

Case Report and Review of Literature on Anesthetic Management for Incisional Hernia Repair in a case of Severe Kyphoscoliosis with TB Spine and Asthma with Severely Deranged Pulmonary Function Tests

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Abstract: *kyphoscoliosis is an abnormal curvature of the spine on two different planes: the coronal plane and the sagittal plane. We report a case of 54 yr old female with incisional hernia with severe kyphoscoliosis with asthma with severely deranged pulmonary function tests. Umbilical hernia repair was done under general anesthesia with anesthetic challenges of difficult airway, difficult positioning due to severely deformed anatomy of the spine, prolonged surgery, acidosis, hypothermia, ventilatory management intraoperatively due to severe obstructive disease*

Keywords: Kyphoscoliosis, Tb spine, asthma, incisional hernia, Hypothermia, respiratory acidosis

1. Introduction

Kyphoscoliosis describes an abnormal curvature of the spine in both a coronal and sagittal plane. It is a combination of kyphosis & scoliosis. This musculoskeletal disorder often leads to other issues in patients, such as under ventilation of lungs, pulmonary hypertension, difficulty in performing day to day activities.^[1,2]

A normal thoracic curvature from 1st to 12th spine has a naturally occurring convex shape with angles ranging from 20 degrees to 45 degrees. When the curvature goes past 45 degrees the condition is termed as kyphosis. It can result in many discomforts including breathing and digestion difficulties, cardiovascular issues, and even neurological deformities.^[3]

Scoliosis refers to yet another form of abnormal curvature in which the persons spine takes an “S” or “C” shape. Typically a human spine is straight but in Scoliosis patients; there may be a curve of ten degrees in either direction, left or right.^[3]

Certain infections can also lead to the development of kyphoscoliosis such as vertebral tuberculosis or general tuberculosis

Asthma is a common long-term inflammatory disease of the airways of the lungs.^[4] It is characterized by variable and recurring symptoms, reversible airflow obstruction, and bronchospasm.^[5] Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath.^[6] These episodes may occur a few times a day or a few times per

week.^[4] Depending on the person, they may become worse at night or with exercise.^[4]

Asthma is thought to be caused by a combination of genetic and environmental factors.^[7] Environmental factors include exposure to air pollution and allergens.^[4] Other potential triggers include medications such as aspirin and beta blockers.^[4] Diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry.^[8] Asthma is classified according to the frequency of symptoms, forced expiratory volume in one second (FEV1), and peak expiratory flow rate.^[9] It may also be classified as atopic or non-atopic, where atopy refers to a predisposition toward developing a type 1 hypersensitivity reaction.^[10]

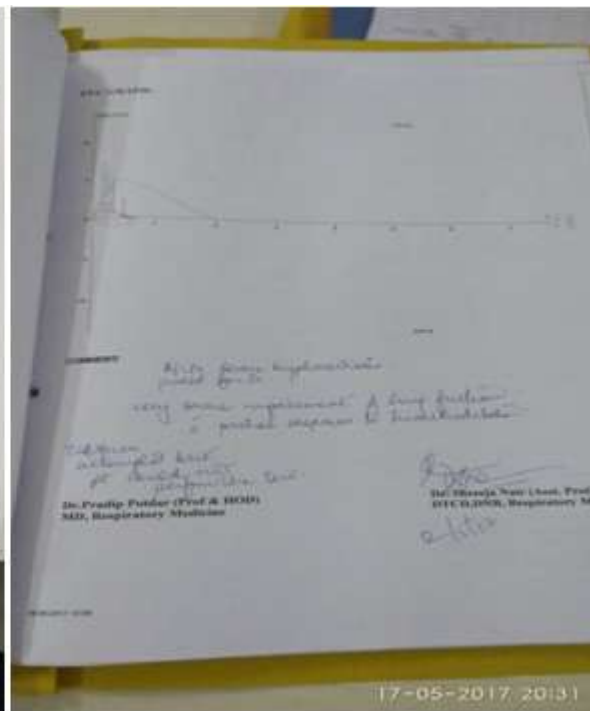
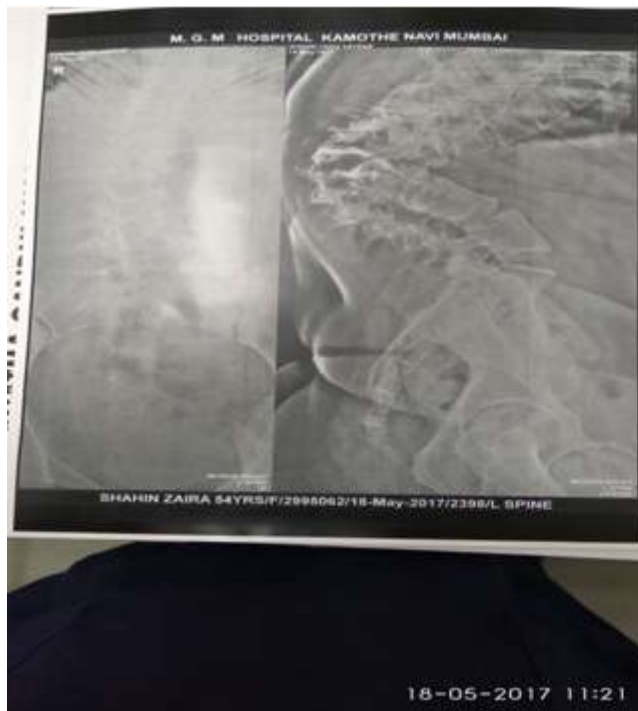
The management of a patient who presented with incisional hernia with severe kyphoscoliosis with asthma with severely deranged pulmonary function tests is described.

2. Case Report

A 54 year old female patient presented with complaints of breathlessness at rest, pain lower abdomen, and abdominal swelling increasing on coughing and exertion. Pt had h/o LSCS 20 years back. Pt is a known hypertensive since 5 yrs on Tab Amlodipine 5mg+ Tab atenolol 40mg OD. Pt has also been recently diagnosed with asthma and started on nebulisation with duolin and budecort 6 hrly. Pt also has severe kyphoscoliosis of the spine.pt had h/o Tb spine 50 yrs back and taken treatment for 1 yr for the same. The patient was thoroughly evaluated and investigated.

Pre anesthetic check up was done and all routine investigations were done complete blood count, pt-inr, total bilirubin, direct bilirubin, serum creatinine, serum electrolytes, random blood sugar, blood group, x ray chest, ecg, pulmonary function tests, ABG at room air.

All investigations were within normal range. X ray chest showed kyphosis and cardiomegaly. Pulmonary function test was suggestive of very severe impairment of lung function with partial response to bronchodilator.



On oral & airway assessment pt had adequate mouth opening, no loose teeth & mallampatti scoring of 3.

Ultrasound (USG) abdomen was s/o 6 cm defect in the anterior abdominal wall with bowel contents s/o incisional hernia. Xray spine (figure 1) was s/o severe kyphosis of spine at L3-L4 level and scoliosis of spine towards left side at L2-L6 level.

Preoperatively pt was prepared. Pt was advised nebulisation with duolin and budesonide 6 hrly and injection hydrocort 100 mg preoperatively and was asked to take antihypertensive medication on the morning of surgery. Bed/venti were reserved in icu.

Preoperative bp was 110/60 and pulse rate 86/min.

General anesthesia was planned for the pt i/v/o severe spinal deformity and short stature of the patient and large defect in abdominal wall and informed consent was obtained from the pt and relatives.

After shifting the pt on OT table two iv cannulas one 20 G in left hand and 18G in right hand were taken and iv fluids started. Standard ASA monitors were applied. The patient was prepared for fiberoptic intubation i/v/o difficult airway and distorted anatomy of the spine and restricted extension of neck. Pt was nebulised with 0.4% lignocaine solution. And gargles were done with viscous lignocaine solution. Transtracheal block was given. Cricothyroid membrane located. 3ml of 4% lignocaine taken in a 5 cc syringe which is passed perpendicular through the cricothyroid membrane. Needle advanced till air is freely aspirated and the drug is pushed inside. The pt was premedicated with inj antitidine 50mg, inj metoclopramide 10mg, inj glycopyrolate 0.2mg, inj midazolam 1mg, inj fentanyl 50 mics.

Fiberoptic intubation was carried out after visualizing da chords with 7.5 mm et tube and fixed at mark 20cm after confirmation of bilateral air entry. After securing the tube pt was induced with inj propofol 80 mg and inj vecuronium 5mg. pt was put on CMV mode of ventilator 12/450/0/50



Anaesthesia was maintained with titrated doses of isoflurane and titrated doses of inj vecuronium and analgesia maintained with inj fentanyl 1 mic/kg/hr.

The surgery was performed in supine position & hands were rested on hand rests on either side of the table and padding was done of all the dependent parts of the body. A transverse incision was taken near the hernia site. The bulging tissue was gently pushed back into the abdomen. 100% O₂ and warm saline wash was given to reverse the ischemia of the bowels. After waiting for 15 minutes and return of normal pink colour of the bowels. The hernial sac was removed and mesh placed over the hernia site and sutures applied.

The surgery took 4 hrs due to extensive size of the defect. Towards the end of the surgery an abg was done s/o respiratory acidosis values were 7.28/50/90/22. Respiratory rate was increased from 12 to 16 and 100% O₂ given for sometime.

Abg was repeated again at extubation and acidosis was corrected values being 7.40/38/220/21. Extubation was planned for the patient and inhalation agents were tapered off. Inj ondansetron 4 mg was given. Patient was reversed with 2.5 mg neostigmine+ 0.4 mg glycopyrolate after patient started breathing spontaneously. Inj hydrocortisone 100mg iv was given before extubation and two puffs of salbutamol inhaler given through et tube.

After complete recovery from neuromuscular blockade and patient following commands the ET Tube was removed. Propped up position was given and patient maintained on mask ventilation and den Hudson mask for sometime until becoming fully conscious and then shifted to post op.

3. Discussion

While assessing the patient particular attention must be paid to the pulmonary function. The FEV₁ and FEF ratio provides a good information about the type of lung disease. Restrictive or obstructive and also about its severity.

Severe kyphoscoliosis posed a problem for intubation and also positioning of the patient on the table.

Induction of anesthesia was done with intravenous and inhalational agents. Maintenance was done with sevoflurane because of its less airway irritant property. Vecuronium was the non-depolarising muscle relaxant of choice because of less histamine release in comparison to atracurium.

An incisional hernia is a type of hernia caused by an incompletely healed surgical wound and protrusion of bowel contents through the incisional site. While incisional hernias can occur at any incision, they tend to occur more commonly along a straight line from the xiphoid process of the sternum straight down to the pubis, and are more complex in these regions. Hernias in these areas have a high rate of recurrence if repaired via a simple suture technique under tension so they are usually repaired using a synthetic mesh.

All pressure points were padded in order to avoid post operative neuropathy. Attention must be paid to maintaining the patients temperature as far as possible. Warmed intravenous fluids, warm blankets and heated mattresses were kept in our case to prevent post operative hypothermia.

In addition to normal maintenance fluid requirements intra operatively, evaporative losses from an open abdomen (10-30 ml/kg/hr) and third space losses to bowel, omentum were taken into account. Crystalloids were used for maintenance and third space losses.

Intra operatively and postoperatively a urine output of 0.5-1.0 ml/kg/hr was maintained.

Anesthetic management in asthmatic patients has been focused on avoiding bronchoconstriction and inducing bronchodilatation. If general anesthesia is used a laryngeal mask airway is safer than endotracheal intubation. Propofol and ketamine inhibit bronchoconstriction, decreasing the risk of bronchospasm during anesthesia induction. Halothane, enflurane and isoflurane are potent bronchodilators and can be helpful even in status asthmaticus. Sevoflurane has shown controversial results.

Vecuronium, rocuronium, cisatracurium and pancuronium do not induce bronchospasm, while atracurium and mivacurium can dose dependently release histamine and should be cautiously administered in those patients.

4. Conclusion

Kyphoscoliosis can be seen in syringomyelia, friedreichs ataxia, spina bifida and duchenne muscular dystrophy due to asymmetric weakening of the paraspinal muscles and presents with signs such as abnormal hunch, uneven length of arms and legs, presence of associated disorders like hypertension, neurological disorders and abnormal gait. Kyphoscoliosis may manifest in an individual at different stages of life and for various causes.

Although the incidence of severe perioperative bronchospasm is relatively low in asthmatics undergoing anesthesia, when it does occur it can be life threatening. Anti inflammatory and bronchodilatory regimen through the perioperative period should be maintained. Potential trigger agents should be identified and avoided. Acute bronchospasm can occur especially at induction and emergence and should be promptly and methodically managed. Several guidelines on the management of asthma are available^[11]. given its prevalence and often subclinical nature, a routine and standard approach to acute bronchospasm enables quick response and good outcome.

Mesh repair is often done for incisional hernia using sutures sewn into the stronger tissues surrounding the hernial site. Laproscopic hernia repair is also common nowadays and are associated with lower infection rates and shorter hospital stays^[12].

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