

Doctor, I am pregnant. Can I be tested for blood clots without having a CT scan?

In some pregnant women who have new or worsening chest pain or shortness of breath, doctors may be able to use three questions, along with a blood test, to safely rule out a blood clot in the lungs (pulmonary embolism, PE) without a CT scan (special type of x-ray).

What's the evidence?

Understanding the problem

Pregnancy increases the risk of developing blood clots. Doctors diagnose blood clots in the lungs (PE) with imaging tests like a CT scan. A CT scan involves exposure to a small amount of radiation to the mother's breast tissue and the fetus. Although fetal radiation exposure from imaging tests for PE is well below the threshold that causes birth defects or childhood cancer, it is important to limit radiation exposure over a person's lifetime. Previous research looking at ways to safely exclude PE without imaging tests that involve radiation exposure usually have excluded pregnant women and, therefore, most pregnant women still require these imaging tests if PE is suspected.

Researchers conducted this study to determine if three questions in combination with a blood test (the YEARS algorithm) could safely exclude PE and avoid CT scans in pregnant women with new or worsening chest pain or shortness of breath.

The study

Who? The study included 498 pregnant women (average age 30 years, 46% in the third trimester of pregnancy) who were seen in the emergency department or obstetrics ward for new or worsening chest pain or shortness of breath.

What? The study used the YEARS questions and a blood test (D-dimer) to determine if a CT was required to safely rule out PE.

YEARS questions	+	Blood test
1) Are there signs of a blood clot in the legs (i.e., DVT)?		D-dimer
2) Is the woman coughing up blood?		
3) Does the doctor think PE is the most likely reason for her symptoms?		

All three of the YEARS questions = "no", plus D-dimer less than 1000 ng/mL = PE is unlikely, therefore, no CT scan needed.

All three of the YEARS questions = "no", plus D-dimer 1000 ng/mL or higher = CT scan needed.

One or more of the YEARS questions = "yes", plus D-dimer less than 500 ng/mL = PE is unlikely, therefore, no CT scan needed.

One or more of the YEARS questions = "yes", plus D-dimer 500 ng/mL or higher = CT scan needed.

Women who had signs of a DVT had an ultrasound (an imaging test with no radiation exposure) of that leg. If a DVT was found, no further testing for PE was needed since clots in the leg and lung are related and treated the same way.

Women not diagnosed with a PE or DVT were asked to return for further testing if they developed new or worsening symptoms over the next 3 months.

What the researchers found

Only one woman who did not have a CT scan (YEARS = 0 plus D-dimer less than 500 ng/mL) developed a blood clot within the next 3 months.

Using 3 questions and a blood test, 39% of pregnant women with suspected PE had the diagnosis safely excluded without a CT scan.

Summary of findings

YEARS algorithm and D-dimer results in pregnant women with chest pain or shortness of breath

Number of YEARS questions that were answered "yes"	D-dimer value (ng/mL)	Was a CT needed?	Results
0	< 1000	No	1 woman developed DVT within 3 months

Number of YEARS questions that were answered "yes"	D-dimer value (ng/mL)	Was a CT needed?	Results
0	≥ 1000	Yes	1 out of 88 women in this group was diagnosed with PE
1 to 3	< 500	No	0 out of 31 women in this group was diagnosed with PE
1 to 3	≥ 500	Yes	15 out of 211 women in this group were diagnosed with PE

This Evidence Summary is based on the following article:

van der Pol LM, Tromeur C, Bistervels IM, et al. **Pregnancy-Adapted YEARS Algorithm for Diagnosis of Suspected Pulmonary Embolism.** *N Engl J Med.* 2019 Mar 21;380(12):1139-1149. doi: 10.1056/NEJMoa1813865. PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/30893534?dopt=Abstract>)

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