

INTRATHECAL BACLOFEN FOR MUSCLE SPASTICITY AND PAIN

- Two Case Reports -

DHAFIR AL KHUDHAIRI^{*}, ABDULLA RABABA^{**}
AND MOHAMMED NAYEEM SADDIQUI^{***}

Introduction

Spasticity is a disorder of muscle function that causes muscle tightness or spasm. It is the involuntary movement (jerking) of muscles which occurs when there is dysfunction of the central nervous system either traumatic or pathological. This dysfunction may result from a traumatic brain injury, stroke, tumor, cerebral palsy or multiple sclerosis^{1,2,3,4,5,6}. Symptoms may include hypertonicity (increased muscle tone), clonus (a series of rapid muscle contractions), muscle spasms, scissoring (involuntary crossing of legs) and fixed joints. Spasticity may be as mild as the feeling of stiffness or tightness of muscles, or it may be so severe as to produce painful uncontrollable spasms of the extremities.

While spasticity cannot be cured completely, some of the associated problems can be managed in a number of ways. Management consists of a combination of different medications, implantation devices and surgery.

The use of oral medication for treatment of spasticity can be very effective. Benzodiazepine, baclofen, dantrolene sodium and tizanidine are

* FFARSCI, Consultant in Chronic Pain Management, Sultan Bin Abdelaziz Humanitarian Centre & Riyadh Armed Forces Hospital and Director of Cardiac Anaesthesia, Prince Sultan Cardiac Centre

** JBPM, PM Diploma, Consultant Psychiatrist.

JBPM, PM Diploma, Consultant Psychiatrist.

*** DO, MD, FAOCPMR, Consultant Psychiatrist.

Chronic Pain Management, Sultan Bin Abdelaziz Humanitarian Centre, Riyadh, Saudi Arabia.

the most widely used agents for the reduction of spasticity. However, at high doses oral medication can cause unwanted side effects including sedation and changes in mood and cognition. It may be necessary to change or combine alternative methods.

Intrathecal baclofen (ITB) infusion is an alternative method of treatment which can significantly relieve spasticity and pain. However, the technique requires expertise and specialist care for a considerable length of time with large start up costs, although health care costs can be reduced in the long term⁷.

Case Report 1

A 30 year old man, diagnosed with multiple sclerosis (MS) of 3 years was admitted to the Sultan Bin Abdulaziz Humanitarian Centre complaining of attacks of painful muscle spasm, mainly in the lower limbs, with severe lower limb scissoring. He was on oral baclofen, dantrolene and diazepam with no benefit. On examination his Ashworth Score (a measure of spasticity) was 4.

It was decided to carry out a diagnostic test of ITB to see if good relief from spasticity and pain could be achieved. A 50 µg ITB bolus was given and the patient observed for 24 hours. The patient had very good relief of spasticity with disappearance of spastic pain, but was very flaccid and could not walk. A second test dose of 25 µg ITB was given. The patient had good relief of spasticity and pain, without flaccidity, and could walk without scissoring.

A Meditronic Synchromed II 40 ml capacity baclofen pump was implanted for intrathecal infusion and an intrathecal catheter inserted from L₂₋₃ – T₁₀. The patient was started at 25 µg per day of ITB infusion and observed regularly. The dose was increased gradually to 50 µg per day with an excellent result. After ITB infusion he had an Ashworth Score of 1.

Case Report 2

A 56 year old woman was admitted to the Prince Sultan Bin Abdulaziz Humanitarian Centre complaining of severe spasticity (Ashworth Score 4) and continuous pain in her lower limbs and hips caused by spinal cord damage after a traffic accident 2 years previously with several failed back surgeries. Spasticity and pain affected the patient, even during sleep. She was on maximum oral baclofen and other sedatives and analgesics with no benefit.

It was decided to carry out a diagnostic test of ITB. A 75 µg ITB bolus was given and the patient observed for 24 hours. The patient gained excellent relief of spasticity and pain.

A Meditronic Synchronised ITB pump was implanted. The patient was started at 50 µg per day of ITB infusion and gradually increased to 110 µg per day with excellent relief of symptoms. After ITB infusion she had an Ashworth Score of 1.

Discussion

When oral medication is not beneficial then alternative methods could be used such as: BOTOX injection directly into the spastic muscle; musculoskeletal surgery, in which surgery is performed in the muscle or tendon itself and may require tendon lengthening or transfer to reduce the tension on the muscle; spinal cord surgery (selective posterior rhizotomy), which requires dissection of nerve rootlets in the lower spine⁸; or ITB infusion.

ITB pump insertion was first carried out by Penn and Kroin in 1984 for the treatment of spasticity and its use has been extensively reported⁹⁻¹².

Baclofen acts on the central nervous system to relieve spasms, cramping, and tightness of muscles caused by spasticity which could be due to traumatic damage to the central nervous system (spinal cord or

cerebral) or other pathological condition of the central nervous system (MS).

ITB therapy consists of a long term delivery of baclofen to the intrathecal space in the spinal column. It is used in those individuals with severe spasticity whose symptoms are not sufficiently relieved or tolerated by oral baclofen and other oral medications.

ITB is approximately 100 times more effective than oral alternative. Selective, controlled intrathecal doses produce fewer side effects than large oral doses which can lead to drowsiness, sedation and dizziness due to baclofen crossing the blood brain barrier⁷.

Multiple sclerosis (MS) is one of the commonest neurological conditions of young adults in the western world and pain and spasticity are two of the commonest symptoms from which people with MS suffer. A recent survey of members of the MS Society found that 54% reported pain and 74% spasticity as current symptoms. As the disease progresses so does the spasticity resulting in muscle spasms, immobility, disturbed sleep and pain.

In addition to neuronal damage due to the disease process, pain can be caused by a variety of factors including spasticity itself. Not uncommonly it may be musculoskeletal in origin arising as a result of abnormal posture following the disability caused by MS.

A screening test of a bolus dose of ITB before deciding to implant a pump will determine if ITB therapy may work. There must also be an observation period after implantation which could last from a few days to several weeks, to ensure there are no complications and to regulate and control the necessary dose.

There may be side effects and complications^{13,14,15} including loose muscles, upset stomach, headache, dizziness, pump malfunctions, catheter related problems (kinking, breaking, displacement) local inflammation and rarely spinal meningitis. Respiratory depression has also been reported secondary to overdose.

Intrathecal therapy today is considered an effective treatment

therapy for intractable spasticity and accompanying pain, especially for comfort and quality of life improvement. However, complications remain frequent and should always be taken into account. Discussion with the patient regarding the associated benefits/risks should be a priority. The broadening of the indications of ITB and thus the increase of the number of patients receiving implanted pumps, calls for the development of standardized procedures for the follow-up of these patients. Standardised evaluation must be developed, routinely used and should – in our opinion – include a measurement of the achievement of functional goals.

The modalities of the refill procedure must also be standardized with the development of specific clinics run by trained physicians and nurses, supported by specialized technicians.

Conclusion

Two cases admitted to the Sultan Bin Abdulaziz Humanitarian Centre suffering from spasticity and managed successfully, with no complications, by ITB infusion after failure to be controlled by conventional oral medication.

References

1. PENN RD: Intrathecal baclofen for spasticity of spinal origin: 7 years of experience. *J Neurosurg*; 77:236-40, 1992.
2. COFFEY JR, CAHILL D, STEERS W, ET AL: Intrathecal baclofen for intractable spasticity of spinal origin: results of a long term multicenter study. *J Neurosurg*; 78:226-32, 1993.
3. ALBRIGHT AL, BARRY MJ, PAINTER MJ, ET AL: Infusion of intrathecal baclofen for generalized dystonia in cerebral palsy. *J Neurosurg*; 88:73-6, 1998.
4. ALBRIGHT AL, KRIEL RL, GILMARTIN RC, ET AL: Hip status in cerebral palsy after one year of continuous intrathecal baclofen infusion. *Pediatr Neurol*; 30(3):163-8, 2004 (Mar).
5. ALBRIGHT AL, GILMARTIN R, SWIFT D, KRACH LE, ET AL: Long term intrathecal baclofen therapy for severe spasticity of cerebral origin. *J Neurosurg*; 98(2):291-5, 2003 (Feb).
6. METZ L: Multiple sclerosis: symptomatic therapies. *Semin Neurol*; 18:389-95, 1998.
7. NANCE P, SCHMIDT B, FEWER D: Intrathecal baclofen for control of spasticity in patients with traumatic or inflammatory myelopathy. *Manitoba medicine*; 63(3):90-1, 1993.
8. http://www.mdvu.org/library/disease/spasticity/spa_mst.html.
9. DRALLE D, MULLER H, ZIERSKI J, KLUG N: Intrathecal baclofen for spasticity. *Lancet*; ii:1003, 1985.
10. HANKEY GJ, STEWART-WYNNE EG, PERLMAN D: Intrathecal baclofen for severe spasticity. *Med J Aust*; 145:465-6, 1986.
11. MULLER H, ZIERSKI J, DRALLE D, BORNER U, HOFFMAN O: The effect of intrathecal baclofen in spasticity in local spinal therapy of spasticity. Muller H, Zierski J, Penn RD eds. Berlin Springer-Verlag; 155-214, 1988.
12. PENN RD, SAVOY SM, CORCOS DC, ET AL: Intrathecal baclofen for severe spinal spasticity. *N Engl J Med*; 320:1517-8, 1989.
13. PENN RD, SAVOY SM, CORCOS D, LATASH M, GOTTLIEB G, PARKE B, ET AL: Intrathecal baclofen for severe spinal spasticity. *N Engl J Med*; 320:1517-21, 1989.
14. COFFEY JR, CAHILL D, STEERS W, PARK TS, ORDIA J, MEYTHALER J, ET AL: Intrathecal baclofen for intractable spasticity of spinal origin: results of a long-term multicenter study. *J Neurosurg*; 226:32, 1993.
15. MIDDEL B, KUIPERS-UPMEIJER H, BOUMA J, STAAL M, OENEMA D, POSTMA T, ET AL: Effect of intrathecal baclofen delivered with severe spasticity. *J Neurol Neurosurg Psychiatry*; 63:204-9, 1997.