



SPINAL ANAESTHESIA –A VALUABLE ANAESTHETIC MANAGEMENT TECHNIQUE IN A CASE OF SEVERE KYPHOSCOLIOSIS SCHEDULED FOR CYSTOLITHOTRIPSY.----A CASE REPORT.

Anaesthesiology

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ABSTRACT

Thoracolumbar kyphoscoliosis provides a very unique challenging situation to anesthesiologists because of the altered anatomy and related cardiopulmonary restrictions in the patient. In such cases planning of anesthesia becomes even more difficult. General anaesthesia has its own set of disadvantages due to airway related complications and cardiopulmonary limitations. Spinal anaesthesia is also difficult to perform due to the deformity of spine and spread of anesthetic drug to unpredicted level. We are presenting an interesting case of a 70 year female with severe kyphoscoliosis planned for cystolithotripsy under spinal anaesthesia. We achieved both bilateral motor and sensory blockade upto T8. There were no complications with stable cardiopulmonary functions and patient reported satisfactory anaesthesia. In conclusion, spinal anaesthesia can be a successful and valuable technique even in cases of severe kyphoscoliosis.

KEYWORDS

spinal anaesthesia, kyphoscoliosis, cobb's angle, paramedian approach

INTRODUCTION

Patients with kyphoscoliosis present unique challenges to an anaesthesiologist for the administration of anesthesia due to abnormality of spine and cardiopulmonary restrictions. Kyphoscoliosis is characterised by abnormal costovertebral skeletal structures arising due to disruption of balance between structural and dynamic components of the vertebral column. There occurs an axial rotation of the vertebral bodies as well as spinous processes. The most common cause of kyphoscoliosis is idiopathic, which occurs in 70% of the population. Other causes include neuromuscular, congenital, or traumatic.(1)(2)

Kyphoscoliosis mainly leads to a restrictive respiratory pattern. Additionally, there is a reduction in chest wall compliance due to the abnormal thoracic cage geometry. In severe cases, there is a significant ventilation-perfusion mismatch which causes arterial hypoxemia. In the cardiovascular system, there is a rise in pulmonary vascular resistance lead to pulmonary hypertension which may progress to right ventricular failure. (1)

The airway management and cardiorespiratory embarrassments make general anesthesia hazardous, where as spinal anaesthesia may be challenging due to difficulty in patient positioning, abnormal curvature of spine, difficulty in identification of intervertebral spaces and unpredictable pattern and level of the block.(3)(4) We report an interesting and challenging case of a 70-year-old female with severe kyphoscoliosis presented with a urinary bladder calculus. She was planned for cystolithotripsy under spinal anaesthesia.

Case Description

A 70 year old female with severe kyphoscoliosis and urinary bladder calculus was posted for endoscopic cystolithotripsy. She is a known case of hypertension and asthma with regular treatment (antihypertensive and inhaled bronchodilator). Patient came with history of burning micturition and difficulty in micturition on and off for past one year and was managed conservatively. Her complaints had increased in last one month. Patient had history of kyphoscoliosis since many years. Patient was not able to lie down completely on her back and was not able to move unaided. There was no history of any motor or sensory symptoms or any bladder/ bowel disturbances.

On examination, her general condition was adequate. Patient was alert, cooperative and well oriented. Her airway assessment showed adequate mouth opening (intact teeth), Mallampati class II with limitation in neck extension. Investigations revealed haemoglobin, platelet count, blood urea, serum creatinine, electrolytes, blood sugar level, ECG were within normal limits. X-ray chest showed crowding of ribs, prominent bronchovascular markings. PFT showed mixed (obstructive plus restrictive) disorder. 2decho was normal (EF 55-60%, no RWMA, mild pulmonary artery hypertension). The risks of anaesthetic technique which include difficult spinal anaesthesia and complications like partial block, failed spinal, high

spinal, general anaesthesia and postoperative intensive care were explained to patient and her care takers. This patient was accepted for anaesthesia under ASA grade III physical status with written and informed high risk consent.

Patient was shifted to operation theatre and intravenous access was obtained with 20 g IV cannula. Patient was preloaded with 500 ml Ringer lactate while pulse-oximeter, NIBP and ECG monitors were connected. All necessary resuscitation equipments, preparation of general anaesthesia and difficult airway cart was kept ready. Intervertebral space was identified by palpating the spine from upwards. Under all aseptic precautions spinal anaesthesia was given with 25 g Quincke spinal needle via paramedian approach in L2-L3 intervertebral space in sitting position by injecting 2.0 ml of 0.5% bupivacaine heavy plus 25 mcg of fentanyl (single attempt). Then patient was given supine position with aided supports and pillows. Sensory block was achieved up to T8 & surgery was started. Her vital parameters like heart rate, blood pressure, ECG & saturation were monitored and maintained within normal limits.

Postoperative pain relief was given by injection paracetamol 1 gm at 8 hours interval and injection tramadol 100 mg IV on SOS basis. Sensory block lasted till 2.5 hours. Patient was kept in ICU for monitoring and shifted to the ward after 24 hours. Patient was discharged after 3 days from hospital.

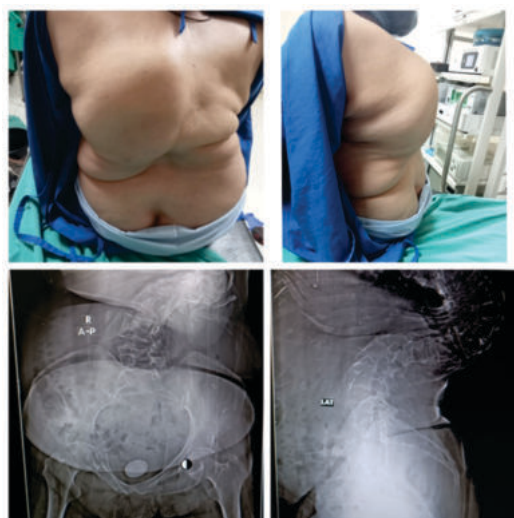


Image 1- Physical Appearance Of Kyphoscoliosis With X-ray Images.

DISCUSSION

Kyphoscoliosis is defined as progressive deformity of spine, which

involves kyphosis, an anteroposterior spinal angulation and scoliosis, a lateral curvature of spine. The level of reductions in cardiac and pulmonary function of kyphoscoliotic patient is directly proportional to the amount of Cobb's angle. Cardiopulmonary status begins to derange if this angle is larger than 40° and it becomes very significant with angle $>100^\circ$. (3)(4) A prospective observational study stated that spinal anesthesia was successful in patients with Cobb's angle $< 50^\circ$. But an observation made that failed subarachnoid block was more in right-sided scoliosis and Cobb's angle more than 50° . Unequal spread of drug after spinal anesthesia was more in right-sided curve. (4) In our patient, kyphoscoliotic curve is more on left side and Cobb's angle was $> 100^\circ$ with mixed obstructive and restrictive respiratory pattern but she had no significant cardiovascular instability. Her echocardiography was normal.

Even if the lungs are functionally normal, the distortion of the thoracic cage makes the respiratory system less compliant and increases the work of breathing. In severe cases, there may be altered airway anatomy which can cause problems during intubation for general anesthesia. (5) General anesthesia with controlled ventilation is associated with many problems such as IPPV and anesthetic agents induced severe hypotension, unpredictable effects of neuromuscular blocking agents, delayed extubation and need for postoperative ventilation. (6)(7)

The ventilatory response to hypercarbia and hypoxia is preserved with neuraxial anesthesia. Partial pressures of both oxygen (P_{O_2}) and carbon dioxide (P_{CO_2}) are essentially unchanged during spinal anesthesia. As neuraxial anesthesia produces a "differential" blockade of motor, sensory, and autonomic fibers, additionally, bronchomotor tone is preserved and not altered to any significant degree with restricted level of sympathetic block. So the degree to which respiratory function is impaired depends on the relative extent of segmental motor blockade. Indeed, spinal anesthesia has been used successfully in high-risk patients with COPD and asthma undergoing infraumbilical surgeries. In many of the settings, neuraxial anesthesia has been associated with reduced postoperative pulmonary complications compared to general anesthesia. (8)

In our case, anesthetic management was focused to maintain normal cardio-respiratory function in perioperative as well as postoperative period. We have opted spinal anesthesia with standard paramedian approach. Neuraxial anesthesia in this type of patient is technically challenging due to angulation and rotation of vertebral body, epidural space is deviated toward the convexity of angulation. (9) Gurayten et al has achieved unilateral spinal block with hyperbaric bupivacaine. It may be due to abnormal angulation and rotation but then he used hypobaric bupivacaine to produce spinal block on contralateral side simply by changing position of patient and then bilateral motor block achieved. (10)

Placement of spinal needle is difficult in patient with severe thoracolumbar kyphoscoliosis due to ossification of interspinous ligaments and bony bridges. Huang et al described a modified paramedian approach of spinal anesthesia for such patients in which spinal or epidural block is given by directing the needle toward the convexity of the curve with significant angulation of the needle. (9) Rashmi Deshmukh et al has demonstrated a preprocedural ultrasound scan in paramedian sagittal and transverse interlaminar view before giving spinal anesthesia via paramedian approach. Ultrasound proved to be a boon in localizing the subarachnoid space. (3) However, the paramedian approach was preferred. (11) Manbir Kaur et al used fluoroscopy and x-ray imaging to detect intervertebral space to perform spinal anesthesia in kyphoscoliotic patient. (12)

We reported a bilateral motor block with sensory block (by pin prick) up to T8 level with hyperbaric drug and standard paramedian approach with normal anatomical landmark based technique. Although ultrasound was kept ready if it was needed. Our patient tolerated spinal anesthesia very well without any partial or incomplete block. Our patient remained completely alert, well-oriented and hemodynamically stable throughout the procedure and in postoperative period as well. There are different techniques like Taylor's approach, modified paramedian approach, sometimes use of hypobaric drugs and ultrasound or other imaging modalities can increase the success rates of spinal anesthesia.

CONCLUSION

Spinal anesthesia with an adequate planning with meticulous

approach can be a much better technique in patients with thoracolumbar kyphoscoliosis by maintaining airway and avoiding complications of general anesthesia. The better maintenance of cardio-respiratory functions with spinal anesthesia will result in more successful outcome.

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Conflicts Of Interest

The authors have no conflicts of interest to disclose.

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