CASE REPORT

A diagnostic conundrum in the context of a pandemic of Coronavirus Disease 2019 (COVID-19)

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Abstract

A 52-year-old with lung cancer and brain metastases, on a 3-month weaning regime of dexamethasone, had a coincidental finding of bilateral, patchy ground-glass opacifications of both central and peripheral lung fields on computed tomography (CT). This was reported to be a sign of Coronavirus Disease 2019 (COVID-19). On Day 13, due to poor clinical progression and multiple negative reverse transcriptase-polymerase chain reaction tests for COVID-19, an alternative diagnosis was sought. Subsequently, this led to a diagnosis of Pneumocystis jirovecii pneumonia. This case demonstrates complicating factors in the diagnosis of COVID-19 and the presence of cognitive bias during a pandemic, which may lead clinicians to overlook a diagnosis, which may otherwise be addressed earlier.

INTRODUCTION

Coronavirus Disease 2019 (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). Typically it presents with fever, dry cough and shortness of breath, in addition to ground-glass opacities (GGO) on chest computed tomography (CT) typically in the peripheries, but can be seen to vary [1, 2].

We report a case of Pneumocystis jirovecii pneumonia (PCP), which occurs due to the opportunistic fungal pathogen Pneumocystis jirovecii. Historically, it is associated with Human Immunodeficiency Virus (HIV), however, due to increasing use of antiretroviral therapy, the incidence is now greater in non-HIV associated cases of, for example, malignancy and immunosuppression, which have a higher rate of mortality, reported between 30% and 50% [3, 4]. Typically it presents with exertional dyspnoea, fever and non-productive cough, with bilateral GGO on chest CT [3]. This is commonly in a central distribution but can vary and be in a more diffuse pattern, alongside less common findings of consolidation, nodules and cystic lesions [3].

This case presented difficulties in diagnosis during the COVID-19 pandemic, highlighting lessons to be learnt.

CASE REPORT

A 52-year-old female presented to the emergency department with a 5-day history of worsening abdominal pain, distension and vomiting. On examination she was peritonitic, tachycardic, hypotensive and tachypnoeic with a new oxygen requirement of 4L.

She had a history of lung adenocarcinoma with brain metastases diagnosed 3 months prior to this presentation, for which she had a craniotomy with resection of metastases and cyberknife radiotherapy. In addition, she was on a weaning regime of oral dexamethasone for the brain metastases, on 2 mg three times a day at presentation, reduced from 8 mg twice daily over the prior 3 months since the diagnosis of malignancy. She had no other significant past medical history and the only other medications she took were lansoprazole for gastric protection whilst on dexamethasone and hormone replacement therapy for menopausal symptoms. She had not started other treatments for her malignancy prior to this presentation.

Imaging demonstrated perforation of the large bowel secondary to diverticulitis, and a coincidental finding of bilateral, patchy GGO of both the central and peripheral lung fields. This was reported to be a probable sign of COVID-19 [Fig 1 and 2].
Figure 1. A coronal slice of CT chest showing bilateral ground-glass opacities.

Figure 2. An axial slice of CT chest showing bilateral ground-glass opacities.

Subsequently, she underwent an emergency subtotal colectomy and ileostomy formation.

Post-operatively, due to the chest CT findings, she was managed as COVID-19 positive. Five reverse transcriptase-polymerase chain reaction (RT-PCR) COVID-19 tests, however, were negative (nose/throat swabs on Days 1 and 10, bronchoalveolar lavage samples on Days 2 and 4, endotracheal secretions on Day 13). On Day 13, due to poor clinical progression preventing successful post-operative extubation, with increasing bilateral areas of ground glass changes on CT, persistently raised inflammatory markers and ongoing pyrexia (despite broad antibiotic cover), an alternative diagnosis was sought to explain the chest CT findings. A screening for alternative respiratory infections was carried out, which detected Pneumocystis jiroveci DNA in sputum and Beta D gluten antigen in serum.

Subsequently, the patient was commenced on 21 days of co-trimoxazole treatment for PCP, resulting in significant clinical improvement and hospital discharge.

DISCUSSION

This case highlights two discussion points.

The first is the diagnosis of COVID-19, due to the discrepancy between the multiple negative RT-PCR tests and the chest CT that was reported as possible COVID-19. This discrepancy is discussed in a systematic review of the accuracy of RT-PCR testing at the time, which concluded that false negative results ranged from 2% to 29% [5]. In addition, a study of 1014 patients in Wuhan, China, found that in patients with negative RT-PCR results, 75% had positive chest CT findings [6]. Subsequently, they concluded that a chest CT had a higher sensitivity for the diagnosis of COVID-19 in comparison to RT-PCR from swab samples, and made the suggestion that CT should be considered as the primary diagnostic tool [6].

The second is the diagnosis of PCP, which arguably should have been on the early list of differentials for a number of reasons.

First, the patient was potentially at risk of developing PCP due to the use of dexamethasone without PCP prophylaxis. This use of corticosteroid prior to the development of PCP is found in up to 90% of cases, and guidelines suggest the use of prophylaxis with co-trimoxazole when a patient is receiving more than the equivalent of 20 mg of prednisolone a day for >4 weeks [4]. Furthermore, her risk of developing PCP may have been compounded by her underlying malignancy [4].

Second, the bilateral GGO on CT that were reported to be a probable sign of COVID-19 were arguably more in keeping with PCP which has a more central distribution in comparison to the peripheries in COVID-19, however, this can vary in distribution [2, 3].

The diagnosis of PCP in this case may have been influenced by the presence of cognitive bias during the COVID-19 pandemic. Cognitive bias refers to the unconscious thoughts and behaviours that influence decision-making [7]. ‘Availability bias’, in particular, which is the influence of observing a high prevalence of a particular disease, such as COVID-19 during the pandemic may have played a role [7]. Subsequently, with COVID-19 at the forefront of the clinician’s mind, additional diagnoses of COVID-19 may have been made prior to the consideration of differentials, for example, those that cause GGO on CT, not only limited to PCP, such as influenza pneumonia [2].

In conclusion, with SARS-CoV-2 likely to become endemic in our society, it is crucial that we continue to enhance our knowledge of COVID-19 to improve our diagnosis and management. Furthermore, with the possibility of pandemics becoming a more common occurrence, it is paramount that clinicians maintain an awareness of the presence of cognitive bias in diagnosis during a pandemic. Similar cases in which cognitive bias has influenced clinical practice during the COVID-19 pandemic are not widely discussed in the literature. This should arguably receive more attention to allow clinicians to address their clinical practice to reduce such biases. These biases may otherwise result in a delay in reaching the correct diagnosis, which could be fatal.

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CONFLICT OF INTEREST STATEMENT

None declared.

ETHICAL APPROVAL

N/A

CONSENT

Consent has been obtained from the patient.
GUARANTOR
All of the authors stated in the manuscript, accept full responsibility for the work, had access to the data, and controlled the decision to publish.

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