



BMH Med. J. 2025;12(4):81-84. **Case Report**

Perioperative management of Becker's muscular dystrophy patient for laparoscopic hysterectomy

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Abstract

Muscular dystrophies are a group of inherited disorders characterized by progressive muscle weakness and wasting. Anaesthetic management of patients with muscular dystrophy undergoing surgery presents unique challenges due to the potential for respiratory compromise, cardiac dysfunction, and susceptibility to malignant hyperthermia. We present a case of a middle aged female with a diagnosis of Becker muscular dystrophy who underwent laparoscopic hysterectomy. We discuss the anaesthetic considerations, including preoperative evaluation, intraoperative management, and postoperative care, highlighting the importance of a multidisciplinary approach. Additionally, we provide a comprehensive review of the literature on anaesthetic management of patients with muscular dystrophy undergoing laparoscopic surgery.

Keywords: Muscular dystrophy, laparoscopic hysterectomy, spinal anaesthesia in muscular dystrophy.

Introduction

Muscular dystrophies are a heterogeneous group of genetic disorders characterized by progressive skeletal muscle weakness and degeneration. Global incidence is approximately 1 in 5000 individuals [1]. Becker muscular dystrophy (BMD) is an X-linked recessive disorder, a milder variant of Duchenne muscular dystrophy, caused by mutations in the dystrophin gene [2]. Patients with BMD may present with varying degrees of muscle weakness, cardiomyopathy, and respiratory dysfunction.

Laparoscopic surgery has become a standard approach for various gynaecological procedures, including hysterectomy, due to its advantages of reduced postoperative pain, shorter hospital stay, and faster recovery [3]. However, laparoscopic surgery in patients with muscular dystrophy poses

unique challenges for anaesthesiologists due to the physiological changes associated with the disease, effect of muscular dystrophy on other organs, rhabdomyolysis and hyperkalaemic response under stressful conditions, and the potential for complications related to pneumoperitoneum and positioning.

This case report describes the anaesthetic management of a patient with BMD undergoing laparoscopic hysterectomy. We also provide a comprehensive review of the literature on anaesthetic considerations for patients with muscular dystrophy undergoing laparoscopic surgery, emphasizing the importance of a multidisciplinary approach to ensure patient safety and optimal outcomes.

Case Presentation

A middle aged woman, with history of progressive quadriparesis for 25 years and a known case of Becker Muscular Dystrophy, presented to the gynaecology department with complaints of heavy menstrual bleeding and dysmenorrhoea. Her BMD was characterized by flaccid quadriparesis (which started with the lower limbs and progressed to upper limbs), wasting and contractures. Her elder sister also has the same disease. There is a history of paternal consanguinity. Neurological examination revealed power of 1/5 in upper limbs, 0/5 in lower limbs and 2/5 in neck flexors. Deep tendon reflexes were absent. Pre-operative ECG showed sinus rhythm. A 2D-Echocardiogram was performed, which revealed normal left ventricular function with an ejection fraction of 60% and no evidence of cardiomyopathy. Pulmonary function tests (PFTs) could not be done as the patient had difficulty in performing the test. Routine blood tests, including coagulation profile, were within normal limits. Abdominal ultrasound confirmed the presence of multiple uterine fibroids, correlating with her symptoms.

Anaesthetic Plan and Informed Consent Due to the high risks associated with anaesthesia, including the possibility of risk of malignant hyperthermia and rhabdomyolysis and also prolonged mechanical ventilation and worsening of neurological status were explained. A multidisciplinary discussion involving the gynaecologist, anaesthesiologist, and neurologist was held. The decision was made to proceed with spinal anaesthesia. The patient and her family were counselled about the risks and benefits of both GA and spinal anaesthesia, including the possibility of conversion to GA if the spinal failed or if she could not tolerate the procedure awake.

The anaesthetic and surgical management of the patient was as follows. In the operating room, standard monitors, 5 lead ECG, ST segment interpretation, pulse oximeter, Non Invasive Blood Pressure (NIBP), temperature probe (Axilla) were attached. An intravenous line was secured with 16G cannula. Radial Artery cannulation was done under local anaesthesia for invasive blood pressure monitoring (IBP). Under strict aseptic precautions and local anaesthesia, in the left lateral position, a subarachnoid block was performed at the L3-L4 interspace using a 25G Quincke needle. 3.8 ml of 0.5% hyperbaric bupivacaine with 60 mcg of buprenorphine was injected. A sensory block upto the T6 dermatome was achieved. The patient was sedated with an infusion of dexmedetomidine at 0.2-0.5 mcg/kg/hr. Her sedation levels and respiratory rates were also monitored.

The patient was placed in a Trendelenburg position. Care was taken to secure her position to prevent nerve injury or slippage. A low-pressure pneumoperitoneum was maintained at 12 mmHg. A total laparoscopic hysterectomy with bilateral salpingectomy was performed. The surgery lasted 90 minutes. The patient remained haemodynamically stable throughout the procedure.

The patient was transferred to the Post Anaesthesia Care Unit (PACU) for further monitoring. Her motor and sensory block regressed completely in 5-6 hours. Post-operative analgesia was provided with intravenous paracetamol 1g and tramadol 100mg was given IV 8th hourly. Her recovery was uneventful, with no cardiac or respiratory complications. She was discharged on the fourth post-operative day. At her 2-week follow-up, she was recovering well.

Discussion

This case report details the successful use of spinal anaesthesia for a total laparoscopic hysterectomy in a middle aged woman with Becker Muscular Dystrophy. The primary success of this case lies in the complete avoidance of general anaesthesia and its associated life-threatening risks in this vulnerable patient.

The anaesthetic management of patients with muscular dystrophies like BMD is challenging [4]. BMD is a congenital muscle disorder caused by genetic mutations. The abnormal dystrophin protein predisposes them to a range of complications under GA. The foremost concern is the risk of malignant hyperthermia, a hypermetabolic crisis triggered by volatile anaesthetics and succinylcholine [5]. Rhabdomyolysis, hyperkalaemia, and cardiac arrest is a well-documented risk in patients with BMD. Therefore, a core principle of anaesthesia in these patients is the strict avoidance of all known triggering agents, making a total intravenous anaesthesia (TIVA) or a regional technique preferable. When TIVA is used as the only anaesthetic technique, the occurrence of postoperative respiratory depression may increase in BMD patients due to high sensitivity to opioids and muscle relaxants. Moreover, propofol may lead to profound hypotension, reduced organ perfusion, and violent coughing. Our choice of spinal anaesthesia completely eliminated this risk.

Laparoscopic surgery, particularly hysterectomy, is almost universally performed under GA with endotracheal intubation. This is because neuraxial anaesthesia presents its own set of challenges for this type of surgery. The creation of a pneumoperitoneum and the required Trendelenburg position can lead to significant respiratory compromise and cephalad spread of the anaesthetic. Furthermore, peritoneal and diaphragmatic stretching from carbon dioxide (CO₂) insufflation frequently causes referred shoulder tip pain, which is not blocked by a mid-thoracic spinal level and can be intolerable for an awake patient [6].

In our patient, we addressed these challenges through multiple strategies. Firstly, we maintained a low-pressure pneumoperitoneum (10-12 mmHg) to minimise diaphragmatic irritation and reduce systemic CO₂ absorption. Secondly, we used an infusion of dexmedetomidine for conscious sedation. Dexmedetomidine is an ideal agent in this scenario as it provides sedation and anxiolysis without causing significant respiratory depression, a crucial benefit in a patient with pre-existing restrictive lung patterns [7]. Its analgesic properties also help obtund the visceral discomfort and shoulder pain associated with laparoscopy under regional anaesthesia [8]. The stable haemodynamics and patient comfort observed in our case highlights the usefulness of dexmedetomidine. Reports of major laparoscopic procedures under neuraxial anaesthesia in patients with muscular dystrophies are scarce in the literature. Most reports describe regional techniques for lower limb or minor open abdominal surgeries. For instance, spinal anaesthesia has been successfully used for patients with other myopathies, like Miyoshi myopathy, for procedures below the umbilicus [9]. However, reports on advanced laparoscopic surgeries like hysterectomy in BMD patients are rare, making this case a valuable addition to the existing evidence. Our successful management demonstrates that with careful planning, the benefits of minimally invasive surgery can be extended to this high-risk population without resorting to GA.

It is important to acknowledge the limitations of this report. This is a single case, and its success was contingent on the patient's specific clinical profile, namely, preserved cardiac function and only minor respiratory impairment. This approach may not be suitable for patients with severe cardiomyopathy, or significant respiratory muscle weakness.

Conclusion

Spinal anaesthesia, supplemented with conscious sedation and managed with a low-pressure

pneumoperitoneum, presents a safe and effective alternative to general anaesthesia for laparoscopic hysterectomy in carefully selected patients with Becker Muscular Dystrophy. This strategy requires a thorough preoperative multidisciplinary assessment and meticulous intraoperative care but can significantly enhance patient safety by circumventing the profound risks of general anaesthesia in this population.

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