

Abstract 1

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Title: Code Pulmonary Embolism: Creation of a Multidisciplinary Program to Improve Care of Patients with Massive and Submassive Pulmonary Embolism

Background:

A multidisciplinary team consisting of physicians, nurses and pharmacists created a program focusing on the risk stratification and treatment of patients with severe forms of pulmonary embolism (PE).

Methods:

The American Heart Association defines massive PE as an acute PE with sustained hypotension, pulselessness or persistent profound bradycardia. A submassive PE is an acute PE without systemic hypotension, but with evidence of right ventricular dysfunction identified by echocardiography, computed tomography or cardiac biomarkers. Recently, many novel therapies have been utilized for the treatment of massive and submassive pulmonary embolism. These include catheter-directed treatment, pulmonary embolectomy and extracorporeal membrane oxygenation. There is limited data on the safety and efficacy of these tools and techniques, and treatment decisions rely on clinician expertise and institutional resources. Because various specialties offer different expertise and opinion, a multidisciplinary approach to massive and submassive PE is crucial. At our large, tertiary-care hospital in Charlotte, North Carolina, we engaged a multidisciplinary team that critically appraised the literature and developed a clinical guideline for the risk stratification and treatment of severe PE based on our available resources and expertise. Dissemination and implementation of the guideline was facilitated by a large, multi-departmental education program, consisting of group didactics, email notices, marketing posters and individual instruction. The development of a Code PE registry will aid in expanding the program to other hospitals within our healthcare system. The registry will serve as a platform for future studies to improve the care of massive and submassive PE.

Results:

Since the launch of the Code PE program, 33 patients have been included in the protocol. The median age of patients was 63 (IQR 37-87) and 19 (58%) patients were females. Submassive PE represented the majority of patients totaling 30 out of 33 patients (91%). There were three massive PEs (3%). 26 (79%) patients were admitted to the intensive care unit (ICU). Average ICU length of stay (LOS) was 2.45 days (SD = 3.78). Average hospital LOS was 6.92 days (SD

= 7.56). Two patients (7%) in the submassive category were treated with intravenous thrombolysis. Three patients (10%) in the submassive category were treated with catheter-directed thrombolysis. Of these patients, there was no intracranial hemorrhage and one patient (20%) had major bleeding (defined as >2 g/dL drop in hemoglobin or need for blood transfusion). Of the patients with submassive PE, there was one patient (3%) that required vasoactive medications, which was considered a PE-related complication (defined as death, need for CPR, need for vasoactive medications or need for intubation). There were no in-hospital deaths in the submassive category. To date, one massive PE patient has been enrolled in the registry. This patient received intravenous thrombolysis and had a major bleeding episode requiring blood transfusion. The patient did not experience intracranial hemorrhage. This patient experienced multiple PE-related complications including need for CPR, need for vasoactive medications and need for intubation. This patient survived, neurologically intact, to hospital discharge. To date, 30-day post-diagnosis follow-up data has been obtained on 25 patients (76%). Of the patients that have been contacted, all (100%) are alive 30-days post-diagnosis.

Conclusion:

In an effort to improve the care of patients with massive and submassive PE, we implemented a Code PE protocol at our large, tertiary-care hospital in Charlotte, North Carolina. The protocol provides a suggested treatment strategy depending on the severity of PE and the patient's risk of bleeding. To date, we have enrolled 33 patients. The submassive category of patients represented a large majority. Of all patients enrolled, 18% received advanced PE therapy (intravenous thrombolysis, catheter-directed treatment, pulmonary embolectomy or ECMO). Of these patients, 33% had major bleeding and no patients suffered ICH. We observed a relatively low rate of PE-related complications. There were no in-hospital deaths or deaths within 30 days of diagnosis. Preliminary data at our institution suggests that most patients with massive or submassive PE receive treatment with anticoagulation only and suffer few PE-related complications. Patients who received advanced PE therapy had a higher rate of bleeding complications, but this did not result in any deaths. The Code PE protocol at our institution may serve as a best-practice model for future collaborative consultation. The model places the patient at the center of decision-making and renders a unified and coordinated treatment strategy. With time, we will collect additional data and document variations in treatment strategies and the resultant outcomes. Hopefully, this will serve as a launching point for future trials and will improve the care of patients with pulmonary embolism.