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Clots traveling from lower veins may not be the cause of pulmonary embolism in trauma patients

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A report from a team of Massachusetts General Hospital (MGH) physicians calls into question the longstanding belief that pulmonary embolism (PE) - the life-threatening blockage of a major blood vessel in the lungs - is caused in trauma patients by a blood clot traveling from vessels deep within the legs or lower torso. In their study utilizing advanced imaging technologies, which appears in the October *Archives of Surgery*, the MGH investigators found no evidence of deep venous thrombosis (DVT) in most trauma patients with pulmonary embolism.

"A consistent finding of previous studies - which was often overlooked - was that no lower-extremity vein clots were found in patients suffering pulmonary embolism," says George Velmahos, MD, PhD, chief of the MGH Division of Trauma, Emergency Surgery, and Surgical Critical Care, who led the study. "But our surgical minds were so stuck in the dogma that PE originates from lower-extremity DVT that even though the data was there, we didn't pay attention to it."

Traditional thinking has been that pulmonary embolism results when a deep venous thrombosis in the legs or pelvis breaks off and travels through the bloodstream into the lungs. If that were true, the authors note, pulmonary embolism patients should still have evidence of the DVT, since part of the original clot would remain attached to the location where it formed. The earlier studies that did not find DVTs in trauma patients with PE had utilized ultrasound imaging, which is

limited in its ability to locate deep venous thrombosis, possibly missing any remaining clots.

The current investigation analyzed the results of computed-tomography-based tests - CT pulmonary angiograms for the lungs and for the lower extremities CT venography, which is highly accurate in diagnosing clots in major blood vessels. The researchers reviewed the records of 247 trauma patients who had received both CT pulmonary angiograms and CT venograms at MGH from 2004 through 2006. While 46 patients developed pulmonary embolism and 18 had deep venous thrombosis, only 7 of the 46 PE patients also had evidence of DVT. The known accuracy of CT venograms make it highly unlikely, the authors note, that many patients had undetected DVTs.

This report - believed to be the first to express doubts about the accepted origin of pulmonary embolism - needs to be confirmed by other investigators and also cannot be extrapolated to the rare instances when PE develops in otherwise healthy individuals. The authors' hypothesis - yet to be tested - is that clots may form independently in the lungs, and if the study's results hold up, they would imply that current measures to prevent PE - including blood-thinning drugs, mechanical compression of the legs and the insertion of filters into the major vein that carries blood from the lower extremities - are not effective.

"If it turns out that clots are forming primarily in the lungs, it would revolutionize the way we think about PE and they way we prevent and treat it," says Velmahos, who is the John Francis Burke Professor of Surgery at Harvard Medical School.

Source: Massachusetts General Hospital (news : web)