

## Cerebral Palsy Child with Deep Brain Stimulation Implant-Treading A Fine Line

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### ABSTRACT

A 14-year-old girl with Spastic Quadriplegic Cerebral Palsy who had been implanted with Deep brain stimulation (DBS) into both sides scheduled for Injection Botox under IV sedation with standard monitoring. DBS is an alternative and effective treatment option for Cervical dystonia, Cerebral palsy, also other illnesses like refractory Parkinson's disease, intractable epilepsy. Anaesthesia in patients with implanted neurostimulator requires special consideration because of interaction between neurostimulator and Diathermy. There are no standard guidelines for anesthetic management of a patient with DBS electrode in situ posted for surgery.

**Keywords:** Cerebral palsy; Deep Brain Stimulation; Injection Botox

### INTRODUCTION

Cerebral palsy is a most common cause of acquired dystonia in childhood. Pharmacological treatment is often unsatisfactory and side effects are frequently dose limiting. Cerebral palsy being a complex disorder and children frequently have multiple impairments. Dystonia is particularly frustrating impairment that interferes with rehabilitation function and is difficult to treat. Of available treatments, DBS has emerged as an option with the potential for large effect size in a subgroup of children.

There is little information available on the management of patients with DBS implant who presents for surgery. Potential problems include Thermal injury to brain tissue, reprogramming, damage to device and leads. They require careful monitoring and management as DBS can interfere with monitoring and therapeutic devices such as Electrocardiograph, peripheral Nerve Stimulators, Cautery, External and implantable Cardioverters and Defibrillators [1-5]

However with careful management, these serious complication can be avoided. We summarise a case of Spastic quadriplegic Cerebral Palsy with DBS implant insitu posted for Botox injection. But in the past two decades, botulinum toxin serotype A (BTX-A) has been introduced as a selective treatment option for spasticity in children with CP. BTX-A, when injected into the muscles, will reduce muscle tone. It became clear that the use of BTX.

### DESCRIPTION

A was a 14 year old girl weighing 40 kilogram with spastic Quadriplegic Cerebral Palsy with implanted Deep Brain Stimulator electrode placed one year ago was scheduled for Botox injection to reduce spasticity and muscle tone. Currently, patient is Tab Baclofen. On the day before surgery Neuro stimulator switch was turned off by the Neurologist after examining for no dystonic symptoms, she was brought on a stretcher with muscle rigidity and impaired cognitive behavior to the recovery room. On the day of surgery, Baclofen was given orally. On Cardiovascular and Respiratory system examination no abnormality detected. In the recovery room, Injection Midazolam of 0.05 mg/kg was given to allay anxiety [6,7].

After discussing with Orthopaedician regarding duration of procedure and confirmation of switching off of the electrode, Mode of Anesthesia was decided to be General anesthesia with Spontaneous ventilation with mask holding as per institution protocol. Anesthesia induced with Thiopentone 200 mg IV, Fentanyl 80 mics IV, Glycopyrrolate 0.2 mg IV. Maintained with Oxygen, Air, Isoflurane, Paracetamol of 600 mg IV given.

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## DISCUSSION

Cerebral palsy (CP) is a collective term used to describe a diverse group of neurological disorders characterized by varying degrees of motor, sensory, and intellectual impairment. Eighty per cent of CP cases develop antenatally and 20% post-natally during the first 2 yr of life. Children with CP may present with a variety of motor problems, changing with growth and development. Primary problems are directly related to the lesion in the central nervous system, influencing muscle tone, balance, strength and selectivity, whereas static muscle contractures and bony deformities (secondary problems) develop slowly over time in response to the primary problems. Furthermore, the child often develops adaptive mechanisms or 'coping responses' in gait to overcome the primary and secondary problems. DBS is not expected to improve weakness, spasticity, deficits of selective motor control, ataxia, dyspraxia, or non-motor impairments including sensory or cognitive dysfunction [7-9].

DBS is a form of neuromodulation; while it can alter certain abnormal patterns of neural activity, it cannot compensate for permanent structural lesions or other deficits of information and computational brain function. Its greatest effectiveness occurs in dyskinetic (athetotic) CP for which dystonia is the dominant impairment. And Botox helps in muscle spasticity as well as dystonia of the neck, which is repetitive and abnormal muscle movement that can be painful or debilitating. For anesthesia, the characteristics of the disease as well as respective long term medications have to be considered. DBS can interfere with Electrocardiograph, Peripheral nerve stimulators, Short wave diathermy, external and implantable Cardioverters and Defibrillators. Hence, the neurostimulator was turned off a day before surgery by the Neurologist [9,10].

Patients with CP require special consideration because of their various disabilities. It must not be forgotten that they have feelings and emotions which are sensitive to the way they are handled and their understanding may be greater than seems apparent on first meeting. These children often require multiple surgical procedures. Orthopedic operations to improve function of the extremities are common, and some patients require surgical correction of progressive spinal deformities.

Common procedures include surgical soft tissue procedures that reduce muscle spasm around the hip girdle, including an adductor tenotomy or psoas transfer and release. A complete history and physical examination is essential before anaesthetizing these children, including a discussion of postoperative pain management with the parents. Cognitive and communication problems may make preoperative assessment more difficult. Parents and caretakers are best to be involved during this period not only to gain information but also allay the fears of the child.

Health worker's safety must always be guaranteed even in the event of an epidemic or catastrophe. In 2009, H1N1 influenza a pandemic led to a lack of supply of protective devices, masks and respirators in the U.S especially in the emergency setting [11]. Recently, SARS-COV-2 outbreaks proved that the national health services are unable to guarantee protective equipment to health personnel at a sustainable rate to deal with the emergency

## CONCLUSION

The proposed device can ensure employee safety by means of equipment already available in the hospital setting with the additional advantage of a relatively low cost. We do not recommend their routine use because the traditional well-established and recommended PPE devices undoubtedly provide a greater level of safety and comfort which no device can replace.

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