

CAT- Jamie Bonner- Block 4, October 4th, 2016

A Multidisciplinary Pulmonary Embolism Response Team. Initial 30-Month Experience With a Novel Approach to Delivery of Care to Patients With Submassive and Massive Pulmonary Embolism.

Kabrhel K, Rosovsky R, Channick R, Jeff M, Weinberg I, Sundt T, Dudzinski D, Rodrigues-Lopez J, Parry B, Harshbarger S, Chang Y, Rosenfield K. American College of Chest Physicians. August 2016; 150 (2): 384-393.

Question: Does the presence of a multidisciplinary Pulmonary Embolism Response Team (PERT) help facilitate coordination in organized, evidence-based, efficient care to patients with high-risk PE.

Background: Acute PE affects 1-2/1,000 adults per year and if not fatal is associated with long-term morbidity. Despite this, the approach to PE treatment has changed little in 50 years. In recent years new approaches and new therapeutic tools have shown promise in high-risk patients with PE including, catheter directed thrombolysis, percutaneous thromboaspiration, improved surgical procedures, and extracorporeal membrane oxygenation (ECMO). This being the case, why are hemodynamically stable and unstable PE's often treated with anticoagulation alone? It is thought that the lack of readily available multidisciplinary consultation in shared decision making inhibits the determination of if and when to integrate these treatments into real-time clinical care.

Methods: In a 30-month trial period PERT activations were under investigation at Massachusetts General Hospital. The PERT core members were specialists made up of cardiology, cardiac surgery, echocardiography, emergency medicine, hematology, pulmonary/critical care, radiology, and vascular medicine. A referring physician would activate the PERT via a 24 hr telephone number and a representative would gather clinical data. Then the entire group would be notified via page or e-mail of an upcoming meeting and by using commercially available software they could review data and radiologic images pertinent to the case, in real time. The group would then come to a consensus about a treatment plan and report it back to the referring provider. If therapeutic intervention was required they would then mobilize the required resources.

Results: In 30 months there were 394 PERT activations. The 30 months were analyzed in five 6 month periods. There was an average successive increase in use in each period by 16%. However among this increase the origin of activation remained constant with most activations originating in the ED (58%), ICU (20%), medical floor (14%), surgical floor (5%) and others. In 314 patients a PE diagnosis was confirmed, 289 before PERT activation and 25 after PERT activation. The 80 undiagnosed PE's were because of death before confirmation, instability hindering confirmatory imaging, or were not compliant with 3-day follow-up. Majority of confirmed PE's were submassive (46%) and massive (25%) and most patients (65%) had evidence of right heart strain on echocardiography or CT pulmonary angiography.

The most common treatment delivered by the PERT was anticoagulation alone with 69% of patients (confirmed PE and completed 3-day follow-up). Advanced treatments included, catheter directed thrombolysis (9%), systemic IV thrombolysis (5%), surgical thrombectomy (3%), suction thrombectomy (0.3%). Three patients had both catheter directed thrombolysis and systemic thrombolysis, so in total 11% of patients underwent thrombolysis after PERT activation. Among the subset of massive PE with 80 patients 14 (18%) underwent systemic or catheter-directed thrombolysis, 4 (5%) of patients had surgical thrombectomy, 4 (5%) required ECMO and 18 (23%) had an IVC filter placed.

Of the 265 patients that completed a 30 day follow-up 14% experienced a "unique patient bleeding event." Mortality was 12% for patients with confirmed PE and 25.3% for patients in the sub-classification of massive PE. There were 159 patients with confirmed PE that completed their 365-day follow-up. An echocardiogram was completed on 40 patients between day 31 and 1 year revealing 12 patients with persistent heart strain, 7 with elevated RVSP, 4 with documented chronic thromboembolic pulmonary hypertension, and 6 had post thrombotic syndrome.

The PERT study leaders compared their thrombolysis intervention of 23% (14% overall) in massive PE (PE with sustained hypotension or pulselessness) to 9% in the Multicenter Emergency Medicine Pulmonary Embolism in their Real World Registry (EMPEROR) study and 13% in the International Cooperative Pulmonary Embolism Registry (ICOPER) study and 3% of a study published by their own institution.

Bottom Line: The PERT paradigm is an organized group of specialists that use collaborative, therapeutic, and evidenced based decision making in treatment of confirmed or highly suspected PE. The use of this group provides multidisciplinary consultation and a well-defined, streamlined path for clinicians to refer sick patients with PE to appropriate specialists with the ability to mobilize resources. The use of PERT increased thrombolytic therapy in massive PE when compared to outside studies and was adopted indefinitely by the study location.

Discussion: Throughout the 30-month interval the use of the PERT team increased in use but the actual reason for the increase wasn't documented. Did the consult team actually prove beneficial to the referring clinician, or did it take 30 months for the staff to be informed that it was something available to them during the correct clinical scenario.

It's the first longitudinal assessment of PERT with no other assessment comparing it to outcomes of standard care so it had to be compared to outcomes of EMPEROR and the ICOPER and another previously published study from Massachusetts General.

Small patient population over a small period of time with massive PE for comparison.
