Physician Receptiveness of Ventilation-Perfusion Imaging in a Randomized Clinical Trial

Colton Junod, BS[1], Alice M. Mitchell, MD, MS[2]

[1]Indiana University School of Medicine, [2]Indiana University School of Medicine, Department of Emergency Medicine

Background and Hypothesis:

Computed Tomography of the pulmonary arteries (CTPA) is the most common imaging modality for evaluating patients for suspected pulmonary embolism (PE), but carries the risk of acute kidney injury (AKI) from contrast media exposure. In appropriately selected patients, ventilation scintigraphy (VQ) imaging is a diagnostically equivalent alternative. We hypothesized that physician perceptions of diagnostic accuracy and study availability contribute to under-utilization of VQ imaging.

Project Methods:

Patients with suspected PE at increased risk of acute kidney injury, were randomly selected to undergo VQ instead of CTPA. Patients unable to consent, patients with a history of pulmonary surgery, and those undergoing contrast-enhanced imaging for other indications were excluded. A screening chest radiograph was obtained prior to study imaging allocation. All cases were reviewed by a nuclear medicine radiologist blinded to acceptance or refusal of VQ imaging allocation. The primary outcome was defined as the rate of physician-refusal of VQ imaging. The unprompted physician-reported reason for refusal was recorded, in real-time, along with any other general responses.

Results:

Following exclusions, 42 subjects were enrolled. Notably, chest radiograph findings excluded only 2 subjects. The reviewing nuclear radiologist agreed with all study-selections for VQ appropriateness and there was no instance of non-diagnostic VQ imaging. Treating physicians refused VQ imaging randomization in 48% (20/42). Physicians also believed VQ imaging lacked sufficient diagnostic accuracy in the context of active non-pulmonary malignancy in 29% (12/42) of cases. Although CT did not identify cases not seen on chest radiograph, in 12% (5/42) cases suspected pneumonia was the reason for refusal. Statements such as “VQ is inferior [for PE],” and “VQ takes too long” were characteristic of general responses from treating providers.

Conclusion and Potential Impact:

VQ imaging remains under-utilized in patients at risk of AKI. Perceived limitations to diagnostic accuracy and study availability are contributors to under-utilization.