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| Title | Pneumothorax |
| Version | 1.1 |

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1. Introduction

- 1.1. Pneumothorax is a complication that increases with age and disease severity. It is a marker of progressive disease and carries a worsening prognosis with a significantly increased mortality rate.
- 1.2. Over half of patients with CF who have a pneumothorax will go on to have further episodes.
- 1.3. Infection, inflammation and mucus plugging in CF increase intrapleural pressures. Airway obstruction can lead to a check valve phenomenon, further increasing the risk of pneumothorax.
- 1.4. Management of pneumothorax follows the guidelines set out in the BTS pleural disease guidelines of 2010. These guidelines are currently under review.

2. Conservative management

- 2.1. Any unexplained chest pain or breathlessness should prompt the exclusion of a pneumothorax.
- 2.2. Pneumothoraces in CF can be classified by the size of the air rim wall as small <1cm, medium 1-2cms or large if >2cms.
- 2.3. Small asymptomatic pneumothoraces should be admitted and observed for at least 24 hours.
- 2.4. High flow oxygen (if the patient is known not to have type 2 respiratory failure) can increase the rate of resorption of the pneumothorax by four-fold and so should be applied for conservative management of small pneumothoraces

3. Chest drains

- 3.1. **Insertion.** Seldinger chest drain placement should be performed by the most experienced operator available. Where possible insertion should take place in a dedicated procedure room by a 'pleural team' highly skilled in chest tube placement.
- 3.2. **CT guidance.** If there is any evidence of pleural tethering on either previous or current imaging, or uncertainty of the best place to insert the drain, then consideration should be given to having the drain inserted under direct CT guidance.
- 3.3. **Anaesthetic.** Insertion of a chest drain can be a traumatic experience for patients. We recommend use of local anaesthetic as well as opiate analgesia and sedation with agents such as lorazepam to reduce anxiety and improve patient comfort.
- 3.4. **Suction.** If resolution of the pneumothorax does not occur within 24-48 hours then suction should be applied via an underwater seal, starting with a pressure of 2.5kPa, increasing to 5kPa as tolerated. If re-expansion does not occur or there is a continued air leak after 3-4 days referral to Thoracic Surgery for on-going support and management is recommended
- 3.5. **Alternatives to Seldinger chest drains.** There are now available ambulatory alternatives to the traditional Seldinger chest drains, however these should not be used for CF patients, as there is no evidence for their use yet.

4. Surgical intervention and pleurodesis

- 4.1. Inevitably some pneumothoraces will not resolve spontaneously.
- 4.2. The best treatment in this case is a limited abrasion pleurodesis, as other forms of pleurodesis are a relative contraindication for future lung transplantation. This includes extensive pleurectomy or

chemical pleurodesis with agents such as bleomycin or talc. In patients unsuitable for transplant these methods may be explored.

4.3. Pleurodesis is recommended when there has been a second ipsilateral pneumothorax

5. Further Management Considerations

5.1. During admission

- All patients with pneumothorax should be admitted
- IV antibiotics should be administered unless there is good reason to withhold them
- Physiotherapy should be continued with modification if necessary
- Positive pressure techniques including PEP masks should be withheld, but may be re-started 2 weeks post-resolution of pneumothorax
- NIV poses a significant challenge and may need to be withheld temporarily unless there is a drain in-situ
- After non-surgical treatment of a pneumothorax spirometry should be avoided for two weeks

5.2. On discharge

- Non-impact exercise and physical activity can commence on resolution of the pneumothorax
- Flying should be avoided for 2 weeks after confirmed complete resolution of a pneumothorax (though BTS guidelines are under review and this guidance may change accordingly)
- Recommence positive pressure airway clearance, including PEP masks, 2 weeks after complete resolution of pneumothorax

6. Tension pneumothorax

6.1. If a patient is cyanosed or pale with a raised respiratory rate and in distress, a tension pneumothorax should be considered.

6.2. Often the mediastinum may be displaced detected by a deviated trachea and displaced apex beat. There is often also associated tachycardia with hypotension.

6.3. Tension pneumothorax is a life-threatening complication and a large bore cannula should be immediately inserted in the second intercostal space and a definitive chest drain inserted immediately afterwards.

7. References

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