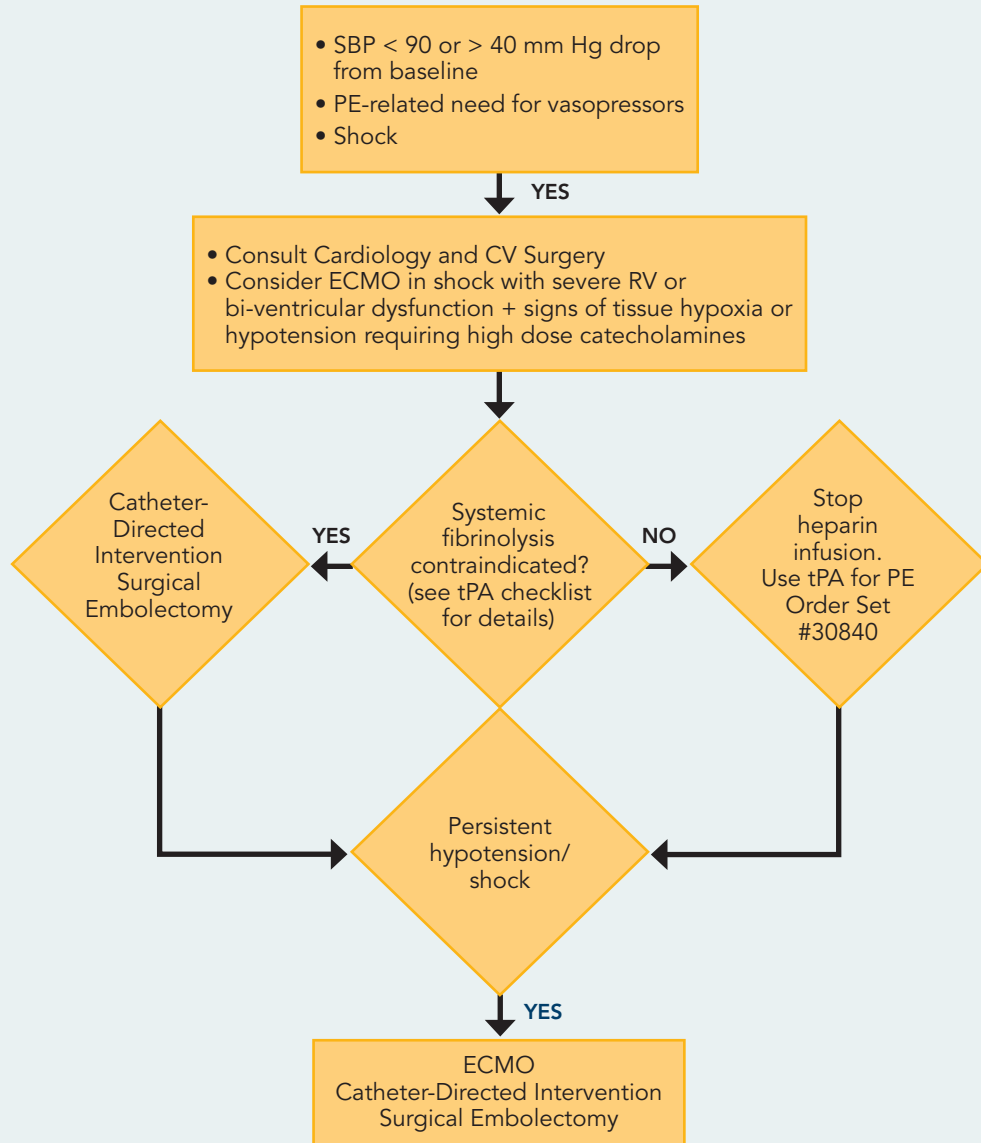


Massive and Submassive Pulmonary Embolism Algorithm

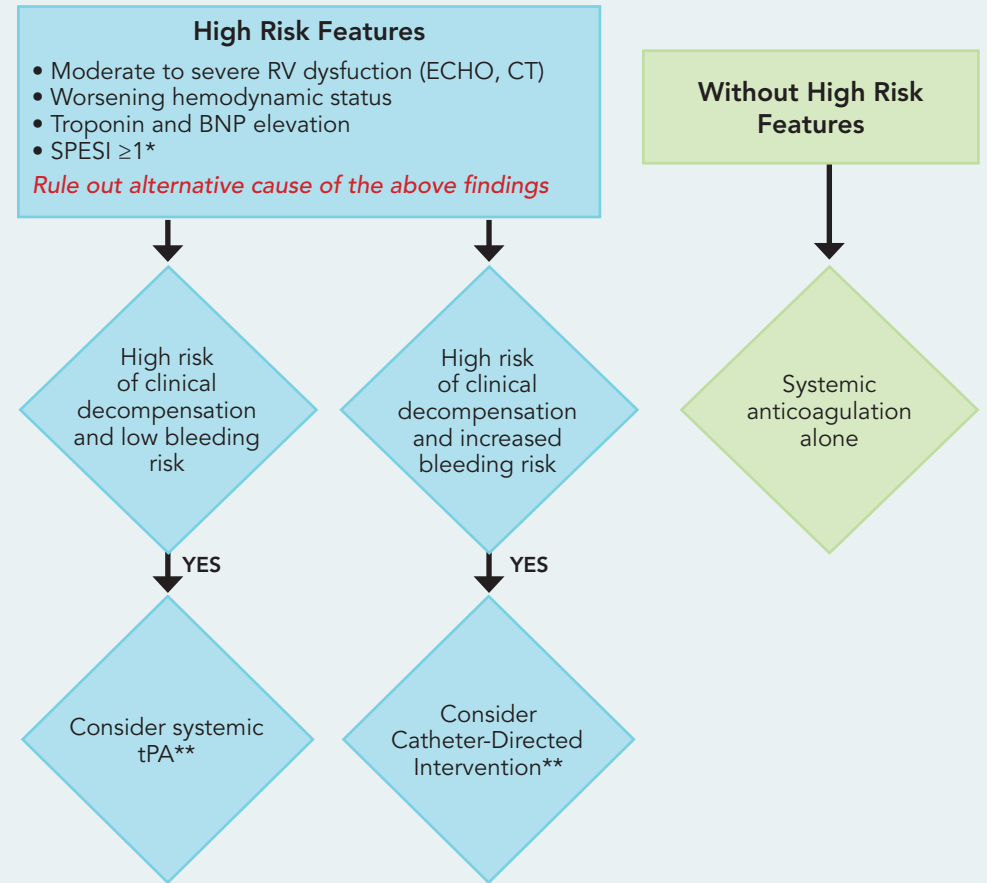
Hemodynamic or respiratory instability/concern for possible clinical decompensation

- Recommend cardiology and CV surgery consults
- Continue anticoagulation
- Obtain STAT ECHO, BMP, CBC, troponin, BNP, lactate, INR, PTT, fibrinogen, type and screen, bilateral LE Doppler US
- Avoid arterial or non-compressible venous punctures
- Call 612-863-1000 to activate PE Response Team (Intensivist, Interventional Radiologist, Cardiologist, Pediatrics for ages 15-18)

Massive PE



Submassive PE



Assess the need for IVC filter

Established indications:

- Unable to anticoagulate
- Recurrent PE despite adequate anticoagulation

Consider in:

- Patients with lower extremity or ilio caval DVT and hemodynamic instability or limited hemodynamic reserve**

* Simplified Pulmonary Embolism Severity Index (SPESI)- predicts overall 30-day mortality

- Age >80
- History of cancer
- Chronic pulmonary disease
- HR ≥ 110
- SBP < 100
- Arterial O₂ saturation < 90%

** Intervention on a case by case basis.

TPA Checklist *Patient-specific risk/benefit assessment is required in each case.*

Major contraindications

- Active bleeding
- Current or previous intracranial hemorrhage
- Structural intracranial disease
- Ischemic stroke within 3 months
- Head or facial trauma, brain or spine surgery within 12 months (shorter intervals may be applicable)
- Suspected aortic dissection

Relative Contraindications/Precautions

- Severe, poorly controlled hypertension or current BP \geq 180/110 mm Hg
- Major non-intracranial bleeding in the last 2 months
- Surgery, trauma, or invasive procedure in the last 2 – 4 weeks
- Traumatic or prolonged (>10 min) cardiopulmonary resuscitation
- Lumbar puncture in the past 3 days
- Vascular puncture at a non-compressible site
- Pericarditis or pericardial effusion
- Platelet count < 100,000 mm³ or anticoagulation resulting in INR > 1.7
- Active peptic ulcer
- Diabetic retinopathy
- Caution in patients currently receiving warfarin, heparin, or antiplatelet drugs
- Caution in pregnancy or h/o parturition in the past 30 days.
- Caution in age > 75 years, Low body weight (< 60 kg)

Outpatient follow up

PE patients with pulmonary hypertension (RVSP > 40) and/or moderate/severe RV dysfunction should have a repeat ECHO and a cardiology follow up at the MHI Pulmonary Hypertension Clinic 6- 8 weeks after discharge. Call PH Clinic (612-863-9996/Emily) to make follow -up appointments.

MHI Anticoagulation Clinic follow up in 4–6 weeks after discharge. Call 612-863-6800 for appointments.

IV TPA Administration and Anticoagulation Highlights

Reduced Dose tPA (associated with reduced bleeding risk):

- For high risk submassive PE
- Patient weighing >50 kg: 10 mg bolus followed by 40 mg infusion over 2 hours
- Patient weighing \leq 50 kg: A total dose of 0.5 mg/kg (10 mg bolus followed by the remaining amount, over 2 hours)

Full Dose tPA: 100 mg infusion over 2 hours

Heparin Infusion: **Stop heparin prior to IV tPA administration**

1. Check aPTT 1 hour after the IV TPA infusion completion, then q 1 hour as needed if first aPTT is still too high
2. Resume IV Heparin infusion per VTE Protocol without a bolus when aPTT is < 80

Catheter-Directed Interventions (CDI) for PE

Massive PE

- Clot fragmentation or aspiration plus tPA 20-40 mg
- Depending on hemodynamic response, continued local low dose lytic infusion directly into clot (see submassive PE below)

Submassive PE

- Local infusion through a catheter
 - Total tPA dose is ~24 mg over 12 or 24 hrs locally
 - Bilateral rate 1 mg/hr x 12 hrs, unilateral rate 0.5 mg/hr x 24 hrs
 - Sub-therapeutic heparin @ 500 units/hr during lysis
 - tPA adjustment if fibrinogen < 200
 - tPA is either stopped or cryoprecipitate is given if fibrinogen < 100
 - Hgb, Plt, INR, fibrinogen in 4 hrs, then q 6 hrs
- Therapeutic heparin is continued until in IR suite and restarted when exiting IR suite after completion of procedure (sub-therapeutic heparin regimen during thrombolytic infusion)

When thrombolysis absolutely contraindicated

- CDI is reserved for Massive or high risk AND clinically deteriorating Submassive PE
- Mechanical clot fragmentation or catheter -aspiration (both typically less effective without tPA)