her eyes weren't closed all day, she was responding appropriately at nine o'clock in the morning, responding later in the day.

Q. How do you know she was responding appropriately at 9:00 a.m. in the morning?

A. That is what it says.

Q. What it says where?

A. Progress notes.

Q. Excuse me?

A. That is what it says in the progress notes.

Q. In the progress notes doesn't it state she remains lethargic?

A. Appears somewhat ill, where is it. She responded appropriately to pain, is able to

localize. That seems to me she is awake and responding appropriately.

Q. Which note are you reading?

A. Dr. Lowrie, June 23rd.

Q. Her dictated note?

A. Typewritten.

Q. Typewritten note.

MR. CRANDALL: That's what he's looking at.

Q. You've not read the other testimony that what she responded to was deep pain in other words?

A. Doesn't say that.

Q. It may not say that, I'm asking if you've not read the other testimony from the resident that indicates that her eyes remained closed, I gather you haven't?

A. No. The record speaks for itself.

It has have an appropriate neurological exam.

Q. Are you still reading the same typewritten report?

A. Yes.

Q. Where are you reading that?

A. First paragraph.

Q. First paragraph Ashley woke up enough to be

extubated overnight, is that what you are reading?
A. Correct.
Q. Neurology was in this morning, the exam revealed she remained lethargic, no other focals, an appropriate exam.
A. That's right.
Q. I wanted to make sure that is what you were reading.
Q. Doctor, do you agree one has to find the cause of a seizure?
A. One has to find the cause?
Q. Right,
A. It would be nice, certainly. 60 to 70 percent of the time we don't,
Q. Many seizures go without a known cause; is that right?
A. That's correct.
Q. A doctor should embark upon some endeavor to find out what caused the seizure; is that right?
A. Yes.
Q. What can you glean from this record was determined by these doctors to have caused her seizures?
A. Well, I believe they think it's an infection, febrile seizure, were responding to that, direct

effect of infection, I would assume they were considering those problems.

Q. What kind of her herpes virus produces a fever?

A. HSVI, HSVII.

Q. Did you notice Dr. Lowrie or Dr. Cohen or any testimony that they were going to search for those two viruses?

A. No. I wouldn't consider HSVI or HSVII in this child.

Q. Why is that?

A. I don't think it fits that clinical picture.

Q. What clinical picture for a virus does it fit?

MR. CRANDALL: We've been through this.

A. HSVI and 11, not just a virus, what do you want, which one?

Q. After she was transferred from PICU to the floor, what plan do you see in the chart did these doctors initiate to continue to search for a virus?

A. Well, I'm not sure that they were continuing to search just for a virus. They were continuing to search for cause of the seizure, of which that was certainly being considered as part of

infectious etiology, a typical febrile seizure.
Q. What were they doing?
A. Observing the child, watching the child, I have to go back and look, had the child on Amoxicillin, Ibuprofen.
Q. That's what they did for her?
A. That's right.
Q. Prophylactically used Amoxicillin to cover for bacteria?
A. Right.
Q. Amoxicillin isn't going to effect a virus, is it?
A. No.
Q. No, it's not.
What about the antipyretic, Tylenol, that doesn't help you finding a virus, does it?
A. No.
Q. Helps controlling a fever?
A. That's correct.
Q. Will an antipyretic control a fever in a viral situation?
A. Sometimes.
Q. Sometimes yes, sometimes no, correct?
A. Right.

Q. As you look through the record, did you find any orders or any notes that showed any attempt to continue to search for the cause of the seizure?
A. Well, the only notes there are on the 23rd, they are going to observe the child, I assume did do further workup as the child's course dictates. You have to ask them what they planned to do the next day.
Q. Observing the child is not going to tell you?
A. Sure it is.
Q. The source of infection?
A. Yes. Show to you what the child's clinical course is -- what else do you propose they do that day?
Q. I'm asking you the question.
A. I told you I don't see anything wrong with what they did in terms of supporting the child, observing the child, the child appears to be improving. The child has an untoward reaction to an infectious agent which is unpreventable, untreatable, undiagnosable as far as I can tell.
Q. Why is a viral infection undiagnosable?
A. How are you going to diagnose it? You can't get acute hepatitis, the cultures aren't going to tell you that, that takes days, what else can you

do?

Q. I'm asking you.

A. It's not treatable anyways.

Q. Do all children who get HSVG die?

A. Excuse me?

Q. Do all children who get HSVG die?

A. No, I don't think so.

Q. Do you have any conversance with the literature regarding roseola and cerebral edema?

A. No, only the fact it can occur.

Q. What do you do to treat cerebral edema, Doctor?

A. What kind of cerebral edema, what is the situation?

Q. Is that part of your answer, that you've got to know what kind of cerebral edema?

A. It's helpful to know what clinical situation, yes. Congestive heart failure you are not going to use Mannitol, you have to tell me what you are talking about.

MISS KOLIS: Did he say heart failure?

MR. CRANDALL: Yes. Donna, I think it is fair to give more of a clinical picture in terms of being awful broad to say how do you

treat cerebral edema. What circumstances is what he wants to know, clinical parameters.

Q. Doctor, do you recall prior to this case testifying that one has to treat cerebral edema, it doesn't matter what causes it, it needs to be treated?

A. Sure. You need to know what clinical situation you are in.

Q. If in the clinical situation of Ashley Carr, if someone had determined that there was cerebral edema prior to this arrest, is there some clinical contra-indication to treat the cerebral edema found in that chart?

A. I'm sorry that's a question?

Q. Yes, that's a question.

A. Then I didn't understand it.

MR. CRANDALL: Is what you're asking, if you assume Cohen -- this kid was in status, had cerebral edema, increased intracranial pressure, how would you propose he treat it?

MISS KOLIS: No, I'm not asking how he would propose to treat it.

Q. Assuming, Doctor, that initially they appreciate there was a cerebral edema, pretend the situation is different.

Based upon the clinical situation of Ashley Carr on the day of the 23rd, could she not have received Mannitol?

A. Could she not have?

MR. CRANDALL: Should she have received Mannitol.

Q. No, I'm asking, he is saying there is some contra-indications, I'm asking if the contra-indications to Mannitol are contained within this clinical resume?

A. The first place when the child stabilized, appears to be improving, I would not think anybody would give Mannitol. What are you going to accomplish? Probably nothing. Even if somebody assumed this child has cerebral edema, most of the time that clears up on its own by merely observing and supporting the child.

Giving Mannitol can sometimes overload the vascular system, put them into heart failure. Furthermore, if they have an infection, one can aggravate the cerebral edema with Mannitol.

Q. How does that happen?

A. Because the Mannitol will be go into the central nervous system, takes more fluid in rather

than taking it out.

Q. Doctor, I want to ask you a couple other questions.

In terms of your training, the training that you received prior to becoming a doctor or specialist, I suppose, you were an intern from '69 to '70, correct?

A. That's correct.

Q. Is that general internship?

A. No, pediatric internship.

Q. Your CV doesn't say that, that is why I'm asking. From '70 to '72 you had a staff association at the United States Public Health Service, can you please explain to me what that was?

A. Research Fellowship in virology.

Q. You weren't doing clinical work at that time, you were doing research?

A. Also doing clinical work too.

Q. What kind of clinical work were you doing that that time?

A. Field studies on respiratory viruses and also doing investigation of viruses at the National Institutes of Health.

Q. This is going to sound like a silly question,

sometimes I have to ask them.

What part of your training do you consider to have been neuro residency?

A. I did a residency after the research Fellowship.

Q. Then lists 1972 to '73 as a special Fellow in pediatrics, was that part of your residency?

A. That's a pediatric residency.

Q. Just checking to be sure.

'73 to '74 you then did a one year residency, is that what you are telling me, in clinical neurology?

A. No, one year Fellowship in adult neurology.

Q. That was adult neurology.

'74 to '76 special Fellow in pediatrics?

A. Yes, as a neurologist.

Q. I think I have that pretty clear at this point in time.

Doctor, you reviewed the chest films in this case?

A. No, I didn't.

Q. Well you listed them as item E on your report.

A. I was furnished those, like I said, I guess I

did look at them.

Q. You guess what?

A. I did look at them.

Q. Did they add anything to your understanding of this case?

A. They were normal as far as I can tell.

MISS KOLIS: Dr. Chalhub, that's all the questions that I have for you.

MR. CRANDALL: Thanks.

THE WITNESS: Thank you very much.

MISS KOLIS: Steve, about him reading?

MR. CRANDALL: I'll send it to him.

MISS KOLIS: That's fine.

(Dr. Chalhub Deposition Exhibit A marked for identification.)

(Deposition concluded; signature not waived.)

ERRATA SHEET

NOTATION	PAGE/LINE

I have read the foregoing transcript and the same is true and accurate.

_____

ELIAS CHALHUB, M.D.

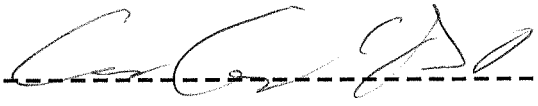
The State of Ohio,

County of Cuyahoga. CERTIFICATE:

I, Constance Campbell, Notary Public within and for the State of Ohio, do hereby certify that the within named witness, ELIAS CHALHUB, M.D. was by me first duly sworn to testify the truth in the cause aforesaid; that the testimony then given was reduced by me to stenotypy in the presence of said witness, subsequently transcribed onto a computer under my direction, and that the foregoing is a true and correct transcript of the testimony so given as aforesaid.

I do further certify that this deposition was taken at the time and place as specified in the foregoing caption, and that I am not a relative, counsel or attorney of either party, or otherwise interested in the outcome of this action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal of office at Cleveland, Ohio, this 17th day of March, 1997.



Constance Campbell, Stenographic Reporter,
Notary Public/State of Ohio.
Commission expiration: January 14, 1998.

Look-See Concordance Report

UNIQUE WORDS: 1,217
TOTAL OCCURRENCES: 3,636
NOISE WORDS: 385
TOTAL WORDS IN FILE: 11,256

SINGLE FILE CONCORDANCE

CASE SENSITIVE

PHRASE WORD LIST(S):

NOISE WORD LIST(S): NOISE.NOI

COVER PAGES = 4

INCLUDES ONLY TEXT OF:
QUESTIONS
ANSWERS
COLLOQUY
PARENTHETICALS
EXHIBITS

DATES ON

INCLUDES PURE NUMBERS

POSSESSIVE FORMS ON

MAXIMUM TRACKED OCCURRENCE THRESHOLD: 50

NUMBER OF WORDS SURPASSING OCCURRENCE THRESHOLD: 1

LIST OF THRESHOLD WORDS:

child [101]

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CURRYCULUM VITAE
ELIAS G. CHALHUB, M.D.

DATE AND PLACE OF BIRTH: July 12, 1943 Boston, Massachusetts

CITIZENSHIP: United States

MARITAL STATUS: Married, Wanda Dianne (July 16, 1945)

CHILDREN: Elias George Chalhub, III (February 19, 1971)
Erin Elizabeth Chalhub (February 10, 1976)

EDUCATION: 1965 - B.A. - Emory University, Atlanta, Georgia

1969 - M.D. - Emory University, Atlanta, Georgia

TRAINING: 1969-70 Intern, North Carolina Memorial Hospital, University of North Carolina

1970-72 Staff Association, United States Public Health Service, National Institute of Allergy and Infectious Disease, Section of Virology and Immunology

1972-73 NINDS Special Fellow in Pediatrics, Washington University School of Medicine, St. Louis Children's Hospital:

1973-74 NINDS Special Fellow in Pediatrics NINDS Special Fellow in Clinical Neurology, Washington University School of Medicine, Barnes Hospital, St. Louis Children's Hospital

1974-76 NINDS Special Fellow in Pediatrics NINDS Special Fellow in Child Neurology, Washington University School of Medicine, St. Louis Children's Hospital

MILITARY SERVICE: July, 1970-72 Surgeon, United States Public Health Service

July, 1970-72 National Institute of Allergy and Infectious Disease

July, 1972 Inactive Reserves, United States Public Health Service

LICENSURE: Arkansas - #R-2389; Florida - #15739; Missouri - #R4625; Georgia - #13019; Alabama - #8386

SOCIETY MEMBERSHIP: Member, American Medical Association
Member, American Academy of Pediatrics
Member, American Academy of Neurology

Member, President's Association
Member, Child Neurology Society
Member, Liaison to the American Academy of Pediatrics
Member, Southern Child Neurology Society
Member, Southorn Sooiety fur Pediatric Research
Member, Southern EEG Society
Member, American Association on Meatal Deficiency
Member, American Epilepsy Association
Member, Central Society for Neurologic Research
Member, Medical Society of Mobile County
Member, Muscular Dystrophy Association
Mcmbcr, National Association for Retarded Citizens
Member, Professor of Child Neurology
Member, The New York Academy of Sciences

BOARD CERTIFICATION: National Board of Medical Examiners, 1972 #105238

Diplomate, American Board of Pediatrics May, 1976

Diplomate, American Board of Psychiatry and Neurology with Special Competence in Child Neurology, 1977

APPOINTMENTS: Member of the American College of Healthcare Executives and awaiting sitting for the Diplomate's Examination

1976-78 Associate Professor of Pediatrics, Neurology, University of Arkansas, Little Rock, Arkansas

1976-78 Head, Division of Child Neurology Department, Pediatrics, University of Arkansas, Little Rock, Arkansas

1976-78 Medical Director, Arkansas Children's Colony

1976-78 Neurologic Consultant to the National Toxicological Research Center

1976-78 Medical Director, Handicapped Children's Center, State Health Department, Little Rock, Arkansas

1976-78 Director, Developmental Disabilities Center, Arkansas Children's Hospital

1977-78 Vice-Chairman, Medical Section Arkansas Chapter of American Association on Mental Deficiency

1984 Continuing Medical Education Committee of the Alabama Medical Association

1984-85 Board of Directors of the Old Dauphin Way Learning Disabilities School

1984-85 Chairman, Neurodiagnostics Committee, Springhill Memorial Hospital

1986-87 Chairman, Pediatric Intensive Care Unit, Mobile Infirmary Medical Center

1987-88 Member, Podiatric Intensive Care Committee, Mobile Infirmary Medical Center

1986-87 Member, Neonatal Podiatric Intensive Care Committee

1986-87 Member, Department of Internal Medicine, Mobile Infirmary

1985-87 Chairman of Continuing Medical Education, Mobile County Medical Society

1985-87 Chairman of Continuing Medical Education - Committee Member - Alabama Medical Association

1987-88 Vice Chairman of Department of Neurology/Neurosurgery Department Mobile Infirmary Medical Center

1989 Head of Neurology/Neurosurgery Department Mobile Infirmary Medical Center

1989 Member, Pediatric Intensive Care Unit Committee, Mobile Infirmary Medical Center

1991 Member, Board of Directors, United Cerebral Palsy of Mobile

1993 Chairman, Professional Standards/Quality Assurance Committee - Alabama Hospital Association

1993 Appointed by Governor of Alabama to the State Certificate of Need Review Board

COMMUNITY ACTIVITIES:

1983-93 Member of the Rotary Club

1984 Program Chairman of the Rotary Club

1984-85 Touchdown Club of Mobile

1991, Member, Advisory Board, Contact Mobile

1078 - Chairman, Research Committee for Arkansas Association for Retarded Citizens

1978 - Advisory Committee for University of Arkansas Multidisciplinary Rehabilitation

1978 - Associate Professor of Neurology Head of Child Neurology, University of South Alabama, Mobile, Alabama

1978 - Co-Director, Muscular Dystrophy Clinic, Mobilo, Alabama

1979 - Member, Board of Advisors, Mohile Association for Retarded Citizens , Mobile, Alabama

1978 - Consultant, Crippled Children's Service, Mobilo, Alabama

1979-80 Member, Utilization Review Committee, University of South Alabama, Mobile, Alabama

1978 - Consultant, Albert P. Brewer Developmental Center, Mobile, Alabama

1979-82 Member, Admissions Committee University of South Alabama College of Medicine

1980-82 Member, Scientific Advisor, Mobile Junior League

1980-83 Director, Rotary Child Study Center

1980-83 Director, Multidiscipline Assessment Clinic, Crippled Children's Clinic, Mobile, Alabama

1981-82 Member of Executive Committee of Providence Hospital

1981-83 Member, Board of Advisors, Oakhill Baptist School

1981-83 Chairman, Intensive Care Committee, Providence Hospital

1981-83 Member, Pediatric Intensive Care Committee, University of South Alabama Medical Center, Mobile, Alabama

1981-83 Member, Board of Advisors, Epilepsy Chapter of Mobile

1981-83 Member, Rotary Rehabilitation Committee, Mobile Infirmary, Mobile, Alabama

1993, Member, American Red Cross, Board of Directors

1993, Mambor, Infirmary Foundation Board of Directors

1993, Vostry, St. Paul's Episcopal Church

1993, Member, Cornerstone Division of United Way Campaign

AWARDS:

19'16-78 Teacher of the *Year*, University of Arkansas, Little Rock, Arkansas

1977-78 Appointed lo the Carter Commission on Mental Health; Liaison, Committee on Mental Retardation

1977-78 Chairman, Children's Mental Health and Handicapped Committee, American Academy of Pediatrics, Arkansas

PEEK EXAMINATION:

1977-78 Peer Review Committee for Review of Research Efforts for the National Center *for* Toxicological Research

1979-80 Examiner in Adult Neurology, American Board of Psychiatry and Neurology, New Orleans, Louisiana

1980-81 Examiner in Adult and Child Neurology, American Board of Psychiatry and Neurology

1981-85 Examiner in Adult Neurology, American Board of Psychiatry and Neurology, Houston, Texas

1986-87 Examiner in Adult Neurology, American Board of Psychiatry and Neurology, Houston, Texas

NATIONAL COMMITTEES:

1980-81 Member, Section on Training in Child Neurology, Child Neurology Society

1981-82 Member, Developmental Disabilities Committee, Child Neurology Society

1982-83 Member, Membership Committee Child Neurology Society

1984-86 Section Chairman of Council on Continuing Medical Education, State of Alabama

GRANTS AND CONTRACTS:

1. Institutional Grant (326-717-250) $7,500, 1977-78. "Study of Methods for Rapid Detection of Congenital Cytomegaloviral Infection". Principal Investigator: Lee Chalhub, M.D.

2. Developmental Disabilities Grant (#77-284) "The Establishment of a Diagnostic Evaluation Center" awarded annually for 3 years. Principal Investigator: Lee Chalhub, M.D.

3. Developmental Disabilities Grant (#77-282) "The Establishment of Genetic Screening and Chromosomal Analysis for the State of Arkansas," 1977. $25,000 awarded annually for 3 years. Principal Investigator: Florence Char, M.D. Co-Investigator: Lee Chalhub, M.D.

4. Department of Mental Retardation - Developmental Disabilities Purchase of Service Contract for "Diagnostic Evaluation of Retarded Children," 1977-78, $75,000, Program Director: Lee Chalhub, M.D.

5. Department of Mental Retardation - Developmental Disabilities Purchase of Service Contract for "Comprehensive Care of Chronically Neurologic Disabled Children in the State of Arkansas," 1977-78, $154,000, Program Director: Lee Chalhub, M.D.

6. Crippled Children's Service Purchase of Service Contract, 1978-79 $8,000, Program Director: Lee Chalhub, M.D.

7. Arkansas Muscular Dystrophy Association Grant 1977-78, Provided for Establishment of Muscle Biopsy and Histochemistry Laboratory $7,500, Program Director: Lee Chalhub, M.D.

8. Grant for Establishment of Multi-Disciplinary Evaluation Center, Rotary Child Study Center, Mobile, Alabama 1980-84, $45,000

EMPLOYMENT RECORD:

1976-78 Associate Professor of Pediatrics and Neurology, University of Arkansas (Little Rock, Arkansas)

1978-82 Associate Professor of Pediatrics and Neurology, University of South Alabama (Mobile, Alabama)

1982-90 Private Practice, Neurology Center (Mobile, Alabama)

1990-91 Associate Medical Director - Mobile Infirmary Medical Centar (Mobile, Alabama)

1991 - 1992 - Administrator/Chief Operating Officer Mobile Infirmary Medical Centar. Executive Vice President, Infirmary Health System, Inc.

1992 - March 1994 - President Mobile Infirmary Medical Center. Executive Vice President, Infirmary Health System, Inc.

April 1994 - Promoted to Clinical Professor of Neurology - University of South Alabama Medical School

April 1994 and Present - Full-time practice of Child Neurology, Mobile, Alabama

MOBILE' INFIRMARY MEDICAL CENTER DEVELOPMENT ACCOMPLISHMENTS

1. Established an aggressive Medical Staff Development Plan.
2. Development of a participative cohesive management team.
3. Assets Management Team has been developed to coordinate the acquisition and accountability for capital.
4. A standards program for renovation of the hospital has been established.
5. A continuous quality improvement process has been developed and implemented throughout the hospital.
6. Cost-containment and utilization of resources program developed.
7. Decreased accounts receivables from 75+ days to 52 days.
8. There is a Utilization Management Plan which will position this hospital for the ability to handle health care reform in the future.
9. Established a Management Training Program.
10. Has established a Performance Evaluation Program for management.
11. Developed relationship with Teaching Institution and Medical School with the University of South Alabama Medical Center with a Surgery Program and a Medicine Program.
12. Physician education has been enhanced and quality improvement plan with the Medical Staff.
13. Developed construction standards which has improved standardization throughout the entire Corporation.
14. Developed a Corporate Education Department.

15. Developed an alternative delivery system with the Department of Nursing.
16. Developed a Fast Track System in the Emergency Room.
17. Established stability in Radiology, i.e., eliminated tho loss of technologists, updated equipment, etc.
18. In preparing the hospital for reform, i.e., critical pathways, 15 DHG categories have been developed and implemented.

PUBLICATIONS

3. **Murphy, B.M., Chalhub,** E.G., Chanock, R.M.: Temperature Sensitive Mutants of Influenza Virus. II. JOURNAL OF INFECTIOUS DISEASES, Vol. 126:170, 1972

2. **Murphy,** B.M., Chalhub, E.G., Nusinoff, S.R., Kasel, J., **Chanock, R.M.:** Temperature Sensitive Mutants of Influenza Virus. III. Further Characterization of the ts-7 (E) Influenza A Recombinant (H2N2) Virus in Man. JOURNAL OF INFECTIOUS DISEASES, Vol. 126:170, 1972.

3. **Murphy,** B.M., **Baron** S., Chalhub, E.G., Uhlendorf, C., Chanock, R.M Temperature Sensitive Mutants of Influenza Virus. IV. Induction of Interferon in the Nasopharynx of Wild-Type and a Temperature Sensitive Recombinant Virus. JOURNAL OF INFECTIOUS DISEASES, Vol. 128:488, 1973.

4. Murphy, B.M. Richmond, D.Et, Chalhub, E.G., Uhlendorf, E.P., Baron S.B., Chanock, R.M.: Failure of Attenuated Temperature Sensitive Influenza A (H3N2) Virus to Induce Heterologous Interference in Man to Parainfluenza Type 1. INFECTION AND IMMUNITY, pp. 62-68, 1975.

5. Chalhub, E.G., Volpe, J., Gado, M.: Linear Nevus Sebaceous Syndrome Associated with Porencephaly and Nonfunctioning Major Cerebral Venous Sinuses. NEUROLOGY, Vol. 25:857-860, 1975.

6. Chalhub, E.G., DeVivo, D.C.: Dipheylhydantion Induced Dystonia and Choreoathetosis in Two Retarded Epileptic Children. NEUROLOGY, Vol. 26:494, 1976.

7. Barton, L.B., and Chalhub, E.G.: Myositis Associated with Influenza A Infection. J PEDIATRICS, Vol. 87:1003, 1976.

8. Chalhub, E.G.: Neurocutaneous Syndromes in Children. PEDIATRIC CLINICS OF NORTH AMERICA, Vol. 23:499, 1976

9. Chalhub, E.G., DeVivo, D.C.: Phenytoin Induced Choreoathetosis. J PEDIATRICS, Vol. 89:153, 1976.

10. Chalhub, E.G., and Nelson, J.S.: Cytomegalovirus Infection of the Newborn: Its Relationship to Congenital Malformation of Developing Brain. NEUROLOGY, Vol. 90, 1977.

11. Chalhub, E.G.: IN VITRO and IN VIVO Induced Hypoglycorrhachia in the Rabbit with Diplococcus Pneumonia. NEUROLOGY 1969.

12. Chalhub, E.G., DeVivo, D.C.: Porencephaly Associated with Coxsackie A9 Infection in the Neonate. NEUROLOGY, Vol. 27:574, 1977.

13. Chalhub, E.G., Boenzinger, J., Feigin, R.D., Middlekamp, J.N., and Shackelford, G.D.: Congenital Herpes Simplex Type II Infection with Extensive Hepatic Calcification, DEVELOPMENTAL MEDICINE AND CHILD NEUROLOGY, Vol. 19:527, 1977.

14. Baker, S.J., Chalhub, E.G., Shackelford, P.: Group B Streptococcal Ventriculitis. J PEDIATRICS, Research, 1978.

15. Chalhub, E.G.: Treatment of Bacterial Meningitis with Intravenous Amoxicillin. PEDIATRIC NEWS, December 1978.

16. Chalhub, E.G., Rappin, J.: Neurocutaneous Syndromes. PEDIATRICS, Rudollp. A.M., Ed., Appleton, Century, Crofts, 1982.

17. Chalhub, E.G.: Centrofacial Lentigenosis. HANDBOOK OF CLINICAL NEUROLOGY, Vol. 3:26-27, 1981.

18. Chalhub, E.G.: Klippel-Trenaunay-Weber Syndrome. HANDBOOK OF CLINICAL NEUROLOGY, Vol. 43:24-26, 1981

19. Chalhub, E.G.: Maffucci-Kast Syndrome. HANDBOOK OF CLINICAL NEUROLOGY, Vol. 43:29-30, 1981

20. Chalhub, E.G.: Chediak-Higashi Syndrome. HANDBOOK OF CLINICAL NEUROLOGY, Vol. 43, 1981.

21. Chalhub, E.G.: Neurocutaneous Melanosis. HANDBOOK OF CLINICAL NEUROLOGY, Vol. 43:33-34, 1981.

22. Chalhub, E.G.: Reye's Syndrome Complicated by a Generalized Herpes Simplex Type I Infection. J. PEDIATRICS, Vol. 98, No. 1:33, 1981.

23. Chalhub, E.G.: Peutz-Jeghers Syndrome. HANDBOOK OF CLINICAL NEUROLOGY, Val. 43:41-42, 1981.

24. Williams, J. Powell, Blalock, C.P., Dunaway, C.L. Chalhub, E.G.: Schizencephaly. JOURNAL OF COMPUTER TOMOGRAPHY, 135-139, 1983.

25. Peavey, K., Chalhub, E.G.: Group B. Streptococcal Infection an Important Cause of Intrauterine Asphyxia. AMERICAN JOURNAL OF OBSTETRICS & GYNECOLOGY, Vol. 146:989-990, 1983.

26. Chalhub, E.G.: Choreoathetosis and Dystonia Related to Tegretol Overdose. In Press.

27. Chalhub, E.G.: Subdural Hematoma and Epidural Hematoma. CURRENT PEDIATRIC THERAPY, W.B. Saunders Publisher, p. 52-53, 1986.

BOOK REVIEWS

1. Chalhub, E.G.: VIRAL DISEASES OF THE CENTRAL NERVOUS SYSTEM. Edited by L.S. Illis, 1975, Baltimore, Williams and Wilkins, NEUROLOGY, Vol. 26:903, 1976.

ABSTRACTS

1. Chalhub, E.G.: In Vitro and In Vivo Induced Hypoglycorrhachia in the Rabbit with Diplococcus Pneumonia. Presentad at tho 20th Annual Meeting of the American Academy of Neurology, Washington, D.C., 1969.

2. Selker, R. & Chalhub, E.G.: Mental Development in Hydrocephalics: Effect of "Elapsed Time" Between Meningocele Repair and Shunt. American Association of Neurological Surgeons, April 1970.

3. Chalhub, E.G.,& DeVivo, D.C.: Diphenylhydantoin Induced Choreoathetosis and Dystonia in Two Retarded Epileptic Children. Presentad ut the 26th Annual Meeting of the American Academy of Neurology, Miami, Florida, 1975.

4. Chalhub, E.G.,& DeVivo, D.C.: Coxsackie A9 Infection Associated with the H.H.E. Syndrome and Porencephaly. Presented at the Child Neurology Society meeting, Monterey, California, October 1976.

5. Chalhub, E.G., & Arrington, R.W.: Neonatal Hypoxic Brain Injury Associated with Nuchal Cord Encirclement. CLINICAL RESEARCH, Vol. 25, 1977.

6. Chalhub, E.G. & Nelson, J.S.: The Neuropathology of Congenital Cytomegaloviral Encephalitis in Patients with Brief and Long-Term and Long-Term Survival, Annuals of Neurology, Vol. 2:260, 1977.

7. Hill, D.E., Schedeie, H. Chalhub, E.G., Boughter, M., Sziszak, T.: Evidence for the Transthecal Transfer of Insulin in Subhuman Primates. Canadian Pediatric Society, June 1977.

8. Morrissy, R.T., Chalhub, E.G.: Myotonic Dystrophy: Caution for the Orthopaedist. Presented to the American Academy of Orthopaedics, 1976.

9. Chalhub, E.G., Collie, W., Goka, T., Howell, R: Progressive Neurologic Disease Associated with Hypercupremia: A New Copper Metabolic Defect? Presented to the Child Neurology Society, 1977-78.

10. Baker, J.S., Chalhub, E.G., & Shackelford, P.: Group B Ventriculitis. Society for Pediatric Research, 48th Annual Meeting, New York, 1981.

11. Chalhub, E.G., & Tamauchi, T.: Reye's Syndrome: A Reasonable Approach. Southern Society for Pediatric Research, 1978.

12. Chalhub, E.G., Bornhofen, J.H., Char, F., & Morrissy, R.A.: Congenital Fiber Type Disproportion, Mitral Valve Prolapse and the Williams "Elfin Facies" Syndrome in a family. Southern Society for Pediatric Research, Clinical Research, Vol. 26:821A, 1978.

13. Chalhub, E.G., bornhofen, J.H. : Congenital Fiber Type Disproportion Associated with Mitral Valve Prolapse and Idiopathic Hypercalcemia of Infancy. Southern Society of Child Neurology, 1977.

14. Eisenach, K., Chalhub, E.G., Yamauchi, T.: Countercurrent Immunoelectrophoresis: Laboratory and Clinical Correlation of Bacterial Meningitis in a Pediatric Population. Clinical Research, Vol 26:821A, 1978.

15. Chalhub, E.G., & Nelson, J.S. : Watershed Cerebral Infarction in Sickle Cell Anemia: A Pathologic and Clinical Description in 16 Children. Southorn Child Neurology Society, 1979.

16. Worsham, C., Chalhub, E,G., Wiseman, If., Silverboard, G.: Coxsackie Virus A21 Disseminated Neonatal Infection. Clinical Research, Vol. 28, 1980.

17. Chalhub, E.G. : Spinal Ependymoma in Childhood: Unusual Features. Clinical Research, Vol. 28, 1980.