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Original Research Article

High Resolution Computed Tomography Chest Manifestations of Covid-19 Infections in Different Age Groups of Adult Patients

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ABSTRACT

Background

This study was conducted to evaluate various HRCT (High Resolution Computed Tomography**)** chest findings in COVID-19 patients of young, middle and old age groups and to determine the association of findings with age.

Methods

This was a hospital-based cross-sectional study conducted among 78 proven RTPCR positive patients who underwent HRCT chest in age groups of 18 and above at the Department of Radiology, Sagar Hospitals, Bangalore, from June 2020 to June 2021 after obtaining clearance from the institutional ethics committee and written informed consent from the study participants.

Results

On HRCT chest, the two most predominant types of lesions in the young age group were pure GGO and mixed GGO with interlobular thickening; in the middle-aged group, mixed GGO with airspace opacification; and in the older age group, mixed GGO with airspace opacification and mixed GGO with complete consolidation. With respect to the number of lesions, they were few in the younger age group and extensive in the middle and older age groups. In the young and middle age groups, the most common distribution of findings was peripherally, whereas in the older age group it was mixed (peripheral and central). Small-sized lesions were the most common in all three age groups. Additionally, there was a slight preponderance to the right and left lower lobes compared to bilateral upper lobes and the right middle lobe in all three age groups. There was a ignificant association between age and the predominant type of lung lesions, their distribution and the number of lesions. No significant association between age and size of lesions, mediastinal lymphadenopathy, pleural effusion, or pleural thickening was noted. Various HRCT findings in different age groups showed different patterns of involvement in these age groups, with the severity of the disease being milder in the younger age group and worse in the older age group. The lesions in the younger age group were of lesser density, fewer numbers, smaller size and showed peripheral distribution compared to the middle and older age groups, who demonstrated increased density of the lesions with a mixed distribution and extensive numbers while the size remained the same in all age groups. Our study showed a significant association between age and lung lesions type, distribution and number in these variable age groups.

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Conclusion
There is a definitively different pattern of lung involvement on HRCT chest in COVID-19 infection in young, middle-aged and old-aged adults.
Keywords: High Resolution Computed Tomography, Chest Manifestations, Covid-19, Adult Patients.

INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a member of the coronavirus cluster of enveloped single-stranded RNA viruses that causes the coronavirus disease 2019 (COVID-19), a serious viral infection. This viral infection was reported first in Wuhan, Hubei Province, China and it presented as a series of unexplained cases of pneumonia in December 2019.[1] Coronavirus disease 2019, (COVID-19) was declared a pandemic by the World Health Organization on March 11, 2020, after the revelation of a novel coronavirus (SARS-CoV-2) from post-deep sequential analysis of nasopharyngeal and throat swab samples. Coronaviruses are enveloped, non-segmented positive-sense RNA viruses that belong to the family Coronaviridae and order Nidovirales and are broadly distributed in humans and other mammals.

The virus is highly contagious and spreads rapidly from person-to-person via respiratory droplets or direct contact.[2,3] As per the WHO, there have been 200,174,883 confirmed cases of Covid-19 and 4,255,892 deaths worldwide as of August 2021. In India, from January 2020 to August 2021, there have been 31,812,114 confirmed cases and 426,290 reported deaths. As of August 2021, a total of 478,544,114 vaccine doses had been administered.[4] The Covid-19 pandemic has been considered a public health emergency worldwide and has contributed to an enormous adverse impact globally. A range of clinical outcomes, from asymptomatic to severe, life-threatening, or even death-threatening, can result from the Covid-19 infection. The incubation period generally ranges from 3 to 7 days and up to 14 days. The characterization of epidemiological and clinical features associated with the recovery and mortality of Covid-19 is pivotal for the development and implementation of effective management protocols and control strategies.[5] Covid-19 infections have exponentially affected our day-to-day lives and are significantly slowing down our global economy. Thousands of people are affected by this pandemic and are falling sick or dying because of the rapid spread of the disease.[6] Various vaccine trials are being done and vaccination drives have been started all over our country. Multiple waves of the pandemic are currently affecting our nation as this deadly virus is constantly evolving. Thus, the emphasis is on taking extensive precautions, such as extensive hygiene protocols like washing hands regularly, wearing masks and social distancing. All age groups (infants, children, adolescents, young adults, middle-aged adults and the elderly) are susceptible to this infection.

The elderly and those with underlying comorbid conditions are more susceptible to this infection. Fever, cough, sore throat, flu-like symptoms and dyspnea were the main complaints of the majority of Covid-19 infected patients in our hospital. The above symptoms were similar to those of other pneumonias caused by coronaviruses, such as SARS (Severe Acute Respiratory Syndrome) and MERS (Middle East Respiratory Syndrome).[3] HRCT is one of the major diagnostic components, according to the World Health Organization and the Centers for Disease Control and Prevention guidelines. The clinical and imaging manifestations in the early stages of Covid-19 infection are used to confirm the diagnosis, adjust the treatment plan and infer the prognosis.[5] Because of the predominant involvement of the respiratory system in Covid-19 infection, HRCT is strongly recommended in suspected Covid-19 cases, as it plays an irreplaceable role in both initial evaluation for detecting lung abnormalities, determining the diagnosis and differential diagnosis, assessment of disease

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progression, detection of pulmonary complications and follow-up, as well as providing insight into the possible subsequent evolution of the disease in infected patients of different ages, which facilitates more accurate diagnosis and the development of treatment strategies.[7,8] Most of the laboratory-confirmed Covid-19 patients demonstrated abnormal findings on chest computed tomography. Since June 2020, our hospital has treated a large number of Covid-19 infection patients; the majority of them underwent HRCT scans. In this study, we have analyzed the various CT findings in different adult age groups (young, middle and older age groups; (18-35 years, 36-55 years and more than 55 years) and determined any predominant findings or association of these findings with various age groups. This will allow for disease pattern recognition and response to this communicable disease.[9]

AIMS AND OBJECTIVES

- To evaluate various HRCT chest findings in Covid-19 patients of young, middle and old age groups and to determine the association of findings with age.
- To determine various HRCT findings in Covid-19 patients of various age groups.
- To determine the extent and severity of HRCT findings in different age groups of Covid-19 patients
- To analyze the association between various HRCT findings and the age of Covid-19 patients.

MATERIALS & METHODS

This was a hospital-based cross-sectional study conducted among 78 proven RTPCR-positive patients who underwent HRCT chest in age groups of 18 and above at the Department of Radiology Sagar Hospitals, Bangalore, from June 2020 to June 2021 after obtaining clearance from the institutional ethics committee and written informed consent from the study participants.

Inclusion Criteria

- Proven RTPCR-positive patients who underwent HRCT chest in age groups of 18 and above.

Exclusion Criteria

- RTPCR-positive patients without any findings on HRCT chest (normal HRCT chest study).
- Patients with pre-existing lung diseases.
- Uncooperative patients unable to hold the breath for the scan in whom there is movement blur on HRCT.

Statistical Methods

Data was entered into Microsoft Excel data sheet and analyzed using SPSS 22 version software.

RESULTS

Predominant Type of Lesion	Age					
	18 to 35 Years		36 to 55 Years		>55 Years	
	Count	%	Count	%	Count	
No lesions	13	50.0%	0	0.0%	0	0.0%
Pure GGO	7	26.9%	5	19.2%	1	3.8%
Mixed GGO with interlobular thickening	3	11.5%	11	42.3%	7	26.9%
Mixed GGO with airspace opacification	3	11.5%	8	30.8%	8	30.8%
Mixed GGO with complete consolidation with	0	0.0%	2	7.7%	10	38.5%

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air bronchogram						
Total	26		26		26	

Association between Age Distribution and Predominant Type of Lesion in Right Upper Lobe

χ 2 =51.51, df =8, p <0.001*

Predominant Type of Lesion	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
No lesions	13	50.0%	0	0.0%	0	0.0%
Pure GGO	6	23.1%	5	19.2%	1	3.8%
Mixed GGO with interlobular thickening	5	19.2%	12	46.2%	8	30.8%1
Mixed GGO with airspace opacification	2	7.7%	8	30.8%	10	38.5%
Mixed GGO with complete consolidation with air bronchogram	0	0.0%	1	3.8%	7	26.9%
Total	26		26		26	

Association between Age Distribution and Predominant Type of Lesion in Right Middle Lobe

χ 2 =48.41, df =8, p <0.001*

Predominant Type of Lesion	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
No lesions	3	11.5%	0	0.0%	0	0.0%
Pure GGO	10	38.5%	2	7.7%	1	3.8%
Mixed GGO with interlobular thickening	6	23.1%	8	30.8%	4	15.4%
Mixed GGO with airspace opacification	6	23.1%	14	53.8%	11	42.3%
Mixed GGO with complete consolidation with air bronchogram	1	3.8%	2	7.7%	10	38.5%
Total	26		26		26	

Association between Age Distribution and Predominant Type of Lesion in Right Lower Lobe

χ 2 =32.95, df =8, p <0.001*

Predominant Type of Lesion	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
No lesions	11	42.3%	0	0.0%	0	0.0%
Pure GGO	9	34.6%	5	19.2%	1	3.8%
Mixed GGO with interlobular thickening	1	3.8%	10	38.5%	6	23.1%
Mixed GGO with airspace opacification	5	19.2%	9	34.6%	10	38.5%
Mixed GGO with complete consolidation with air bronchogram	0	0.0%	2	7.7%	9	34.6%
Total	26		26		26	

Association between Age Distribution and Predominant Type of Lesion in Left Upper Lobe

χ 2 =49.5, df =8, p <0.001*

Table 1

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In the right upper lobe, among subjects in the young age group, the predominant type of lesion was pure GGO (26.9%). Most of the lesions in the middle-aged group were mixed GGO with interlobular thickening (42.3%). Most of the lesions in the old-age group were mixed GGO with complete consolidation with air bronchogram (38.5%).

In the right middle lobe, among subjects in the young age group, the predominant type of lesion was pure GGO (23.1%). In the middle-aged group, the predominant type of lesion was mixed GGO with interlobular thickening (46.2%) and in the old-age group, the predominant type of lesion was mixed GGO with airspace opacification (38.5%).

In the right lower lobe, among subjects in the young age group, the predominant type of lesion was pure GGO (38.5%). In the middle-age group, the predominant type of lesion was mixed GGO with airspace opacification (53.8%) and in the old-age group, the predominant type of lesion was mixed GGO with airspace opacification (42.3%).

In the left upper lobe, among subjects in the young age group, the predominant type of lesion was pure GGO (34.6%). In the middle-aged group, the predominant type of lesion was mixed GGO with interlobular thickening (38.5%) and in the old-age group, the predominant type of lesion was mixed GGO with airspace opacification (38.5%).

Predominant Type of Lesion	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
No lesions	9	34.6%	0	0.0%	0	0.0%
Pure GGO	6	23.1%	3	11.5%	1	3.8%
Mixed GGO with interlobular thickening	5	19.2%	8	30.8%	6	23.1%
Mixed GGO with airspace opacification	6	23.1%	11	42.3%	10	38.5%
Mixed GGO with complete consolidation with air bronchogram	0	0.0%	4	15.4%	9	34.6%
Total	26		26		26	
Association between Age Distribution and Predominant Type of Lesion in Left Lower Lobe						
χ 2 =33.47, df =8, p <0.001*						
Number of Lesions	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	13	50.0%	0	0.0%	0	0.0%
Few	11	42.3%	2	7.7%	0	0.0%
Multiple	2	7.7%	5	19.2%	1	3.8%
Extensive	0	0.0%	19	73.1%	25	96.2%
Total	26		26		26	
Association between Age Distribution and Number of Lesions in Right Upper Lobe						
χ 2 =68.32, df =6, p <0.001*						
Number of Lesions						
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	13	50.0%	0	0.0%	0	0.0%
Few	11	42.3%	9	34.6%	2	7.7%
Multiple	2	7.7%	1	3.8%	2	7.7%
Extensive	0	0.0%	16	61.5%	22	84.6%
Total	26		26		26	
Association between Age Distribution and Number of Lesions in Right Middle Lobe						

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χ 2 =52.91, df =6, p <0.001*						
Number of Lesions	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	3	11.5%	0	0.0%	0	0.0%
Few	16	61.5%	0	0.0%	0	0.0%
Multiple	5	19.2%	3	11.5%	1	3.8%
Extensive	2	7.7%	23	88.5%	25	96.2%
Total	26		26		26	
Association between Age Distribution and Number of Lesions in Right Lower Lobe						
χ 2 =60.14, df =6, p <0.001*						
Table 2						

In the left lower lobe, among subjects in the young age group, the predominant types of lesions were pure GGO (23.1%) and mixed GGO with airspace opacification (23.1%). In the middle age group, the predominant type of lesion was mixed GGO with airspace opacification (42.3%) and in the old age group, the predominant type of lesion was mixed GGO with airspace opacification (38.5%).

In the right upper lobe, among subjects in the young age group, 42.3% had few lesions. In the middle-aged group 73.1% had an extensive number of lesions and in the old-age group, 96.2% had an extensive number of lesions.

In the right middle lobe, among subjects in the young age group, 42.3% had few lesions. In the middle-aged group, 61.5% had an extensive number of lesions. In the old-age group, 84.6% had an extensive number of lesions.

In the right lower lobe, among subjects in the young age group, 61.5% had few lesions. In the middle-aged group, 88.5% had an extensive number of lesions. In the old-age group, 96.2% had an extensive number of lesions.

Number of Lesions	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	11	42.3%	0	0.0%	0	0.0%
Few	11	42.3%	3	11.5%	0	0.0%
Multiple	3	11.5%	3	11.5%	2	7.7%
Extensive	1	3.8%	20	76.9%	24	92.3%
Total	26		26		26	
Association between Age Distribution and Number of Lesions in Left Upper Lobe						
χ 2 =58.27, df =8, p <0.001*						
Number of Lesions	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	9	34.6%	0	0.0%	0	0.0%
Few	11	42.3%	1	11.5%	0	0.0%
Multiple	4	15.4%	4	15.1%	2	3.8%
Extensive	2	7.7%	21	80.8%	25	96.2%
Total	26		26		26	
Association between Age Distribution and Number of Lesions in Left Lower Lobe						
χ 2 =59.12, df =8, p <0.001*						
Distribution Predominance	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	

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	Count	%	Count	%	Count	%
Absent	13	50.0%	0	0.0%	0	0.0%
Peripheral	12	46.2%	19	73.1%	9	34.6%
Central	1	3.8%	0	0.0%	3	11.5%
Mixed	0	0.0%	7	26.9%	14	53.8%
Total	26		26		26	
Association between Age Distribution and Distribution Predominance in Right Upper Lobe						
χ 2 =47.45, df =6, p <0.001*						
Distribution Predominance	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	13	50.0%	0	0.0%	0	0.0%
Peripheral	11	42.3%	18	69.2%	8	30.8%
Central	2	7.7%	2	7.7%	5	19.2%
Mixed	0	0.0%	6	23.1%	13	50.0%
Total	26		26		26	
Association between Age Distribution and Distribution Predominance in Right Middle Lobe						
χ 2 =46.27, df =8, p <0.001*						
Table 3						

In the left upper lobe, among subjects in the young age group, 42.3% had few lesions. In the middle-aged group, 76.9% had an extensive number of lesions. In the old age group, 92.3% had an extensive number of lesions.

In the left lower lobe, among subjects in the young age group, 42.3% had few lesions. In the middle-aged group, 80.8% had an extensive number of lesions. In the old age group, 96.2% had an extensive number of lesions.

In the right upper lobe, among subjects in the young age group, the most common distribution predominance was peripheral (46.2%). In the middle-aged group, the most common distribution predominance was peripheral (73.1%). In the old age group, the most common distribution predominance was mixed (53.8%).

In the right middle lobe, among subjects in the young age group, the most common distribution predominance was peripheral (42.3%). In the middle-aged group, the most common distribution predominance was peripheral (69.2%). In the old age group, the most common distribution predominance was mixed (50.0%).

Distribution Predominance	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	3	11.5%	0	0.0%	0	0.0%
Peripheral	23	88.5%	17	65.4%	11	42.3%
Central	0	0.0%	1	3.8%	2	7.7%
Mixed	0	0.0%	8	30.8%	13	50.0%
Total	26		26		26	
Association between Age Distribution and Distribution Predominance in Right Lower Lobe						
χ 2 =24.52, df =6, p <0.001*						
Distribution	**Age**					

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Predominance	18 to 35 Years		36 to 55 Years		>55 Years	
	Count	%	Count	%	Count	%
Absent	11	42.3%	0	0.0%	0	0.0%
Peripheral	14	53.8%	20	76.9%	12	46.2%
Central	1	3.8%	0	0.0%	1	3.8%
Mixed	0	0.0%	6	23.1%	13	50.0%
Total	26		26		26	
Association between Age Distribution and Distribution Predominance in Left Upper Lobe						
χ 2 =38.62, df =6, p <0.001*						
Distribution Predominance	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	9	34.6%	0	0.0%	0	0.0%
Peripheral	17	65.4%	16	61.5%	8	30.8%
Central	0	0.0%	1	3.8%	1	3.8%
Mixed	0	0.0%	9	34.6%	17	65.4%
Total	26		26		26	
Association between Age Distribution and Distribution Predominance in Left Lower Lobe						
χ 2 =39.25, df =6, p <0.001*						
Average Size of Lesions	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	13	50.0%	0	0.0%	0	0.0%
Small	12	46.2%	21	80.8%	4	15.4%
Moderate	1	3.8%	4	15.4%	13	50.0%
Large	0	0.0%	1	3.8%	9	34.6%
Total	26		26		26	
Association between Age Distribution and Average Size of Lesions in Right Upper Lobe						
χ 2 =65.3, df =6, p <0.001*						
Table 4						

In the right lower lobe, among subjects in the young age group, the most common distribution predominance was peripheral (88.5%). In the middle-aged group, the most common distribution predominance was peripheral (65.4%). In the old age group, the most common distribution predominance was mixed (50.0%).

In the left upper lobe, among subjects in the young age group, the most common distribution predominance was peripheral (53.8%). In the middle-aged group, the most common distribution predominance was peripheral (76.9%). In the old age group, the most common distribution predominance was mixed (50.0%).

In the left lower lobe, among subjects in the young age group, the most common distribution predominance was peripheral (65.4%). In the middle-aged group, the most common distribution predominance was peripheral (61.5%). In the old age group, the most common distribution predominance was mixed (65.4%).

In the right upper lobe, among subjects in the young age group, 46.2% had small-sized lesions. In the middle-aged group, 80.8% had small-sized lesions and in the old-age group, 50% had moderate-sized lesions.

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Average Size of Lesions	Age					
	18 to 35 Years		36 to 55 Years		>55 Years	
	Count	%	Count	%	Count	%
Absent	13	50.0%	0	0.0%	0	0.0%
Small	13	50.0%	20	76.9%	6	23.1%
Moderate	0	0.0%	4	15.4%	11	42.3%
Large	0	0.0%	2	7.7%	9	34.6%
Total	26		26		26	
Association between Age Distribution and Average Size of Lesions in Right Middle Lobe						
χ 2 =58.12, df =6, p <0.001*						
Average Size of Lesions	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	3	11.5%	0	0.0%	0	0.0%
Small	22	84.6%	19	73.1%	9	34.6%
Moderate	0	0.0%	4	15.4%	6	23.1%
Large	1	3.8%	3	11.5%	11	42.3%
Total	26		26		26	
Association between Age Distribution and Average Size of Lesions in Right Lower Lobe						
χ 2 =28.3, df =6, p <0.001*						
Average Size of Lesions	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	11	42.3%	0	0.0%	0	0.0%
Small	15	57.7%	20	76.9%	9	34.6%
Moderate	0	0.0%	4	15.4%	7	26.9%
Large	0	0.0%	2	7.7%	10	38.5%
Total	26		26		26	
Association between Age Distribution and Average Size of Lesions in Left Upper Lobe						
χ 2 =46.8, df =6, p <0.001*						
Average Size of Lesions	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	9	34.6%	0	0.0%	0	0.0%
Small	17	65.4%	19	73.1%	7	26.9%
Moderate	0	0.0%	4	15.3%	7	26.9%
Large	0	0.0%	3	11.5%	12	46.2%
Total	26		26		26	
Association between Age Distribution and Average Size of Lesions in Left Lower Lobe						
χ 2 =48.76, df =8, p <0.001*						
Table 5						

In the right middle lobe, among subjects in the young age group, 50% had small-sized lesions. In the middle-aged group, 76.9% had small-sized lesions, and in the old-age group, 42.3% had moderate-sized lesions.

In the right lower lobe, among subjects in the young age group, 84.6% had small-sized lesions. In the middle-aged group, 73.1% had small-sized lesions, and in the old-age group, 42.3% had large-sized lesions.

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In the left upper lobe, among subjects in the young age group, 57.7% had small-sized lesions. In the middle-aged group, 76.9% had small-sized lesions, and in the old-age group, 38.5% had large-sized lesions.

In the left lower lobe, among subjects in the young age group, 65.4% had small-sized lesions. In the middle-aged group, 73.1% had small-sized lesions, and in the old-age group, 46.2% had large-sized lesions.

Mediastinal Lymphadenopathy	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Small/Few	23	88.5%	22	84.6%	17	65.4%
Small/Multiple	2	7.7%	4	15.4%	6	23.1%
Large/Few	1	3.8%	0	0.0%	2	7.7%
Large/ Multiple	0	0.0%	0	0.0%	1	3.8%
Total	26		26		26	
Association between Age Distribution and Mediastinal Lymphadenopathy						
χ 2 =7.00, df =6, p = 0.321						
Pleural Effusion	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	26	100.0%	26	100.0%	24	92.3%
Mild	0	0.0%	0	0.0%	2	7.7%
Moderate	0	0.0%	0	0.0%	0	0.0%
Severe	0	0.0%	0	0.0%	0	0.0%
Total	26		26		26	
Association between Age Distribution and Pleural Effusion						
χ 2 =4.105, df =2, p = 0.128						
Pleural Thickening	**Age**					
	18 to 35 Years		**36 to 55 Years**		**>55 Years**	
	Count	**%**	**Count**	**%**	**Count**	**%**
Absent	26	100.0%	26	100.0%	19	73.1%
Mild	0	0.0%	0	0.0%	1	3.8%
Moderate	0	0.0%	0	0.0%	6	23.1%
Severe	0	0.0%	0	0.0%	0	0.0%
Total	26		26		26	
Association between Age Distribution and Pleural Thickening						
χ 2 =15.38, df =4, p = 0.002*						
Table 6						

Among subjects in the young age group, 88.5% had small or few mediastinal lymphadenopathies. In the middle-aged group, 84.6% had small or few mediastinal lymphadenopathies, and in the old-age group, 65.4% had small or few mediastinal lymphadenopathies.

Among subjects in the young and middle age groups, 100% had no pleural effusion, and in the old age group, 92.3% had no pleural effusion, while 7.7% had mild pleural effusion.

Among subjects in the young and middle age groups, 100% had no pleural thickening, and in the old age group, 3.8% had mild and 23.1% had moderate pleural thickening.

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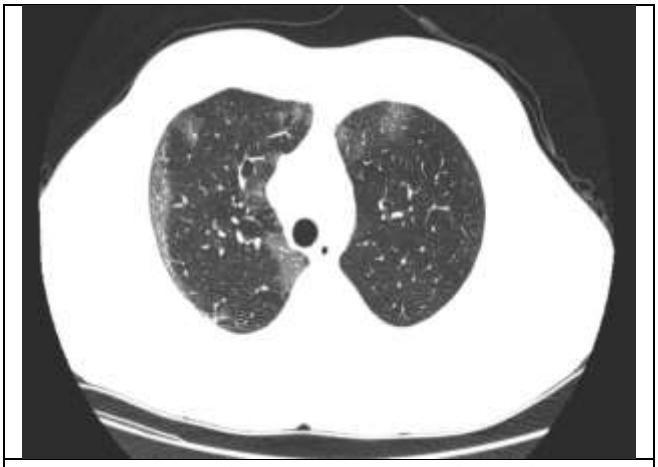

Image 1: Axial section HRCT chest showing peripheral distribution of pure ground glass opacities

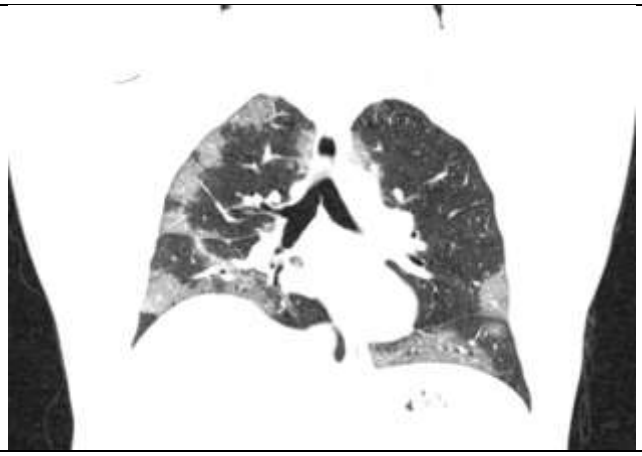

Image 2: Coronal section HRCT chest howing peripheral distribution of mixed ground glass opacities with interlobular eptal thickening

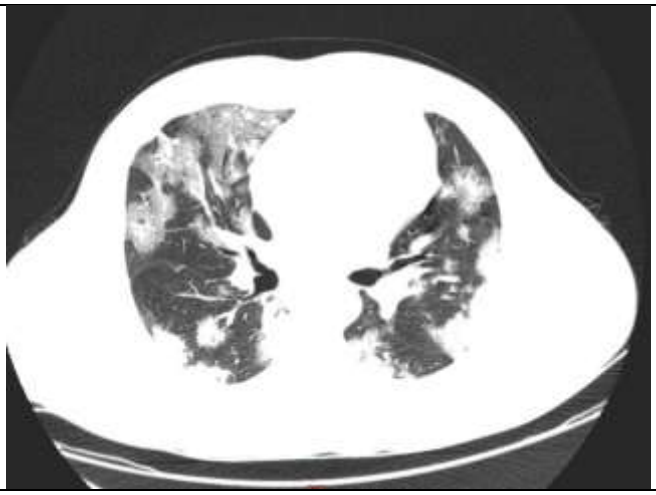

Image 3: HRCT lung axial section showing peripheral distribution of small sized mixed ground glass opacities with airspace opacifications

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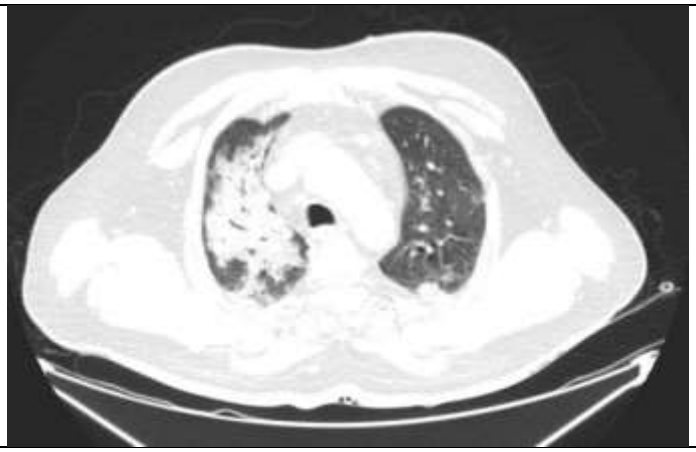

Image 4: HRCT lung axial section showing mixed distribution of large sized mixed ground glass opacities with complete consolidation with air bronchogram

DISCUSSION

Predominant Type of Lesions in Bilateral Lungs (Lobe Wise): 18 to 35 Years

In our study, the most common predominant type of lesion in the 18-35 year-old age group was pure GGOs in all five lobes bilaterally.

Predominant Type of Lesions in Bilateral Lungs (Lobe Wise): 36 to 55 Years

In our study, the most common predominant type of lesion in the 36–55 year age group was mixed GGO with interlobular thickening in all five lobes bilaterally.

Predominant Type of Lesions in Bilateral Lungs (Lobe Wise) > 55 Years

In our study, the most common predominant type of lesion in the >55-year-old age group was mixed GGO with airspace opacification in all five lobes bilaterally. Therefore, there was a significant difference in age distribution and the predominant type of lesions in bilateral lungs.

Haseli S. et al.[10] studied a total of 63 patients. 50.7% of the patients had a pure GGO in all age groups. The most common findings were pure GGO and consolidation, which were observed in 92.1% and 42.9% of patients, respectively.

Number of Lesions in Bilateral Lungs (Lobe Wise) 18 to 35 Years

In the study of the right upper lobe, among subjects in the age group 18 to 35 years, 42.3% had few lesions. In the study of the right middle lobe, 42.3% had few lesions. In the study of the right lower lobe, the majority of them had few lesions (61.5%). In the study of the left upper lobe, the majority of them had few lesions (42.3%). In the study of the left lower lobe, the majority of them had few lesions (42.3%). In our study, the majority of lesions in 18-35 years age group were few in all five lobes bilaterally.

Number of Lesions in Bilateral Lungs (Lobe Wise) 36-55 Years

In our study, the majority of lesions in the 36- to 55-year-old age group were extensive in all five lobes bilaterally.

Number of Lesions in Bilateral Lungs (Lobe Wise) >55 Years

In our study, the majority of lesions in the >55-year-old age group were extensive in all five lobes bilaterally. There was a significant difference in age distribution and the number of

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lesions in bilateral lungs. Chen Z et al.[8] observed that there were fewer lesions in younger adolescents and adolescents than in middle-aged and older patients.

Distribution of Lesions in Bilateral Lungs (Lobe Wise) 18-35 Years

In our study, the most common distribution of lesions in the 18- to 35-year-old age group was peripheral in all five lobes bilaterally.

Distribution of Lesions in Bilateral Lungs (Lobe Wise) 36-55 Years

In our study, the most common distribution of lesions in the 36- to 55-year-old group was peripheral in all five lobes bilaterally.

Distribution of Lesions in Bilateral Lungs (Lobe Wise) >55 Years

In our study, the most common distribution of lesions in the >55 -year-old age group was mixed in all five lobes bilaterally. There was no significant difference in the age distribution and distribution of lesions in bilateral lungs for young and middle-aged groups. While, the older age group has significance for the distribution of lesions. Chen Z et al.[8] studied the lesions of patients, which were mostly distributed in the peripheral zone of the lung (80.7%) in all age groups.

Size of Lesions in Bilateral Lungs (Lobe Wise) 18-35 Years

In our study, the majority of lesions in 18–35-year-olds were small in all five lobes bilaterally.

Size of Lesions in Bilateral Lungs (Lobe Wise) 36-55 Years

In our study, the majority of lesions in 36-55 years were small in all five lobes bilaterally.

Size of Lesions in Bilateral Lungs (Lobe Wise) >55 Years

In our study, the majority of lesions in > 55 years were small in all five lobes bilaterally. There was no significant difference in age distribution or size of lesions in bilateral lungs. Chen Z et al. observed that the lesions were mostly 1−3 cm patchy or nodular in opacity (49.4%). With an increase in age, the possibility of the appearance of 5–10 cm of large patchy opacity and ≥10 cm of larger patchy opacity was likely to increase. Our study findings showed that middle-aged and older patients had more severe lung and lobe involvement.

Additional Findings in Chest

Mediastinal Lymphadenopathy

In the study, among subjects in the age group 18 to 35 years, 88.5% had small or few mediastinal lymphadenopathies; among subjects in the age group 36 to 55 years, 84.6% had small or few mediastinal lymphadenopathies; and among subjects in the age group >55 years, 65.4% had small or few mediastinal lymphadenopathies; and 23.1% had small or multiple mediastinal lymphadenopathies. There was no significant association between mediastinal lymphadenopathy and age distribution. Salehi S. et al.[7] observed that mediastinal lymphadenopathy is less common or rare.

Pleural Effusion

In the study, among subjects in the age groups of 18 to 35 years and 35 to 55 years, 100% had no pleural effusion. Among the subjects in the age group of >55 years, 92.3% had no pleural effusion and 7.7% had mild pleural effusion. There was no significant association between pleural effusion and age distribution. Chen Z et al.[8] observed that only one of the 98 patients in this study was found to have bilateral pleural effusion.

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Pleural Thickening

In the study, among subjects in the age groups 18 to 35 years and 36 to 55 years, 100% had no pleural thickening. Among subjects in the age group of 55 years, 73.1% had no pleural thickening, 3.8% had mild pleural thickening, and 23.1% had moderate pleural thickening. There was no significant association between pleural thickening and age distribution. Salehi S et al. studied pleural thickening, and subpleural involvement is one of the less common findings, mainly in severe disease.

CONCLUSION

It can be concluded that there is a definitively different pattern of lung involvement on HRCT chest in COVID-19 infection in young adults, middle-aged adults, and old-aged adults.

REFERENCES

[1] Foust AM, Phillips GS, Chu WC, Daltro P, Das KM, Garcia-Peña P, et al. International Expert Consensus statement on chest imaging in pediatric COVID-19 patient management: imaging findings, imaging study reporting, and imaging study recommendations. Radiology: Cardiothoracic Imaging 2020:e200214.

[2] Song F, Shi N, Shan F, Zhang Z, Shen J, Lu H, et al. Emerging 2019 novel coronavirus (2019-nCoV) pneumonia. Radiology 2020;295(1):210-7.

[3] Chen A, Huang J, Liao Y, Liu Z, Chen D, Yang C, et al. Differences in clinical and imaging presentation of pediatric patients with COVID-19 in comparison with adults. Radiology: Cardiothoracic Imaging 2020;2(2):e200117.

[4] World Health Organization. WHO Coronavirus Disease (COVID-19) Dashboard. https://covid19.who.int/.

[5] Bhandari S, Rankawat G, Bagarhatta M, Singh A, Gupta V, Sharma S, et al. Clinico-radiological evaluation and correlation of CT chest images with progress of disease in COVID-19 Patients. The Journal of the Association of Physicians of India 2020;68(7):34-42.

[6] Haleem A, Javaid M, Vaishya R. Effects of COVID-19 pandemic in daily life. Current Medicine Research and Practice 2020;10(2):78.

[7] Salehi S, Abedi A, Balakrishnan S, Gholamrezanezhad A. Coronavirus disease 2019 (COVID-19): a systematic review of imaging findings in 919 patients. Am J Roentgenol 2020;215(1):87-93.

[8] Chen Z, Fan H, Cai J, Li Y, Wu B, Hou Y, et al. High-resolution computed tomography manifestations of COVID-19 infections in patients of different ages. Eur J Radiol 2020;26:108972.

[9] Zhu T, Wang Y, Zhou S, Zhang N, Xia L. A comparative study of chest computed tomography features in young and older adults with corona virus disease (COVID-19). Journal of Thoracic Imaging 2020;35(4):W97.

[10] Haseli S, Khalili N, Bakhshayeshkaram M, Taheri MS, Moharramzad Y. Lobar distribution of COVID-19 pneumonia based on chest computed tomography findings; a retrospective study. Arch Acad Emerg Med 2020;8(1).