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ANAESTHETIC MANAGEMENT IN INGUINAL HERNIA PATIENT WITH SCOLIOSIS: A CASE REPORT

Anaesthesiology

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ABSTRACT

Introduction: Inguinal hernia repair is one of the most commonly performed surgical procedures worldwide, typically yielding favourable outcomes in otherwise healthy patients. However, the presence of comorbid conditions such as scoliosis. Adolescent idiopathic scoliosis is a disease with an overall prevalence of 0.47-5.2 % in the current literature; which can pose unique challenges for surgical planning and anaesthesia management. **Case Summary:** A 37-year-old male with a 20-year history of scoliosis presented with right groin pain and swelling, diagnosed as right inguinal hernia. Due to Cobb's angle of >50° and restrictive lung function, regional anaesthesia was preferred. Ultrasound-guided triple nerve block with ropivacaine was used, targeting the ilioinguinal, iliohypogastric, and genital branch of the genitofemoral nerves. Spinal deformity posed challenges for positioning, ventilation, and anaesthesia distribution. Surgery proceeded under monitored sedation without complications. Postoperative recovery was smooth, with the patient transferred to the surgical ward after observation. **Conclusion:** Triple nerve block offers effective anaesthesia and analgesia for inguinal hernia surgery, especially when spinal anaesthesia is challenging. Larger studies can further validate its safety and efficacy.

KEYWORDS

INTRODUCTION

Scoliosis is a three dimensional structural deformity of vertebral column where the lateral curvature of spine is exaggerated measured by Cobbs angle on radiographic imaging with an overall prevalence of 0.47-5.2 % being more in females; ratio ranging from 1.5:1 to 3:1 and increases substantially with increasing age[1]. Patients with scoliosis when present for lower abdominal and lower limb surgeries, do pose a unique challenge for anesthesiologists [2] due to abnormal anatomy of the vertebral column possibly narrowing or asymmetry of spinal canal. So, this report was aimed to study the advantages of triple block in a patient with scoliosis planned for hernia surgery.

Case Summary

A 37 year old male patient with history of scoliosis since 20 years, came to the surgery department with complaint of pain and swelling over the right groin since 3 months. Patient was diagnosed with right inguinal hernia and planned for right open mesh hernioplasty. Pre-anaesthetic workup included thorough clinical examination and evaluation of the extent and severity of spinal deformity through imaging study. Cobbs angle was found to be >50° . Vitals were within normal limits. Patient was also assessed for pulmonary function tests which revealed restrictive pattern with baseline oxygen saturation within normal limits. So, Triple block (local block) was selected.

Administering general anaesthesia in a patient with scoliosis is challenging due to anatomical and physiological changes. In this case, spinal deformity caused thoracic curvature and rib cage distortion, reducing lung compliance and impairing pulmonary function. These alterations increased the risk of hypoventilation and hypoxia during anaesthesia. Positioning the patient was difficult, and achieving uniform distribution of anaesthetic agents was complicated by the asymmetrical chest wall and reduced thoracic volume. Intraoperative ventilation required careful monitoring and adjustment to ensure adequate oxygenation and carbon dioxide elimination throughout the procedure.

Hemodynamic instability was another concern, as altered intrathoracic pressures and potential cardiac displacement could affect circulation. Furthermore, patient positioning on the operating table was challenging, requiring customized padding and supports to prevent pressure injuries and ensure surgical access. Collectively, these factors demanded heightened vigilance, preoperative planning, and intraoperative adaptability to safely manage anaesthesia in this scoliosis patient.

Spinal anesthesia in scoliosis patients is challenging due to distorted spinal anatomy. Abnormal curvature disrupts normal landmarks, complicating identification of the epidural or spinal spaces. Vertebral misalignment makes midline location and ideal needle angle difficult, increasing the risk of improper placement. Resistance during needle advancement may cause more discomfort. These factors raise the chances of complications like dural puncture or misplacement. Additionally, the spinal curvature can cause uneven spread of anesthetic, leading to asymmetric or inadequate block levels during the procedure.

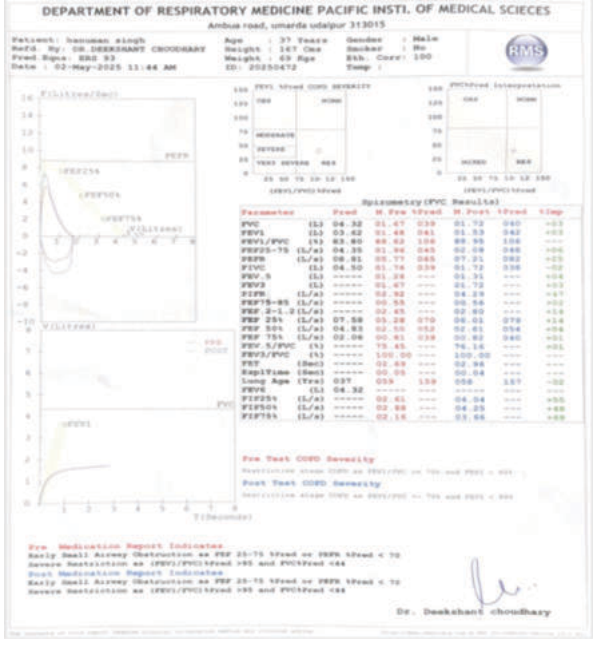

Figure 1 : PFT

Figure 2 : Clinical Image Showing

Figure 3 : X ray Chest – PA View

In the operating room, standard monitoring was initiated, including electrocardiography (ECG), noninvasive blood pressure (NIBP), and pulse oximetry. The patient was positioned supine. A senior consultant performed an ultrasound-guided triple nerve block on the operative side using a SonoSite MicroMaxx machine with a high-frequency (6–13 MHz) linear probe. After sterile preparation, the probe was placed above the anterior superior iliac spine (ASIS), perpendicular to the inguinal ligament. The external oblique, internal oblique, and transversus abdominis muscles were visualized, and the fascial plane between the internal oblique and transversus abdominis—targeting the ilioinguinal and iliohypogastric nerves—was identified. A 21G × 100 mm SonoPlex Stim cannula was inserted using an in-plane technique, and 10–15 mL of 0.5% ropivacaine was administered.

The genital branch of the genitofemoral nerve was blocked separately using an out-of-plane approach near the spermatic cord, injecting 5 mL of 0.5% ropivacaine. The incision site was also infiltrated with 5 mL of local anesthetic. Total anesthetic volume ranged from 20 to 25 mL. Block effectiveness was confirmed via pinprick test. Mild sedation with midazolam (0.05 mg/kg) was maintained. Vitals remained stable during surgery, and the patient was transferred to postoperative care, then to the ward after 30 minutes without complications.

DISCUSSION

Approximately 20 million inguinal hernia repairs are being performed globally every year[3]. The most widely used modality of anaesthesia during inguinal hernia repair surgery is spinal anaesthesia as it provides both intense sensory and motor blockade[4].

In our case report, patient also has scoliosis. The female to male ratio ranges from 1.5:1 to 3:1 and increases substantially with increasing age. In particular, the prevalence of curves with higher Cobb angles is substantially higher in girls than in boys: The female to male ratio of idiopathic scoliosis rises from 1.4:1 in curves from 10° to 20° up to 7.2:1 in curves >40°. Curve pattern and prevalence of scoliosis is not only influenced by gender, but also by genetic factors and age of onset.[1]

Thoracic curves are the most common (48 %), followed by thoracolumbar/lumbar curves (40 %). Double curves (9 %) and double thoracic curves (3 %) are less common.[5]

Scoliosis often leads to secondary involvement of the respiratory, cardiovascular, and neurological systems. Common respiratory issues include restrictive lung disease, pulmonary hypertension, and hypoxic pulmonary vasoconstriction, while cardiac complications may involve cor pulmonale, right ventricular hypertrophy, and cardiomyopathy. Restrictive lung disease reduces vital capacity, tidal volume, and functional residual capacity, leading to an increased respiratory rate. Airway management and respiratory compromise are the most frequent challenges in these patients. Administering general anaesthesia is particularly difficult due to vertebral rotation and thoracic deformity. In this case, spinal curvature and rib cage distortion impaired pulmonary function and made patient positioning difficult, especially with upper thoracic and cervical spine involvement. These anatomical changes led to reduced lung compliance and a restrictive pattern on pulmonary function testing, increasing the risk of hypoventilation and hypoxia during anaesthesia.[2] The distorted thoracic cavity and asymmetrical chest wall expansion hindered even distribution of anaesthetic agents. Intraoperative ventilation required close monitoring to maintain adequate oxygenation and carbon dioxide levels. Hemodynamic instability was also a concern due to altered intrathoracic pressure and possible cardiac displacement. Additionally, patient positioning demanded careful planning, customized supports, and padding to avoid pressure injuries and ensure surgical access. Effective management required thorough preoperative preparation and vigilant intraoperative monitoring.

Spinal anesthesia in patients with scoliosis can be significantly challenging due to the altered spinal anatomy. Scoliosis, characterized by abnormal curvature of the spine, complicates the usual landmarks for identifying the epidural and spinal spaces. The deviation in the alignment of the vertebrae makes it difficult to locate the ideal needle insertion point, increasing the risk of improper needle placement. Moreover, the curvature may lead to difficulty in achieving accurate needle placement at the desired level of the spine, particularly when attempting to find the midline or ensure the proper angle of insertion. Additionally, the altered anatomy can result in increased resistance to needle advancement and potentially more discomfort or pain for the patient during the procedure. This can also increase the likelihood of complications such as dural puncture or inadvertent insertion into the wrong space. The curvature can lead to issues with the distribution of the anesthetic, resulting in asymmetric block levels. However, it may not be an appropriate anaesthetic technique at this situation and also may not be ideal for fast-track ambulatory surgery due to undesirable haemodynamic responses, urinary retention, postdural puncture headache, and prolonged recovery and hospital stay[6-7]. But the revolution that came with the new era of ultrasound guidance and the concept of Enhanced Recovery after Surgery (ERAS), has made an ease in practice of the anaesthesiologists to provide better anaesthesia with a better postoperative outcome and pain relief.

So, One of the effective modalities for anaesthesia in inguinal hernia surgery is triple nerve block where block to ilioinguinal, iliohypogastric and genitofemoral nerves is given as they have a variable origin, course, and distribution in the inguinal region[8-9]. This combined modality approach improves the quality of analgesia and reduces perioperative opioid requirements and its associated side effects[10-12] and this approach, if done ultrasound guided, gives higher chance of success and a lesser volume of required local anaesthesia.[13-15]

In multiple studies, it has been studied that peripheral nerve blocks of ilioinguinal and ilio-hypogastric nerves are quiet efficacious for postoperative pain relief in inguinal hernia surgery. In our present study, genitofemoral nerve block was also used as the benefit has been demonstrated at the time of sac traction during open inguinal hernia surgery[16-17]. Also, Gurkan et al[18] found out in their study that this nerve block approach provides postoperative analgesia for a longer time and early recovery. Another study showed better and significant results with triple nerve block approach than subarachnoid block.[19]

CONCLUSION

The triple nerve block technique for inguinal hernia surgery provides better anaesthetic and favourable analgesic efficacy in intraoperative as well as postoperative period. It is also helpful and better anaesthetic alternative in inguinal hernia patients where subarachnoid block is difficult or cannot be given. Further the study of efficacy, benefits and effects of this approach can be demonstrated on multiple and larger number of patients.

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