Drug Intervention In Post Polio Syndrome

by David Diamant, MD

Acute paralytic polio is a very old disease, dating back further than 1000 B.C. The symptoms in those who had polio were first mentioned in medical literature in the 19th century. Approximately 25% of those with acute polio developed symptoms later in life, such as fatigue, muscle aches, joint aches, difficulty with breathing, sleeping problems, weakness, and swallowing difficulties. In some these symptoms are referred to as the post-polio syndrome. Many of the after effects of the acute polio are manageable to a certain degree. Exercise, pacing of activities, using braces and assistive devices, as well as compensatory strategies in activities of daily living are methods of dealing with some of these effects. There have been several attempts at pharmacological intervention for managing certain aspects in post-polio syndrome. Areas addressed have included fatigue, concentration, muscle weakness and strength, as well as endurance. In the recent medical literature there have been several drugs studied in reference to post-polio syndrome, and in the following review they will be presented.

It has been shown that levels of Insulin-like Growth Factor-1 (IGF-1), also known as Somatomedin, is present in lower levels in polio survivors than in age-matched controls. Human growth hormone secretion is what is responsible for circulating levels of IGF-1. With lower circulating levels of IGF-1 in post-polio patients, Gugta and others studied whether muscle strength can be improved by increasing the levels of IGF-1, which was done by giving the patient human growth hormone. Over a three month trial including six subjects, there were no statistically significant increments in strength or endurance despite normalization of IGF-1 levels. Thus at this point use of human growth hormone treatment of post-polio muscle weakness would not be indicated.

Despite many hypotheses for post polio syndrome, including aging of the motor unit, overuse of existing motor units, and persistent viral infections, none have proven to be the cause of the later effects of polio. Also included in this group of hypotheses is that post polio syndrome may be secondary to immunologic abnormalities. Thus studied was the effect of a high dose of an anti-inflammatory - Prednisone - and its effects on new muscle weakness and fatigue in post-polio syndrome. The study lasted 25 weeks, with high dose Prednisone being given for four weeks followed by a gradual taper until off medication after week 25. Muscle strength and feelings of fatigue were measured. Despite results showing a very small improvement in muscle strength after three months of treatment, such was not maintained after this point. Furthermore such did not correlate with any functional improvements, nor were there any improvements in level of fatigue. Therefore, there is no current recommendations for the use of high dose Prednisone in management of post-polio syndrome.

Amantadine is a drug that is used to treat Influenza, to improve symptoms from Parkinson's disease, and to improve fatigue in Multiple Sclerosis. Uncontrolled studies have shown that Amantadine can improve fatigue in those with post-polio syndrome. However, in a six-week trial comparing use of Amantadine with that of placebo, it appears that both can result in similar improvement in sensation of fatigue in post-polio syndrome. Thus currently with placebo being nearly as effective as Amantadine, there is no recommendation for the use of Amantadine based on this controlled trial.

Selegiline, also called Deprenyl, is a drug that belongs to a class called MAO-B inhibitors, and it is used in the treatment of Parkinson's disease. A case study, involving two patients, came out within the last three years showing that these two patients reported less fatigue on Deprenyl. One of them had Parkinson's disease, the other did not. As a result of their improvement in symptoms they were both taken off of the medication, but shortly thereafter requested to be re-started secondary to complaints of greater fatigue. However, in this report there was no control group used. There was a small number which gives the study very little power, and there was no real measurement. Thus, there is not proven efficacy in the use of Deprenyl in the treatment of Post-polio related fatigue.

Perhaps one of the more promising studies was that of using Pyridostigmine (Mestinon) in the treatment of post-polio related fatigue. Some believe that post-polio fatigue may be in part related to impaired transmission of the neural and neuromuscular junction - that is at the junction between the end of the neuron (nerve cell) and the beginning of the muscle fiber. Electromyographic (EMG) studies were performed on a group of patients (numbering 17) whereby 7 of them had delays in transmission of neural impulses across the neuromuscular junction that improved after being given Edrophonium (a drug that enhances neuromuscular junction transmission) intravenously. Thereafter an oral form of a similar drug called Mestinon was given to all 17 patients, and after one month on it, 9 showed improvement in their degree of fatigue. Most interestingly 7 of the 9 responders were those who had shown EMG improvements after IV Edrophonium. Thus such shows that perhaps fatigue not only can be secondary to delays in transmission at the neuromuscular junction but that medication may in fact improve the level of fatigue in the properly selected patient population.

Overall, pharmacologic intervention in the treatment of post-polio syndrome has been limited. Several studies have occurred, most of which don't seem to be very promising except possibly that using Mestinon in the well selected patient. Medications do have their side effects, which is important to bear in mind when considering use of pharmacotherapy in the treatment of post-polio sequelae. Their use should not be done willy nilly - drug intervention should be based on sound principle and controlled research, and their effects should be monitored for positive as well as negative consequences.

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