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Extracardiac Findings

Wells and Geneva decision rules to predict pulmonary embolism: can we use them in Covid-19 patients?

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Introduction: Pulmonary embolism (PE) is a recognized complication of SARS-COV2 infection due to hypercoagulability. Before the COVID era, the need for computed tomography pulmonary angiography (CTPA) to rule out PE was determined by clinical probability, based on Wells and Geneva scores, in association with D-dimer measurements. However, patients with SARS-COV2 infection have a pro-thrombotic and pro-inflammatory state which may compromise the usefulness of these algorithms to select patients for CTPA.

Purpose: To evaluate the accuracy of the Wells and Geneva scores to predict PE in patients with SARS-COV2 infection.

Methods: Retrospective study of consecutive outpatients with SARS-COV2 infection proved by positive PCR who underwent CTPA due to suspected PE. The Wells and Geneva scores were calculated and the area under the curve (AUC) of the receiver operating characteristic curve was measured.

Results: We enrolled 235 patients (61% males, mean age 69.10 ± 16.69 years) and the incidence of pulmonary embolism was 15% (35 patients). In patients with PE, emboli were located mainly in segmental arteries (60%) and bilaterally (46%). Patients with PE were older (mean age 75.06 ± 2.23 vs. 68.06 ± 1.21 years, $p = 0.022$), and did not differ in sex or risk factors for thromboembolic diseases from the non-PE group. Patients with PE had higher D-dimer levels (median 15.41 mg/dl, IQR 1.17 – 20.00) compared to patients without PE (median 5.99 mg/dl, IQR 0.47 – 2.82, $p < 0.001$).

There was no statically significant difference between the average Wells score in patients with PE and without PE (1.04 and 0.89 respectively, $p = 0.733$) and the AUC demonstrated that the Wells score had no discriminatory power (AUC = 0.52). Within patients with PE, 19 patients had a Wells score of zero. Regarding the Geneva score, there was also no difference between the average score in patients with and without PE (4.20 vs 3.93 respectively, $p = 0.420$). AUC for Geneva score was 0.54.

Clinical probability combined with D-dimer measurement had a 100% sensitivity for both Wells and Geneva scores, but a specificity of 10% and 11%, respectively.

Conclusion: PE diagnosis may be challenging in patients with SARS-COV2 infection since both conditions may have similar signs and symptoms and may be associated with increased D-dimers. According to our results, traditional clinical prediction scores have little discriminatory power in these patients and a higher D-dimer cut-off should be considered to better select patients for CTPA to minimize radiation exposure and contrast-related complications in COVID-19 patients.