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NEWS

RSNA Press Release

CT Angiography May be Unnecessary in Patients with Suspected Pulmonary Embolism

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At A Glance

- A quick assessment of a patient's risk factors may eliminate the need for CT angiography in many cases of suspected pulmonary embolism.
- Without any risk factors present, there is less than a 1 percent chance of a CT angiogram positive for pulmonary embolism.
- Pulmonary embolism risk assessment could help reduce patient radiation exposure, as well as costs associated with CT angiography.

OAK BROOK, Ill. — A new study suggests that computed tomography (CT) angiography might be unnecessary in many patients suspected of having pulmonary embolism (PE), based on the results of risk assessment analysis. PE risk assessment could help reduce radiation exposure and costs associated with CT angiography. The results of the study appear in the online edition and August print issue of the journal *Radiology*.

"Our study suggests that the frequency of ordering CT angiograms can be markedly reduced with resultant cost-savings and decreased radiation exposure," said lead author Mark D. Mamlouk, M.D., radiology resident at the University of California, Irvine in Orange, Calif.

Pulmonary embolism occurs when a blood clot, usually from the leg, travels through the bloodstream and gets lodged in a pulmonary artery. The condition can be fatal, so prompt diagnosis is critical.

CT angiography's high sensitivity and specificity has made it the preferred modality for diagnosing PE. However, the increasing use of the examination has fueled concerns over procedure costs and radiation exposure to patients, along with risks associated with the use of contrast agents.

For the study, the researchers assessed the possibility of using risk factors associated with thromboembolism, or blood clot formation, to reduce the number of CT angiograms for PE. They reviewed the electronic medical records of 2,003 patients who underwent CT angiography for possible PE between July 2004 and February 2006. Among the risk factors assessed were age, history of immobilization and cancer. Other risk factors included excess estrogen state, a history of venous thromboembolism, gender and disorders that cause blood to clot more easily than normal.

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Overall, CT angiograms were negative for PE in 1,806 of 2,003 patients, or 90.2 percent. Among the 197 patients with CT angiograms positive for PE, 192, or 97.5 percent, had one or more risk factors.

All of the risk factors except gender were determined to be statistically significant. Age of 65 years or older and immobilization were the most common risk factors in positive PE patients.

Of the 1,806 patients with CT angiograms negative for PE, 520 (28.8 percent) had no risk factors. Furthermore, excluding age and gender, 1,119 (62 percent) had no risk factors. Risk factor assessment had a sensitivity of 97.5 percent and a negative predictive value of 99 percent in all patients.

Without any thromboembolic risk factors, there was only a 0.95 percent chance of a CT angiogram positive for PE, according to Dr. Mamlouk.

"Thromboembolic risk factor assessment is an effective clinical method to determine when to perform CT angiography for PE," Dr. Mamlouk said. "Risk assessment can be performed when clinicians acquire their patients' history. It takes only a few minutes, and there's no cost."

Dr. Mamlouk and colleagues also concluded that the combination of no risk factors and a negative D-dimer, a blood test that helps in the diagnosis of blood clots, yielded an extraordinarily low risk for a positive CT angiogram for PE.

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"Pulmonary Embolism at CT Angiography: Implications for Appropriateness, Cost, and Radiation Exposure in 2,003 Patients." Collaborating with Dr. Mamlouk were Eric vanSonnenberg, M.D., Rishi Gosalia, M.D., David Drachman, Ph.D., Daniel Gridley, M.D., Jesus G. Zamora, M.D., Giovanna Casola, M.D., and Sanford Ornstein, M.D.

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