

Teachable Moment: Follow Up Chest Radiography Following Acute Bacterial Pneumonia

Andrea Ma

Story from the Front Lines

An otherwise healthy man in his mid-60s presented to clinic for follow up of presumed right lower lobe pneumonia following recent right reverse right total shoulder arthroplasty. He was initially seen in the emergency room for a cough. His chest x-ray revealed a new airspace opacity and atelectasis in the right lower lobe consistent with a developing right lower lobe pneumonia. He was treated with a five day course of azithromycin and encouraged to use an incentive spirometer.

On clinic follow up four days later, the patient reported resolution of his pulmonary symptoms. Despite feeling back to his baseline, he was very anxious regarding the results of his follow up chest x-ray, which had been ordered by the emergency room physician and completed prior to our clinic appointment.

Teachable Moment

Radiographic changes typically lag behind clinical recovery of CAP and resolve relatively slowly. In one prospective study of elderly patients over age 70 admitted to a hospital for community-acquired bacterial pneumonia, individuals showed a 35%, 60%, and 84% radiographic resolution at 3, 6, and 12 weeks, respectively. Radiographic resolution was slower for patients with bacteremia, enteric gram-negative bacilli pneumonias, and multi-lobar involvement. Given the burden of underlying comorbidities, a period of 12 to 14 weeks was recommended for slowly resolving pneumonia to be considered non-resolving¹. Additionally, pneumonias caused by bacterial pneumonia cleared more slowly than those caused by atypical pathogens¹.

Although practice patterns vary, it has been usual practice among clinicians to arrange post-treatment chest radiography (CXR) approximately six weeks following resolution of pneumonia². In patients who have clinically improved, follow up CXR is presumably intended to rule out malignant neoplasms that have caused post-obstructive pneumonia, particularly in high-risk patients (age > 50, smoker, history of chronic obstructive pulmonary disease) about six weeks after CAP treatment².

However, there is little evidence to support this practice. The most recent Infectious Diseases Society of America (IDSA) and American Thoracic Society (ATS) Consensus Guidelines on the Management of Community-Acquired Pneumonia in Adults (2007) does not comment on the utility or timing of follow up radiography³. Guidelines from the British Thoracic Society (BTS) in 2009 acknowledge there is little evidence to support this practice but suggests repeat radiography in high risk patients about six weeks after CAP treatment in non-improving patients.

Prior studies have demonstrated a relatively low incidence of lung cancer diagnoses on radiographic follow up of pneumonia. The most recent study performed by Tang et al in 2011 reports an incidence of about 1.1% at 90 days and 2.3% over five years of follow up⁴. If films

had been restricted to patients over age 50, incidence would have increased to 2.8%. While this population-based cohort study was not a randomized comparison of imaging vs no imaging, the low incidence of lung cancer suggests that routine post-treatment chest radiographs are not warranted in patients at low risk for lung cancer. This is further corroborated by a retrospective radiology-based study performed at an academic center in 2014, which found 1.5% incidence of new thoracic malignancy (mean age 68 years) and 3.7% of alternative nonmalignant lung disease (mean age 56 years) which corresponded with the initial abnormality seen on chest radiography⁵.

Together these studies suggest that follow up chest radiography should be restricted to patients with continued symptoms or those at higher risk for lung cancer (e.g. males, smokers, over age 50) or alternative non-malignant pulmonary disease including sarcoidosis, bronchopulmonary sequestration, organizing pneumonia, or other atypical infection.

References

¹ El Solh AA, Aquilina AT, Gunen H, and Ramadan F. *Radiographic resolution of community-acquired bacterial pneumonia in the elderly*. J Am Geriatr Soc. 2004 Feb; 52(2):224-9.

² Lim WS, Baudouin SV, George RC, et al; Pneumonia Guidelines Committee of the BTS Standards of Care Committee. *BTS guidelines for the management of community acquired pneumonia in adults: update 2009*. Thorax (2009) 64 (Supplement_3): iii1-iii55.

³ Mandell LA, Wunderink RG, Anzueto A, et al. *Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults*. Clin Infect Dis (2007) 44 (Supplement_2): S27-S72.

⁴ Tang KL et al. *Incidence, correlates, and chest radiographic yield of new lung cancer diagnosis in 3398 patients with pneumonia*. Arch Intern Med (2011); 171:1193.

⁵ Little BP, Gilman MD, Humphrey KL, et al. *Outcome of recommendations for radiographic follow up of pneumonia on outpatient chest radiography*. Am Jour Roentgenol (2014); 202(1):54-9.