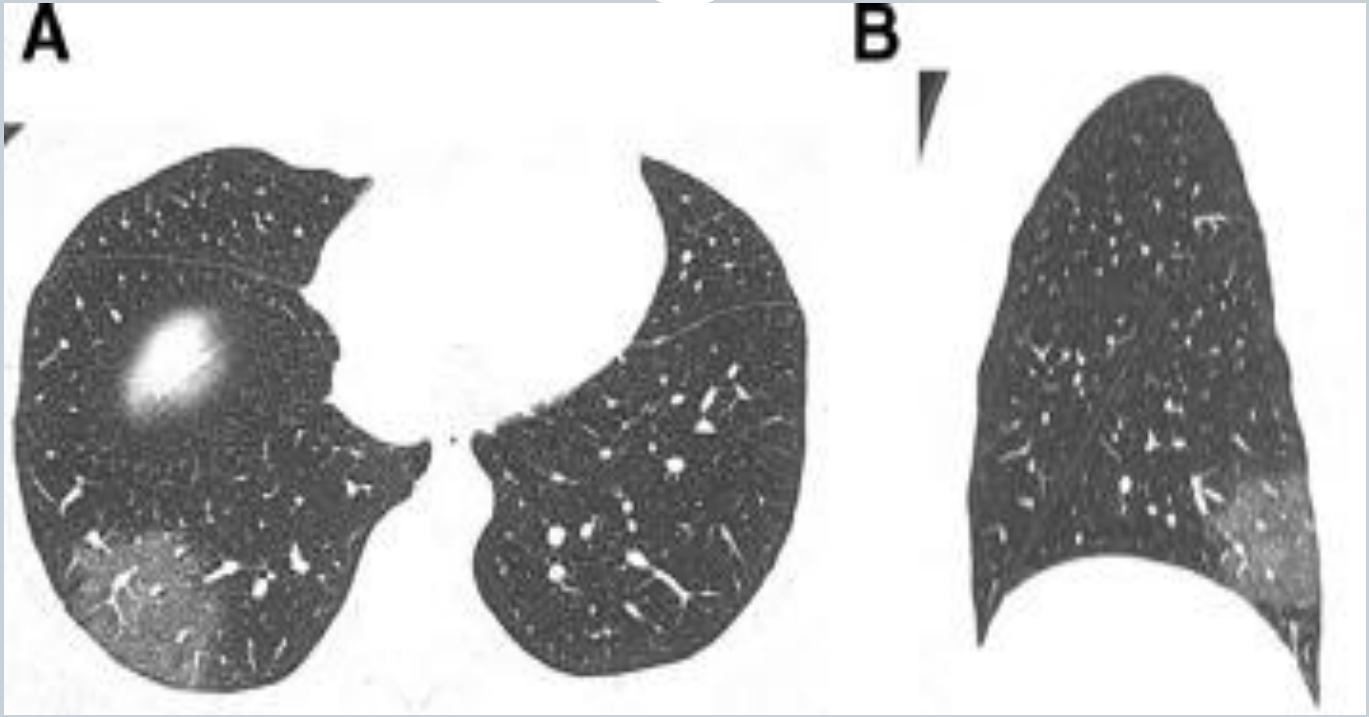
Компьютерная томография легких при COVID-19



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ОЦЕНКА МЕДИЦИНСКИХ ТЕХНОЛОГИЙ, ПРЕДЛАГАЕМЫХ ВСЕМИРНОЙ ОРГАНИЗАЦИЕЙ ЗДРАВООХРАНЕНИЯ ДЛЯ ЛЕЧЕНИЯ НОВОЙ КОРОНАВИРУСНОЙ ИНФЕКЦИИ COVID-19 / Холовня-Волоскова М.Э., Корнилова Е.Б., Толкушин А.Г., Полякова К.И. // Московская медицина. 2020. № S2 (36). С. 42-52.

Оценка медицинских технологий, предлагаемых Всемирной организацией здравоохранения для лечения новой коронавирусной инфекции COVID-19

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Аннотация

Вспышка новой коронавирусной инфекции (COVID-19), объявленная 7 марта 2020 года ВОЗ пандемией, обусловила интенсивный поиск потенциально эффективных средств для ее лечения среди как уже известных лекарственных препаратов (ЛП), зарегистрированных для лечения других заболеваний, так и новых молекул. Из большого количества ЛП и их комбинаций отделом оценки медицинских технологий ГБУ «НИИОЗММ ДЗМ» выбраны для анализа и последующей оценки те, которые включены ВОЗ в международные исследования оценки эффективности лекарственной терапии (ЛТ) COVID-19 и зарегистрированы в Российской Федерации: комбинация лопинавир/ритонавир, интерферон-бета, гидроксихлорохин и хлорохин. На основе доступных данных клинических исследований выполнен анализ эффективности лечения с помощью этих препаратов как COVID-19, так и схожих заболеваний (MERS и SARS). Алгоритмы лечения новой коронавирусной инфекции разных степеней тяжести проанализированы как в российских, так и в зарубежных клинических рекомендациях. Изучено дозирование препаратов и профили их безопасности, а также затраты на них. Изучены исследования применения оцениваемых препаратов в лечении COVID-19, проводимые в настоящее время. Имеющиеся на момент написания данного материала (первая декада апреля 2020 года) сведения о результатах лечения с применением указанных ЛП не позволяют сделать однозначный вывод об их эффективности, в связи с чем их применение допустимо по решению врачебной комиссии в установленном порядке. Затраты на терапию оцениваемыми препаратами являются незначительной частью затрат на лечение новой коронавирусной инфекции.

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Фурман Е.Г. Поражение нижних дыхательных путей и легких при коронавирусной инфекции covid-19 у детей и взрослых: сходства и отличия (обзор литературы) / Фурман Е.Г., Репецкая М.Н., Корюкина И.П. // Пермский медицинский журнал. 2020. Т. 37. № 2. С. 5-14.

ПОРАЖЕНИЕ НИЖНИХ ДЫХАТЕЛЬНЫХ ПУТЕЙ И ЛЕГКИХ ПРИ КОРОНАВИРУСНОЙ ИНФЕКЦИИ COVID-19 У ДЕТЕЙ И ВЗРОСЛЫХ: СХОДСТВА И ОТЛИЧИЯ (ОБЗОР ЛИТЕРАТУРЫ)

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LOWER AIRWAYS AND LUNGS AFFECTION IN CORONAVIRUS INFECTION COVID-19 AMONG CHILDREN AND ADULTS: SIMILARITIES AND DIFFERENCES (REVIEW OF LITERATURE)

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Представлены данные актуальных публикаций за 2019–2020 гг., касающиеся течения новой коронавирусной инфекции COVID-19 у детей и взрослых. Обсуждаются особенности нового коронавируса SARS-CoV-2, причины его тропизма к дыхательной системе человека. Подробно освещаются вопросы клинических и рентгенологических проявлений поражения легких при COVID-19 у детей и взрослых. Для заболевания COVID-19 у взрослых характерно наличие клинических симптомов острой респираторной вирусной инфекции: повышение температуры тела (> 90 %); кашель (сухой или с небольшим количест-

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КТ-ПАТТЕРНЫ ПРИ COVID-19 АССОЦИИРОВАННЫХ ПНЕВМОНИЯХ - СТАНДАРТИЗАЦИЯ ОПИСАНИЙ ИССЛЕДОВАНИЙ НА ОСНОВЕ ГЛОССАРИЯ ОБЩЕСТВА ФЛЕЙШНЕРА / Христенко Е.А., фон Стакельберг О., Кауцор Х.У. и др. // Российский электронный журнал лучевой диагностики. 2020. Т. 10. № 1. С. 16-26.

КТ-ПАТТЕРНЫ ПРИ COVID-19 АССОЦИИРОВАННЫХ ПНЕВМОНИЯХ – СТАНДАРТИЗАЦИЯ ОПИСАНИЙ ИССЛЕДОВАНИЙ НА ОСНОВЕ ГЛОССАРИЯ ОБЩЕСТВА ФЛЕЙШНЕРА

Христенко Е.А.[1,2], фон Стакельберг О.[1,2], Кауцор Х.-У.[1,2], Лайер Г.[3], Ридэн Т.В[3].

По опубликованным данным компьютерная томография (КТ) играет центральную роль в диагностике, оценке тяжести поражения и течения COVID-19 ассоциированных пневмоний. Исходя из этого, задачей представленного исследования явилась стандартизация оценки изменений органов грудной клетки у больных вирусными пневмониями COVID-19 с использованием терминологии глоссария Общества Флейшнера. В статье представлены результаты КТ-исследований больных с подтвержденной COVID-19 инфекцией. Предложено использование терминологии из глоссария Общества Флейшнера для унифицированного протоколирования результатов торакальной КТ при COVID-19 ассоциированной пневмонии. Представлена семиотика и показана значимость отдельных паттернов в оценке выраженности и прогнозировании течения атипичной пневмонии.

Ключевые слова: коронавирусная инфекция, COVID-19 ассоциированные пневмонии, компьютерная томография (КТ), глоссарий Общества Флейшнера

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https://www.elibrary.ru/item.asp?id=42619693

Сперанская А.А. ЛУЧЕВЫЕ ПРОЯВЛЕНИЯ НОВОЙ КОРОНАВИРУСНОЙ ИНФЕКЦИИ COVID-19 / Сперанская А.А. // Лучевая диагностика и терапия. 2020. № 1 (11). С. 18-25.

ЛУЧЕВЫЕ ПРОЯВЛЕНИЯ НОВОЙ КОРОНАВИРУСНОЙ ИНФЕКЦИИ COVID-19

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Цель исследования: оценить лучевые паттерны новой коронавирусной инфекции COVID-19. *Материалы и методы.* Обзор литературных источников. *Результаты.* COVID-19 вызывает острую тяжелую форму вирусной пневмонии. Лучевая диагностика COVID-19 очень важна, так как компьютерная томография (КТ) может быть первым исследованием, которое демонстрирует признаки вирусного поражения легких, позволяет оценить тяжесть поражения и неблагоприятные прогностические признаки его дальнейшего развития. Первичным КТ-паттерном COVID-19 является картина инфильтрации отдельных вторичных легочных долек по типу «матового стекла» (симптом «сухого листа») с последующим уменьшением объема поражения при благоприятном развитии событий либо их нарастании, присоединении КТ-картины «булыжной мостовой» и появлении в зоне «матового стекла» альвеолярной инфильтрации при неблагоприятном варианте течения заболевания. Эти симптомы являются предвестниками развития респираторного дистресс-синдрома. При более позднем первичном обследовании первичными КТ-симптомами становится паттерн «булыжной мостовой» и участки альвеолярной инфильтрации, что коррелирует с неблагоприятным дальнейшим течением и исходом. Отмечено, что для вирусной пневмонии при COVID-19 было характерно расположение изменений в задних субплевральных и перибронхиальных отделах. Все авторы подтверждали, что полости, узловые образования, плевральные и перикардиальные выпоты и лимфаденопатия при COVID-19 отсутствовали. В процессе наблюдения были предложены количественные характеристики поражения с балльной оценкой, использование которых может помочь в определении прогноза. Также была определена временная стадийность процесса и формирование у части больных остаточных изменений в легких, которые, как при гриппозной пневмонии H1N1 (2008–2019 гг., 2015–2016 гг.) и атипичной пневмонии SARS-CoV-2 (2003 г.), могут запускать процессы развития прогрессирующего легочного фиброза. Отмечается необходимость частого проведения КТ-исследований (каждые 4 дня) для возможности своевременной оценки быстрой динамики и изменения лечебной тактики. Анализ результатов обследования должны проводить минимум два рентгенолога, имеющих опыт работы в торакальной радиологии, с привлечением третьего независимого эксперта, в случае расхождения мнений. Все авторы подтверждали низкую информативность традиционной рентгенографии в оценке вирусного поражения легких, в некоторых исследованиях не выполнялась рентгенография грудной клетки, применяли только КТ как более чувствительный метод выявления ранних изменений, по аналогии с предыдущими вспышками коронавируса. Однако роль традиционной рентгенографии признавалась несомненной при оценке изменений в условиях реанимации. *Выводы.* Накопление опыта клинико-лучевого обследования больных COVID-19 позволил определить лучевую семиотику процесса, важную для определения лечебной тактики.

Ключевые слова: компьютерная томография, вирусная пневмония, COVID-19

Финансирование. Исследование не имело спонсорской поддержки

https://www.clinicalkey.com/#!/content/journal/1-s2.0-S092966462030142X

[CT imaging features of patients with different clinical types of COVID-19] / Zhong Q., Li Z., Shen X., Xu K. // Zhejiang Da Xue Xue Bao Yi Xue Ban. - 2020. - Vol. 49, № 2. - P. 198-202.

CT imaging of the COVID-19

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KEYWORDS
COVID-19;
Computed tomography;
Imaging

COVID-19 pneumonia presented with certain characteristic chest CT imaging features, which are helpful to the radiologist in the early detection and diagnosis of this emerging global health emergency. In this report, we present chest CT findings from five patients with COVID-19. Except for one case with normal lung appearance, all the other four cases had certain characteristics, including ground-glass opacity (GGO), consolidation and atoll sign. The lesions were mainly distributed in the peripheral portion of lung.

https://www.clinicalkey.com/#!/content/journal/1-s2.0-S0720048X20301509

Diagnosis of the Coronavirus disease (COVID-19): rRT-PCR or CT? / Long C., Xu H., Shen Q. et al. // Eur. J. Radiol. - 2020. - Vol. 126. - P. 108961. - doi: 10.1016/j.ejrad.2020.108961.

Diagnosis of the Coronavirus disease (COVID-19): rRT-PCR or CT?

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ABSTRACT

Purpose: To evaluate the diagnostic value of computed tomography (CT) and real-time reverse-transcriptase-polymerase chain reaction (rRT-PCR) for COVID-19 pneumonia.

Methods: This retrospective study included all patients with COVID-19 pneumonia suspicion, who were examined by both CT and rRT-PCR at initial presentation. The sensitivities of both tests were then compared. For patients with a final confirmed diagnosis, clinical and laboratory data, in addition to CT imaging findings were evaluated.

Results: A total of 36 patients were finally diagnosed with COVID-19 pneumonia. Thirty-five patients had abnormal CT findings at presentation, whereas one patient had a normal CT. Using rRT-PCR, 30 patients were tested positive, with 6 cases initially missed. Amongst these 6 patients, 3 became positive in the second rRT-PCR assay(after 2 days, 2 days and 3 days respectively), and the other 3 became positive only in the third round of rRT-PCR tests(after 5 days, 6 days and 8 days respectively). At presentation, CT sensitivity was therefore 97.2%, whereas the sensitivity of initial rRT-PCR was only 83.3%.

Conclusion: rRT-PCR may produce initial false negative results. We suggest that patients with typical CT findings but negative rRT-PCR results should be isolated, and rRT-PCR should be repeated to avoid misdiagnosis.

https://www.clinicalkey.com/#!/content/journal/1-s2.0-S1076633220301446

Coronavirus Disease (COVID-19): Spectrum of CT Findings and Temporal Progression of the Disease / Li M., Lei P., Zeng B. et al. // Acad. Radiol. - 2020. - Vol. 27, № 5. - P. 603-608.

Coronavirus Disease (COVID-19): Spectrum of CT Findings and Temporal Progression of the Disease

Mingzhi Li, MD[1], Pinggui Lei, MD[1], Bingliang Zeng, MD[1], Zongliang Li, MD, Peng Yu, MD, Bing Fan, MD, Chuanhong Wang, MD, Zicong Li, MD, Jian Zhou, MD, Shaobo Hu, MD, Hao Liu, PhD

Coronavirus disease is an emerging infection caused by a novel coronavirus that is moving rapidly. High resolution computed tomography (CT) allows objective evaluation of the lung lesions, thus enabling us to better understand the pathogenesis of the disease. With serial CT examinations, the occurrence, development, and prognosis of the disease can be better understood. The imaging can be sorted into four phases: early phase, progressive phase, severe phase, and dissipative phase. The CT appearance of each phase and temporal progression of the imaging findings are demonstrated.

Keywords: COVID-19; 2019-nCoV; Coronavirus; Pneumonia; Tomography; X-ray computed.

INTRODUCTION

Coronavirus disease (COVID-19) is an emerging infection that is caused by a novel coronavirus (1–3). Since December 2019, when a number of COVID-19 cases emerged in Wuhan, Hubei Province, China, infection with COVID-19 has been declared an epidemic, with new cases emerging rapidly in other regions of China and across the world (4,5). By March 4, 2020, a total of 80,424 patients have been diagnosed with COVID-19 infection, and 2984 patients have died.

Chest imaging is of great importance for the diagnosis and understood. Due to the high infectivity of the disease, histopathological examination has been limited. The advantage of CT over histologic examination is that CT can evaluate the whole lungs whereas histology is subject to sampling error, as it looks at only localized regions of the lungs. Here, we report the imaging findings and temporal progression of this disease.

METHODS AND MATERIALS

The cases reported in this study came from three hospitals (***) in China. All cases were confirmed by real-time

https://www.clinicalkey.com/#!/content/journal/1-s2.0-S0009926020301355

CT characteristics of patients infected with 2019 novel coronavirus: association with clinical type / Wang J., Xu Z., Wang J. et al. // Clin. Radiol. - 2020. - Vol. 75, № 6. - P. 408-414.

CT characteristics of patients infected with 2019 novel coronavirus: association with clinical type

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AIM: To summarise the features of chest computed tomography (CT) of a series of patients infected with 2019 novel coronavirus (2019-nCov) to speed up recognition and have a better understanding of COVID-19 disease.

MATERIALS AND METHODS: The clinical information and chest CT images of 93 patients infected with 2019-nCov from multiple centres were reviewed.

RESULTS: Of the 93 cases, abnormalities in 91 cases were located at the subpleural level, presenting with ground-glass opacity (GGO; n=69, 74.2%) and consolidation (n=56, 60.2%) in multiple lobes. Other CT features included vascular dilatation (n=83, 89.2%), interlobular septal thickening (n=29, 31.2%), bronchodilatation (n=44, 47.3%), the crazy-paving sign (n=34, 36.6%), the sieve-hole sign (n=12, 12.9%), pleural thickening (n=21, 22.6%), and pleural effusion (n=8, 8.6%). Multiple lobe involvement, including the presence of consolidation, the crazy-paving sign, interlobular septal thickening, pleural thickening and pleural effusion, was more common in critical patients with heavy/critical infection ($p<0.05$), whereas the presence of GGO, involvement of one or two lobes, and the halo sign were more common in patients with mild/common-type infections ($p<0.05$). Moreover, older age, higher body temperature, complaints of chest tightness and breathlessness, and lymphopenia was associated with heavy/critical infections.

CONCLUSION: The CT and clinical appearances of COVID-19 are variable and reflect the severity of COVID-19 to some extent.

https://www.clinicalkey.com/#!/content/journal/1-s2.0-S1477893920300958

Hao W. Clinical diagnostic value of CT imaging in COVID-19 with multiple negative RT-PCR testing / Hao W., Li M. // Travel Med. Infect. Dis. - 2020. - Vol. 34. - P., 101627. - doi: 10.1016/j.tmaid.2020.101627.

Clinical diagnostic value of CT imaging in COVID-19 with multiple negative RT-PCR testing

Dear Editor,

At the end of December 2019, an outbreak of unexplained pneumonia in Wuhan [1,2] was caused by Severe Acute Respiratory Syndrome Coronavirus −2 (SARS-CoV-2) infection named Coronavirus Disease-19 (COVID-19). As of February 22, 2020, widespread human-to-human transmission has resulted in 76,396 cases with 2,348 deaths in 26 countries. Clinically, we have found that some patients had initial negative RT-PCR results, but chest CT had typical imaging findings, including ground-glass opacification (GGO) and/or mixed consolidation. Early detection, early diagnosis, early isolation, and early treatment of these cases can effectively control the spread of the epidemic and the emergence of large outbreaks.

A 56-year old patient who traveled to Wuhan, China 5 days ago was admitted to the emergency department for an hyperthermia (39.1 °C) evolving for 1 day. Laboratory studies showed white blood cell count, lymphocyte cell count and serum procalcitonin were normal.

Several additional laboratory tests were abnormal, including C-reactive protein (48.65mg/L; normal range, 0–10 mg/L), erythrocyte sedimentation rate (23 mm/h; normal range, 0–20 mm/h) and alanine aminotransferase (57 U/L; normal range, 5–40 U/L). On admission, chest CT scan revealed multiple ground-glass opacities in both lungs, especially the extrapulmonary bands and subpleural distribution (Fig. 1 A). Three RT-PCR assay of the oropharyngeal swab samples were negative for the SARS-CoV-2 nucleic acid. After antiviral (ribavirin) and symptomatic treatment, repeat chest CT showed significant progression of multi-focal ground-glass opacification and mixed consolidation that most appeared at peripheral area of both lungs (Fig. 1 B). Therefore, we performed the fourth SARS-CoV-2 nucleic acid test and the result was positive. In the end, the patient was diagnosed with COVID-19 pneumonia.

We performed RT-PCR experiments in strict accordance with the officially recommended standard protocols. Total RNA was extracted from clinical specimens with the MagNA Pure 96 system (Roche, Penzberg, Germany). RT-PCR was conducted by iCycler thermocycler (Bio-Rad Laboratories Inc., Hercules, CA) using IQSYBR Green SuperMix (Bio-Rad Laboratories Inc., Hercules, CA) and 300 pmol/mL each primer to determine the RNA expression levels of SARS-CoV-2. Primer names and sequences were provided by the Chinese Center for Disease Control. ORF1ab-F, 5′-CCCTGTGGGTTTTACACTTAA-3′; ORF1ab-R, 5′-ACGATTGTGCATCAGCTGA-3′; ORF1ab-P,5′-CCGTCTGC GGTATGTGGAAAGGTTATGG -3′. Thermal cycling was performed at 55 °C for 10 min for reverse transcription, followed by 95 °C for 3 min and then 45 cycles of 95 °C for 15s, 58 °C for 30s.

This case was finally diagnosed with COVID-19 pneumonia, and we have performed a total of 4 swab tests. The collection, transportation, storage, nucleic acid detection reagents, and nucleic acid amplification instruments of the clinical samples were performed strictly in accordance with the standards recommended by the Chinese Center for Disease Control. Therefore, the most likely cause of the positive result of the fourth swab test for SARS-CoV-2 is a considerable increase in the amount of virus, which is related to the worsening of the patient's condition. Firstly, the clinical manifestations of the patient showed significant symptoms of high fever, shortness of breath, cough, sputum, and fatigue, compared with that at admission. Secondly, bilateral coarse breath sounds with wet rales distributed at the bases of both lungs were heard on auscultation. Thirdly, repeat chest CT showed a great progression of multi-focal GGO and mixed consolidation that most appeared at peripheral area of both lungs compared to the previous chest CT. One study illustrated that the CT imaging feature of COVID-19 pneumonia is bifocal extra-zonal distribution, bilateral and multifocal [3]. Another study showed that chest CT was more sensitive than RT-PCR (98% and 71%, respectively) [4].This is consistent with the imaging findings of this case we reported.

According to current diagnostic criteria [5], etiological examinations (such as swab tests) have become the gold standard for diagnosing SARS-CoV-2 infection and removing patient isolation. However, due to the time-consuming laboratory tests and the lack of viral substances in

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Favorable changes of CT findings in a patient with COVID-19 pneumonia after treatment with tocilizumab / Cellina M., Orsi M., Bombaci F. et al. // Diagn. Interv. Imaging. - 2020. - Vol. 101, № 5. - P. 323-324.

Favorable changes of CT findings in a patient with COVID-19 pneumonia after treatment with tocilizumab

KEYWORDS
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Severe acute respiratory syndrome coronavirus 2;
Computed tomography

Dear Editor,

Pneumonia is the most frequent and serious complication of coronavirus virus disease 2019 (COVID-19). Computed tomography (CT) has a pivotal role in COVID-19 patients with false negative real-time polymerase chain reaction (RT-PCR) results [1]. CT has also a major role in monitoring disease progression and evaluating the efficacy of treatment. New potential COVID-19 therapies are currently under investigation in multiple trials worldwide. Of these, tocilizumab has recently demonstrated effectiveness in patients with severe COVID-19 pneumonia [2]. We report the favorable changes of CT findings in a 64-year-old man, who received tocilizumab as a treatment of COVID-19 pneumonia.

A 64-year-old man without significant clinical history initially presented with syncope. His vital signs were within the normal ranges. Ear temperature was 38 °C and oxygen saturation was 99% on room air. Chest X-Rays showed mild linear densities in the lower and middle left lung fields. Laboratory investigations showed increased white blood cell count (10.900 per μL), elevated serum lactate level (250 U/L) and elevated reactive C protein (RCP) (89 mg/dL). The other blood tests showed normal results. COVID-19 was detected in a throat swab sample by RT-PCR. Due to the worsening of the blood tests on the day 2 (white blood cell count, 15.270 per μL; serum lactate level, 341 U/L; serum CRP level, 285 mg/dL), the patient was admitted to a dedicated ward. On day 6, the patients developed dyspnea; decreased of oxygen saturation (90%) and further increase of CRP was observed (336 mg/dL); white blood cell count was 10.800 per μL; interleukin-6 was 80 ng/L (normal value <6 ng/dL). On day 7, unenhanced chest CT showed the presence of diffused bilateral air space opacities, including ground glass opacities and consolidation, with prevalent posterior distribution, linear opacities, mainly peripheral, mild bilateral pleural effusion, and mediastinal lymphadenopathy (Fig. 1). Assisted ventilation was started. The patient received 2 doses of tocilizumab (8 mg/kg), 12 hours apart, on day 7 and 8. On day 9, CRP dropped to 96 mg/dL and white blood cell count to 2.360 per μL. Patient clinical condition progressively improved and ventilatory support was gradually weaned. On day 14, repeat chest CT showed mark improvement of CT findings, with size reduction of air cells opacities, density reduction of consolidations, with evidence of some ground glass opacities, peripheral reticular opacities, reduction of pleural effusion and mediastinal lymphadenopathy.

Tocilizumab is a humanized recombinant monoclonal antibody that acts as an IL-6 receptor antagonist and provided clinical benefits in a study on 21 Chinese patients with severe COVID-19 pneumonia [2]; therefore the Italian Medicines Agency (AIFA) announced on March 19 the launch of TOCIVID-19, an independent phase 2 study to assess the efficacy and safety of this monoclonal antibody in the treatment of COVID-19 pneumonia. In this scenario, chest CT plays a central role. Different studies demonstrated the importance of chest CT in the diagnosis and first assessment of COVID-19 pneumonia with demonstration of the damages to the lung parenchyma, including interstitial inflammation and consolidation, similar to the features previously reported for other coronavirus infections; however few data are currently available on the changes in chest CT findings from initial diagnosis until patient recovery, and evaluating therapeutic efficacy [3]. It is likely that in a near future, chest CT will become a pivotal tool for monitoring disease progression and effectiveness of experimental therapies in patients affected by COVID-19 pneumonia.

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Ostad S.P. CT Manifestation of COVID-19 Pneumonia; Role of Multiplanar Imaging / Ostad S.P., Haseli S., Iranpour P. // Acad Radiol. - 2020. - Vol. 27, № 5. - P. 753-754.

CT Manifestation of COVID-19 Pneumonia; Role of Multiplanar Imaging

From:

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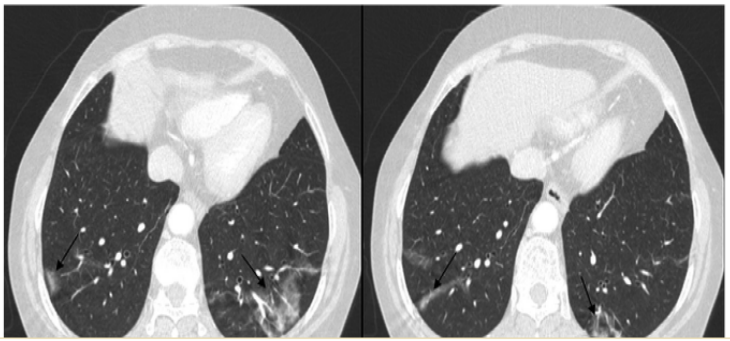
Dear Editor,

Since the outbreak of Coronavirus Disease 2019 (COVID-19) in December 2019 in Wuhan, China, an increasing body of literature has discussed the radiologic manifestations, with case reports and case series describing the important radiologic features (1). Most radiologic investigations have focused on chest CT scan because of its wide availability and high resolution. It provides a thorough insight into lung parenchymal involvement, thus leading to early diagnosis and prompt patient management. CT findings can also be used to assess the disease severity and to suggest the possibility of superimposed bacterial infection (2). Although the imaging manifestations of the new corona virus pneumonia are similar to common viral pneumonia, some more specific imaging characteristics have also been described. One of the most common radiologic presentations is patchy or punctate ground glass opacity (GGO). Patchy consolidation may also be detectable, but with less frequency (3,4). Therefore, by detecting peripheral subpleural GGO in suspected cases and in appropriate clinical setting, radiologists can often make a confident diagnosis.

However, awareness of other diseases resulting in such a radiologic pattern is essential when interpreting the CT images. Moreover, there may be some technical issues, resulting in an artifactual ground glass pattern. Figure 1 demonstrates axial chest CT images in a suspected case of COVID-19 infection referred to our center. Irregular zones of ground glass densities are visible in both lower lobes (Fig 1). Based on this finding, the chest CT scan was initially considered consistent with the COVID-19 pneumonia; however, the sagittal and coronal reconstructed images, revealed that the apparent GGOs were in fact caused by linear atelectasis in the bases of both lower lobes in an otherwise normal lung (Fig 2). On all images, structures that are partially



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A role for CT in COVID-19? What data really tell us so far / Hope M.D., Raptis C.A., Shah A. et al. // Lancet. - 2020. - Vol. 395, № 10231. - P. 1189-1190.

has widespread testing available, as strongly recommended by WHO, alongside treatment and robust contact tracing.[1] In neither country do health workers have adequate access to personal protective equipment; nor are there nearly enough hospital beds to accommodate the onslaught of patients. Even worse, by refusing to ease sanctions against Iran, Venezuela, and Cuba, the US has crippled the ability of other countries to respond, continuing to block medical supplies and other humanitarian aid.[2]

Meanwhile, Asian countries, including China, South Korea, Singapore, and Taiwan, have provided rapid, effective, and often innovative responses, thanks in part to their recent experience with outbreaks of Middle East respiratory syndrome in 2015 and the 2002–03 severe acute respiratory syndrome epidemic. China has convened hundreds of foreign officials to share lessons, and dispatched experts, masks and other supplies to Italy and other affected countries. Cuba has also sent doctors to

solidarity. The global health model is based in large part on technical assistance and capacity building by the US, the UK, and other rich countries, whose response has been sclerotic and delayed at best. A recent report by Global Health 50/50 showed that 85% of global organisations working in health have headquarters in Europe and North America; two-thirds are headquartered in Switzerland, the UK, and the USA.[4] More than 80% of global health leaders are nationals of high-income countries, and half are nationals of the UK and the USA.

Global health will never be the same after COVID-19—it cannot be. The pandemic has given the lie to the notion that expertise is concentrated in, or at least best channelled by, legacy powers and historically rich states. We must move quickly, for our own security, beyond the rhetoric of equality to the reality of a more democratic, more multipolar, more networked, and more distributed

A role for CT in COVID-19? What data really tell us so far

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Radiologists have watched the coronavirus disease 2019 (COVID-19) pandemic unfold, wondering if and how imaging could be useful for diagnosis. Perhaps imaging could aid in screening or accelerate the speed of diagnosis, especially with shortages of RT-PCR.

Some radiology literature suggests a pivotal role for CT. Ai and colleagues[1] report on 1014 patients who received both RT-PCR and CT in Wuhan, China, during their epidemic. They found that 97% of cases with RT-PCR-confirmed diagnoses had CT findings of pneumonia, and conclude, "CT imaging has high sensitivity for diagnosis of COVID-19". Other investigators are less optimistic. Inui and colleagues[2] reviewed CT scans of 112 cases of

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Pulmonary embolism in patients with COVID-19: Time to change the paradigm of computed tomography / Rotzinger D.C., Beigelman-Aubry C., von Garnier C., Qanadli S.D. // Thromb. Res. - 2020. - Vol. 190. - P. 58-59.

Letter to the Editors-in-Chief

Pulmonary embolism in patients with COVID-19: Time to change the paradigm of computed tomography

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ABSTRACT

Objective: To raise awareness for possible benefits of examining known COVID-19 patients presenting sudden clinical worsening with CT pulmonary angiography instead of standard non-contrast chest CT.

1. Background

Since December 2019, the world is facing a rapidly expanding pandemic of lower respiratory tract infection by a novel coronavirus SARS-CoV-2 (severe respiratory syndrome coronavirus 2). In some patients, this viral infection causes a clinical syndrome referred to as coronavirus disease 2019 (COVID-19), but the heterogeneity of the disease course poses a challenge to healthcare providers and optimal management of patients. The use of CT imaging in the diagnosis and follow-up has rapidly grown, and radiological patterns along the disease course are increasingly understood. While COVID-19-related lung injury shares some radiological findings with other viruses from the coronaroviridae family, some differences emerge already. To date, most, if not all the available literature regarding SARS-CoV-2 infection relies on non-contrast CT, which is considered the first-line imaging tool [1] and has even proven useful to diagnose COVID-19 pneumonia when initial polymerase chain reaction screening is negative [2].

Nevertheless, the exact role of CT imaging in the management of COVID-19 is still being debated, and evidence-based guidance regarding acquisition protocols is lacking. Current guidelines advocate the use of non-contrast chest CT for the diagnosis, severity assessment, and monitoring of COVID-19 [3]. Generally, when CT is indicated, the examination should be carried out with as little harm as possible to the sepsis, and septic shock. Coagulopathy commonly occurs in sepsis and may predict outcomes in severe COVID-19 [4]. Han et al. reported disturbed coagulation function in patients infected with SARS-CoV-2 as compared to healthy controls, including elevated D-dimer, fibrin/fibrinogen degradation products, and fibrinogen levels [5]. Additionally, two different studies by Zhou et al. [6] and Tang et al. [7] recently reported a positive correlation between elevated D-dimer levels on admission and in-hospital COVID-19 mortality, raising questions regarding potentially unknown pulmonary embolism and outlining the possible role of CT pulmonary angiography in patients with COVID-19 and rapid clinical worsening. On the other hand, taking the same patients to the CT suite several times to perform non-contrast and subsequently contrast-enhanced CT may be logistically challenging for radiology departments since time-consuming infection control measures are required.

Fig. 1 shows an example of a 75-year-old patient admitted at our institution due to low-grade fever, asthenia, chills, and odynophagia. Upon physical examination, coarse end-inspiratory crackles were noted at the right lung base. Respiratory rate was 16/min, and oxygen saturation 95% on room air. Blood sampling showed leukopenia (3.3 G/L), lymphopenia (0.79 G/L), thrombopenia (129 G/L), and normal hemoglobin levels (157 g/L). Nasopharyngeal sampling was positive for SARS-CoV-2. He suddenly developed dyspnea and tachypnea on day 4

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Serial CT features in discharged COVID-19 patients with positive RT-PCR re-test / Dou P., Zhang S., Wang C. et al. // Eur. J. Radiol. - 2020. - Vol. 127. - P. 109010. - doi: 10.1016/j.ejrad.2020.109010.

Serial CT features in discharged COVID-19 patients with positive RT-PCR re-test

Dear Editor,

The Coronavirus Disease 2019 (COVID-19) appeared in December 2019 in China and has infected more than 100,000 patients in China since then. After MDT (multi-disciplinary team treatment), more than 60,000 patients were cured and discharged from the isolation wards of designated hospitals. All of the discharged patients were negative as assayed by real-time reverse transcriptase-polymerase chain reaction (RT-PCR) tests.

Based on Chinese government guidelines, these discharge patients needed to remain in isolation in the home for 2 weeks followed by additional follow-up nucleic acid testing and chest CT examination. However, some discharged patients have retested positive using nucleic acid tests. Reports of these scattered cases have drawn huge scrutiny. Unfortunately, there are some relevant issues needing resolution. First, the capacity for transmission between persons with these patients after positive diagnosis still needs to be determined. Second, the features of serial chest CT scans need to be analyzed to improve our awareness of these cases. Finally, the reason causing these positive retest results should be discussed.

We report here the serial CT examination features of two cluster transmission cases with positive follow-up nucleic acid test results after discharge.

1. Case report

1.1. Clinical evaluation and method

The two COVID-19 cases confirmed by the Jiangsu Province Center of Disease Control and Prevention (CDC) received antiviral treatment in the isolation ward of this institution between January 25 and February 9 (Fig. 1). According to the fifth and sixth edition guidelines on COVID-19 issued by the National Health Commission of the People's Republic of China [1,2], two consecutive negative RT-PCR test results in an interval at least one day apart is the standard necessary for discharge. These two patients met all of the discharge criteria and were given discharge permission by the MDT.

presented in Table 1.

The axial, sagittal, and coronal thin slice (1.5 mm) reconstruction images from the lung (window width, 1500 HU; window level, −400 HU) and a mediastinal window (window width, 400 HU; window level, 40 HU) were used for evaluation, respectively. All of the imaging were analyzed, and a consensus was reached by two senior radiologists (K.X. and Y.K.M.) with more than 30 and 20 years of experience in interpreting chest CT imaging, respectively, who did not know detailed clinical, laboratory, epidemic or outcome information. The following image features were recorded: number, area, and density of lesion. The density and area of the largest lesion in each CT examination were also measured. For nodular lesions, the number of all lesions was also counted (***Case 2***) (Figs. 2 and 4).

1.1.1. Case 1

A 56-year-old male patient, who travelled from Guangzhou City, Guangdong Province to Xuzhou City, Jiangsu Province by train on January 14, 2020 and stayed for 6 h at Wuhan, Hubei Province Hankou Station, was the first confirmed COVID-19 case in our institution. The patient developed fever, fatigue, and cough on January 19, with the highest temperature reaching 39.5 °C, and was hospitalized in the isolation ward of our institution after 6 days (Jan 25).

Laboratory results showed decreased counts of white blood cells, neutrophils, lymphocytes, and eosinophils, and increased C-reactive protein (CRP) and lactate dehydrogenase (LDH) values (Table 1). After 9 days of treatment in the isolation ward and two consecutive negative nucleic acid tests, the patient was discharged. After isolation in his home for 17 days, the man performed throat and anus swab nucleic acid test, with positive results (Fig. 1).

The patient received six CT scans throughout the course of the disease. We report here his series of chest CT curves. The initial CT after hospitalization (Jan 28, 2020) showed multi-focal patchy ground glass opacity (GGO) with a little fibrous tissue in both the lungs, involving all of the pulmonary lobes. The curve of density showed its highest value in the second examination, and then decreased in the first follow-up examination after discharge. The area of lesion also reached a peak value in the second imaging and then decreased. Compared with the admission CT examina-