Opportunities to Decrease Use of CT Pulmonary Angiography in a University Emergency Department

Kusum S. Mathews, MD, MPH, Peter S. Marshall, MD MPH, Christopher L. Moore, MD, Ami N. Rubinowitz, MD, Mark D. Siegel, MD

Background: CT Pulmonary Angiography (CTPA) in patients at low risk for PE leads to unnecessary radiation and IV contrast exposure and adds to cost. Published algorithms combining pretest probability (PTP) and D-dimer (DD) testing can identify low risk patients who can safely forego CTPA. This study was designed to identify low risk patients undergoing CTPA in our Emergency Department (ED) and potential opportunities to safely forego testing.

Methods: We conducted a single-site retrospective electronic chart review for adult patients visiting the ED from 8/07-2/08. ED physicians assigned patients a clinical judgment-based PTP (CPTP) and were able to test DD levels. Investigators used recorded data to calculate a Revised Geneva Score and assign a Geneva PTP (GPTP).

Results: 496 patients (mean age 50±18, range 18-94; 67% women) underwent CTPA. GPTP placed more patients in lower risk groups than CPTP: (30 vs. 12% low, 68 vs. 55% intermediate, 2 vs. 33% high; p<0.001). PE was found in only 39 cases (8%). DD was ordered in 46%. 7% with a positive DD had PE; no patient with a negative DD had PE. Of 40 patients with a low/intermediate GPTP and negative DD, none had PE. 264 patients in the low/intermediate GPTP group had no DD checked, suggesting missed opportunities to forego CTPA. However, DD was negative in only 18% of those checked, implying that the benefit of more DD testing would be modest.

Conclusions: PE rates in our cohort were low: only 8% of CTPAs were positive. CPTP appeared to overestimate PE risk compared to GPTP. Increased use of GPTP and DD testing would have identified more patients who could safely avoid CTPA. However, negative DDs were unusual, suggesting the need for better methods to identify patients who can safely forego CTPA.