

Case Report

Anaesthesia management in a patient of interstitial lung disease with pulmonary hypertension for emergency laparotomy

Hardik A. Parekh*, Prajakta D. Latkar, Ameya G. Nalavade, Hemant H. Mehta

Department of Anaesthesia and Pain Management, Sir H N Reliance foundation Hospital, Mumbai, Maharashtra, India

Received: 05 February 2021

Accepted: 08 August 2021

*Correspondence:

Dr. Hardik A. Parekh,

E-mail: hardikparekh512@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

We report the anaesthetic management of a patient with known case of interstitial lung disease (ILD) with profound fibrotic changes and bullae with severe pulmonary hypertension (PH) posted for exploratory laparotomy for cecal volvulus. Emergency exploratory laparotomy was done under combined spinal-epidural anaesthesia to avoid intra-operative and post-operative pulmonary complications associated with general anaesthesia and mechanical ventilation.

Keywords: ILD, Laparotomy, Combined spinal-epidural anaesthesia

INTRODUCTION

Idiopathic interstitial pulmonary fibrosis (IPF) is considered the most common form of ILD. Its course is progressive and cause is unknown. Idiopathic IPF affects the gas exchange as it results in chronic inflammation and progressive fibrosis of lung parenchyma.¹ IPF is a fatal lung disease; the natural history is variable and unpredictable: Most patients with IPF demonstrate a gradual worsening of lung function over years; a minority of patients remains stable or deteriorate rapidly. Some patients may experience episodes of acute respiratory worsening despite previous stability. IPF is defined as a specific form of chronic, progressive fibrosing interstitial pneumonia of unknown cause, occurring primarily in older adults, limited to the lungs, and associated with the histopathologic and/or radiologic pattern of unspecified interstitial pneumonia (UIP). In the lungs, parenchymal and vascular remodelling share pathomechanisms that may explain the relatively high prevalence (30-40%) of PH in ILD patients. Notably, PH significantly contributes to exercise limitation and dismal prognosis of ILD patients.²

CASE REPORT

A 71 years old female, weighted 37 kg, known case of hypothyroidism and ILD presented to ER with complains of acute onset abdominal pain and nausea with 5 episodes of non-bilious vomiting since morning. Computed tomography (CT) of abdomen was done which was suggestive of caecal volvulus. Patient was posted for exploratory laparotomy with±small bowel resection and anastomosis. Patient was known case of hypothyroidism for 8 years and was on tab thyroxine 50 mcg OD. Patient had history of dry cough with shortness of breath 7-8 years back and was diagnosed with ILD. Patient was on tablet N-acetyl cysteine, tablet deriphyline and Foracort inhaler TDS for the same. Her mobility was restricted only within the house, due to breathlessness on climbing one flight of stairs

Preoperative preparations

The patient underwent preoperative assessment by history taking, physical examination and preoperative laboratory investigations which include complete blood count, liver function, renal function test, prothrombin time, INR,

arterial blood gas analysis, ECG, HRCT chest and echocardiography. HRCT chest was suggestive of bilateral lung disease of UIP pattern with more profound fibrotic changes in the left upper lobe causing mild volume loss and associated with paraseptal emphysema, bullae in this lobe. 2D echocardiography was suggestive of severe PH, Moderate tricuspid regurgitation, RVSP 70mmHg, dilated RA (40 mm), dilated RV (39 mm) with mildly impaired RV systolic function (TAPSE 15 mm), LVEF 60%, type 2 diastolic dysfunction with raised LV filling pressures (E/E' 21), mildly sclerosed aortic valve with adequate opening. In ABG pH was 7.37, pO₂ 64.6, pCO₂ 33.4, SO₂ 93.5%, HCO₃ 19. In blood investigations Hb was 13.7, WBC 16460, platelets 375000, INR 1.0, creatinine 0.73, albumin 4.6, sodium 140, and potassium 4.6. Rest investigations were within normal limits. Nebulisation was given with levosalbutamol, ipratropium and budesonide a night before surgery and before shifting the patient to the operation theatre. A well written detailed informed consent was taken from the patient and her relatives. They were counselled well regarding the expected intraoperative complications like SOS conversion to general anaesthesia, postoperative prolonged ICU stay, prolonged mechanical ventilation, and pneumothorax. All emergency drugs including phenylephrine, adrenaline, antiarrhythmic drugs, noradrenaline infusion and defibrillator pads were kept ready. All necessary drugs and equipment for general anaesthesia were kept ready.

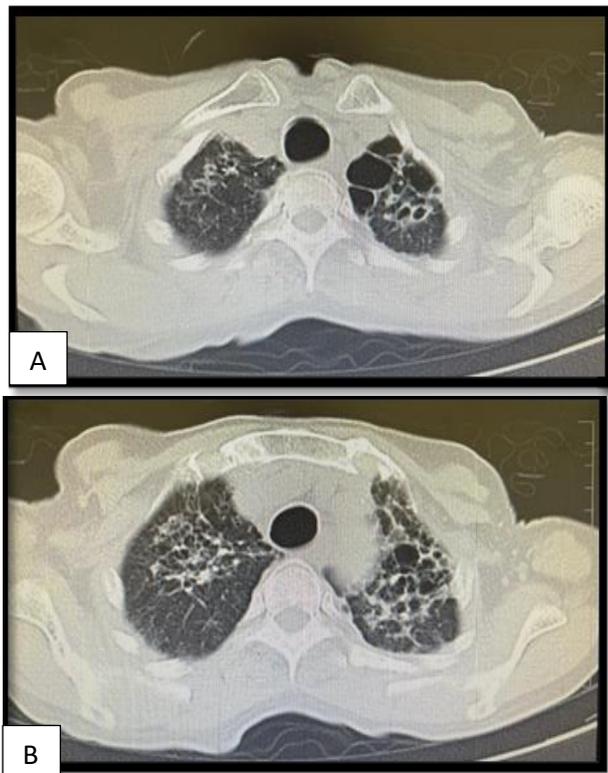


Figure 1 (A and B): HRCT chest with bilateral lung disease with UIP pattern with profound fibrotic changes with paraseptal emphysema and multiple bullae.

Intraoperative management

Patient was taken inside the operating theatre after ensuring adequate fasting. The patient was optimally monitored with electrocardiogram, non-invasive blood pressure and pulse oximetry. In the operating room, the baseline heart rate was noted to be 82 beats per minute, blood pressure was 142/74 mmHg and 94% SpO₂ on room air. Supplementary oxygen was started with Hudson mask at 6L/min. IV fluid plasmalyte A started with pre-existing 20G IV line on right hand. Another 18G IV line secured in right forearm. Injection pantoprazole 40 mg IV and injection hydrocortisone 100 mg IV given. Left radial artery was cannulated under local anaesthesia for beat-to-beat blood pressure monitoring. Central line was secured in right internal jugular vein under USG guidance with local infiltration of skin under all aseptic precautions for CVP monitoring. In sitting position using 18G Tuohy's needle using loss of resistance technique with normal saline epidural space reached at 2.5 cm at T11-T12 intervertebral space. Epidural catheter was inserted and fixed at 7.5 cm under all aseptic precautions. After that using 25G Whitacre needle 2 cc of 0.5% bupivacaine heavy with 90 mcg buprenorphine and with 1 cc NS was given intrathecally for spinal anaesthesia in L2-L3 intervertebral space after clear flow of CSF and negative aspiration for blood. Patient made supine after confirming the position of epidural catheter by meniscus sign. Injection dexamethasone 8 mg, injection ondansetron 4 mg and injection metoclopramide 10 mg IV were given. Antibiotics injection cefoperazone and sulbactam 1.5 gm and injection metronidazole 500 mg were given slow IV after test dose, before incision was made. Elliptical mid line incision from umbilicus to pubic symphysis was taken. Serosal tears were repaired and caecum was tacked to lateral peritoneum of right iliac fossa. Total surgical time was around 60 min and no extension of incision was required as no bowel resection was needed and only cecopexy was done. Vitals throughout the surgery was stable. After the surgery patient was shifted to ICU for observation. Epidural Baxter infusion of 0.0625% bupivacaine was started at 5 ml/hr 2 hours after the surgery and continued for 2 days and IV paracetamol 1 gm IV TDS was given. Post-operative patient was continued with Foracort inhaler with spacer, supplemented oxygen and incentive spirometry. Next day patient was shifted to ward and got discharged after 7 days post-procedure.

DISCUSSION

Postoperative pulmonary complications are 9.5 times more frequent in patients with pre-existing pulmonary disease than in corresponding individuals without such dysfunction.³ We propose that such complications are largely related to the effects of general anaesthesia (GA) and mechanical ventilation on the compromised lung, as well as the additional problem of controlling postoperative pain, which further impairs pulmonary function from the resultant analgesic requirements.⁴

Many patients with severe pulmonary compromise are denied surgery, as they are prone to further functional decline in the postoperative period. GA induction and intubation results in the immediate dependence of mechanical ventilation. GA also places the patient at risk for bronchospasm, V/Q mismatch, pneumothorax, and respiratory depression from residual anaesthetic and muscle relaxant.^{4,5} Although neuraxial blockade using RA is not physiologically benign, it offers several advantages. It is well known that abdominal surgery is associated with a decrease in functional residual capacity. RA attenuates this effect by improving diaphragmatic function (disrupts surgery-induced reflex inhibition of the phrenic nerve) and chest wall compliance (decreases chest wall muscle tone). Normal minute ventilation is thus maintained. Further, patients prone to congestive heart failure or cor pulmonale may benefit from the accompanying neuraxial blockade induced preload and afterload reduction. On the down side, FEV is diminished secondary to loss of abdominal muscle tone, resulting in decreased ability to cough and clear secretions. However, this potential problem can generally satisfactorily be tolerated with aggressive pulmonary toilet pre- and postoperatively. GA has the benefit of facilitating a secure airway and a means of providing positive pressure ventilation; however, induction of GA and intubation of the patient results in (at least transient) mechanical ventilation dependence. Additional physiologic/mechanical effects of GA (potential for bronchospasm, V/Q mismatch, pneumothorax, kinked or occluded endotracheal tube, respiratory depression from residual anaesthetics/muscle relaxants) impede ventilator weaning in the patient with SPI.⁶ Guay published an article comparing the effects of NA and GA on perioperative and postoperative morbidity and mortality, including death, chest infections, myocardial infarction and serious adverse event outcomes. All Cochrane Reviews that were included in this study spanned from the use of NA with or without GA to GA alone in adult patients with intermediate or high cardiac risk. Notable was the reduction in 0-to-30-day mortality in the setting of NA in comparison with GA and a decreased risk of pneumonia with NA compared to GA.⁷ Another advantage of epidural anaesthesia is that it blunts the stress response, during and after surgery, and decreases the resulting inflammatory and coagulation pathways

associated with it. In turn, there is a reduction in the likelihood accompanying sequelae, such as thromboembolic complications, myocardial ischemia and infarction, impaired pulmonary function, ileus, fatigue, postoperative infection and postoperative confusion.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Mallick S. Outcome of patients with idiopathic pulmonary fibrosis (IPF) ventilated in intensive care unit. *Respiratory med.* 2008;102(10):1355-9.
2. Behr J, Ryu JH. Pulmonary hypertension in interstitial lung disease. *Eur Respiratory J.* 2008;31(6):1357-67.
3. Mallon JS, Edelist G. Risk factors of importance-the patient. *Probl Anesth.* 1992;6:193-204.
4. Guay J, Choi PT, Suresh S, Albert N, Kopp S, Pace NL. Neuraxial anaesthesia for the prevention of postoperative mortality and major morbidity: an overview of cochrane systematic reviews. *Anaesthesia Analgesia.* 2014;119(3):716-25.
5. Savas JF, Litwack R, Davis K, Miller TA. Regional anaesthesia as an alternative to general anaesthesia for abdominal surgery in patients with severe pulmonary impairment. *Am j surg.* 2004;188(5):603-5.
6. Nunn JF. Effects of anaesthesia on respiration. *Bri J Anaesthesia.* 1990;65(1):54-62.
7. Guay J, Choi PT, Suresh S, Albert N, Kopp S, Pace NL. Neuraxial anaesthesia for the prevention of postoperative mortality and major morbidity: An overview of cochrane systematic reviews. *Anesth Analg.* 2014;119:716-25.
8. Nimmo S. Benefit and outcome after epidural analgesia. *BJA.* 2004;4:44-7.

Cite this article as: Parekh HA, Latkar PD, Nalavade AG, Mehta HH. Anaesthesia management in a patient of interstitial lung disease with pulmonary hypertension for emergency laparotomy. *Int J Res Med Sci* 2021;9:3216-8.