Experience in the use of ACR Appropriateness Criteria for pulmonary embolism CT utilization by the Emergency Room in a community teaching hospital

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Disclosure

None
Purpose

Providing evidence-based guidelines to collaborate with the ER physicians to guide appropriate imaging for patients with suspected PE.
Materials/Methods

The guidelines are based on American College of Radiology Appropriateness criteria, and American College of Emergency Physicians Choosing Wisely Initiative point 7.

We utilized evidence-based ACR appropriateness criteria to evaluate the rate of appropriate vs inappropriate exams being ordered for CT Chest Pulmonary Embolism protocol study.

The data presented to the ER physicians as an educational format.
Materials/Methods

- A retrospective study was performed which included a total 110 consecutive CT chest pulmonary protocol studies ordered by the ER between 6/1/2015 and 8/6/2015 at Saint Vincent Hospital.

- Medical records were reviewed with special attention to the clinical presentation, suspicion of PE, D-dimer testing, and differential diagnosis documented.

- Modified Wells score for pulmonary embolism used to evaluate each case.
According to ACR appropriateness criteria:

1) CT chest PE protocol is given 9 points (usually appropriate) with high clinical suspicion of PE (Wells score >4) or with positive D-dimer even with low clinical suspicion of PE (Wells ≤ 4).

2) CT chest PE protocol is given 3 points (usually NOT appropriate) with low clinical suspicion (Wells ≤ 4).

3) CT chest PE protocol is given 1 point (usually NOT appropriate) with low clinical suspicion (Wells ≤ 4) and negative D-dimer.
Total of 110 PE CT chest studies reviewed.

Clinical suspicion for PE was appropriately documented in 59 cases (54%, considered appropriate)

No appropriate differential diagnosis with clinical suspicion for PE documented in 34 cases (31%), however benefit of doubt provided that PE is being considered by chart data.
Results

There was no clinical suspicion for PE in the differential diagnosis in 17 cases (15% considered inappropriate).

19 cases with low clinical suspicion who should have had a D-dimer, however it was not performed. These represent 17% of potentially avoidable studies.
Results

D-dimer was positive in 44 cases (40 %), negative in 16 cases (15%), and not performed in 50 cases (45%).

Cases with positive D-dimer (40%) are considered appropriate regardless of the clinical suspicion, which was not always clear.

Cases with negative D-dimer and low suspicion are considered not appropriate.

Out of the 50 cases with no D-dimer, 31 cases have appropriate clinical suspicion documented.
Clinical suspicion for PE appropriately documented

- No clinical suspicion of PE
- No appropriate differential diagnosis or suspicion for PE (benefit of doubt given that PE is considered)

- Wells score >4
- Wells score ≤4
- D-dimer not performed
- D-dimer performed
Clinical suspicion of PE
Wells score >4

Wells score ≤4
Positive D-dimer

No appropriate DD or suspicion of PE documented
Wells score >4

Wells score ≤4
D-dimer not performed

No clinical suspicion of PE
Wells score ≤4
Negative D-dimer

Appropriate

Not appropriate
Conclusion

Based on ACR appropriateness criteria and ACEP Choose Wisely Initiative, a simplified algorithm was proposed to assist ER physician in ordering appropriate studies in patients with suspected pulmonary embolism with multiple areas of potential improvement in the existing practice, including:

1) Proper documentation of clinical suspicion of PE and alternative diagnoses.

2) Emphasizing the use of scoring criteria (Wells score) to guide appropriate imaging ordering.
3) Using D dimer to help guiding appropriate imaging ordering, especially in patients with low Wells score \( \leq 4 \).

4) Encouraging the use of alternative imaging such as CT chest without contrast, or contrast enhanced CT chest, particularly when alternative diagnosis is a consideration.
Signs and Symptoms suggestive of PE

Document the Clinical Suspicion of PE

List Alternative Diagnosis if applicable

Modified Wells (Please document in the patient’s chart)

MW ≤ 4

- D dimer
  - Negative
    - Consider alternative diagnosis & imaging (C-/C+ CT Chest)
  - Positive

MW > 4

- CT PE Protocol
  - Negative
    - Stop
  - Positive
    - Risk Evaluation