Diagnosis of PE in Pregnancy

Literature review and a proposed algorithm

Grand Rounds Summary Document

May 6, 2021

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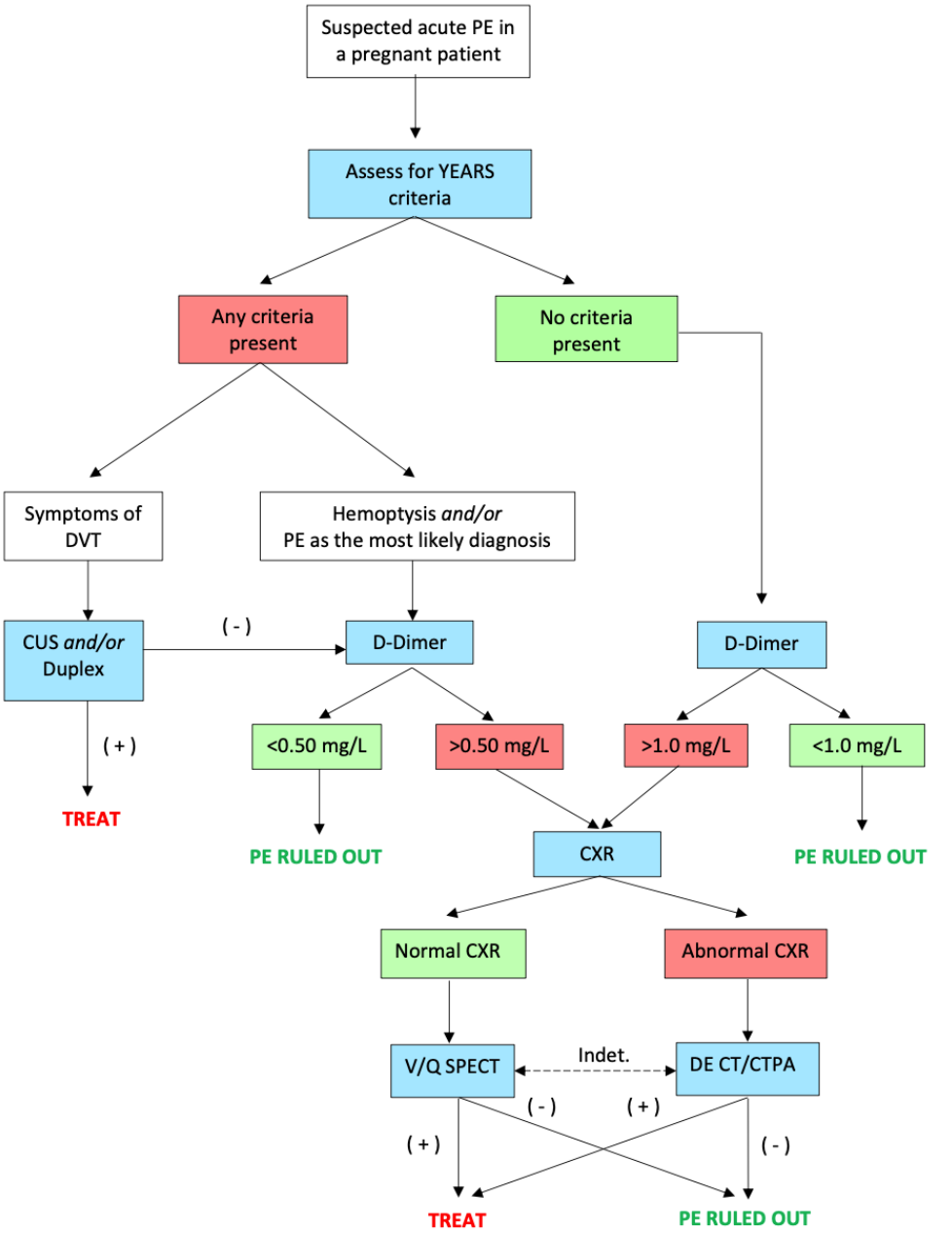
For stable pregnant patients with low-intermediate pre-test probability for an acute PE, based on clinician gestalt



Full video recording:

https://youtu.be/PZny9rbCLcg

Ultrasound in DVT

- Iliac clots are more common in pregnancy due to compression of the common iliac vein by the common iliac artery, which increases as the gravid uterus increases
- Gold-standard is full leg compression ultrasound and iliac duplex – *we need to specifically indicate concern for iliac clot* in our DI requisitions otherwise proximal doppler not always done
    - Think about iliac clot with pelvic, back, abdo, groin pain or whole leg swelling
- Asymptomatic ultrasound has a very low yield – 1-2% will have DVT. *Do not delay diagnosis by ultrasounding asymptomatic patients.*
- LEFt rule – low probability of DVT if 0/3 criteria. *Not ready for use in isolation.*
    - Criteria:
        - Left leg
        - Unilateral edema (>2cm calf swelling)
        - First trimester presentation

Ddimer

- Ddimer increases as trimester increases – no agreed upon gestational-age based "normal" values or cut offs yet.
- Two prospective studies (*Revised Geneva and Pregnancy-Adapted Years*) with two attempted external validations

Study	Algorithm	Study Cohort	CTPA Reduction	Missed VTE
Righini et al, 2018	Revised Geneva	CT-PE	11.6%	0
Van der Pol et al, 2019	Pregnancy-Adapted YEARS	Artemis	39%	1 DVT (0.21%)
Langlois et al, 2019	Pregnancy-Adapted YEARS	CT-PE	21%	0
Goodacre et al, 2020	I – PA-YEARS II – Revised Geneva	DiPEP	PAY – 21% rGS – 44%	PAY – 5/12 PEs rGS – 3/12 PEs

- Goodacre study used DiPEP cohort which was retrospectively risk stratified in a population where the majority of patients had received anticoagulation (prophylactic or therapeutic) prior to d-dimer measurement
- European Society of Cardiology ultimately incorporated recommendations to use ddimer in pregnant patients with suspected PE based on top three studies (above)

- For low test probability patients (as determined by clinician gestalt) with no YEARS criteria, *can safely use 1.0mg/L FEU* as ddimer cutoff
    - YEARS criteria:
        - Hemoptysis
        - Clinical signs of DVT
        - PE most likely diagnosis

Diagnostic Imaging

- Dual Energy CTPA is use in Calgary and has far better rates of diagnostic studies compared to what is reflected in US literature
    - Uses 2 xray spectra instead of one, reduces issues with contrast bolus timing due to hyperdynamic state
- With a normal CXR, often can do perfusion-only SPECT (or "Q SPECT"). Nuclear Medicine makes this decision, not us

	Maternal breast tissue	Fetus
CXR	<0.01 mGy	0.001-0.01 mGy
CTPA	10-70 mGy	0.03-0.66 mGy
Q SPECT (Perfusion only)	0.2-1.2 mGy	0.1-0.6 mGy
V/Q SPECT	0.3-1.5 mGy	0.2-0.7 mGy

	Maternal breast tissue	Fetus
CXR	Less than a penny	Less than a penny
CTPA	$10-70	3-65 cents
Q SPECT	20 cents - $1.20	10-60 cents
V/Q SPECT	30 cents - $1.50	20-70 cents

- Making it simple for patients: 1mGy = $1
    - To increase relative risk of breast cancer by 14% - $10
    - Level of radiation required for potential harm to fetus (impaired organogenesis, childhood cancer) - $50
- *Negligible risk to fetus* with either modality. *Significant increase* in radiation to maternal breast tissue with CTPA
    - V/Q first choice with normal CXR
    - If abnormal CXR or alternate diagnosis suspected – CTPA

Unstable Pregnant Patients

- Imaging: Bedside echo or consider CTPA
- Contact PERT, can lyse based on echo findings alone
- UFH and thrombolysis are safe in pregnancy