The Heart of the Matter:

CFS & Cardiac Issues

Part 1b

(current as of 04/02/05)

by Carol Sieverling

Continue to Part 2a

Go to part 2b

Go to part 1a

Useful Definitions

Top Priority: Blood Pressure

"Now there is one factor that I want to mention before I get into the data display. Natelson requires, as a rule, before you're allowed into his medical school for study (whether it's this particular study or any other study) that you consider coming off of all medications and all nutraceuticals or he may not see you. Furthermore, his team is not treatment oriented."

Patient responds: "Well, I certainly wouldn't agree to do that. I'd be a wreck."

Dr. Cheney continues: "Of course you wouldn't agree. Therefore, the data I'm about to present is not anywhere near as bad as you are." You are more severely affected than anyone in this study. I'm not sure he has patients from the truly severe end of the spectrum of CFS. Those patients don't participate in studies. Just reflect on that as I go through this.

In this study, the normal person and the non-disabled CFIDS patient pump 7 liters a minute through their heart with very little variance: 7 liters plus or minus .5. When they stand up, they drop all the way down to 5 liters per minute, a full 30% drop in output. That's normal.

"First of all, why does it go down when you stand up? Because the heart can only pump as much blood as returns to it. If you drop the return by 2 liters per minute, you will always drop the output by 2 liters per minute. The blood has to go uphill against gravity, so there's an automatic 2 liter per minute drop in return, and therefore an automatic 2 liter drop in output even though the heart is completely normal. Where does that extra 2 liters go? It's pooled in your lower extremities and capacitance vessels. Rapidly, by the way." [Capacitance vessels are the larger veins of the body where most of the blood volume is found and where regional blood volume is regulated. For a great explanation of the circulatory system, including the different types of veins and arteries and their respective functions, go to www.cvphysiology.com/Blood%20Pressure/BP019.htm.]

Why don't normal people sense that 30% drop in output? You might assume that their blood pressure would fall 30% and they'd sense it. Nevertheless, their blood pressure either stays normal or goes up when they stand. Blood pressure is so vitally important that the body compensates to prevent blood pressure from dropping.

Think about how significant blood pressure is. Physicians are allowed by law to pronounce people dead. That's a lot of power. And how do we do that? Think about the movies. They always check for a pulse—blood pressure. No pulse—you're dead. And, of course, they check to see if you're breathing. However, if you don't have a pulse and aren't breathing, you'll be pronounced dead. Doctors don't even have to check for brain activity.

Why does the law give doctors such power? Because there's never been an exception to this rule. No breath, no pulse, you're dead. No exceptions—unless you're ice cold. "It points to how important blood pressure is to the body, because blood pressure is, in fact, life. And so, your body will defend your blood pressure beyond anything else. Or, to put it another way, it will sacrifice everything—even your brain—to keep the pulse going."

Nozzles

"Now, when your Q drops 30%, your pressure will not drop, because your body will defend that pressure, even to the loss of your brain. This is critical to understanding what happens in CFIDS patients." [Let's use an analogy from gardening.] "Here's the hose attached to a spigot at the side of the house. I have the spigot turned fully counterclockwise [on] and it has maximum Q at 7 liters per minute coming out of that hose. Because it's coming out fast enough, there's enough pressure for this water to shoot out of the hose and I can water all the plants out there, all the way out to the 4th row tomato plants, 6 feet beyond this hose. So, I can sit there and water all day long providing sufficient nutrients and stuff to the plants, because I have adequate Q.

"Now let's take the knob and crank it down so that we drop it down from 7 liters to 5. That would be a normal drop on standing up. The pressure should drop at least 30% or more, but doesn't. Why?" Because, if you turn the flow down, the water can't get out to the tomato plants anymore. There's not enough pressure and it's just dribbling out, so what do I do? I take my thumb and I press it on the end to partially block it and create backpressure. That builds the pressure back up sufficiently to allow that stream of water to shoot out at sufficient velocity to water the tomato plants in the 4th row—even though I had a 30% drop in (cardiac) output. Because my thumb gets tired, I put a nozzle on the end of the hose and tighten it down so I can spray all the way out there at a low Q [pressure]. That's what a nozzle is for.

And you have a nozzle in you. It's called the end arteriole or resistance vessel. It regulates the resistance against which flow occurs to keep your pressure within normal range—despite a large fluctuation in Q produced by standing up or laying down. Because I can maintain the pressure, I can water the plants all the way out to the tomato plants in the fourth row regardless of the Q, because the pressure is maintained.

Now, let's crank it to down to 50%, taking it from 7 liters per minute, all the way down to 3.5 liters per minute. I still have the

same nozzle attached but when I drop the flow to 3.5 liters, I can't reach the tomato plants, unless I really tighten down on the nozzle. Moreover, if I tighten it all the way down just a little tiny spray spits out. Maybe only a drop or two will reach all the way out to the tomato plants. Now I'm sacrificing water perfusion of the plants in order to maintain pressure, because without blood pressure you're dead. [Perfusion: the injection of fluid into a blood vessel in order to reach an organ or tissues, usually to supply nutrients and oxygen.]

When faced with a low Q, the body sacrifices tissue perfusion in order to maintain blood pressure, and that's all you need to know to understand this concept. Microcirculation to the tissues of the body is sacrificed to maintain blood pressure so you will not die in the face of a low Q, and that is what is going on in the disabled CFIDS patient.

In Peckerman's study, the data of the disabled CFIDS patients reveals that when they are supine (laying down), their Q is 5 liters per minute. So laying down they can perfuse out to the extremities, but admittedly not as much volume gets out there as would occur at 7 [the Q of the controls and mild CFIDS patients when laying down], but there's enough volume that you are really not that badly affected.

Let's look at what happens when the disabled CFS patients stand up. They drop to 3.7 liters per minute, a 50% drop from the normal of 7, and that means they can't water the tomato plants! The tomato plants start to shrivel up and experience trouble. Big trouble! At 3.7 liters per minute, they do not have adequate Q to function. There will be a functiovnal contraction [lowering of what you are able to do] determined by the drop in Q. The lower the "Q" goes from there, the more in bed you will be, because lying down is the only time you come close to sufficient Q.

Patient asks: "So basically, the tomato plants are all the organs and tissues in the body?"

Dr. Cheney replies: "Yes!"

And those "severe" patients in the study who dropped to 3.7 liters per minute would be mild or moderately ill patients in my practice. How do I know that? I know it by virtue of their pressure changes and their heart rate changes. Look particularly at the MAP (mean arterial pressure)—MAP is the average of your systolic and diastolic pressure. If your blood pressure is 120 over 80, your MAP is 100. All groups in the study had virtually the same MAP when they stood. There is no real difference in the MAP of the controls and the patients in this paper. That's not true in my practice. My patients are virtually always lower than normal. Same for their heart rates.

Sacrificial Prioritization

Now here's an important, critical idea. The body does not sacrifice tissue perfusion equally across all organ systems. It prioritizes the order of sacrifice, and you can see the progression of your disease in this prioritization.

The heart pumps out blood to the artery and the artery produces blood pressure. It pumps down to the smallest arteriole called the resistance vessel, which we will call the nozzle. The nozzle then breaks out into a capillary bed that delivers a certain capillary pressure to the tissues. In the human body, every cell in your body is within 1 millimeter of a capillary, (except in cartilage, periosteal bone and the cornea). Then, the blood returns to the heart via the veins, the venous return.

"There are two organ systems that have a super nozzle in addition to the main nozzle. They have a super built-in nozzle—it's called the Renin Angiotension System, or RAS. It's built into two organs: the lung and the kidneys. They have the greatest nozzle in the body. They can spit water out all the way to the tomato plants with practically no Q at all; they just need a little bit. They can sustain the greatest degree of Q problems, because they have this extra fancy nozzle, the Renin Angiotension System."

Additionally, the heart and the brain also have secondary nozzles. Although not as powerful as the RAS, these secondary nozzles protect that tissue even in the face of extremely low Q. Therefore, the lung, the brain, the kidneys, and the heart are a little bit more protected than the liver, gut, muscles and skin from a drop in Q.

First Compromised: Skin and Compensatory Hypothyroidism

Having said this, in what order are things sacrificed and what are the consequences? The first is the skin. If you sacrifice the microcirculation of the skin, several problems can arise. One is that without adequate microcirculation to the skin, the body

cannot thermoregulate anymore. [Thermoregulate: regulate body temperature]

You cannot stand heat or cold, although heat will be more difficult at first than cold—in part because if you're too cold you just put on more clothes, but how do you rip your skin off when you get too hot? If your core temperature rises high enough, you will not sleep and your body will activate your immune system. In order to regulate that problem, your body will kick in thyroid regulation and you will downregulate [reduce or suppress a response to a stimulus] your thyroid to keep your temperature from going too high, and you will develop "compensatory hypothyroidism"! Now you will have trouble with cold.

The second thing your body will not be able to do is get rid of VOCs (Volatile Organic Compounds), which are shed in the skin's oil ducts. VOCs build up in the fat stores of your body and you become progressively chemically poisoned by whatever is present in your environment, and whatever you are genetically susceptible to—different things in different people. If that's pretty significant, we call that Multiple Chemical Sensitivities (MCS). If all you've got is microcirculatory deficiency of the skin, we'll call that MCS and the treatment is to put you in a sauna to outgas you—to detoxify you—which is in fact the primary treatment of MCS patients. We'll also exercise you, which is another MCS treatment.

Next Up: Muscles

If it gets worse than that, the next thing you'll sacrifice are your muscles. You'll have exercise intolerance—you can't go up stairs or climb mountains as easily. When you move your muscles, you feel like you got hit by a ten-ton truck. Very minor activity on day one produces a day two on which you say, "What did I do, it's almost like I ran a marathon."

If it gets still worse, you begin to get fibromyalgic pain. If it affects the joints, it may precipitate pyrophosphoric acid and uric acid crystals and you start to have arthralgias and myalgias linked to this microcirculatory defect. Microcirculation problems have been suggested by Fibromyalgia research in Toronto. Moldofsky tried to induce FM symptoms by interrupting the sleep of study participants and was successful with a significant number of the women. It was harder to induce clinical FM in men, and almost impossible in male athletes. It came down to microcirculation. Men had a higher capillary cross-sectional area (more capillaries) than women. Athletes have more than non-athletes. Male athletes are therefore more resistant to microcirculatory problems within the muscles, whereas sedentary women are the most vulnerable. Microcirculatory problems will be much worse for sedentary women because such problems are modified by the capillary cross-sectional area. Low cardiac output further exacerbates microcirculatory problems.

Third System Down: Liver/Gut

The next thing affected is your liver/gut. Probably the very first thing you'll notice is that there are fewer and fewer foods you can tolerate. If it gets really bad, there will be only a handful of foods you'll be able to eat—for a lot of odd reasons. In part because microcirculation is necessary for proper digestion. Also, your body won't secrete digestive juices so you won't digest your food. If you can't digest your food you'll get peptides that are only partially digested and highly immune-reactive. They'll leak out of your gut [into your bloodstream] and you'll get food allergies and/or sensitivities.

Your body will also fail to detoxify your gut ecology, so your gut will begin to poison you. That's manifested as feeling yucky and a sense of toxic malaise. You get diarrhea, constipation, flatulence, and all kinds of GI problems, including bacterial overgrowth, yeast overgrowth, parasitic overgrowth.

It's a problem because you have poor microcirculation. If it gets worse, you'll get malabsorption syndromes because the nutrients that are—by some miracle—digested, are not absorbed well because there's no microcirculation. At which point, you will begin to become increasingly toxic, which can manifest as a variety of skin disturbances, and you don't feel good, and other interesting things—particularly in the brain.

Fourth Affected: The Brain

In the brain, there's a devastating effect with respect to liver/gut dysfunction—it can quickly toxify the brain. That's perceived initially as, "I only have problems when I have to use my brain." Then it becomes a problem even when you don't use your brain that much. You have all kinds of cognitive complaints like memory disturbance and processing speed. Then

you begin to get central brain structures that can destabilize you psychiatrically. You can get hypothalamic structures that begin to destabilize you from an autonomic nervous system perspective and/or neuroendocrine response defects. [neuroendocrine: the interaction between the nervous system and the hormones of the endocrine glands] Whatever the brain does, it doesn't do it as well.

The brain and the heart probably get hit about the same time, but patients usually notice their brain being affected much earlier than their heart. That's because heart muscle cells have the greatest mitochondrial content of any tissue in the body. Thus, when mitochondria are impaired, the heart muscle has the greatest reserve and is the least vulnerable. Neurons have far less mitochondria and they run out long before the heart, especially if you're sedentary. If you're sedentary there's not too much demand on your heart, but you can still think and make great demands on your brain. Energy is energy, whether it's being used physically or cognitively. The effect on the brain is noticed first because it has less reserve, especially if you're thinking—unless you do meditation. Patients who are both sedentary and meditating regularly may actually preserve their brain longer than those who are just sedentary and use their brain a lot.

Fifth: Heart—A Two-Parter

Part A: Manifestation of Microcirculatory Impairment

The effect on the heart has an "a" part and a "b" part. "The initial manifestation of microcirculatory impairment of the heart is arrhythmia. What kind? You name it, you've got it."

"You'll also notice, again, exercise intolerance, because the heart is indeed a muscle just like your leg muscle. When you go up flights of stairs or up mountainsides, you need more cardiac output and you can't sustain it. Therefore, you're going to have trouble. As it gets worse, you'll begin to see mitral valve prolapse (MVP) because that inadequate capillary function affects the papillary muscle and results in prolapse of the mitral valve. Finally, when you get even more severe microcirculation problems, you start to get chest pain as you begin to knock off myocardial cells [heart muscle cells] because they can't get adequate oxygen."

Part B: "The Event Horizon"

"And finally you get to the 'B' part of the heart, and I'll put a line here [on one of many drawings] which I'll call the Event Horizon, after a movie I saw by that name. 'Event Horizon' is a movie in which a group of space explorers discovers a black hole. They park their space vessel outside the event horizon because if they pass that line they can't get back, and if they pass it they're drawn down into a vortex into the black hole and vanish from this universe."

"The Event Horizon with respect to the heart is this: when the microcirculation defect within the heart itself (produced by a low Q), begins to impact Q itself, you enter a vicious cycle. Microcirculation impairment reduces the Q, which produces more microcirculation impairment which produces even more Q problems, and back and forth, zigzagging into a vortex, and down you go "through the Event Horizon" to the next phase of cardiac failure, which is the lung."

Sixth System: Lung & Kidney

"Cardiac failure in the lung produces Congestive Heart Failure (CHF) and Pulmonary Edema. Then comes the kidney—because remember the kidney and lung have the super-duper RAS system. So the last to go turns out to be the kidney which has the biggest RAS system of all buried in its cells, the Renin Angiotension System. When the kidneys go, you go into renal failure, which combined with the liver, is often dubbed hepatorenal failure, and that is the requisite cause of death due to Idiopathic Cardiomyopathy." [After crossing the Event Horizon and spiraling down into Congestive Heart Failure]. I've been there and done that. I'm an expert on that particular journey. And this is the exact sequence I went through over a two—to three-year time period."

[The remainder of this article will be in the July issue of the newsletter. Alternatively, choose to go to Part 2a below.]

Continue to Part 2a

GO TO PART 2B

GO TO PART 1A

BACK TO CHENEY TOPICS

BACK TO TOP OF PAGE

BACK TO MAIN RESEARCH PAGE

BACK TO DR. CHENEY TOPICS

BACK TO TOP OF PAGE

Home • Meeting Information • Resources • Medical Information • Newsletter Archives • Who Are We? • Board of Directors & Staff Information • Help & Email • Legal Disclaimer • Fair Use Notice • Update: 04/10/05