intensive care society

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STATE OF THE ART

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Life-threatening tracheobronchial obstruction with blood clot, managed using whole endotracheal tube suction

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Introduction

Tracheobronchial obstruction due to blood clot after mucosal injury is a rare complication of tracheal instrumentation which may occur during airway surgery (eg tracheostomy), or during a minor procedure such as use of a bougie at intubation. This situation poses several challenges, including potential ongoing bleeding, obstruction of both distal and proximal airways, ball-valve behaviour, and the potential for complete airway occlusion at any stage with subsequent failure of ventilation. We present a case of life-threatening tracheal blood clot following bougie-facilitated tracheal intubation for a patient undergoing incision and drainage of a chest wall abscess.

Methods

A literature search was performed on Pubmed and GoogleScholar using search terms ‘tracheal/tracheobronchial’ ‘obstruction’ ‘blood clot’ ‘mucus plug’ ‘suction’. The authors present this in context of a recent emergency case.

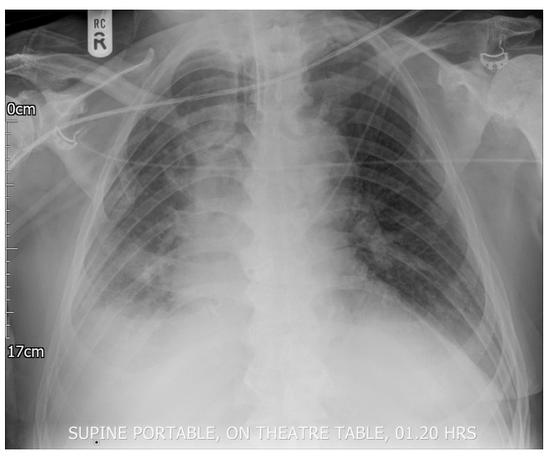

Figure 1. Chest XR

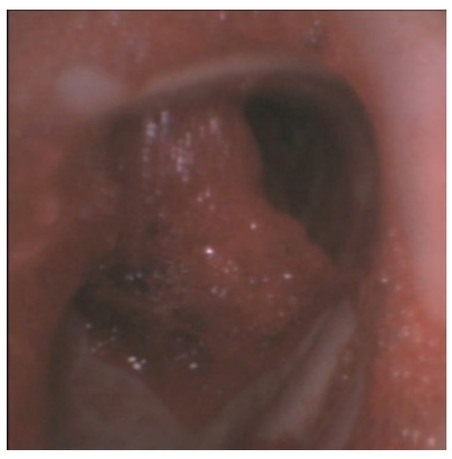

Figure 2. Bronchoscopic view

Results

There are several case reports of emergency management of tracheobronchial obstruction, usually either from blood clots due to airway injury (for example at tracheostomy), or from large mucus plugs. Most are removable using standard suction catheters, or using suction via fibreoptic bronchoscopy. If this is unsuccessful, rigid bronchoscopy and optical grasping forceps may be indicated. Topical thrombolysis may also be an option, if there is no ongoing bleeding source. Should all these tactics fail, as in this case, the endotracheal tube may be advanced onto the clot under fibreoptic vision, then connected directly to the suction and removed – along with the complete clot – before the patient is reintubated.

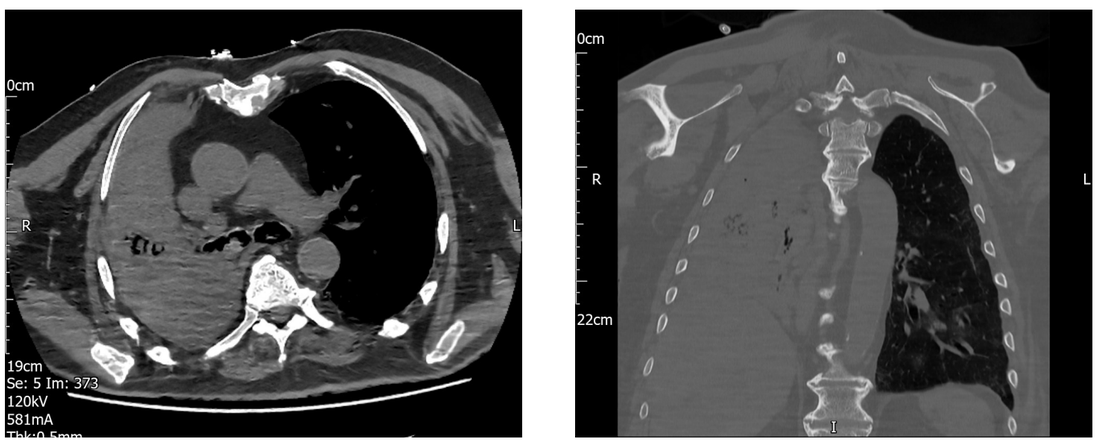

Figure 3. CT angio of chest (axial, sagittal)

Conclusions

The use of a whole endotracheal tube as a suction device in life-threatening tracheobronchial obstruction is a simple but life-saving technique using standard kit available in all anaesthetic rooms, and may save lives where standard rescue methods fail.

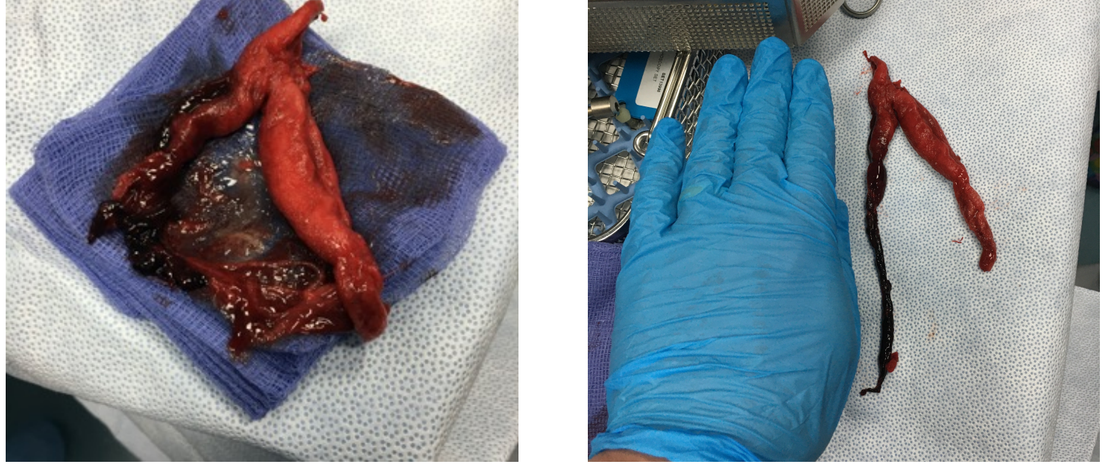

Figure 4. Clot removed (hand for scale)

80M presents out-of-hours with large chest wall abscess with surrounding cellulitis. Not responded to antibiotics in community. Booked for incision and drainage.
No old notes available. BMI 33. Some haematological and cardiac investigations at local private hospital. Atrial fibrillation on edoxaban (stopped 36 hours ago).
Hb 80, Platelets 60. Creatinine 118.
Haematologist – ‘Should be okay for surface surgery’

Airway plan: 2nd generation LMA (Auragain), ramped position

Supraglottic device not sitting well on induction, therefore decided to intubate. Grade 3 view with CMAC MAC-4 blade. Bougie, felt clicks. Unable to railroad tube so removed and bagged. Grade 1 view with D blade, bougie and easy railroading of tube. Small streak of blood noted on bougie, presumed to be from lip. Case proceeded uneventfully with normal ventilatory pressures and oxygenation.

Fresh red blood noted in ETT at end. No audible air entry in R side chest.

Suction catheter to oropharynx (clear) and ETT (fresh red blood). Correction dose of Prothrombin complex concentrate, 1 pool platelets, 1g tranexamic acid, adrenaline neb.
Normal ROTEM after products. CXR RLL consolidation (Figure 1)

Bronchoscopy (Figure 2) – large, obstructing, semi-mobile clot in trachea extending into both main bronchi, occluding right. No clear source of bleeding. Attempted suction via flexible bronchoscope, unsuccessful. Further unsuccessful attempts with different suction and larger bronchoscope.
Deteriorating clinical picture – increasing pressures, decreasing tidal volumes, worsening hypercapnia.

Discussion with regional cardiothoracic centre – suggests rigid bronchoscopy at local site and CT angiogram.

CT angiogram (Figure 3) – no active bleeding point demonstrated. Complete occlusion right main bronchus, partial occlusion of trachea and left main bronchus.

Rigid bronchoscopy (with Mapleson C on side port rather than Sanders injector) – began to remove clot piecemeal → graspers broke. No further kit available.

Reintubated – unable to ventilate. Sat up – able to ventilate at low tidal volumes.

Distal ETT advanced onto clot via flexible bronchoscope. Suction tubing advanced into proximal ETT and seal formed with tight grasp of gloved hand. Extubated using ETT as suction device, with large tracheobronchial clot removed attached to tube (Figure 4).

Reintubated uneventfully, now able to ventilate. Transferred to ICU.

Repeat bronchoscopy over next few days – some residual clot. Biopsy suggestive of clot, no malignancy. Progressive reduction and clearance in clot volume and improvement in respiratory parameters. Extubated day 4. Discharged from hospital day 11.

References

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