

Erector Spinae Plane Block in an Asthmatic, Post-Thymectomy, Myasthenia Gravis patient with repeated Myasthenic Crisis episodes for Percutaneous Nephrostomy and Cystoscopy

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Abstract

Myasthenia gravis is an autoimmune disorder attacking the neuromuscular junctions at the post-synaptic membrane causing fatigable weakness of skeletal muscles. These cases pose an anaesthetic challenge since drugs used in general anaesthesia interact with the anticholinesterase medications used for control of myasthenia gravis symptoms and result in post-operative complications like respiratory muscle weakness and continuation of ventilator support. Here we have used Erector Spinae Plane Block and supplemented it with minimal sedation along with preservation of spontaneous ventilation and thus avoided the complications associated with general anaesthesia in such patients.

Keywords: Myasthenia gravis, Erector spinae plane block, Percutaneous nephrostomy, Cystoscopy

Introduction

Myasthenia gravis is an auto-immune disorder in which patients present with fatigable weakness of skeletal muscles [1]. Administering anaesthesia is challenging due to interaction of muscle relaxants and reversal agents with diseased acetyl choline receptors on the post synaptic membrane of skeletal muscles [2, 3]. This could lead to complications like prolonged neuro muscular blockade, cholinergic crisis, myasthenic crisis which can all result in post operative ventilatory stay [4].

We present a case of percutaneous nephrostomy and cystoscopy where we have used a combination of ultrasound guided erector spinae plane block with total intravenous anaesthesia. Available literature states that general anaesthesia with non depolarising muscle relaxants and train of four monitoring should be the anaesthesia of choice in such patients [4].

Case presentation

A 57-year-old male, a known case of Myasthenia gravis (MG) for three years was posted for percutaneous nephrostomy (PCN). He has a history of thymectomy 3 years back with uneventful general anaesthesia followed by myasthenic crisis 10 days later which was treated with plasmapheresis (5 cycles), mechanical ventilation and steroids. He also had a history of blurred vision with muscle weakness 2 months back which was again treated with plasmapheresis (6 cycles). During his current admission he had no muscle weakness, swallowing or breathing difficulty. He was on Tab Mycophenolate 500

mg BD, Tab Pyridostigmine 60 mg TID and Tab Prednisolone 5 mg OD for 3 years. Additionally, he was also on Tab Nebivolol 5 mg BD, Tab (Glimepiride 1mg+ Metformin 500 mg) TID and Tab (Vildagliptin 50 mg+Metformin 500 mg) OD for 15 years. His blood pressure was 126/82 mmHg and HbA1c was 7.2. He was a known asthmatic for 3 years with no recent history of asthmatic attack or steroid intake for the same. He was not on any regular medications for asthma and has no wheeze on auscultation. Airway examination was normal. Examination of the back did not reveal any active skin infection or discharge. Total leukocyte count was 17340 and CRP was 55. All other laboratory parameters were normal and systemic examination did not reveal any significant abnormality. Intermittent fever was managed with 1.5 gm intravenous cefoperazone sulbactam combination and 750 mg amikacin. Plan was to perform USG guided erector spinae plane block (ESPB) on left side at T10 level and achieve anaesthetic depth with total intravenous anaesthesia with preservation of spontaneous ventilation.

Patient was explained the procedure. The chances of prolonged mechanical ventilation in an event of use of muscle relaxation if general anaesthesia was required was explained. Appropriate consent was obtained, and the patient was instructed to continue all his current medications until the day of surgery. After confirmation of adequate fasting, patient was wheeled in the operating room. American Society of Anaesthesia (ASA) standard monitors were attached and a 20 G intravenous line was secured in the dorsal aspect of left palm through which ringers lactate was started. Oxygen was

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started via Hudson was at 4 litres per minute. Patient was placed in prone position. Under all aseptic precautions, the area from T4-T12 vertebra was cleaned using 2% chlorhexidine and betadine. A sterile curvilinear probe (Sonosite) (2-5 MHz) was placed 3cm to the left of T10 spinous process. The muscle layers namely trapezius and erector spinae were identified. Transverse process was confirmed by squaring sign. A 23G Quinckes spinal needle (Becton Dickinson, Guadelix, Spain) was introduced from the lateral side of the probe using out of plane approach. After hitting the transverse process, 20 ml of 0.5% Bupivacaine was injected after negative aspiration of blood and air. Drug spread was seen under real time. Block level was assessed at 15 minutes post injection which showed absence of pin prick from T4-L1 level extending 2 cm from midline on the back upto left mid clavicular line anteriorly. 10ml of 2% lignocaine infiltration was done at the surgical site by the surgeon. Total duration of surgical procedure was 30 minutes. Other drugs used were intravenous 1 gm paracetamol and 50mg propofol titrated to effect. Surgery was uneventful and the patient was pain free for upto 18 hours post procedure.

Discussion

MG is an anaesthetic challenge because of the interaction of routine anaesthetic drugs like muscle relaxants with anti cholinesterase medications which are routinely used in the treatment of myasthenic patients. There is a possibility of disease exacerbation due to surgical stress and drugs that increase muscle weakness resulting in myasthenic crisis and prolonged mechanical ventilation. Renal pain is transmitted by T10 to L1 nerve roots and pain arising from ureter is transmitted by T10 to L2. Blockade of somatic and visceral components innervating the skin, muscle, kidneys and ureters is required to achieve adequate analgesia for PCN and cystoscopy. ESPB was first described by Forero et al. for thoracic neuropathic pain [5]. Thoracic spinal nerves after exiting from the intervertebral foramen split into dorsal and ventral rami. The dorsal ramus splits into medial and lateral branches. The ventral ramus continues as the intercostal nerve and splits into lateral and anterior cutaneous branches that supply lateral thoracic wall, anterior chest wall and upper abdomen respectively. Thus, it covers both somatic and visceral pain. In this patient the dermatomal level required was from T6 upto T12 which was adequately achieved by injection at T10 level. Regional anaesthesia in the form of central neuraxial or peripheral nerve blocks should be the anaesthesia of choice in such patients. As far as possible aim should be to preserve spontaneous respiration with adequate anaesthetic depth by the use of short acting anaesthetic and analgesic drugs. Drugs like benzodiazepines and opioids which can cause respiratory depression should be avoided. It is important to also note the amide local anaesthetics should be preferred over esters since anticholinesterase medications can theoretically inhibit the hydrolysis of esters and cause prolonged block.

Mid thoracic or higher levels of neuraxial blockade which is required for this case could result in paralysis of accessory muscles of respiration and hypotension. Also, it is difficult to predict drug spread and manipulate the block levels in prone position. Also, after 3 days of drainage of 60ml pus from perinephric area, ultrasound showed a fresh collection of 125 ml fluid. NYSORA recommends that sepsis of different origin should be considered as a relative contraindication and decision to perform neuraxial anaesthesia should be taken based on the initiation of antibiotic therapy and hemodynamic stability. Considering the possibility of localised spread of infection, spinal anaesthesia around that level was avoided. and unilateral erector spinae block was preferred over neuraxial anaesthesia [6,7].

Bonvinci D et al., Aksu et al. have reported that ESPB is a safer alternative to paravertebral block for prevention of post-operative pain in various abdominal and thoracic surgeries [8, 9]. Munise et al used ESPB for post thoracotomy pain in patients with myasthenia gravis and concluded that it reduced the opioid requirement after thymectomy thus preventing the possible post-operative complications [10]. Our patient was pain free upto 18 hours post surgery without any opioid requirement. Kim et al. used a catheter-based technique at T8 level for percutaneous nephrolithotomy by using 10ml of 0.75% ropivacaine with 10ml saline and (1:200000) epinephrine twice a day for 5 days postoperatively and observed that the patient had no opioid requirement [11]. Singh.S et al concluded that the use of single shot ultrasound guided ESPB with 20 ml of 0.5% bupivacaine before induction of general anaesthesia in modified radical mastectomy, significantly reduced the post-operative 24-hour morphine consumption [12].

Conclusion

Fascial plane blocks can be used as adjuncts to anaesthesia in patients who might be at a higher risk of side effects of anaesthesia medications due to their disease states. Respiratory depression and subsequent ventilatory requirement can be avoided in a lot of patients if ESP block is used with carefully titrated sedation to achieve a good anaesthetic depth. Anaesthesiologists should incorporate such blocks in routine practise and take advantage of the reduced anaesthetic doses and subsequently reduced side effects. Further studies should be done about the exact receptors and nerve endings where the drug acts in erector spinae block, and catheter based continuous infusions for sustained pain relief in major surgeries.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the Journal. The patient understands that his/her name and initials will not be published, and due efforts will be made to conceal his/her identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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