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Case Report

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Treatment of Chronic Muscle Spasm Secondary to Chemotherapy – A Case Report

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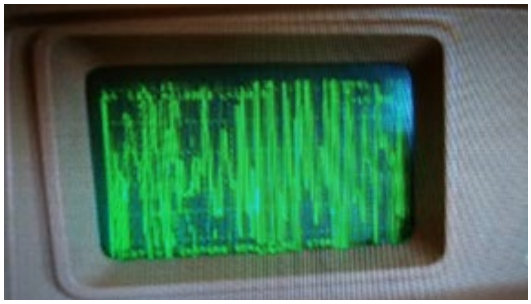
A known common complication of chemotherapy is the development of muscle spasms. The etiology of which may be multifactorial. However, unlike spasticity secondary to stroke, chronic muscle spasms are not maintained by neurological impulses or lack thereof. Chronic muscle spasms are maintained by continuous spontaneous electrical activity (SEA) throughout the body of the muscle. I have proposed the underlying cause for the SEA is muscle ischemia and the SEA is essentially an arrhythmia similar to what is seen with arrhythmias caused by cardiac ischemia [01]. Regardless of the initial insult that results in chronic muscle spasm, the spasm takes on a life of its own. Treatment with various modalities needs to relieve the SEA and the ischemia. The ischemia results from the muscle contraction impeding its own blood supply on a microcirculatory level. Animal research that I done during my cardiology fellowship but unfortunately failed to publish demonstrated that progressive doses of beta blockers that progressively suppressed cardiac contraction led to a reversal of the systolic/diastolic coronary flow. With enough suppression the predominant coronary flow became systolic rather than diastolic. This simple finding shows that contracting muscle will limit blood flow into the muscle. In most cases muscle spasms are temporary. However, if left unattended the muscle starts to run out of the energy required to relax. It is little appreciated that it takes more energy for the muscle to relax than to contract. It is sort of a mouse trap model where it takes energy to set the trap but minimal to set it off.

My research over the past 15 years was involved in looking for the sustaining cause of chronic muscle spasm and finding a viable treatment. As described above, the etiology now seems straightforward and easy to comprehend though it took a while to figure it out. Regarding treatment, I was able to find a medication that acts like an antiarrhythmic to put out the SEA. That medication phenoxybenzamine is an FDA approved drug that I use in an off-label fashion. It forms a covalent bond on the alpha-adrenergic receptor in the muscle rendering those treated receptors inactive permanently. The muscle need to replace those receptors over time. This gives the medication a duration of action of 2 to 3 months and gives the muscle time to recover. Off-label use of medication, while not likely commonly used in oncology, is common in many other fields of medicine. The FDA only requires that the patient be informed we the medication is being used in an off-label manner, that the physician is knowledgeable of the mechanism of action and keeps track of any complications.

Not yet mentioned is the occurrence of muscle injury that accompanies chronic muscle spasm. An easy way to understand this to look at cardiac muscle that is ischemic secondary to coronary artery disease. Over time the muscle goes into a state of myohibernation resulting in loss of mitochondria and muscle tissue. With coronary revascularization the cardiac muscle gradually recovers replacing mitochondria and muscle tissue. It has been shown that in the case of chronic skeletal muscle spasm the same process occurs [2].

Treatment of muscle spasm with phenoxybenzamine is done under EMG guidance. Only muscle that exhibits SEA is treated. Lidocaine is mixed with the phenoxybenzamine for both its immediate antiarrhythmic properties and for pain relief as phenoxybenzamine is a muscle irritant. Also added to the mixture is a small amount of dexamethasone to minimize the irritation. Lidocaine works very quickly in suppressing the SEA allowing the physician to treat the muscle in a geographic manner. All muscle demonstrating SEA needs to be treated but not muscle without SEA. The effects of lidocaine are time limited generally more than an hour but less than 2 hours. This is fortunate as it takes phenoxybenzamine nearly one hour to form the covalent bonds on the muscle receptors.

Figures below show typical SEA of muscle in chronic spasm and resolution of SEA with injection.



The case report this was all building up to occurred 13 years ago. At the age of 21 she was diagnosed with stage three Hodgkin's lymphoma. She underwent 6 to 8 cycles of chemotherapy consisting of Vincristine, prednisone, Doxorubicin and Bleomycin followed by a stem cell transplant. Approximately two months after her treatment was finished, she developed a debilitating pain in her legs. She could not walk without pain. They were a classic presentation of chronic muscle spasm. EMG evaluation revealed diffuse SEA. She underwent two treatments with the procedure which I have since named CMECD® successfully resolved the bilateral calf muscle cramps. The outcome was successful enough that she was able to wear her high heels when she came back to see me in the office.

Of note, now 13 years later, the muscle spasms did not recur. I have since collected data demonstrating long term results with the CMECD® procedure [3]. CMECD is an acronym for Coletti Method Emg guided ChemoDenervation. None of the hundreds of patients I treated ever needed repeat injection unless they found a way to recreate the overuse injury that led to the chronic muscle spasm. As it turns out, overuse injury is the predominant precursor to chronic muscle spasm.

Being able to treat successfully at least one of the potential side effects of chemotherapy should be within the quiver of the chemotherapist. Treatment of chronic muscle spasms in the calf muscles is one of the simplest sites but almost any skeletal muscle demonstrating chronic spasm can be treated. As noted above the EMG signal of SEA is the identifying signature of a muscle in chronic spasm. What is required is use of an EMG device, EMG injection needles and obtaining the compounded medication from a sterile compounding pharmacy. For physicians in the United States, I have found a sterile compounding pharmacy that can ship to all states. Millers Pharmacy of Wyckoff, New Jersey can be reached at 201-891-3333. They are familiar with the doses of the phenoxybenzamine/dexamethasone solution. A dose for treating one patient is currently $60. The cost of EMG injection needles are about $18. Lidocaine is added to the compounded solution at the time of treatment. For physicians outside of the US, phenoxybenzamine is available to any sterile compounding pharmacy from a Texas based supplier PCCA.

A video of the procedure is available along with other extensive information on the procedure on a physician teaching website, CMECD.info. It contains most of the information in the book I wrote entitled "Chronic Muscle Spasm and Pain – Discoveries in the Etiology, Identification and Treatment of Chronic Muscle Spasm and Resultant Chronic Pain" available from most online retailers and for which I receive no royalties [4].

A fully recorded Powerpoint presentation, scheduled to be presented at an upcoming Neurology conference, is available online from Dropbox. It can be viewed directly by using the URL listed below or the QR code. It is obviously aimed at a neurology audience and has both general and highly technical information.
https://www.dropbox.com/scl/fi/ssulqaqtjplavmp20shbj/Neurology-PowerPoint-with-text-3-4-24-mp4-video.mp4?rlkey=jmkmg0xqdgcz3tbwqcqrni9pp&dl=0

Scan this QR code to download Dropbox and view Neurology PPT

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