



CLINICAL PRACTICE GUIDELINE

Guideline coverage includes NICU KEMH, NICU PMH and NETS WA

Needle Aspiration of the Chest

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To remove air from between the parietal and visceral pleura, whilst avoiding laceration to the lung or blood vessels, in an infant suspected of having an accumulation of air within the pleural space.

This is an emergency procedure only.

Pneumothorax can occur spontaneously in a well term infant or may be associated with resuscitation, meconium aspiration syndrome, respiratory distress syndrome and positive pressure ventilation. Signs of a pneumothorax may be subtle and some infants may show no other signs except an increase in restlessness. A blood gas analysis may be the first indication that a pneumothorax has occurred.

As pneumothorax may complicate resuscitation following delivery, bilateral needle aspiration should be considered during a failed resuscitation and before ceasing resuscitative efforts.

Air generally accumulates anteriorly and in the apex of the pleural space.

Equipment

- 10 mL luer lock syringe
- 22 gauge intravenous cannula (for term neonates) 24 gauge cannula for infants < 30 weeks, or 23 gauge butterfly needle
- 3 way tap
- 25cm extension tubing
- Alcohol wipe

Procedure

1. Confirm pneumothorax by transillumination.
2. Position the infant supine and supported, consider the administer analgesia/local anaesthesia if time permits.
3. Attach 3-way tap to 10 mL luer lock syringe and turn the 3-way tap so that all ports are in the off position. Remove the caps from the 3-way tap.
4. Attach a 25cm extension tube to the other end of the 3-way tap if a cannula is being used ([Fig. 1](#)).
5. Add the butterfly needle extension to the 3-way tap when this system is used ([Fig. 2](#)).
6. Using the alcohol wipe, swab the infant's skin in the area of the 2nd-3rd rib along the mid-clavicular line.
7. Place a finger on the infant's 3rd rib. Guide the 22/24 gauge intravenous cannula, or butterfly needle, along the finger and insert it into the 2nd

intercostal space, along the mid-clavicular line, at an angle of 90°. **Avoid the nipple area** (Fig. 3).

An alternative site to drain is the 4th-5th intercostal space in the anterior axillary line (Fig. 4).

8. Once in position, remove the needle from the intravenous cannula and attach the extension tubing (with 3-way tap and syringe) to the cannula, or the 3-way tap & syringe, to the butterfly extension.
9. Turn the 3-way tap to aspirate air from the infant's chest into the syringe. Turn the 3-way tap to expel the air into the atmosphere. Allows operator to measure expelled air.
10. Continue to aspirate until resistance is met. If a butterfly needle is used, it should be removed after the aspiration is completed.
11. Once the infant is stable perform transillumination to confirm air removal. In term infants, or those with a thick chest wall, transillumination may fail to detect pneumothorax. Assess infant, perform chest x ray and consider the need for an intercostal catheter.
12. The intravenous cannula used for needle aspiration may remain in situ and should not be removed until requested by a consultant.
13. Chest x ray is definitive diagnostic tool and may assist in deciding further intervention.

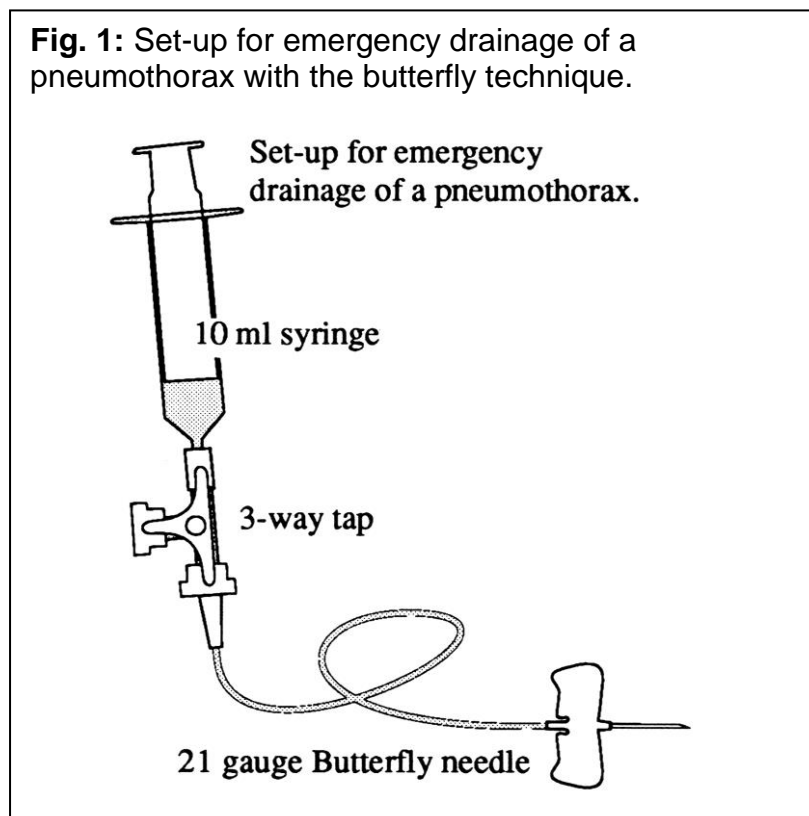


Fig. 2: Set-up for emergency drainage of a pneumothorax with the cannula technique. This cannula can be utilised to attach directly to an underwater seal drain in some circumstances.



Fig. 3: 2nd intercostal Insertion site for emergency needle aspiration.

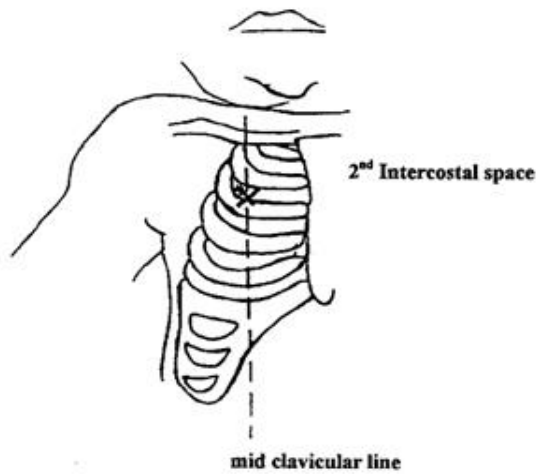
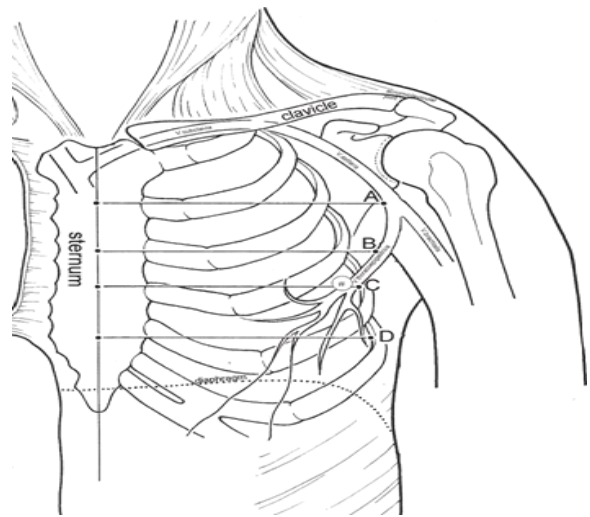




Fig. 4: C and D marks the 4th or 5th rib marks points respectively.



References

1. Eifinger F, Lenze M, Brisken K, Welzing L, Roth B, Koebke J. The anterior to midaxillary line between the 4th or 5th intercostal space (Buelau position) is safe for the use of thoracostomy tubes in preterm and term infants. *Pediatric Anesthesia*. 19(6):612-617, June 2009.

Document owner:	Neonatal Coordinating Group		
Author / Reviewer:	Neonatal Coordinating Group		
Date first issued:	June 2006		
Last reviewed:	1 st December 2014	Next review date:	1 st December 2017
Endorsed by:	Neonatal Coordinating Group	Date endorsed:	December 2014
Standards Applicable:	NSQHS Standards: 1  Governance, 9  Clinical Deterioration		

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