"New Hope in Post-Polio Syndrome"

By David Perlmutter, MD

This article, by Dr. David Perlmutter, MD, was distributed by Dr. Lauro Halstead at the Post Polio Conference held Jan. 8th in Sacramento. While the final results on Human Growth Hormone are not in, the article says there have been promising results. Dr. Lauro Halstead mentioned Human Growth Factor in his talk at the Conference in Phoenix, March 18, 2000. The Editor.

From the Book: *BrainRecovery.com* by David Perlmutter, MD, Board-Certified Neurologist

Poliomyelitis, now a rarity in the United States, is a viral induced illness, which reached epidemic levels in the United States in the late 1940's to the mid-1950's. An effective vaccination program led to a dramatic decline in new cases. There are an estimated 300,000 polio survivors in the United States today – 25% of whom experience symptoms of so-called "post-polio syndrome." (1)

Post-polio syndrome is an illness in which polio survivors experience weakness in muscles previously affected by the infection. The onset of post-polio syndrome may occur any time between 10 and 40 years after recovery from the initial polio event. There is a direct relationship between the severity of post-polio syndrome and the severity of the initial polio infection. Typically, individuals who had only minor muscle weakness with their original polio infection as a rule experience only mild symptoms of post-polio syndrome. In others, often those who experienced severe weakness originally, post-polio syndrome can cause profound muscle weakness with feelings of generalized fatigue, joint and muscle pain, and continued loss of muscle bulk. (2)

The cause of post-polio syndrome has not yet been fully elucidated. It is certainly well known that a specific virus causes the original polio infection and there has been some speculation that post-polio syndrome may represent some form of reactivation of this latent virus. But as yet this has not been fully demonstrated.

Another theory relates post-polio syndrome to the normal process of nervous system aging. This theory holds that all parts of the nervous system age at a fairly constant rate, which continues throughout an individual's lifetime. The original polio infection may simply have advanced this aging process by a quantum leap.

The diagnosis of post-polio syndrome is typically made based upon a full understanding of a patient's history -- with particular emphasis on under-standing the initial event of polio - and the physical examination. It may at times be confused with other diseases characterized by progressive weakness including amyotrophic lateral sclerosis (ALS), muscular diseases like muscular dystrophy, and spinal stenosis. So various ancillary studies are often part of the evaluation. These tests include magnetic resonance e.g. (MRI) studies of the spine and brain, spinal fluid analysis (lumbar puncture), electro-myography (EMG), and nerve conduction studies. These are tests designed to exclude other conditions since there is as yet no specific definitive test available to diagnose post-polio syndrome. There has been no isolation of any virus felt to be causative in this illness nor is there any evidence that this condition is in any way contagious.

Until recently, attempts at treating post-polio syndrome have been disappointing. Studies at the National Institutes of Health (NIH) have evaluated treating post-polio patients with the immune-regulating chemical interferon, but this has proven ineffective. Steroids have been tried and these studies have likewise demonstrated no improvement. Other drugs, which have been evaluated and proven essentially useless, include pyridostigmine and amantadine. (3)

But one area of research that clearly shows promise is the use of so-called "growth factors" which are substances known to increase the branching of nerve terminals and enhance the way nerves provide information to muscles. Soon, a multi-center trial will begin to evaluate insulin-like growth factor (IGF-1) in the treatment of post-polio syndrome . But, while the use of IGF-I in post-polio syndrome seems promising, it is still very much in the experimental stage. (4)

If post-polio syndrome does indeed represent simply an advanced form of aging of the nervous system, then it would make sense to at least take a look at any pharmaceutical agent that could conceivably slow down parameters of aging. There is a medicine that can do just that, and it's called human growth hormone. Human growth hormone has been popularized as of late as a so-called "fountain of youth" drug, and that title is to some degree, fairly accurate. In the book *Grow Young with HGH* (human growth hormone), author Dr. Ronald Klatz summarizes the

various studies of human growth hormone documenting its effect in a number of measures of aging including its ability to lower blood pressure, improve kidney function, increase energy level, enhance sexual performance, increase cardiac out-put, enhance immune functions, improve cholesterol profile with higher HDL and lower LDL, increase bond strength, enhance wound healing, sharpen vision, increase memory retention, and improve sleep. (5) Indeed human growth hormone has become one of the cornerstones of treatment in various anti-aging clinics.

In early 1998, we began administering human grown hormone to patients with post-polio syndrome. The results have been nothing short of dramatic. Typically patients who have been experiencing progressive decline in muscle function have experienced not only stabilization, but also actual improvement of muscle strength. Here are reports from two of our patients suffering from post-polio syndrome who are now using human growth hormone:

T.N. is a 65 year-old-gentleman who sustained a fairly advanced case of poliomyelitis at age 22 years. He was hospitalized for 4 months spending most of that time in an "iron lung." He was then on crutches for 3 years. Thereafter, he was never able to run or go up steps without at least some difficulty and had been left with some fairly severe weakness of the left leg. As he stated: "I was steadily losing strength and had other problems until I started growth hormone injections nine months ago. My overall strength has improved for the first time in thirteen years. One thing I notice most is the ability to get up from a chair without difficulty. Before growth hormone I would sometimes have to make more than one attempt to raise to standing.

The second benefit is my stamina has increased to the point that I can get through a large airport without resting several times.

Lastly, my sleep (I have sleep apnea) has improved more than any time in forty years."

Here's another report describing the effectiveness of human growth hormone from a 60 year-old retired engineer:

Dear Dr. Perlmutter,

I am a 60 year-old male who had polio at the age of 5 that affected primarily the muscles in my legs (quadriceps) and lower back. In my teenage years due to a regimen of exercise and weight training, I maintained good mobility and strength and was able to participate in most activities normal to teenagers.

When entering my early 40's, I began to experience a great deal of leg pain and the muscles in my legs had begun to weaken. By the time of my late 40's, the weakness and pain became so significant, I went through a series of tests at Henry Ford Hospital in Michigan. It was then that I was diagnosed with post-polio syndrome.

At 50 years of age, I fully retired and moved to Florida. Although I continued with a regimen of exercise, healthy diet, and vitamin supplements, I noticed that my legs had grown progressively weaker. By the time I turned 60, in addition to the leg weakness, I also began to experience muscle wasting in my arms. Up to this point in my life, I always had good upper body strength and muscles due to the weight training, so I became very concerned and started to do a great deal of research to try to find a possible solution to this problem.

A few months ago, I read an article by Dr. Perlmutter describing the work he was doing with patients suffering from post-polio syndrome. After an extensive examination and interview, Dr. Perlmutter started me on a program using human growth hormone and nutritional supplements. After only 6 weeks using the human growth hormone the results have been startling. By the 4th week, the muscle wasting in my arms has reversed to the point that they are as good as they were when I was 40. After 6 weeks, although I still experience pain, the strength is 20% improved in my legs.

Your most grateful patient,

H.G.

Human growth hormone administration:

Human growth hormone *Humatrope(R)* is given by intramuscular injection – 2mg, 3 times each week. This dosage is slowly increased over 2-3 months to 4mg, 3 times a week. Patients should be told to watch for side effects such as ankle swelling, tingling or numbness in the first 3 fingers (carpal tunnel syndrome), or breast enlargement. These experiences are fortunately quite rare. We have found that our patients easily learn how to self-administer this medication, a technique easily learned from the treating physician or nurse.

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Antioxidants

Whether post-polio syndrome represents an accelerated aging phenomenon or a reactivation of a latent virus, the final common pathway destroying the neurons is mediated *by free radicals*. Free radicals are destructive chemicals normally found in all living systems; formed during the process of energy metabolism. It is the progressive destruction of the body's tissues and DNA by free radical activity that is responsible for the process we call aging.

Normally, our bodies successfully quench these potentially damaging free radicals almost instantaneously after they are formed. This is the job of the various antioxidants that we produce and consume. Obviously it makes sense to enhance antioxidant potential in post-polio syndrome, and any other degenerative condition for that matter.

Alpha-lipoic acid -- The discovery of the antioxidant potential of a*lpha-lipoic acid* will rank as one of the most important advances in the treatment of neurodegenerative diseases in this decade. Its usefulness in protecting the nervous system from damaging free radicals has been the subject of extensive research. Why lipoic acid has attracted so much attention centers upon at least three unique characteristics. First, more than almost any other antioxidant, lipoic acid readily crosses the blood-brain barrier becoming available to the entire central nervous system. Second, lipoic acid actually enhances the regeneration of other antioxidants in the brain including vitamins C and glutathione. Finally, lipoic acid acts as a metal chelator. That means it binds and enhances the excretion of various potentially toxic m@ which may otherwise encourage the production of free radicals.

Vitamin E -- Perhaps the most popular antioxidant worldwide, vitamin E should be included in the post-polio program since it is one of the main anti-oxidants of the nervous system. Being a fat-soluble antioxidant, vitamin E helps reduce free radicals in fat-containing tissues like the brain and peripheral nerves. Its ability to quench free radicals in the brain likely explains its profound effectiveness in slowing the progression of Alzheimer's disease and why it is advocated in Parkinson's disease as well. With many vitamins there is very little difference in quality between discounted brands and more expensive labels. Not so with vitamin E. Supermarkets and drugstores frequently carry low quality and inexpensive vitamin E products. Read the fine print. The vitamin E you want is *d-alpha tocopherol*. Don't be fooled into buying the synthetic *dl-alpha tocopherol*. It may seem like a small distinction, but there is a profound difference in the biological activities of these two products. Also, vitamin E, being oil based, should be refrigerated to preserve its potency.

Glutathione -- Also an important brain antioxidant, *glutathione* has been the subject of intense study as of late because of its critical role in brain aging. Like alpha lipoic acid, *glutathions* helps to recycle vitamins C and E, and may also enhance the activity of neuro-transmitters. These are the chemical messengers allowing neurons the ability to communicate with each other. Unfortunately, *glutathione* cannot itself be given orally since it is rapidly digested to its constituent amino acids. This explains why we administer *glutathione* intravenously as part of our protocol in the treatment of Parkinson's disease, and why *IV glutathione* may become a part of our protocol for post-polio syndrome in the future. Fortunately, there is a nutritional supplement, which has been found to significantly enhance the body's natural production of *glutathions*. It is the modified amino acid *N-acetyl cysteine* or NAC, which in addition to encouraging *glutathione* production, possesses anti-oxidant properties in its own right.

Vitamin C -- This vitamin also falls into the category of "brain antioxidants." It works in concert with Vitamin E, lipoic acid and glutathione. Its important to emphasize that the main antioxidants in the brain, vitamins C and E, glutathione, and alpha lipoic acid all work in concert, protecting against the damaging effect of free radicals in slightly different ways. Deficiencies of one or more of these agents creates a weak link in the chain, paving the way for an increased damage from free radical activity.

Vitamin D -- Like vitamin E, this important antioxidant is fat-soluble making it an ideal candidate for neurological conditions. Recent research shows that the antioxidant activity of vitamin D may exceed that of vitamin E. We are only now just beginning to recognize that vitamin D has many important roles in human physiology aside from helping to maintain bone density.

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Cellular Activation

Enhancing the metabolic activity of damaged but functional neurons is a primary goal in the treatment of post-polio syndrome. This can be accomplished with the following nutrients:

Creatine -- Visit any popular gym or fitness club and you're likely to find that *creatine monohydrate* is one of their best selling nutritional supplements. And with good reason. Studies have long demonstrated convincing evidence of the benefit of creatine supplementation in several indices of athletic performance. Because of creatine's benefit in athletes, researchers have studied its possible role in various neurological disorders. In a 1999 study published in the journal *Neurology*, Canadian researchers tested the effectiveness of creatine monohydrate in post-polio syndrome as well as several other conditions characterized by muscle weakness. The results were impressive. There was an increase in both upper and lower extremity strength, with an actual increase in muscle mass not only in the patients with post-polio syndrome, but in several other conditions as well, including muscular dystrophy, inflammatory muscle disease, and neuropathy. (6)

The study was short term – only 10 days, but our experience with long term usage of creatine demonstrates continued benefit and safety of this nutritional supplement. Typical adult dosage is 6-8 grains of creatine monohydrate each day. Individuals consuming a diet high in mean may find beneficial results from a lower dosage in the 4-5 gram per day range.

Acetyl-L-carnitine - Acting in many ways similar to creatine, acetyl-L-carnitine enhances the metabolic activity of neurons by serving as a transporter of metabolic fuels to the energy producing machinery of the cell, the mitochondria. Aside from bringing the "coal to the furnace," acetyl-L-carnitine further aids in energy production by assisting in the removal of toxic byproducts of metabolism.

Coenzyme QIO (CoQIO) - Essential for the viability of everything living, COQIO is an enzyme which facilitates the fundamental biochemical processes involved in cellular energy production. Since abnormalities of muscle cell metabolism are at the heart of post-polio syndrome, COQIO is receiving a lot of attention as an adjunct to the treatment of this disease. Danish researchers using highly sophisticated techniques to evaluate muscle cell metabolism have now demonstrated significant improvements in muscle cell energy production in the calf muscle of post-polio syndrome patients following COQIO administration. The researchers invoked three mechanisms for the beneficial action of CoQIO, including improvement in blood circulation to the affected muscles, enhanced cellular energy production, and a reduction in free radical activity. (7)

Nicotinamide Adenine Dinucleo-ide (NADH) - Like COQIO, NADH is a critical enzyme in the biochemical pathway for energy production. Having demonstrated its effectiveness in various other neurodegenerative dis-orders like Alzheimer's disease, Parkinson's disease, as well as chronic fatigue syndrome, the energy-enhancing potential of NADH secures its inclusion in the BrainRecovery.com protocol for post-polio syndrome.

BrainRecovery.com - Program for Post-Polio Syndrome Human Growth Hormone – (Humatrope®) Dosage 2mg IN4, 3 days each week increasing to 4mg IM, 3 days weekly after 2 months. Injectable Human Growth Hormone can be obtained from:

Medical Center Pharmacy
10721 Main Street
Fairfax, Virginia 22030 USA
(800) 723-7455
Fax: (800) 238-8239

Medical Compounding Center
2524 Valleydale Road, Suite #100
Birmingham, Alabama 35244 USA
(800) 526-9183
Fax: (800) 626-9184

A list of physicians using human growth hormone can be found in the book , *Grow Young with HGH* (see resources section).

Vitamins and Antioxidants		**Cellular Energizers**	
Alpha Lipoic Acid	80 mg	Coenzyme QIO	60 mg

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N-acetyl Cysteine	800 mg	Creatine monohydrate	4-5 grams
Vitamin E	1200 IU	Acetyl-L-carnitine	400 mg
Vitamin C	800 mg	NADH	5 mg twice daily
Ginko biloba	60 mg		
Vitamin D	800 mg		

Resources

Post-Polio Syndrome, edited by Lauro S. Halstead and Gunnar Grimby, Hanley & Belfus, Philadelphia, 1995.

A Summer Plague. Polio and Its Survivors, Tony Gould, Yale University Press, 1995

Current Trends in Post-Poliomyelitis Syndrome, Daria A. Trojan and Neil R. Cashman, Milestone Medical Communications, New York, 1996.

Post-Polio Syndrome: A New Challenge for the Survivors of Polio, a CD-ROM Published by Bioscience Communications, New York.

Managing Post-Polio: A Guide to Living Well with Post-Polio Syndrome, Edited by Lauro S. Halstead. NRH Press and ABI Professional Publications, Falls Church, VA, 1998.

Grow Young with HGH, by Dr. Robert Klatz. Harper Collins, New York, ISBN 006-18682-8, 1997.

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References:

1. 1. Post-polio fact sheet, NIH Publication No. 96-4030, National Institute of Health, 1996.
2. 2. Ibid.
3. 3. Ibid.
4. 4. Ibid.
5. 5. Klatz, R., *Grow Young with HGH,* New York: Harper Collins 1997, p. 9.
6. 6. Tamopolsky, M., Martin, J., Creatine monohydrate increases strength in patients with neuro-muscular disease, *Neurology* 52: 854-87, 1999.
7. 7. Mizuno, M., Quistorff, B., Theorell, H., et al., Effects of oral supplementation of coenzyme Q IO on 3 1 PNMR detected skeletal muscle energy metabol-ism in middle-aged post-polio subjects and normal volunteers, *Mol Aspects Med 18* (Suppl.): S291-98.

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Townsend Letter for Doctors and Patients, December 1999, pp 106-108.

Editor's Note:- I realize this is a very long article, but it touches on things not touched on before.

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