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ANAESTHETIC MANAGEMENT OF INTRAOPERATIVE IATROGENIC TRACHEAL TEAR

Anaesthesiology

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ABSTRACT

Intraoperative tracheal injury is rare but life threatening complication. High degree of suspicion is essential to identify these cases and early intervention is associated with better outcome[1]. We report a case of a intraoperative tracheal injury who was managed conservatively with protective lung ventilation in a patient undergoing transhiatal esophagectomy for carcinoma esophagus.

KEYWORDS

tracheal injury, transhiatal esophagectomy, conservative management.

INTRODUCTION

Iatrogenic intraoperative tracheal injury is a lethal complication seen during transhiatal esophagectomy. It poses unique challenges to anaesthesiologist in terms of accurate anatomic diagnosis and ventilatory management.

CASE REPORT

A 38 year old female came with complaints of dysphagia and vomiting since two months. Patient was investigated and diagnosed as having carcinoma of lower third of esophagus. She was posted for transhiatal esophagectomy with proximal gastrectomy with gastric conduit and esophagogastric cerical anastomosis under general anesthesia.

Preoperative evaluation found no comorbidities with low body mass index(BMI). Systemic examination was normal. Baseline investigations were within normal limits. Patient was taken to operation theatre and monitors attached. Vitals noted. General anaesthesia was induced with injection propofol 100mg IV, fentanyl 60µg, glycopyrrolate 0.2mg, midazolam 1mg and vecuronium 4mg. After 3 minutes of ventilation patient was intubated with portex cuffed single lumen endotracheal tube(ETT) number 7 and correct placement was confirmed by ausculatation and capnography. Invasive BP monitoring started in left radial artery. Anaesthesia was maintained with sevoflurane 1.5% and 50%O2 with N2O.

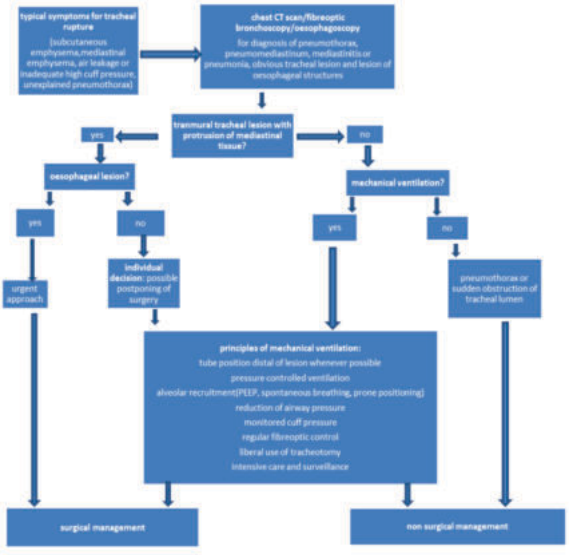
By laparoscopic technique adhesions and gastroesophageal junction (GEJ) dissected, esophagus pulled inferiorly and esophagus separated from all adhesions and dissection completed till carina. Neck dissection started using open technique with left curvilinear incision taken over the neck. Procedure remained uneventful for initial five hours. During dissection when esophagus was lifted off the trachea and blunt dissection of cervical esophagus was done to free it from adhesions, there was sudden gush of air from cervical incision, sudden loss of ventilation with drop of peak airway pressure to zero, oxygen saturation dropped to 92% but patient was haemodynamically stable. Patient was taken on manual ventilation to check position of ETT and bilateral air entry. On auscultation air entry was markedly reduced bilaterally. Surgeons were requested to check the surgical field and it was confirmed that there was rent of around 1.5cm in posterior tracheal membrane just proximal to carina by direct visualization and palpation with surgeon's finger. Immediately surgeons were requested to insert intercostal drain(ICD) bilaterally. Bilateral lung expansion and restoration of normal lung ventilation is ensured after ICD insertion. During ICD insertion 100% O2 was given at high flows, ETT cuff inflated little more. Manual ventilation done with high respiratory rate and high tidal volume. Ventilation became adequate as soon as the ICD was placed and column movement with frankly visible air leak was observed in the drain. Patient saturation was improved. Cuff pressure monitored regularly at repeated intervals. Discussion was done with operating surgeon to decide the definitive management of the tear for better survival of the patient postoperatively. After consultation with cardio vascular thoracic surgeon and ear nose and throat (ENT) surgeon it was decided jointly to continue the surgery to form gastro esophageal conduit anastomosis which would effectively buttress the tracheal rent and prevent further leakage of ventilator gases. This was confirmed intraoperatively as there was no air leak after conduit anastomosis formation. Feeding jejunostomy was done with creation of tunnel. Intraoperative arterial blood gas values are pH 7.45, pCO2 39.9 Torr, pO2 279.8 Torr , anion gap 3.8mmol/L , $HCO3^-$ 27.5mmol/L. Patient was shifted to CCU , sedated and paralysed with intermittent positive pressure ventilation with bilateral ICD inserted for further management.

DISCUSSION

Tranashiatal esophagectomy is commonly performed for lower third esophageal malignancy[2]. Tracheal tear occurs more commonly during cervical mobilization of esophagus if the tumor is adherent. There is 26% incidence of respiratory complications during transhiatal esophagectomy[2].

Tracheal injury is suspected when there is sudden drop in tidal volume or drop in peak airway pressure delivered to the patient or sudden drop in saturation[3]. Diagnosis is confirmed either by direct visualization or CT chest or fibreoptic bronchoscopy. The essentials of anaesthetic management in tracheal injury is to ensure adequate ventilation and protection of the airway. Goals of ventilation is to maintain end tidal carbon dioxide(ETCO2), keep pH within normal range, peak airway pressure <27cm H2O and positive end expiratory pressure(PEEP) adjusted to achieve SpO2 >92% at all times. Pressure controlled ventilation with decelerating flow pattern has been shown to provide better arterial oxygenation[3].

Deja et al.[4] described comprehensive algorithm regarding diagnosis and management of iatrogenic tracheal rupture



[CT- computed tomography]

Flowchart 1.- Management Algorithm[4].

Nikolaos et al.[5] in a mini review concluded that for small laceration and stable patients conservative management is considered sufficient, while surgical management is mandatory for large defects with significant air leak and patient instability. As our patient was haemodynamically stable and tear was small ,patient was managed conservatively.

Eshan Ahmed et al.[6] in a case report concluded that early recognition, maintainance of adequate ventilation, team approach with surgeons during airway injury are points to successful management. In our case definitive treatment was planned after discussion with operating surgeon, cardio thoracic surgeon and ENT surgeon.

Massimo Conti, et al.[7] in their letter to editor recommended conservative non operative therapy as the best approach to post intubation trachea bronchial rupture in patients who are (1)on spontaneous ventilation, or (2)when extubation is scheduled within 24 hours from the time of diagnosis, or (3) for patients who will require continued ventilation to treat their underlying respiratory status. Surgical repair is reserved for cases where NIV or bridging the lesion is technically not feasible or for injuries diagnosed during thoracic surgery.

Conservative treatment is favored in patients who do not require mechanical ventilation. When mechanical ventilation is possible without loss of tidal volume and emphysema is mild and patient is stable conservative management is indicated by placing cuff beyond tracheal tear[5]. In our case adequate ventilation was achieved and patent vitals were stable, so conservative approach was followed. It is advisable to leave ETT uncut in case of need to advance ETT further beyond the tracheal tear[2]. If tear is close to the carina or involves bronchus DLT may be used under fibreoptic guidance[1].

Surgical treatment is considered for tears >2cm[6]. There is no place for conservative management in large tears because failed medical treatment may reduce chances of successful delayed surgical repair due to infection and inflammation that inevitably follow[8].

CONCLUSION

Timely diagnosis and management is the key to the successful management of intraoperative tracheal inury. Majority of tracheal injuries can be managed conservatively if tracheal injury is small, adequate ventilation can be maintained by without disturbing the tracheal tissue further and enhancing the primary healing of injury.

Conflict of Interest: None

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