

POST-LOBECTOMY DIFFICULTY IN WEANING OFF THE VENTILATOR-IS IT EDAC?

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INTRODUCTION

Excessive Dynamic Airway Collapse (EDAC) along with tracheobronchomalacia (TBM) constitutes Excessive Central Airway Collapse (ECAC) which presents with a myriad of respiratory symptoms.^[1,2,3] In the post-operative period EDAC may be suspected in a patient difficult to wean off the ventilator, when other causes have been excluded.^[4] Confirmation of diagnosis is by Fiber Optic Bronchoscopy (FOB) and dynamic CT scanning.^[5,6,7] EDAC is an entity characterized by >50% reduction in the lumen of the trachea with anterior bowing of the posterior membranous wall of the trachea.^[5] The symptomatology in a non-surgical patient may vary from asymptomatic to wheezing refractory to treatment, dyspnea, stridor and coughing.^[8]

Post lobectomy there are unique factors contributing to difficulty weaning from ventilator such as vocal cord injuries, bronchopleural fistulae, pulmonary embolism, post-thoracic surgery non-cardiogenic pulmonary edema, atelectasis, bronchospasm and pneumonia leading to respiratory failure. The challenge lay in ruling out these complications and treating EDAC after appropriate diagnosis. We report successful management of this patient with post-operative EDAC.

CASE DESCRIPTION

70year old male weighing 91 kg with a BMI of 31(Obese), a known hypertensive with medical renal disease taking Tab. Indapamide Sustain Release 10mg OD, Tab Bisoprolol 2.5mg OD and a combination of Olmesartan 40mg + Amlodipine 5mg & Chlorthalidone 12.5mg OD. He had complaints of night snoring which would subside on awakening and day time somnolence, though a diagnosis of sleep apnea was not confirmed with a sleep study. An X ray chest taken during an annual medical checkup revealed a suspicious mass in the Right Upper zone which was diagnosed as adenocarcinoma of lung on biopsy. A PET/CT confirmed Right lung upper lobe tumor extending till the pleura. MRI Brain was normal & the disease was staged as T2bN2M0.

The patient underwent 4 cycles of neo Adjuvant Chemotherapy with Inj. Pemetrexed and carboplatin

following which there was reduction in tumor mass and lymph node volume. Pre-operative evaluation gave ASA II status for anesthesia.

The patient underwent right upper lobectomy with lymph node dissection through a lateral thoracotomy exposure. He was given balanced general anaesthesia with epidural. He was administered 4 crystalloids, 1 colloid intra-operatively. His intra-operative course was uneventful with stable hemodynamics, balanced input & output. At the end of surgery, a right intercostal drain (ICD), and two drains, one in the right chest wall and right neck were placed.

Post operatively the patient was shifted to ICU on IPPV mode of ventilation. The patient was mechanically ventilated with TV – 450ml, RR- 16/min, PEEP- 0, FiO2- 50%, PIP- 26. He was sedated with an infusion of Fentanyl 50mcg/hr and Midazolam 2mg/hr along with an Epidural infusion of- Ropivacaine 0.2% and Fentanyl 2mcg/ml at 5 ml/hr. After overnight ventilation the patient was gradually weaned to CPAP with PS – 10, PEEP- 0, FiO2 – 40%. His morning X-Ray chest showed normal left lung with collapsed segment in right middle zone. ABG on FiO2 40% - pH - 7.40, pCO2 45 paO2 64 SaO2 92%. He was conscious, oriented, following verbal commands but on T-Piece with O₂ at 8 lit/min he became increasingly restless & tachypneic with RR- 30/min with EtCO₂ – 25. On auscultation he had reduced

air entry on right side with normal air entry on left side. The ICD column was moving well & hence FOB was planned to remove secretions or a mucus plug from the bronchus or trachea.

Bronchoscopy showed minimal secretions and hence the patient was sedated and ventilated on IPPV with previous settings. His ventilation improved & vitals stabilized and it was planned to ventilate him till the next day.

On post-operative day (POD) 2 a second weaning trial was attempted during which the patient developed atrial fibrillation which was treated with intravenous Digoxin 0.25mg and sinus rhythm was restored. The patient was again sedated and mechanically ventilated. POD3 the weaning trial was initiated again and the patient was weaned till CPAP with PS – 10, PEEP- 0, FiO₂ – 40%. He again became tachypneic on T piece and hence FOB was planned again, which revealed the posterior wall of trachea to be floppy which collapsed on expiration. These FOB findings confirmed the diagnosis of EDAC and a plan to gradually wean the patient off the ventilator was undertaken.

The patient was kept on CPAP with settings of PS – 10, PEEP- 0, FiO₂ – 40% on which his respiration stabilized but he developed Atrial Fibrillation again which was treated with Amiodarone infusion. Percutaneous Tracheostomy was done in view of diagnosis of EDAC and major thoracic surgery which mandated a slow weaning from ventilator. Over the next four days he was weaned to minimum CPAP support and maintained on same. On the 7th post-op day FOB was repeated to evaluate the upper airway & vocal cord were reported normal.

The patient was maintained on T piece on 6 lit O₂/min from POD 8 onwards, Drains were gradually removed and after confirming adequate lung expansion decannulation of Tracheostomy was planned on POD14. The patient withstood the decannulation well.

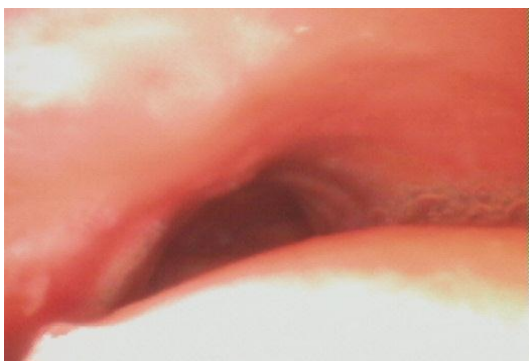


Image 1: EDAC on expiration.

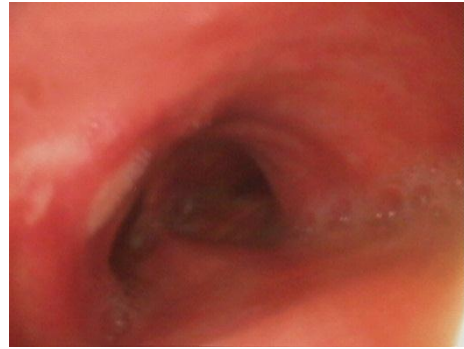


Image 2: Inspiration.

DISCUSSION

EDAC along with TBM are pathophysiologic entities comprising ECAC.^[3]

EDAC is characterized by excessive forward displacement of the membranous wall due to weakness and atrophy of the longitudinal elastic fibers of the posterior wall.^[3] It is an exaggeration of the normal narrowing of the trachea during exhalation.^[5,9] In EDAC the posterior wall is thinner and histologic evaluation of the affected segments has shown changes in the elastic fibers of the paramembranacea.^[10,11]

Symptoms may present with severe dyspnea, intractable cough, recurrent infections and respiratory failure.^[1,2,3,5,8] Diagnosis of ECAC should be based on dynamic flexible bronchoscopy and/or dynamic CT scan and clinical symptoms that are not fully explained by another disease.^[6,7] Initial treatment includes treatment of recurrent infections, medical therapy for concomitant airway diseases, pulmonary physiotherapy, airway clearing device, pursed lip breathing, continuous positive airway pressure (CPAP) and pulmonary rehabilitation. Patients should undergo evaluation for vocal cord dysfunction and gastro esophageal reflux disease since both are highly prevalent in this patient population. CPAP can be an effective treatment option for patients awaiting definitive surgery or for patients who cannot undergo surgery.^[3]

Our patient had BMI 31 and had symptoms of mild OSA though not confirmed with sleep studies. Post operatively the increased work of breathing due to airway edema, secretions, thoracic incision, residual muscle paralysis and lobectomy itself on a prior setting of OSA could have contributed to symptoms of EDAC in our patient. Asymptomatic central airway collapse with exhalation may be a relatively common finding as suggested by a recent study of dynamic CT scans.^[6]

EDAC in a patient after anesthesia and surgery presenting for the first time in the post-operative period has been reported by other authors in different clinical situations.^[4] Morbid obesity and the resulting increased intrathoracic pressure, especially in the supine position,

would contribute to an exaggeration of normal expiratory airway collapsibility.^[4]

CPAP is a well-established treatment modality for EDAC and we were able to wean our patient to CPAP. Tracheostomy may stent the proximal part of the collapsible trachea and give respite to the patient as observed in our patient whom we were able to wean better after tracheostomy.^[5]

A gradual weaning course of CPAP with intubation and later on with diagnosis of EDAC confirmed, tracheostomy and BIPAP helped our patient recover.

CONCLUSION

EDAC can be triggered in a previously asymptomatic patient in the post-operative period due to various factors such as airway edema, secretions, and increased work of breathing due to respiratory muscle weakness, thoracic or high abdominal incision and in our patient resection of the lung itself. Clinicians need to be aware of the entity to arrive at a diagnosis of EDAC. FOB and dynamic CT as diagnostic modes and judicious use of CPAP and if needed tracheostomy to help ventilation and eventual recovery from EDAC.

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