Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Correspondence

Preoperative COVID-19 CT screening in renal transplant recipients

Sir—We read with great interest the findings from the Royal College of Radiologists (RCR) national audit, which demonstrated the low sensitivity for the identification of COVID-19 in a preoperative group of patients making it difficult to justify computed tomography (CT) screening during the pandemic in the UK.[1] This corroborates our own experience[2] and that of another institution[3] in demonstrating a low diagnostic yield of CT for COVID-19 in this cohort of patients; however, in this letter, we would like to also highlight the potential impact that our reports may have in a specific cohort: renal transplant patients.

At our institution, renal transplantation continued throughout the pandemic. In the early stages of the pandemic, we performed preoperative thoracic CT as reverse transcription polymerase chain reaction (RT-PCR) testing was not available for preoperative patients. Subsequently, CT was performed in cases where RT-PCR results would not be available in an acceptable time frame prior to the operation. Here, we correlate imaging findings with PCR and re-evaluate the imaging of those patients who had CT findings classic or indeterminate for COVID-19 pneumonia, as well as determine how the radiology report affected clinical care.

We performed a retrospective study of the potential renal transplant recipients who have undergone CT chest screening for COVID-19 from 27/3/20 to 9/6/20. The study took place as part of a Trust retrospective audit and the requirement for informed consent was waived. Seventy-four CT chest examinations took place in 68 patients, 60% male, median age 53 years (range 24–77 years). CT examinations were reported according to the BSTI guidelines, with 57 reported as normal, 7 as indeterminate, 3 as classic/probable COVID-19, and 7 were reported as non-COVID-19 (four fluid overload, three infection). One patient with indeterminate findings went on to have another CT chest 25 days later, which remained indeterminate, whilst another patient with indeterminate findings had a subsequent normal CT 31 days later. 20 were reported by thoracic radiologists, whilst 54 were reported by other cross-sectional radiologists. 49 patients had nasopharyngeal swab RT-PCR, in 55% the result of RT-PCR was available within a day of the issued CT report. All patients who had a normal CT and went on to have RT-PCR had a negative RT-PCR. The only patient in the overall cohort to have a positive RT-PCR test had an indeterminate CT examination; it later transpired that this patient was symptomatic with a fever.

Eight of nine patients were suspended from the transplant waiting list because of the report (of classic/probable COVID-19 or indeterminate for COVID-19). At the time of writing, five remain on the waiting list, whilst three patients have subsequently received their transplant following a delay of 25, 33, and 61 days.

Two thoracic radiologists (H.P., L.W.) undertook the review of the nine CT examinations reported as classic/probable or indeterminate for COVID-19, blinded to the RT-PCR result, and issued a report without knowledge of the purpose of the study and cohort (see Table 1 and Fig 1). In three cases, both thoracic radiologists interpreted CT examinations as non-COVID-19 (a combination of fluid overload, infection and expiratory study) when originally the examinations had been reported as indeterminate by non-thoracic cross-sectional radiologists. There was a 48.15% overall agreement amongst the three raters (original report and re-review). The interobserver agreement was poor (free-marginal kappa 0.31, 95% confidence interval [CI]: 0.05–0.56). Interobserver agreement was better between the two chest radiologists on blinded review: 66.7% overall agreement with a moderate agreement of free-marginal kappa 0.56 (95% CI: 0.12–0.99). The interpretation and representative images are provided below, alongside patient outcomes.

Our findings highlight the difficulties in classification of CT findings in this cohort and emphasise the challenges in differentiating between British Society of Thoracic Imaging (BSTI) categories, particularly those of indeterminate and non-COVID with poor interobserver agreement; this has also been found on chest radiography.[4] In this cohort, ground-glass opacity, the hallmark of COVID-19 infection, may in fact be caused by a degree of fluid overload secondary to end-stage renal failure, and this is supported by the reclassification of two cases as volume overload by reinterpretation by thoracic radiologists. Time since dialysis and patient's admission weight (in comparison to their "target" or "dry" weight) may lend important additional clinical information when interpreting preoperative scans in this cohort. Furthermore, this cohort of patients is also more susceptible to bacterial infection and other comorbidities or medication effect,

Table 1
Results from second reporting of the nine CT examinations reported as classic/probable or indeterminate for COVID-19.

Case	Initial report	Reporter 1	Reporter 2	PCR	Outcome
1	Classic/probable (general radiologist)	Indeterminate	Classic/probable	Negative	Suspended: remaining on waiting list
2	Classic/probable (thoracic radiologist)	Classic/probable	Classic/probable	Negative	Postponed and happened 61 days later
3	Indeterminate (general radiologist)	Non-COVID-19 (other infection)	Non-COVID-19 (other infection)	Positive	Suspended: remaining on waiting list
4	Indeterminate (general radiologist)	Indeterminate	Indeterminate	Negative	Postponed and happened 25 days later
5	Indeterminate (general radiologist)	Non-COVID-19 (fluid overload)	Non-COVID-19 (fluid overload)	Negative	Postponed and happened 33 days later
6	Classic/probable (general radiologist)	Indeterminate	Indeterminate	Negative	Suspended: remaining on waiting list
7	Indeterminate (thoracic radiologist)	Indeterminate	Non-COVID-19 (other infection)	Negative	Proceeded as planned
8	Indeterminate (general radiologist)	Indeterminate	Non-COVID-19 (infection/atelectasis)	Negative	Suspended: remaining on waiting list
9	Indeterminate (general radiologist)	Non-COVID-19 (expiratory study/viral infection/fluid)	Non-COVID-19 (expiratory study/viral infection/fluid)	Negative	Suspended: remaining on waiting list

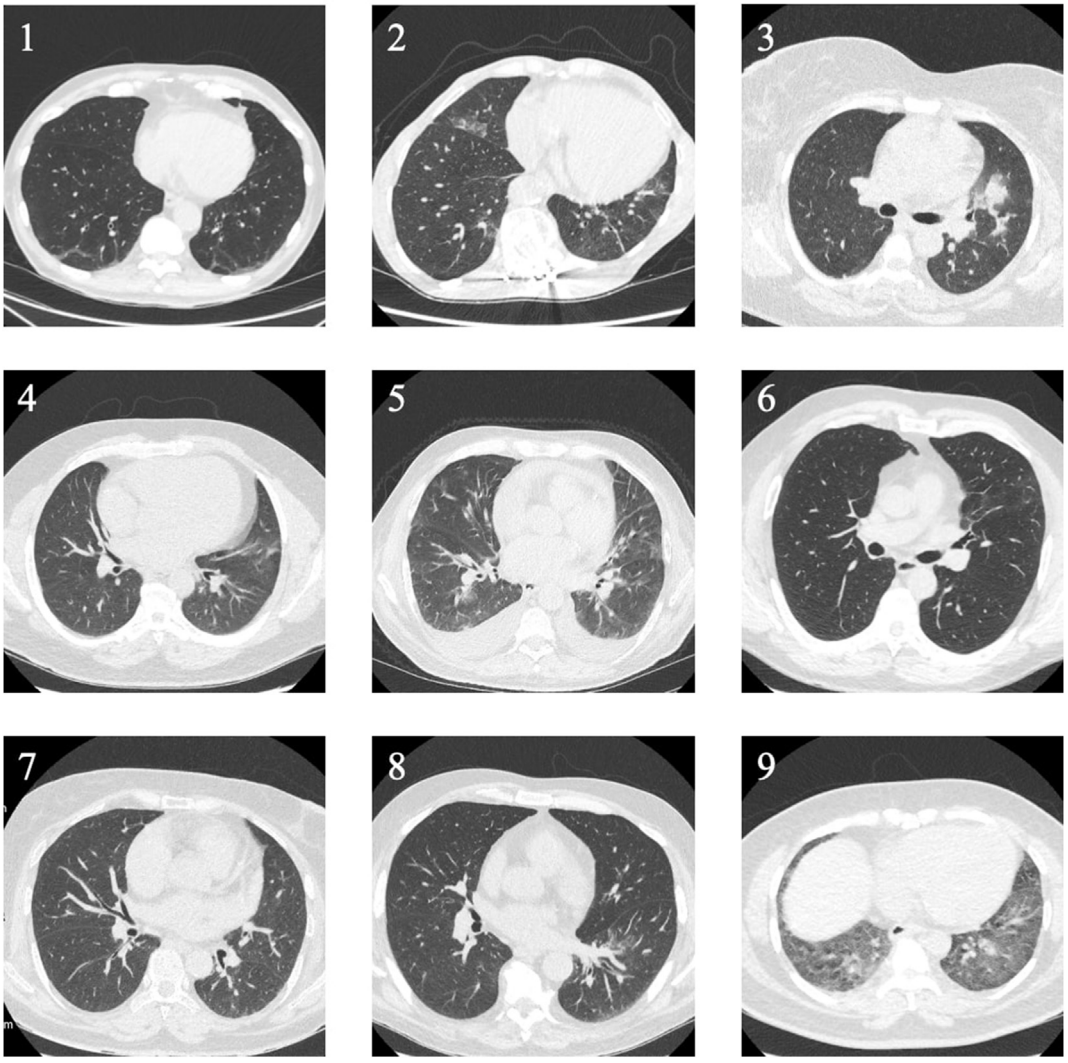

Figure 1 Example images from the nine cases classified as indeterminate for COVID-19 or classic/probable COVID-19 on initial report.

which may challenge interpretation. Meanwhile, the patient who was symptomatic and RT-PCR positive had indeterminate features on CT: unilateral, relatively central consolidation/ground glass. Overall, therefore, these findings support the assertion made by National Institute for Health and Care Excellence (NICE) guidelines[5] that CT should not be performed in patients preoperatively with no symptoms.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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M.T. Tsakok*, M. Chetan, R. Shaw, L. Wing, H. Peschl
John Radcliffe Hospital, Oxford University Hospitals NHS Foundation Trust, Headley Way, Oxford, UK
* Guarantor and correspondent: M.T. Tsakok.
E-mail address: maria.tsakok@doctors.org.uk (M.T. Tsakok)

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Re: clinical characteristics and radiological features of children infected with the 2019 novel coronavirus

Sir—We read with interest the article by Lu *et al.* in the Journal. The authors stated that chest computed tomography (CT) is a key component in the diagnostic work-up for patients with suspected 2019 novel coronavirus (COVID-19) infection[1]; however, studies have shown that the patterns of COVID-19 infection on CT are non-specific and variable, ranging from normal to abnormal with no correlation to timing of positive viral detection.[2] It is based on this evidence that the Centers for Disease Control and Prevention (CDC) state that the chest radiograph or CT alone is not recommended for the diagnosis of COVID-19.[2] The American College of Radiology (ACR) also does not recommend CT for screening or as a first-line test for diagnosis of COVID-19.[3] Recently, the European Society of Paediatric Radiology (ESPR) taskforce has written similar guidance echoing that imaging should not be used routinely for the diagnosis of COVID-19 in children, but reserved for cases where results are anticipated to alter the management.[4]

We note that CT was recommended as the major evidence of clinical diagnosis in HuBei province by the National Health and Health Commission of China (5th edition).[5] It is unclear if this was targeted at the adult or paediatric population, but one would assume this was the former in view of the severity of disease in the adult versus the paediatric population. Although there may be different guidance in Guangzhou province, if the HuBei province recommendation was used, it may be the case that the authors had to perform CT in these children; however, the blanket application of this guidance to the paediatric population disregards the “as low as reasonably achievable” (ALARA)[6] principle and the Image Gently Alliance,[7] which advocates that when studies are indicated, they should be performed with the lowest radiation exposure that will allow diagnosis.

Although the study’s patients all tested positive using the oropharyngeal test, they had relatively mild symptoms (one had a high fever of 39.1°C) and none necessitated intensive care admission. The patients’ mild clinical symptomatology did not, in our opinion, warrant CT. In particular, it is questionable if a chest radiograph was even justifiable in the one asymptomatic patient who remained asymptomatic with no clear/overt abnormality seen on both the chest radiograph and CT performed. Applying the British Society of Thoracic Imaging (BSTI)[8] radiology decision tool for suspected COVID-19, at least two patients would not have had a chest radiograph, much less a chest CT. The follow-up CT exaiminations performed in two patients also goes against the ALARA principle and guidance from the Image Gently Alliance: one patient had rhinorrhea while the other had a low-grade fever (36.8°C) and cough. As these patients already had a radiographic abnormality, would it not be reasonable for follow-up with a chest radiograph instead of CT?

Lastly, we acknowledge that this was a retrospective study and understand the potential importance of identifying the radiological manifestations of COVID-19 in the midst of a world-wide pandemic; however, moving forward, we argue that the risk of radiation exposure to the