



BMH Med. J. 2026;13(2):52-55. **Case Report**

Perioperative considerations in a patient with implanted deep brain stimulator posted for elective shoulder surgery

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Abstract

Deep brain stimulation (DBS) is a procedure that is becoming increasingly common in the management of Parkinson's Disease (PD). DBS of the subthalamic nucleus and the palladium have been proven to provide excellent relief to symptoms of motor fluctuations and dyskinesias caused by advanced stage Parkinson's disease. As it significantly improves the quality of life of patients, it is inevitable that as anaesthesiologists we will encounter more patients who have DBS device in situ, posted for coincidental surgeries. So, it is important for us to understand the challenges in such cases. The management of such a case involves a multidisciplinary team with the anaesthesiologist, surgeon and the neurologist. Here we discuss the case of a middle aged person with a DBS device who underwent shoulder arthroscopy.

Keywords: Deep brain stimulation. Perioperative care in implanted DBS. Parkinson Disease and Anaesthesia

Introduction

With longer life expectancy and better diagnostic techniques, the incidence of Parkinson's Disease (PD) is increasing globally [1,2]. As DBS is a life altering treatment for patients living with disability associated with PD, and with its accessibility improving with time, anaesthesiologists are going to encounter more patients with a DBS in situ presenting for unrelated surgery. So, it is important we know the challenges of managing such a patient.

Case report

Patient was a middle aged male, a known case of Parkinson's disease for the last fifteen years. Despite medical management his quality of life deteriorated due to tremors, stiffness of limbs and movement impediment, and hence he underwent deep brain stimulation 5 years back. Medtronic DBS device was employed, and bilateral sub-thalamic nucleus deep brain stimulation was done which resulted in improvement in the motor symptoms of Parkinson's disease.

The patient had sustained recurrent anterior dislocation of his right shoulder due to the involuntary movements associated with Parkinson's disease. So, the patient was posted for Latarjet repair of the shoulder. His BMI was 25.7 kg/m². He had a heart rate of 70 bpm and a blood pressure of 140/74 mmHg. Airway examination revealed normal mouth opening, Mallampati score of 2 and adequate neck movements. Neurological examination showed mild tremors, cog-wheel rigidity and freezing gait. Routine blood investigations were all within normal limits. He had a normal electrocardiogram and chest X-ray showed the Implantable Pulse Generator (IPG) of the DBS device in the left infraclavicular region. A routine neurological consult was done considering the chronic history of Parkinson's disease and the DBS unit was interrogated for its battery life and device function. Risk of DBS device malfunction and interference with medical equipment's like electrosurgery was discussed by the team and adequate precautions that can be taken to prevent the same were taken. The patient was kept nil per oral for solid foods for 8 hours and clear fluids for 1 hour before the surgery.

Injection midazolam 1mg and pantoprazole 40 mg was given as premedication, and the patient was wheeled into the OT. The remote used for turning off the DBS IPG wirelessly was also taken with the patient's permission. Anaesthesia was induced with 100ug fentanyl, 100mg propofol and 40mg atracurium and after bag and mask ventilation for three minutes the patient was intubated using an 8.0 sized cuffed end tracheal tube. Anaesthesia was maintained using air and sevoflurane. Using the remote device the DBS machine was carefully switched off as instructed by the trained personnel. Then an ultrasound guided inter-scalene brachial plexus block was given with 15 ml of 0.2% ropivacaine. The patient was carefully placed in the left lateral position as the right shoulder was to be operated on. All the pressure points were meticulously padded, and special attention was given to the area of the IPG to prevent mechanical injury. The surgery was performed in sixty minutes during which the patient's haemodynamics remained stable. Injection paracetamol and Magnesium sulphate were also given for analgesia. All drugs which can cause extrapyramidal symptoms were avoided. The DBS unit was switched on carefully using the remote device before extubation. The patient was awake and comfortable and was shifted to the recovery room.

Discussion

DBS is a technique which is significantly less invasive compared to its surgical predecessors and has many advantages. It's reversibility, safety profile and adjustability has made it very popular in the treatment of PD [3]. It suppresses overactivity in the pallidum, sub-thalamic nuclei or thalamus in Parkinson's patients. When PD patients with DBS present for coincidental surgery, care should be taken to assess the status of the device preoperatively. Battery of the device should be checked, and the device should be interrogated by trained personnel. A detailed medical history should be taken especially the anti-Parkinson's therapy so it can be continued appropriately during the perioperative period. Medications that can cause exacerbation of extrapyramidal symptoms should be avoided.

DBS system can be affected by the electromagnetic interference from various medical devices like electrocautery, diathermy, therapeutic ultrasound, external cardiac defibrillator and laser equipment [3]. They can potentially cause direct damage to the system leading to altered stimulation or complete malfunction. The risk of damage by electrosurgery to the conductive materials like the metallic case, leads and the DBS unit remains even after it is turned off. Bipolar cautery causes less interference with implanted neuro-stimulators compared to mono-polar cautery and hence is preferred in such patients [4]. There have been reported cases of brain injuries due to heat production at the tip of the DBS electrodes caused by diathermy used in dental surgery [5]. Cardiac defibrillator if required in an emergency, according to recommendation by the manufacturer Medtronic it can be used at the lowest possible energy and as far away from the device as possible [3]. DBS can interfere with ECG signals, but it resolves when the stimulator is turned off [6]. The stimulator can suffer direct mechanical injury especially in cases where the patient needs to be in lateral or prone positions, and it should be padded and handled with care to avoid injury.

In patients with DBS, when the stimulator is turned off the symptoms tend to recur and are usually worse than the baseline symptoms. So, for maximum patient comfort, it should be turned off only after induction of anaesthesia and should be turned back on before extubation for a smooth recovery [7]. The patient should be informed of the risk of device dysfunction even if it is switched off during the intra-operative period. In our case we followed all the necessary precautions to ensure device functioning in the preoperative period itself and took the necessary precautions to prevent intraoperative interference with the DBS unit. As we performed an inter-scalene block, there was minimal hemodynamic fluctuations during the surgery and no complaints of post operative pain. Regional anaesthesia like inter-scalene block in shoulder surgery helps in practicing opioid sparing anaesthesia which is preferable for patients who are already on polypharmacy [8]. Moreover, Parkinson's patients suffer from autonomic dysfunction, so it is prudent to maintain hemodynamic stability by avoiding the sympathetic response caused by pain. Management of patient presenting with DBS for coincidental surgery poses unique anaesthetic challenges and requires individualised assessment and care.

Conclusion

Effective management of a Parkinson's disease (PD) patient with deep brain stimulation (DBS) involves thorough preoperative evaluation, careful planning, prompt treatment with antiparkinsonian medications, avoiding drugs that can exacerbate PD symptoms, and adhering to precautions to prevent DBS malfunction. For patients undergoing shoulder arthroscopy, combining general anaesthesia with an inter-scalene brachial plexus block offers optimal surgical and anaesthetic conditions.

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