

Anesthetic Management of a Patient with Thoracolumbar Kyphoscoliosis Coming for Emergency Endoscopic Retrograde Cholangiopancreatography and Interval Laparoscopic Cholecystectomy

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Abstract

We describe a patient with postpoliomyelitis residual paralysis with thoracolumbar kyphoscoliosis who presented for an emergency endoscopic retrograde cholangiopancreatography and interval laparoscopic cholecystectomy. This case report emphasizes on the adequate perioperative optimization and the meticulous anesthetic management of a long-standing kyphoscoliotic patient with respiratory compromise.

Key words: Anesthesia, endoscopic retrograde cholangiopancreatography, kyphoscoliosis, laparoscopic cholecystectomy

INTRODUCTION

Scoliosis is a complex, three-dimensional rotational deformity of the spinal column in sagittal, coronal, and axial planes. It may be idiopathic, congenital, or neuromuscular. Untreated severe idiopathic scoliosis is fatal by the fifth decade due to pulmonary hypertension and respiratory failure.^[1] We report a case of postpoliomyelitis residual paralysis (PPRP) with kyphoscoliosis scheduled for emergency endoscopic retrograde cholangiopancreatography (ERCP) and interval laparoscopic cholecystectomy.

Written informed consent is obtained from the patient for publication, attachment of pictures and X-ray.

CASE REPORT

A 51-year-old male with severe kyphoscoliosis was admitted with complaints of intermittent right upper quadrant pain for 15 years with an acute onset fever, jaundice, and pruritus for 15 days. On examination, he was icteric, cyanotic, dyspnoeic, and diaphoretic. He was unable to lie supine. Room air saturation was 78%. Further examination revealed bilateral basal crepitations and rhonchi, tachycardia, reduced

power (4/5) and muscle wasting in all four limbs, and severe thoracolumbar kyphoscoliosis [Figure 1].

The patient had deranged liver function test. Chest X-ray revealed severe kyphoscoliosis with Cobb angle of 60°. Pulmonary function test (PFT) could not be performed because of severe dyspnea [Figure 2].

ERCP and common bile duct stenting were done with total intravenous anesthesia (TIVA), and endotracheal tube intubation was facilitated with atracurium. The patient was extubated at the end of the procedure and shifted to the Intensive Care Unit with noninvasive ventilation (NIV) support and maintained for 24 h. He was discharged with an advice to undergo interval laparoscopic cholecystectomy after 6 weeks and continue incentive spirometry and deep breathing exercises.

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The scheduled laparoscopic cholecystectomy had to be postponed over 6 months due to repeated respiratory infections.

After optimization, breath-holding time was 12 s, room air saturation was 98%, and PFT revealed severe obstructive and restrictive lung disease [Table 1]. Echocardiography was normal with an ejection fraction of 55% and no pulmonary arterial hypertension.

Laparoscopic cholecystectomy was done under TIVA with propofol and dexmedetomidine infusions titrated to hemodynamic response. Atracurium was given for intubation and ventilation was maintained on pressure-controlled mode with oxygen and air. Tidal volume (TV) of 450 ml was obtained with an inspiratory pressure (IP) of 20 cmH₂O. End-tidal carbon dioxide (ETCO₂) was 32 mmHg with a respiratory rate of 12/min. During pneumoperitoneum, the intra-abdominal pressure was maintained at 10 mmHg. IP was raised to 28 mmHg to achieve a TV of 450 ml. Respiratory rate was increased to 18/min to maintain ETCO₂ at 32 mmHg. The procedure lasted for 3 h and extubated on the table. Paracetamol was used for postoperative analgesia. NIV was instituted for 24 h. The patient was shifted to the ward on day 1 and discharged on the 3rd postoperative day.

DISCUSSION

Poliomyelitis is an acute, paralytic viral infection caused by enterovirus. About 1–2%^[2] of them may progress to permanent flaccid paralysis, known as PPRP. Quadriparesis occurs in 1.4% and kyphoscoliosis in 12% of patients with PPRP.^[3,4]

The Cobb angle is a radiological measurement to evaluate the severity of scoliosis. The higher the Cobb angle, more the pulmonary impairment. In our patient, although Cobb angle was 60°, pulmonary function was severely impaired due to long-standing, untreated kyphoscoliosis and repeated respiratory infections.

Poliomyelitis survivors are prone to an entity known as poliomyelitis syndrome which includes respiratory

tract dysfunction, fatigue, intolerance to cold, pain, and muscle weakness.^[3] Poliovirus damages the reticular activating system, on which many of the anesthetic drugs act.^[5] This accounts for the extreme sensitivity of anesthetic medications leading to delayed awakening and postoperative complications.^[6] Hence, we avoided opioids in the perioperative period. These patients are also prone to develop malignant hyperthermia, myoglobinuria, and cardiac dysrhythmia,^[7] hence making succinylcholine and inhalational agents a relative contraindication. Due to the alteration in the prejunctional acetylcholine receptors in these patients, single-dose atracurium was given. Propofol and dexmedetomidine infusions were used to maintain the anesthesia and analgesia to facilitate a smooth recovery and extubation.

The anatomical abnormality of the ribcage in a severe kyphoscoliotic patient poses a challenge for laparoscopic cholecystectomy and inadvertently prolonging the surgery [Figure 3].^[8]

The postoperative pulmonary complication rate increases with the increasing severity of preoperative restrictive lung pattern.^[9] NIV in the postoperative period has helped to prevent postoperative pulmonary complications.

To conclude, the anesthetic management of our patient was challenging due to the following concerns:

1. Emergency procedure outside the operation theater, in a compromised state

Table 1: Values of pulmonary function test preoperatively

Parameter	Predicted	Actual	Percentage predicted
FVC	3.734	0.798	21.37
FEV1	3.037	0.565	18.60
FEV1/FVC	81.33	70.76	87.01
PEF (L/s)		2.784	

FVC: Forced vital capacity, FEV1: Forced expiratory volume in 1 s, PEF: Peak expiratory flow



Figure 1: Thoracolumbar kyphoscoliosis

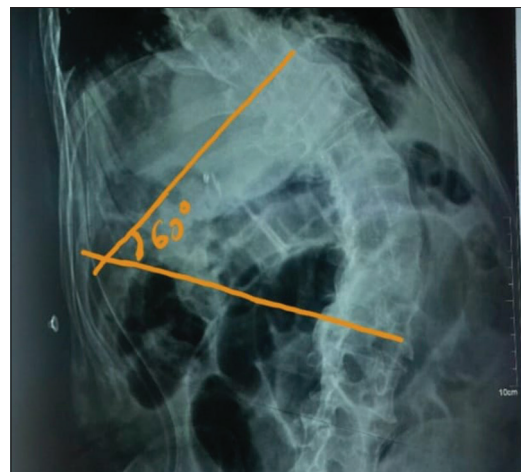


Figure 2: X-ray showing thoracolumbar kyphoscoliosis with Cobb angle of 60°

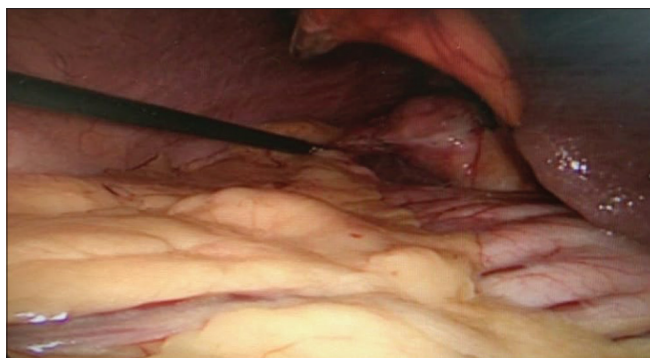


Figure 3: Difficulty in surgical approach to the gall bladder due to anatomical abnormality

2. Long-standing scoliosis with severe restrictive and obstructive lung disease leading to poor respiratory reserve
3. Laparoscopic cholecystectomy *per se* causing increased intra-abdominal pressure leading to hemodynamic instability and pulmonary insult.

We successfully overcame these obstacles by careful planning and management of anesthesia using TIVA, avoiding narcotics, inhalational agents, repeat dose of muscle relaxants, and instituting prophylactic NIV in the postoperative period.

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Conflicts of interest

There are no conflicts of interest.

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