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Pathology

Radiology Efforts in Diagnosing COVID-19 (Three Selected Cases)

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Abstract		Case Report

The main purpose of the current manuscript was to highlight the radiology role in diagnosing COVID-19. The routine non-contrast CT chest is the examinations that done to diagnose infections of COVID-19. The scan covers the area of interest for the lung. This is manuscript includes three cases to confirm the COVID-19 infection which already were tested by the respiratory tests of RT-PCR. CT examination was done in axial sections to evaluate the disease severity with imaging features of ground glass opacities (GGO) appearance among the cases and both lung clearly visible affected in the lung window. Some pulmonary consolidative changes with septal thickening and finding of pneumonia. Two of the cases suspected pulmonary embolism (PE), and computed tomography pulmonary angiogram (CTPA) technique was done and the finding shows normal flow of contrast media through main pulmonary trunk with no evidence of PE.
Keywords: Coronavirus infections, Pneumonia, pulmonary embolism.

INTRODUCTION

An episode of coronavirus (COVID-19) disease started in last December 2019 in China Wuhan city (1), whereas the infection likely incorporates a zoonotic root related to the city's Huanan Fishfood, broad human-to-human transmission has come about in more than a million cases in most world nations with 100000 passing's as of mid-May 2020(2). Illness was to begin with detailed within the United States on January 2020, and the number expected to increase in next months, unless strategic planning in facing this new disease started.. In Saudi Arabia as well as other Arabian countries great efforts are being made by the ministries of health in the Arab countries to fight this new pandemic, which is unparalleled before, such as surveying and social separation, to analyze the impact of infection.

The foremost common showing clinical indications are fever and hack in expansion to other non-specific symptomatology counting dyspnea, cerebral pain, muscle soreness, and weariness (3). Almost 20% of cases are extreme, and mortality is around 3% [10]. The World Health Organization (WHO) pronounced a worldwide wellbeing crisis on January 30, 2020 [3]. The disease is evaluated to have a cruel hatching period of 5.2 days to weeks and commonly causes fever, hack, myalgia and pneumonia in patients (4). To date there's a scarcity of data with respect to SARSCoV- 2 contamination in children.

Be that as it may, most patients with COVID-19 has been analyzed with pneumonia and characteristic computed tomography (CT) imaging designs; hence radiological examinations are fundamental for the early conclusion and assessment of the disease. (5). The primary report of patients with COVID- 19 portrayed two-sided lung inclusion on starting chest CT in most patients, with a consolidative pattern seen in patients within the ICU and a predominantly ground-glass design in patients who were not within the ICU (6).

An examination of introductory chest CT appears in most of people with affirmed COVID- 19 (6). According to data available for authors, there is a lack of data published worldwide from our local community regarding role of radiologic examination in COVID-19 diagnosing, this may be attributed to little of people number affected by this pandemic disease, but the number of patients recommended to increase. So this manuscript considers being first attempt in this field for local Saudi community. The most literature found from China country (1-6) and some other European countries (7-11) in addition to report from WHO (12).

The main purpose of the current manuscript was to highlight the radiology role in diagnosing COVID-19.

CT chest protocol

Non- contrast and low dose CT chest acquisition are protocols used for patients with suspected, or confirmed for follow up with infections of COVID-19. The CT scan parameters are: 120 kV as tube potential difference, tube current (120–380) mA. While for low dose (20-40)mA, thickness (5–7) mm, slice interval 5 mm, rotation speed 0 ·5 s, patient position supine with head first, scanning starting from thoracic inlet and end down to include upper abdomen to ensure that cover whole the chest area. The scan takes axial sections for all the chest area.
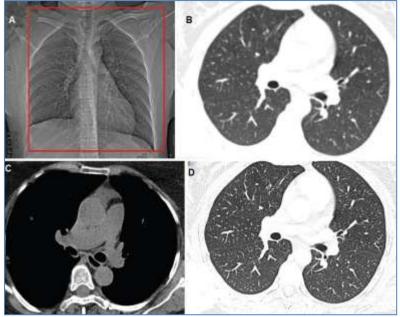

Fig-1 (A-D): Routine chest: (A) Scout image: the red box shows the field of view for chest CT, extending from thoracic inlet to upper abdomen. (B) Stander lung window Images and mediastinal windows (C); and high resolution reconstruction (D)

Acquired sections were reconstructed before being reviewed on the picture archiving and communication system (PACS) monitor into Multi-planer reconstruction (MPR) to sagittal and coronal plane to give more details in other sections .then all the images send for interpretation in the radiologist workstation.
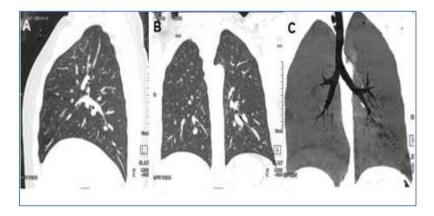

Fig-2 (A-C): Image reformatting: (A and B) Sagittal and coronal reformation in standard lung window to allow three‑ dimensional view(C)

Case1

A59years old female admitted to hospital with bilateral pneumonia and suspected COVID19 infection. 27March2020 reported with nCovid19 with positive confirmatory respiratory sample test and required high ventilator support duo to ARDS on 19April2020 CT chest without contrast was done with finding of mild pnemomedistinal , peripheral bilateral multilobar Ground Glass Opacity (GGO)with visible inter lobar lines (Crazy Paving). No pleural effusion or lymphadenopathy noticed.
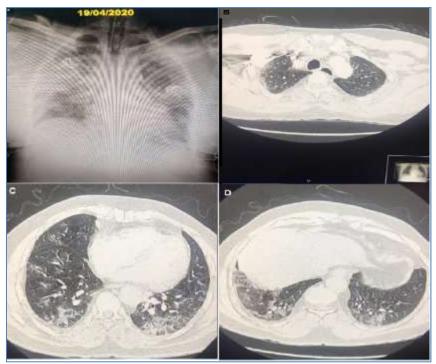
Fig-3 (A-D): Routine Chest: (A) Scout image view for chest CT, extending from thoracic inlet to upper abdomen. (B-D) stander lung window Images peripheral bilateral multilobar Ground Glass Opacity (GGO) with visible inter lobar lines (Crazy paving)

Case 2

On 25April 2020 a56years old female complain of fever, cough and shortness of breathing admitted to emergency department, required ventilator support her lab investigation reported with nCovid19 with positive confirmatory respiratory sample test.

The patient desaturated tachycardia tachypnea and suspected pulmonary embolism CTPA technique was done and finding shows normal flow of contrast media through main pulmonary trunk with no evidence of PE. The lung window shows bilateral Ground Glass Opacity (GGO) for full parenchymal finding refer to high resolution window.
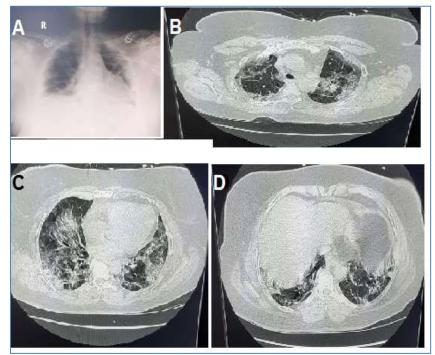

Fig-4 (A-D): Routine Chest: (A) Scout image view for chest CT, extending from thoracic inlet to upper abdomen. (B-D) stander lung window images bilateral Ground Glass Opacity (GGO) for full lung parenchyma

Case 3

A 43 years old male admitted to hospital with suspected pulmonary embolism PE mutiaxial cuts CT scan of the chest with utilizing PE protocols was performed and there was no radiological evidence of major PE with normal chest wall regarding the bony and soft tissue components .In the lung window there are bilateral multi-focal patchy of ground glass opacity and consolidative changes with septal thickening and finding in the lung parenchyma are suggestive of pneumonia likely related to COVID19 infection correlated with given history of positive case.
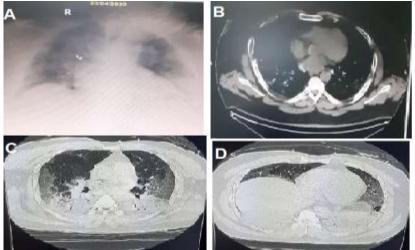

Fig-5 (A-D): Routine chest: (A) Scout image shows the field of view for chest CT, extending from thoracic inlet to upper abdomen. (B) Stander lung window Images and mediastinal windows (C); and high resolution reconstruction (D)

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