Case Report

COVID-19 pneumonia identified by CT of the abdomen: A report of three emergency patients presenting with abdominal pain

Sherif Abolyazid, MD & MSc (Radiology)⁎, Shireen Alshareef, SBEM & JBEM, Nouf Abdullah, MD & RCPSC, Abdalla Khalil, FRCGP, MRCEM (UK), Arab BIM & DTM, Nashaat Hamza, MD, ABIM & ABID, Ahmed Salem, Mb BCh & MSc (EM)

⁎ Medical Imaging Department, IMC Hospital, Jeddah, Saudi Arabia

Abstract

Patients with COVID-19 infection may present to the Emergency Department (ED) with gastrointestinal complaints and no respiratory symptoms. We are presenting 3 patients who came to the ED with abdominal pain; and the computed tomography [CT] of the abdomen showed findings suggestive of COVID-19 pneumonia.

A 65-year-old male patient presented with symptoms of urinary tract infection and left renal angle tenderness. A 42-year-old male patient presented with right flank pain postextracorporeal shock wave lithotripsy. A 71-year-old male known to have type 2 diabetes mellitus and who had had whipple surgery for a neoplasm of the head of the pancreas presented with a painful epigastriic swelling. The 3 patients had positive COVID-19 polymerase chain reaction (PCR) tests and mild-to-moderate illness, and were discharged home after 2 weeks with a good recovery. The first patient had a false negative early PCR test, which turned positive on 2 repetitions of the test.

A systematic review of CT abdomen, including inspection of the lung bases using the lung window in all CT abdomen, is essential to detect findings suggestive of COVID-19 pneumonia in patients requiring a CT abdomen study. As proven in the literature, CT findings of COVID-19 pneumonia have a higher sensitivity than the PCR test.

© 2020 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license. (http://creativecommons.org/licenses/by-nc-nd/4.0/)
Introduction

During the first 2 months of the COVID-19 epidemic in China, gastrointestinal symptoms were reported in a small percentage of admitted patients (4%-10%) [1–3]. Respiratory symptoms (dyspnea, cough, and expectoration) were the most frequent symptoms (19%-81%) [1–3].

Eighty-four percent of patients showed bilateral chest involvement in chest radiographs, and computed tomography (CT) imaging abnormalities consistent with pneumonia were detected even in asymptomatic patients [3,4].

In 17.9% of patients with nonsevere disease and in 2.9% of patients with severe disease, no radiographic or CT abnormality was found. Lymphocytopenia was present in 83.2% of patients on admission [1].

Case report 1

A 65-year-old male patient presented to the Emergency Department (ED) with dysuria, interrupted urine stream, and fever for 6 days. He was prescribed ciprofloxacin orally, but he was still febrile with left flank pain and no respiratory complaint. He looked weak, his pulse was 90/min, his blood pressure was 128/74 mm Hg, his temperature was 38.7°C, and his oxygen saturation was 96%. Mild tenderness was noted in the left lumbar area of his abdomen; the rest of the physical exam was unremarkable. Laboratory tests were notable for white blood cells of 4.600/μL, neutrophils of 3.200/μL, and lymphocytes of 1.100/μL (1.300–3.500 μL). His lactate dehydrogenase was 450 mg/dL (135-225 mg/dL), and his procalcitonin was 0.12 ng/mL (0.5-2.0 ng/mL). The rest of the liver function tests, serum creatinine, electrolytes, D dimer, and urine analysis were within the normal range. The patient’s ECG and cardiac enzymes were normal.

A CT abdomen/renal stone study without contrast was unremarkable. Meanwhile, a small, suspicious lesion was seen at the left lung base (see the yellow arrow indicating the CT mediastinal window in Fig. 1a). The lung window revealed a large, patchy area of ground-glass opacity (GGO) (CT axial view), which was incompatible with that in the mediastinal window (see the yellow arrow at the lung window in Fig. 1b).

Multiple bilateral, variable-sized, patchy areas of GGO were also noted at the axial view of the lung parenchyma (indicated by red arrows in Fig. 1c).

The patient was admitted to the COVID-19 medical unit. A nasopharyngeal swab was taken, and the patient’s polymerase chain reaction (PCR) test was negative. Two repeated nasopharyngeal swabs were taken on the third and fifth days after admission, and both PCR tests were positive.

The patient received IV paracetamol, azithromycin, IV fluids, and hydroxychloroquine orally (a suggested therapeutic modality) [5]. He felt better and suffered from dry cough only. His oxygen saturation was 96% in room air. He was transferred to another COVID-19 healthcare isolation facility, where his condition improved, and he was discharged home after 2 weeks.

Case report 2

A 42-year-old male patient came to the ED with right flank pain for 2 days. He had dysuria but no hematuria, fever, or rigors. He had no respiratory complaint. His past history included bilateral ureteric stones, and he had received extracorporeal shock wave lithotripsy for a right ureteric stone at another hospital five days previously.

The patient’s pulse rate was 90/min, his blood pressure was 148/90, his temperature was 36.8°C, his respiratory rate was 20/min, and his oxygen saturation was 98% at room air.

His abdominal exam revealed a tender right renal angle and lumbar area; the rest of his physical exam was unremarkable. Laboratory tests showed a normal complete blood cell count and differential count. The patient’s serum creatinine was 1.76 mg/L (0.62–1.24 mg/dL), and his C-reactive protein was 72 mg/L (up to 5mg/L). Liver function tests and D dimer were normal. Urine analysis revealed RBCs 27/HPF.

Fig. 1 – CT abdomen renal stone study without contrast; 3 axial views. (a) A small, suspicious lesion at the left lung base in the mediastinal window (yellow arrow). (b) A large, patchy area of ground-glass opacity in the lung window, which was incompatible with the size of the lesion in the mediastinal window (yellow arrow). (c) Multiple bilateral, variable-sized patchy areas of ground-glass opacities at the axial view of the lung parenchyma lung window (red arrows). (Color version of figure is available online.)
A CT renal stone study without contrast showed a 4-5 mm radiodense stone in the middle part of the right ureter with mild back pressure (indicated by the red arrow in the CT coronal image shown in Fig. 2a). A small, suspicious lesion was seen at the right lung base (indicated by the yellow arrow in the mediastinal window in Fig. 2b). Two patchy areas of GGO at the bilateral lung bases were noted (indicated by the red arrows in the lung window shown in Fig. 2c). Multiple bilateral patchy areas of GGO were seen (indicated by the red arrows in the lung window shown in Fig. 2d).

The patient’s COVID-19 PCR test was positive. He was admitted to the COVID-19 ward, where he received IV fluids, paracetamol, azithromycin, ceftriaxone, and Lornoxicam. His urine culture revealed no growth. He developed a mild cough, and his oxygen saturation was 97%. He was transferred to a COVID-19 healthcare facility and discharged home after 2 weeks.

**Case report 3**

A 71-year-old male patient known to have type 2 diabetes mellitus presented to the ED with upper abdominal pain and swelling for 1 day. He had no fever or altered bowel and no respiratory complaint. He had a past history of Whipple surgery for a neoplasm of the head of the pancreas three years previously.
Fig. 3 – CT abdomen and pelvis with IV contrast. (a) Evidence of aerobilia (axial view-postoperative changes indicated by yellow arrow). (b) An anterior abdominal wall hernia defect in the midline with a nonobstructed herniating part of the colon. (c) Multiple bilateral peripheral patchy areas of reticulations in the lung parenchyma (red arrows). (d) A suspicious right base patchy area of reticulation at the lung base pulmonary window (red arrow). (Color version of figure is available online.)

The patient’s pulse rate was 75/min, his blood pressure was 128/74 mm Hg, his respiratory rate was 18/min, his temperature was 36.8°C, and his oxygen saturation was 99%. He had mild tenderness and a soft swelling in the umbilical area with no rebound or gurgle; the rest of the physical exam was unremarkable.

The patient’s complete blood count and differential were within normal range. His serum creatinine, electrolytes, C-reactive protein, D dimer, ferritin, and cardiac enzymes were within normal range. His lactate dehydrogenase was 260 mg/dL (up to 220 mg/dL). A CT of the patient’s abdomen and pelvis with IV contrast showed evidence of aerobilia (postoperative changes) (indicated by yellow arrow Fig. 3a). The CT also revealed an anterior abdominal wall hernia defect in the midline with a herniating part of the colon, which was not obstructed (see Fig. 3b).

Multiple bilateral peripheral patchy areas of reticulations were noted in the lung parenchyma (indicated by red arrows in Fig. 3c). The lung base pulmonary window showed a right base patchy area of reticulation (indicated by the red arrow in Fig. 3d).

The patient was admitted to the COVID-19 medical unit, and his PCR test was positive.

He developed a dry cough and a low-grade temperature. He received ceftriaxone, azithromycin IV, and paracetamol IV. His vital signs, including oxygen saturation at room air, were normal, and he was transferred to a healthcare isolation facility. He was stable, did not develop any new symptoms, and was discharged after 2 weeks.

Discussion

In a review article from Beijing, China, the incidence of gastrointestinal symptoms in COVID-19 was 3%-75%, the incidence of anorexia was 39.9%-50.2%, of diarrhea was 2%-49.5%, of vomiting was 3.6%-66.7%, of nausea was 1%-29.4%, of
abdominal pain was 2.2%-6.0%, and of gastrointestinal bleeding was 4%-13.7%. Diarrhea was the most common gastrointestinal symptom in children and adults and was observed both before and after diagnosis. In 36%-53% of patients, fecal PCR was positive 2 to 5 days after sputum PCR was positive [6].

Ai et al compared the results of CT chest scan to COVID-19 PCR testing in 1014 patients with suspected COVID-19 infection in Wuhan, China. They found that the sensitivity of CT chest scan (97%-98%) was higher than that of the COVID-19 PCR (66%-80%) [7].

A study was conducted by the National Institute of Allergy and Infectious Diseases in the United States to estimate the variation of false negative rates of RT-PCR-based COVID-19 testing since the time of exposure was 67% (CI, 27%-94%) on day 4 from exposure and decreased to 20% (CI, 12%-30%) on day 8 from exposure (3 days after symptom onset) [8].

These 2 studies focusing on the incidence of false negative PCR tests explain the first COVID-19 PCR false negative test in our first patient, whose subsequent 2 tests on the third and fifth day after hospital admission were positive.

In a study on chest CT findings in COVID-19 pneumonia that focused on the duration of symptoms (dividing symptom duration into 6 stages), the lower lobes were more inclined to be involved, with higher CT scores at every stage [9].

In a cohort study in Wuhan, about 58 asymptomatic cases of COVID-19 pneumonia confirmed by SARS-CoV-2 nucleic acid testing and a CT scan had a history of exposure; GGO was the primary CT manifestation in this cluster of patients (94.8%), and consolidation was present in another three patients (5.2%). Pneumonia was predominantly located in the peripheral and subpleural areas of the lung (75.9%), mostly involving 1 or 2 lung lobes (65.5%). The GGO lesions were inclined to distribute in the lower lobes (left 62.1% vs right 68.9%) [10].

These studies, which showed the basal findings of the CT chest scans of patients infected with COVID-19 without respiratory symptoms, explain why additional cases of COVID-19 pneumonia are detected after reviewing CT of the abdomen for abdominal complaints, as in our reported 3 cases [11].

**Conclusion**

COVID-19–infected patients may present with gastrointestinal symptoms only and no respiratory complaints. A thorough and systematic review of CT abdomen may reveal findings suggestive of COVID-19 pneumonia in this group of patients. As is noted in the literature, CT findings of COVID-19 pneumonia are more sensitive than polymerase chain reaction (PCR) testing, which can result in false negative tests. Healthcare workers should deal with all patients as suspected COVID-19 cases until this is ruled out (i.e., they should use full protective measures against droplet infection).

**Statement**

An informed written consent was obtained from presented patients for publication.

**REFERENCES**

[1] Guan WJ, Ni ZY, Hu Y, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med 2020;382(18):1708-1720.

[2] Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China [published correction appears in Lancet. 2020 Jan 30. Lancet 2020;395(10223):497-506].

[3] Xu XW, Wu XX, et al. Clinical findings in a group of patients infected with the 2019 novel coronavirus (SARS-Cov-2) outside of Wuhan, China: retrospective case series. BMJ 2020;368:m792 Published 2020 Feb 27.

[4] Shi H, Han X, Jiang N, et al. Radiological findings from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study. Lancet Infect Dis. 2020;20(4):425-434.

[5] Gautret P, Lagier JC, Parola P, et al. Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial [published online ahead of print, 2020 Mar 20]. Int J Antimicrob Agents 2020;105949.

[6] Tian Y, Rong L, Nian W, He Y. Review article: gastrointestinal features in COVID-19 and the possibility of faecal transmission. Aliment Pharmacol Ther 2020;51(9):843-851.

[7] Ai T, Yang Z, Hou H, et al. Correlation of chest CT and RT-PCR testing in coronavirus disease 2019 (COVID-19) in China: a report of 1014 Cases [published online ahead of print, 2020 Feb 26]. Radiology 2020;200642.

[8] Kucirka LM, Lauer SA, Laeyendecker O, Boon D, Lessler J. Variation in false-negative rate of reverse transcriptase polymerase chain reaction-based SARS-CoV-2 tests by time since exposure [published online ahead of print, 2020 May 13]. Ann Intern Med. 2020 M20-1495.

[9] Ding X, Xu J, Zhou J, Long Q. Chest CT findings of COVID-19 pneumonia by duration of symptoms. Eur J Radiol 2020;127:109009.

[10] Meng H, Xiong R, He R, et al. CT imaging and clinical course of asymptomatic cases with COVID-19 pneumonia at admission in Wuhan, China [published online ahead of print, 2020 Apr 12]. J Infect. 2020 Jul;81(1):e33-e39 S0163-4453(20)30211-5.

[11] Siegel A, Chang PJ, Jarou ZJ, Paushter DM, Harmath CB, Arevalo JB, et al. Lung Base Findings of Coronavirus Disease (COVID-19) on Abdominal CT in Patients With Predominant Gastrointestinal Symptoms [published online ahead of print, 2020 Apr 17]. AJR Am J Roentgenol. 2020:1-3.