IN THE COURT OF COMMON PLEAS
CIVIL DIVISION
CUYAHOGA COUNTY, OHIO

JGL marked copy.

ANGELO PRIVITERA, Exec., etc.,

Plaintiffs,

vs. No. 321436

THE CLEVELAND CLINIC FOUNDATION,

Defendant.

Evidence **Deposition** of DR. LAWRENCE T. GOODNOUGH
taken on behalf of the Plaintiffs on
March 15, **1999**

INDEX

Reporter: Sara Alice Masuga, CSR, RPR
No. 084-002993

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ANGELO PRIVITERA, Exec., etc., Plaintiffs,
vs. No. 321436
THE CLEVELAND CLINIC FOUNDATION, Defendant.

APPEARANCES:

For Plaintiffs: Lancione & Sloan
By John G. Lancione, Esq.

For Defendant: Bonezzi, Switzer, Murphy & Polito Co., L.P.A.
By William D. Bonezzi, Esq.

THE DEPOSITION of DR. LAWRENCE T. GOODNOUGH was taken on March 15, 1999, between the hours of eight o'clock in the forenoon and six o'clock in the afternoon of that day in the County of St. Louis, State of Missouri, before me, Sara Alice Mauga, Commissioner, a Notary Public, Certified Shorthand Reporter, in a certain cause now pending in the Court of Common Pleas, Civil Division, Cuyahoga County, Ohio, wherein ANGELO PRIVITERA, Exec., etc. are the Plaintiffs and THE CLEVELAND CLINIC FOUNDATION is the Defendant, on the part of the

Plaintiffs, pursuant to commission and notice.

EXHIBIT INDEX

DR. LAWRENCE T. GOODNOUGH produced, sworn, and examined as a witness on behalf of the Plaintiffs testified and deposed as follows:

CROSS-EXAMINATION

BY MR LANCIONE:

Q Would you state your full name for the record, please?
A. Lawrence Tim Goodnough.
Q. Arid where do you reside, Dr. Goodnough?
A, I'm in Town and Country, Missouri
Q **And** how long have you lived there?
A. Since August of 1992.
Q Are you employed **at** the present time?
A. Yes,
Q. By whom?
A. Washington University.
Q. **And** that has been since when'!
A. **August** of 1992.
Q. Prior to that time, you were in Cleveland, were you?
A. Yes,
Q. How long were you there?
A I was there from **'78** to '92.
Q. Can you tell me what your duties and responsibilities were very generally from 1978 until yuu **left** Cleveland?
A. From '78 to '81, I was finishing my

training in **hematology arid** oncology and from '81 **to** '92 I was on the faculty at Case Western Reserve.
Q. **And** what **did** your practice consist of?
A. I attended on general medicine. I attended **on** -- in hematology, oncology. I had a practice in hematology and oncology and **I** became associate director of the blood **bank** during my term there.
Q. In those various capacities starting **with** your duties in medicine, tell me what you did, actually **what** you were doing in medicine
A. Well, seeing patients, taking care of patients, inpatients, outpatients. consulting on patients, teaching.
Q. What kinds of cases?
A. It would run **the** gamut On general medicine, it would include all internal medicine for whatever reason people were in the hospital, In my hematology **arid** oncology practice, it would be ranging from anemia to complex hematology cases such as DIC or TTP. **in** oncology, it would range from leukemia and bone marrow transplantation to solid organ oncology such as head and neck cancer, breast cancer'.

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Q What about the blood bank?
A I--
Q Tell me what your duties were there.
A I was medical director of the apheresis unit where we collected platelets to support the transplant program. We had an autologous blood donation program. I ran the therapeutic apheresis program and then, as associate director of the blood hank, I also helped oversee the blood bank laboratory.
Q For the autologous donation program, tell me how that was run. I mean, how soon before surgery do patients contribute their own blood and what are the conditions, how are they treated during that period, if there is any standard for that?
A Well. the program took off in the mid 1980's, in particular from '85 through 1990, where increasingly for surgeries like orthopedic surgery and urologic surgery patients would elect to predonate their blood beginning as early as 42 days before surgery, which is the maximum period of time that you can store liquid blood, More commonly I would estimate four weeks before surgcry predonating a unit a week was the general practice,
Q. Were patients who were reasonably healthy

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otherwise given any sort of a program of vitamins or supplemental intake of any products?
A. Well, they were encouraged to take oral iron during the period of blood donation,
Q Was there any monitoring of the patient's coagulation profile or CBC's?
A. We would monitor the blood count, the CBC, of the patients who were predonating their autologous blood. Every time they came in, we had a certain standard for a minimum hematocrit for blood donation,
Q. What was that'!
A. Thirty-three percent.
Q How long before the surgery went did they -- were they to stop donating their blood?
A. It would depend OH how they were scheduled, how much time we had before surgery. If the surgeon wanted three units and he gave us three weeks. then we would make sure we got it in a minimum of 72 hours before surgery was the standard for the last donation.
Q. Do you know what the program consisted of at The Cleveland Clinic in 1995, the autologous blood program'!
A. I don't, but the standards I just

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referred to were AABB standards and they were fairly widely followed.
Q. What is -- What has been your practice here in St. Louis?
A. Here I have been -- I am director of transfusion services, so I oversee the donor center, the apheresis unit, the stern cell apheresis program for bone marrow transplantation. I see patients in consultation, again, with complex hematologic problems that usually require me to intervene with therapeutic apheresis and I attend on the bone marrow transplant service,
Q. Have you engaged in any medical legal consultations during your career'.'
A, Yea.
Q. Tell me when that first began.
A, I don't know what the first year would be. I would suspect sometime in the mid 1980's.
Q And what subjects, what specialties?
A. Complex hematology cases, oncology cases. and blood bank cases.
Q. When you were in Cleveland, did you do any consulting for the Jacobsen, Maynard firm?
A. When I was asked.
Q. How often was tint?

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A. I don't know. I would guess -- I would estimate perhaps a half a dozen cases over the years.
Q. Were you insured by PIE at any time during that period'!
A. Yes, I was when I was on the faculty at Case Western Reserve.
MR. BONEZZI: Objection and move to strike.
Q. That would have been when, during what ycnrs?
A. As best as I can recollect, it was during the entire period of time, but there may have been other carriers, I didn't pay too much attention to those things.
Q Okay. Did you participate in any peer review activities on behalf of PIE or the Jacobsen, Maynard firm?
A. I remember perhaps once or twice where they asked me to come in and participate in 3 peer review session.
MR. BONEZZI: Objection and move to strike.
Q. And how many --
A. Rut I don't know that Jacobsen, Maynard

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asked me to. It may have been PIE itself.
Q. Okay. How many cases did you say that you reviewed or consulted on for Jacobsen. Maynard? You said approximately half a dozen?
A. I lose track of how many cases. I can think of a half a dozen cases where I put in a lot of time in terms of depositions and perhaps even trial testimony. I may have been asked to review a few more than that that nothing ever came of those cases.
Q. Who were some of the lawyers that you worked with there?
A. With Jacobsen, Maynard?
Q. Yes.
A. It would be Bill Bonezzi. primarily, and his associates.
Q. And what kinds of cases were those?
A. Complex hematology cases, oncology cases, perhaps a blood bank case. I don't remember,
Q. Do you remember any particular case with any particular issues in any of the cases?
A. I remember one case where I -- it came to trial testimony.
Q. What kind of a case was that?
A. It was a case of TTP.

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Q. What's that?
A. Thrombotic thrombocytopenic purpura.
Q. And what was the issue in that case: do you recall?
A. It was an issue of -- Well, the plaintiff's case was that the hematologist mismanaged the TTP, so I agreed to defend the hematologist.
Q. And what happened to the patient?
A. The patient died.
MR. BONEZZI: Off the record. please.
(At this point, an off-the-record discussion was had.)
Q. When did you first become involved in this case? Do you have any records that show that? Do vau have any letters --
A. I h i my---
Q. -- from Mr. Boiiezzi?
A. I have my correspondence.
Q. Okay.
A. I'd have to refer to the records tu remember.
Q. Sure, go ahead.

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A. Oh. here we go. Thanks. So, it would have been about June of 9998.
Q. Can I see what you're referring to? Is this your. file?
A. Yes.
Q. From your file?
A. Yes.
(At this point. Plaintiff's Exhibit No. 1 was marked for identification,)
Q. Dr. Goodnough, I'm going to hand you Plaintiff's Deposition Exhibit Number One, a letter from Mr, Bonezzi consisting of three typewritten pages, and ask you to identify that for me.
A. It's a letter to me from Bill on -- Mr. Bonezzi on the Privitera vs. Cleveland Clinic case.
Q. Dated?
A. June 15, 1998.
Q. Okay. Are you going to be testifying on standards of care for anesthesiologists or anesthetists in this case?
MR. BONEZZI: NO.
A. No.
Q. Are you going to be testifying as to the

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standards of care with respect to --
(At this point, there was a short interruption.)
Q. -- orthopedic surgery or neurosurgery or any surgeon's activities that deal with scoliosis surgery?
A. No.
Q. Are your opinions going to be limited to the medical specialty of hematology?
A. No,
Q. What other medical specialties or subjects will you be venturing opinions on?
A. Transfusion medicine.
Q. What does -- Define transfusion medicine for me.
A. Transfusion medicine is a clinical discipline of-- in which there are clinical aspects and laboratory aspects related to the overall field of hematology, coagulation, and blood banking.
Q. Okay. In your report -- Do you have a copy of that to take a look at?
A. (No response.)
Q. You say in the last paragraph in your opinion the physicians Dr. Schubert, Dr. Kalhan, Dr. Dews, and Dr. Ebrahim did not cause or

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contribute to the abnormalities of tissue anoxia, DIC or metabolic disturbances. Do you include in there the other anesthesia delivery people such as residents or C.R.N.A.'s?
A. Yes.
Q. Okay. So, what is your opinion as to the cause of death?
A. In my opinion, Ms. Privitera died of disseminated intravascular coagulation
Q. And when did this condition arise for the first time?
A. Well, may I refer to the medical records?
Q. Sure.
A. As best I can determine, the DIC developed as a complication of this surgical case on or around 19:30.
Q. 7:30 p.m.?
A. Correct., Or perhaps shortly thereafter.
Q. Well, how long thereafter would you say it could have also happened?
A. Sometime over the next hour after that. Sometime between 7:30 and 8:30.
Q. Okay, Now, what are the causes, just generally speaking, of DIC?

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A. It's -- DIC is an aberration of the coagulation pathway caused by a trigger of either the intrinsic or extrinsic pathway to set off a cascade of fibrin formation diffusely intravascularly. So, it's some kind of a trigger.
Q. So, it separates out the fibrin from the fibrinogen'?
A. It causes the fibrinogen to be converted to fibrin,
Q. In the literature, I find that they refer to shock sometimes its a cause of DIC developing.
A. It can be,
Q. Is that something you understand to be true?
A. It can be,
Q. Haw does that happen?
A. In a trauma case, for exanaplc, shock can lead to DIC if you have tissue anoxia, inadequate delivery of oxygen to the tissue, or something plugging up the tissue.
Q. So, a lack of oxygen to tissues can he that triggering mechanism to cause the coagulation cascade'?
A. It can.
Q. Would other disease states be capable of

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triggering that cascade, also'?
A. Yes
Q. Infection?
A. Infection.
Q. Sepsis?
A. Correct.
Q. And I suppose we could back up and go into the causes of the failure to deliver adequate oxygen to tissues as being a preliminary building block to the causation that leads to the coagulation cascade?
A. I don't think that's what was going on in this case. The example we were talking about was in trauma surgery. In orthopedic surgery, the mechanism for DIC is different.
Q. You mean that if a patient has metabolic, acidosis. for example, that doesn't trigger' the coagulation cascade'!
A. In this case, I believe that the metabolic acidosis was a consequence of DIC.
Q. Well, that wasn't my question. My question is could it he the other way around in some cases.
A. No, you have to have something more of a definitive inciting agent.

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Q. Could it bc an electrolyte inrhalance'?
A, No, I've never heard of that,
Q What about lactic acidosis?
A. That's secondary to DIC. it doesn't cause DIC.
Q. Well, tell me what the causes cat-be.
A. Tissue thromboplastin, tissue juice released into the general circulation, a common sequelae of orthopedic surgery, most commonly manifests by clotting problems, blood clots, pulmonary thromboemboli, strokes and heart attacks, but the counterpart of that would bc a more generalized DIC, as in this case.
Q What other causes in surgery can bring about DIC, excessive blood loss'!
A Not generally. In --
Q. Hut possibly?
A. Possibly.
MR BONEZZI: Objection.
You can go ahead and answer.
Q. Okay What else?
A Obstetrical complications in the gynecologic literature or OB are well known to that. Cancer surgeries. Cancer can cause that. Infection, again.

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Q. So, DIC never occurs unless there is what? I mean, tell me what --
A. An inciting agent to trigger the coagulation cascade.
Q That inciting agent may possibly be in a surgical case rather than a trauma case what, blood loss?
A, Usually tissue thromboplastins, especially in the orthopedic cases.
Q. What are tissue thromboplastins?
A. They're tissue juice. Intracellular elements when you have a cell cutting or grinding as you do in orthopedic surgcry, Bone and soft tissuc are rich in thromboplastins, which arc capable of -- known -- known to activate the coagulation cascade.
Q. Is there an increased risk of that when you use scavenged blood'!
A. No, 1 wouldn't think so. not if you wash it..
Q. So, is that what you're saying happened in this case, that there was the thromboplastins that incited the coagulation cascade?
A. That's my opinion, yes.
Q. Had nothing to do with blood loss or insufficient volume resuscitation?

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A, I don't think that there was insufficient volume resuscitation except at the very end in the -- in the setting of DIC.
Q. Okay. Tell me about the patient's blood loss, What was the patient's blood loss in the initial phases of this surgery.
MR. BONEZZI: What period of time'?
Q. The initial phases of the surgery, The surgery started at 1:38.
A. Well, I'm referring to the anes --
MK. BONEZZI: Well, wait. Hang on. But the surgcry also didn't conclude until after 8:30, so when you talk about the initial stages, what --
Q. Starting --
MR BONEZZI: -- period?
Q Starting at 1:38.
A. Well, I'm looking at the estimated blood loss of the anesthesia record and the first notation is around 3:30, 15:30 or so or 15:45 of 1.200 cc's.
Q Okay. Is that a normal blood loss for this kind of surgery, if you know?
A. I think it's within the range expected for a complex scoliosis repair.

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Q That's about five to six hundred cc's an hour, something like that?
A, I'd have to refer to when surgery started, I know anesthesia started at noon. If you assume that surgcry started around one o'clock or so --
Q It started about 1:30, I think I think it says there.
A Right, so that would he two, two arid a half hours later, yes.
Q. With respect to blood loss, how much replacement is necessary for red cell replacement, for example, per unit of blood loss say?
A It depends on the starting hematocrit of the patient, the pace of bleeding. There is nu formula for replacing blood loss,
Q What about fresh frozen plasma; is there any -- is there any standard for that for a patient that had a hematocrit and hemoglobin like this patient did?
A. There's no standard, Again, it depends on the pace of the blood loss, any coagulation tests you may be getting back.
Q. What kind of coagulation tests are necessary in a case like this?

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A. I don't know that any are necessary. It depends on the blood loss. Rut the ones that are most commonly obtained would be a proTime, a PTT, platelet count, occasionally a fibrinogen.
Q. And what do those tests reveal when you're having a coagulation, coagulopathy problem?
A, Well, they would -- the proTime and PTT would become prolonged if you are low in clotting factors. Your platelet count would decrease if you arc consuming platelets, And your fibrinogen would go down if you're utilizing fibrinogen.
Q For coagulation?
A. Yes.
Q How long does it take for those tests to become pathologic after the development of DIC?
A. I think with DIC they would become abnormal very quickly, very quickly.
Q. What is the relationship between the administration of crystalloid solutions and the loss of blood from a surgical wound? How much crystalloid do you give per unit of blood loss in a major case like *this?*
A Well, the general rule of thumb is that you give it one cc for one cc at the time of blood loss with the intention of catching up to even ——

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a two to one or perhaps even a three to one ratio of crystalloid to blood loss.
Q. What about colloid solutions'!
A. Colloid solutions, there's no general rule of thumb except usually one cc for one cc blood loss replacement.
Q Do you know how much crystalloid was given to this patient prior to seven o'clock, for example?
A. I have a notation that as of four o'clock, for example. that she had been given a total of close to five liters of crystalloid, what I interpret to be another 1,000 or one liter of Hespan, and another liter of albumin. That would be 16:00. And then if you go from there to seven o'clock, it appears as if she was given an extra *I,500* ml of, well. a liter of lactated Ringers and mother one liter of Hespan along with some blood. I mean, the blood would he in addition to the figures I gave you.
Q. A thousand cc's of Hespan did you say'?
A, Yes.
Q. Is that a colloid or 3 crystalhid?
A. That would be a colloid.
Q. Were there signs of hypovolemia in the

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hours prior to seven o'clock?
A. Not as far as I'm concerned, no.
Q. The urine output was not significant to you'?
A. The -- I'm looking at the vital signs and there *wits* no indication that this patient's blood pressure had really changed substantially until shortly before seven o'clock.
Q. It was being supported by pressors, wasn't it?
A. At one point it was
Q. Around four -- 4:30?
A. I have three o'clock for some reason. I don't know. I may he off a bit. I have 15:00.
Q. Well, it says --
A. The Neo-Synephrine starts at 15:00, but it's hard fur me to know where -- where they started that. And there was some transient hypotension at that time.
Q. What about the blood -- How much blood bid you calculate that they gave to this patient prior to seven o'clock?
A. Prior to seven o'clock, I have totalled up six units of -- but probably -- six units of red cells, three of whom were autologous, three of whom

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were directed, and then I -- it appears to me as if another two units of red cells was given around 7:30.
Q How many would that he?
A Well, that would be a total of eight by *7.30.*
Q And her blood loss at that time was approximately something in excess of *2.600* cs's?
A That's correct.
Q Is your DIC diagnosis a clinical diagnosis or is it laboratory backed?
A It's a clinical diagnosis with laboratory tests supporting my impression.
Q What laboratory tests support that?
A The blood gas and potassium levels.
Q What blood gases particularly?
A Well, and the proTime arid the PTT, The blood gas I'm looking at would be the one somewhere after -- right before 21:00 with a pH of 7.20.
Q 8:22 20:22?
A. Yes, it looks like it. Along --
Q That looks like -- Is that along with tfic negative base excess, is that metabolic acidosis?
A. Yes.
Q And that supports your clinical diagnosis

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of DIC?
A. That. and the lactate level of 7.5.
Q. Why is that'!
A. Indicating that it was a lactic acidosis tissue anoxia from DIC. And then the pro --
Q. What other things can cause tissue anoxia?
A. Well, lots of things can cause tissue anoxia, but in this case the other laboratory parameters, the proTime of 26 seconds. the PTT of 157 seconds at 21:00 indicate to me that it was DIC as -- as the source of tissue anoxia.
Q. The tissue anoxia occurred between tfic time of 7:20 and 8:20, the worsening of the tissue anoxia; is that true'!
A. That's -- That's where I'm saying that's when the DIC started, yes.
Q. That can't be from hypoperfusion or inadequate pressure or inadequate intravascular volume, is that what you're saying?
A. That would be one possibility, but I don't -- I don't put the case together that way.
Q. Why not?
A. I think the DIC came first.
Q. Why?

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A. Because it's a recognized complication of complex orthopedic surgery. Commonly there are large venous clot problems like deep vein thrombophlebitis, pulmonary emboli, stroke, heart attacks, The disseminated intravascular coagulation is just a more diffuse systemic presentation of that related to the tissue thromboplastins from the surgery,

Q Did all of those other things happen here, is **that what** you're saying? **All** those other thromboembolisms and all that, did that **all** happen here?

A. Nn, what I'm saying is it's a spectrum. These are all clotting disorders and the DIC is **a** -- is one spectrum in which in a prolonged orthopedic case, a complex spine case with diffuse release of tissue thromboplastin you can get DIC and it's a recognized clinical problem that has laboratory manifestations.

Q. What other of these things happened tu this patient in **addition** to DIC, all these other complications that you've just enumerated?

A. The complications of acidemia **and** hyperkalemia and massive blood loss and ultimately mortality are related to the DIC. They're secondary

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to the DIC.

Q. And they can't be caused by inadequate perfusion of the tissues because there's not enough oxygen, there's not **enough** red blood cells carrying oxygen? It can't be caused by that?

A. That's not how I **put** this case together. I believe that the -- to the extent that this patient was **hypovolemic arid -- arid** had a cardiopulmonary arrest from acidemia **and** hyperkalemia, it was a consequence of the DIC and not a cause of the DIC. The DIC manifested before that.

Q. I know that, but you're not saying **that** it's impossible for it to happen the other way around, are you?

A. I don't see any evidence in this in this case from my reading of the medical record **that** it -- that it happened that way.

Q. Do you see adequate perfusion of the tissues based upon all of the laboratory reports, based upon the clinical condition of the patient, based upon this entire record that blood replacement was adequate, that other **fluid** replacement was adequate, that her intravascular pressure, that her heart was working properly- that everything was

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being monitored? She was hemodynamically stable, in other words, according to you; correct'!

A. What I'm saying is all the way through 7:30 or shortly thereafter when I believe that the DIC commenced, up until that point there is nothing in this record to indicate that there was any problem with respect to volume resuscitation or blood bank or transfusion management.

Q. And then suddenly at that point because of the nature of this surgery and the products -- the tissue products that got into her bloodstream, she developed DIC?

A. That's correct,

Q. How often in scoliosis cases do patients develop DIC?

A. I can in my uwn personal experience recall at least two previous occasions where that happened.

Q. **And** how many total occasions are you aware of?

A. I don't know.

Q. **Hundreds?**

A. I don't know.

Q. Hundreds at least?

A, It's a **recognized** complication. That's

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why wc call it complex spine surgery, **And** I know of at least two cases in my own career where these -- the scoliosis repair or the -- or the spine surgcry was complicated by DIC.

Q. And did the patients die in both cases?

A. One of them.

Q. **Is** there something called a dilutional coagulopathy'!

A, I think it's a misnomer. **You** can have -- You can have abnormalities of **the** coagulation laboratory tests based on dilution.

Q. And what **does** that cause'!

A, It causes an **abnormal** proTime and a PTT, but it's not **a** coagulopathy per se.

Q. Does it cause bleeding, excessive bleeding?

A, Rarely.

Q. **Are** you aware of any literature that deals with disseminated intravascular coagulation during surgery for scoliosis?

A. Not in particular, but there's *a* lot written about it,

Q. **Are** you aware of the rate of this occurring?

A. I couldn't quote a figure to you, no.

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Thankfully it's not common; it's rare.
Q Does the patient's general health enter into the picture of whether or not this condition -- DIC develops during a major surgery like this?
A No, I believe it's more related to the specific surgical procedure itself.
Q Is hypothermia known to worsen DIC or increase the chances of DIC developing?
A I think in certain cases it's known to be a problem with respect to coagulation
Q. What kind of cases?
A, Deep hypothermic aortic arch repair, which is a complex cardiothoracic situation. Even in routine bypass procedures, I think they've learned not to cool the patient as much as they used to because of those problems
Q. How about inadvertent hypothermia') I'm not talking about intentional hypothermia. Is it known to increase the risk of DIC developing?
MK. BONEZZI: In 1995?
Q. In --
MR. BONEZZI: And before'?
Q Beginning in -- Before 1995, yes, certainly.
A. I wouldn't be able to distinguish between

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intentional or inadvertent hypothermia. I believe it would be the same.
Q. And what temperature would you ascribe to the term "hypothermia"--
A. Well --
Q -- in this sense that we're talking about'!
A. I mean, I would say anything under 28 degrees centigrade and down. The cooler the patient, basically the more problematic the coagulation cascade or platelet function might be.
Q. Well, at 29 -- 20 to 29 degrees, the patient is unconscious, aren't they?
A Well. during surgery --
Q. Either intentionally or --
A, -- during surgery, I certainly would --
Q. -- not intentially?
A. -- hope so, yes.
Q. Even without anesthesia'!
A. I guess you'll have to give me a specific. I don't understand what you're talking about without anesthesia.
Q Well, if a person is 28 degrees centigrade, not in an operating and not under anesthesia, aren't they unconscious?

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A. I -- I would guess so. You'll have to give me a specific situation You mean like falling in Lake Erie in December'!
Q. Yeah. Any way they could get that way Maybe falling down in the snow. If you know, I mean.
A, I guess I don't understand where you're going with conscious, unconscious I thought we were talking about coagulation
Q Bo you think that 34 degrees centigrade in an anesthetized patient would increase the risk of DIC developing?
A I wouldn't think so, no. Cardiothoracic patients are commonly -- they commonly undergo surgery below that
Q. Arid do they develop DIC sometimes from that?
A Not -- Not from the hypothermia per se, but from everything else that's going on with the case including tissue thromboplastins. But the hypothermia is commonly felt to be a contributing factor.
Q Can I see the notes that you've been referring to, Doctor'! This is your analysis of the anesthesia record that I'm looking at now?

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A It was an attempt to summarize what was going on during the case as I was reading through the record.
Q What is the significance of the glucose level at 7:20 of 230?
A. That doesn't have any meaning to me one way or the other.
Q. You don't have any idea or theory about what caused that to be elevated?
A I think it's unremarkable.
Q Back at 6:49, the laboratory tests, the platelet count is 173. Was there any significance to that?
A Can I have my notes back'!
Q Sure.
A That's lower than what she started with, but still within the range of normal.
Q What about fibrinogen? It's 154,
A, That's low, but still above a level of 100 to 150, which is the lower range where you might want to intervene
Q And what's causing that?
A. I think in part dilution and in part consumption.
Q. What was causing the hemoglobin and

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hematocrit to drop?
A Blood loss, dilution,
Q And was the proTime also falling?
A. At what time?
Q 6:49.
A, Not as far as I'm concerned. The proTime was 12.1. That's absolutely normal.
Q. How about the PT?
A. The PTT of 27 seconds is absolutely normal.
Q. And (here was a -- I think a base excess of negative six at that time, Does that mean anything at all in the picture of this patient's clinical condition?
A, I don't get that until 7:30.
Q. 7:19 -- 7:20. I'm sorry.
MR. BONEZZI: Yes.
A. Right, but the --
Q. That's when you say --
A. The other value --
Q. -- the DIC was in the process of becoming fulminant?
A. That's when I see the first evidence that this patient was developing DIC. At the earlier values you had quoted me were from sometime earlier.

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Q. Yes, the --
A. 6:45.
Q. -- 6:49.
A. Right.
Q. And what should have been done in response from a hematological viewpoint to these changes in the laboratory findings from 6:49 through the 7:20 figures?
A. The hematologic figures were unremarkable. The proTime, PTT were absolutely within the normal range as was the platelet count. The fibrinogen was a tad low.
Q. How about at 7:20?
A. Well, at 7:20 I have a blood gas and that's all I have.
Q. A base excess of minus six?
A. Yes. That's why I think that around 7:30 or shortly thereafter this patient was developing DIC.
Q. Not before?
A. No.
Q. So, at 7:20 was she developing DIC?
A. I think there's evidence of a mild acidemia that by 2015 had become worse.
Q. What about the hemoglobin and hematocrit

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at 7:20?
A. The hematocrit 24 percent is commonly seen perioperatively in patients with blood loss,
Q. And the calcium ion at 7:20?
A. The -- I have that as low. 0.64.
Q. And why was that?
A. I don't know. hut it could have been from the citrate load from the plasma that was given
Q. What plasma wits given?
A I have three units of plasnia had been given up tu that point and around that time, although it's difficult for me to say, another three units of platelets were given, which is a platelet, a plasma rich product. So, this patient received well in excess of a liter of plasma. possibly explaining the hypocalcemia.
Q. is there anything else that could have caused these changes that we're talking about from 6:49 through 7:20, these laboratory -- some abnormalities that we've talked about?
A. Well, again, the only thing that I have here is the blood gas and, so, based on the subsequent blood gases, my interpretation of this record is that she was developing DIC on or around 7:30 and it's obvious thereafter that the worsening

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of the blood gases were related to the DIC.
Q. Well, what treatment at 7:20 when this DIC is developing, as you put it, is necessary to reverse this procedure or does everybody die from this?
A. I think it's a terrible situation to be in. DIC is a devastating complication and I think treatment is overall pretty futile and I think there is a high mortality. I mean, some things you do you never catch up.
Q What is the treatment, fresh frozen plasma?
A Fluid resuscitation, blood, plasma, platelets.
Q Cryoprecipitate?
A. If necessary.
Q. What do you mean if necessary? What makes it necessary?
A It's something you throw irk as a source of fibrinogen in addition to the plasma you're giving.
Q. The DIC, what was the hemorrhaging that it caused prior to the time this patient arrested, the additional 2,400 milliliters?
A You're referring to the period between

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18:15 and 20:15?
Q. **Yeah.**
A What is the question again, please?
Q Is that -- Was **that** blood loss caused by the DIC?
A Well, I don't **know** what the blood loss was as of 7:30, but I think from 7:30 on or eight o'clock on, all of that blood loss was directly related to the DIC, yes.
Q Arid what -- what do you say the mortality rate is in DIC?
A I think it's in excess of 50 percent, but it depends on the situation, but I think in some -- in some settings it's upward of 90 percent. Generally I think most people would acknowledge that for whatever the reason, if the patient's in DIC, the mortality is in excess of 50 percent,
Q What are the laboratory **tests** that are diagnostic of DIC, split products and things of that nature? Are there -- Are there some things that you can prove that DIC **existed by having** certain **tests**?
A. You can do that, but they're all laboratory based and it takes **a** long time to do some of those, so in retrospect it helps you understand what was going on with the patient, but they're not

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very useful in terms of managing the patient at the time because it **takes** too long **to** get them back,
Q. Well. was anything like that done, I mean, here, any of these tests done here?
A. I didn't see any evidence that there was and I'm not **surprised** because they're generally not that useful. There's little time to wait around for those tests.
Q. Are there any *of* your publications or presentations that deal specifically with your opinions in this case?
A, I have written on DIC in the past. I've written a lot about orthopedic surgery, so I'm basing my opinions on my experience, general knowledge, a lot of what -- a lot of which I have published, yes,
Q. What specific publications are you talking about?
A. I'd have to refer to my C.V.
Q. That's okay. You can do that,
A. The Management of DIC is in one of the standard textbooks, Principles of Transfusion Medicine. It's number seven under my invited publications. That would be on or around Page 16 or so.

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Q. Limitations in Procuring Adequate Autologous Blood?
A. No, no. Invited publications, Page 16.
Q. I've got Page 16 here.
A. Can I see what you have?
Q. Okay. Maybe we've got two different --
A. This is pretty out of date.
Q. Oh.
A. May of '95.
Q. Well, that's the one I just got *a* week ago.
A. so --
Q. Do you have an up-to-date otic?
A. I do.
Q. Okay.
A, You can have this if you **like,**
Q. Okay, good. Just I'll take this.
MR. BONEZZI: Let me see that. Did I give this to you?
MR. LANCIONE: Yes,
MR. BONEZZI: I apologize.
A. So, number seven is the one I'm referring to. That would be the first edition of that **textbook** and I've -- there's been **a** second edition which I'm looking for now.

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(Questions by Mr. Lancione)
Q. I have some marked in mine. Maybe I have that. Let me see. Second edition, is that what you're **talking** about?
A. Uh-huh.
Q. I've got number. 56. but maybe that's --
A, That's not quite what I had, **but** I'm sure it's around there somewhere.
Q. Williams and Wilkins, Management of DIC, Principles of Transfusion Medicine, Second Edition?
A. Yes.
Q. Okay.
A. That's it.
Q. All right. You've also written on Informed Consent Regarding to Transfusion.
A. *Yes.*
Q. What is the standard for informed consent?
A. Well, the medical legal standard is to have a discussion with the patient about the potential risks and the potential benefits of blood, alternatives to blood if it's appropriate, possible alternatives, an opportunity to answer questions and some kind *of* an indication that consent was given.
Q. *A* discussion of risks?

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A, Yes, the relative risks and benefits of blood.
Q. What about discussing DIC?
A. That is usually -- I mean, to the extent it's addressed would be part of the discussion of (fie surgical aspects of the case.
Q. So, that's the responsibility of the surgeon to talk about the risk of DIC?
A. I --
MR HONE ~ objection. Go ahead and answer,
A. In my opinion, there is no responsibility to talk about remote -- rare to remote risks. I think the patient has to have an understanding from the surgeon and anesthesiologist that they may die from the surgcry and the complications related to surgery that may result in that, but to go through a laundry list of complications including DIC would probably tax any surgeon, anesthesiologist or patient.
Q. So, that risk is so remote that it wouldn't be something that the surgeon or the anesthesiologist should discuss with a patient in a case like this?
A. I think it's a rare complication. If you

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want to term it remote, you can do that. But it seems to me that very rare events can he encompassed under the general theme that complex surgery is substantial, you don't do it lightly, and patients can have complications that can lead to death, and I think that covet's a lot of very rare complications.
Q. What could have been done in this case to prevent her death then'!
A, I think they did the best they could under extraordinary circumstances. I think the DIC was a devastating complication and I think they did everything they could in terms of fluid resuscitation and transfusion medicine.
Q So, essentially you're saying nothing that anyone could have done in this case could have saved her life?
A, Not in my opinion.
Q What clinical manifestations would have occurred prior to this sudden cardiac arrest that occurred at about 9:15? What would the surgeons or the anesthesiologist have noticed, just suddenly the patient has a cardiac arrest?
A. Well, I have that the arrest occurred around 21:00; is that correct?
Q. Well, it appears here 21:15, 9:15.

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A Isn't that 10:15?
MR. BONEZZI: Twenty-one.
A Sorry. 9:15.
Q. No. it's twenty-one
A, Okay. I got you
Q. 9:15.
A. I got you. So, vour question was what were the clinical manifestations of an impending arrest: is that your question'!
Q. Right. I mean, they're taking care of it patient and they're going along and apparently nobody suspects anything and then suddenly the patient has a cardiac arrest,
A. I don't get that impression at all. I think that the blood gas at 20; 15 was an abnormal blood gas. 1 think that they did understand that there was a problem.
Q. So, you're saying that even if they had an extra line in and they could have gotten more crystalloids and more colloids and more fresh frozen plasnia and more red cells to replace her blood, it still wouldn't have done any good?
A. That's not what I'm saying at all. I see evidence that they had -- venous access was not an issue. They were giving a lor of crystalloid, a lot

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of blood products after that point.
Q. After seven -- After 8:30 are you saying?
A. Well, all the way through and even after they recognized there was a clinical problem, I see lots of notations. I see a iiter of lactated Ringers. I see a second liter of lactated Ringers being given simultaneously with several units of blood around the time of that blood gas.
Q. Through the two 16-gauge lines?
A. Correct,
Q How many units of packed red cells did they give before the cardiac arrest?
A. Well, my interpretation of the record is that she received 13 units of red cells, three units of plasma, and three units of platelets before the cardiac arrest and then after that they note at the final summary of the case, for example, she received a total of 30 units of red cells. So, between 7:30 and the cardiac arrest or even after that, 7:30 on, she rceivcd 17 units of red cells, for example, subtracting 13 from 30. Seventeen units of red cells. She received what looks like mother two liters of plasma and another three units of platelets along with a substantial amount of crystalloid and colloid.

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Q If there were less than 13 units of packed red cells released from the blood bank prior to her arrest, then we can conclude that they couldn't have been given, 13 couldn't have been given if there were less than 13 released from the records; is that correct?

A. I'd have to review those records with you, You certainly can't give blood if it's not been sent from the blood bank.

Q. Okay. Wax the autopsy significant to you at all with respect to your opinions?

A No.

Q. What products are given to replace factors and electrolytes both'!

A. Crystalloid is given to replace electrolytes. It depends on the nature of the blood loss, the pace of the blood loss, and the amount of blood loss as to whether you choose to replace clotting factors or not.

Q. Well, are there not a lot of clotting factors in fresh frozen plasma?

A. Yes.

Q What hemodynamic monitoring was going on during his surgery; do you know'!

A. I am not an expert in that area. I know

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that they had an arterial line in. I know that they were monitoring vital signs.

Q. Were they monitoring the pulmonary artery pressure'?

A. No,

Q. They didn't have a Swan-Ganz line in'!

A. No,

Q. Would that have helped them discover that DIC was occurring earlier?

A, Not in MY opinion, My view of the field is that Swan-Ganz catheters are more problems than they are benefit.

Q. Is potassium excreted in the urine?

A. It can be.

Q. Okay. I think that's all I have.

MR. BONEZZI: We'll read.

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LAWRENCE T. GOODNOUGH

STATE OF MISSOURI)
) SS
COUNTY OF)

Subscribed and sworn to before me this day of , 1999.

NOTARY PUBLIC:

My Commission Expires:

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STATE OF MISSOURI)
) SS
COUNTY OF ST. LOUIS)

I, SARA ALICE MASUGA, a Notary Public in and for the County of St. Louis, State of Missouri, DO HEREBY CERTIFY that pursuant to agreement between counsel there appeared before me on March 15, 1999, at the Holiday Inn, 4505 Woodson Road, St. Louis, Missouri, DR. LAWRENCE T. GOODNOUGH, who was first duly sworn by me to testify the whole truth of his knowledge touching upon the matter in controversy aforesaid so far as he should be interrogated concerning the same; that he was examined and his examination was taken down in shorthand by me and afterwards transcribed upon the computer, and signed by the deponent, his signature having been reserved by agreement of counsel, and said deposition is herewith returned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal this 19th day of March, 1999.

Notary Public - CSR No. 084-002993
My Commission Expires January 28, 2000