Different D-dimer algorithms to rule out pulmonary embolism in patients with cancer: a comparative study

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Topic(s):
Pulmonary Embolism (PE)

Background: Pulmonary embolism (PE) is more prevalent in patients with cancer. D-dimers are a less useful test in such patients due to less specificity. Several algorithms have been developed as an alternative to the fixed d-dimer cutoff, aiming to avoid the excessive use of computed tomography pulmonary angiography (CTPA), but it is not clear which is the most accurate algorithm in PE patients with cancer.

Objective: To compare the efficacy of 4 algorithms to rule out pulmonary embolism (fixed Ddimer cutoff, age-adjusted, YEARS and PEGed) in patients with active cancer.

Methods: Retrospective study of consecutive outpatients who presented to the emergency department and underwent CTPA for PE suspicion from April 2019 to February 2020. The clinical-decision algorithms were retrospectively applied. In fixed and age-adjusted cutoffs, high probability patients are directly selected for CTPA and the others perform CTPA if DDimer ≥500µg/L or age x10 µg/L within patients over 50 years, respectively. YEARS includes 3 items (signs of deep vein thrombosis, haemoptysis and whether PE is the most likely diagnosis): patients without any YEARS items and Ddimer ≥1000ng/mL or with ≥1 items and Ddimer 500ng/mL perform CTPA. In the PEGed, patients with high clinical probability or with intermediate and Ddimer >500µg/L or low probability and Ddimer >1000 µg/L are selected for CTPA.

Results: Of 409 patients with suspected PE, 87 patients (21.3%) had cancer. The prevalence of PE was 38% in cancer patients and 35% in patients without cancer (p>0.05). Age-adjusted cut-off, compared to the conventional cutoff, had an AUC significantly higher (0.68 vs 0.61, p=0.005). Despite both having 100% sensitivity, age-adjusted cutoff had a significantly higher specificity compared to conventional cut-off (44% vs 35%, p<0.05). Both YEARS and PEGEd algorithms had significantly lower sensitivity (p=0.003 and p=0.002, respectively) and higher specificity (p<0.001, for both) compared to conventional cutoff in patients with active cancer. The AUC of these two algorithms was not significantly different compared to conventional cutoff (p=0.08 and p=0.78, respectively).

Conclusion: Considering our results, age-adjusted cut-off seems to be the most accurate algorithm to rule out pulmonary embolism in active cancer patients.

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<tr>
<td>Conventional</td>
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<tr>
<td>Age-adjusted</td>
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<tr>
<td>YEARS</td>
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<td>44</td>
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<td>PEGED</td>
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