**Pulmonary Embolism:**

**When to Treat Aggressively**

The majority (70%) of pulmonary embolism (PE) events are considered low risk with a rate of death less than 1%. Three to six months of anticoagulation to prevent recurrence and chronic thromboembolic pulmonary hypertension is a Class I recommendation. If anticoagulation is contraindicated or if a pulmonary embolus occurs in the face of adequate anticoagulation, an IVC filter can be placed and subsequently removed when clinical thrombotic risk factors diminish. Low risk PE patients are characterized by both absence of myocardial necrosis biomarkers and lack of right ventricular (RV) dysfunction on echo, CT or MRI. Some of these low risk patients can be acutely treated as outpatients, (when using a PE severity index score), a trend that is practiced in several parts of the country.

In contrast, patients with large pulmonary emboli are hypotensive (<90mmHg for at least 15 minutes) and usually require ionotropic support. These patients are considered to have massive pulmonary emboli with a mortality of at least 30%. This category of pulmonary embolism patient merits aggressive treatment. Traditionally, these patients were offered systemic thrombolytic therapy.

Recently, the use of catheter directed thrombolytic therapy in which clot is directly infused with lytic drug, or a combination of both lytic drug infusion and mechanical thrombectomy, are believed to be more effective techniques. Simultaneous lytic and mechanical therapy appears to allow for lower doses of lytic medication, shorter treatment times and possibly less bleeding.

Patients with submassive pulmonary emboli are characterized by RV dysfunction, elevated myocardial biomarkers (Troponins, Pro- BNP) but are normotensive. These patients require considerable deliberation as to therapeutic recommendations. Intravenous and now catheter directed lytic therapy has not uniformly been shown in this submassive group to yield superior results compared to conventional anticoagulation. In addition, within this submassive patient cohort, those over 65 years seem to be at especially high risk for major bleeding with systemic lytic therapy and for this reason an aggressive treatment approach is still controversial. Renal insufficiency, age >65 and dual antiplatelet therapy use should further dissuade from recommending aggressive treatment for this submassive PE group. Hemodynamic deterioration in this subgroup secondary to cardiopulmonary decompensation rather than bleeding can be a reason to change course and pursue rescue thombolytic +/- mechanical therapy.

In summary, good risk patients less than 65 years old with submassive PE can be offered systemic or catheter directed thrombolytic +/- mechanical therapy with an expected low complication rate. Beyond that, for this submassive PE group, conventional anticoagulation with low molecular weight heparin followed by warfarin or immediate use of the new oral direct acting anticoagulants is preferred.

It continues to be an honor to help care for your patients.

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