



## Indian Family of Cerebral Palsy

Voluntary Organization dedicated for the welfare of the people with cerebral palsy since 1993

### Development of Neurosurgical Management of Spasticity at NIMS in India

A report circulated by the New York Times about the excellent work of W.J. Peacock on rhizotomy was published in the Hindu way back in 1987. The grandparents of a child with Cerebral Palsy, who read this article, consulted Dr. Peacock. After assessing the child, Selective Posterior Rhizotomy (SPR) was recommended, but owing to the expensive treatment in U.S, he suggested performing the surgery in India. The Nizam's Institute of Medical Sciences (NIMS), at Hyderabad, was considered a suitable hospital for conducting the procedure. In 1998, Dr. Peacock conducted a workshop at NIMS and demonstrated the surgical technique to the neurosurgeons.

After this workshop, a full-fledged physiotherapy and surgical infrastructure was developed at the NIMS to cater to the needs of such patients in our country. Around 12,000 cases have been screened and 160 cases have undergone SPR. The overall results are gratifying.

Encouraged by the positive results of rhizotomy, a number of workshops on cerebral palsy and surgery were conducted for doctors at several places.

In this neurosurgical procedure under general anaesthesia, the lower part of the back bone is opened by laminectomy. The membrane covering the cauda equina (horse tail-like structure of the nervous system) are incised. The nerve roots of the cauda equina are dissected into their component rootlets. These rootlets are stimulated by a computerised ENMG machine. The lower limbs, which are kept exposed to see the response of nerve simulation, are observed for movements. The rootlets showing excessive stimulation in the involved muscles are sectioned. The spasticity subsides immediately and does not recur. The patient undergoes physiotherapy postoperatively to improve motor functions.

With the experience gained since 1988, we have realised that early intervention by neuro developmental physiotherapy can greatly improve the motor function in suitable cases. There is hardly any awareness about diagnosis and treatment of this disorder in our country.

Even if early diagnosis is made, neuro developmental physiotherapists are not readily available. Hence parents have to travel to distant places for physiotherapy. In addition to physical disability, these children also suffer from speech problems, mental sub normality and seizures. So the parents have to go to different centers for management of all these problems.

With the idea of having at least one multidisciplinary rehab center, the Cerebral Palsy Home, in each district of the country, a charitable organisation known as the Indian Family of Cerebral Palsy was constituted. About 600 members have been enrolled so far.

Work at NIMS has progressed to surgically manage the adult paraplegics who have

spasticity due to spinal injury or any other nonprogressive disease. Rhizotomy was performed in these patients and they have shown appreciable improvement. In some of these cases, the spastic bladder causing urinary trouble was also managed by rhizotomy.

The positive results of rhizotomy in children and adults have prompted us to relieve spasticity of the upper limbs. Patients having diffused harmful spasticity involving entire upper limb on both right and left side were considered for rhizotomy. This problem is common on cervical spinal injury patients. This kind of surgery by electro stimulation in spinal injury cases was performed by us. Gratifying results were obtained especially in cervical (neck) injury patients. Unexpectedly prehensile also improved in them. In this procedure, like lumbosacral rhizotomy for lower limbs, the surgery is performed on the spine but at a higher level i.e, on cervical spine in the neck. The spinal cord is exposed and the nerve roots entering the response is noted in the upper limbs. The rootlets showing excessive response in the harmful muscles are sectioned. Spasticity subsides immediately and does not recur.

Rhizotomy is usually indicated for diffuse spasticity of the limbs. But in some cases only one or two groups of muscles are involved. In such patients since it is unnecessary to perform surgery on the nervous system by opening the spine, another surgical procedure called selective neurotomy was initiated.

In this procedure the nerve is exposed in its course in the limb itself. It is dissected into its component fascicles under the microscope; The fascicles are then stimulated by the computerized ENMG machine. The fascicle showing excessive contraction of the muscle is sectioned. It relieves spasticity immediately and the relief is permanent. Not only Cerebral Palsy cases but also other patients with nonprogressive problems like injury to head or spine, healed infection of the nervous system, are benefited. It is a relatively safe procedure, less expensive and post-operative recovery is faster.

Patients with spasticity in the upper limbs, find it difficult to hold something in their hand, because their palm remains directed downwards. This problem can be improved after selective neurotomy. Some children with cerebral palsy tend to walk on their toes. The lower limbs are otherwise normal. In such cases surgery is performed on their peripheral nerve rather than the spine. Relief in spasticity improves walking in such cases.

Around 75 selective neurotomies have been performed at NIMS, Hyderabad. An appreciable improvement in functions have been observed in many cases. The same procedure for dystonic cerebral palsy cases (involvement of one upper limb only) has been tried with improvement in some cases.

Botulinum toxin recently introduced in India has been found useful in some selected cases of focal dystonia and spasticity. It is, however, expensive for the common man.

All spastic patients are not considered immediately for neurosurgical ablative procedures. They are assessed carefully to make sure that the spasticity is not helping them. Sometimes spasticity may act as natural calipers and help the patient perform some of the motor activities. A wrong selection for surgery may cause deterioration. Only those patients who have difficulty in performing motor function due to spasticity are considered for surgery. In such patients, first nonsurgical treatment modalities, like kinesthetic therapy are tried. On development of resistance to them, the neurosurgical procedure is indicated.

An ideal case is one who has harmful resistant spasticity and good strength in the involved

muscles. Orthopaedic complication of spasticity like contractures and dislocations are negative clinical features.

The main goal of ablative procedures is to improve the existing motor function to a great extent. However, in ideal cases, gain in motor milestones or acquisition of lost function is possible. Reduction of spasticity also has positive effects on its harmful manifestation like pain discomfort, muscle shortening, dislocation and deformities. Relief in pain and discomfort results in greater cooperation from patient during physiotherapy.

All these surgical techniques are not considered ideal procedures for management of spasticity. But still better procedure come into vogue, these will greatly benefit the patients suffering from harmful resultant spasticity due to nonprogressive disorders.

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