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FROM THE FAMILY PRACTICE INQUIRIES NETWORK

How accurate is the clinical diagnosis of pneumonia?

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EVIDENCE-BASED ANSWER

No element or combination of elements from the clinical history and physical examination are sufficiently sensitive or specific to confirm or exclude acute community-acquired pneumonia (CAP). A chest x-ray is recommended to make the diagnosis (Grade of Recommendation: **A,** based on well-designed cohort studies). No studies specifically demonstrate improved patient outcomes through use of chest x-ray in adults; however, accurate diagnosis is expected to reduce the number of unnecessary antibiotic prescriptions (Grade of Recommendation: **D,** based on expert opinion).

EVIDENCE SUMMARY

Metlay and colleagues[1] found only 4 high-quality, prospective cohort trials evaluating the sensitivity and specificity of the clinical history and physical examination in pneumonia. In each of the 4 studies, the reference standard for the diagnosis of pneumonia was a new infiltrate on chest radiograph. Subjects were community-dwelling adults with acute cough who were seen in ambulatory settings, and who had an average pneumonia prevalence of 7% (range, 3%–38%).[1] Although no study specifically addressed the interobserver reliability of the history and physical examination findings in pneumonia, other studies of chest findings typically found variable reproducibility. In a study by Spiteri and associates,[2] 24 physicians examined 24 patients with a variety of respiratory conditions: only 4 had pneumonia on chest x-ray. The most reliable findings (dullness to percussion and wheezing) had only fair agreement among examiners (kappa approximately 0.5).

Nine symptoms (cough, dyspnea, sputum production, subjective fever, chills, night sweats, myalgias, sore throat, and rhinorrhea) and 3 items in the past medical history (asthma, immunosuppression, and dementia) were associated with pneumonia. For most elements of history, both the positive and negative likelihood ratios

(LR+, LR−) were in the indeterminate range of 0.5 to 2.0. No single feature was sufficient to either rule in or rule out the diagnosis.[1]

Regarding the physical examination, tachypnea, tachycardia, and fever had LR+s between 1.5 and 2.4 in an ambulatory setting. In one study, the absence of any vital sign abnormalities reduced the likelihood of pneumonia substantially (LR− = 0.18), but did not rule out the diagnosis completely.[1] Egophony had an LR+ of 5.3. Other physical findings (rhonchi, crackles, decreased breath sounds, dullness to percussion, and bronchial breath sounds) yielded LR+s from 1.5 to 3.5, respectively. Most individual findings were insufficient to diagnose pneumonia. For example, if the baseline prevalence of pneumonia was 5%, the presence of crackles raised the probability to 10% and their absence decreased the probability to 3%.

The sensitivity and specificity of clinical diagnosis varied with the prevalence of pneumonia. In a general practice setting, 20 of 402 patients with cough were diagnosed with pneumonia by chest x-ray.[3] Physicians correctly diagnosed 7 patients clinically, and incorrectly diagnosed pneumonia in 22 additional patients.[3] At a Veterans Administration hospital, a prospective cohort of 52 men with acute cough and change in sputum production underwent sequential blinded examination by 3 physicians. Rales and bronchial breath sounds were common, and chest x-ray confirmed pneumonia in 28 patients. Sensitivity of clinical diagnosis ranged from 47% to 69%, and specificity from 58% to 75%.[4]

Several researchers improved diagnostic accuracy by combining multiple elements from the history and physical examination. For example, according to Metlay and colleagues,[1] Heckerling et al calculated the probability of pneumonia if up to 5 predictors were present. However, if the prevalence of pneumonia in a primary care population is 5%, the presence of all 5 predictors raises the probability of pneumonia only to 53%.[1] The absence of 4 of the 5 findings (fever >37.8°C, heart rate >100 beats per minute, decreased breath sounds, crackles) reduces the risk of pneumonia to 1%, thus eliminating the need for radiography or antibiotics in most situations. If the patient also has asthma, the risk drops even further.

RECOMMENDATIONS FROM OTHERS

The Infectious Diseases Society of North America states that a chest x-ray is necessary for accurate diagnosis. In otherwise healthy adults with acute cough illness, antibiotic therapy is indicated only for pneumonia. A normal chest x-ray obviates the need for antibiotics.[5,6]

CLINICAL COMMENTARY

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The immediate question for clinicians is “Can you treat pneumonia based on clinical findings alone?” Apparently, the answer is “no” unless the radiograph would be unacceptably difficult to obtain (eg, certain nursing home or homebound patients). Can the patient have pneumonia even if the chest radiograph is negative? Subtle early

pneumonias sometimes blossom on chest film after a day or two. The diagnosis of pneumonia can be just as much a subjective “call” for the radiologist as “a few crackles” can be for the clinician, so the bottom line is: If you suspect pneumonia, order a chest film.

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