European Radiology (2021) 31:1185–1193
https://doi.org/10.1007/s00330-020-07252-3

CHEST

The use of imaging in COVID-19—results of a global survey by the International Society of Radiology

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Received: 24 June 2020 / Revised: 12 August 2020 / Accepted: 31 August 2020 / Published online: 17 September 2020

Abstract

Objectives This survey conducted by the International Society of Radiology and supported by the European Society of Radiology aimed to collect information regarding radiology departments' current practices in the management of patients with COVID-19.

Methods Responses from 50 radiology departments involved in the management of COVID-19 patients representing 33 countries across all continents were analyzed. The analysis revealed important variations in imaging practices related to COVID-19 across the world for different disease severity and various clinical scenarios.

Results Imaging is usually not performed in asymptomatic patients (69% of institutions do not image) but is used at the end of confinement (in 60% of institutions). In the majority of institutions, chest imaging is used in suspected or confirmed patients with COVID-19 (89% and 94%). All imaging departments involved in this survey reported the use of imaging in COVID-19 patients showing severe symptoms or who were critically ill. However, there is a wide variation in imaging modality type used for each clinical scenario. The use of imaging is applied in line with existing guidelines and recommendations in 98% of institutions with structured reporting recorded in 58% of institutions. The vast majority of institutions reported a significant impact of the COVID-19 pandemic on the imaging department's routine activity (83%).

Conclusion We believe that the results of this survey will help to understand current heterogeneities in radiology practice and to identify needs and gaps in the organization and function of radiology departments worldwide in relation to the COVID-19 pandemic. The results of this survey may inform the development of an overall strategy for radiology department organization and imaging protocols in pandemic conditions.

Key Points

- *The results of this survey, which included responses from 50 radiology departments representing 33 countries, showed important variations in imaging practices related to COVID-19 across the world.*
- *While imaging is usually not performed in asymptomatic patients (69% of institutions), it is used in suspected or confirmed patients with COVID-19, in COVID-19 patients showing severe symptoms or who were critically ill, and at the end of confinement (89%, 94%, 100%, 100%, 60% of institutions, respectively). However, there is a wide variation in imaging modality type used for each clinical scenario.*
- *In 98% of institutions, the use of imaging is applied in line with existing guidelines and recommendations, with structured reporting recorded in 58% of institutions. COVID-19 pandemic made a significant impact on the imaging department's routine activity in 83% of institutions.*

Keywords COVID-19 pandemic · Radiology department · Survey

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s00330-020-07252-3) contains supplementary material, which is available to authorized users.

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Abbreviations

ACR	American College of Radiology
BSTI	British Society of Thoracic Imaging
CBR	Brazilian College of Radiology
COVID-19	Coronavirus disease 2019
CSR	Chinese Society of Radiology
CXR	Chest X-ray
ENT	Ears, nose, and throat
ESR	European Society of Radiology
ESTI	European Society of Thoracic Imaging
HAS	French National Health Authority
ICU	Intensive care units
ISR	International Society of Radiology
LUS	Lung ultrasound
PE	Pulmonary embolism
RANZCR	Royal Australian and New Zealand College of Radiologists
RCR	UK Royal College of Radiologists
RSR	Russian Society of Radiology
RT-PCR	Reverse transcriptase polymerase chain reaction
SERAM	Spanish Society of Radiology
SFR	French Society of Radiology
STR	Tunisian Society of Radiology

Introduction

A group of patients with atypical pneumonia was identified in Wuhan, China, in December 2019. The causative virus was named severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and the associated disease—coronavirus disease 2019 (COVID-19) [1–3]. Soon thereafter, COVID-19 has spread rapidly throughout the world. The World Health Organization (WHO) declared the outbreak of public health emergency of international concern at the end of January 2020 and in March 2020 the global health situation was characterized as a pandemic outbreak.

Although the diagnosis of COVID-19 is confirmed by the identification of viral RNA in reverse transcriptase polymerase chain reaction (RT-PCR), chest imaging plays an important role in the diagnostic workup of patients with possible or suspected disease, in particular in settings where RT-PCR testing is not available or test results are delayed, as well as in patients showing respiratory symptoms associated with COVID-19 in whom RT-PCR tests are initially negative. Furthermore, chest imaging is used in the clinical management and follow-up of patients with COVID-19 in addition to laboratory parameters and clinical findings. Finally, in some patients with COVID-19, different imaging exams and image-guided procedures of various body sections have to be undertaken in line with proper indications [4].

In the context of the COVID-19 pandemic, all health facilities have been faced with an urgent need for setting up new organization models and adapting protocols regarding the management of patients with COVID-19. Radiology departments also had to adapt their workflow and to organize workforce according to the new circumstances. The International Society of Radiology (ISR) and the European Society of Radiology (ESR) recognized a need to get an insight of radiology department organization during the COVID-19 pandemic and therefore conducted this global survey with the aim to collect information regarding current practices of radiology departments in the management of COVID-19 patients.

Material and methods

The survey was conducted from the 6th to 26th of April 2020. For this purpose, an online questionnaire regarding the use of imaging in COVID-19 patients was prepared using Survey Monkey. The survey was sent to renowned representatives of ISR and ESR member countries.

The questionnaire was composed of six clinical scenarios regarding different levels of disease probability (*suspected case/confirmed case*), disease severity (*asymptomatic/severe symptoms/critically ill patient*), and patient management (*hospital discharge*). The use of imaging was assessed first in two clinical scenarios set up in situations of different probabilities of COVID-19—in symptomatic patients with suspected COVID-19 and in patients with confirmed disease, and secondly in three clinical scenarios with different disease severities—in asymptomatic subjects, in patients with severe symptoms and in critically ill patients. Furthermore, the use of imaging for decision-making related to the discharge of hospitalized patients with COVID-19 was investigated. Under each scenario, several questions were posed about the type of imaging modality performed (chest X-ray, chest CT, lung US, MRI) and the reason for imaging use in that particular clinical scenario. Additionally, three general questions on whether departments undertook the measures recommended by existing guidelines, structured reporting of imaging in patients with COVID-19, and the impact of the COVID-19 pandemic on radiological department's organization were included in the survey. Finally, at the end of the survey, respondents could add any type of comments in a free-text field. The survey questionnaire form is included in Annex 1.

Results

Information about the use of imaging in patients with suspected or confirmed COVID-19 was collected in order to assess current imaging practices in different clinical scenarios related to COVID-19. The survey gathered responses from 52