TITLE: Higher accuracy of lung ultrasound over chest X-ray for early COVID-19 diagnosis

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Abstract

Background: The COVID-19 pandemic rapidly strained healthcare systems worldwide. The reference standard for diagnosis is a positive reverse transcription polymerase chain reaction (RT-PCR) test, but results are not immediate, and sensibility is variable.
Aim: To evaluate the diagnostic accuracy of lung ultrasound compared to chest X-ray for COVID-19.
Design and Setting: A retrospective analysis of symptomatic patients admitted into one primary care centre in Spain between March and September 2020.
Method: Patients' chest X-rays and lung ultrasounds were categorised as normal or pathologic. RT-PCR confirmed COVID-19 infection. Pathologic lung ultrasound images were further categorised as showing either local or diffuse interstitial disease. McNemar and Fisher tests were used to compare diagnostic accuracy.
Results: Most of the 212 patients presented fever at admission, either as a standalone symptom (37.74% of patients) or together with others (72.17% of patients). The positive predictive value of lung ultrasound was 90% for diffuse interstitial pattern and 46.92% for local pattern. Lung ultrasound had a significantly higher sensitivity (82.75%) (P<0.001), but lower specificity (71%) than chest X-ray (54.02% and 86%, respectively) (P=0.008) for identifying interstitial lung disease. Moreover, the sensitivity of lung ultrasound for severe interstitial disease was 100%, and was significantly higher than chest X-ray (58.33%) (P=0.002).
Conclusion: Lung ultrasound is more accurate than chest X-ray for identifying patients infected with COVID-19 and it is especially useful for those presenting diffuse interstitial disease.

Keywords: general practice, lung ultrasonography, thoracic radiography, COVID-19