Intrathecal Baclofen: Is It Helpful or A Hindrance?

Psychology of Drugs and Behavior

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Abstract:

The project was on a drug called Baclofen. Baclofen has been and continues to be used to treat a neurological movement disorder. Baclofen has many positives and negatives affecting an individual. The drug has two main routes of administration followed by a self-report of a person using intrathecal Baclofen.

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After sustaining a traumatic brain injury a person might be left with uncontrollable muscle spasticity known as dystonia (UAB Traumatic Brain Injury Model System, 2003). It can be quite frustrating to experience this type of disorder. The muscle contractions can cause slow repetitive movements that can be painful and eventually progress into tremors or other neurological disorders. One may wonder, what is spasticity?

Due to my own health issues I know that spasticity is caused by an imbalance of electrical signals coming from the spinal cord through the nerve cells to the muscle. This imbalance causes the muscle to become hyperactive, resulting in involuntary spasms. Currently, research shows there have been few types of medicines that could help assist a person who suffers from this neurological disorder (Finnimore, Roebuck, Sajkov, & McEvoy, 1995). The focus of this paper is centered on a drug called Baclofen.

The pharmacology of Baclofen, also known as Lioresal Intrathecal, works by helping to relax those hyperactive muscles. Lioresal Intrathecal is a muscle relaxant and an antiplastic; even though the results of Baclofen are not fully understood by researchers (Medtronic, 2002). Baclofen is a structural analog of inhibitory neurotransmitter Gama-Aminobutyric Acid (GABA) and may show its effects by stimulation of GABA receptor subtypes (Finnimore et al., 1995). Its chemical name is 4-amino-3-(4-cholophenyl) butanic acid (Medtronic, 2002). The drug is a sterile, pyrogen-free, isotonic solution free of antioxidants, preservatives, or other potentially neurotoxic additives (Medtronic, 2002). Baclofen inhibits both monosynaptic and polysynaptic reflexes at the spinal level, possibly by decreasing excitatory neurotransmitter release from afferent terminals, although actions of supraspinal sites may also occur and contribute to clinical effect (Medtronic, 2002). In humans, as well as animals, Baclofen has shown to have general

central nervous system depressant properties as indicated by the production of sedation with anesthetizing somnolence, ataxia, respitory, and cardiovascular activities (Medtronic, 2002).

The route of administration for Baclofen can be taken orally in a pill form also known as a screening test. The medication is taken by a patient in this manner to see if he or she might observe an overall improvement regarding muscle tone. The side effects of oral intake, however, can adversely affect a patient. These side effects may include muscle weakness, confusion, sleepiness, nausea, and vomiting (Thomas health care Inc., 2012, http://www.mayoclinic.com/health/drug-information/DR600213). The side effects of oral Baclofen or other type of muscle relaxants may be harmful to a person, so how can doctors think that a patient should be a candidate for Baclofen?

The medication can also be delivered intrathecally. The word 'intrathecal' means that a drug, Lioresal, is delivered directly into the intrathecal space where cerebrospinal fluid flows around the spinal cord (Medtronic, 2002). Lioresal is a liquid form of oral Baclofen. A doctor will surgically place the titanium pump and monitor the dose of the medication. A pump is surgically placed below the skin in the abdomen and connected to a thin, flexible tube known as a catheter. The catheter is then threaded beneath a person's skin into the intrathecal space where Baclofen can be most effectively delivered. The medication does not circulate throughout the body, so side effects may be minimized. When Lioresal Intrathecal is introduced directly into the intrathecal space, studies have shown a 100 times better improvement versus the oral form of Baclofen (Medtronic, 2002).

Intrathecal Baclofen therapy has been extensively studied since 1984 (Gerszten, Richer, & Johnstone, 1998). The research has confirmed an improvement in spasticity and muscle spasms in patients with cerebral palsy, multiple sclerosis, stroke, traumatic brain injury, or spinal cord injury, and those who suffer intolerable side effects from oral Baclofen (Albright, Gilmartin, Swift, Krach, & Ivanhoe, 2003). For individuals who have sustained a traumatic brain injury or cerebral palsy the medication may provide long-term control of spasticity, particularly, may reduce uncontrollable muscle tone in both arms and legs (Medtronic, 2002). Individual sufferers from cerebral palsy may have less developmental hip issues (Gerszten, Richer, & Johnstone, 1998). Baclofen could delay orthopedic surgery are those individuals (Gerszten, Albright, & Johnstone, 1998). For those who suffered a traumatic brain injury, studies have shown an improvement in cleanliness and transfer scores (Krach, Kriel, Gilmartin et al., 2003). One may ask are there side effects to receiving this medication intrathecally to the spinal cord. There are patients suffering from dystonia or dystonia related issues that are currently receiving Baclofen intrathecally. One positive of intrathecal Baclofen is the fact that a drug can be delivered right to the target site in the spinal cord. Since the drug does not circulate throughout the body, only small doses are required to be effective; therefore, side effects are minimal. The reader may ask has it been approved by the FDA?

A number of adverse effects have been described following the end of intrathecal or oral Baclofen including: sympathomimetic symptoms, seizures, status epilepticus, hyperthermia, psychomotor agitation, exaggerated rebound spasticity, muscle rigidity, and alterations of mental status (Medtronic, 2002). Any of these symptoms or disorders may be a result of an overdose or withdrawal of this medication. If the doctor is not well-trained in Baclofen and gives a patient too much, an overdose may occur. An acute massive overdose may cause coma or death

(Bensmail, Quera Salva, & Roche, et al., 2011). Less symptomatic forms of overdose may present with signs of drowsiness, lightheadedness, dizziness, a depressive mental state, respitory decline, seizures, regression of nasal airflow as a result of low muscle tone, or loss of consciousness progression into coma (Medtronic, 2002). The reader should wonder, are there any withdrawal symptoms?

The withdrawal symptoms can result in extreme pain and are quite life-threatening. Some symptoms of withdrawal include an increase in spasticity, itching, low blood pressure, tingling sensation, and possibly thinking (Greenberg and Hendrickson, 2003). In some rare cases, patients have showed these symptoms: high fever, altered mental state, and spasticity worse than before starting Baclofen treatment, and muscle rigidity (Britton, Goldstein, Jones-Redmond, & Esselman, 2005). The patient's doctor should be notified as soon as a patient shows these symptoms (Medtronic, 2002).

Four years after sustaining a traumatic brain injury, I too, was diagnosed with dystonia, with that being stated, I received the attention from a specialist of pediatrics, who thought I would be a good candidate to receive Lioresal intrathecally. After surgery I started to use Baclofen to control my muscle spasms. The benefits that I do see are unbelievable. Before starting Baclofen, my gait pattern was horrendous. I walked with much muscle rigidity as a result of my muscle tone. The muscle of my left side was always in a flexed state, making my foot point continuously downward. As a result of using Baclofen, my left foot has returned to a normal degree of flexion. Another result of the Lioresal Intrathecal pump was the decrease in rigidity in my left arm. My pinch- release- pattern was nonexistent. As a result, however, my fine dexterity drastically has improved in both limbs.

There are a few things, in retrospect, that I wish I would have been more cognizant before agreeing on receiving the drug. I was not well informed of the severity of the side effects (e.g., sleepiness and difficulty breathing) of this drug prior to receiving it. Most people, like myself, never question the practices of one's doctors because a patient centers on the physicians substantial knowledge, in particular, my doctor is centered on neurological disorders in pediatric patients.

Conclusion:

This paper examined the science of Baclofen, the effects, the select population who could receive the drug, common route of administrations, and a self-report from a person using this type of muscle relaxant. The insight and impressions received from completing this project are enormous. If I only knew now what I knew back then, I would have been more aware of making this crucial decision for receiving the medication. I will, even though, use my knowledge to advise an individual who is suffering from dystonia about the positive and negatives of the drug baclofen.

Before receiving the intrathecal baclofen my muscle tone was classified as hypertonic. The excess muscle tone impeded my ambulation. When my physical therapist was interviewed about implications about the baclofen pump, Kim Barrette said that when using a Likert scale from 0-10 to rate my muscle tone before receiving Baclofen was an eight. After receiving the drug he rates it a three (Kim Barrette, 2012). In conclusion, I have thought of calling the doctor and telling him or her to surgically remove the drug from my body, but now I can see the important implications that this drug has influenced my life. If I went through with the surgery, after consulting with my family, I would lose my flexibly and my independence to walk various places in class, house, or outside.

References

Albright, A. L., Gilmartin, R., Swift, D., Krach, L. E., Ivanhoe, J. K.. Long Term Intrathecal Baclofen Therapy for Severe Specificity of Cerebral Organ. *J. Neurosurg*. 2003; 291-295.

Bensmail, D., Quera Salva, M.A., Roche, N. & et al. (2011). Effect of intrathecal baclofen on sleep and respiratory function in patients with spasticity. Retrieved from: http://www.neurology.org/content/67/8/1432.abstract.

Britton, D., Goldstein, B., Jones-Redmond, J., Esselman, P. (2005). Baclofen pump intervention for spasticity affecting pulmonary function. *Journal of Spinal Cord Medicine. 28*(4): 343-347.

Cuny, E. E., Richer, E. E., & Castel, J. P. (2001). Dysautonomia syndrome in the acute recovery phase after traumatic brain injury: Relief with intrathecal Baclofen therapy. *Brain Injury*, *15*(10), 917-925. H doi:10.1080/02699050110065277.

Finnimore, A.J., Roebuck, M., Sajkov, D., & McEvoy, R.D. (1995). The effects of the GABA agonist, baclofen, on sleep and breathing. *ERS Journals Ltd. 8*: 230-234.

Gerszten P. C., Albright, A. L., Johnstone G. F.. Intrathecal Baclofen Infusion and Subsequent Orthopedic Surgery in Patients with Spastic Cerebral Palsy. *J. Neurosurg.* 1998; 88 (6): 1009-1013.

Greenberg, M., & Hendrickson, R. (2003). Baclofen Withdrawal Following Removal of an Intrathecal Baclofen Pump Despite Oral Baclofen Replacement. *Journal Of Toxicology -- Clinical Toxicology*, *41*(1), 83.

Krach, L. E., Kriel, R, L., Gilmartin, R. C., et al,. Hip Status in Cerebral Palsy after One Year of Continuous Intrathecal Baclofen Infusion. *Ped Neurol*. August 2003; 30 (3): 163-168.

Barrette, K., (2012, April 19). Physical Therapist. Masters in Sports Biomechanics. Telephone interview.

Mayo Clinic. (2012). Baclofen (intrathecal route). Retrieved from: http://www.mayoclinic.com/health/drug-information/DR600213

WebMD. (2012). Multiple Sclerosis and Baclofen Therapy. Retrieved from: **http://www.webmd.com/multiple-sclerosis/intrathecal-baclofen-pump.**