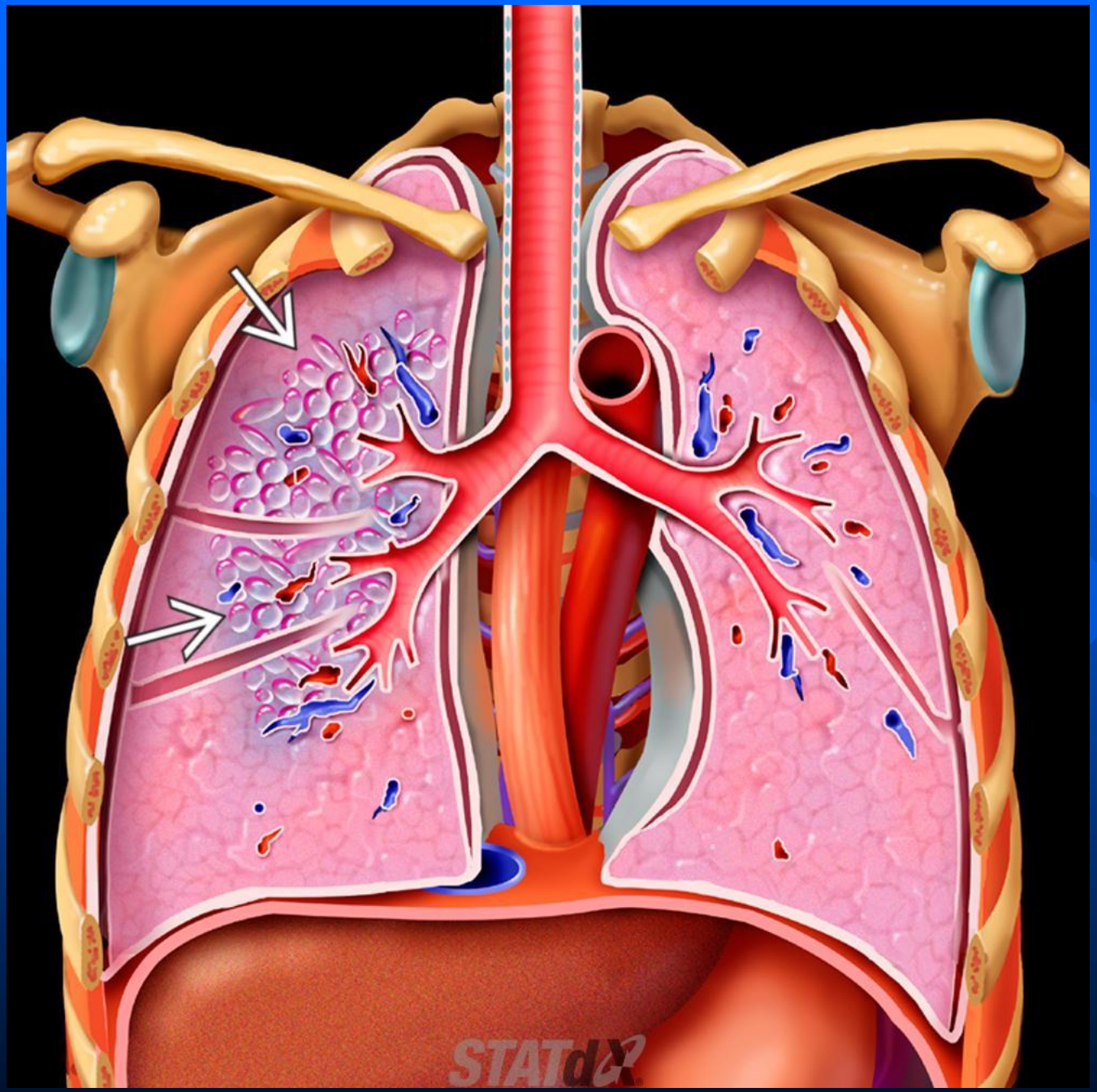
Pulmonary Interstitial Emphysema (PIE)

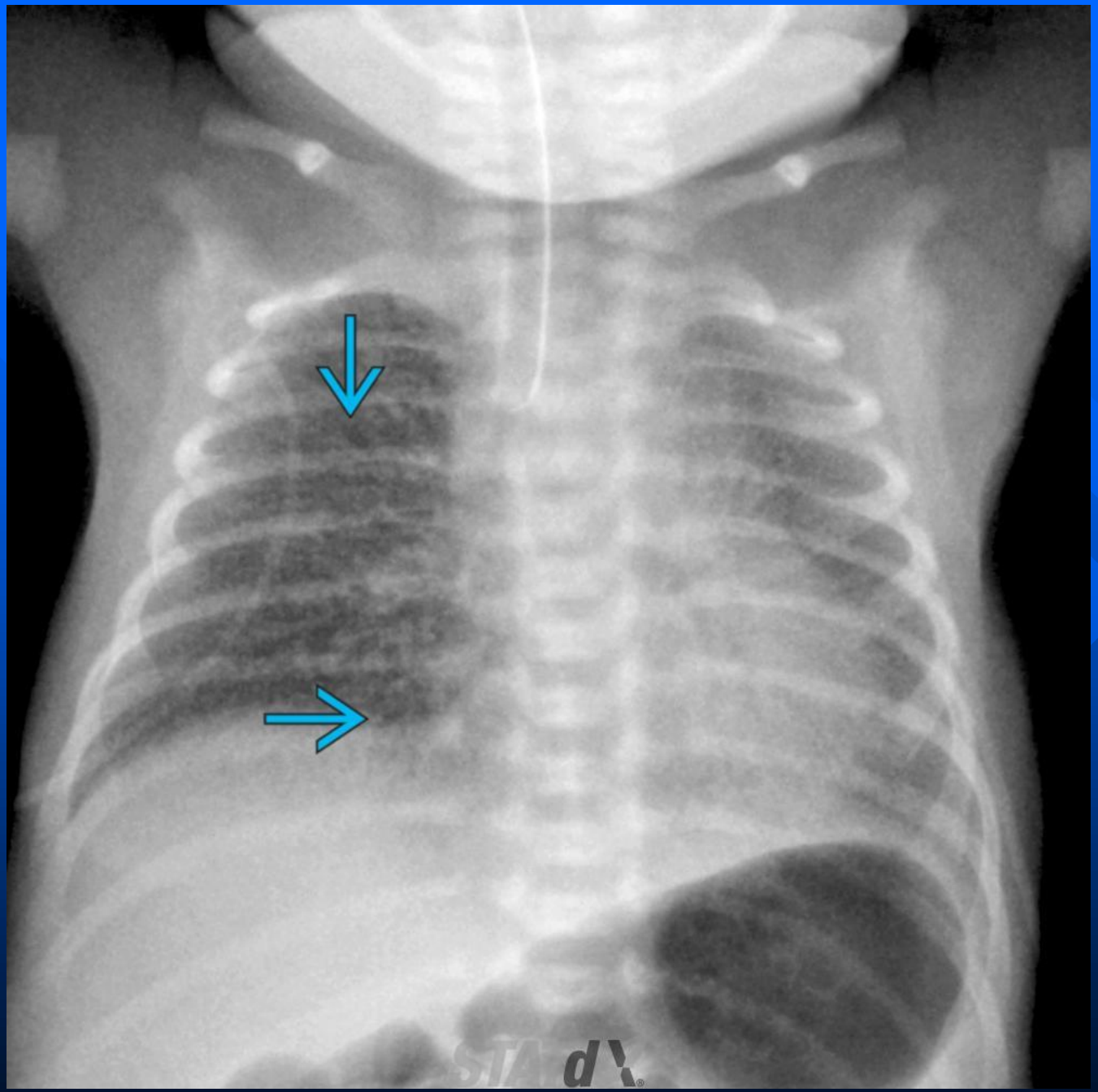
- Abnormal location of air within the pulmonary interstitium and lymphatics.
- It typically results from rupture of overdistended alveoli following barotrauma in infants who have hyaline membrane disease.
- Interstitial emphysema can also occasionally be incidentally detected in adults.
- PIE is almost always associated with mechanical ventilation or continuous positive airway pressure in the first weeks of life.
- Reduced lung compliance, prematurity, low birth weight, meconium aspiration syndrome and pneumonia are other risk factors.

X-ray

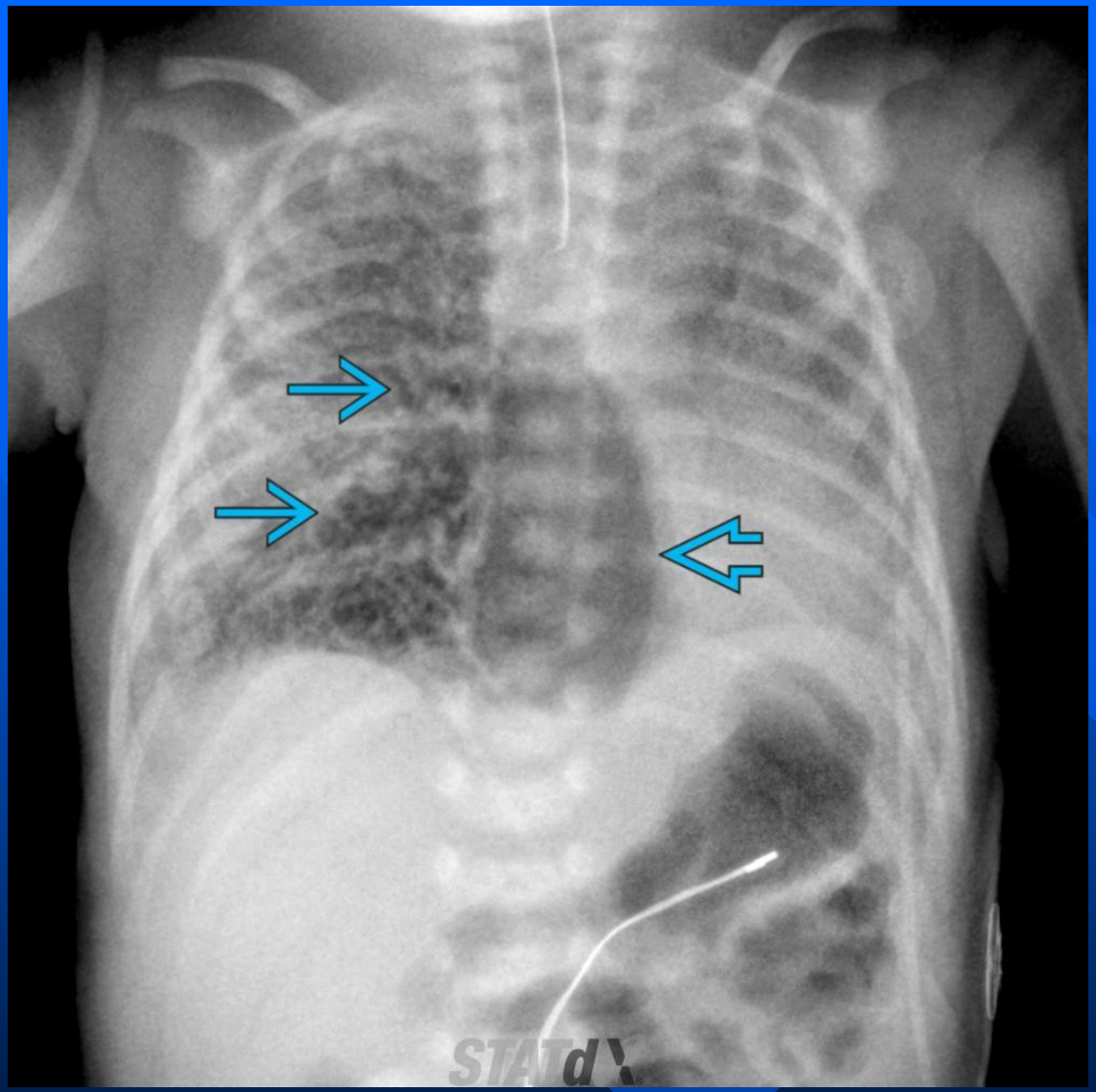
- Cystic or linear radiolucencies in the interstitium radiating from the hilum
- Affected segment is often hyperexpanded and static in volume on multiple radiographs.
- Pneumothorax, pneumomediastinum, or pneumopericardium
  - in supine patients, pneumomediastinum is evident by the sharp mediastinum sign
- the heart tends to get smaller as intrathoracic pressure increases and results in diminished venous return into the chest



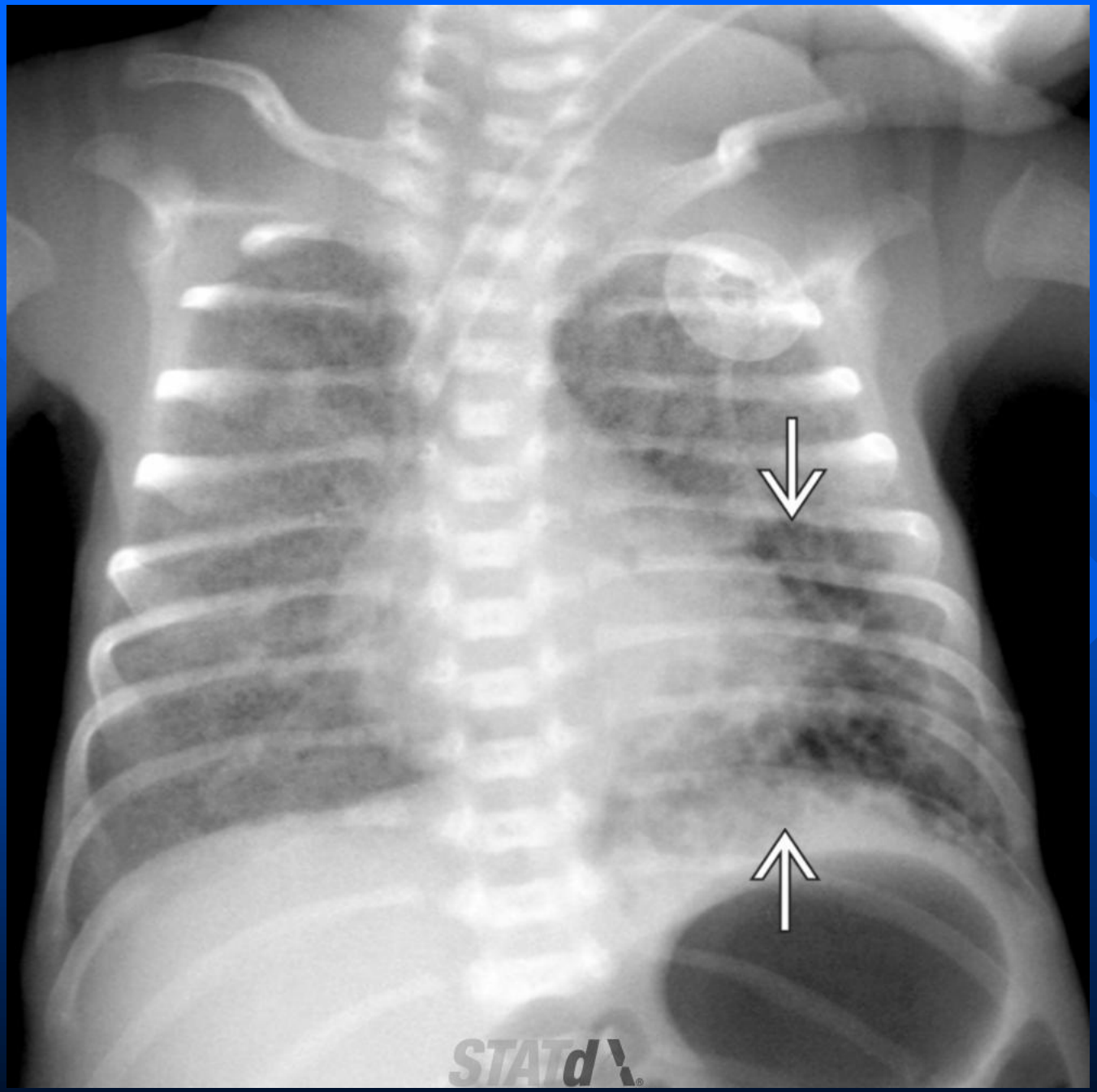
Coronal graphic depicts round & linear foci of gas (white solid arrow) in the right lung parenchyma secondary to air escaping into the pulmonary interstitium.



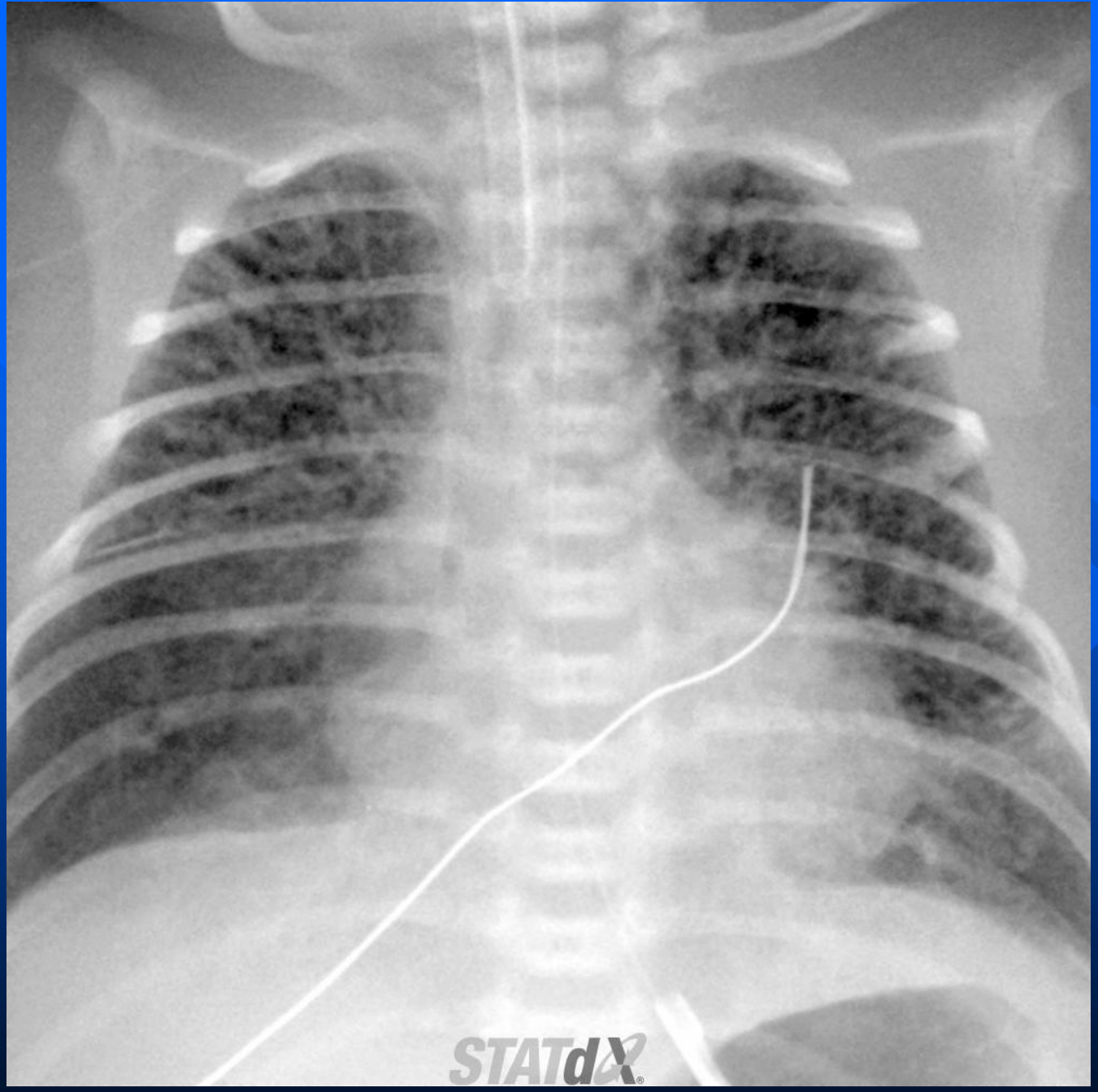
AP chest radiograph in an intubated, 2 day old, former 31-weeks premature infant with surfactant deficiency disease (SDD) shows typical diffuse granular pulmonary opacities. There are mild scattered linear & bubbly lucencies of pulmonary interstitial emphysema (PIE) (cyan solid arrow) in the right lung.



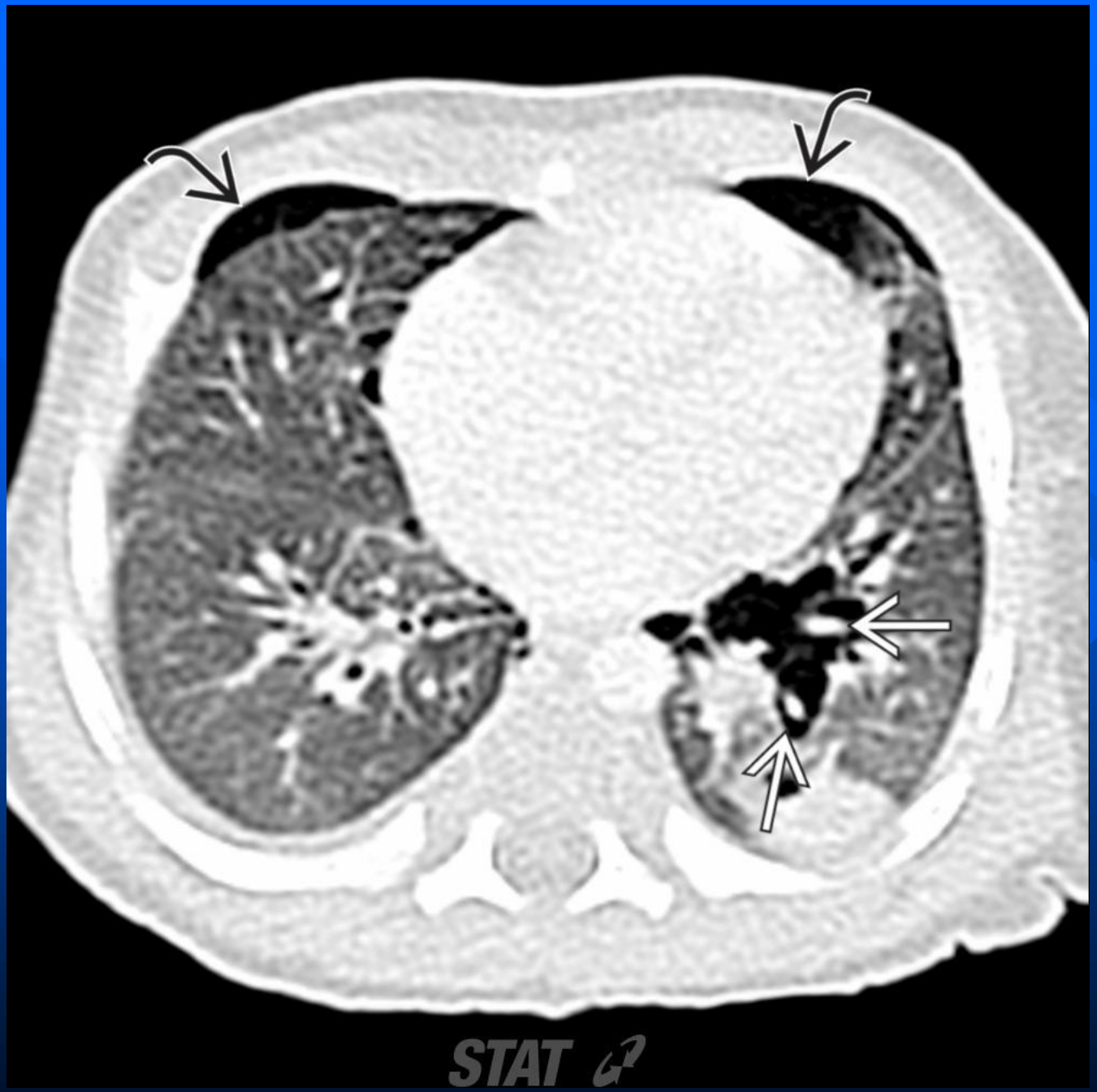
AP chest radiograph 24 hours later in the same patient shows more extensive bubbly & linear lucencies throughout the right lung (cyan solid arrow), typical of PIE. A large inferomedial gas collection has also developed (cyan open arrow), shifting the heart leftward.



AP radiograph shows cystic & linear lucencies (white solid arrow) from PIE in a patient with SDD. Note that only the left lower lobe is involved. The distribution of PIE can range from a single lobe to widespread bilateral involvement.



AP chest radiograph shows bilateral upper lobe PIE in a premature infant with hazy pulmonary opacities due to SDD. Note the relative sparing of the lower lobes.



Axial CECT shows a dot-dash appearance of interstitial gas in PIE due to the dense arteries (white solid arrow) in the left lower lobe being surrounded by air in the lung interstitium. Bilateral pneumothoraces (black curved arrow) are present.

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