Radiology



# Vaccination and Reduced Severity of COVID-19 Pneumonia Visualized with Chest Radiography

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Andrea Borghesi[1] (MD), Roberto Maroldi[1] (MD)

[1] *Department of Medical and Surgical Specialties, Radiological Sciences and Public Health, University of Brescia, ASST Spedali Civili of Brescia, Piazzale Spedali Civili, 1, I - 25123 Brescia, Italy*

**Name and street address of institutions from which the work originated:** *University of Brescia and ASST Spedali Civili of Brescia, Piazzale Spedali Civili, 1, I - 25123 Brescia, Italy*

**Corresponding author:** Andrea Borghesi, MD; e-mail: andrea.borghesi@unibs.it

**ORCID:** Andrea Borghesi → 0000-0002-4761-2923

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**List of abbreviations**

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| COVID-19 | Coronavirus disease |
| CXR | Chest X-ray |

Editor:

We read with great interest the article by Dr. Lee and colleagues published online in *Radiology* on February 1, 2022 (1). In their large cohort of 716 hospitalized patients with coronavirus disease (COVID-19), vaccinated patients exhibited fewer chest computed tomography findings of COVID-19 pneumonia than unvaccinated patients. Additionally, the need for ventilatory support and the frequency of intensive care unit admission were significantly lower in the vaccinated group than in the unvaccinated group (1).

In a similar vein, we reviewed our own data on the impact of vaccination on COVID-19 pneumonia severity in our hospital, which is in the eastern part of Lombardy, Italy. Our hospital was one of the hot spots of the COVID-19 pandemic in Italy. We selected chest X-rays (CXRs) performed in our emergency room between November 2021 and February 2022 only on COVID-19 patients with respiratory symptoms for whom information on COVID-19 vaccination status was available. We considered both hospitalized and discharged patients. Patients who had not completed their vaccination course or previously had COVID-19 were excluded. We ranked the disease severity using a dedicated CXR scoring system (*Brixia* score) for patients with COVID-19 (2-5). To analyze differences between the vaccinated and unvaccinated groups, baseline characteristics (patients' age and gender) and *Brixia* scores were compared using Mann-Whitney *U* test and chi-square test. Notification of this retrospective analysis was presented to our local ethics committee.

Of 205 patients who had CXR performed in our emergency room, there were 109 who were vaccinated, 96 who were unvaccinated. Age and gender were similar in the two groups (p=.50). The *Brixia* score was higher in the unvaccinated group (median, 5; interquartile range, 3-7) than in the vaccinated group (median, 1; interquartile range, 0-6) (p<0.001). The percentage of CXRs *without* lung abnormalities was higher in the vaccinated group (36%) than in the unvaccinated group (13%) (p<0.001).

The data presented by Lee et al. and our own preliminary data are concurrent: both highlight the crucial role of COVID-19 vaccination to overcome this new disease – providing imaging evidence of vaccine efficacy and providing hope for a gradual return to normalcy.

**REFERENCES**


1. Lee JE, Hwang M, Kim YH, Chung M, Sim B, Chae KJ, Yoo JY, Jeong YJ. Imaging and Clinical Features of COVID-19 Breakthrough Infections: A Multicenter Study. Radiology. 2022 Feb 1:213072. doi: 10.1148/radiol.213072. Published February 1, 2022. Accessed February 5, 2022.
2. Borghesi A, Maroldi R. COVID-19 outbreak in Italy: experimental chest X-ray scoring system for quantifying and monitoring disease progression. Radiol Med. 2020 May;125(5):509-513. doi: 10.1007/s11547-020-01200-3.
3. Borghesi A, Zigliani A, Golemi S, Carapella N, Maculotti P, Farina D, Maroldi R. Chest X-ray severity index as a predictor of in-hospital mortality in coronavirus disease 2019: A study of 302 patients from Italy. Int J Infect Dis. 2020 Jul;96:291-293. doi: 10.1016/j.ijid.2020.05.021.
4. Au-Yong I, Higashi Y, Giannotti E, Fogarty A, Morling JR, Grainge M, Race A, Juurlink I, Simmonds M, Briggs S, Cruikshank S, Hammond-Pears S, West J, Crooks CJ, Card T. Chest Radiograph Scoring Alone or Combined with Other Risk Scores for Predicting Outcomes in COVID-19. Radiology. 2022 Feb;302(2):460-469. doi: 10.1148/radiol.2021210986.
5. Little BP. Disease Severity Scoring for COVID-19: A Welcome Semiquantitative Role for Chest Radiography. Radiology. 2022 Feb;302(2):470-472. doi: 10.1148/radiol.2021212212.