To CT or not to CT, that is the question!

The use of evidence-based medicine to help investigate a clinical problem

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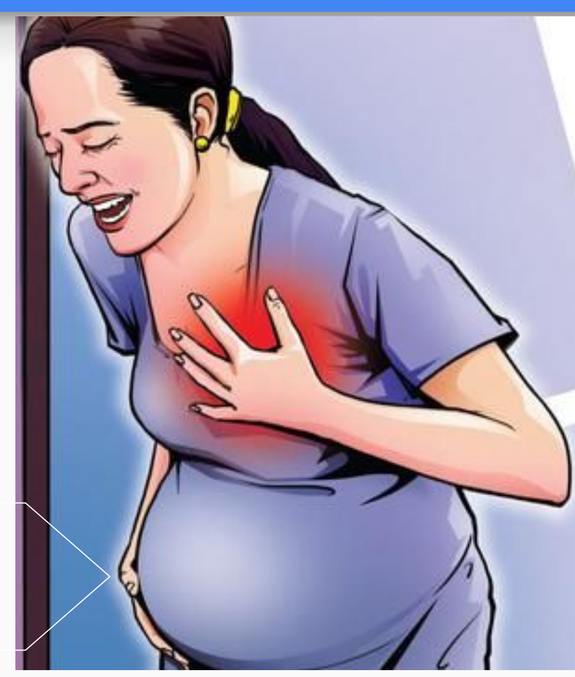
Clinical case:
A 19 year old female patient who was 16 weeks pregnant presented after collapsing whilst walking with her boyfriend. She lost consciousness for 1-2 minutes before regaining consciousness, however, with no recollection of what had happened. This was followed by shortness of breath, chest pain and visual and auditory problems. The doctor suspected a PE and was wondering whether to perform a CT pulmonary angiogram (CTPA) or a ventilation perfusion scan (V/Q scan) to investigate this.

Currently, the Royal College of Obstetricians and Gynaecologists (RCOG) guidelines state that both a V/Q scan or CTPA can be performed if the chest x-ray is normal. The higher radiation dose of the CTPA compared to the V/Q scan led to the doctor's dilemma.

Our question:
Is lung scintigraphy better than a CTPA in diagnosing a pulmonary embolism in a pregnant woman?

P	Pregnant women
I	CT Pulmonary angiography
C	Lung scintigraphy
O	Diagnosing a pulmonary embolism



Databases used: Cochrane, PubMed.
Source of best evidence: *Imaging for the exclusion of pulmonary embolism in pregnancy.* van Mens, T., Scheres, L., de Jong, P., Leeflang, M., Nijkeuter, M. and Middeldorp, S. (2017). Cochrane Database of Systematic Reviews.
Validity of the source: This systematic review addressed the question we formed, and looked at both cohort and cross-sectional study designs. Many relevant studies were looked at, including various languages and both published and unpublished studies. However, the risk of bias was deemed high due to unclear blinding about which patient received which investigation.

Results:
The review had 11 studies in total (four CTPA, five lung scintigraphy, two both) with a total of 695 CTPA and 665 lung scintigraphy results.
The systematic review looked at the **medium negative predictive values** (NPV) and the **median sensitivity scorings** to determine the accuracy of the tests. They also included the studies which reported back as 'inconclusive', that is, did neither confirm nor deny the presence of a PE.
CTPA: Median NPV= **100%** (range 96-100%).
Median sensitivity= **83%** (range 0-100%)
Median of inconclusive test results= **5.9%** (range 0.9-36%)
Lung scintigraphy: Median NPV= **100%** (range 99-100%)
Median sensitivity= **100%** (range 0-100%)
Median inconclusive test results= **4%** (range 0-23%)

Discussion and take-home message:
From the results we can conclude that **both** CTPA and lung scintigraphy can be used for the exclusion of PE during pregnancy, with **lung scintigraphy having a higher sensitivity than CTPA so should be considered first.**

Application for the patient in question:
From the study we can conclude that **diagnostic testing should not be withheld from our pregnant patient** as the median NPVs and sensitivities were high, showing that they do correctly diagnose PEs. However, long term outcomes should have also been included in the study. In addition to this, other factors such as radiation exposure to mother and foetus, adverse events, patient burden, costs and availability should be considered.

References

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