

Case Report

ANAESTHETIC MANAGEMENT OF PATIENT WITH POST POLIO SYNDROME WITH HEAD INJURY

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ABSTRACT

Polio virus is transmitted through the fecooral route. It selectively damages the motor and autonomic nervous system especially anterior horn cells of the spinal cord, vital centres in the medulla, cranial nerves nuclei, and nuclei in the roof of cerebellum. Permanent damage usually develops in the lower extremities. Acute poliomyelitis involving flaccid palsy, muscle weakness respiratory failure was one of the feared diseases responsible for paralysis and death in the early 90s. This disease is mostly eradicated from USA, Australia and other developed countries with the successes of polio vaccination programmes, but is still a problem in tropical countries. Post polio syndrome (PPS) refers to a cluster of potentially disabling signs and symptoms among polio survivor's decades after initial polio illness. Previous poliomyelitis itself can be considered as a condition of increased risk of respiratory failure due to chronic hypoventilation and sleep related disordered breathing related to PPS. A patient with PPS affecting both lower limbs with the associated head injury is a challenge for anaesthetist. In this article we present a case report of 29 year old male with bilateral post polio palsy of lower limbs with severe head injury due to road traffic accident (RTA) who successfully underwent surgery, open reduction with intramedullary nailing of right femur under regional anaesthesia technique.

Key words: *Post Polio Syndrome, Polio Virus, Regional Anaesthesia Technique, Respiratory Failure*

INTRODUCTION

Polio virus is transmitted through feco-oral route. Selectively polio infection damages motor and autonomic nervous system especially anterior horn cells of spinal cord and cranial nerve nuclei. Poliomyelitis survivors may develop post polio syndrome (PPS), which refers to a cluster of potentially disabling signs and symptoms among polio survivors, decades after initial polio illness. Permanent damage usually develops in the lower extremities leading to paralytic polio in 1-2% of infected individuals (Melnic, 1996). Almost 50% of those with acute muscle weakness develop post paralytic permanent loss of motor function affecting limbs and respiratory functions (Lobben, 2001). Poliomyelitis may be associated with scoliosis in 30% of cases (Lambert *et al.*, 2005). PPS associated with chronic hypoventilation and sleep related disorder poses patient to the increased risk of respiratory failure when the patient is exposed to general anaesthesia. Regional anaesthesia with central neuraxial block is also an anaesthetic challenge in view of difficulty in palpating anatomical land marks leading to difficulties in performing lumbar puncture. Hence, the present case was challenging for both general anaesthesia as well as regional anaesthetic technique. Further, the cost of the procedure and management in case of complications (ICU management) was an added issue because the patient was poor.

CASES

A 29 year old male patient with ASA physical status II presented to the orthopaedic department with history of road traffic accident resulting in injury to the right thigh and head injury. Patient was a known case of post polio residual palsy, his present orthopaedic evaluation revealed fracture of right femur bone with head injury. Patient was referred to the anaesthesia department for anaesthesia fitness to carry out the surgical procedure. On examination pulse rate was 86/min, BP 120/80 mm of hg, room air oxygen saturation 95% (SpO₂). His lungs were clear and cardiac examination showed regular rate and rhythm without any murmur. Haemoglobin was 13.1gm/dl, blood urea 34 mg/dl, Serum creatinine 0.7 mg/dl,

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blood glucose 108 mg/dl, Serum sodium 139meq/L, Serum potassium 3.8meq/L and Serum Chloride 99meq/L. His ABG, ECG and X-ray chest reports were normal. CT brain revealed multiple contusions in the right frontal and temporal lobes with fracture of occipital bone. Considering the anatomical and neurological deformities due to PPS with the associated head injury, the patient was a challenging case for anaesthetic management. However, following thorough clinical evaluation and noting down the neurological deficits due to previous PPS and present head injury related problems the risks explained to the patient and his relatives and informed consent obtained. In the operation theatre a large bore intravenous line was secured and patient preloaded with ringer lactate 15 ml/kg BW. ECG leads, NIBP and pulse oxymetry probe connected for monitoring. Under strict aseptic precautions, the patient in the right lateral position lumbar puncture was performed at L3-L4 inter vertebral disc space with 25 g Quincke needle via midline approach. When a free and clear CSF flow was noted, 2.5 cc of hyperbaric Bupivacaine 0.5% was injected intrathecally. The operation table was maintained at neutral position throughout the procedure. Sensory block reached up to T6, Surgical procedure lasted for 90 minutes. Patient tolerated the procedure well without complications, complaints and need for any sedation. Patient was observed in post operative recovery for 1 hour and then shifted to the surgical intensive care unit. Pain relief was provided with Diclofenac sodium suppository 100 mg BD and Injection Tramadol 100 mg IV BD for 2 days. Remaining part of the post operative period was uneventful.

DISCUSSION

The term poliomyelitis originates from the Greek words, “Polios”-(gray), “myelos”- (marrow) and Latin suffix- “itis”-(inflammation), and refers to the specific localization of infection in the anterior horn (gray matter of the spinal cord). Acute paralytic polio is caused by the infection of the polio virus (enterovirus). The term PPS was launched in 1985 by Halstead. PPS is a condition characterized by the progressive weakness many years after the recovery from acute polio illness. Aetiology of PPS is unknown, it is estimated that 20-50% of the polio survivors will experience PPS but there are diverging data about who are at risk.

The choice of using a general vs. a regional anaesthesia should be based on the pre operative assessment, type of surgery and patient desires. Polio patients are often sensitive to sedative medications and emergence may be prolonged. Over sedation and weakness, or both may result in respiratory failure and death (Magi *et al.*, 2003; Janda, 1979). This could be due to central neuronal changes especially in the reticular activating system from the original disease; the site of action for many anaesthetics (Steolting & Dierdorf, 2002).

Often patients with past history of polio may exhibit increased sensitivity to non depolarizing muscle relaxants (Gyermek, 1990). Hence, selection of shorter acting agents, such as rocuronium or mivacurium along with careful titration of doses to desired effect, is important in patients with PPS. The depolarising muscle relaxant (Succinylcholine) may precipitate hyperkalaemia, severe post operative pain, so it should be avoided if possible. Autonomic system dysfunction may lead to gastroesophageal reflux, tachyarrhythmias, and sometimes difficulty in maintaining BP following anaesthetic supplementation. Regional anaesthesia with central neuraxial block is also an anaesthetic challenge due to difficulty in palpating anatomical land marks and performing lumbar puncture. The use of neuraxial anaesthetic was previously avoided because of unknown risks and potential worsening of symptoms (Lobben, 2001). However, spinal anaesthesia can be safely administered in PPS patients with less adverse effects (Higashizawa *et al.*, 2003). Sedative medication administered during the perioperative period needs vigilant respiratory monitoring (Bruno, 2002).

Conclusion

In conclusion, patients with post polio syndrome should be thoroughly evaluated for the co-existing disease. Anaesthetic management involves multiple considerations like, compromised respiratory function, SRBD, aspiration risk, cold intolerance and chronic pain syndrome. Further, post polio patients may often exhibit altered sensitivity to commonly used general and regional anaesthetic agents. Adequate

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knowledge of these factors enriches the anaesthetist's skill to provide a safe anaesthesia in patients with PPS and poliomyelitis.

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