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Mediastinal lymphadenopathy: A serious complication in COVID-19 patients

Dear Editor,

The coronavirus disease 2019 (COVID-19) pandemic is still a major public health concern that poses a significant risk to the entire world. COVID-19 can cause a variety of clinical symptoms, ranging from asymptomatic infection to moderate and severe pneumonia, or infiltration of several organs and structures. The presence of comorbidities, high C-reactive protein levels (CRP), and high pneumonia severity index (PSI) scores are all well-known markers of poor prognosis [1]. Age and comorbidities such as diabetes, hypertension, cardiovascular disease, chronic renal disease, chronic lung disease, cancer, smoking, and obesity are the most significant risk factors for COVID-19 pathogenicity [2]. Although pulmonary manifestation is common and increases quickly, other organ failures such as gastrointestinal, cardiac, or neurological system dysfunction can also occur. COVID-19 individuals are characterized by chest CT scan abnormalities such as bilateral, multi-lobar ground-glass opacity with a lateral or posterior distribution (or both), notably in the lower lobes [3]. One of the significant CT findings is mediastinal lymphadenopathy which can be also caused by malignant or benign disorders. Mediastinal lymphadenopathy is described as mediastinal lymph node enlargement with a short-axis diameter of 10 mm [4]. In a study by Pilechian et al. the prevalence of mediastinal lymphadenopathy in COVID-19 disease was 17.4%, while gender and comorbidities such as diabetes, hypertension, and cardiovascular disease were not associated with mediastinal lymphadenopathy. They also found significant differences in oxygen saturation, length of hospital stays, invasive ventilation, ICU admission during hospitalization, disease progression, and COVID-19 severity between people with and without lymphadenopathies [5]. Sardanelli et al. reported that mediastinal lymphadenopathy was more prevalent in individuals who died during the hospital stay and in those with consolidation and crazy paving patterns on radiological findings [6]. According to research conducted by Bao and Wynants, the prevalence of mediastinal lymphadenopathy (LAP) in patients with COVID-19 varies from 3.4% to 5.4% [7,8]. However, the study conducted by Valette et al. reported that mediastinal lymphadenopathy frequency in individuals with severe COVID-19 has increased dramatically to 66%, particularly affecting the subcarinal station, in 9 of 15 COVID-19 patients hospitalized in the Intensive Care Unit (ICU) [9]. In a study conducted on 650 patients, mediastinal lymphadenopathy indicated a higher inflammatory response in COVID-19 patient populations and predicted 30-day mortality [10].

Using immunofluorescent labeling and electron imaging it has been suggested that SARS-CoV-2 directly infects macrophages in Lymph nodes and spleen from six autopsies [11]. Microscopic examination revealed lymph node vascular dilatation and congestion, as well as a lack of corticomedullary differentiation. There was localized necrosis and lymphocyte apoptosis in lymph nodes. The germinal centers and marginal sinus vanished in some lymph nodes, and the remaining lymphatic sinus was filled with monocytes and plasmacytoid monocytes [12]. Laboratory testing revealed that the COVID patients with the lymphadenopathy had a considerably lower absolute lymphocyte count, higher ESR values, and a higher Neutrophil-to-Lymphocyte Ratio [5]. Extrapulmonary spread and direct SARS-CoV-2 particle effect on mediastinal lymph node tissues may produce lymphopenia in COVID-19 patients. In most cases, mediastinal lymphadenopathy suggests a lung issue. One of the causes of mediastinal lymphadenopathy is leukemia. Other causes include Lung cancer, Sarcoidosis, and Anthracosis, also known as Miner's lung in which there is a lung ailment caused by the carbon buildup in the lungs as a result of frequent exposure to air pollution or inhalation of smoke or coal dust particles. Cystic fibrosis a hereditary condition, Infection with histoplasmosis, Chronic Obstructive Pulmonary Disease, and Coccidioidomycosis all have a role in the disease's etiology [13]. According to a case report by Trikannad A et al., there is also a risk of mediastinal lymphadenopathy following the COVID-19 vaccination [14]. There are no special precautions for the therapy of mediastinal lymphadenopathy in COVID-19 patients; nevertheless, imaging modalities on the chest of critically ill COVID-19 patients should be performed for the identification of lymphadenopathy and severe spreading chest infection. Although the COVID-19 pandemic is currently under control, preventative measures must be maintained in order to exclude consequences such as mediastinal lymphadenopathy and disease transmission.

In light of these aforementioned studies, it is important to perform large-scale research in order to establish a stronger relationship between mediastinal lymphadenopathy and COVID 19's disease course. Furthermore, there is limited literature on the COVID-19 vaccine's effect on mediastinal lymphadenopathy which is yet another reason why authors feel the need for an extended discussion on this topic globally.

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Abbreviations: COVID-19, coronavirus disease 2019; CRP, C-reactive protein levels; LAP, mediastinal lymphadenopathy; ICU, Intensive Care Unit; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; ESR, erythrocyte sedimentation rate; CT, computed tomography scan.

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Consent

NA.

Ethics statement

The present study includes printed and published information; therefore, the formal ethical clearance was not applicable for this study.

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Declaration of competing interest

The authors declare that there is no conflict of interest.

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References

[1] Y. Shang, T. Liu, Y. Wei, J. Li, L. Shao, M. Liu, Y. Zhang, Z. Zhao, H. Xu, Z. Peng, F. Zhou, X. Wang, Scoring systems for predicting mortality for severe patients with COVID-19, EClinicalMedicine 24 (2020), 100426, https://doi.org/10.1016/J.ECLINM.2020.100426.

[2] J.E. Rod, O. Oviedo-Trespalacios, J. Cortes-Ramirez, A brief-review of the risk factors for covid-19 severity, Revista de Saúde Pública 54 (2020), https://doi.org/10.11606/S1518-8787.2020054002481.

[3] S. Salehi, A. Abedi, S. Balakrishnan, A. Gholamrezanezhad, Coronavirus disease 2019 (COVID-19): a systematic review of imaging findings in 919 patients, AJR Am J Roentgenol 215 (2020) 87–93, https://doi.org/10.2214/AJR.20.23034.

[4] R.F. Munden, B.W. Carter, C. Chiles, H. MacMahon, W.C. Black, J.P. Ko, H. P. McAdams, S.E. Rossi, A.N. Leung, P.M. Boiselle, M.S. Kent, K. Brown, D.S. Dyer, T.E. Hartman, E.M. Goodman, D.P. Naidich, E.A. Kazerooni, L.L. Berland, P. v. Pandharipande, Managing incidental findings on thoracic CT: mediastinal and cardiovascular findings. A white paper of the ACR incidental findings committee, J Am Coll Radiol 15 (2018) 1087–1096, https://doi.org/10.1016/J.JACR.2018.04.029.

[5] S. Pilechian, A. Pirsalehi, A. Arabkoohi, Mediastinal lymphadenopathy and prognosis of COVID-19 disease, Iranian Journal of Microbiology 13 (2021) 495, https://doi.org/10.18502/IJM.V13I4.6974.

[6] F. Sardanelli, A. Cozzi, L. Monfardini, C. Bnà, R.A. Foà, A. Spinazzola, S. Tresoldi, M. Cariati, F. Secchi, S. Schiaffino, Association of mediastinal lymphadenopathy with COVID-19 prognosis, The Lancet Infectious Diseases 20 (2020) 1230–1231, https://doi.org/10.1016/S1473-3099(20)30521-1/ATTACHMENT/C300614C-9689-4C90-A0E1-A3615E175E28/MMC1.PDF.

[7] C. Bao, X. Liu, H. Zhang, Y. Li, J. Liu, Coronavirus disease 2019 (COVID-19) CT findings: a systematic review and meta-analysis, Journal of the American College of Radiology 17 (2020) 701, https://doi.org/10.1016/J.JACR.2020.03.006.

[8] L. Wynants, B. van Calster, G.S. Collins, R.D. Riley, G. Heinze, E. Schuit, M.M. J. Bonten, J.A.A. Damen, T.P.A. Debray, M. de Vos, P. Dhiman, M.C. Haller, M. O. Harhay, L. Henckaerts, N. Kreuzberger, A. Lohmann, K. Luijken, J. Ma, C. L. Andaur Navarro, J.B. Reitsma, J.C. Sergeant, C. Shi, N. Skoetz, L.J.M. Smits, K.I. E. Snell, M. Sperrin, R. Spijker, E.W. Steyerberg, T. Takada, S.M.J. van Kuijk, F. S. van Royen, C. Wallisch, L. Hooft, K.G.M. Moons, M. van Smeden, Prediction models for diagnosis and prognosis of covid-19: systematic review and critical appraisal, The BMJ 369 (2020), https://doi.org/10.1136/BMJ.M1328.

[9] X. Valette, D. du Cheyron, S. Goursaud, Mediastinal lymphadenopathy in patients with severe COVID-19, the Lancet, Infectious Diseases 20 (2020) 1230, https://doi.org/10.1016/S1473-3099(20)30310-8.

[10] C. Satici, F. Cengel, O. Gurkan, M.A. Demirkol, E.S. Altunok, S.N. Esatoglu, Mediastinal lymphadenopathy may predict 30-day mortality in patients with COVID-19, Clinical Imaging 75 (2021) 119, https://doi.org/10.1016/J.CLINIMAG.2021.01.028.

[11] Z. Feng, B. Diao, R. Wang, G. Wang, C. Wang, Y. Tan, L. Liu, C. Wang, Y. Liu, Y. Liu, Z. Yuan, L. Ren, Y. Wu, Y. Chen, The novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) directly decimates human spleens and lymph nodes, MedRxiv (2020) 2020, https://doi.org/10.1101/2020.03.27.20045427, 03.27.20045427.

[12] Y. Ding, H. Wang, H. Shen, Z. Li, J. Geng, H. Han, J. Cai, X. Li, W. Kang, D. Weng, Y. Lu, D. Wu, L. He, K. Yao, The clinical pathology of severe acute respiratory syndrome (SARS): a report from China, The Journal of Pathology 200 (2003) 282, https://doi.org/10.1002/PATH.1440.

[13] Can COVID-19 Cause Mediastinal Lymphadenopathy?, June 13, 2022 n.d.), https://www.medicinenet.com/can_covid-19_cause_mediastinal_lymphadenopathy/article.htm.

[14] A. Trikannad, S. Vellanki, G. Kunapareddy, Mediastinal lymphadenopathy after COVID-19 vaccine: staging dilemma in oncology patients, Chest 160 (2021), A1460, https://doi.org/10.1016/J.CHEST.2021.07.1337.

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