Case Report

Suspected Intraoperative Anaphylactic Reaction Caused by a Hepatic and Pulmonary Hydatid Cyst

Ankur Sharma, Renu Sinha, Varuna Vyas[1], Bikash Ranjan Ray

Departments of Anesthesiology and [1]Pediatrics, All India Institute of Medical Sciences, New Delhi, India

Abstract

We report a 40-year-old male patient who underwent thoracolaprotomy for liver and lung hydatid cyst. The patient had severe intraoperative anaphylaxis, which was managed successfully.

Key words: Anaphylaxis, anesthesia, hydatid cyst

Introduction

Encysted larvae of *Echinococcus granulosus* causes a parasitic infection known as hydatidosis. Though all organ systems can be affected, it predominantly affects the liver (55–70%) and lungs (18–35%). Thoracic association of hepatic hydatid cyst are observed in approximately 0.6–16% cases.[1,2] The proximity of cysts in or around the vital organs makes the surgery and anesthetic management challenging. We here describe the suspected anaphylaxis reaction during surgery of liver and lung hydatid cyst.

Case Report

A 40-year-old male weighing 63 kg with a diagnosis of hydatid cyst of lung and liver was scheduled for thoracoabdominal excision of the cysts. He presented with the history of cough with yellowish expectoration, chest pain, hemoptysis, dyspnea, and orthopnea for last 10 days. He had no other comorbidities and was a nonsmoker, nonalcoholic. His blood investigations showed normal hemogram, liver function tests, and renal function tests. His electrocardiogram (ECG) was unremarkable except T inversion in V1 and V2 leads. The chest X-ray showed large cystic shadow in the lung parenchyma without definitive demarcation of the diaphragm and blunted costophrenic angle [Figure 1a and b]. Computed tomography scan of the thorax revealed cystic mass in the liver and right lung parenchyma, with loss of continuity of the diaphragm, transdiaphragmatic herniation with multiple daughter cysts [Figure 2].

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Respiratory evaluation was done and his breath holding time was around 15 s. Pulmonary function tests revealed forced expiratory volume in one s (FEV1) 2l (70%) of the predicted, FEV1/forced vital capacity (FVC) 103% of predicted, and FVC 65% of predicted. Arterial blood gases revealed PO_2 of 66.6, PCo_2 35.9, pH 7.467, and base excess 2.2.

Echocardiography revealed ejection fraction of 60% with no structural or regional wall motion abnormality. His bronchoscopy showed normal left bronchus with edema and narrowing of the right upper and middle lobe bronchus.

During the investigations, tablet albendazole 400 mg BD was started and continued. Steam inhalation, salbutamol nebulization, and chest physiotherapy were advised to loosen and remove the secretions. During preoperative assessment, need for throracic epidural, postoperative incentive spirometry, and complications of the surgery were explained and informed written consent was obtained. The patient was shifted to the operation theater, and ECG, SpO_2, and noninvasive blood pressure (BP) were attached. His baseline heart rate was 82/min, and BP was 128/74 mmHg. Thoracic epidural catheter was placed at D10–11 interspace in sitting position

Address for correspondence: Dr. Ankur Sharma, Room No. 5011, Main AIIMS Building, AIIMS Campus, Ansari Nagar, New Delhi - 110 049, India. E-mail: ankuranaesthesia@gmail.com

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before induction and negative test dose was confirmed. Preoxygenation was done for 3 min; anesthesia was induced with intravenous (IV) fentanyl l100 μg, propofol 120 mg. Adequate neuromuscular blockade was achieved with 6 mg vecuronium and 37 F left sided Robertshaw double lumen tube (DLT) was inserted into the trachea and position was confirmed by auscultation and fiberoptic bronchoscope. His airway pressures were around 24–25 cm H_2O. Peripheral inserted central line and invasive arterial line were inserted. Ryle's tube and temperature monitoring were done. Surgery was started with laparotomy in semilateral position. The patient was hemodynamically stable until the cyst excision was started; thereafter, the patient had hypotension (mean arterial BP 50 mmHg) which did not respond to the boluses of ephedrine. We started injection dopamine which showed a transient response but hypotension again ensued. His airway pressures also increased to 30 cm H_2O, and we suspected anaphylaxis reaction. Injection adrenaline 50 μg bolus was given, to which the patient BP responded, so adrenaline infusion was started from 2 μg/min and escalating up to 6 μg/min to maintain the BP. After removal of the liver hydatids, one lung ventilation (OLV) was initiated and the lung hydatid cyst which was reaching almost up to the pericardium was removed. There was no intraoperative desaturation and anesthesia was maintained with oxygen and nitrous in the ratio 50:50 with isoflurane end tidal 0.5–0.7 titrated according to the depth of anesthesia and the BP changes. Intraoperatively, 0.0625% bupivacaine with 2 μg/ml fentanyl was administered through epidural catheter and IV morphine 9 mg was given for perioperative analgesia. The surgery was completed in 3 h and the patient was extubated after confirming adequate reversal of the nondepolarizing muscle relaxant.

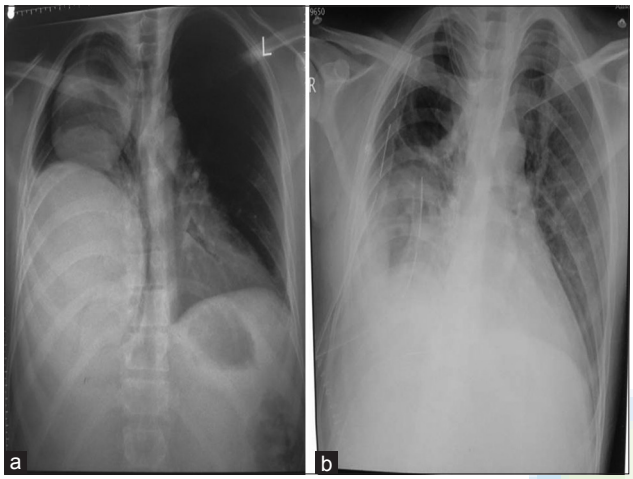

Figure 1: (a) The chest X-ray showed large cystic shadow in the right lung parenchyma and no definitive demarcation of the diaphragm with blunted costophrenic angle (b) after removal of hydatid cyst

Postoperatively, the patient had crepitations on the operative site and transient tachypnea which resolved after nebulization with salbutamol and propped up position. The patient was shifted to Intensive Care Unit with adrenaline infusion at 7 μg/min. The adrenaline was weaned off on the 3rd day, and the chest X-ray showed improvement from the immediate postoperative period. Albendazole was continued in the postoperative period along with other antibiotics. Epidural morphine was continued

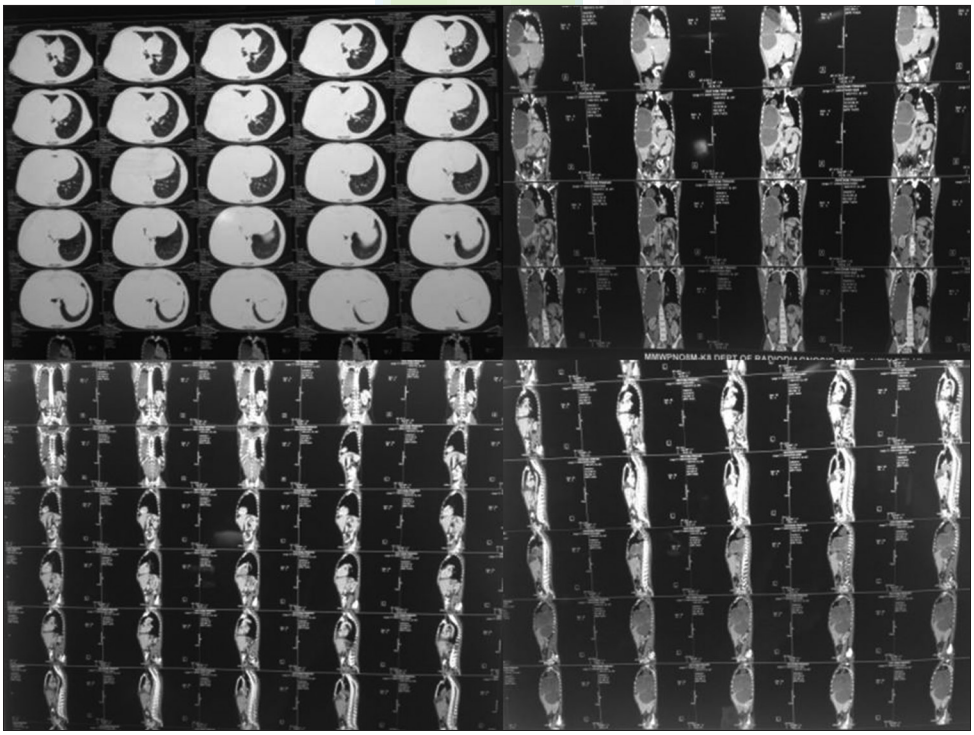

Figure 2: Computed tomography scan of the thorax showed cystic mass in the liver and lung parenchyma with transdiaphragmatic herniation with multiple daughter cysts

for analgesia till 5th day of the surgery to facilitate the lung expansion exercises and intensive spirometry. The patient was shifted to high dependency unit on the 5th day and shifted to the ward on 15th day of surgery and was discharged to home on the 25th day.

Discussion

The hydatid cysts usually remain asymptomatic until their enlarging size evokes manifestations due to agglomeration. Abdominal pain or a palpable mass in the right upper quadrant are the common manifestations of hepatic hydatid cyst. Breach of a hydatid cyst may cause fever, pruritus, eosinophilia, or anaphylaxis. Pulmonary hydatid cysts may burst into the bronchial tree or pleural cavity and result in cough, hemoptysis, and chest pain.[3]

Isolation of the unaffected lungs in hydatid cyst of lung by OLV is required for control ventilation.[4] In these cases, operative manipulations can force fragments of laminated membrane or small daughter cysts into the bronchial tree. These extruded solid fragments lodge in bronchi of the same or opposite lung, resulting in acute obstruction of the airways. Inadvertent spillage of cyst contents may cause secondary pleural or bronchogenic hydatidosis.[5,6] DLT should also be considered in some hydatid cysts of the liver with concomitant thoracic involvement.[7-9] OLV can be challenging as almost all the parenchyma of the diseased lung is affected, and a perfect isolation is required to prevent the spillage, especially for lateral position. The most frequent complication during OLV is due to ventilation-perfusion mismatch, resulting from the combination of position, OLV, and lung disease. We confirmed the position of DLT by fiberoptic bronchoscopy as malpositioning of DLT results in failure to collapse the operative lung; difficulty in ventilating one or both the lungs, and air trapping.

Apart from hydatid cyst surgery, anaphylaxis reactions in operating room may be caused by various drugs, blood products, betadine, and latex. The management of anaphylaxis includes withdrawing the offending drug, interrupting the effects of the preformed mediators that were released in response to the antigen and preventing further mediator release.[10]

The incidence of perianesthetic anaphylaxis ranges between one out of every 3500 and 20,000 general anesthetic administrations with central nervous system sequelae of 5–6% and mortality of 3–4%.[10] Although management should be individualized to every patient, adrenaline with α, β1- and β2-adrenergic effects, is the drug of choice for acute anaphylaxis and should be given as early as possible. As an alpha-receptor agonist, it reverses peripheral vasodilation and reduces edema. Its beta-receptor activity dilates the bronchial airways, increases the force of myocardial contraction, and suppresses histamine and leukotriene release. Another crucial role of adrenaline is via β2-adrenergic receptors triggering a rise in intracellular cyclic adenosine monophosphate that inhibits further mast cell and basophil mediator release, thereby attenuating the severity of the reactions.

Due to unavailability, the blood tests to confirm anaphylaxis such as serum tryptase level and radio-allegro-sorbent tests could not be done in the present case.

Anesthetic implications in our case included high chances of hemodynamic instability due to the close proximity of the cyst to heart, difficulty in ventilation due to atelectasis of left lower lung, and surgery over the anatomical site possibly causing rupture of cysts and leading to anaphylaxis.

Conclusion

Any hemodynamic instability and increase in airway pressure during surgery of hepatic and pulmonary hydatid cyst should raise the suspicion of anaphylaxis. Early diagnosis and resuscitation are crucial for fruitful outcome.

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Conflicts of interest

There are no conflicts of interest.

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