CARDIAC ARREST – TRACHEAL TEAR

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Tracheal rupture most commonly occurs after blunt trauma to the chest, but is a rare complication after intubation (1:20,000).

Its importance derives from the high associated morbidity and mortality.
CASE PRESENTATION
Mrs J presented to a local DGH Accident and Emergency on 26/12/14 following an out of hospital cardiac arrest.

She was found by her husband in the early hours of the morning to be unresponsive. He immediately commenced cardiopulmonary resuscitation for 10 minutes.

On arrival of the paramedics Mrs J was found to be in ventricular fibrillation. CPR was continued and Mrs J was intubated with a size 8.0mm endotracheal tube. No laryngoscopy grade recorded but no record of difficulty intubating. Ongoing CPR and defibrillation but no ROSC.
CASE PRESENTATION

Past Medical History
• Thyroidectomy for cancer in 2006
• Crohn’s disease
• Hysterectomy

Drugs
• Azathioprine

Background
Mrs J is a 45 year old radiographer, married with two teenagers.
On arrival in A&E Mrs J received a further 27 minutes of CPR before the return of spontaneous circulation was established.

Total CPR time = 65 minutes!

Mrs J was thrombolysed for a suspected Pulmonary Embolism (exact indication unclear). She subsequently underwent a CT scan. No evidence of Surgical Emphysema at this time.
CT of the head revealed a normal brain and no Pulmonary Embolus.

CT Thorax showed no evidence of Pulmonary Embolus, but did reveal mediastinal gas and an abnormally dilated distal Trachea, Surgical Emphysema and bilateral consolidation.
CASE PRESENTATION

- Given the intra-Thoracic findings on CT, Mrs J was ventilated on ITU with low tidal volumes (6mls/kg), an FiO2 of 50% and no PEEP.

- Cardiovascularly she was supported with Noradrenaline, Pitressin, Dobutamine and Amiodarone.

- Over the course of the next 2 days she continued to develop increasing Surgical Emphysema, so a further CT scan was performed. No chest drain was inserted (no documentation as to why).
CASE PRESENTATION

Results of second CT scan

• Right Cerebellar Infarct

• Large Pneumomediastinum

• Large Pneumopericardium

• Endotracheal tube in right Bronchus
CASE PRESENTATION

• Mrs J’s family were informed of her poor prognosis and the priest was called for.

• A Do Not Resuscitate Order was completed.

• Transfer was arranged to the Cardiothoracic team at James Cook University Hospital.
Mrs J was accepted to CICU paralysed, sedated and ventilated on Fi02 50% with no PEEP.

She had widespread Surgical Emphysema up to her eyes.

A 12F Seldinger chest drain was inserted.

Treatment with Piperacillin/Tazobactum & Metronidazole was commenced.
CASE PRESENTATION

• Mrs J was transferred to the operating theatre and prepared for Tracheal repair utilising femoral/femoral Cardio-Pulmonary bypass.

• A Videoscopic Flexible Bronchoscopy was performed.

• A 3cm tear was noted in the membranous part of the Trachea, just proximal to the Carina.

• The tip of the Endotracheal tube was in the right Bronchus.

• Given the location and extent of the pathology and the very high risk of full heparinisation and bypass, a decision was made to treat conservatively.
CASE PRESENTATION

TRACHEAL TEAR
CASE PRESENTATION

CT SCAN SHOWING DILATED TRACHEA
Iatrogenic Tracheal rupture is a rare condition and has many causes

- Intubation
- Tracheostomy
- Bronchoscopy
- Placement of stents
- Oesophagectomy

Oro-tracheal intubation is the most common cause - with emergency intubation causing a threefold increase in the risk of death.
DISCUSSION

Chest X-Ray & CT can show –

• Soft tissue Emphysema

• Pneumomediastinum

• Pneumopericardium

• And/or Pneumothorax
Pneumomediastinum is uncommon and occurs when air leaks into the mediastinum. The diagnosis can be confirmed via chest X-ray showing a radiolucent outline around the heart and mediastinum or via CT scanning of the thorax.
A Pneumopericardium refers to an accumulation of gas/air between the Myocardium and Pericardium.
Clinical signs & symptoms of a Tracheal tear

• Subcutaneous Emphysema

• Respiratory insufficiency

• Pneumothorax

• Haemoptysis
DISCUSSION

Diagnostic confirmation is by direct visualisation of the Tracheal tear by bronchoscopy.
DISCUSSION

Mechanical Risk factors –
• Multiple forced attempts at intubation
• Inexperienced health professional
• Over inflation of the cuff
• Inappropriate size of tube
• Incorrect position of the tip of the tube
DISCUSSION

Anatomical Risk factors –

- Congenital tracheal abnormalities

- Weakness of the membranous portion of the trachea

- COPD

- Chronic use of steroids

- Advanced age

- Female sex
Management
Consensus has not been reached on the management of tracheal tears.

Early surgical repair has traditionally been the mainstay of treatment, however, recent publications consider conservative management to be the treatment of choice.

Recently some studies have demonstrated that surgical repair in critically ill patients is a high risk procedure with a mortality that can reach 71%.
DISCUSSION

Conservative management includes –

• Intubation with the cuff distal to the area of rupture

• Continuous tracheal aspiration

• Use of a pleural drain, if required

• Appropriate empirical antibiotic therapy
DISCUSSION

Mrs J was managed conservatively and kept sedated for 5 days to allow the trachea to heal.

After 5 days she had daily sedation holds when she opened her eyes spontaneously and responded appropriately but was resedated due to coughing. Neurological recovery was confirmed.

On day 11 she had a repeat bronchoscopy performed which demonstrated that the tracheal tear had healed. The endotracheal tube was withdrawn to above the level of the lesion.

After a further 24 hours with no air leak & no Surgical Emphysema a surgical tracheostomy was performed.
CONCLUSION

Ten days after her Tracheostomy Mrs J was decannulated and transferred to Coronary Care the following day.

An angiogram revealed normal coronaries and she was subsequently fitted with an ICD for suspected long Q-T syndrome.

Mrs J returned home after one month in hospital and is hoping to return to work as a radiographer in September.
CONCLUSION

In summary -
Iatrogenic tracheal tears are a rare condition which carry a high morbidity and mortality.

Diagnostic suspicion is essential, with subsequent confirmation by bronchoscopy.

Emergency intubation carries a threefold increase in the risk of death in comparison to elective intubation.

Treatment is controversial although it appears that conservative management is associated with a better outcome.
ANY QUESTIONS?