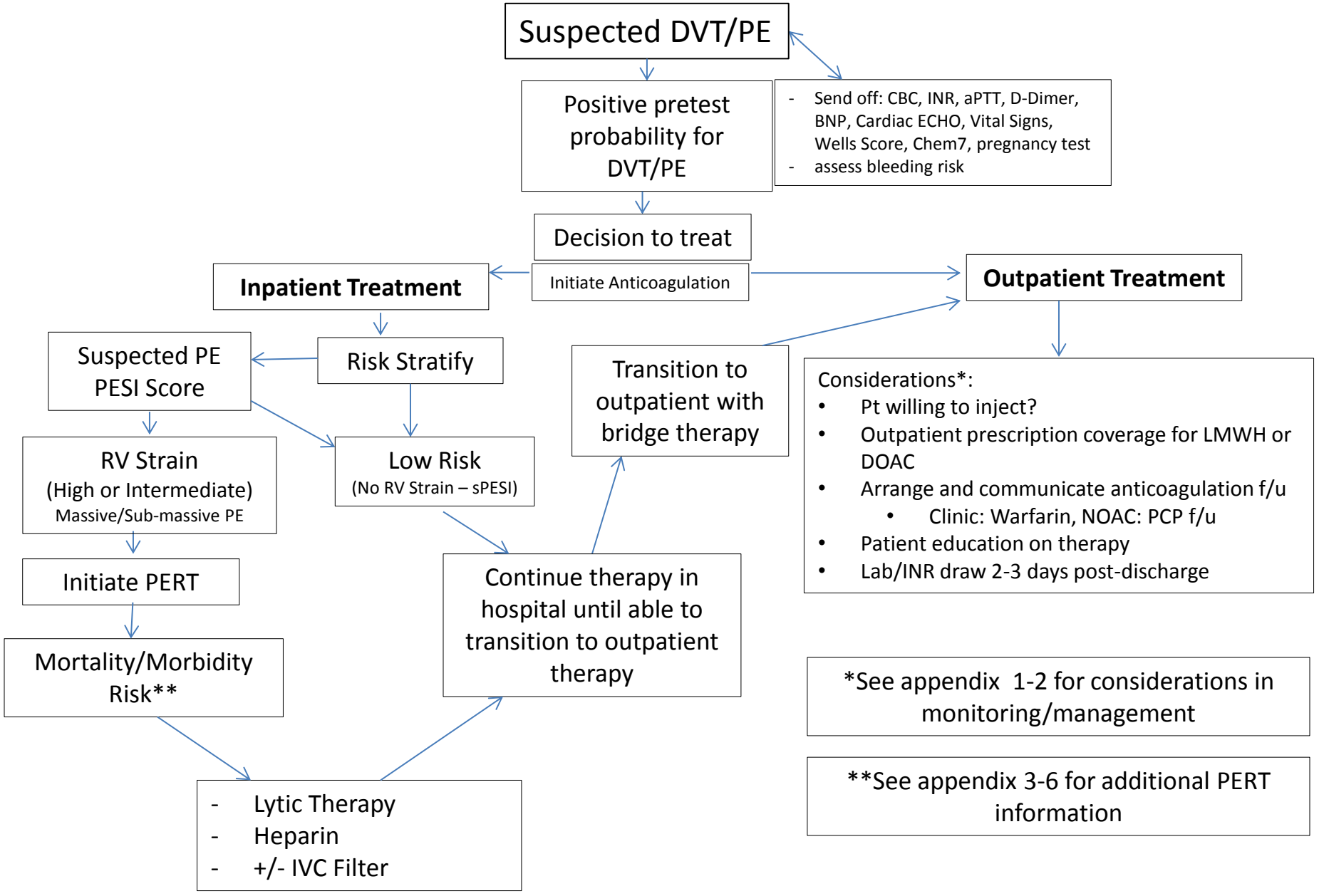
Venous Thromboembolism Clinical Algorithm



Approved by UCDH Pharmacy & Therapeutics Committee 3/2017.

Venous Thromboembolism Clinical Algorithm: Appendix 1

Considerations for monitoring:

- CBC
- D-dimer (no repeat necessary)
- INR
- Chem 7 (renal function for newer oral agents and LMWH)
- Antiplatelet therapy/Interacting medications
- Upcoming procedures
- Follow up issues (adherence/compliance)
- Symptoms of clot extension or PE
  - Consider repeat imaging if concerning
- Symptoms of bleeding

Venous Thromboembolism Clinical Algorithm: Appendix 2

Drug therapies:

- Warfarin to target INR 2.0-3.0
- Dalteparin 200 units/kg ABW* SQ if VTE within 30 days
- Dalteparin 150 units/kg ABW SQ if VTE greater than 30 days
  - CrCl < 20 ml/min contraindicated
- Enoxaparin 1 mg/kg ABW SQ BID
  - Contact Pharmacy if CrCl < 30 ml/min
  - Alternative dosing: 1.5 mg/kg daily
    - Not recommended if high risk, obese, cancer patient
- Fondaparinux 7.5mg SQ Q24
  - 5 mg if less than 50 kg
  - 10 mg if greater than 100 kg
  - Contact Pharmacy if patient has a estimated CrCl 30 ml/min
- Heparin 2500 or 5000 unit bolus
  - VTE treatment order set (Protocol ID # 180)
- Rivaroxaban** 15mg twice daily x21 days, then 20mg daily
  - Contact pharmacy if patient has a estimated CrCl < 30 ml/min
- Dabigatran** 150mg twice daily after 5-10 days parenteral therapy
  - Contact pharmacy if patient has a estimated CrCl < 30 ml/min
- Apixaban** (not approved) 10 mg twice daily x 7 days, then 5 mg twice daily
  - Contact pharmacy if patient has a estimated CrCl < 25 ml/min, or Scr > 2.5
- Edoxaban: Contact Pharmacy for dosing recommendations

*Patients >150 kg, please contact pharmacy
Round to closest syringe size
** Contact Pharmacy if weight is over 120kg

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PERT Guidelines based on risk for mortality/morbidity: Appendix 3

Bleed Risk	Low	Moderate	High
PE Risk			
Intermediate	Heparin +/- Lytic	Heparin +/- Catheter Lytic	+/- IVC Filter, watch
High	Systemic Thrombolysis		Catheter Directed Lytic
911	Contraindication or failed anticoagulation/thrombolytic: CT Surgery, ECLS team, Vascular Surgery		

Thrombolytic Management

Agent	Dosing	Comment

TPA	- Full dose: 100 mg over 2 hours (10 mg bolus with remaining 90 mg over 2 hours)
	- Half dose: 50 mg over 2 hours (10 mg bolus with remaining 40 mg over 2 hours)
	- <50 kg, the total dose is calculated as 0.5 mg/kg, which is given as a 10-mg initial bolus followed by the remainder over 2 hours.
	
	Up front option in cardiac arrest
	- Up to 50 mg IVP over 1 minute in the setting of cardiac arrest with high suspicion for PE.
	  ○ Repeat dosing allowed at 15 mins based on bedside clinical decision. (Case report data)
	  ○ Infuse additional 50 mg over the next 2 hours at physician discretion) (Total dose 100mg)
		Common approach if time available – preferred option in sub-massive PE, non-cardiac arrest setting.
		
		PEAPETT study (Am J Emerg Med 2016) n=23 – dose just 50mg and heparin initiated immediately with a 2000-5000 bolus followed by a infusion 10 Unit/kg/hr for 24-30 hours then transitioned to long term therapy (rivaroxaban/apixaban)

Tenecteplase (TNK)	Full dose: 30-50 mg (weight dependent) single intravenous bolus <60 kg = 30 mg ≥60 to < 70 = 35 mg ≥70 to < 80 = 40 mg ≥80 to < 90 = 45 mg >90 kg = 50 mg	PEITHO Trial - Fibrinolysis for patients with intermediate-risk pulmonary embolism. N Engl J Med. 2014;370:1402-11.
Heparin/ LMWH	Initiate a heparin infusion (with option of a small bolus) as soon as feasible after administration of the lytic therapy. If concurrently receiving a LWMH, initiate a heparin infusion 12 hours after the last LMWH dose. Initiate heparin infusion after administration of the lytic agent, or if already on heparin and a high aPTT, re-initiate heparin once the aPTT (or anti-Xa) value has fallen into the target range	

Pulmonary Embolism Severity Index (PESI): Appendix 4

- Estimate of 30-day mortality and severity of complications from PE based on 11 clinical criteria: age, sex, history of cancer/CHF/chronic lung disease, tachycardia, hypotension, tachypnea, hypothermia, hypoxia, AMS
- Externally validated for newly diagnosed PE, in patients treated with enoxaparin then transitioned to vitamin K antagonists, excluded patients with renal failure or severe comorbidities
- Scored from 0 to >125; Risk classes I to V with corresponding range in mortality estimated 1% to 25%
- Very low risk (score <65) and low risk (score 66-85) PE patients had 30-day mortality <1% and may be candidates for outpatient care
- Calculator: http://www.mdcalc.com/pulmonary-embolism-severity-index-pesi/
- Sources: Derivation/Validation (Aujesky D, 2005), Prospective Validation (Donze J, 2008), Outpatient Management Trial (Aujesky D, 2011)
- Simplified PESI (sPESI)

PESI Score

PESI Score	Class	Risk 30 day Mortality
0-65	I	0.0-1.6%
76-85	II	1.7-3.5%
86-105	III	3.2-7.1%
106-125	IV	4.0-11.4%
≥125	V	10-24.5%

Simplified PESI (sPESI): Appendix 5

- Abbreviated version of the PESI score; uses 6 clinical criteria instead of 11
- Best used to determine LOW risk PE patients that may be candidates for outpatient care
- As accurate as the original PESI for 30-day mortality from PE
- Compared to PESI the sPESI derivation categorized fewer patients as low risk; patients in the sPESI study had more comorbidities
- Low risk by sPESI = 0 points; associated mortality 1.1% and severe morbidity 1.5%
- High risk >/= to 1 point; however increasing points on the sPESI does not correlate to increasing mortality
- Calculator: http://www.mdcalc.com/simplified-pesi-pulmonary-embolismseverity-index/#how-to-use
- Sources: Derivation (Jimenez D, 2010), Meta-analysis (Zhou, 2012)

PE Rule-out Criteria (PERC): Appendix 6

- In low risk patients (pre-test probability <15%) helps rule out PE to <2% chance, and avoids unnecessary testing and treatment for PE
- Based on 8 clinical criteria; All criteria must be absent/negative to be able to apply PERC
- Any positive criteria makes PERC non-applicable; D-dimer may then be considered, however PERC does not mandate further testing
- Based on estimated test threshold of 1.8%, below which the risks of workup are considered to equivalent to risk of missing PE
- Calculator: http://www.mdcalc.com/perc-rule-pulmonary-embolism/
- Sources: Original PERC derivation and validation (Kline J, 2004), Second multi-center validation (Kline J, 2008)