






COVID-19: chest X-rays to predict clinical outcomes

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The pandemic caused by the viral agent SARS-CoV-2 has pushed health care systems to the limit worldwide, making their management and even resource rationing the cornerstone in the management of the crisis.⁽¹⁾ Although most patients are asymptomatic or oligosymptomatic, a fraction of those will require hospitalization due to systemic repercussions or respiratory symptoms, and some of those will present with rapid clinical worsening, requiring invasive ventilation and treatment in the ICU.⁽²⁾ The search for biomarkers that help predict severe outcomes is therefore valuable.

In this issue of the *Jornal Brasileiro de Pneumologia*, Baratella et al.⁽³⁾ present an interesting retrospective study that aims to evaluate the potential of a simple semiquantitative visual score based on chest X-rays (CXR), as well as of clinical and laboratory parameters, for the prediction of severe outcomes (need for noninvasive ventilation, need for intubation, or death) in patients with COVID-19. The data presented in that study show a possible role of CXR in helping stratify the risk of evolution to severe disease, corroborating data from previous studies in the literature.^(4,5) In the study by Baratella et al.,⁽³⁾ the absence of a severe outcome was significantly associated with a lower proportion of patients with high scores on baseline CXR, and patients with normal baseline CXR results required no noninvasive ventilation or intubation, nor did they die.

Other studies have evaluated the potential of simple CXR scores alone or in association with other clinical and laboratory parameters to predict the outcome in COVID-19. CXR was tested as a prognostic predictor in adults and middle-aged patients by Toussie et al.,⁽⁴⁾ and their score was useful in predicting hospital admission after adjusting for demographic factors and comorbidities, and it was also an independent predictor of intubation in hospitalized patients. Schalekamp et al.⁽²⁾ developed a model for prediction of severity involving clinical and laboratory parameters and a semiquantitative score; higher scores were associated with critical outcomes. In addition, the authors showed that the distribution of the findings might be associated with a worse prognosis; patients with predominantly central or diffuse involvement, as well as those with bilateral pulmonary involvement, were more likely to present with critical outcomes than were those with peripheral distribution or unilateral involvement.⁽²⁾ Another risk calculator using multiple clinical and laboratory parameters was able to predict severe outcomes, the presence or absence of abnormalities on CXR being considered one of the parameters.⁽⁵⁾ Similarly,

other studies have shown the potential for quantifying pulmonary involvement on CXR in order to predict the risk of complications in patients with COVID-19.⁽⁶⁾

The use of automated tools using artificial intelligence algorithms is also noteworthy, showing satisfactory agreement between the evaluation of radiologists and of deep learning-based artificial intelligence regarding opacities and disease extension on CXR.⁽⁷⁾

Although evolution of COVID-19 is variable, the imaging aspects follow a relatively similar timeframe that has already been described for both CXR and chest CT. On CXR, findings peak 10-12 days after the onset of symptoms.⁽⁸⁾ Patients who sought medical attention later after the onset of symptoms had higher CXR scores in the study by Toussie et al.⁽⁴⁾ For the purpose of clinical application of those risk prediction scores, it would be interesting to adjust the CXR scores to the onset of symptoms in order to standardize the date of CXR acquisition.

A potential disadvantage of the radiographic method would be its low sensitivity for detecting mild or early-stage disease, as well as its lower capacity to define some differential diagnoses, such as pulmonary thromboembolism, when compared with chest CT. However, issues such as cost, accessibility, less exposure to radiation, practicality in reading/applying semiquantitative scores, biosafety (such as greater practicality in disinfecting surfaces), mobility (enabling studies to be carried out at the bedside), and facilitation of performing sequential studies make the inclusion of this method valuable in such risk prediction scores.⁽⁹⁾

The use of imaging methods for COVID-19 screening has been discouraged in most clinical settings; it has generally been reserved for individuals with risk factors and probable disease progression or for those with worsening of symptoms. In those cases, such methods can be used in order to assess aspects such as extension of disease and differential diagnosis.⁽⁹⁾ A recent consensus of the Fleischner society regarding imaging studies considered the use of CXR or chest CT in COVID-19 patients, making it clear that, when these studies are indicated, the decision on the method to be used ultimately depends on its availability, local resources, and expertise of professionals.⁽⁹⁾ CXR has been recommended as an initial method for evaluating patients in the ER and inpatients.⁽¹⁰⁻¹²⁾

The study by Baratella et al.⁽³⁾ gives a different perspective on the role of imaging methods in the screening and diagnosis of COVID-19, focusing on the screening of patients

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that can potentially present with complications. Although questions about how and which imaging methods can assist in the diagnosis and monitoring of the evolution of COVID-19 patients have yet to be answered (taking into consideration issues of accuracy, availability of resources, and regional policies), the study by Baratella et al.⁽³⁾ adds evidence to the fact that CXR, alone or as a part of clinical and laboratory multiparametric scores, can assist in risk stratification for predicting severe outcomes in the initial assessment of patients with COVID-19, with consequent implications for the management of clinical care, beds, and resources.^(2,4,5)

AUTHOR CONTRIBUTIONS

PPTST, KLI and EM: conception and planning of the study; interpretation of evidence; drafting and revision of preliminary and final versions; and approval of the final version.

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