**EXCERPTS FROM DIRECTAND CROSS-EXAMINATION OF STATE’S CONSULTING PATHOLOGIST REGARDING OPINION AS TO CAUSE OF DEATH**

**IN CHILD HOMICIDE CASE**

**DIRECT EXAMINATION**

**By Prosecutor:**

**Q.** Would you please state your full name and spell your last name for the record.

**A.** J.B.B.

**Q.** And what is your business address please?

**A.** Children’s…Hospital.

**Q.** What is your occupation?

**A.** I am the director of the laboratories at the Orthopedic Hospital.

**Q.** Could you initially give us a sketch of your medical background and training?

**A.** Yes. I graduated from…

**Q.** Have you had occasion to publish articles and books in your field?

**A.** Yes, I have. I have co-authored three books. I have not counted the articles recently, but something in excess of seventy scientific articles have been published.

**Q.** On what subject matter?

**A.** Several subjects. Particularly research interests which have had to do with the general subject of sudden death in infants. I have also had a considerable number of publications in the area of tumors in school, and a variety of birth defects.

**Q.** Have you had occasion to speak at universities in other states?

**A.** Yes, I have. I have been fortunate enough to be invited as the guest speaker to a number of countries….

**Q.** What various medical societies do you belong to?

**A.** A number of conventional medical societies….

**Q.** Have you had occasion to have experiences in the area of forensic pathology, that is pathology as it applies to the court?

**A.** Yes. During my five years….

**Q.** Have you done research or published articles in the area of pathology as it relates to childhood abuse?

**A.** Yes. A number of my publications on sudden death in infancy and in childhood have touched on the area of childhood abuse. I have not specifically authored an article with that title.

**Q.** Have you previously testified in court in both…County in this state and in other states?

**A.** Yes. I have testified in all three locations in cases of childhood abuse or suspected or questioned child abuse, I would guess, two dozen times.

**Q.** Can you give an estimate, and I realize it may be difficult, on the number of autopsies that you have performed, or have been performed under your direction?

**A.** I have not kept an exact log, but a conservative estimate would be in excess of 4000 total autopsies of which over 2500 concerned infants and children. Now, these are the examinations I have done personally. It doesn’t include those that I have supervised, which would double or triple that number.

**Q.** As the head of pathology at the Children’s…Hospital, and director of pathology, are you involved in performing autopsies on an everyday basis?

**A.** Yes, I am.

**Q.** Were you consulted by…County, by the medical examiner, Dr. R., regarding the death of a child by the name of J.J.?

**A.** Yes, I was. I have not kept an exact record, but sometime, I believe, within a week or two after the initial autopsy examination, Dr. R. requested my consultation in this case.

**Q.** In consulting with Dr. R., what materials, and to prepare for consulting with Dr. R., what materials related to this case did you examine?

**A.** The most immediately relevant was a copy of his original autopsy description, the original microscopic sections which he had caused to be prepared from this case, and the photographs that were taken prior to and during the autopsy examination of this child. I also had the opportunity to review the clinical records from the two hospitals involved, in the context of this case.

**Q.** And you also had an opportunity to examine the stairs that are depicted in State’s Exhibit 7?

**A.** That is correct.

**Q.** Based upon your examination of the autopsy report, the examination of the microscopic slides, and the records from both of the hospitals, and that photograph, did you form an opinion, to a reasonable medical certainty, as to the cause of death of this child?

**A.** Yes, I did.

**Q.** And what was that opinion? What is that opinion?

**A.** That the death was occasioned by more than one episode of very severe injury to the abdomen. The latter episode led to a period of slow leakage of blood into the abdominal cavity, and clinical shock, which ended up with the cardiac arrest, and after vigorous efforts to resuscitate that cardiac arrest, irreversible brain anoxia occurred as a result of the period of absent circulation, and the preceding period of shock, and this in turn was the final event in the life of this child.

**Q.** You referred to the episode as more than one episode of blunt trauma. What do you mean? What is basically your definition? How are you using the term “episode”?

**A.** I am referring to that fact that the autopsy examination, both the initial naked eye examination and the microscopic sections presented from the tissues of this case, reveal not only multiple significant injuries to the intestines, the mesentery of the intestines, and two points on the surface of the liver, but also revealed evidences of scarring in some of those same areas indicating that a prior episode of similar nature has occurred in some of those same areas. Now, there is not a whole range of time intervals represented in these, the microscopic evidence of old damage. All the areas thus sampled appear to be similarly old, and the multiple areas of recent damage appear to be similarly recent without any direct evidence in the abdomen of intermediate stages of injury.

**Q.** When you refer to the evidence of old damage from the death of the child, could you indicate approximately how old those older injuries appear to you to be?

**A.** Well, this is somewhat complicated by the fact that the tissues of infants and children heal more rapidly, and the scar tissue forms earlier in infants and children than it does usually in the average adult. I would put a lower time range of ten to twelve days on the age of the older lesions and upper time range which goes on for months, and that at any point in that time range that previous episode could have occurred.

**Q.** You examined the tissues, from the older scar, is that correct?

**A.** That is correct.

**Q.** Now, the scarring, or what we keep referring to as the older injury in this case, does that scar leave that area more vulnerable to injury?

**A.** It depends on some factors. One is the age of the scar tissue. Mature scar tissue makes organs or tissue tougher than they were before. Apparently the good Lord designed scar tissue to do just that, to achieve just that, and to make the tissue tougher and more resistant to subsequent injury. There is a time in the development of scar tissue early on before it has become dense, and full of fibers, when there are numerous small blood vessels there in that younger scar tissue when it is easily damaged. The scar tissue in this case had passed beyond that early vulnerable stage, and it was in the more mature and resistant stage. There is a complicating factor, however, in that sometimes scar tissue can make adjacent structures bind together so that if one structure is separated from another it may tear apart rather than simply fall apart as it would if that scar tissue weren’t present. If, for instance, I had two loops of intestinal tract bound together by scar tissue, it could make those two loops more susceptible to subsequent injury by providing a fixation point against which a tear could occur, but because of the great protective mechanism of the abdomen, because of its flexibility and pliability, and the fact that the organs lie loosely within the cavity, and are easily moved about, the result of scar tissue can increase the vulnerability of tissue to subsequent damage. So, my answer to your question is a complicated one, but in general scar tissue makes organs more resistant to subsequent injury. Under specific circumstances, they can sometimes make it more susceptible.

**Q.** I would like to talk just a moment about the injuries that you observed in this particular case, starting with the injury to the mesentery and the bowel.

(State’s Exhibit #17 marked for identification)

**Q.** Dr. B., showing you what has been marked for identification as State’s Exhibit 17, could you indicate what that is?

**A.** Yes. This is a drawing of a portion of the intestinal tract, showing both a portion of the large intestine, and a portion of the small intestine, with the mesentery and blood vessels serving those segments of the intestine.

**Q.** Does that drawing appear to be accurate?

**A.** Yes, it does.

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**Q.** Could you state or indicate for the jury, just basically first of all, where, and perhaps using this diagram, where the bowel and the mesentery are going to be located in the body, so basically relating the drawing in #17 to the larger drawing?

**A.** The drawing you have seen before shows one of the clear markers, the appendix in the right lower corner of the abdomen. That is showing in red, and then in green, then again in red, are segments of the large intestine. Then, the drawing is incomplete. The large intestine, a segment has been taken out for illustrative purposes, then the large intestine comes down here, and the small intestine empties into the large intestine right above the appendix. This segment is taken out and it hangs down like a loop, and it is that segment which has been lifted up in this other drawing. Here is the appendix down here. It is the right lower corner of the abdomen. Here is the small intestine entering the large intestine right near the appendix. That segment which is removed from the red part, and in the original drawing, as I say, it is lifted up now and it is like looking between the leaves of a book looking in towards the spine of that open book, and you see a veil or a membrane, from which this loop is suspended, and from which this small intestine is suspended. Now, this drawing doesn’t give an idea of the true length of the intestinal tract, which we now is about twenty feet in adults, and would be perhaps five or six feet in a child of two or three years of age. I think the best way to think about the mesentery is like a Japanese fan, which has on the outer border diameter, a very large fan of say five or six feet, and at the base it is about six inches across, and the base extends from the point near the appendix where the small intestine enters upward and leftward, to a point near the lower border of the stomach, which is shown in yellow. Here in about a six-inch attachment the base of that fan exists, and from it then is this very large mesentery. Now, if you imagine this fan with a six-foot outer curvature, and attach a segment of garden hose, or sausage, or whatever you wish, in your imagination, that represents the small intestine. If you then fold that fan up, you get some approximation of the real size in the human abdomen, with multiple loops of intestine suspended by that veil. That veil contains blood vessels shown to be very prominent in this drawing. They are emphasized by virtue of their red color, and there indicated are two or three of the largest of these vessels which would be somewhere in the range of a diameter of a small lead pencil, and those vessels progressively branch and break up like the branches in a tree and become smaller as they get closer and closer to the intestinal tract. These vessels are covered by a membrane that has been cut away here to reveal them. That membrane contains fattish and fibrous tissue, quite tough, and it protects these vessels, which by the time they are out to the point where they are going to insert into the intestinal tract, are almost microscopic in size. You will note that most of these vessels run in a direction perpendicular to the bowel, and going back to our analogy of the Japanese fan, they run in the direction of the ribs of the fan, and sometimes it is possible for a tear to occur between the ribs and to be quite sizable, and not involve the major vessels at all. At other times, the tears are across those ribs, or across these vessels and the clinical significance depends entirely upon how near the root of the mesentery the attachment we are, because that will determine the size of the vessel, and thus the rapidity of the hemorrhage, and it also determines the amount of intestinal tract which loses its circulation, and the injury back here will cause the entire small intestine and a part of the large intestine to lose the circulation and to have to be sacrificed, whereas a tear out near the intestinal tract may simply remove the circulation from a half an inch or an inch of intestine.

**Q.** Does, where the injury is located, in terms of how close to the attachment, to the intestine, does that control how much bleeding you are going to have or how quickly you are going to have bleeding?

**A.** Absolutely. Of course, I have to add to that, the length of the tear is also important. A tear which removed the entire small intestine from the mesentery would obviously bleed more than a one inch tear, yes. An extremely important determinative of the rate of hemorrhage is the size of the vessels which are involved, and therefore, how far out on the branches of the tree one has passed.

**Q.** In the tissues and slides that you examined with regard to J.J. (the victim in this case), and the photographs in the autopsy report, where were the tears in the bowel from the mesentery in this case?

**A.** They were near to the intestinal tract. In fact, at least one of them was so near that it had the effect of stripping the outer muscular coat away from the intestinal tract. This is as far out as you can get. It actually involves the ripping or tearing off of the surface coat of the small intestine. There is another tear that was nearer into the roots of the mesentery, but which didn’t involve the major blood vessels. I believe the largest tear that was found was described as three by five inches, which is quite a sizable gap in the mesentery.

**Q.** What clinically is going to happen when you get a gap like that in the mesentery in the bleeding?

**A.** Well, two things will happen. Of course, there will be a loss of blood into the abdominal cavity. The injured segment of the intestine will lose its circulation, and sometimes there is, if a segment itself is very short, there will be adequate circulation from the adjacent areas, but usually one will see damage to the intestinal wall as a by-product of this.

**Q.** What are going to be the manifestations that, say for instance, that a treating physician would pick up on when there is that kind of bleeding going on internally?

**A.** You would expect evidence of irrigation in the abdomen. These, after all, are injuries which disrupt the tissues and cause rough surfaces, and usually in this setting, there will be the perception of pain and discomfort, which will be communicated to those caring for the patient. More ominous and disturbing will be evidences as if blood loss continues and is not stopped, and there will be progressive evidence of shock, shock manifested by low blood pressure, rapid pulse, cold, clammy skin, and sometimes an alteration in consciousness.

**Q.** When you refer to the kind of alterations in consciousness, as you might see in a case of internal bleeding, would those vary from the kind of alterations in consciousness you would expect from a head injury such as concussion?

**A.** Yes. A concussion will typically be at its maximal state of development in terms of clinical obviousness immediately after the blow. If you hit something sufficiently hard on the head, and they will drop unconscious, and they will at a varying rate come out of that state of coma, and that is the end of it. With shock, on the other hand, you are not initially in a state of unconsciousness, only after the circulation to the head begins to be marginal, then the body begins to mount a number of defense mechanisms that attempts to support the blood pressure. It closes down blood vessels. The reason that the skin becomes clammy is that the blood vessels restrict. This is not important in the maintenance of life, though, so that it can take the blood and put it where it is really needed, the kidneys, and the lungs, and the head, and the brain. As these adaptive processes occur, there will be changes in the effectiveness of the circulation of blood to the head. So, you might expect to see fluctuations in consciousness. Initially no abnormality in consciousness in a shock-induced alteration of consciousness then as the shock goes into the borderline stage, you will see fluctuations, or you may see that, and finally it progresses on to the point where it is so severe that the body cannot maintain adequate blood flow to the brain, and you go into a permanent coma.

**Q.** Now, there were also injuries to the liver, is that correct?

**A.** Yes.

**Q.** That you examined. Could you indicate what the nature of those injuries were as you observed them on the slides and in the autopsy report?

**A.** There were two tears in the fibrous capsule of the liver. One of them was described as three centimeters, which is about an inch and a quarter in length, on the front surface of the left lobe of the liver. It would be in this area, this general area here. (Indicating.) The other tear was a shorter one, approximately a half to three-quarters of an inch in length and it was situated on the undersurface of the liver, and we would have to flip this surface up and look underneath the liver, and it was in a direct line with an old-fibrotic band which enters the undersurface of the liver that represents the old umbilical fetus. That band exists throughout life sort of like a violin string, if you will, that goes from the umbilical, or belly button region into the liver. If the liver is forced backwards with great violence, sometimes this violin string structure can have the effect of cleaving, or producing a tear in the immediately adjacent liver tissue, and the location of that suggests to me that that mechanism was involved in that tear on the undersurface.

**Q.** From your examination of the autopsy report and the tissues, and your study of the entire case, do you have an opinion whether there was more than one impact that caused these injuries we have been talking about?

**A.** I would suspect rather strongly that there was more than one impact on the anterior surface of the abdomen. There was a large number of separate, countable, recent bruises. I believe there were something like nine separate bruises described in, and documented in, the area of the right side of the abdomen. The only way to get nine bruises would be to have a single blow with an object, or some combination thereof. The majority of injuries were situated on the right side of the abdomen, both in the front, on the skin surface, and the back deep around the right kidney, so that a blow, or an impact, a force, a mechanical force, impinged on the abdominal wall, and that was associated with injury in the back of the abdomen. Those are physically separated by some distance from the laceration of the left lobe of the liver, and several discrete and separate lacerations of the small intestine were present. Again, a profile suggesting to me the likelihood of more than one blow. Now, because of the extreme mobility of the intestinal, or of the abdominal contents, it is possible to get things lined up so that a number of organs are stacked on top of one another, and a blow occurs, and they then shift around, and the fact that they were lined up one moment is no longer apparent, so that we can be misled in this situation, but I am influenced by the separateness of the bruises on the abdominal wall in concluding more than one impact occurred. And that impact was not a gentle one because, as I mentioned earlier, the abdomen has this protective mechanism of being very soft and yielding, and it is very much like a shower curtain, if you strike a shower curtain with a baseball bat, you don’t do much damage with that shower curtain, but if you were to glue it to the wall or stretch it extremely tight with a number of guy wires around it, you could easily then tear it with a very small object, just stick your finger through it, and if you hit it with a baseball bat, you would do damage to the curtain and the wall behind it. Now, to bruise the skin of the abdomen then requires that the force which impinges on the abdomen has to be of sufficient strength that it comes up against a hard surface on the deep side, the equivalent of the wall behind the shower curtain. A high abdominal injury in the area of the rib cage finds such a hard deep surface in the form of the ribs, but down below the rib cage, that blow has got to strike, or has to force the skin up against the back wall of the body with sufficient force that the blood vessels within that skin are injured, and that is beyond the realm of ordinary minor falls, or moderate fall type injuries.

**Q.** Are the injuries that you observed in the liver and the mesentery of the bowel, in this case, below the rib cage area?

**A.** Yes. The left lobe of the liver injury was, I believe, beneath the rib cage. The others, though, weren’t.

**Q.** So, they were down lower in the abdomen?

**A.** That is correct.

**Q.** Based upon your examination of the injuries in this case, and the photograph that I previously showed you, State’s Exhibit 7, depicting this stairway, in your opinion, could those injuries have been caused by a fall down those stairs?

**A.** Not at all, and I would like to explain that if I could.

**Q.** Yes.

**A.** The stairway has some specific points worth mentioning. One is that it is on a porch which is very short, it looks like maybe a six or eight foot wide porch. The stair has an incline of perhaps forty-five degrees, or perhaps a little less, it’s a relatively ordinary degree of incline. Now, if you imagine a person standing on that top step, and stumbling, and falling, they would fall downward onto the top steps, but you would only go to the bottom of that staircase. If a force, a horizontal force, is sufficient to cause the body to go forward the length of that staircase from top to bottom, if this is the top and this is the bottom, it would have to be a force capable of moving the body that distance, because gravity is bringing the body down and friction is bringing the body down on those stairs, and if you simply fall onto a staircase, unless it is extremely steep, one, you don’t continue all the way to the bottom of that staircase, you simply fall. It is possible, if you are thrown or pushed or are running at a high rate of speed, and trip at the top of the staircase, to have enough horizontal forward trajectory to be propelled all the way down this lengthy staircase, but this is a rather crowded and short porch, and I don’t see how a person could get enough velocity to project themselves all the way to the bottom.

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**Q.** Are there other considerations in viewing the staircase that lead to your conclusion?

**A.** Yes. The staircase has the typical edges, the stairs which are long, straight edges, but don’t offer any tricky, narrow projections. Now, the nature of the bruises on the abdominal skin are small as though the impact was against a somewhat small object, and the striking of a larger surface like the edge of a stair, with simply the weight of a, as I recall, twenty-seven pound body, is in no way sufficient to cause the severe injuries that we see in the abdomen of this little boy.

**Q.** Does the fact that there were the old evidence of scarring, does that affect your opinion?

**A.** It suggests to me that whatever led to the final episode was sustained by this child on some previous occasion and that a very similar mechanism was employed.

**Q.** Does it lead you to believe that those areas were any more vulnerable such that a fall as described down the stair could simply be a matter of aggravating an old injury, old scar tissue?

**A.** No. The amount of shearing force involved in separating the muscle coat of the small intestine, of producing tears of the size we have here, in the flexible situation of the intestinal tract, are inconsistent with that hypothesis. The simple development of bruises on the abdominal wall is, as I have attempted to point out, a very dramatic event because it is difficult to produce, and that had nothing to do with the scarring, and finally, there were injured areas in the microscopic inspection apart from the scarred areas.

**Q.** So, there were current injuries where there was not old injury?

**A.** Correct.

**Q.** Are you able to estimate, to a reasonable medical certainty, the time of the infliction of these current injuries, with relation to the death of the child?

**A.** Yes. The magnitude of the whole injuries in the mesentery and intestinal wall, and the outer surface of the liver, is such that in the normal course of events, there will be a healing process, and the first stage, which is inflammation, and if the injury has been sustained as long as eighteen hours prior to death, I would expect to see more than the very slight degree of inflammation related to those recent injuries that was available under the microscopic sections I examined. On the other hand, there was a little bit of inflammatory reaction, and something like eight to twelve hours are usually required before one sees that. So, I would put the bracket at the low end of somewhere around eight hours, and I wouldn’t want to be pinned to the minute on this, somewhere around eight hours, and the high end at somewhere around eighteen hours.

**Q.** So, eight to eighteen hours before the actual death of the child would have been when you would estimate the injury would have been incurred?

**A.** Yes.

**Q.** Are you familiar with the hematocrit?

**A.** Yes.

**Q.** Could you, first of all, initially explain, since we are all new to these terms, what a hematocrit is?

**A.** The blood is, I am sure you all know, is composed of cells suspended in a fluid, and one simply puts a blood specimen in a centrifuge and spins it down and the cells settle to the bottom, and they can be determined to occupy then a specific volume of the original fluid. In the usual situation, it is about forty percent of the volume of blood samples of a healthy person that will be composed of red blood cells. In anemia, the hematocrit will be lower, and in an uncommon disease where there are too many red blood cells, that will be higher.

**Q.** What is the normal range of hematocrit for a child of approximately two years of age?

**A.** Well, I don’t keep tables of the normal values in my head, unfortunately, but approximately forty would be the middle value, with a range of about five above and below that figure. So, somewhere in the range of thirty-five to forty-five would be my estimate of a normal value for a child in that age range.

**Q.** Is it somewhat lower for children than it is for adults?

**A.** Well, it depends on the age of the child. At this age, it would be roughly the same as for an adult.

**Q.** And what would be the significance of a dropping hematocrit or of a lowering hematocrit?

**A.** That means that the red cell volume, red blood cell volume has been lost either by hemorrhage, or another way that can happen is by diluting the blood by adding fluid to it which can also drop the hematocrit, which is, after all, a percentage of a volume occupied by cells. If you increase the fluid, the percentage drops even though the red cells are constant, the red cells drop, and the fluid drops with it, the percentage will remain constant. So, you have to take those numbers and then put that in a clinical situation of what you know or perceive is going on in a patient before you can really evaluate that.

**Q.** At what point after the infliction of an injury, and the commencement of some kind of internal bleeding, how long would you expect it to be before you would start to see the hematocrit dropping?

**A.** Well, that is an extremely variable situation because you need to consider such things as how fast is it bleeding, was the patient dehydrated before it happened, and very importantly, were intravenous fluids being given after the hemorrhage. If you are giving fluid, then you will hasten the rate at which a hematocrit drop might become apparent because in the normal course of events, unassisted by intravenous fluids, it will take some hours for the body to adjust to a hemorrhage. If I were to cut a major artery from my wrist, I would have a sudden drop of blood volume, but the percentage of that blood remaining composed of blood cells wouldn’t change until the body began to shift fluid from other compartments into the blood to maintain the volume, and that might take several hours before it becomes obvious, although if I cut a very large vessel, large artery, then the changes might begin to develop quite rapidly. If intravenous fluids were being given to sustain my blood volume, less than an hour would be required to have a hematocrit change. Well, in the situation where the small blood vessels are leaking slowly, and where some degree of intravenous fluids are being given, I would expect the process to be a gradual one, and it would be difficult to put numbers on it. Again, more or less the numbers I put on the inflammatory changes, is something like eight to eighteen. That eight to something like that would be the kind of range I might expect.

**Q.** If you had, bearing in mind the injuries that you observed in this particular case, if on the morning on the 13th, approximately 2:30 in the morning on June 13th, you had a hematocrit of 37, and if at 6:30 in the morning you had a hematocrit of 32.5, would that, and given the extent of the injuries that you observed, and the infliction of that injury at sometime between ten and one o’clock in the morning of the 12th, or 13th, would that be consistent with that hematocrit reading?

**A.** Absolutely.

**Q.** Did you review the autopsy as it related to the head injuries, or the findings of the bruising to the skull?

**A.** Yes, I did.

**Q.** Would you, from the head injuries as found at the autopsy, would you expect those injuries to cause cardiac arrest in this child?

**A.** No.

**Q.** Are you familiar with cardiopulmonary resuscitation?

**A.** Yes.

**Q.** Are you familiar with the techniques that are used in applying CPR in children?

**A.** Yes, I am.

**Q.** Have you had occasion to perform autopsies on both adults and children where CPR had led to injury, or had resulted in internal injury?

**A.** I have had occasion to do autopsies on a large number of adults where CPR led to injury, particularly aged adults because of the extreme brittleness of their ribs in an aged person and their bones are fractures more easily. In young adults, and more so in a child, the rib cage is very flexible, and much like a green willow branch which bends but doesn’t break. And the majority of internal injuries we see as a result of cardiopulmonary resuscitation are the result of lacerations or tears of the inner tissues caused by the jagged broken ends of ribs or the breastbones. Since ribs and the breastbone basically can’t be broken by cardiopulmonary resuscitation in the child, injuries or lacerations to the internal organs are virtually impossible to create, and I don’t recall ever seeing such a case.

**Q.** The injuries that you observed in this case in the abdomen, in your opinion, could those injuries have been caused by vigorous CPR?

**A.** No; and I would like to amplify on that if I could. The injuries that are in the abdomen, there is no evidence of injury over the heart, or over the lungs, which are in the directional area of the CPR. There is no bruising, there are no lacerations, not even tiny hemorrhages in the area immediately beneath where any person with any rudiment of knowledge about CPR would be applying the push pressure down. A handbreadth or more away below that area is where we see the injuries, the internal injuries. So that unless the person doing the CPR knew nothing whatsoever about the human anatomy, and was producing extremely violent blows to the abdomen in an attempt to do CPR, there is no way that could have led to these changes.

**Prosecutor:** Thank you. I have no further questions at this time.

**CROSS-EXAMINATION**

**By Defense Counsel:**

**Q.** Dr. J.B.B., I want to clarify a couple of things that you testified about. As I understand your testimony about the hematocrit drop, you said that in a situation like we have here where there is a very slow bleed, a seeping type bleed, because no major vessels were damaged, it would take between eight and eighteen hours before there would be hematocrit drop, is that your testimony?

**A.** Yes, that was my testimony. I should say; what do you mean by drop? I am talking about a large drop. We are talking about a drop here which was registered at 6:30 of some unknown figure when the child was first admitted, and we know about at 2:30 it was at 37, and at 6:30 it was at 32.5. Now, I suppose that would be an intermediate drop beneath—

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**Q.** In this case, Doctor, we are dealing with a drop from 37 to 32.5, is that correct?

**A.** That is correct, yes.

**Q.** And that occurred, that drop had occurred as of about 6:30 in the morning, is that your understanding?

**A.** That is my understanding.

**Q.** From reviewing the hospital record?

**A.** Between 2:30 and 6:30 or 2:00 and 6:30, something like that, that was the time responsible for those two readings.

**Q.** That would be a substantial drop, as I understand it, although not a drastic drop?

**A.** Not a substantial drop. The range, if you took the same specimen and did two consecutive hematocrit measurements, you get a variation by two units, so a variation by five units is not an extremely large one. It is enough that it needs to be explained, but it is near the lower limits where you can say something definite is going on.

**Q.** But it is significant then to be a cause for concern, isn’t that true?

**A.** It should be. As I say, it needs to be explained when a drop of about five units occurs, it should trigger concern, yes.

**Q.** And in this case, Doctor, we don’t know how much higher the hematocrit reading may have been when the child was first admitted to the hospital, do we?

**A.** I don’t recall having seen such a figure, no.

**Q.** And in fact, according to your testimony, a normal one might have been as high as 45, is that right?

**A.** Or as low as 35, that is right.

**Q.** So, it is possible, under the facts of this case, that the drop might have been much more substantial than the two readings we have here indicate, isn’t that true?

**A.** Possibly, yes.

**Q.** And in a situation where there is any significant drop, your testimony is that the time frame from the initiation is a gradual bleeding until the drop occurred, and that is from eight to eighteen hours?

**A.** That was the context of no intravenous fluids. That was the response for a significant drop, and I did not really define significant, occurring naturally, you know, where the body is doing the adjusting of the volume rather than the physician doing the adjusting of the blood volume. So, we have, you know, really a tremendously fuzzy area here with a lot of variables.

**Q.** Then, would your testimony be impossible to say?

**A.** It is possible to put brackets on things. It is impossible to make precise statements given those numbers alone, yes.

**Q.** Doctor, in this case, the bleeding was gradual, is that your testimony?

**A.** Yes.

**Q.** And in fact the bleeding may have come to a stop at various points due to the clotting and the vascular constrictions, is that correct?

**A.** That is conceivable, yes.

**Q.** In fact, that could likely have happened in this situation, isn’t that true?

**A.** Well, I don’t feel too comfortable with the word “likely.” I would prefer to say, it could have happened. I think with the amount of tissue tearing that we observed in the abdomen, that it wouldn’t be likely, but it could happen.

**(CONTINUATION OF CROSS-EXAMINATION AFTER OVERNIGHT RECESS)**

**Q.** Dr. J.B.B., I believe you testified yesterday that you had an opportunity to review in detail all the records in this case, is that correct?

**A.** Yes, I did.

**Q.** And as a part of that review, did you examine the hospital charts from the admitting hospital regarding the infant, J.J.?

**A.** I did examine the charts. I must state that I did not read every word in the charts. I skimmed them rather rapidly, and with an emphasis on the area of specific interest and concern at the time that I was doing the review.

(Defendant’s Exhibit #18 marked for identification.)

**Q.** Specifically this morning, did you have an opportunity to review a copy of a part of that hospital record which I am handing you now and what has been marked as Defendant’s Exhibit 18?

**A.** Yes, I did.

**Q.** Would you tell the jury what that document consists of?

**A.** This consists of the nursing clinical summary for the date of June 13th, 1980, and comprising the time period between 4:15 a.m. and 10:50 a.m. on that date in the case of J.J.

**Q.** All right. What kind of information is contained in this document?

**A.** The rate of pulse and respiration, the state of the pupils of the eye, the amount of fluids that were administered intravenously, the amount of fluids that were produced in the form of urine, and the commentaries by the attending nurse, or nurses, as to what was happening to the child, or in the case of the child, on an intermittent basis, more or less minute by minute.

**Q.** Calling your attention to the third page of that document, can you tell the jury what that is?

**A.** This consists of one page from the physician’s progress record containing the admitting note dated 4:45 a.m. on the 13th…by Doctor, as I understand it, by Dr. L.

**Q.** Once again, does this third page pertain to the patient J.J.?

**A.** Yes, it does.

…………………………………………

**Q.** Doctor, do you have an opinion, based upon everything you know about this case, about what was causing the signs exhibited by J.J. when he was brought to the hospital up until about 6:00 a.m.?

**A.** Yes, I do.

**Q.** And your opinion is that that child was suffering from shock, isn’t that true?

**A.** That is correct.

**Q.** And that is the most likely diagnosis, isn’t that true?

**A.** Yes.

**Q.** Should any reasonable competent physician have been capable to diagnose that?

**A.** It is always difficult to be in somebody else’s shoes. I would say that from my knowledge of the case it would suggest that a reasonably competent physician should have suspected the presence of shock.

**Q.** Once again, we are talking about a period from the time of admission until about 6:00 a.m.?

**A.** That is correct.

**Q.** Doctor, you testified regarding some stairs yesterday. How familiar are you with the stairs involved in this case? Have you gone out and viewed those?

**A.** No, I have not.

**Q.** Do you know what the vertical height of the stairs is?

**A.** No, except to the extent that one can estimate from a photograph and give some frame of reference, but other than examining the photographs which we saw in the courtroom yesterday, I have no specific knowledge or measurement of those stairs.

**Q.** Do you know how many steps there were from your own recollection?

**A.** Eight or nine is my recollection.

**Q.** Do you know the width of those steps?

**A.** Not from my recollection. Somewhere in the range of ten inches, I would recall, but I certainly could modify that if I were given a chance to review the photograph.

**Q.** But you are guessing from the photograph, are you not?

**A.** I am guessing from my recollection of the photograph during which time that question didn’t come up.

**Q.** So you don’t know the height of the stairs either, do you, with any preciseness?

**A.** Again, not with any preciseness.

**Q.** Have you ever felt the texture of the stairs with your fingers?

**A.** No.

…………………………………………….

**Q.** How many experiments have you performed, Doctor, on children falling down stairs?

**A.** None.

**Q.** What knowledge do you have of any experiments that have been conducted regarding children falling down stairs?

**A.** None in terms of children.

**Defense Counsel:** I have no further questions.

**REDIRECT EXAMINATION**

**By Prosecutor:**

**Q.** Dr. J.B.B., I believe yesterday afternoon we were discussing once again the hematocrit in this case, and your indication was that the drop from 37 to 32.5 you would not consider a significant drop, is that correct?

**A.** No. I would consider that a significant—it is not a—it is a genuine drop. It is not of a high order of significance, but it is of some significance.

**Q.** It is something, as a clinician, that you would pay attention to?

**A.** Yes.

**Q.** At what point does it have to drop before a person is in serious difficulty?

**A.** Well, that is a very difficult question to answer because the adequacy of circulation is critical to the significance of a given hematocrit as is the adequacy of respiration, given an ideal blood pressure, or a capability to increase blood pressure, above normal to compensate for a reduced oxygen carrying capacity of the blood. Given an ideal set of lungs, an individual can maintain life with a hematocrit of 5, but if the ability to oxygenate the blood, or to circulate that blood to the vital organs is reduced, then the level which the hematocrit is critical to life would be correspondingly higher.

**Q.** Is it not unusual, is it, to see a hematocrit down in the high tens and low twenties?

………………………………………

**A.** In the hospital we see situations like that very often.

**Q.** With a drop within a short period of time from 37 to 27, within a matter of a couple of hours, would that be a significant drop?

**A.** It would be significant to the extent that it would require an explanation. There are circumstances where the significance would be very little. For instance, a dehydrated child who was previously anemic, then was given a large amount of intravenous fluid to overcome the dehydration, would have a drop of that magnitude, and one wouldn’t be concerned about that. It would be easily explained by the circumstances but certainly any drop of ten points in a hematocrit would be a finding requiring explanation.

**Q.** I believe you indicated that the I.V. and interjection of fluid into the system, would have an effect on how quickly the hematocrit might drop, where there was in fact internal bleeding?

**A.** That is correct.

**Q.** And could you indicate again for the jury why the interaction of intravenous fluid would be important?

**A.** The basic principle we are talking about here is that if you could imagine a fluid, let’s take juice for example, it occurs to any syrup in a pitcher, and if you pour some syrup out of that pitcher, that is more or less what happens in a rapid hemorrhage, you pour blood out of the vascular system, and in the case of blood, the circulation will think and operate to restore the original volume of the body, and the body perceives any decrease in blood volume as very important and potentially catastrophic unless the body is aided by a physician to attempt to shift the fluid from the less critical part of the body into the blood compartments. That would be like if we poured a half of the syrup out of a pitcher, then poured water back in from some source to dilute that syrup. In the case of adding intravenous fluid, you are taking over a job and helping the body to achieve that goal more rapidly, instead of having to rob the fluid from another body compartment. And to rebuild the blood, you pour this fluid into the blood vessels of the patient and the diluting of the syrup from the pitcher then occurs more rapidly, and just as the sweetness of the syrup would go down, so the amount of red blood cells in the blood system goes down by this dilutional process, and the intravenous fluid, and the rate which it is given will determine the rapidity with which the dilution occurs, and this dilution is another way of expressing the drop in the hematocrit The red blood cells are being diluted by a smaller total amount, and the total amount of red blood cells are not available because they have been hemorrhages out of the vessels, and now they are being diluted now over a larger blood volume. That is what we are saying when we say the hematocrit is dropping.

**Q.** I believe that you indicated to defense counsel and myself this morning that you would like to revise the more normal range of a hematocrit for a child of this age?

**A.** Yes.

**Q.** After consulting some periodical?

**A.** Yes. As I indicated yesterday, I don’t carry a large number of tables of normal volume in my head, so I did take the opportunity at the recess in court here to refresh my memory as to the normal values, and in our hospital, at this age, the normal volume would be 36 plus or minus 5. I indicated yesterday it would be 40 plus or minus 5, which means then that in a normal child in the two to three year age range, one would expect to see a range between 31 and 41 rather than 35 and 45 as I indicated yesterday, with 36 being the average.

**Q.** Okay. Now, on to a somewhat different area. We have been talking yesterday about clotting, and the fact that internal hemorrhaging can result in clots, which can then—and it being under certain circumstances. What I would like to ask you is whether or not this clotting of the blood from a hemorrhage is going to affect the rate of inflammation in the tissues?

**A.** No, it is not.

**Q.** So, that the rate of inflammation, or the amount of inflammation you see at the time of death is a fairly accurate indicator of the time that bleeding commences, is that correct?

**A.** It is an indicator of the time that the injury to tissues commences. And the reason that the clotting does not affect the inflammatory rate is that the white blood cells immediately move from inside the blood vessels to the outside of the blood vessels and migrate on their own power to the area of inflammation. Clotting closes off blood vessels, but the white blood cells can overcome that fact by getting to the scene of the injury under their own power.

**Q.** And they go there to perform a healing kind of process?

**A.** That is correct.

**Q.** Now, one final question. Is it possible to determine how quickly you are going to see shock, a person go into shock, from the point in time of an injury, or from the point in time of the commencement of bleeding, can you say how soon you are going to see shock?

**A.** It is extremely difficult until one has available very accurate information as to the exact size of the blood vessel injury. For instance, I know that there was a defect of one square centimeter in the major blood vessel coming out of the heart, and I know the blood pressure, it would be possible for me to do a calculation of how many cubic centimeters of blood would be lost per second, and therefore to make a very accurate assessment of how rapidly the patient would go into shock, because we know the original blood volume, and we know about how much blood volume could be lost, but in the circumstances such as we are talking about here, with injuries to the mesentery involving a myriad of small vessels of varying small size, there is no way for me to even guess at a cross sectional involved, and the blood pressure showed fluctuations during the course of this patient’s hospital period, which would also influence the rate with which the blood is forced out of the vessel. So, this long answer basically comes down to, no, it is not possible to be extremely precise about this question.

**Q.** Based upon the injuries that you saw, and in your examination of the autopsy and the examination of the tissue, and the records that you looked at in this case, with a child exhibiting at least some, or conflicting signs of shock, at say 2:00 in the morning, is that inconsistent with an injury occurring at midnight or 1:00 in that same morning?

**A.** No. I would say it would be very consistent with that time sequence.

**Prosecutor:** Thank you. I have no further questions.

**RECROSS EXAMINATION**

**By Defense Counsel:**

**Q.** Doctor, it would be consistent with quite a few different time sequences, would it not?

**A.** Yes. I have tried to indicate there is not a precise kind of estimation that can be made.

**Q.** So, your best opinion is that you don’t know when the injury might have occurred, isn’t that true?

**A.** Various time periods carry various probabilities, and I would say that a time period in the range of two to four hours from the onset of detection, or the presence of the signs of shock, would be a very high probability situation, but with the decreasing level of probabilities, the time scale could be carried backwards for quite a number of hours.

**Q.** Up to eighteen hours, couldn’t it?

**A.** I think in certainty, yes, I think yes, conservatively it could go out that far, it probably decreasing with each hour beyond that two to four hour range.

**Q.** And such factors as blood clotting and vascular constriction would slow down a person’s symptoms and signs of shock?

**A.** That is correct.

**Q.** In this case, the blood vessels rupture were of a small nature, isn’t that right?

**A.** Yes, small in the sense of small as perceived by the naked eye, yes.

**Q.** And those might very well have clotted or have constricted, to slow down the bleeding, isn’t that true?

**A.** They could have, yes.

**Q.** Is it much more likely that the small blood vessels will clot quicker than the larger ones, isn’t that true?

**A.** Well, it depends on the time frame, but certainly the large vessels are certainly a plus. The muscular artery is more likely to constrict than the big elastic vessel, the major vessels coming out of the heart, but I know of no evidence that a vessel the size of a pencil lead will constrict more actively than one two or three times the size of a pencil lead. For instance, I know of no evidence within that kind of a size range that the smaller ones would constrict or clot off more easily than the larger ones within that medium size range.

**Q.** Isn’t it true that blood clots can form more effectively in the small vessels than in the large blood vessels?

**A.** Well, again that depends on the definition of small and large.

**Q.** We are dealing here with all the blood vessels that were ruptured, isn’t that true?

**A.** They are more likely to form effectively in a blood vessel the size of a pencil lead than one-half an inch in diameter, yes.

**Q.** Now, the prosecutor asked you about the normal hematocrit reading for a child of this age, and you checked your figure. Now, you are saying that the normal range is 31 to 41, but isn’t it true that the change in hematocrit is what is critical in diagnosing some internal problem with a child rather than the absolute value?

**A.** That is true.

**Q.** And a drop in hematocrit, you want to pay close attention to that rather than any one value?

**A.** That is correct.

**Q.** And in fact, in this case, we had a significant drop in the hematocrit, isn’t that true?

**A.** Yes.

**Defense Counsel:** I have no further questions.

**REDIRECT EXAMINATION**

**By Prosecutor:**

**Q.** Dr. J.B.B., just to clarify something. I believe we went over this yesterday, but given a hematocrit at 2:30 in the morning of 37 and a hematocrit of 32.5 at 6:30 in the morning, and the I.V. fluid in between, are those hematocrits inconsistent with an injury having occurred sometime between ten and one o’clock in that same morning?

**A.** Absolutely consistent.