

Pneumonia radiologic findings

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Lobar pneumonia

- is a radiological pattern associated with homogeneous and fibrinosuppurative consolidation of one or more lobes of a lung in response to bacterial pneumonia.

- The radiological appearance of lobar pneumonia is not specific to any single causative organism, although there are organisms which classically have a radiological presentation of lobar pneumonia. *Streptococcus pneumoniae* (also known as pneumococcus) is the most common causative organism of lobar pneumonia.

- there is homogeneous opacification in a lobar pattern. The opacification can be sharply defined at the fissures, although more commonly there is segmental consolidation ³.
- The non-opacified bronchus within a consolidated lobe will result in the appearance of [air bronchograms](#). Strictly speaking, consolidation is not associated with volume loss; however, [atelectasis](#) can occur with small airway obstruction.
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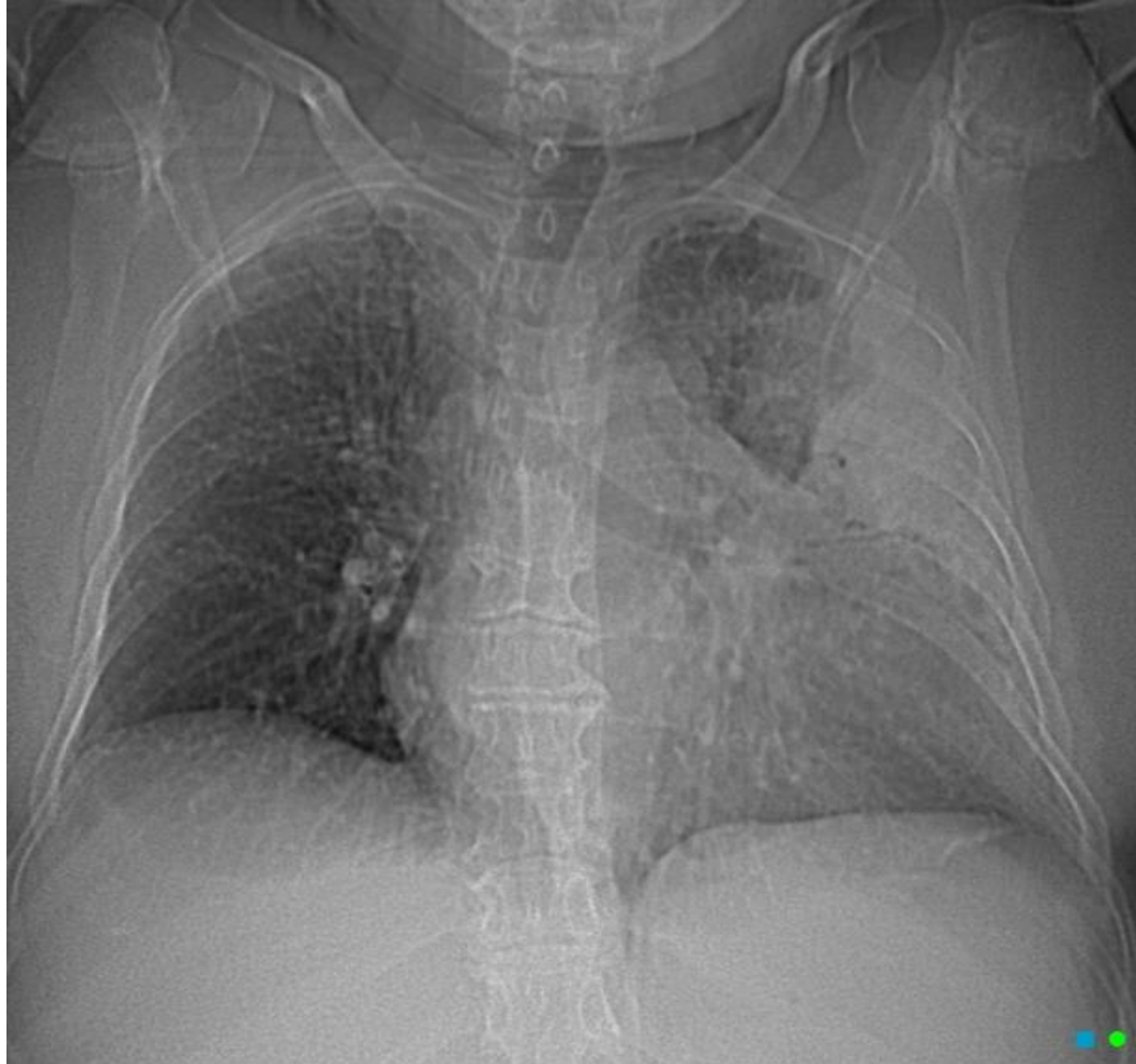
- lobar pneumonia appears as a focal dense opacification of the majority of an entire lobe with relative sparing of the large airways. There may be additional associated areas of ground-glass opacity in a lobar or segmental pattern, likely representing areas of partial involvement or simply atelectasis

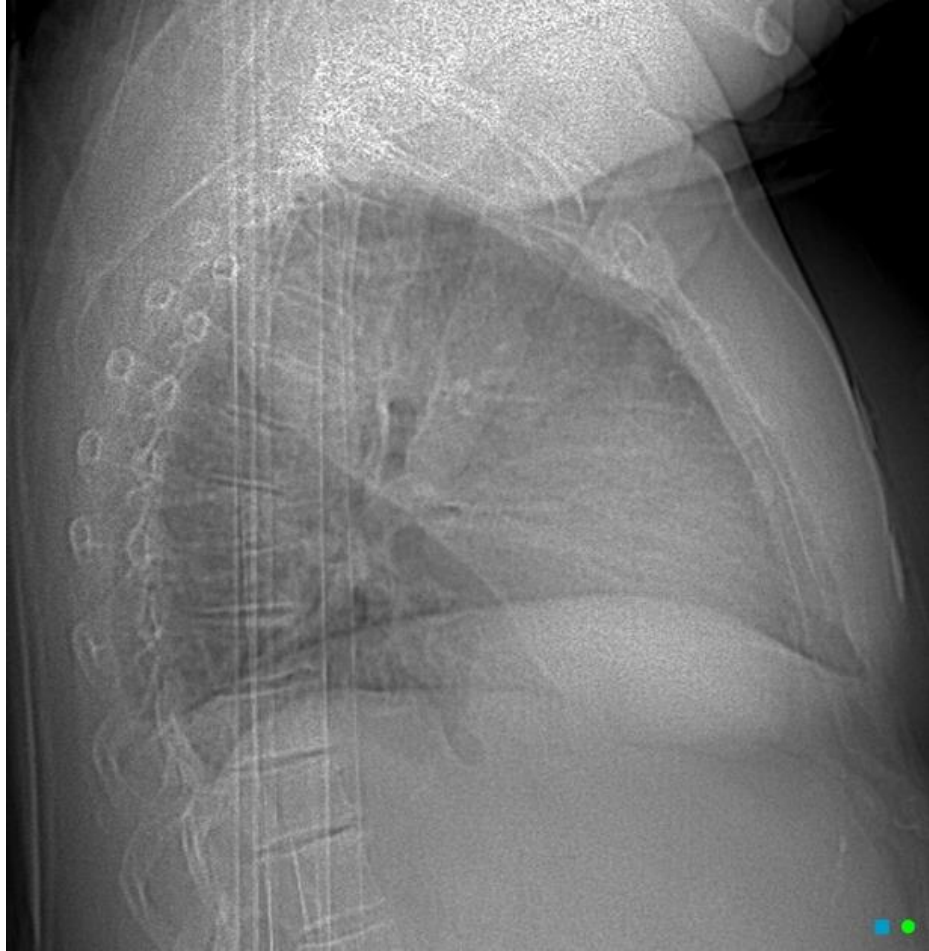
- On contrast-enhanced CT, pneumonia often enhances less than atelectatic lung, although there is no clear Hounsfield unit threshold to distinguish the two. For example, one small study used a threshold of 85 HU to distinguish between atelectasis versus pneumonia on CT PE proto

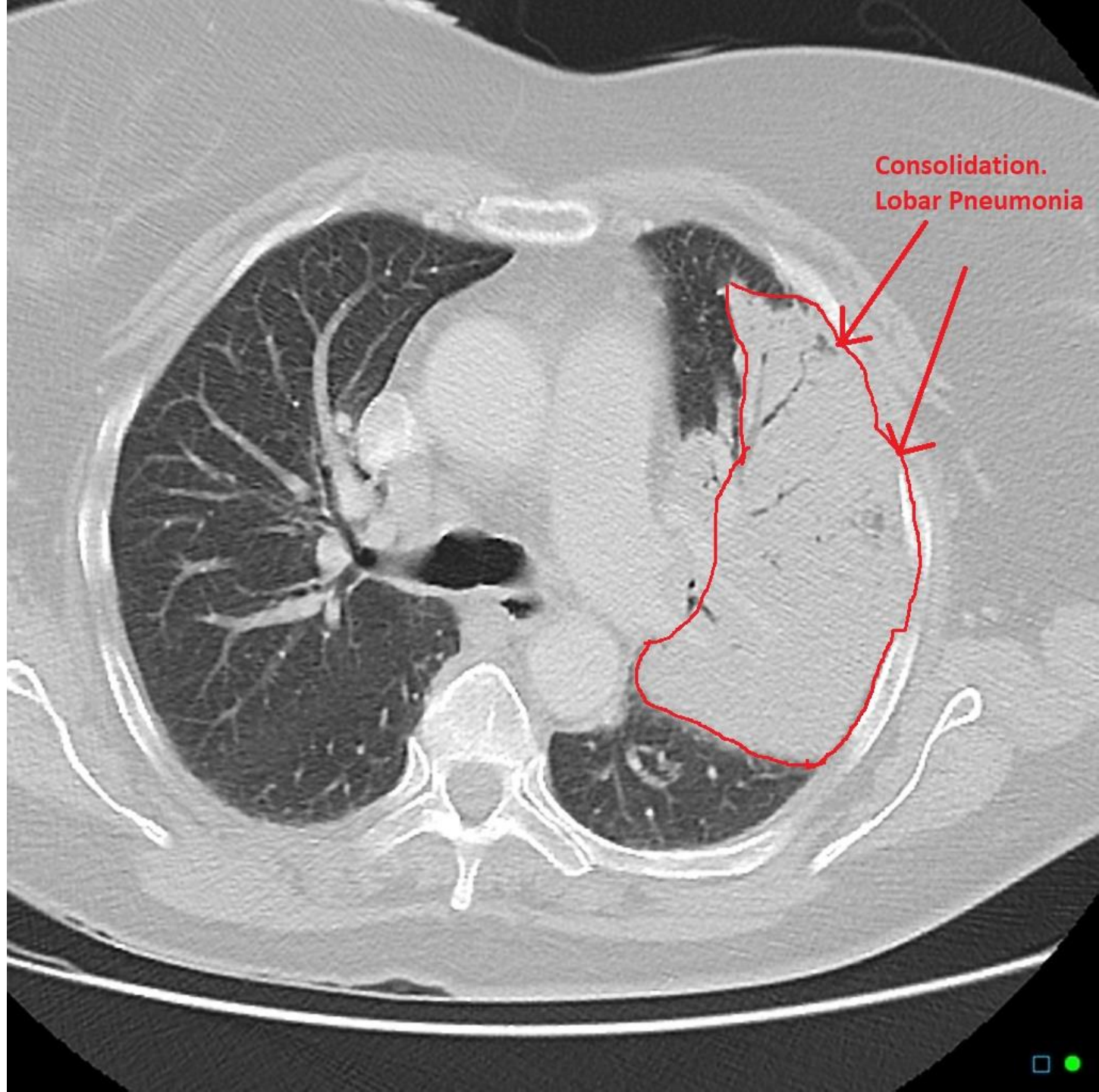
Complications

- [pulmonary abscess](#) ²
- pleural ²
 - [parapneumonic effusion](#) - fibrinous inflammatory reaction to the adjacent pulmonary inflammation
 - [empyema](#) - purulent fibrinous inflammatory reaction due to infectious spread into the pleural space
 - note that both bland and purulent effusions may result in subsequent scarring/adhesions depending on the degree of fibroblastic organization ²

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Consolidation.
Lobar Pneumonia

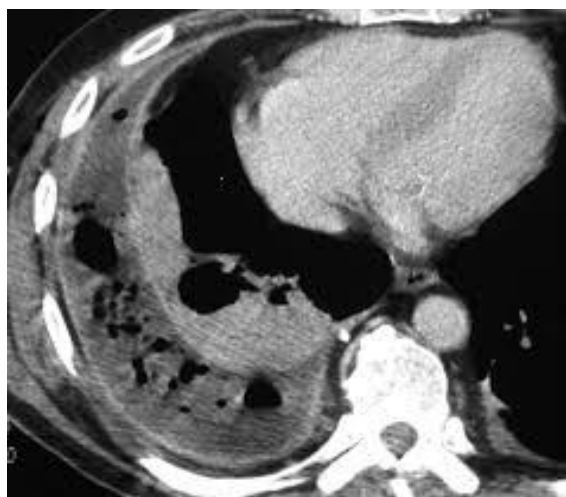


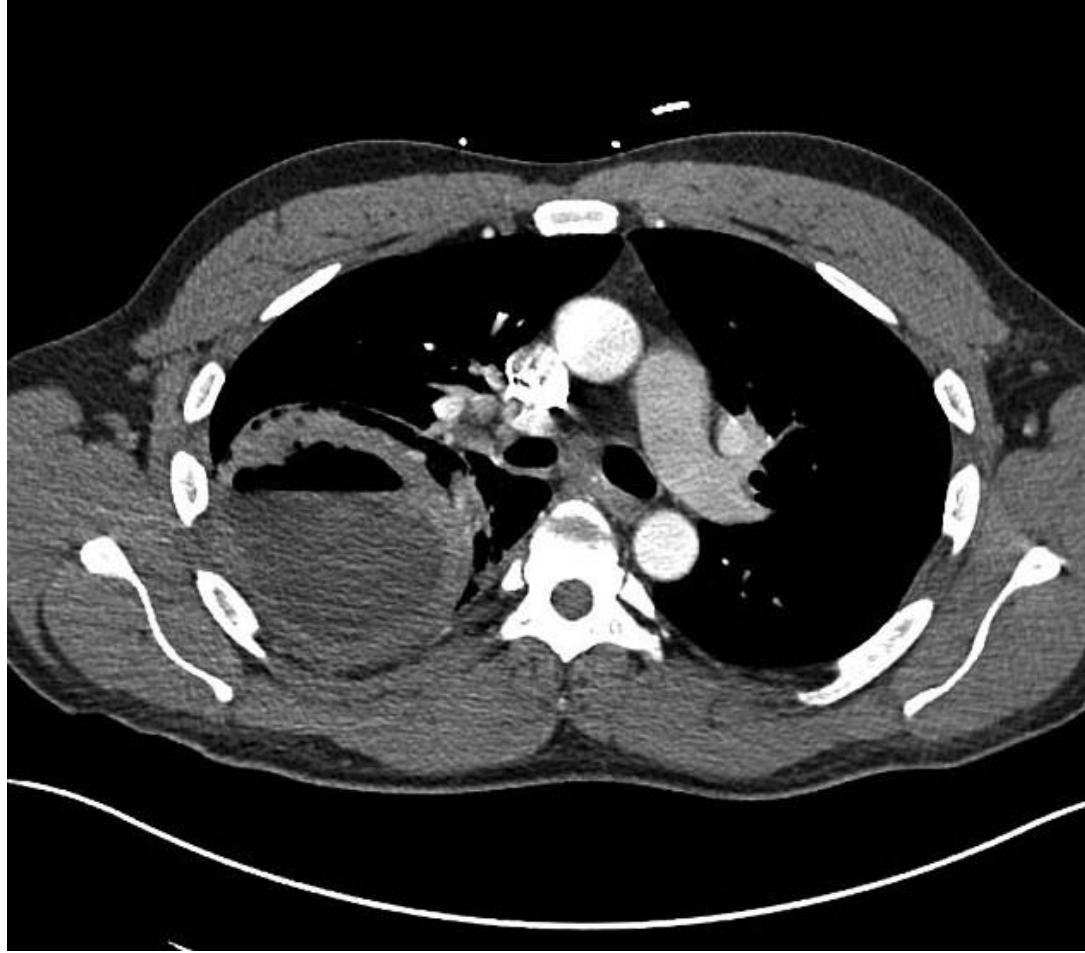
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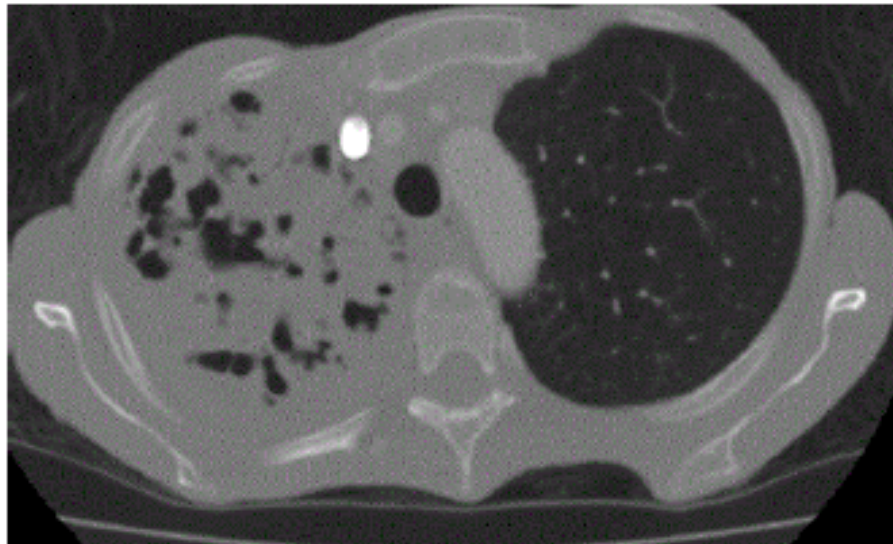


Figure 1 Complicated necrotizing pneumonia.



Empyema vs pulmonary abscess

- shape
 - an abscess is usually (but not always) round in all projections
 - an abscess may form acute angles with the costal surface / chest wall
 - an empyema is usually (but not always) lentiform
- **CT**
- relationship to adjacent bronchi/vessels
 - an abscess will abruptly interrupt the bronchovascular structures
 - an empyema will usually distort and compress adjacent lung
- [split pleura sign](#)
 - an empyema causes thickening and separation of the visceral and parietal pleura
- wall
 - an abscess has thick irregular walls
 - an empyema usually has smoother walls
- angle with pleura
 - an abscess usually has acute angles ([claw sign](#))
 - an empyema tends to have obtuse angles
- pleural enhancement
 - an empyema tends to show more pleural enhancement
- extrapleural fat
 - an empyema tends to show edema/haziness of the extrapleural fat
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Bronchopneumonia

- also sometimes known as **lobular pneumonia**, is a radiological pattern associated with suppurative peribronchiolar inflammation and subsequent patchy consolidation of one or more secondary lobules of a lung in response to bacterial pneumonia.

- *Staphylococcus aureus*
- *Klebsiella pneumoniae*: [Klebsiella pneumonia](#)
- *Haemophilus influenzae*: [pulmonary Haemophilus influenzae infection](#)
- *Pseudomonas aeruginosa*: [Pseudomonas aeruginosa pneumonia](#)
- *Escherichia coli*
- Anaerobes, such as *Proteus* species

radiography

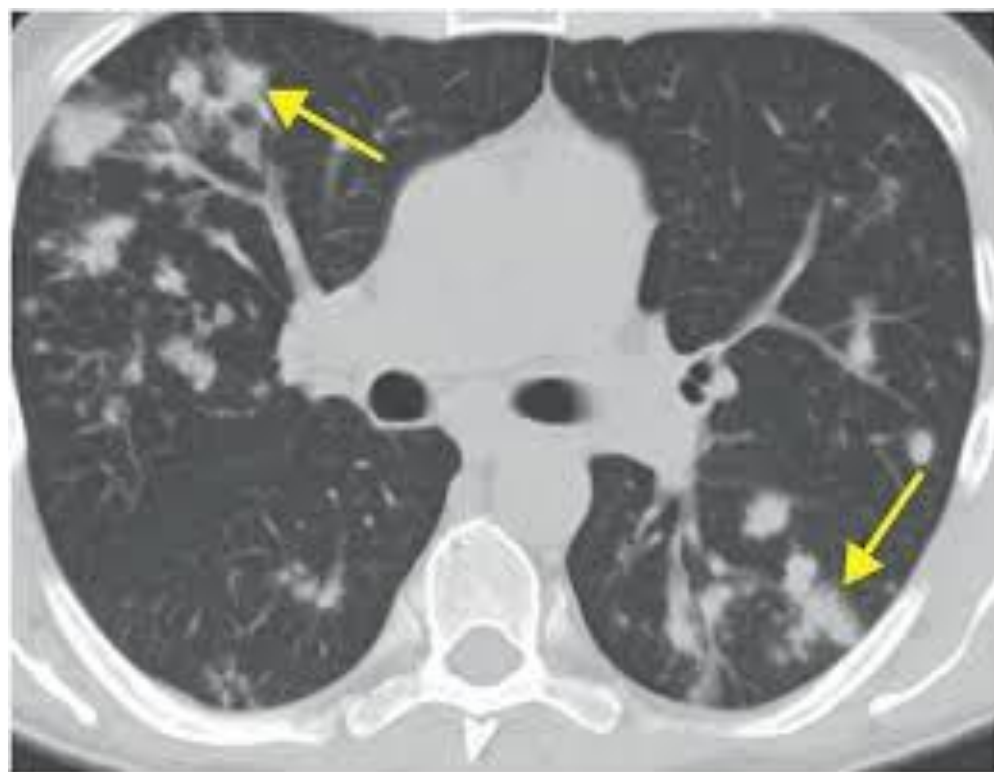
- Bronchopneumonia is characterized by multiple small nodular or reticulonodular opacities which tend to be patchy and/or confluent. This represents areas of the lung where there are patches of inflammation separated by normal lung parenchyma. ².
- The distribution is often bilateral and asymmetric and predominantly involves the lung bases

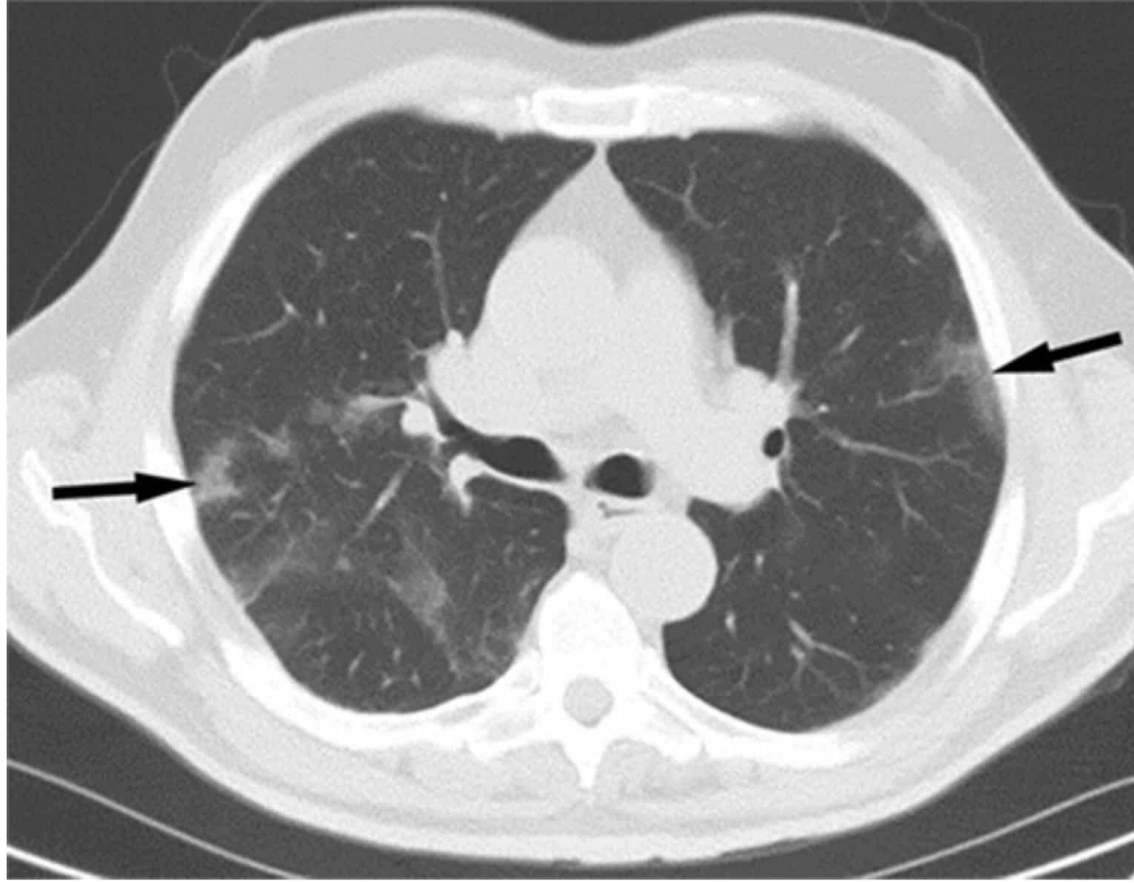
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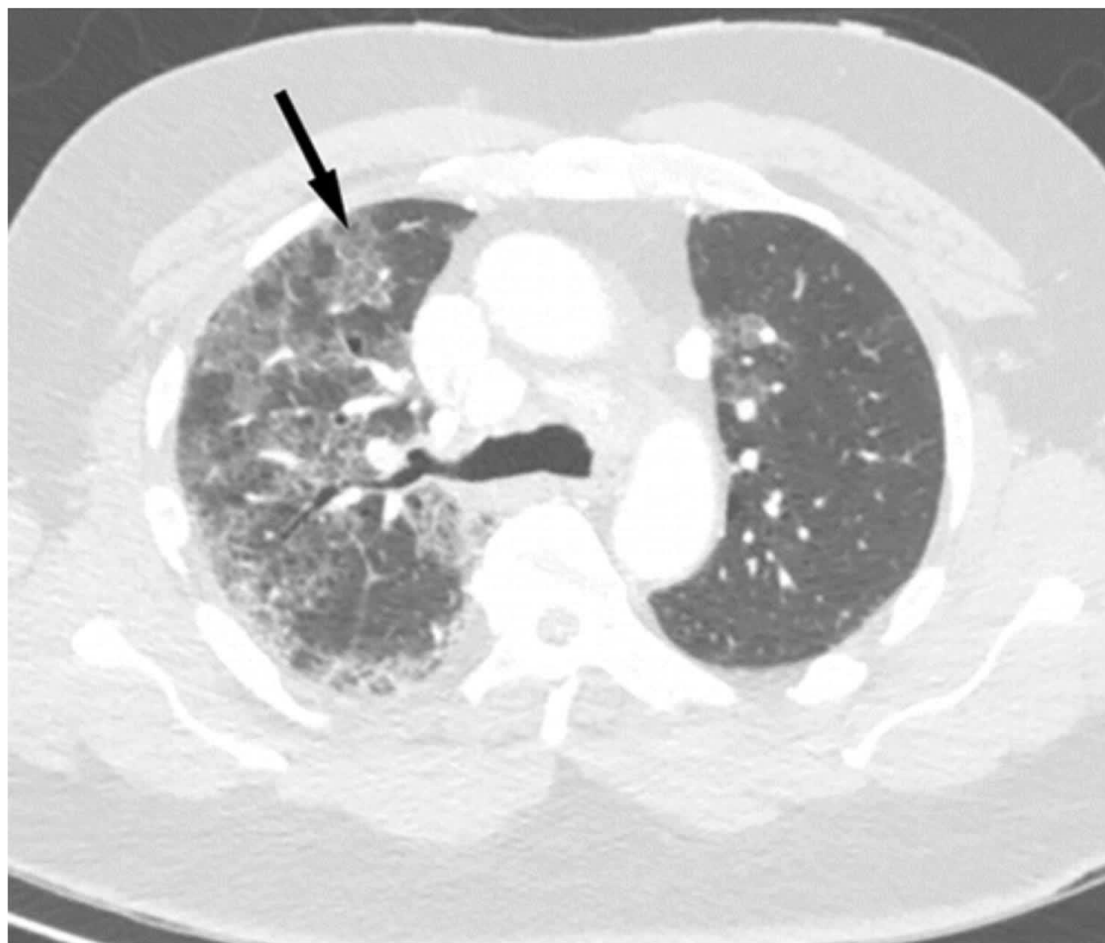
- Multiple foci of opacity can be seen in a lobular pattern, centered at centrilobular bronchioles. This may result in a [tree-in-bud appearance](#). These foci of consolidation can overlap to create a larger heterogeneous confluent area of consolidation or 'patchwork quilt' appearance

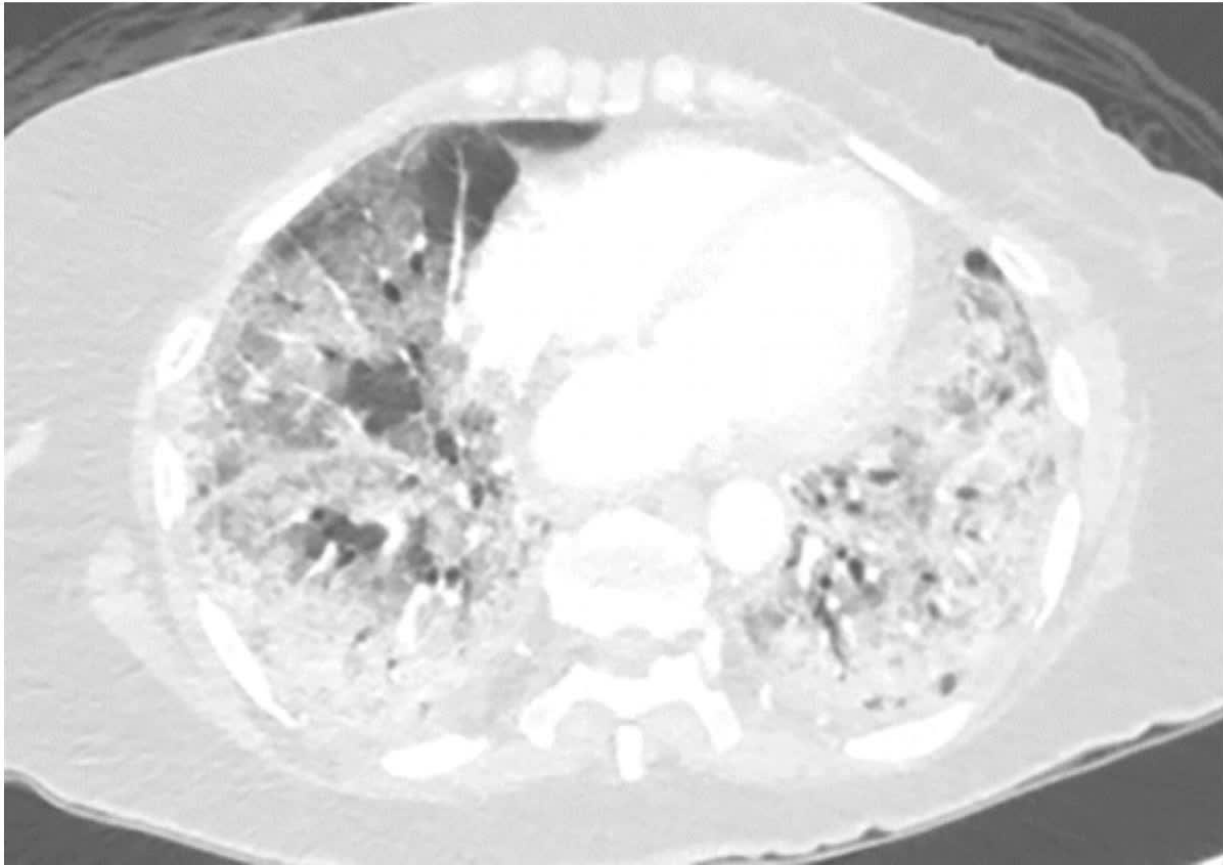


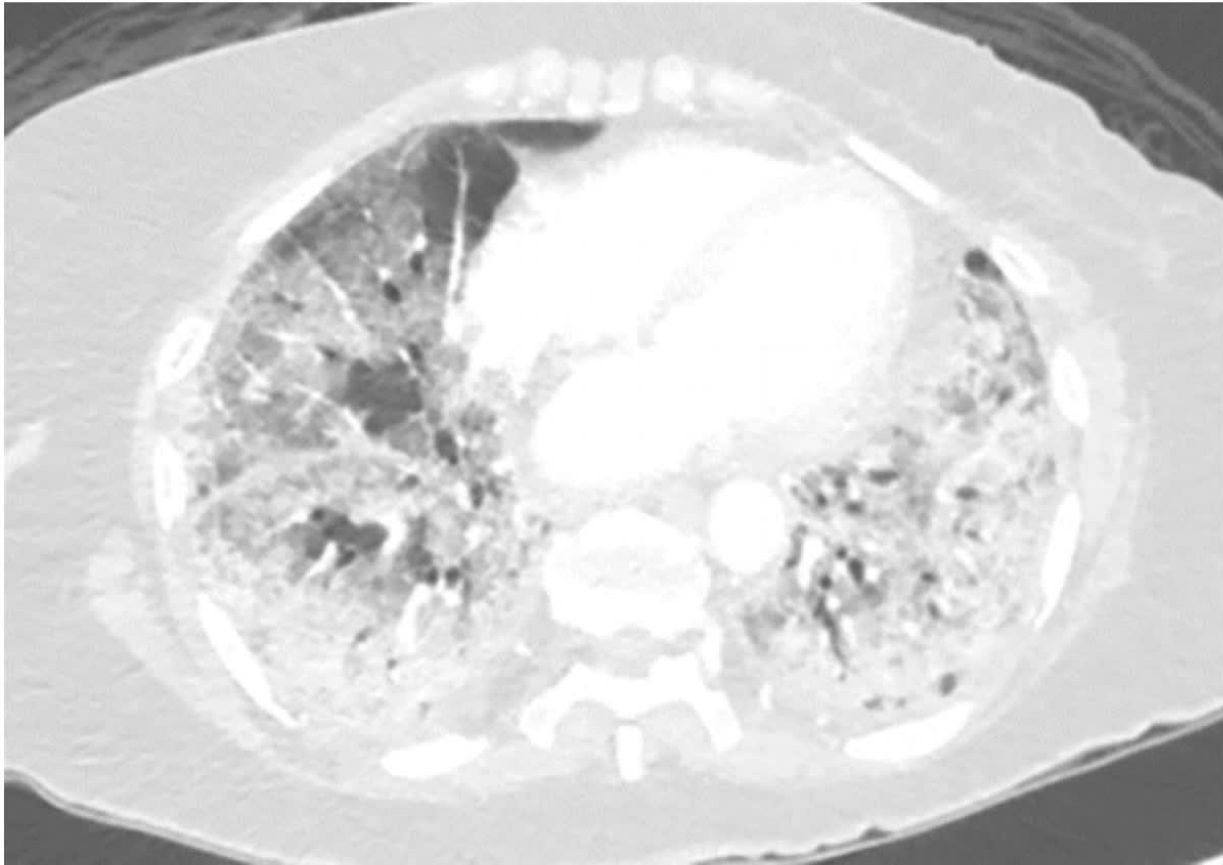














Round pneumonia

- is a type of [pneumonia](#) usually only seen in pediatric patients. They are well defined, rounded opacities that represent regions of infected consolidation.

- **Plain radiograph**
- Round pneumonias are round-ish and while they are well-circumscribed parenchymal opacities, they tend to have irregular margins. They most commonly occur in superior segments of lower lobes and in the majority of cases (98%), they are solitary ⁵.
- [Air bronchograms](#) are often present though are only seen in 17% of cases when they occur in adults ².





