'Selective strategy' recommended for CT scans in emergency departments

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Emergency medicine researchers with the University of Cincinnati (UC) are advocating a new strategy for diagnosing a common but dangerous condition in the emergency room.

Pulmonary embolism, or PE, is a potentially lethal disease in which a blood clot, usually from the legs, travels to the lungs and becomes lodged in a pulmonary artery. But the most common way of testing for PEs, a computed tomography angiography (CTA), comes with so many side effects that researchers in emergency medicine are now looking for ways to reduce use of the test.

In a CTA, a contrast dye is first injected into a vein. As the dye circulates through the body, a CT scan is used to take detailed images of the vessels.

"The use of CTA for blood clots has increased 235 percent between 1991 and 2002," says Michael Ward, MD, UC emergency medicine operations research fellow. "However, recent literature has shown there are significant risks associated with CTA, including radiation, severe allergic reaction and kidney failure from the contrast dye.

"As more risks are discovered, the development of diagnostic strategies to reduce the use of CTA has become extremely important."

In a study done June 2010, Ward used existing data to predict costs and results for two models of PE diagnosis. One model tests all patients for

PE using a CTA. Another uses compression ultrasound to first test for deep vein thrombosis (DVT), the formation of a blood clot in the leg.

"The diagnosis of a DVT, together with symptoms of PE, almost certainly suggests a PE," says Ward. "If the test for DVT was positive, the patient was admitted to the hospital for PE and started treatment with anticoagulants. If the test was negative, patients had a CTA performed to evaluate for PE."

In the study, researchers used a computer decision model to evaluate a typical patient being evaluated in the ED with signs and symptoms of a PE. Using the model, Ward and his colleagues were able to test different scenarios to see how each strategy held up.

The model showed that the selective CT strategy resulted in both a life expectancy increase for patients and a cost savings for hospitals. Ward's analysis is published in the January issue of *Academic Emergency Medicine*.

"Our work suggests that a PE diagnostic strategy that uses compression ultrasound followed by selective CTA is not only cost-effective, but may be a way to reduce the incidence of adverse affects associated with the CTA," says Ward.

Ward says that an ultrasound strategy has been used in the ED before, but only as a rule-out strategy, rather than the rule-in approach tested in this study. With almost half the CTAs in the U.S. in 2006 performed in the emergency room, he says a reduction of unnecessary CTA imaging in a cost-effective manner can have a strong impact for both patients and health care providers.

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