Massive Pulmonary Embolus

Definition of Massive Pulmonary Embolus

Massive Pulmonary Embolus (MPE) is a clinical diagnosis. The definition takes into account the clot burden and the patient's underlying cardiopulmonary status. A MPE is a pulmonary embolus (PE) that is associated with systemic arterial hypotension.

Scope of the Problem

Pulmonary Embolus occurs in >600,000 patients per year and the three month mortality is about 15%. There is a three to five fold increase in mortality for those patients with hemodynamic compromise. Approximately 4-10% of patients with PE have a MPE. Two thirds of fatalities will occur in the first hour.

Diagnostic Strategies

Primary diagnostic modality would be contrast spiral CT scan of the Chest.

Management

Early intervention to resuscitate and stabilize the patient is important. Mechanical ventilation should be initiated for persistent hypoxia. Be careful of further hypotension following initiation of mechanical ventilation. Be judicious with fluid resuscitation to prevent further right ventricular dysfunction. Early vasopressor therapy is important to stabilize the patient. Norepinephrine or dopamine would be preferred agents.

Treatment

Heparin

Heparin therapy should be initiated early in MPE patients and is the mainstay of therapy. To achieve a therapeutic level quickly, use a weight based nomogram. Infusing heparin concurrently with tPA or restarting the heparin after tPA infusion is optional. Do NOT administer heparin concurrently with urokinase or streptokinase.

Thrombolytics

Thrombolytics are the treatment of choice for patients with PE and hemodynamic instability. Thrombolytic therapy has been shown to produce more rapid clot lysis than heparin alone but has not shown to have a mortality benefit. No difference has been shown between different types of lytics if given comparable doses.

Indications include any PE patient that is hemodynamically unstable or manifests signs of shock or cardiovascular collapse. Contraindications include active internal bleeding, history of stroke, recent intracranial or intraspinal surgery or trauma, intracranial neoplasm, arteriovenous malformation, aneurysm, known bleeding diathesis, or severe uncontrolled hypertension. Major hemorrhage is reported at 10-20%. Fatal hemorrhage rates are about 1-2% for PE treated with lytics. Intracranial hemorrhage occurs in 1-2% of PE patients that receive tPA.

Approved tPA dosing for PE is a 100mg continuous infusion over 2 hours. Heparin can infuse concurrently with tPA or held until the tPA infusion is complete and then restarted.

Embolectomy

For patients with persistent hypotension and contraindications to thrombolytics, embolectomy could be considered. Open surgical embolectomy or catheter based embolectomy are possible, but availability and expertise are often limited.

Key Points

- MPE is defined as a PE with associated hypotension or evidence of shock
- CT Chest with contrast is the diagnostic imaging modality of choice
- Pressor therapy should be instituted early
- Early Heparin therapy is important
- Thrombolytics should be used for MPE if no contraindications are present

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