CASE REPORT

Bilateral pneumothoraces in a patient with laryngeal carcinoma following tracheostomy for stridor

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SUMMARY

A pneumothorax following a tracheostomy is a known but rare complication. Bilateral pneumothoraces are rarer still and very few are described in the literature. We present a case of bilateral pneumothoraces following an emergency tracheostomy in a female patient with known laryngeal carcinoma. She was managed with bilateral intercostal chest drains (ICDs) with good result. Anatomical integrity of the oesophagus was confirmed using barium swallow. Prior to removal of the drains a CT scan of the thorax was performed that showed disease progression and led to a change in the initial curative plan. We emphasise the importance in early diagnosis of this complication with a low index of suspicion. We suggest regular monitoring and a low threshold for treatment with bilateral ICDs.

BACKGROUND

Pneumothorax, including bilateral pneumothoraces, are known complications of tracheostomy and percutaneous tracheostomy.^{1 2} The risk of pneumothorax is known to be reduced with minimal dissection. Posterior wall laceration can lead to pneumomediastinum. The incidence of a pneumothorax post-tracheostomy is reported at 0–4%.³ This complication rate decreases to 0.8% with the technique of percutaneous tracheostomy.⁴

In this case report we describe bilateral pneumothoraces following an emergency tracheostomy insertion with attention to the management using intercostal chest drains (ICDs). Although this is a rare condition, if diagnosed late or managed poorly it can have grave implications for patients.

CASE PRESENTATION

A 45-year-old woman previously diagnosed with supraglottic squamous cell carcinoma (cT3 N0 M0) was admitted with worsening stridor. She had a history of stridor, however, over the past 2 weeks this had progressed to the point where she was dyspnoeic at rest. Nasendoscopy revealed a supraglottic tumour occluding the vocal cords. She underwent an urgent tracheostomy that, due to the tumour, required lateral and posterior dissection. During the procedure the airway was controlled with an endotracheal tube. The patient was transferred back to the ward following the procedure. She was self-ventilating and no longer in respiratory distress.

INVESTIGATIONS

The postoperative chest radiograph (figure 1) revealed bilateral pneumothoraces and subcutaneous

emphysema. Despite this finding she was asymptomatic. A gastrografen swallow showed the oesophageal mucosa to be intact. Of note, it is standard practice in our institution to use a gastrografen swallow as the first-line investigation in suspected visceral injury as barium can cause bronchoconstriction and mediastinal inflammation.

TREATMENT

In keeping with the British Thoracic Society (BTS) guidelines thoracic surgeons were consulted who suggested either bilateral drains or initially draining one side and observing the other. Owing to the right being slightly larger (2.7 cm) than the left (2.2 cm), an 18 French ICD was inserted into the right pleural space with the view to monitor the left side. The ICD was inserted using the Seldinger technique without complications. The Seldinger technique was used as the pneumothoraces were not large and there was no anticipated injury to the lung and therefore no expected persistent air leak. Subsequently, a chest radiograph was taken to ensure correct placement and to ensure no further complications (figure 2). During this time the patient had the gastrografen swallow, which confirmed oesophageal integrity. The chest radiograph, however, did show an increase of the left pneumothorax. Following this the patient did feel more dyspnoeic. Her oxygen saturations were still above 96% with a fractional inspired oxygen of 0.21,

Figure 1 Anteroposterior erect chest radiograph following tracheostomy showing bilateral pneumothoraces and subcutaneous emphysema.

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Figure 2 Anteroposterior erect chest radiograph following right-sided intercostal drain placement. Note the change in volume of the left pneumothorax from [figure 1](#). The right-sided intercostal drain is at the apex with a well-expanded right lung.

however, her respiratory rate had increased to 24 breaths/min. There was no clinical suggestion of a tension pneumothorax. The left-sided pneumothorax was subsequently treated with an 18 French ICD. This was also inserted using the Seldinger technique without complication.

OUTCOME AND FOLLOW-UP

A subsequent CT scan demonstrated progression of the supraglottic tumour. There was no persistent air leak, therefore the right ICD was removed on day 4 post-tracheostomy and the left ICD on the following day with no further complications. The patient was discharged with follow-up by ear, nose and throat surgeons, oncology and the community palliative care team.

DISCUSSION

Percutaneous tracheostomy with bronchoscopic guidance is a safer procedure. While pneumothoraces including bilateral pneumothoraces are reported following this procedure, the risk is considerably reduced. However, due to the emergency nature of this procedure a traditional approach to tracheostomy was the safer route as it ensured the tracheostomy was sited clear of the supraglottic tumour. The siting of the tracheostomy was under direct visualisation therefore bronchoscopy was not used.

In this case the surgeon was astute about the complications of tracheostomy especially given the nature of this case. This was an emergency procedure in a patient with difficult anatomy due to her known tumour, which required significant dissection around the trachea. Despite the asymptomatic nature of the patient a chest radiograph and gastrografen swallow were requested. We recommend that a chest radiograph should always be performed after a tracheostomy. The placement of the tracheostomy and complications can be assessed.

An ICD is an effective and relatively safe method for treating pneumothoraces following tracheostomy. It is the preferable

treatment option in those with underlying lung pathology or those being positively ventilated. In those with a pneumothorax that is under 50% of the thoracic volume, observation with chest radiographs and supportive oxygen therapy may be used. Aspiration is an acceptable management option in the case of a simple unilateral pneumothorax, however, due to the increased cardiorespiratory stress in bilateral pneumothoraces, we suggest having a lower threshold for placing bilateral ICDs.

Current BTS guidelines (2010) on the management of bilateral pneumothoraces do suggest the insertion of an ICD.⁵ Patients with bilateral pneumothoraces are often excluded from trials in the treatment of spontaneous pneumothoraces especially as the majority are admitted following trauma and require bilateral ICDs. Owing to this, the guidelines suggest a case by case assessment and judgement.

It may be possible in particular cases to treat by close monitoring of symptoms, observations and regular chest radiographs. A low threshold of inserting ICD is important. We recommend that bilateral drains should be inserted simultaneously. Relieving the right-sided pneumothorax would have led to a shift in the mediastinum towards the right side and subsequently an increased pressure difference in the left hemithorax.

Bilateral pneumothoraces following tracheostomy are rare, however, they require a low index of suspicion for investigation and treatment should be tailored to the patient's clinical status. If treatment by ICDs is considered then bilateral drains should be placed simultaneously.

Learning points

- ▶ Be aware that bilateral pneumothoraces are a known complication following surgical and percutaneous tracheostomy.
- ▶ Chest radiographs should be performed routinely following a tracheostomy.
- ▶ Have a low threshold for inserting intercostal chest drains in the case of bilateral pneumothoraces.

Competing interests None.

Patient consent Obtained.

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