

3.14 CTPA in Pregnancy: A Refresher on Risk Vs Reward

¹James A O'Regan, ¹Niamh Logan, ¹Patrick W O'Regan

¹Cork University Hospital, Cork, Ireland

Background: Acute pulmonary embolus(PE) is a rare cause of maternal morbidity and mortality with increased risk in the third trimester and post-partum period^{1,2}. Normal physiological sequelae of pregnancy can mimic the presentation of acute PE which can result in an uncertain clinical picture³. There is a low threshold to investigate and exclude PE in this patient cohort^{4,5}.

Methods: We present the current clinical information and guidance with regard to Computed Tomography Pulmonary Angiogram (CTPA) in pregnancy.

Results: Despite the use of risk calculators and D-dimer blood tests, a large proportion of these patients undergo ionising CTPA with the inevitable stochastic radiation risks⁶. Informed patient consent is of paramount importance in this regard.

The radiation dose delivered to the foetus in a CTPA is well below the accepted level for teratogenicity and death with the main concern being for a marginal increase in the risk of childhood malignancy⁷. Hormone induced increase in breast glandular activity results in increased radiosensitivity with increased risk of breast cancer, particularly younger patients⁸. The theoretical risk of hypothyroidism in neonates secondary to iodinated contrast have not been confirmed⁹.

Conclusion: CTPA is recommended in the correct clinical context as the benefit of correct diagnosis and avoiding unnecessary anticoagulation outweigh the risks of ionising radiation¹⁰.

Keywords: CTPA, Computed Tomography Pulmonary Angiogram, PE, Pulmonary Embolus, Risk

Disclosures: None

Funding: None

Conflicts of Interest: The authors declare that they have no conflict of interest.

Corresponding Author: James A O'Regan

References:

1. Wilkinson H, Trustees, Medical A. Saving mothers' lives. Reviewing maternal deaths to make motherhood safer: 2006-2008. *BJOG*. Oct 2011;118(11):1402-3; discussion 1403-4. doi:10.1111/j.1471-0528.2011.03097.x
2. Heit JA, Kobbervig CE, James AH, Petterson TM, Bailey KR, Melton LJ, 3rd. Trends in the incidence of venous thromboembolism during pregnancy or postpartum: a 30-year population-based study. *Ann Intern Med*. Nov 15 2005;143(10):697-706. doi:10.7326/0003-4819-143-10-200511150-00006
3. Chan WS, Ray JG, Murray S, Coady GE, Coates G, Ginsberg JS. Suspected pulmonary embolism in pregnancy: clinical presentation, results of lung scanning, and subsequent maternal and

- pediatric outcomes. *Arch Intern Med*. May 27 2002;162(10):1170-5. doi:10.1001/archinte.162.10.1170
4. Rutherford SE, Phelan JP. Deep venous thrombosis and pulmonary embolism in pregnancy. *Obstet Gynecol Clin North Am*. Jun 1991;18(2):345-70.
 5. Righini M, Robert-Ebadi H, Elias A, et al. Diagnosis of Pulmonary Embolism During Pregnancy: A Multicenter Prospective Management Outcome Study. *Ann Intern Med*. Dec 4 2018;169(11):766-773. doi:10.7326/M18-1670
 6. Bellesini M, Robert-Ebadi H, Combescure C, Dedionigi C, Le Gal G, Righini M. D-dimer to rule out venous thromboembolism during pregnancy: A systematic review and meta-analysis. *J Thromb Haemost*. Oct 2021;19(10):2454-2467. doi:10.1111/jth.15432
 7. Schembri GP, Miller AE, Smart R. Radiation dosimetry and safety issues in the investigation of pulmonary embolism. *Semin Nucl Med*. Nov 2010;40(6):442-54. doi:10.1053/j.semnuclmed.2010.07.007
 8. Ronckers CM, Erdmann CA, Land CE. Radiation and breast cancer: a review of current evidence. *Breast Cancer Res*. 2005;7(1):21-32. doi:10.1186/bcr970
 9. Bourjeily G, Chalhoub M, Phornphutkul C, Alleyne TC, Woodfield CA, Chen KK. Neonatal thyroid function: effect of a single exposure to iodinated contrast medium in utero. *Radiology*. Sep 2010;256(3):744-50. doi:10.1148/radiol.10100163
 10. Leung AN, Bull TM, Jaeschke R, et al. American Thoracic Society documents: an official American Thoracic Society/Society of Thoracic Radiology Clinical Practice Guideline--Evaluation of Suspected Pulmonary Embolism in Pregnancy. *Radiology*. Feb 2012;262(2):635-46. doi:10.1148/radiol.11114045