Needle aspiration of the chest is performed as an emergency procedure to remove air from between the parietal and visceral pleura, while avoiding laceration to the lung or blood vessels, in an infant suspected of having an accumulation of air within the pleural space (pneumothorax).

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, increasing transcutaneous CO2, persistent tachycardia, abrupt increase in respiratory rate 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
- 20 gauge intravenous cannula or 21 gauge butterfly needle
- 3-way tap
- 25 cm extension tubing
- 1% chlorhexidine/70% alcohol wipe

**Procedure**

*If credentialed, a lung ultrasound may be considered instead of diagnostic CXR (Raimondi et al 2016, Catarossi L et al 2016, Liu et al 2017). Ultrasound may be useful in rapid diagnosis and confirm position of needle corresponding to air leak.*

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 chlorhexidine/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 intravenous cannula, or butterfly needle, along the finger and insert it into the 2nd intercostal space, just above the rib below to avoid injury to the neurovascular bundle, 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. Measure the volume of expelled air. Care must be taken while manipulating the 3-way tap to avoid accidental reinjection of air into the chest cavity.

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/ CXR to confirm resolution of 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. The chest x-ray is a definitive diagnostic tool and may assist in deciding further intervention.

---

**Fig. 1:** Set-up for emergency drainage of a pneumothorax with the butterfly technique.
**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


<table>
<thead>
<tr>
<th>Document owner:</th>
<th>Neonatal Coordinating Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author / Reviewer:</td>
<td>Neonatal Coordinating Group</td>
</tr>
<tr>
<td>Date first issued:</td>
<td>June 2006</td>
</tr>
<tr>
<td>Last reviewed:</td>
<td>14th February 2020</td>
</tr>
<tr>
<td>Next review date:</td>
<td>14th February 2023</td>
</tr>
<tr>
<td>Endorsed by:</td>
<td>Neonatal Coordinating Group</td>
</tr>
<tr>
<td>Date endorsed:</td>
<td>25th February 2020</td>
</tr>
<tr>
<td>Standards Applicable:</td>
<td>NSQHS Standards: Governance, Acute Deterioration</td>
</tr>
</tbody>
</table>

Printed or personally saved electronic copies of this document are considered uncontrolled. Access the current version from the WNHS website.