Case Report

ISSN: 1735-0344 *Tanaffos 2023; 22(2): 272-275*

TANAFFOS

Misdiagnosed Pneumocystis Pneumonia as COVID-19: A Case Report

Fahimeh Hadavand [1,2], Simin Dokht Shoaei [1,2], Amir Behnam Kharazmi [2]

[1] Infectious Diseases and Tropical Medicine Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran, [2] Clinical Research and Development Center, Imam Hossein Teaching and Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Received: 15 May 2022
Accepted: 1 January 2023

Correspondence to: Shoaei SD
Address: Clinical Research and Development Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
Email address: Drshoaei@sbmu.ac.ir

Nonspecific clinical features and imaging findings of COVID-19 may lead to misdiagnosis with other diseases that have specific risks and treatments. Here a patient is reported with Pneumocystis Pneumonia with an undiagnosed HIV disease who was treated for COVID-19 with no response after one week. COVID-19 was diagnosed by CT findings but PCR was negative. Further evaluation for ground glass opacities confirmed AIDS and clinical response to Pneumocystis Pneumonia treatment.

Keywords: SARS-CoV-2; Chest CT Scan; *Pneumocystis jirovecii*

INTRODUCTION

The new coronavirus was identified in December 2019 in Wuhan city, China; and subsequently named the Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2). SARS-CoV-2 disease (COVID-19) has caused 5,400,000 deaths worldwide by 31 December 2021 (1). COVID-19 presents with nonspecific symptoms such as fever, sore throat, fatigue, anosmia, cough, shortness of breath, abdominal pain, and myalgias (2). Diagnosis is confirmed by nasopharyngeal swabs and real time reverse-transcription polymerase chain reaction (RT-PCR) which takes time. Chest computed tomography (CT) accelerates diagnosis with findings such as ground glass opacities (GGO) with a peripheral and/or posterior distribution and mainly in the lower lobes, variable infiltrates, and consolidations; Less common are pleural and pericardial effusions, lymphadenopathy, cavitation, and halo sign in CT scan (3).

Clinical symptoms and chest CT-findings are nonspecific which can cause misdiagnosis. In nasopharyngeal swab PCR-negative patients, the GGO pattern of lung CT scan is the basis of disease documentation which has other differential diagnoses; thus, physicians should be aware. This pattern can be seen in many other pathologies including infections (bacterial, viral, and fungal), interstitial lung diseases, organizing pneumonia, exposures, drug toxicity with a growing list of drugs, and miscellaneous (pulmonary edema, aspiration pneumonia, diffuse alveolar hemorrhage, pulmonary alveolar proteinosis, and eosinophilic pneumonia) (4).

The imaging appearance and differentiating features of interstitial lung disease should be considered with the clinical course of the disease and other paraclinical

findings (5). Some fungal and viral diseases can be cured with special drug when it is diagnosed correctly (6). In this case report, a patient with pneumocystis pneumonia was misdiagnosed with COVID-19 due to being unaware of his HIV-positive status and focusing on the pandemic.

CASE SUMMARIES

In September 2020, a 62-year-old man presented to the emergency clinic with complaints of fever, productive cough, and dyspnea on exertion from 10 days ago. He had chills, weakness, malaise, generalized myalgia, and diarrhea. There was no similar disease in family members. He had hypertension controlled with Losartan and was a smoker with 40 packs/year. He was ill, conscious, and co-operate.

On examination, he was an old male with moderate respiratory distress. His blood pressure was 125/95 mmHg, his pulse was 100 beats/min, respiratory rate was 28 breaths/min, and OT was 37.3°C. His oxygen saturation was consistent at 89% on room air increasing to 92% with 5-7Lit/min O_2 with a face mask. His weight was 75kg. The skin was normal. Chest expansion was symmetric and normal. On auscultation, normal vesicular breathing was heard with decreased sounds in the left lung. He had a normal abdominal exam and normal force of extremities.

His chest X-ray showed a bilateral diffuse reticular pattern prominent in the medial zone (Figure 1). CT scan showed a patchy area of ground glass in bilateral lung fields without nodular infiltrates, no pleural effusion or space-occupying lesion; and normal mediastinum. An accidental finding was left thyroid lobe enlargement with nodularity and mild right deviation of the trachea (Figure 2). His laboratory data are shown in Table 1. Venous blood gas parameters, thyroid function tests, bilirubin, and liver enzymes were normal. He also had a noninflammatory culture negative stool.

Considering the COVID-19 epidemics, he was started on lopinavir/ritonavir, Interferon-α, and supportive care (diphenhydramine, acetaminophen, naproxen, Vit. D, Vit. C, Vit. B complex, oral rehydration solution), ceftriaxone, and losartan. Naproxen was discontinued as he developed hyperkalemia to 5.8. Despite being on treatment for a week, no improvement was noted. The respiratory rate decreased to normal but BIPAP was used to keep oxygen saturation over 90%. General condition was good with no new findings in the chest exam. On the 7th day, the COVID-19 PCR report was negative. The patient had no sputum to be evaluated for microbiology and cytopathology. In re-evaluation and new history taking, he reported no known tuberculosis contact history but mentioned unprotected extramarital affairs from 10 years ago as multi-partner with sex workers. He had mild chronic diarrhea and weight loss in the past two years.

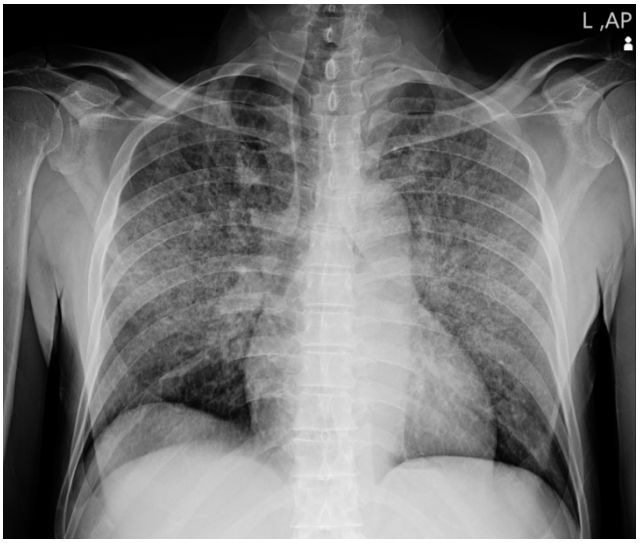

Figure 1. Chest X Ray Showing Bilateral diffuse reticular pattern

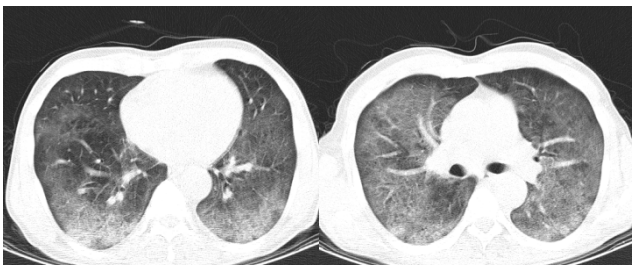

Figure 2. CT scan showing bilateral patchy area of ground glass

Thus, the query of HIV and PCP was raised by the history. The presumptive diagnosis of PCP was made and therapy was started with trimethoprim-sulfamethoxazole (TMP-SMX) and blood was tested for ELISA HIV-Ab which came back reactive and then confirmatory Western Blot as well. The patient was unable to expectorate sputum and refused any intervention such as bronchoscopy. No allergic reactions were evident and the patient tolerated the therapy well. After 10 days of treatment, the patient got

better with improvement in breathing. He was discharged and went under routine follow-ups and treatment for AIDS in a health center clinic. He was treated with TMP-SMX for 3 weeks then on prophylaxis; anti-retroviral treatment (ART) including dolutegravir, lamivudine, and abacavir, with good clinical and paraclinical response after months (Table 1).

Table 1. Paraclinical findings of the case patient

Test	Result	After Months Therapy
White Blood Count	6.600/µl	
Lymphocyte	11% (TLC=726/ml)	
Hemoglobin	10.7gr/dl	
Platelet	151,000/µl	
ESR	105mm/h	
C-Reactive Protein	196mg/l	
Iron	18mcg/dl	
Ferritin	1650mcg/l	
Troponin	0.01ng/ml	
Lactate	11u/l	
Albumin	3.4g/dl	
Lactate Dehydrogenase	764u/l	
COVID-19 PCR	Negative	
HIV I-II ELISA	Positive	
HIV Western Blot	Positive	
HIV Viral Load	2,975,505 Copies /ml	Undetectable
CD4 Count	8 Cells/ml	144 Cells/ml

DISCUSSION

The majority of COVID-19 patients are asymptomatic or have mild general, respiratory, or gastrointestinal symptoms. A minority can develop life-threatening complications such as ARDS, multi-system organ failure, thromboembolic events, and cytokine release syndrome (CRS) (5). It should be diagnosed on time to be managed correctly. One of the infectious differential diagnoses is pneumocystis with relatively similar clinical and paraclinical presentations. It is a life-threatening infection if left untreated with the correct specific antibiotic as many other infectious diseases (6).

Pneumocystis, is a fungus that is not sensitive to usual antifungal drugs and does not grow on laboratory media (7). *Pneumocystis jirovecii* pneumonia (PJP) is a common opportunistic infection causing pneumonia in immunocompromised patients and rarely in immunocompetent people. It is typically seen in immunocompromised cases with CD4 counts less than 200 cells/ml (8). The presentation of PJP in a patient with HIV infection is typically subacute, accompanied by a slow onset of dry cough and dyspnea.

On the contrary, in patients without HIV infection, it manifests acutely with severe hypoxia, rapid respiratory deterioration, and respiratory failure (4,9). These nonspecific manifestations make clinical diagnosis of PCP difficult, even for experienced physicians. It presents with normal chest X-rays in 25% of all initial cases with inconclusive CT-scans. They show bilateral interstitial infiltrates most commonly but can be atypical (4).

The most common high-resolution CT finding of PJP is diffuse GGO, often greater in extent in the absence of HIV infection (10). With more advanced disease, crazy-paving pattern, consolidation, nodules, and cysts are also found; lung consolidation is more common in HIV-negative patients (11) which all are common in COVID-19.

Microscopical diagnosis needs samples of expectorated sputum (30%–90% sensitivity), bronchoalveolar lavage fluid (90%–95% sensitivity), or a lung tissue biopsy (95%–100% sensitivity) (12).

The stains to show PJP are Gomori-methenamine silver, Gram-Weigert, and the Wright-Giemsa stain. Of course, immunofluorescent staining is the gold standard for diagnosis.

High levels of serum LDH are also seen in PJP, indicating lung tissue damage (13). High serum 1,3-beta-d-glucan (BDG) levels are also helpful in the early diagnosis of PJP in a non-invasive manner (14,15). The diagnosis of PCP is based on a high clinical suspicion to do the relevant tests. In this case, no information about HIV in the patient and not asking about it because of the COVID-19 pandemic, the busy emergency ward, and similar clinical and paraclinical manifestations of both diseases caused delayed diagnosis.

Clinicians should always consider all possibilities regardless of how improbable they may seem, as in every system in the body some diseases may be misdiagnosed or even be concomitant in the pandemic or non-pandemic situations (16,17).

We have limitations in the microbiologic exam of sputum or bronchoalveolar fluid as the patient refused bronchoscopy. N-acetyl cysteine (NAC) prescription did not induce sputum in the patient, and other procedures such as a negative pressure chamber were not available. Accordingly, the diagnosis was made clinically and radiologically. The patient underwent treatment with Co-trimoxazole and had a good response on the 10th day; he was discharged voluntarily with continuing complementary HIV tests, and prophylactic and therapeutic drugs in a private office.

Conflict of Interests

The authors have no conflict of interest.

Acknowledgments

We sincerely thank our coworkers, who were involved in managing this patient but did not have the criteria for authorships.

REFERENCES

1. Parra-Lucares A, Segura P, Rojas V, Pumarino C, Saint-Pierre G, Toro L. Emergence of SARS-CoV-2 Variants in the World: How Could This Happen? ***Life (Basel)*** 2022;12(2):194.
2. da Rosa Mesquita R, Francelino Silva Junior LC, Santos Santana FM, Farias de Oliveira T, Campos Alcântara R, Monteiro Arnozo G, et al. Clinical manifestations of COVID-19 in the general population: systematic review. ***Wien Klin Wochenschr*** 2021;133(7-8):377-82.
3. Falzone L, Gattuso G, Tsatsakis A, Spandidos DA, Libra M. Current and innovative methods for the diagnosis of COVID 19 infection (Review). ***Int J Mol Med*** 2021;47(6):100.
4. Parekh M, Donuru A, Balasubramanya R, Kapur S. Review of the Chest CT Differential Diagnosis of Ground-Glass Opacities in the COVID Era. ***Radiology*** 2020;297(3):E289-E302.
5. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. ***Lancet*** 2020;395(10229):1054-62.
6. Dehghan F, Khorami N, Taleghani NT, Bassiri A, Davoodian P, Shirvani F, et al. Drug utilization evaluation of vancomycin in pediatric department. ***Novelty in Biomedicine*** 2018;6(1):9-14.
7. Mandell, Douglas & Bennett. Principles and Practice of Infectious Diseases. 8th ed. Philadelphia: Churchill Livingston; 2020: 211-22.
8. Hidalgo A, Falcó V, Mauleón S, Andreu J, Crespo M, Ribera E, et al. Accuracy of high-resolution CT in distinguishing between Pneumocystis carinii pneumonia and non-Pneumocystis carinii pneumonia in AIDS patients. ***Eur Radiol*** 2003;13(5):1179-84.
9. Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. Harrison's principles of internal medicine, 19e. New York, NY, USA: Mcgraw-hill; 2015:1547-1550
10. Hardak E, Brook O, Yigla M. Radiological features of Pneumocystis jirovecii Pneumonia in immunocompromised patients with and without AIDS. ***Lung*** 2010;188(2):159-63.
11. Tasaka S, Tokuda H, Sakai F, Fujii T, Tateda K, Johkoh T, et al. Comparison of clinical and radiological features of pneumocystis pneumonia between malignancy cases and acquired immunodeficiency syndrome cases: a multicenter study. ***Intern Med*** 2010;49(4):273-81.
12. Arshad V, Iqbal N, Saleem HA, Irfan M. Case of undiagnosed pneumocystis pneumonia (PCP). ***BMJ Case Rep*** 2017;2017:bcr2017221871.
13. Esteves F, Calé SS, Badura R, de Boer MG, Maltez F, Calderón EJ, et al. Diagnosis of Pneumocystis pneumonia: evaluation of four serologic biomarkers. ***Clin Microbiol Infect*** 2015;21(4):379.e1-10.
14. Corsi-Vasquez G, Ostrosky-Zeichner L, Pilkington EF 3rd, Sax PE. Point-Counterpoint: Should Serum β-d-Glucan Testing Be Used for the Diagnosis of Pneumocystis jirovecii Pneumonia? ***J Clin Microbiol*** 2019;58(1):e01340-19.
15. Karageorgopoulos DE, Qu JM, Korbila IP, Zhu YG, Vasileiou VA, Falagas ME. Accuracy of β-D-glucan for the diagnosis of Pneumocystis jirovecii pneumonia: a meta-analysis. ***Clin Microbiol Infect*** 2013;19(1):39-49.
16. Nasri Razin B, Shoaei SD, Family A, Nabavi M, Abbasi F. Mycobacterium tuberculosis and Cryptococcus neoformans co-infection meningitis in a young immuncompetent woman. ***Iran J Clin Infect Dis*** 2011;6(2)93-5.
17. D'Ardes D, Boccatonda A, Schiavone C, Santilli F, Guagnano MT, Bucci M, et al. A Case of Coinfection with SARS-COV-2 and Cytomegalovirus in the Era of COVID-19. ***Eur J Case Rep Intern Med*** 2020;7(5):001652.