Webinar

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Hemostasis Innovation is Here.

Pulmonary Embolism in Pregnancy

What is VTE?

Venous thromboembolism (VTE)

VTE is the 3rd most common cardiovascular disease and one of the leading causes of death and disability worldwide. It is a condition that usually consists of blood clot forming in the deep veins of the leg, groin, or arm (known as deep vein thrombosis, DVT) which can migrate through the circulation, lodging in the lungs (known as pulmonary embolism, PE).

A comprehensive scientific review by the World Thrombosis Day (WTD) steering committee revealed that 10 million cases of VTE occur annually[1].

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VTE in Pregnancy

The risk of VTE is 4 to 5 times higher in pregnant women compared to non-pregnant women of the same age[6]. The estimated incidence of VTE in Pregnancy is from 1 to 2 per 1.000 pregnancies[7]. Several factors used in VTE diagnosis in the general population pose a challenge for its diagnosis during Pregnancy[7]:

- D-Dimer increases over the course of pregnancy
- Symptoms of DVT and PE, like swelling of the leg or shortness of breath can be found in normal pregnant women
- Imaging techniques in the case of pulmonary embolism are associated with radiation that may be harmful to both mother and fetus

All these factors highlight the need for validated algorithms for PE Diagnosis in Pregnancy to avoid unnecessary imaging and radiation.

Maternal Mortality

Maternal mortality has been on the decline globally, with estimates of 451.000 in 2000 to 295.000 in 2017[2]. While most countries are on a downward trajectory some developed and developing countries are seeing increases in Maternal Mortality[2–4]. Developing countries account for 99% of all Maternal Mortality but Preventable Maternal Mortality is a global issue[5].
Hemostasis complications (Hemorrhage or thrombosis) represent approximately 30% of the causes of Maternal Mortality in both developed and developing countries[5].

Take home message

Prospective studies suggest that diagnostic algorithms are helpful to guide the diagnostic process for pulmonary embolism and the management of pregnant women.

Furthermore, the measurement of D-Dimer in combination with clinical signs can avoid exposure to radiations of mother and fetus.

PE Diagnosis in Pregnancy

Studies on PE in the pregnant population were usually retrospective and of limited quality. Two recent prospective studies aimed to change that and were referenced in the European Society of Cardiology guidelines which now recommend that D-Dimer and Clinical prediction tools should be considered to rule out PE in Pregnancy[8]. The first study by Righini et al. is a large multicenter management outcome study and included 395 pregnant women with clinical suspicion of PE in the emergency department from 11 centers in France and Switzerland[9]. In 46 (11.6%) of 395 patients, the combination of a low or intermediate risk using the revised Geneva score and a D-Dimer value <0.5 µg/ml allowed to rule out PE and avoided the need of any imaging techniques[9]. All remaining patients followed a diagnostic algorithm that included imaging techniques. The 3-month risk for VTE in women not receiving anticoagulant therapy as recommended by the algorithm of the study was 0.0% (CI, 0.0% to 1.2%)[9]. The authors also concluded that the yield of D-Dimer measurement is high enough to suggest its use for this indication[9].
The second study by Van der Pol et al. is a prospective management study that included 498 pregnant women with a suspicion of PE in 18 participating hospitals in The Netherlands, France and Ireland[10]. This study followed the below algorithm guided by a Pregnancy-Adapted YEARS criteria and D-Dimer values to guide the diagnostic and management choices in PE suspected pregnant women[10].

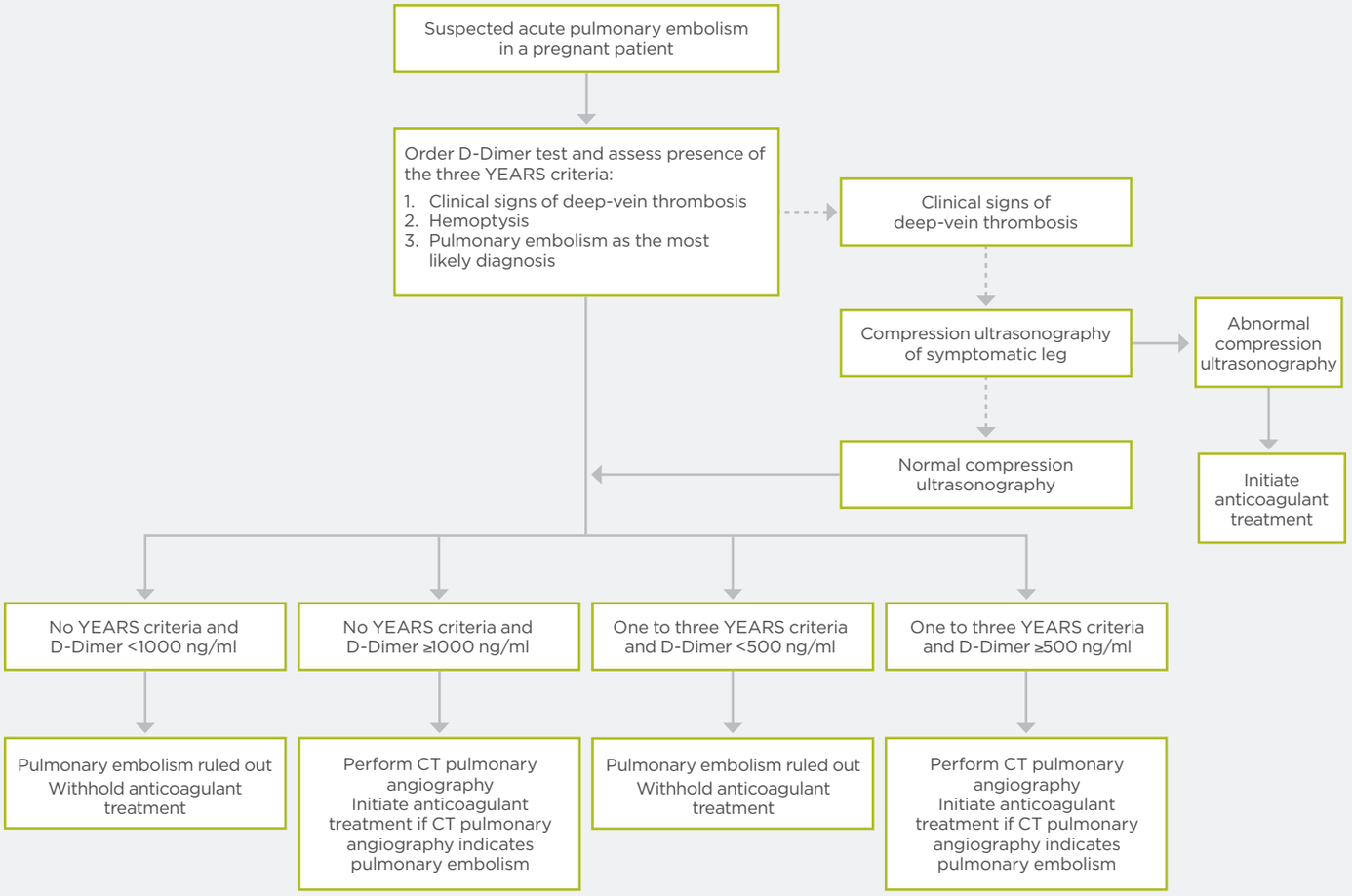

Figure: Pregnancy-Adapted YEARS Algorithm, for the Management of Suspected Acute Pulmonary Embolism in Pregnant Patients. CT denotes computed Tomography[10].

CT pulmonary angiography was avoided in 65% of patients during the first trimester (when radiation is potentially most harmful to the fetus), in 46% of patients during the second trimester, and in 32% of patients during the third trimester[10].
Out of the 477 patients in whom pulmonary embolism was ruled out at baseline, who remained untreated during follow-up, and who completed the follow-up period, only 1 patient received a diagnosis of VTE during follow-up (0.21%; 95% CI, 0.04 to 1.2)[10].