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Anaesthetic Management of Geriatric Female with Kyphoscoliosis

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Abstract: ***Subarachnoid block in patients with kyphoscoliosis present as a nightmare to anaesthesiologists owing to the deformity of the spine. We present a case report of a poliomyelitis patient witha peri - implant fracture of right distal femur planned for a distal femoral locking compression plate (DFLCP) under Spinal Anaesthesia.***

Keywords: Subarachnoid block, kyphoscoliosis, poliomyelitis, fracture femur, cobb angle

1. Introduction

Kyphoscoliosis is a forward and lateral bending of the spine affecting the thoracolumbar spine.[1] The most common cause of kyphoscoliosis is idiopathic. Other causes are neuromuscular like poliomyelitis, spinal muscular atrophy, cerebral palsy etc; myopathic like muscular dystrophy; mesenchymal disorders and trauma. [2] Restrictive lung disease and pulmonary hypertension may progress to cor pulmonale causing death in these patients.

2. Case Presentation:

A 75 - year - old female presented with an alleged history of fall. The patient had a history of previous surgery for a fracture right femur 12 years back under spinal anaesthesia. The patient had a history of poliomyelitis at age of 8 years followed by decreased motor power in the right lower limb and thoracolumbar kyphoscoliosis. The patient had no history of hypertension /asthma/diabetes mellitus/ tuberculosis/ stroke in past. The patient was a non - smoker, non - alcoholic and vegetarian in diet. On examination, the patient was conscious and well - oriented to time, place and person. Pulse rate 110/min BP: 150/90 mm HgChest: bilateral air entry +nt; CVS: S1 S2+nt. SpO_2: 84 to 88%on room air. Mallampati grading I, Edentulous with a thick short neck, restricted neck extension and kyphoscoliosis. The patient's hemogram, liver function test, renal function test and coagulation profile were within normal limits. The patient's CXR was suggestive of increased broncho - vascular marking & kyphoscoliosis. In electrocardiography sinus tachycardia was present. Pulmonary function tests were suggestive of severe restrictive lung disease. A neurological assessment was done and there was decreased motor power on the right side due to poliomyelitis. We planned regional anaesthesia for the patient and preparation was also done for giving general anaesthesia if required. The patient was administered tab pantoprazole 40mg two hrs before surgery with sips of water. In the operation theatre, monitors were attached and baseline parameters heart rate, blood pressure, electrocardiography and pulse oximetry were recorded. The intravenous line was secured with an 18 - gauge cannula and crystalloid was started. The patient's baseline vitals were HR: 118/min, BP: 160/110 mmHg, SpO_2: 87%on room air; Under strict aseptic precautions, with the patient in sitting position L3 - L4 intervertebral disc space was identified, 2ml of 2%lignocaine was administered in the skin and subcutaneous tissue; lumbar puncture was done with 23 gauge Quincke's Spinal needle after noting the free flow of cerebrospinal fluid 2ml of 0.5% hyperbaric bupivacaine with fentanyl 25µg (0.5 ml) was injected. The patient was made to lie supine and the pillow was placed below the shoulders and a level of sensory block was T6 tested with a pinprick. Surgery commenced at the surgical site after achieving a satisfactory sensory block. The intraoperative period was uneventful with the duration of surgery lasting for 2 hours and 30 minutes. Intraoperatively patient was oxygenated with a hudson mask with a flow of 8 litre/min. The patient was haemodynamically stable and no spinal – related complications were seen and was shifted to the ward postoperatively.

3. Discussion

Kyphoscoliosis is characterized by a progressive deformity of the spine with idiopathy being the cause in 80% of cases. In our case, it was due to the neuromuscular disorder poliomyelitis. Kyphoscoliosis causes a decrease in functional residual capacity, inspiratory capacity, vital capacity, and total lung capacity. The abnormal geometry of the thoracic cage decreases chest wall compliance and makes intubation and ventilation difficult. There is a marked decrease in ventilation - perfusion mismatch leading to arterial hypoxemia and difficulty in extubation which leads to postoperative mechanical ventilation and increased length of ICU stay. [3] In the cardiovascular system, there is an increase in pulmonary vascular resistance causing pulmonary hypertension which may lead to right ventricular hypertrophy and right ventricular failure. Restrictive lung disease, airway management, and cardio-respiratory insult make general anaesthesia hazardous, whereas regional anaesthesia is met with technical problems due to an abnormal curvature of the spine. [4] The level of derangements in cardiac & pulmonary function is related to the amount of cobb's angle in thoracolumbar X - ray. The cardiopulmonary function starts decreasing if this angle is larger than $45^{o}$and it becomes very significant with an angle greater than 100^{o}. The CSF volume is decreased in the kyphoticspine, thus even lower doses of local anaesthetics may achieve a higher than expected level of the block resulting in a higher incidence of hypotension hence the volume of local anaesthetic must be accordingly adjusted. In patients with severe curves, the hyperbaric solution may

pool in the dependent portion of the spine resulting in an inadequate block. Exercise tolerance tests, pulmonary function tests and arterial blood gas analysis help to determine the severity of respiratory impairment. [5] Noninvasive positive - pressure ventilation may help in patients with impending respiratory failure. [6]

The challenges, in this case, were tachycardia, hypertension, short neck, kyphoscoliosis, restricted neck extension, deranged PFT, and fat embolism. Keeping these challenges in mind surgery was planned under regional anaesthesia and a backup plan for general anaesthesia like rapid airway management position (RAMP), difficult airway cart, cardiac drugs and fibre optic intubation was prepared. The risk of anaesthetic technique (difficult spinal anaesthesia and complications like partial block, failed spinal, high spinal, general anaesthesia and post operative intensive care. Various techniques which could be used include the midline approach, paramedian approach, ultrasound - guided subarachnoid block, various manoeuvres like flexion of both limbs at the hip and knee joint after administering spinal anaesthesia to eliminate the scoliotic curve, general anaesthesia and finally administering spinal anaesthesia in lateral position along the concavity of scoliotic curve on the table. [7] The decreased success rate in subarachnoid block is due to difficulty in palpation of intervertebral space, unsuccessful need LE insertion, multiple attempts before successful insertion, false loss of resistance and failed or inadequate blockade. [8] Hence pre - anaesthetic evaluation and prior preparation for any untoward complications will give the proper outcome with fewer complications.

4. Conclusion

As these patients have abnormalities in pulmonary function and deformity in the spine, they pose difficulty both in giving general and regional anaesthesia. But with clinical assessment and proper preoperative planning, one can give regional block (subarachnoid block) in these patients.

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Figure 1: Inspection of back

Figure 2: Mallampati Grading

Figure 3: X Ray Chest

Figure 4: Administration of Spinal anaesthesia