TIP SHEET: COPD IMAGES

POSSIBLE ISSUE

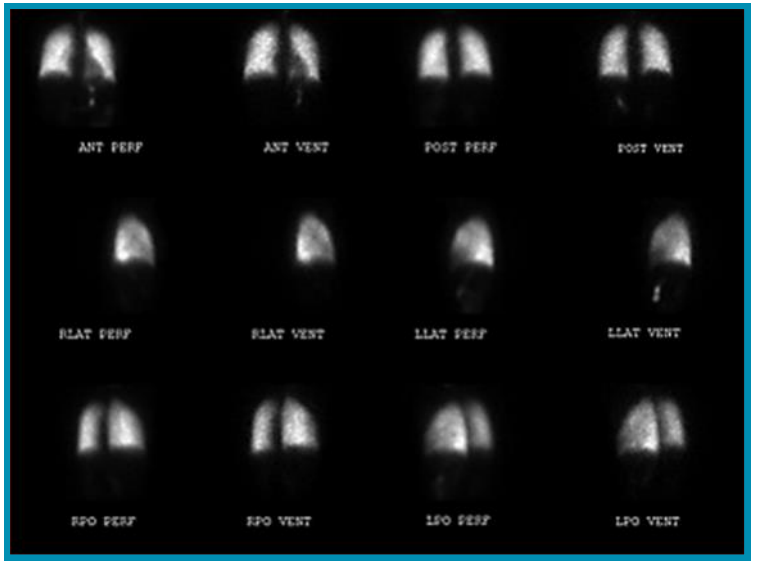
When a patient has COPD, my Xenon Scan looks even during equilibrium and I see hang-up on washout. On my Aerosol Scan, the images are mottled and filled with 'hot spots'. What is the problem?

SOLUTION

There is no problem! The scans both show patterns compatible with COPD but they present them differently. On the Xenon Scan, the lungs fill with gas over time in the equilibrium phase. This means the images are generally quite smooth. When you go to Washout you begin to see delayed washout, which is typical of COPD since with this disease, there is an inability to get rid of air.

The Aerosol Scan is quite different, in that there is no washout phase. Rather, the particles (not a gas) are inhaled and stay where they initially land. In the case of COPD, this results in a mottled image with 'hot spots' and excessive central deposition. This appearance is sometimes thought of as 'clumping'. It isn't, rather, it is simply an accurate representation of the condition of the lungs. Whenever there is a mucous plug or other partial obstruction, air accelerates past the site of partial obstruction and then immediately decelerates after passing the obstruction (the Bernoulli effect), depositing activity on the backside of the obstruction.

Another way to look at it is that the two scans operate 180° from each other. In one (Xenon), washout makes the diagnosis, in the other (Aerosol), wash-in makes the diagnosis. Also, because the lower energy of Xenon-133 is not ideal for the camera, the resolution is less and with the ideal energy of the Aerosol (Tc^{99m}), the resolution is greater.



Normal Lungs (above)

Lungs with COPD (below)

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