Coronary Artery Bypass Grafting In Patient With Severe Kyphoscoliosis Leading To Severe Restrictive Lung Disease: A Rarity Of A Condition

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Introduction:

Kyphoscoliosis causes restrictive lung disease, ventilation-perfusion mismatch, hypoxemia and cardiovascular involvement in various forms(1). Deviation of the trachea and rotation of the heart and great vessels may lead to difficulties in intubation, central venous access, surgical cannulation, and surgical access to the coronary vessels. Thus careful preoperative optimization and postoperatively, intensive respiratory therapy and pain management are prime concerns(2).

Case Description:

68-year-old male with known case of triple vessel disease, hypertension, myocardial infarction, severe kyphoscoliosis and severe restrictive lung disease. Preoperative spirometry showed FVC 1.02 L (39 % predicted), FEV1: 0.7 L (34 % predicted) and FEV1/FVC: 68.80 % indicating severe restrictive lung disease. Baseline pO2 and pC02 were 71 mm of Hg and 40 mm of Hg respectively. Echocardiography showed Ejection Fraction of 50% and TAPSE of 2.0 cm. On physical examination, he had a severe thoracic kyphoscoliosis.

In the operating room, the patient was monitored with ECG, pulse oximetry, nasopharyngeal temperature and invasive arterial and central venous line.

Lungs were preoxygenated then patient was induced with IV fentanyl 400 Åµg and midazolam 3 mg and intubated with IV rocuronium 100mg as muscle relaxant. There were no issues during intubation and maintaining ventilation in our case. Ventilator mode was volume-controlled with lung protective strategy. Anesthesia was maintained with oxygen and 1-2 % sevoflurane inhalation. When the chest was opened, the heart and aorta were seen to be shifted and rotated towards the right thorax. Saphenous Vein graft was harvested to reach the LAD. Hemodynamic stability was maintained with noradrenaline 0.05 Åµg.kg-1min-1 and milrinone 0.3 Åµg.kg-1min-1 and surgical operative time was 130 minutes.

Patient was transferred to the ICU and continued on lung protective ventilation protocol. All infusions were at minimum dose within four hours after arrival to the ICU. Eighteen hours after surgery, with hemodynamic stability minimum inotropic supports and hemostasis, trachea was extubated using standard weaning protocol with backup of NIV weaning strategy. He was shift to HDU on the 1st postoperative day.
Patient controlled analgesia, targeted incentive spirometry more than 500ml within 24 hours of extubation, effective coughing, chest expansion, ambulation and functional independency of daily activities were done in the consecutive days and discharged home on the 7th postoperative day.

Discussion:

Severe Kyphoscoliosis leads to progressive respiratory and cardiovascular involvement. Anesthesia, post-operative intensive care, respiratory care, pain therapy and early ambulation deserve special mention(2).

Major operation of kyphoscoliotic patients have multiple technical challenges. Supine positioning, central line insertion, difficult airway, restrictive pulmonary disease and decreased cardiac output are some of the major hurdles. In our case, we managed these expected difficulties by keeping difficult intubation trolley, inotropes loaded, CPB pumped primed and all ready to use before induction of anesthesia. Use of lung protective and noninvasive ventilation after extubation, vigorous chest physiotherapy with incentive spirometry, aggressive pulmonary toileting and early ambulation were done to reduce the postoperative respiratory morbidity. Prior planning to handle the intra and post-operative challenges will help in the successful outcome of these cases (3).

This case also highlights the paramount importance of partial or complete independence to perform daily and instrumental activities associated with decreased risk of postoperative pulmonary complication.

Although in past, incidences of multiple co-morbid conditions existing together in a single elderly patient have been reported but perioperative reports on patient with severe kyphoscoliosis leading to severe restrictive lung undergoing CABG is rarity of a condition.

References

