INNOVATIONS
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Intrathecal baclofen more effective than oral dosing to relieve MS, CP spasticity pain

Widely used for the treatment of pain produced by spastic movement disorders – especially diplegia, cerebral palsy, multiple sclerosis and amyotrophic lateral sclerosis (Lou Gehrig's disease) – is the medication baclofen.

Unfortunately, it has been observed that in many patients oral administration of baclofen does not provide adequate pain relief.

Research over the past decade suggests that such patients should continue baclofen therapy but may benefit if the administration of the medication is changed from oral to intrathecal delivery.

When introduced directly to the intrathecal space, baclofen can more significantly decrease severe spasticity and spasms, along with associated pain, than it can when taken orally. Importantly, investigators have reported that appreciably lower baclofen dosing is required using the intrathecal method of delivery.

Spasticity's ill effects treatable

Spasticity is a common occurrence in the aforementioned multiple sclerosis and cerebral palsy patients, but also in individuals who have suffered stroke, brain injury or spinal cord injury.

The condition is defined clinically as a motor disorder characterized by a velocity-dependent increase in tonic stretch reflexes with exaggerated tendon jerks that result from hyperexcitability of the stretch reflex, as one component of upper motor neuron syndrome.

Still, the exact pathophysiology of spasticity is not completely understood. But regardless, spasticity can have a distressing effect on function and comfort. In addition to pain, spasms may produce musculoskeletal complications, incoordination, loss of function and permanent muscle shortening or contracture.

Even so, spasticity in these patients is usually treatable to some extent by prescribing baclofen. And it is advantageous to do so: Benefits of treatment include improvements in gait, hygiene, activities of daily living and ease of care. Treatment also promotes improved endurance, tone reduction and increased range of motion and joint position – all of which facilitate the patient's ability to participate in complementary physical, occupational and speech therapy.

Long familiarity with baclofen

Baclofen, developed in the 1920s, was at first intended for the treatment of epilepsy. It proved largely ineffective in that regard, although, in the course of subsequent testing, it was found to decrease spasticity in some patients, including those in the populations that are the focus of this discussion.

Despite the long familiarity with baclofen, its precise mechanism of action as an antispasticity agent (and as a muscle relaxant) remains a bit of a mystery.

Here is what is understood: Baclofen inhibits both monosynaptic and polysynaptic reflexes at the spinal level, possibly by decreasing the release of excitatory neurotransmitters from primary afferent terminals (although actions at supraspinal sites may also occur and contribute to its clinical effect). Baclofen is a structural analog of the inhibitory neurotransmitter gamma aminobutyric acid (GABA) and may exert its antispasticity effects by modulation of the $GABA_B$ receptor subtype.

Patients typically take 10 to 100 milligrams per day of oral baclofen in order to obtain adequate spasticity and pain relief. For most people, though, 60 to 80 milligrams is too high, while 10 milligrams is too low.

Lower dosing possible

Intrathecal baclofen therapy makes it possible to administer the medication in significantly lower doses. The reason is that the medication is delivered directly to the spinal fluid rather than via the digestive and blood systems. When delivered intrathecally, significantly more of the medication is available to the central nervous system.

The delivery mechanism in intrathecal baclofen therapy is an implanted mechanical pump that includes a medication reservoir refillable by means of percutaneous injection.

Two types of pumps are available. The first is a constant-flow pump that delivers the medication at a rate set by the surgeon prior to implantation. The second is a programmable pump that delivers the medication at a frequency and dose size determined by programmable onboard software. Both kinds transport the baclofen dose through a catheter that extends to the spine's intrathecal space.

The surgeon who implants the pump – ideally a highly skilled neurosurgeon – does so only after trialing with either an

intrathecal injection or the placement of a temporary intrathecal pump. The trial is deemed successful if the patient derives at least a 50% improvement in his or her symptoms.

Given the sophistication and expense of these pumps, careful selection of patients is therefore a must.

Conclusions

For multiple sclerosis and cerebral palsy patients (along with others suffering from similar spasm- and contracture-producing central nervous system disorders), pain is an unfortunate associated condition. The pain is often severe enough to interfere with patients' ability to engage in even the most basic activities and can greatly complicate matters for caregivers.

In numerous studies over the years, oral baclofen has been shown to be a viable therapy for painful spasticity and contracture. However, when administered intrathecally, baclofen's efficacy is dramatically increased while the amount of medication required is greatly reduced. The scaled-down dosing may result in fewer and/or lessened side effects.

Intrathecal delivery requires implantation of a baclofen pump. These pumps come in two varieties: constant-flow and programmable. Both are quite sophisticated – the latter more so than the former.

If the goal is to improve the quality of the multiple sclerosis or cerebral palsy patient's life, then intrathecal baclofen therapy should be given serious consideration.

However, implantation is a uniquely tricky procedure. Therefore, it behooves the patient's primary-care physician to refer only to a thoroughly trained and highly experienced intrathecal therapy specialist.

Among the many things I was taught during my time at the Mayo Clinic was how to correctly and safely implant and maintain intrathecal baclofen pumps. Today, years later, the only U.S. manufacturer of the devices uses my practice as a showcase for colleagues around the world who want to observe the delicacy of the implant procedure – and the good results that follow from deftly finding the precisely optimal spot to place the device components.

I think this may explain in part why so many physicians in Milwaukee, Waukesha and neighboring Wisconsin communities request my help with their multiple sclerosis and cerebral palsy patients desperate for lasting and superior pain relief.

I invite you to consider joining them in utilizing me as such a resource. Please know that when you refer to me, you can do so with confidence. For in addition to being accessible to you, it also is customary for me to keep you informed of your patients' progress, beginning with a detailed report sent to you after the initial consult and continuing with a letter following each successive visit. (You can also expect a phone call from me after surgery to apprise you of the results and discuss any pertinent details.) Additionally, I take the time to inform patients and answer all their questions in terms they can understand. Satisfied by the services and support I can provide, those of your patients who are seen by me will return to you more willing than ever to continue entrusting their ongoing care to you.

For further information about intrathecal baclofen therapy as well as my other neurology-specific surgical services, please call me at (414) 385-7150.

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