CHEST EXAMINATION

PART 3 – CHEST AUSCULTATION

AUTHOR Phil Jevon, PGCE, BSc, RN, is resuscitation officer/clinical skills lead; Alan Cunnington, MD, FRCP, is consultant physician; both at Manor Hospital, Walsall.

Auscultation can be defined as the process of listening, usually with a stethoscope, to sounds produced by movement of gas or liquid within the body, as an aid to diagnosis (McFerran and Martin, 2003). Chest auscultation, listening to breath sounds in the chest, is probably the single most useful technique in the diagnosis of lung disease.

THE STETHOSCOPE

The stethoscope was first used in medicine by Laennec, a French physician, at the beginning of the 19th century. In its original form, it was a wooden cylinder with a hole drilled from one end to the other (Epstein et al, 2003). The standard modern stethoscope consists of two earpieces with tubing connected to the chest piece, which comprises the diaphragm and the bell (Fig 1). It transmits sounds from the chest, helps to exclude external noise and selects sounds of certain frequencies, enabling the practitioner to focus on them (Epstein et al, 2003).

The diaphragm is designed to amplify high-pitched sounds and should be placed firmly against the patient’s skin to ensure optimal amplification and transmission of the sound. The bell is designed to transmit low-pitched sounds such as heart murmurs and should be placed lightly against the skin (Ford et al, 2005). The diaphragm is normally used for chest auscultation. However, if the patient has a thin, bony chest, the bell may provide a more airtight fit. If the patient has a very hairy chest, it is less likely that hairs will be trapped below the bell, which can cause a crackling sound (Epstein et al, 2003).

BREATH SOUNDS

Breath sounds are produced when the vocal cords vibrate during inspiration and expiration. These sounds are transmitted along the trachea and bronchi and filtered through normal lungs to the chest wall (Talley and O’Connor, 2001). Volume and frequency of breath sounds are changed by pathology of the lungs and surrounding tissues, generating clinical signs (Ford et al, 2005). If anything is interspersed between the lung and the chest wall, such as air or fluid, breath sounds will be reduced on the affected side (Epstein et al, 2003).

Normal (vesicular) breath sounds are louder and longer during inspiration compared to expiration, and there is a gap between the inspiratory and expiratory sounds (Talley and O’Connor, 2001). Normal sounds have a rustling quality.

Bronchial breath sounds are loud and long during inspiration and expiration, and there is no gap between the two (Ford et al, 2005). They can be heard when lung tissue is solid but airways are patent. Bronchial breaths...
sounds are difficult to describe, but can be mimicked by putting the tip of the tongue on the roof of the mouth and breathing in and out through the mouth (Epstein et al, 2003).

ADDITIONAL BREATH SOUNDS
There are three other types of breath sound:
- **Wheezes (rhonchi):** high-pitched musical sounds associated with air being forced through narrowed airways, for example in asthma (Ford et al, 2005), and usually more pronounced on expiration. Inspiratory wheeze (stridor) usually indicates severe upper airway obstruction, such as a foreign body or laryngeal oedema. If inspiratory and expiratory wheezes are heard, this is usually due to excessive airway secretions (Adam and Osborne, 2005).
- **Crackles (crepitations):** non-musical sounds, associated with a reopening of a collapsed airway, for example in pulmonary oedema (Ford et al, 2005). They are usually localised in pneumonia and mild bronchiectasis. In pulmonary oedema and fibrosing alveolitis, both lungs are equally affected (Epstein et al, 2003).
- **Pleural friction rub:** leathery/creaking sounds during inspiration and expiration, evident when normally smooth pleural surfaces are roughened and rub on each other (Adam and Osborne, 2005).

VOCAL RESONANCE
Vocal resonance reflects changes in lung density and patency, facilitating diagnosis (Ford et al, 2005). It can be assessed by asking the patient to say ‘ninety-nine, ninety-nine’ while auscultating. Sounds will be muffled over a normal lung, but clearly audible over a consolidated lung because transmission is better through a solid lung (Talley and O’Connor, 2001).

PROCEDURE
- Explain the procedure and, ensuring privacy and dignity, expose the chest.
- Ask the patient to breathe in and out normally through their mouth.
- Use diaphragm of stethoscope (Fig 1).
- Anterior chest: auscultate from side to side (Figs 2 and 3) and top to bottom. Auscultate over equivalent areas and compare the volume and character of the sounds and note any additional sounds.
- Compare sounds during inspiration and expiration and note location and quality.
- Posterior chest: repeat procedure (Figs 4 and 5).
- Assess vocal resonance. Ask the patient to say ‘ninety-nine, ninety-nine’ and compare the sounds at equivalent positions on each side of the chest (Ford et al, 2005).
- Document findings and report as required.

FIG 4. Posterior chest auscultation 1 – auscultate the one side

FIG 5. Posterior chest auscultation 2 – auscultate the other side

REFERENCES


PROFESSIONAL RESPONSIBILITIES
This procedure should be undertaken only after approved training, supervised practice and competency assessment, and carried out in accordance with local policies and protocols.