Case in Point

Bronchial Breathing and Resonant Percussion—An Important Combination of Signs in Pneumothorax

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This case discusses the possibility that the physical signs of pneumothorax are commonly overlooked and that some simple, basic examination procedures are easy, efficient tools in diagnosing this condition.

Pneumothorax is a common clinical problem encountered by physicians in many clinical settings. Pneumothorax may be either primary or secondary; primary pneumothorax occurs in patients without underlying lung disease; whereas secondary pneumothorax occurs in patients with preexisting pulmonary disease, such as bullous emphysema.[1] In most cases, pneumothorax results from a rent in the alveolar membrane; an interruption in the parietal pleura following chest trauma or surgical procedures may also be causative.

Pneumothoraces are readily diagnosed clinically by using several techniques, including observation, percussion, and auscultation; more recently, point-of-care ultrasonography has been used with high sensitivity and specificity.[1,2] However, clinical suspicion must be high when these maneuvers are being performed in order for the examiner to determine that a pneumothorax may be present. Furthermore, plain chest radiography may be unreliable in diagnosing pneumothorax.[2,3] The authors describe a combination of physical signs that may be particularly useful as a rapid, inexpensive, and simple method to increase the examiner's index of suspicion and pretest probability of a pneumothorax.

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CASE REPORT

A 40-year-old male presented to a walk-in clinic with a chief concern of shortness of breath for several hours. The dyspnea was acute in onset; the patient reported pleuritic right chest discomfort, but no fever, chills, or cough were present. The patient was healthy and did not have known lung disease, although he reported smoking 5 to 10 cigarettes daily.

On physical examination, the patient was uncomfortable and diaphoretic. He was afebrile, his heart rate was 105 bpm, his blood pressure was 110/80 mm Hg, and his respiratory rate was 18 bpm. Cardiac examination revealed tachycardia with a regular rhythm; there were no murmurs, gallops, or rubs present. The jugular venous pressure was not elevated. The left lung field was clear to auscultation; distant, bronchial breath sounds were heard throughout the right lung field. Percussion was not performed nor was tactile fremitus assessed.

A chest radiograph was ordered due to a concern for a consolidative process in the right lung: specifically, pneumonia with parapneumonic effusion or empyema was suspected. Laboratory tests were sent but were not initially available. The radiograph revealed a pneumothorax comprising 100% of the right lung field; the lung had collapsed medially to the proximal right main stem bronchus. Percussion performed later revealed resonant percussion over the right posterior lung field. The patient was admitted to the hospital, and a right chest tube was placed in the patient. The patient recovered uneventfully and was discharged from the hospital.

DISCUSSION

Bronchial breath sounds are thought to originate in large and patent airways that are surrounded by a consolidated lung.[4] In the normal lung, these sounds are poorly transmitted to the ex-

aminer's stethoscope and are quiet compared with the normal vesicular lung sounds that originate in the lung parenchyma. However, in consolidative processes, bronchial breath sounds are appreciably louder. The loudness of the sound is due to the greater transmission of the sound produced in the larger airways through water density rather than through air density. Consolidation (accumulation of fluid in the pulmonary tissues) creates more of a water density than the near air density of the normal lung.[5]

A softer variant of bronchial breath sounds may be present in patients with pneumothoraces. The finding of very distant breath sounds and bronchial breathing would be identical on auscultation to a patient with a pneumonia with empyema; indeed, that is what the provider believed was the diagnosis. The reason is that in a 100% pneumothorax, the collapsed lung is consolidated; it is just very distant from the examiner's stethoscope and, therefore, produces markedly reduced, but bronchial, breath sounds. Had the examiner done the most rudimentary of attempts at percussion, he or she would have realized that there was resonance or perhaps hyperresonance; this could not have been possible in consolidated pneumonia with empyema or with pleural effusion. This finding would have been in stark contrast to the expected dullness to percussion in other processes; thus pneumothorax would have been suspected earlier in the patient's course.

The case discussed presents a persuasive argument for the routine performance of chest percussion in patients with dyspnea. Percussion takes only a few seconds to perform and, as discussed, provides important information to the examiner in making triage decisions and changing his or her pretest probability of pneumothorax before obtaining further imaging. Percussion does not rely solely on auscultation of the percussion by the examiner. Percussion is performed by placing the distal interphalangeal joint of the second or third digit of the examiner's nondominant hand on the patient's chest and striking the joint with the distal phalanx of the second or third digit of the examiner's dominant hand. The examiner then appreciates the change in sensation as well as sound created by the percussion over tissues of various densities.

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The authors reviewed documentation of examinations of thousands of patients in their clinical work. Their overwhelming impression, verified by a review of current inpatients at the San Francisco VAMC is that the examination of the chest as recorded in the medical record consists only of auscultation. Often students and residents (and attending physicians) will mention egophony, but when asked what it is, few if any can describe it or the pathophysiology leading to the phenomenon. The authors believe that well in excess of 90% of patients admitted or seen in a clinic do not have the results of chest percussion mentioned in the documentation of the physician-patient encounter. Moreover, when asked at bedside to perform the maneuver, few know how, and fewer still know the significance.

The failure to perform percussion at all in the present case is thus not surprising. One should not expect in a nontension pneumothorax that there should be any change in the percussion note from the expected resonance; after all, the lung is an air-filled organ. When under tension, hyperresonance is a crucial physical sign, and patients with this are often in extreme respiratory distress and hypotensive. The patient was uncomfortable, indeed seemed as though he had an acute cardiopulmonary process, but not as critically ill as a patient with tension pneumothorax.

CONCLUSION

The authors believe that this combination of physical signs in patients with pneumothorax—distant bronchial breath sounds with resonant percussion—may be commonly overlooked by health care providers as bronchial breath sounds and are quite common and usually associated with consolidative processes. Traditional examination findings discussed in most textbooks of physical diagnosis—decreased chest wall movement and decreased or absent breath sounds—are not appreciated in up to 30% of patients with pneumo-

thorax.[6] The lack of rapid diagnosis in patients with pneumothorax may lead to much morbidity and even mortality, as 1% to 3% of pneumothoraces may proceed to tension pneumothorax. Tension pneumothorax often leads to hemodynamic stability and, if untreated, death.

Further, this simple part of the physical examination is seldom performed today, and that simple examination, in conditions like a large pneumothorax, can lead more rapidly to the diagnosis and proper treatment for the reasons noted earlier. Maintenance of this skill is important in determining the proper use of imaging and contributes to the physician's ability to use physical examination to alter the pretest probability of various pulmonary pathologic processes. Although perhaps examination of the first cranial nerve is performed less often, the authors are certain that percussion, the funduscopic examination, and the otolaryngologic examination are on the verge of clinical extinction. The authors strongly believe that the thorough examination, when mastered, is of value to patient and provider alike. ●

Author disclosures

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