V/Q scans and computerized tomography pulmonary angiography in pulmonary emboli in pregnancy: Superiority for fetal or mother

Sir,

Diagnostic imaging for pulmonary thromboembolism (PTE) in pregnancy is important.[1]

We had 23-year-old women with 5 months pregnancy who presented with acute dyspnea without past medical history of known cardiopulmonary disease and normal physical examination in heart and lung. Acute pulmonary embolism (PE) was diagnosed after patient undergone V/Q mismatch scan. She was treated with low molecular weight heparin (LMWH) (Enoxaparine Sc) during pregnancy, warfarin after delivery until 12 months. The patient terminated pregnancy with normal vaginal delivery with healthy baby with APGAR 9 venous thromboembolism (VTE) remains a major reason of maternal death.[2] The incidence of VTE in healthy women is 4-5/10000/year.[3]

The diagnosis of PE in pregnancy is difficult. A rate of maternal and fetal radiation exposure against possibility fatal misdiagnosis is required.[2]

D-dimers are plasma break-down output of cross-linked fibrin and therefore are used as markers of last thrombus foundation. Unfortunately, D-dimers are also elevated in pregnancy or acute inflammatory states; therefore, they are used for their negative predictive value (i.e., a normal value excludes VTE). Excellent cut off D-dimers and brain natriuretic peptide in conjunction with clinical prediction models deprive low risk women and so decrease the risk of maternofetal radiation exposure.[1]

The modalities that are used maximum, are V/Q scans and/or computerized tomography pulmonary angiography (CTPA) in connection with lower limb compression Doppler ultrasonography. V/Q scans take planar images of patient lungs after inhalation and injection with a radioactive isotope. Pulmonary arterial thrombus is recognized by areas of mismatched perfusion compared with ventilation. Low-dose perfusion scans have comparable finding rates for PE in pregnancy, with no statistically significant difference between the number of positive, nondiagnostic, or common scans compared with CTPA.[2]

Low-dose radiation, determined as exposure of 50 mSv, does not increase fetal orinfant death or cause mental defects or growth retardation at 8-15 weeks' gestation. Radiation exposure to the fetus with both V/Q scans and CTPA is 1-2 mSv. V/Q scanning has comparable exposure to CTPA.

Rradiologists focused on fetal radiation exposure and disregard to mothers of radiation exposure to maternal breast tissue. Perfusion-only scanning delivers a dose of 0.28 mSv to maternal breast tissue, but CTPA gives a dose 35 times higher at 10-70 mSv.[2] In the long-term, CTPA confers a 14% increased risk against the background for breast cancer in pregnant women who are under 40 years old.[2]

The European Association of Nuclear Medicine lately has published data on V/Q single photon emission tomography (SPECT) imaging.[2] In contrast to the two-dimensional image from standard V/Q scanning, multiple 3-girthal images are necessary, because the scan er rotates around the patient. This results in better image quality and fewer nondiagnostic scans and is quicker than planar V/Q imaging.[2]

V/Q SPECT has higher levels of sensitivity (97% vs. 68-86%) and relative rates of specificity when compared with CTPA. The radiation dose with V/Q SPECT is about 35-40% of the dose that is required for CTPA with a slightly lower radiation dose to the fetus and a significantly lowerdose to maternal breast tissue (approximately 4% of CTPA).[2]

Therefore because of higher sensitivity and lower dose of radiation to mother and fetus, pregnant patients with high probability of acute PTE should undergone V/Q scan as recommended by European Association of Nuclear Medicine.[2]

Nahid Azdaki, Mahmood Hosseinzadeh Maleki, Toba Kazemi, Seyyed Ali Moezi, Hamid Reza Mashraghi Moghaddam

Atherosclerosis and Coronary Artery Research Center, Cardiology Department, Birjand Univercity of Medical Sciences, Birjand, Iran

Address for correspondence: Dr. Toba Kazemi, Birjand Atherosclerosis and Coronary Artery Research Center, South Khorassan, Pasdaran Avenue, Birjand, Iran.
E-mail: drtooba.kazemi@gmail.com

REFERENCES

1. Moradi M. Pulmonary thromboembolism in pregnancy: Diagnostic imaging and related consideration. J Res Med Sci 2013;18:255-9.
2. Cutts BA, Dasgupta D, Hunt BJ. New directions in the diagnosis and treatment of pulmonary embolism in pregnancy. Am J Obstet Gynecol 2013;208:102-8.
3. Kazemi T, Javadinia SA. Pulmonary emboli following oral contraceptive misuse and long air travel. J Res Med Sci 2012;17:894.