Case Report

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Extra Pleural Pneumonectomy: Perioperative Anaesthetic Management in Spindle Cell Sarcoma Patient – A Case Report

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Abstract

Extrapleural pneumonectomy is a radical and aggressive surgery for malignant pleural tumors. Anaesthesia management in these patients is highly a challenging task for anesthesiologists due to increased risk of perioperative morbidity and mortality. We present a case report of 45 year old female with spindle cell sarcoma for extrapleural pneumonectomy it represents our institution experience in anaesthesia care. An understand of the unique physiological consequences of this procedure,preoperative assessment of cardiopulmonary function,thoracic epidural, physiotherapy, high vigilance, team work, collaboration with surgeon helps to improve perioperative outcome of patients.

Keywords: Extra pleural pneumonectomy; Spindle cell sarcoma; Forcedexpiratory volume in 1 second; Forced vital capacity.

Introduction

Extrapleural pneumonectomy (EPP) is a surgical treatment for malingnant pleural tumors which is an invasive complex surgery first described by Irving Arthur Sarot in 1949[1] for the treatment of tuberculosis empyema and later Butchart et al.,employed in malignant pleural mesothelioma treatment.[2] EPP involves enbloc resection of lung, ipsilateral diaphragm,parietal pleura and pericardium.

Anaesthesia management of these patients will be highly challenging due to risk of significant blood loss, hemodynamic instability,difficult fluid therapy and risk of dysrhythmias, cardiac herniation and pericardial tamponade.[3]

Case report

A 45 year old female patient, with history of cough and breathlessness since two months presented to our institute. She has been diagnosed as spindle cell sarcoma and posted for left thoracotomy and pneumonectomy.

Preanaesthetic checkup done: She has no other medical comorbid illness and not on any medications. *Her vitals:* heart rate 70 bpm, blood pressure 100/60 and oxygen saturation 93% on room air. Routine laboratory investigations and cardiac evaluation were within normal limits. Pulmonary function tests revealed mild restrictive pattern with FEV1/FVC 91%,FEV1 postoperative predicted 45%, lung perfusion scan left 6.9% and right 93.1%.Computed tomography (CT) thorax showed pleural based tumor with multiple pleural nodules and collapsed left lung with effusion. CT guided pleural nodule biopsy which showed spindle cell sarcoma.After discussing with intra hospital tumor board planned for upfront surgery.

On day of surgery standard monitors,five lead electro cardiography,pulse oximetry,non- invasive blood pressure was connected.Underaseptic

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precautions (ASP) thoracic epidural at T6–T7 using 18 G touhy needle and 20 G catheter threaded and fixed at 9 cm before induction. Right subclavian venous and right radial artery cannulation were done to monitor central venous pressure and invasive pressure monitoring respectively.

Preoxygenationwas done for 5 min. Glycopyrrolate 0.2 milligram (mg), midazolam one mg, fentanyl two microgram/kg were given intravenously.Induction done with propofol2 mg/kg,vecuronium 0.1 mg/kg.Intubated with 32 Fr left double lumen tube (DLT), tube secured after confirming with fiberoptic bronchoscopy. Patient placed in right lateral for left thoracotomy. Anaesthesia maintained with oxygen - air mixture,isoflurane and vecuronium. One lung anaesthesia was initiated with tidal volume 6 ml/kg, 15 breaths per minute and Fio 2 –50%.Adequate ventilation was monitored with end-tidal carbon di oxide,arterial blood gas analysis.

The surgery includes EPP, hemidiaphragm resection and repair with mesh and closure of bronchial stump with latissimus dorsi flap to prevent bronchopleural fistula.Pericardial resection was not done in our patient.

During surgery appropriate padding done at all pressure points. Fluid warmer, forced air warmer, pneumatic compression stockings were used. Temperature with peripheral probe, arterial blood gas analysis and urine output were monitored. Noradrenalin infusion started to maintain mean arterial pressure more than 70mmhg.Total blood loss was 1200 ml replaced with1500 ml crystalloids, two units of packed red cell,one unit of fresh frozen plasma and four platelets. DLT was withdrawn little during bronchial stump stapling. After completion of surgery muscle relaxation was reversed by neostigmine 2.5 mg with glycopyrrolate 0.4 mg,extubated on table in order to prevent stump leak,patient shifted to ICU.Total urine output was 500 ml for 8 hours. Intraopratively patient started on continuous epidural infusion with a mixture of bupivacaine 0.125% with 2 microgram/ml fentanyl at 8 ml/hour, continued in post-operative period. Nor - adrenaline was tapered after second day of surgery.Patient developed ileus on second postoperative day due to hypokalemia correction given with potassium chloride. Patient discharged on tenth postoperative day.

Discussion

EPP involves enbloc resection of lung,ipsilateral diaphragm, parietal pleura and pericardium.[1] Anaesthetic management is crucial in reducing the postoperative complications by understanding the physiological changes associated with EPP which includes prolonged duration of surgery,fluid-electrolyte and acid base imbalance,temperature variations and arrhythmias.[3,4,6] Induction agent propofol, fentanyl, vecuronium and isoflurane was used to reduce myocardial depression[3,5] and thoracic epidural used to reduce pain and early extubation of patient to reduce bronchial stump leak and ventilator associated complications.

Thoracic epidural with local anaesthetics known to inhibit hypoxic pulmonary vasoconstriction and also reduces mean arterial pressure, even though we had placed to reduce postoperative respiratory complications, early mobilization of patients and reduction in opioid usage and its complications.[6]

Lung isolation can be done either with DLT or bronchial blockers. In our patient we used double lumen tube.The most important goal during one lung ventilation is to ensure adequate oxygenation, prevent hypoxemia as well as acute lung injury,therefore we used protective lung ventilation with low tidal volume 6ml/kg, fio2 –50%, 15 breaths per minute to maintain peak airway pressure between 25–30 cmH2o.[5,6,7,8]

Hypotension occurred due to anaesthetic agents, thoracic epidural, insensible loss, blood loss during surgery which was managed by fluid therapy and blood components. Perioperative fluid management is an important cornerstone of hemodynamic stability and a challenge for each anaesthesiologist. Liberal fluid administration leads to lung edema,acute lung injury, respiratory failure and increases postoperative mortality. This was managed with goal directed fluid therapy and nor adrenaline infusion to maintain hemodynamic stability and tissue perfusion as well as to maintain urine output of 0.5 ml/kg/min.[3,6]

Maintaining normothermia during procedure is very much essential to prevent hypothermia induced complications like impaired platelet and clotting factor enzyme function,impaired immune function, increased heart rate, oxygen demand which can lead to myocardial infarction. We used forced air blanket to maintain temperature above 35.5 degree Celsius.[6,9]

Pulmonary complications are the major etiology for morbidity and mortality. Independent risk factors for pulmonary complications are ASA 3, smoking, age more than 70, COPD, BMI>30mg/kg. Prolonged exposure to general anaesthetics can cause reduced production of surfactant,increased

alveolar-capillary permeability,impaired alveolar macrophage function and slow mucociliary clearance leading to an alteration in gas exchange. Positioning and mechanical ventilation cause postoperative atelectasis which results in V/Q mismatch and hypoxemia.[7]

Conclusion

Patients undergoing EPP are at risk of perioperative complications, detailed preoperative assessment and risk stratification of patients is essential to reduce morbidity and mortality.

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