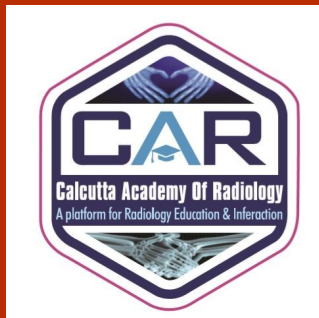


- Coronaviruses are a large family of viruses that are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS).
- A novel coronavirus (COVID-19) was identified in 2019 in Wuhan, China. This is a new coronavirus that has not been previously identified in humans.

**INSIDE
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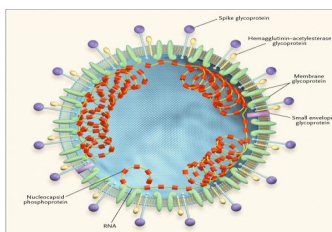
COVID-19

Hi! Namaste,

This is Dr. Viral Parekh from Kolkata, India. As you all know, we are living in an unusual time and facing the biggest challenge of our time - Covid - 19 - Corona Virus Disease.

I had no idea that in 21st. Century we would be facing a pandemic like this. All these years, the medical fraternity was under impression that our science has advanced so much that we have conquered most of the diseases and we are almost invincible. But here comes a microscopic particle and causes a havoc all over the world and we realize that how helpless we are. Is it a nature's way to make us humble? I don't know, but for now, we the protagonists of CAR - Dr. Anup Sadhu, Dr. Bijon Kundu and yours truly are dedicating first issue of our much awaited newsletter to

COVID. The basics of disease and the various aspect of Radiology concerning the disease will be discussed here. Basically, this is a compilation of various resources and whole idea is to create



Coronavirus

awareness about the disease and its Radiological aspects.

Being medical practitioners, it is our social responsibility to educate the community and to prevent the spread of disease as much as possible.

I am yet to see a Radiograph or CT scan of a known COVID

patient. So, I or for that matter most of the Radiologists of our country have very limited experience of its Radiological aspects. However, Dr. Mahaveer Goyal has seen 6 patients of serum positive COVID-19 patients. He has shared his experience with us in a pictorial essay. Dr. Kulbir Ahlawat, Director of Radiology of Medanta Medicity Hospital has also shared his experience with us. Dr. Amar Udare also chipped in at the last moment and shared his experiences with us.

WHO and various Radiological societies have brought out literature about the disease which I have compiled here.

One clarification here is that though my name is Viral, it has nothing do with any virus. It is derived from a Sanskrit word, which means something rare or scarce.

Basics of Covid -19 - WHO information

The COVID-19 virus affects different people in different ways. COVID-19 is a respiratory disease and most infected people will develop mild to moderate symptoms and recover without requiring special treatment.

People who have underlying medical conditions and those over 60 years old have a higher risk of developing severe disease and

death.

People with mild symptoms who are otherwise healthy should self-isolate and contact their medical provider or a COVID-19 information line for advice on testing and referral.

People with fever, cough or difficulty in breathing should call their doctor and seek medical attention.

Common symptoms include:

- fever
- tiredness
- dry cough.

Other symptoms include:

- shortness of breath
- aches and pains
- sore throat
- and very few people will report diarrhoea, nausea or a runny nose.



Dr. Amar Udare
MD, DNB
Fellow in Cross-Sectional
Imaging,
McMaster University,
Hamilton,
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amarudare@gmail.com
Creator of radiogyan.com

Dr. Amar Udare is a young and dynamic Radiologist. He is now doing his fellowship in Cross sectional imaging at Hamilton, Canada, He has developed a website - radiogyan.com - A free radiology website for radiology residents and professionals. He runs a Telegram group also, where thousands of Radiologists and Residents are members. Bravo Amar, for helping the fraternity and spreading the knowledge. We are proud of you. Here are excerpts from an article by him.

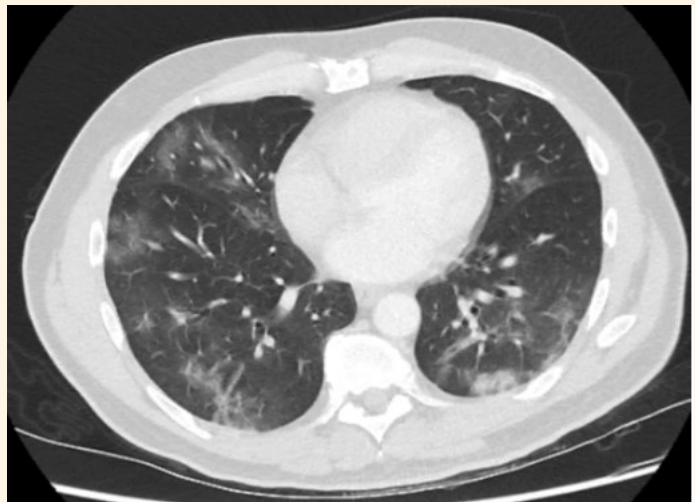
Sample cases: CT findings in patients with proven COVID-19 pneumonia

Imaging features of Novel Coronavirus (COVID-19) on CT

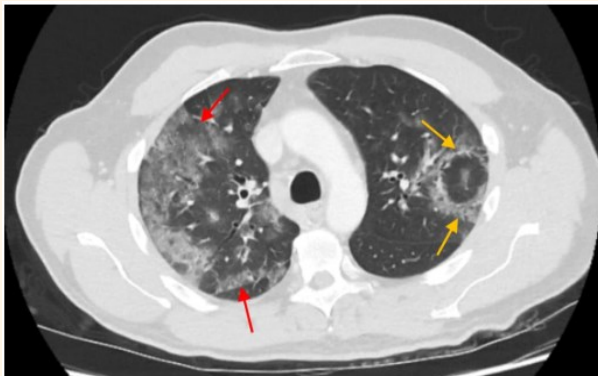
- ➊ Bilateral **peripheral** basal dependent ground-glass opacities (GGOs) are the hallmark, especially early in the disease.
- ➋ Consolidations can be seen in the later stages, but rare to see them without GGOs
- ➌ Later stages can show crazy-paving appearance, **reverse halo (atoll) sign**.
- ➍ Some patients can have a rounded appearance of opacities.

Following features **are NOT seen**, typically in the early stages:

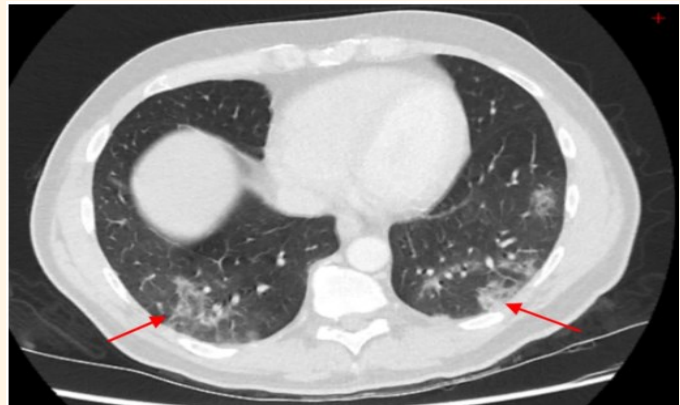
- » Pleural effusions
- » Lymphadenopathy
- » Cavitation
- » Discrete nodules
- » Lobar consolidation
- » Tree-in-bud opacities.



Bilateral peripheral ground-glass opacities



Peripheral distribution of ground-glass opacities (red arrow) with reverse halo or atoll sign (yellow arrow)



Basal predominant ground-glass opacities in a patient with COVID-19 pneumonia



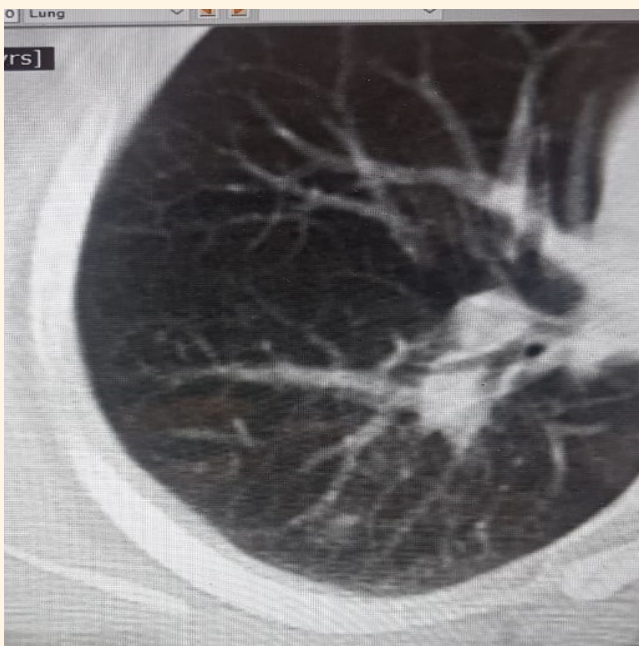
Patchy ground-glass opacities in a patient with COVID-19 pneumonia.



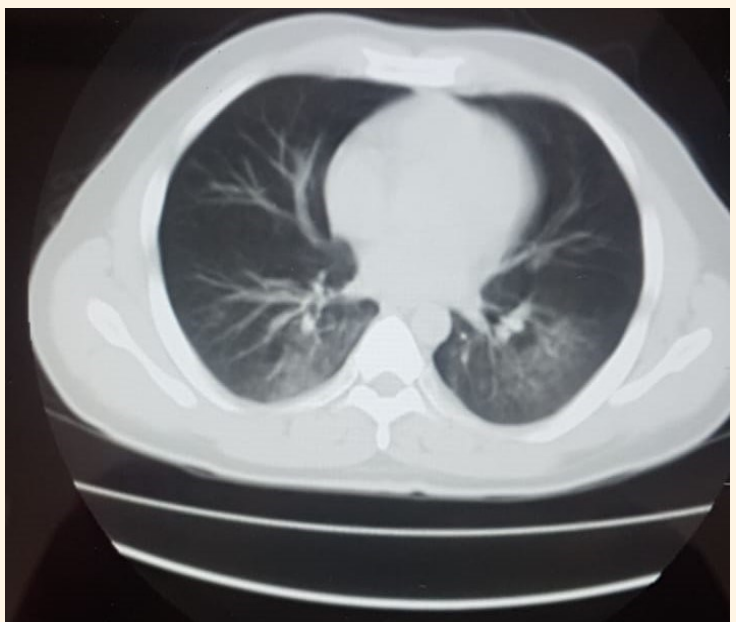
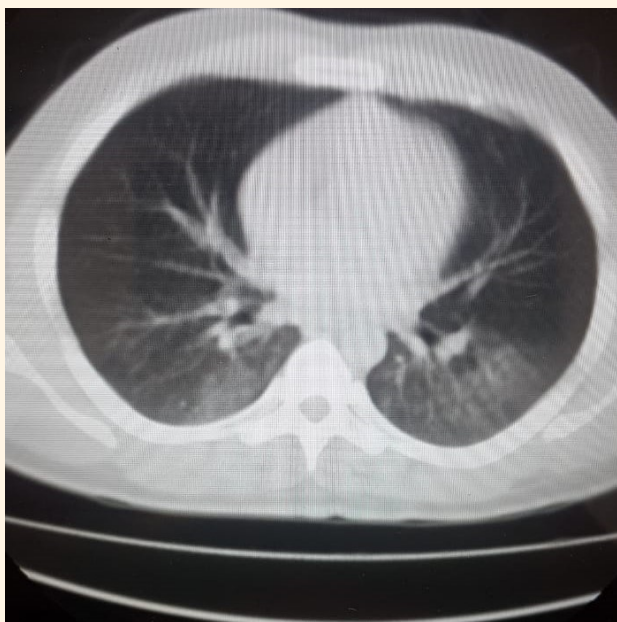
Dr. Mahaveer Goyal,
MD, FICR
Infinity Scans,
Jaipur Nuclear Imaging Pvt.
Ltd.
DKM Diagnostics, Jaipur,
Rajasthan.
Former Secretary of ICRI and
IRIA, Rajasthan Branch

Dr. Mahaveer Goyal, a senior Radiologist from Jaipur, Rajasthan has kindly consented to share his experience with us. He has given us CT scan images of 6 patients, who were all COVID-19 positive and all of them have now recovered and their RT-PCR have become negative and are still under quarantine. The age of these patients varies between 22 to 40 years. Few of them were healthcare workers also. Here are the images.

Patient 1 : 35 years old male patient with small bilateral basal ground glass opacities. No pleural effusion. Patient recovered symptomatically and now has become serum negative and still under quarantine.



Patient 2 : 28 years old male patient with bilateral peripheral ground glass opacities. No pleural effusion. Patient recovered symptomatically and now has become serum negative and still under quarantine.

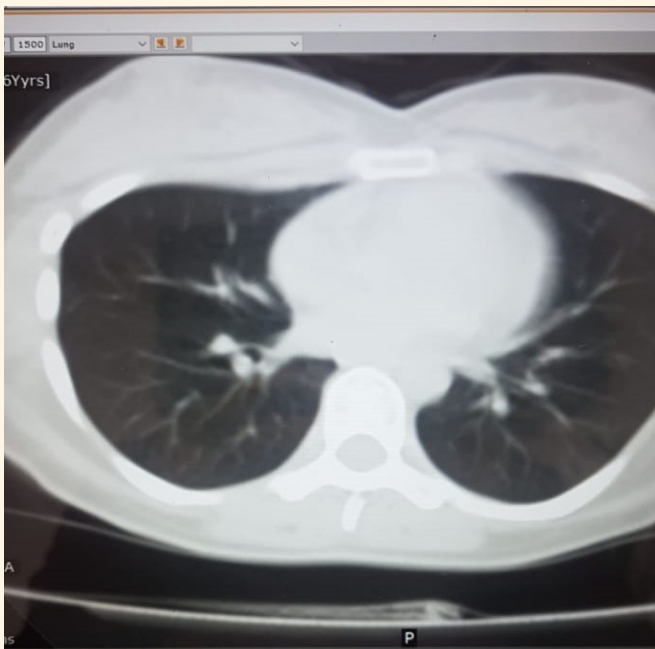




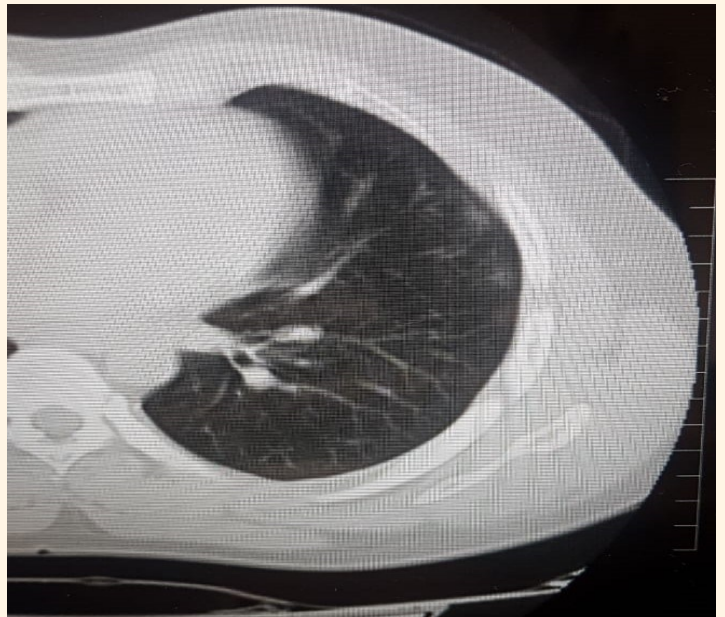
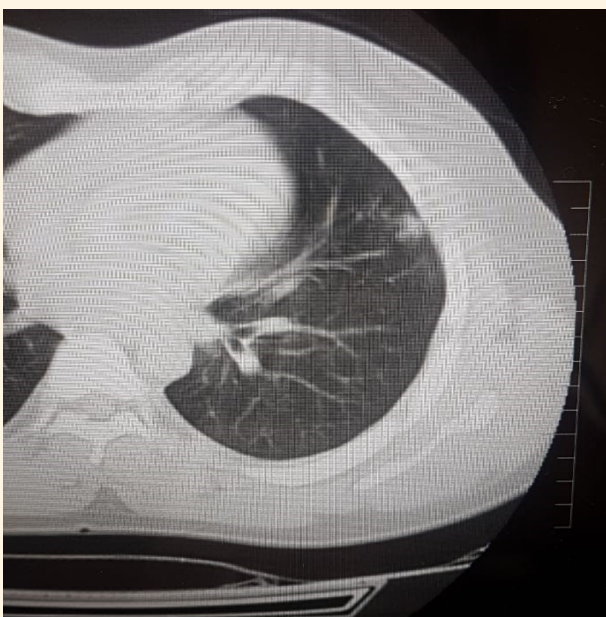
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Patient 3 : 26 years old female patient. Serum positive. CT scan was normal. Now serum negative.



Patient 4 : 22 years old male patient with small alveolar opacities. No pleural effusion. Patient recovered symptomatically and now has become serum negative and still under quarantine.

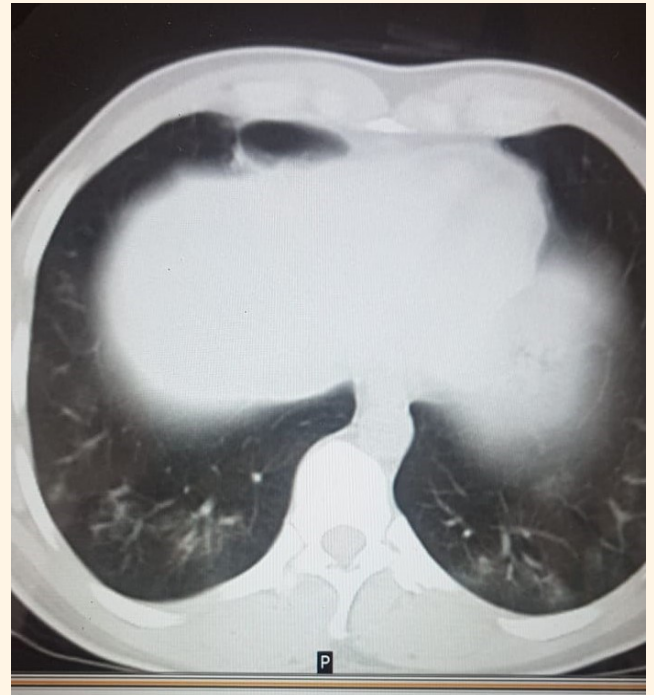
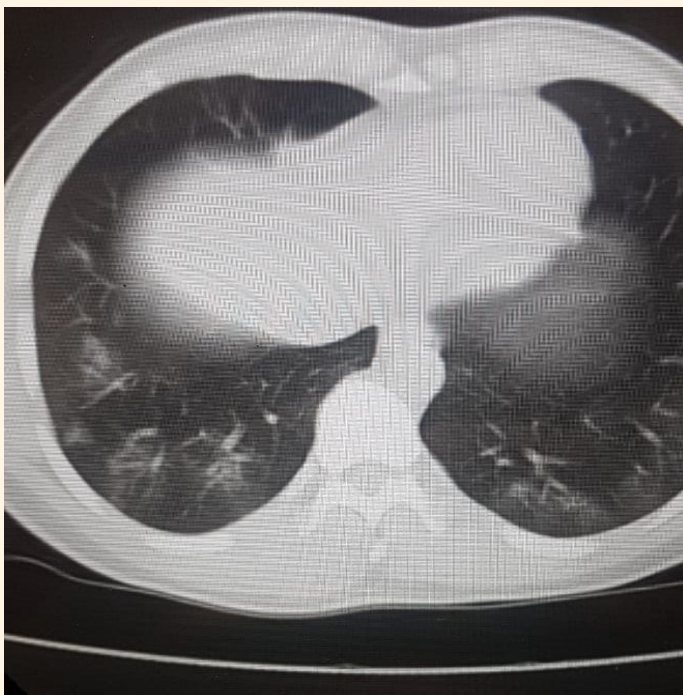




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Patient 5 : 32 years old male patient with small bilateral basal ground glass opacities. No pleural effusion. Patient recovered symptomatically and now has become serum negative and still under quarantine.

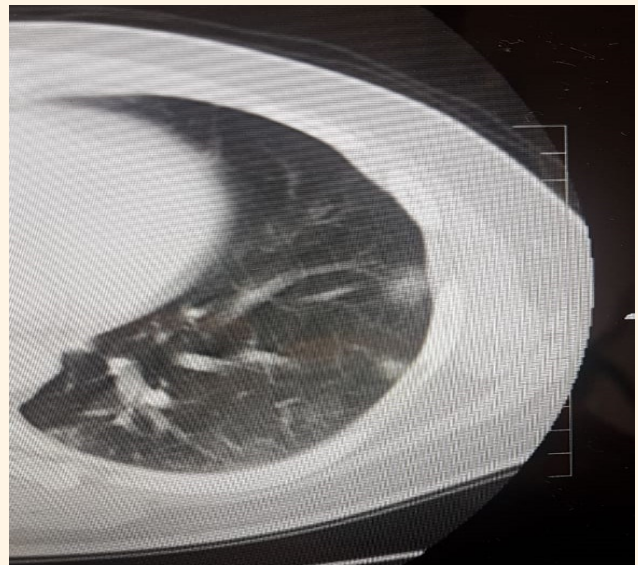




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Patient 6 : 40 years old male patient with small bilateral ground glass and alveolar opacities. No pleural effusion. Patient recovered symptomatically and now has become serum negative and still under quarantine.

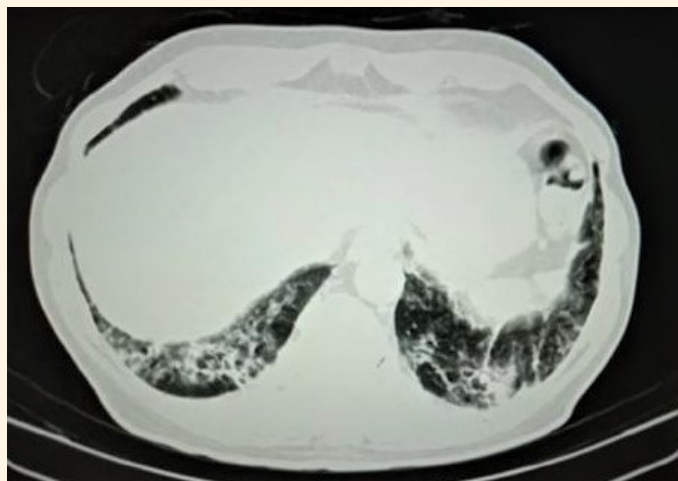
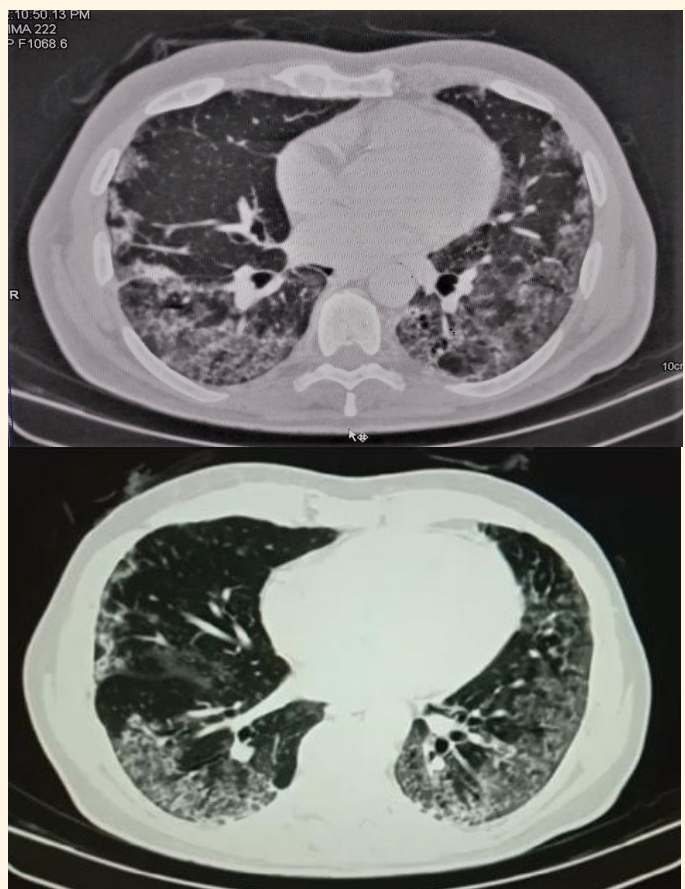
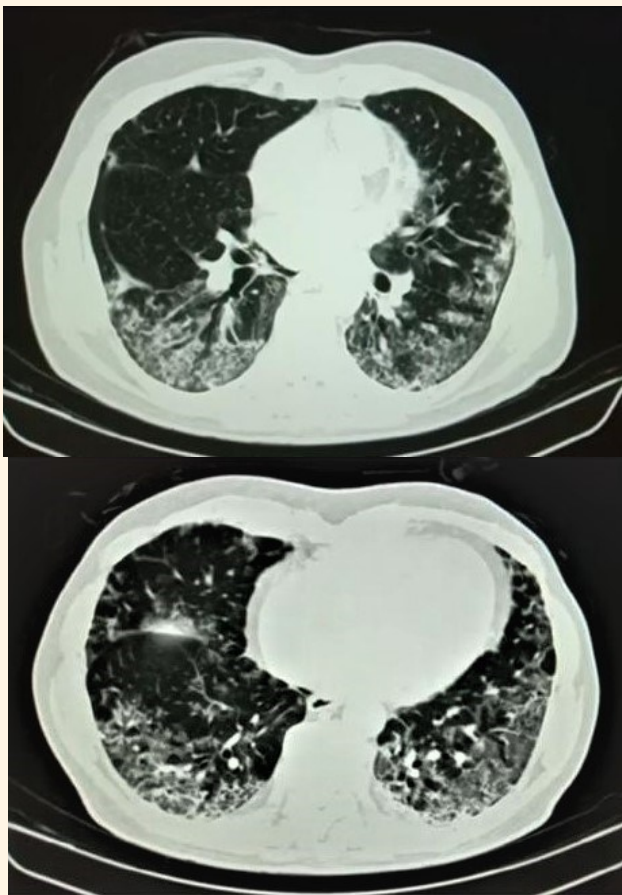




Dr. Kulbir Ahlawat, MD
Director of Radiology
Medanta,
The Medicity Hospital,
Gurgaon,
Haryana, INDIA.

Dr. Kulbir Ahlawat, Director of Radiology at Medanta Medicity Hospital, Gurgaon, India has kindly consented to share his experience with us. He has given us few CT scan images and a series of X-ray images which shows progression of the Covid-19 over a period of time.

Patient 1 : CT scan showing perivascular and ground glass opacities and consolidation. The imaging appearances resemble those of organising pneumonia. and are frequently accompanied by pleural effusions.

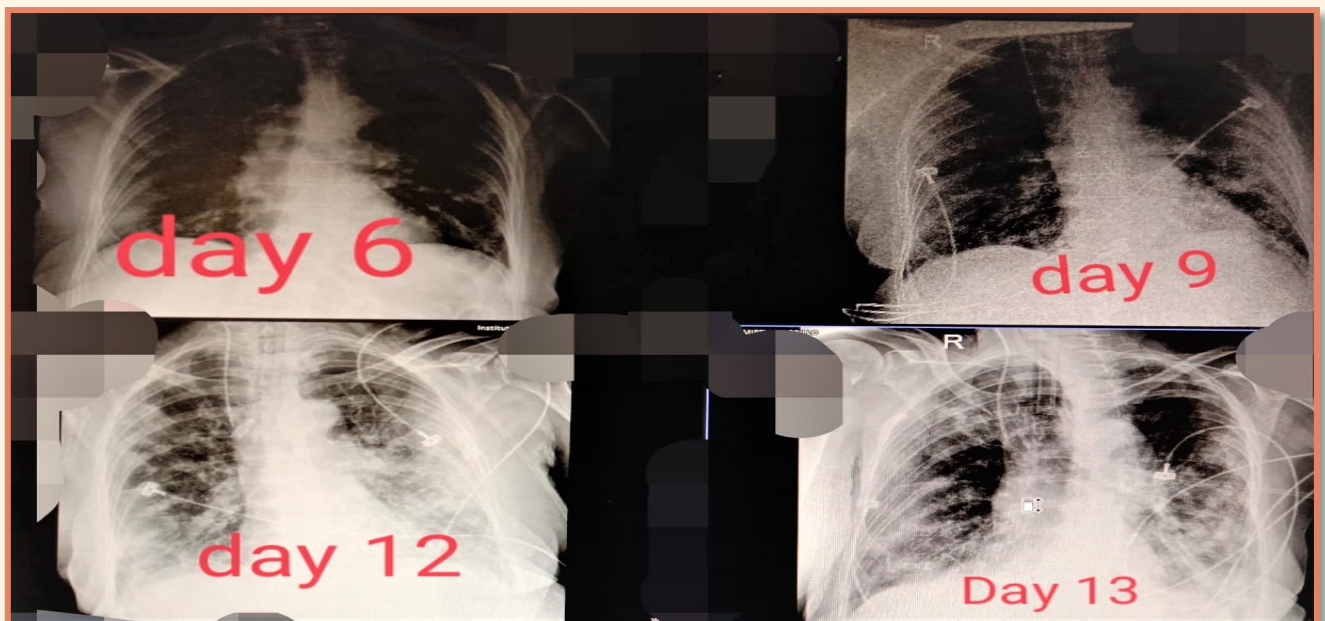




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Patient 2: Serial skiagrams showing progression of the disease over a period of time.



We are thankful to Dr. Kulbir Ahlawat, Dr. Mahaveer Goyal and Dr. Amar Udare for sharing their experiences with us and in the process helping the Radiological fraternity.

What Radiology Department Should Know



WHO information

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

The best way to prevent and slow down transmission is be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol based rub frequently and not touching your face.

The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow).

At this time, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments. WHO will continue to provide updated information as soon as clinical findings become available.

The novel COVID-19 is highly contagious and is believed to transmit mostly through respiratory droplets, but there is uncertainty as to whether the virus can be transmitted by touching a surface or an item that is contaminated (ie, a fomite). Droplets have the greatest risk of transmission within 3 ft., but they may travel up to 6 ft. from their source. So, following precautions are must.

Patient:

1. Portable imaging

equipment limits transportation of the patients. So minimizes the chance of spreading the infection.

2. Patient should wear a surgical mask while entering and leaving the Radiology Department.

Medical Staff should wear:

1. Eye protecting goggles.
2. Face mask.
3. Disposable fluid-resistant gown.

Environment:

1. Disinfect after contact with every Covid-19 suspected patient.
2. All image viewing stations, mouse and keyboard should be sanitized.
3. Sanitise CT and MRI gantries.
4. Sanitise Ultrasound probes, probes.

Reference: Soheil Kooraki et. al J Am Coll Radiol 2020

How to clean Imaging equipment in COVID 19 Infection

The viral load of coronaviruses on inanimate objects during an outbreak is unknown, but it's plausible that disinfection methods should help, especially when applied to frequently touched surfaces where you might expect the viral load to be most potent, according to the study.

The investigators cite the World Health Organization, which advises that

1. Environmental cleaning and disinfection procedures are followed consistently and correctly.
2. Thoroughly cleaning environmental surfaces with water and detergent and applying com-

monly used hospital-level disinfectants (such as sodium hypochlorite) are effective and sufficient procedures.

3. Ethanol at concentrations between 62 percent and 71 percent reduced coronavirus infectivity within 1 min exposure time by 3.0–4.0 log₁₀, according to the study.
4. Concentrations of 0.1–0.5 percent sodium hypochlorite and 2 percent glutaraldehyde were also quite effective with > 3.0 log₁₀ reduc-

tion in viral titre.

5. In contrast, 0.04 percent benzalkonium chloride, 0.06 percent sodium hypochlorite and 0.55 percent ortho-phthalaldehyde were less effective.
6. The endemic human coronavirus strain (HCoV-) 229E can remain infectious on certain surfaces for as little as 2 hours or up to 9 days.

Ref: Article from Infection control today.

BSTI COVID-19 CXR Report template

Findings

Normal

COVID-19 not excluded.
Correlated with RT-PCR

Classic/Probable COVID-19

Lower lobe and peripheral predominant multiple opacities that are bilateral (>> unilateral)

Indeterminate for COVID-19

Does not fit Classic or Non-
-COVID-19 descriptors

Non-COVID-19

Pneumothorax / Lobar pneumonia / Pleural effusion(s) / Pulmonary oedema

Quantifying disease

Mild / Moderate / Severe

Other findings

Codes for subsequent Radiology Information System search:

CVCX0 = Normal.

CVCX1 = Classic

CVCX2 = Indeterminate

CVCX3 = Non-Covid 19



BSTI: CT reporting template: COVID-19

Pre-existing lung findings

1. Emphysema - None/mild/moderate/severe
2. Fibrosis - None/mild/moderate/severe

Findings:

1. Normal
2. Classic/probable COVID-19 Predominant pattern - Bilateral basal GGO/Crazy paving/Peripheral consolidation/Reverse halo/Perilobular.
3. Indeterminate for COVID –19-Does not fit classic or Non-CVID 19 patterns or clinical context.
4. Non-COVIC-19 - Lobar pneumonia/Cavitation/Tree in Bud/Centrilobular nodules/Lymphadenopathy/Pleural effusion.

Disease Distribution:

1. Upper - Central 2/3
2. Middle—Peripheral 1/3
3. Lower
4. Random
5. Broncho centric Y/N

Conclusion:

1. Normal
2. Classic/Probable COVID-19 infection
CT severity score
Mild /Moderate/Severe
Pure GGO, ≤ 3 focal abnormalities and all ≤ 3 cm
Pure GGO, > 3 focal abnormalities or > 3 cm max diameter, consolidation, architectural distortion
3. Indeterminate for COVID-19 infection
CT severity score
Mild ≤ 3 focal abnormalities and all ≤ 3 cm max diameter
Mod/Severe > 3 focal abnormalities or > 3 cm max diameter
4. Non-COVID-19
Correlate with RT-PCR

Codes for RIS searches:

- CVCT0 = Normal
CVCT1 = Classic/probable
CVCT2 = Indeterminate
CVCT3 = Non-COVID-19

COVID-19: Structured Reporting for Chest CT

RSNA Expert Consensus Document on Reporting Chest CT findings related to COVID-19.

Endorsed by the STR & ACR 3/24/2020

Classification	Rationale	CT Finding	Suggested Reporting Language
Typical	Commonly reported imaging features of greater specificity for COVID-19 pneumonia	- Peripheral, bilateral (multilobar), GGO w/ or w/o consolidation or visible intralobular lines ("crazy-paving") - Multifocal GGO of rounded morphology w/ or w/o consolidation or visible intralobular lines ("crazy-paving") - Reverse halo sign or other findings of organizing pneumonia (seen later in the disease)	Commonly reported imaging features of (COVID-19) pneumonia are present. Other processes such as influenza pneumonia and organizing pneumonia, as can be seen with drug toxicity and connective tissue disease, can cause a similar imaging pattern. [Cov19Typ]
Indeterminate	Nonspecific imaging features of COVID-19 pneumonia	Absence of typical features AND the presence of: - Multifocal, diffuse, perihilar or unilateral GGO w/ or w/o consolidation, lacking a specific distribution, & are non-rounded or non-peripheral - Few very small GGO with a non-rounded & non-peripheral distribution	Imaging features can be seen with (COVID-19) pneumonia, though are nonspecific and can occur with a variety of infectious and noninfectious processes. [Cov19Ind]
Atypical	Uncommonly or not reported features of COVID-19 pneumonia	Absence of typical or indeterminate features AND presence of: - Isolated lobar or segmental consolidation w/o GGO - Discrete small nodules (centrilobular, tree-in-bud) - Lung cavitation - Smooth interlobular septal thickening w/ pleural effusion	Imaging features are atypical or uncommonly reported for (COVID-19) pneumonia. Alternative diagnoses should be considered. [Cov19Aty]
Negative	No features of pneumonia	No CT features to suggest pneumonia	No CT findings present to indicate pneumonia. (Note: CT may be negative in the early stages of COVID-19) [Cov19Neg]

ORANGE optional; PURPLE for report coding

COVID-19 and Teleradiology - Viral Parekh

There are two school of thoughts amongst the Radiologists. One for and another against Teleradiology. But with this pandemic, I am all for Teleradiology. Because in difficult times like this, when most of the world is locked down, Teleradiology is a great saviour. But in our country, biggest problem is that there is no standardization of Teleradiology services. There is also no clear directive from various clinical establishments regarding its legality. But in Western world, there are clear cut guidelines and it is a legal sys-

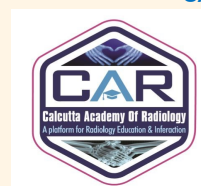
tem of providing Radiology services. Another problem is since Teleradiology in India is controlled by various business organizations, who dictate the terms and walk away with major chunk of fees. So, most of us are not for Teleradiology.

But we must come forward and our parent organization - IRIA must formulate guidelines and push for its standardization and legalization with various clinical licensing authorities.

Radiologists must get united and start a group Teleradiology service and should not

depend on Teleradiology service providers. For a start, you can use cloud based storage drive. Many open source DICOM viewers are also available. So, initial investment will not be much. But, a good quality display monitor is a must.

To conclude, it is now or never for Teleradiology.





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**A Platform For Radiology Education
& Interaction**

Calcutta Academy of Radiology was formed on international day of Radiology in 2019, that is on 8th. November, 2019 to promote Radiology education, keeping in mind Residents as well practicing Radiologists.

Since then we are on WhatsApp and Telegram, where thousands of cases have been discussed by members from all over the world and in the process we are sharing our experiences and helping each other. These social media platforms have turned out to be great learning tools.

We had organized a half day CME also on GI Radiology in February, 2020. We have plans to organize more such CME programmes in future when world recovers from this ongoing pandemic.

We are on YouTube also where we regularly post teaching videos and in the process try to propagate Radiology as much as possible.



Next issue will be published in June 2020

We will be bringing out such Newsletters with a frequency of one issue every two months. So, next issue will be published in June, 2020.

We are hereby inviting good interesting cases and original work from our fellow Radiologists, which will be published on merit basis.

So, I request all of you to contribute to this Newsletter. Please send your material in Word format with good quality images. Please send your photograph and details of your place of work with email address also.

Your material should reach us by 15th. Of May, 2020. You can send the word file to our abovementioned email address or you can

WhatsApp it to above-mentioned three phone numbers.

We are also inviting 8-10 minutes teaching Videos for our YouTube channel. If your video is of good quality and contains good teaching material, we will publish it on our channel. Please note that it should contain original teaching material.

So friends, utilize your time during this lockdown and engage yourself in academic activities and send it to us. We will be more than happy to publish it, of course it should be quality material.

Our Telegram group is lagging behind in academic activities as compared to two WhatsApp groups, so I request all of you to join our Telegram group. Since, WhatsApp restricts the number

of members to 256 only, whatever activity going on there is not helping the whole Radiology community.

Telegram can add up to whopping 200,000 members. So, if we post our study material there; it will reach to and benefit huge number of members.

So friends, take care and be safe. Being a hard core optimist, I am sure we will overcome this pandemic and very soon we will be back to our normal life.

We shall overcome. Deep in my heart, I do believe that we shall overcome, someday.

So long,

Viral Parekh.