

Importance of Identifying Bronchial Breath Sounds in Medical Practice-A 'Back-to-Basics' Approach to Revive a Dying Clinical Art

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Introduction

Auscultating the chest for lung sounds is one of the most important aspects of the clinical examination of the respiratory system. From the myriad of sounds heard on auscultation of the chest, the ability to accurately differentiate between the various types of bronchial breath sounds is at times a challenge for even the most experienced Respiratory Physicians.

Since the bronchial tree has a tubular configuration, the breath sounds produced in such cases contain a number of single frequencies, giving them all a musical tenor and quality [1,2].

Bronchial breath sounds when heard anywhere over the lungs are always indicative of an underlying pathology.

Therefore, differentiating various types of bronchial breath sounds is exceedingly important, as it helps to diagnose various potentially life-threatening lung pathologies at an early stage.

Types of bronchial breath sounds:

Bronchial breath sounds can essentially be characterized into the following three categories, namely:

- a) Tubular or high-pitched sounds
- b) Cavernous or low-pitched sounds, and,
- c) Amphoric, or sounds with a 'metallic' ring.

Tubular bronchial breath sounds

Usually, the sound generated in the laryngeal and tracheal regions is modified by the alveolar spaces of the normally functioning lung parenchyma, into characteristic vesicular breath sounds which have a 'rustling' quality.

However, when normally aerated lung parenchyma is replaced by pathological lung tissue the glottic sounds that are generated are conducted up to the chest wall unchanged, and heard through the stethoscope as high-pitched sounds which are commonly known as tubular bronchial breath sounds, due to their characteristic 'tubular' quality.

Presence of tubular bronchial breath sounds on auscultation are indicative of the following:

- Consolidation or solidification of lung tissue
- Atelectasis (or lung collapse) with a patent bronchus adjacent to it
- A large tumour with a patent bronchus adjacent to it
- Pulmonary infarction (due to engorgement of blood in the lung tissue)
- Massive pleural effusion with an underlying partially collapsed lung. This occurs in about one-third of cases of massive pleural effusion in which an underlying partially collapsed lung (usually the lower lobe) is responsible for transmitting the sound from a large patent bronchus to the pleural fluid, and further to the chest wall, unchanged.

Cavernous bronchial breath sounds

These are bronchial breath sounds which are low-pitched and 'hollow-sounding'.

When heard over the lungs, cavernous bronchial breath sounds are indicative of the following:

- A thin-walled cavity communicating with a bronchus, as in post-staphylococcal pneumonia. In such cases, it must be noted that if the organism is highly virulent, multiple thin-walled cavities can even form in the lung parenchyma in a matter of a few hours, which can sometimes lead to significant morbidity in the patient.
- Trachea deviated to one side as a result of apical lung fibrosis (usually due to pulmonary tuberculosis), commonly known as the 'pulled-trachea syndrome'.

Amphoric bronchial breath sounds

This is a very significant auscultatory finding which if picked up by the discerning physician, is of great clinical significance and diagnostic importance.

Amphoric bronchial breath sounds are low-pitched bronchial breath sounds with high-pitched overtones [3,4]. They have a 'metallic ring,' when heard on auscultation. In this condition, high-pitched overtones occur because of the strong resonance of sound waves within the walls of a cavity or within the pleural cavity [4].

Amphoric bronchial breath sounds are strongly indicative of the following conditions:

- A large thick-walled cavity which is communicating with a patent bronchus, such as a tuberculous cavity lined by granulation tissue. In this case, the smooth wall of the cavity is capable of reflecting the sound waves well, resulting in a 'metallic' sound on auscultation.
- A cavitating tumour mass with an adjacent patent bronchus.
- An open pneumothorax resulting from a bronchopleural fistulous tract.
- A tension pneumothorax. It primarily occurs due to mechanical chest trauma or lung injury during mechanical ventilation. In this condition, with each respiratory cycle, there is increasing pressure within the pleural cavity with the lung deflating more and more, leading to pressure effects on the mediastinum and great veins. If severe, this can significantly impair the venous return to the right atrium resulting in cardiogenic shock and death.

Identifying amphoric bronchial breath sounds on auscultation is very significant, as it can help detect the presence of a tension pneumothorax at the initial stage of occurrence, which being a medical emergency, would require immediate intervention in order to reduce the high pressure in the pleural cavity and urgently restore venous return to the heart.

Detection of amphoric bronchial breath sounds is also highly relevant in other situations as their early detection can help in the diagnosis of a tuberculous lung cavity or a small open pneumothorax, with a high degree of accuracy.

Amphoric bronchial breath sounds are therefore an important diagnostic indicator, which if identified at the initial stage of clinical examination (auscultation), can shed significant light on the potential underlying lung pathology, and can even be life-saving in certain situations.

Techniques for detecting the various types of bronchial breath sounds

Tubular bronchial breath sounds are similar to the sounds heard on normally auscultating over the trachea and larynx but differs from them in being less intense and harsh, but of a higher pitch. This is because tubular bronchial breath sounds are produced within the smaller and narrower bronchial air passages. Being high-pitched sounds, they are best heard with the diaphragm of the stethoscope, on auscultation.

Cavernous bronchial breath sounds are low-pitched sounds with a peculiar 'hollow' quality. They can be artificially imitated by breathing into the hollow of one's hand or by whispering the word "who". Being low-pitched sounds, they are best heard with the bell of the stethoscope, on auscultation.

Amphoric bronchial breath sounds are a special type of low-pitched bronchial breath sounds with high-pitched overtones [3,4] which have a distinct "echo-like" or "metallic" quality. This sound can be imitated by blowing through a metal pipe or by blowing hard across the mouth of a bottle or the open end of a rifle. Since amphoric breath sounds have high-pitched overtones, they are best heard with the diaphragm of the stethoscope, on auscultation.

Conclusion

In spite of all the technological advances taking place on a near-daily basis in medicine, identifying the different types of bronchial breath sounds accurately on auscultation has proved to be very useful in clinical practice, as its detection has always given excellent insight into the potential pathology that may be existing in the given patient, thereby helping in the prompt diagnosis and management of the patient. Hence, it is vitally important for all physicians to accurately identify bronchial breath sounds and appreciate their relevance in clinical practice.

Competing Interests

None.

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