CASE REPORT

Iatrogenic Tracheal Tear

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ABSTRACT

Large post intubation tracheal tears are usually detected intra-operatively due to unstable signs namely impaired ventilation and mediastinal emphysema and often require surgical management. Smaller tracheal tears are often missed during anaesthesia and recognized during the postoperative period. Conservative management should be considered in these latter cases.

Keywords: Conservative management, intubation, tracheal tear

Desgarro Traqueal Iatrogénico

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RESUMEN

Grandes desgarros traqueales tras una entubación se detectan usualmente intra-operativamente debido a señales inestables, a saber, ventilación defectuosa y enfisema del mediastino. Tales desgarros requieren a menudo tratamiento quirúrgico. Los desgarros traqueales menores no se ven a menudo durante la anestesia y se reconocen sólo durante el periodo postoperatorio. Un tratamiento conservador debe ser objeto de consideración en estos últimos casos.

Palabras claves: Tratamiento conservador, entubación, desgarro traqueal

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INTRODUCTION

Iatrogenic tracheal tear is a rare complication of intubation and can present as a life-threatening situation intra-operatively, especially if large. Small tears however are often diagnosed postoperatively and aggressive surgical management is often not necessary after delayed diagnosis of smaller iatrogenic tracheal tears. A case report of the successful management of such a case is presented.

Case Report

A 43-year old female was admitted for a routine laparoscopic cholecystectomy in a district hospital. The intubation was achieved with a size 6-cuffed endotracheal tube. The induction of anaesthesia was smooth and the surgery was uneventful. The anaesthetic team reported that the patient coughed up a small amount of blood following extubation. It was also noted that there was a small amount of blood on the cuffed area of the endotracheal tube. Two hours postoperatively, she complained of chest pain. Her vital signs were stable and her oxygen saturation was 100% on room air. Cardiac and respiratory system examinations were unremarkable. She was treated with nonsteroidal anti-inflammatory analgesia which failed to relieve the pain.

A chest radiograph showed a small area of lucency projecting over the right superior mediastinum (Fig. 1). Lateral soft tissue neck radiograph showed air in the prevetebral space of the neck (Fig. 2). Following these findings, the patient was transferred to the otolaryngology service. On admission, she continued to complain of chest pain, her vital signs remained stable and there was evidence of surgical emphysema on the right side of the neck. Naso-endoscopic findings showed an erythematous posterior commisure and a minimally haemorrhagic left vocal cord. An urgent computed tomography (CT) scan with contrast was performed which showed subcutaneous emphysema in the neck between

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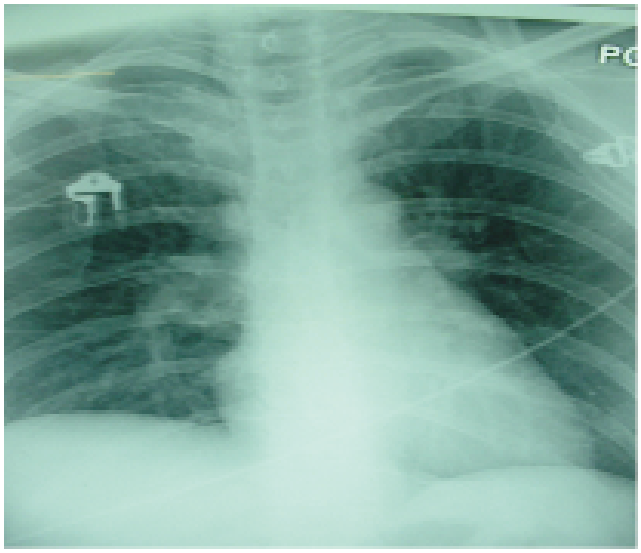

Fig. 1: Chest radiograph showing a small area of lucency projection over the right superior media-stinum.

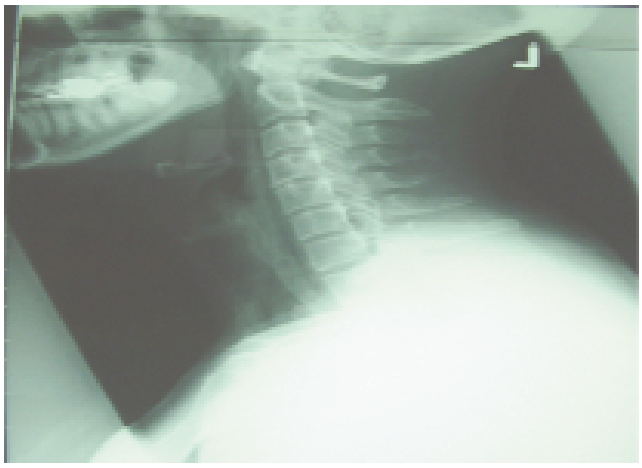

Fig. 2: Lateral soft tissue neck radiograph showing air in the prevetebral space of the neck.

the trachea and oesophagus medially and the carotid sheath laterally. There was also air extending cranially from the carina to the base of the skull. There was no visible extra visceral collection of contrast or fluid in the neck, thorax or abdomen (Fig. 3).

The patient was managed conservatively. She was kept nil by mouth and hydrated with intravenous fluid. She was treated with analgesia, intravenous (antibiotic) piperacillin-sodium tazobactam sodium 4.5 grams daily and intravenous pantoprazole sodium 40 mg daily. She was allowed clear fluids on the third day, since the pain had subsided. A repeat chest radiograph showed no pneumomediastinum and bronchoscopy was normal. She resumed normal diet on the fourth day, was discharged on the fifth day for followed-up in the clinic.

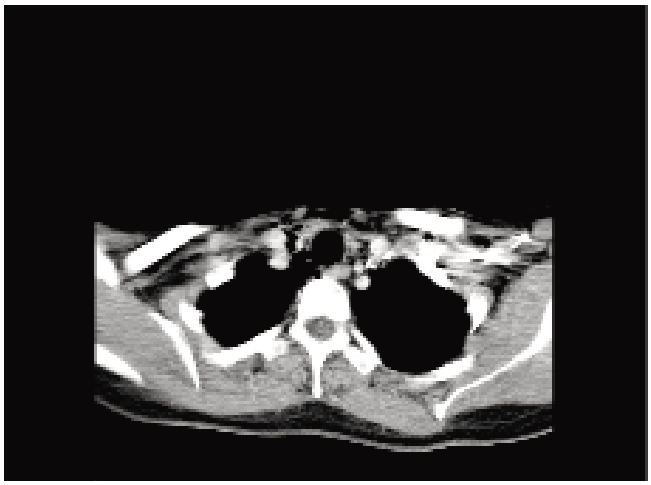

Fig. 3: Computed tomography scan with contrast showing subcutaneous emphysema between trachea and oesophagus medially and the carotid sheath laterally.

DISCUSSION

Iatrogenic tracheal tears are a rare complication of intubation, percutaneous tracheostomy and bronchoscopy with an incidence ranging from 0.05 − 0.19% (1). Contributory factors include multiple vigorous attempts at intubation, patient positioning with inflated cuff, over inflation of the cuff and improper tube size (2). Previously, use of nitrous oxide during anaesthesia was implicated as well as anatomic alterations which might be a contributing factor. It is more common in females, due to the shorter necks. Predisposing individual factors include weakened tracheal wall due to steroids, chronic obstructive pulmonary disease and tracheomalacia. Most tears occur in the lower third of the trachea in the membranous part and are discovered intra-operatively because of impaired ventilation and mediastinal emphysema. Tears discovered postoperatively present commonly with chest pain and surgical emphysema. Chest radiographs and computerised tomography are important for confirmation of the diagnosis.

Management is non-surgical/conservative or surgical. Conservative management is a viable option after delayed diagnosis of iatrogenic tracheobronchial rupture (3). Conservative management includes fluid resuscitation, *nil per os* (mouth), intravenous broad spectrum antibiotic, analgesia and continual reassessment as was performed in the index patient.

Ross *et al* proposed guidelines in 1997 regarding surgical repair. It was for patients with unstable vital signs, evidence of respiratory distress, associated oesophageal injury, volume of mediastinal fluid collection, progression of air leakage, sepsis, and tears more than 4 cms and full thickness (4). If surgery is contemplated, a bronchoscopy is mandatory to assess the tear and to determine the surgical approach. Airway control is gained through insertion of the tracheal tube and inflating the cuff distal to the tear for

ventilation. Surgical options vary between the right thoracotomy approach for repair involving the distal trachea, main stem bronchus or both the cervical approach when the laceration is located in the proximal two-thirds of the trachea and newer video assisted bronchoscopic approach where the expertise is available (5). In patients not fit for surgery, repair with covered expandable stents has been done (6). Fibrin glue has been used to strengthen the suture line (7).

Prompt diagnosis and adequate treatment are important for abating this potentially fatal situation. The final decision to treat conservatively or surgically should be based on clinical, radiological and bronchoscopic findings.

REFERENCES

1. Leinung S, Möbius C, Hofmann HS, Ott R, Rüffert H, Schuster E et al. Iatrogenic tracheobronchial ruptures – treatment and outcomes. Interact CardioVasc Thorac Surg 2006; **5:** 303−6.
2. Chen EH, Logman ZM, Glass PSA, Bilfinger TV. A case of tracheal injury after emergent endotracheal intubation: A Review of the Literature and Causalities. Anesth Analg 2001; **93:** 1270−1.
3. Jougon J, Ballester M, Choukroun E, Dubrez J, Reboul G, Velly JF. Conservative treatment for post intubation tracheobronchial rupture. Ann Thorac Surg 2000; **69:** 216−20.
4. Ross HM, Grant FJ, Wilson RS, Burt ME. Non operative management of tracheal laceration during endotracheal intubation. Ann Thorac Surg 1997 **63:** 240−2.
5. Mussi A, Ambrogi MC, Menconi G, Ribechini A, Angeletti CA. J Thorac Cardiovasc Surg 200l; **120:** 115−8.
6. Madden BP, Sheth A, Ho TBL, McAnulty G. Novel approach to management of a posterior tracheal tear complicating percutaneous tracheostomy. Br J Anaes 2004; **92:** 437−9.
7. Hofmanna HS, Rettigb G, Radkeb J, Neefa H, Silbera RE. Iatrogenic ruptures of the tracheobronchial tree. Eur J Cardiothorac Surg 2002; **21:** 649−52.