

What Role Do Decision Making Tools Play in the Investigation of Pulmonary Emboli?

An Audit into the Clinical Appropriateness of CT Pulmonary Angiogram Requests in the Investigation of Acute Pulmonary Emboli

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INTRODUCTION

- **Acute pulmonary embolism (PE)** is often inappropriately investigated due to the **non-specificity** of the presenting signs and symptoms¹⁻⁵.
- It is thought that PEs have a **10-30% mortality** if left **untreated**¹⁻⁵. However, inappropriate investigations to investigate these are often performed with **serious clinical, patient safety,** and **financial** considerations¹⁻⁵.
- With all this in mind, our **aims** were:
 1. To assess the clinical appropriateness of CT pulmonary angiogram (CTPA) requests in the investigation of acute PE, and;
 2. To review the impact of a digital clinical decision making tool on this

BACKGROUND

- Our study was based on audit standards suggested by the **National Institute for Health and Care Excellence (NICE)** guidelines based in the United Kingdom (UK)⁶.
- NICE provide guidance, advice and evidenced based information to clinicians in the UK to inform their clinical practice. These guidelines suggest that **all CTPA requests** for a PE should be **risk stratified** using a decision making tool (**Wells Criteria**) in the request⁶.
- Patients are then stratified into high and low risks groups based on their calculated Wells Score (**high: >4; low: <4**)⁶.
 - **Low risk** patients should then have a d-dimer blood test.
 - **All high risk** patients, or patients with a positive d-dimer should have a CTPA unless contraindicated.
 - **All patients with a Wells score of less than 4** (low risk) or **absent or negative** d-dimers should not have a CTPA.

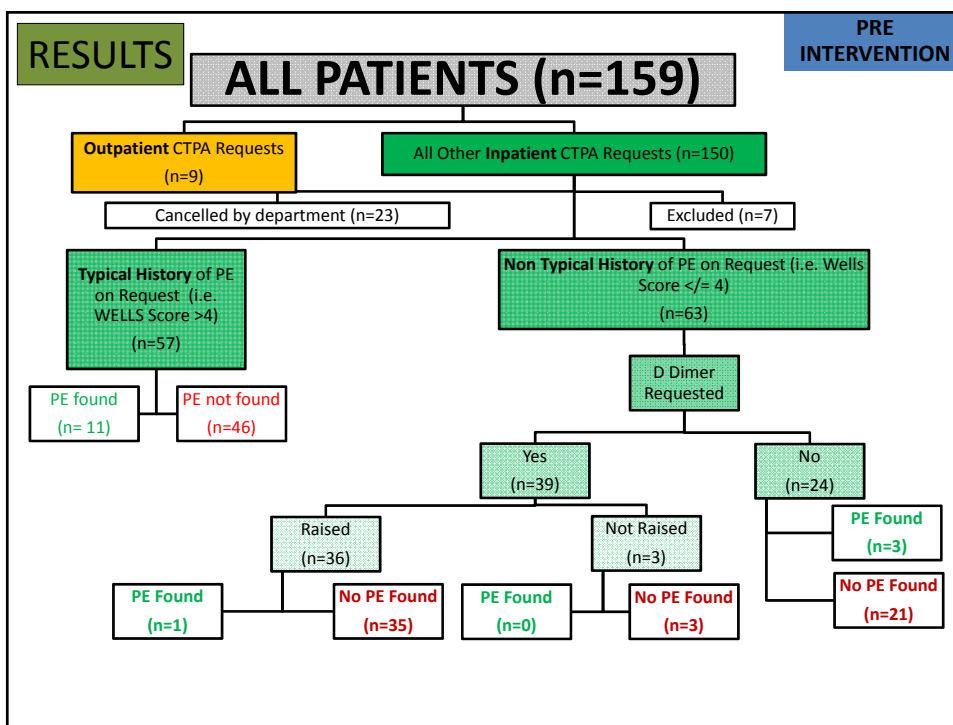
NICE GUIDELINES

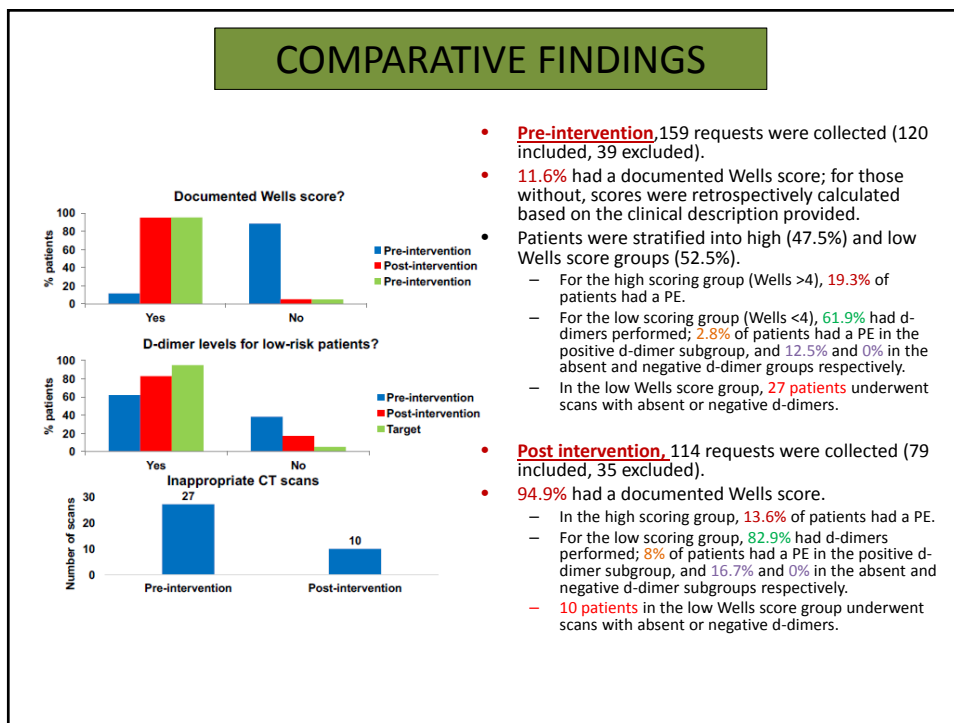
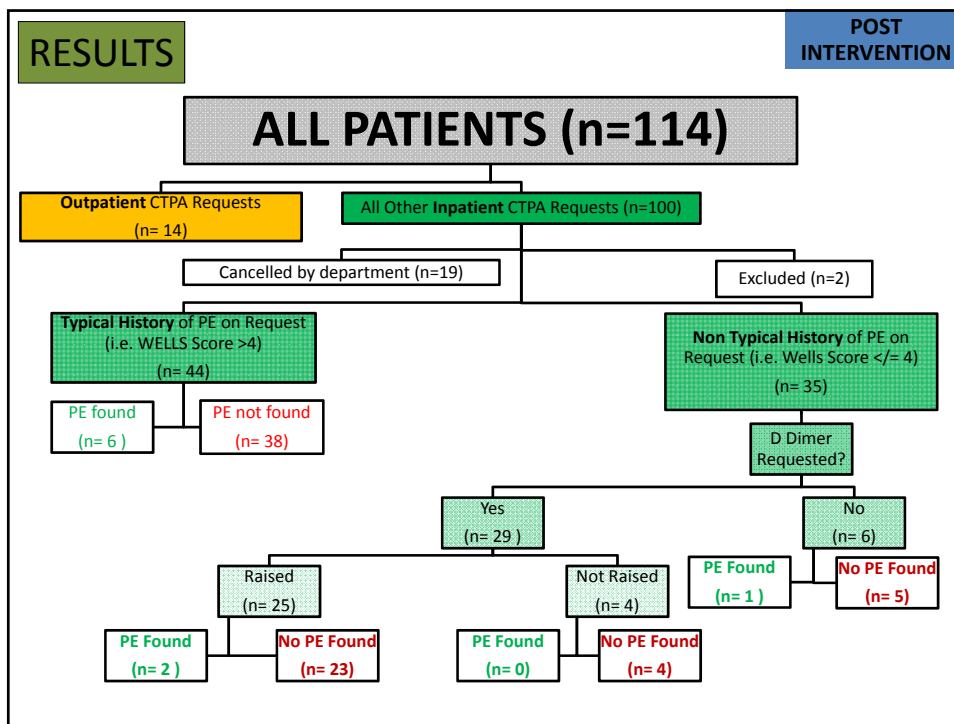


METHODS

- We conducted a **prospective study** looking at all the CTPA requests carried out at our **medium-sized, district general hospital** within two months, and collected data on **patient demographics, clinical details**, the use of a **pre-test probability** scoring (Wells score¹⁻⁵) and **d-dimer** levels.
- After **introducing a decision making tool** into the electronic request system at the hospital, we re-assessed the appropriateness of these requests.

Audit Standards and Current Practice		
Standards	Recommended ²	Current Practice (Pre Intervention)
All CTPA requests for PE should have a documented Wells score in the clinical details section.	>95%	11.67%
All high risk patients (Wells > 4 & Wells </=4 + positive D-dimer) should have a CTPA.	>95%	100%
All low risk patients (Wells </=4) should have D-dimer levels.	>95%	61.9%
No patient with Wells </=4 + negative/not requested D-dimer should have a CTPA.	0 scans	27 scans





CONCLUSIONS

- **Risk stratification** of suspected PE using the Wells criteria is **underutilised**.
- Use of a decision making tool is an evidence-based way to:
 - Ensure there is **increased documentation** of Wells scores for CTPA requests
 - Ensure there are **increased d-dimer tests** in low Wells score patients
 - **Reduce the number of inappropriate scans** when patients have a low Wells score or have absent or negative d-dimer tests
- Overall, integrated decision making tools **improve adherence to national guidelines**, potentially **reduce unnecessary patient radiation dose**, and help radiology departments **manage the high clinical demand** for scans.

References

1. Wells,P.S., Anderson,D.R., Rodger,M., et al. (2000) Derivation of a simple clinical model to categorize patients probability of pulmonary embolism: increasing the models utility with the SimpliRED D-dimer. *Thrombosis and Haemostasis*. **83**(3), 416-420.
2. Wells,P.S., Anderson,D.R., Rodger,M., et al. (2001) Excluding pulmonary embolism at the bedside without diagnostic imaging: management of patients with suspected pulmonary embolism presenting to the emergency department by using a simple clinical model and d-dimer. *Annals of Internal Medicine*. **135**(2), 98-107.
3. Wells,P.S., Ginsberg,J.S., Anderson,D.R., et al. (1998) Use of a clinical model for safe management of patients with suspected pulmonary embolism. *Annals of Internal Medicine*. **129**(12), 997-1005.
4. BTS (1997) Suspected acute pulmonary embolism: a practical approach. British Thoracic Society, Standards of Care Committee. *Thorax*. **52**(Suppl 4)
5. BTS (2003) British Thoracic Society guidelines for the management of suspected acute pulmonary embolism. *Thorax*. **58**(6), 470-483.
6. NICE Management of Pulmonary Embolism <https://cks.nice.org.uk/pulmonary-embolism> (accessed 19/10/2018)