(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 4, Issue 5, Page No: 663-673
September-October 2021

IJMSCR

Clinicoradiological Profile and Outcome of Severe Covid 19 Patients at A Tertiary Care in Andhra Pradesh

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Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Introduction:

Covid 19 has contributed to enormous adverse impact globally. The objective of this study is to report clinical, radiological, laboratory profile, course and final outcomes of covid 19 patients admitted in the Department of Pulmonary Medicine, Andhra Medical College, Visakapatnam.

Materials and Methods:

This is a hospital based observational cross-sectional study of 270 admitted covid 19 patients with saturation less than 90% room air from April 2021 to June 2021. Clinical, radiological, laboratory characteristics and treatment outcome data were obtained and analyzed.

Results:

Out of 270 patients, 72.30% were males. 72 patients (26.7%) were in the age group of 30-39 years. Breathlessness, cough and fever were the most common symptoms in 98.1%, 71.5%, 70% respectively. DM and HTN were the most common comorbid illness among study population. Lymphopenia was present in 48% of patients. CRP was increased in 83%, elevated d dimer in 86%, LDH and ferritin increased in 72 % and 51% respectively. 215 patients had bilateral disease in CT. Left lower lobe was the most common lobe involved in 65% of patients. Both GGO and consolidation were seen in 52.5% of patients. All five lobes were involved in 50 % of patients. 60 patients died in the course of stay in our hospital. Maximum mortality observed in more than 60 years of age distribution.

Conclusion:

Clinical and radiological characteristics vary among population. CT has proven to be a good tool in assessment of covid 19 disease, both in terms of diagnosis, assessing severity and follow up. Mortality is observed to be increased with age and in patients associated with comorbidities.

Keywords: COVID 19, Mortality, Radiological characteristics

INTRODUCTION

Covid 19 diseases caused by RNA beta coronavirus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was declared to be a global pandemic on March 11th, 2020. Clinical spectrum varies from asymptomatic to severe life-threatening course or death. Covid 19 has contributed to enormous adverse impact globally.[1]

80% of patients have viral clearance in 10-14 days, but 20 % of patients have invasion and infection of type 2

pneumocyte leading to cytokine storm because of the release of inflammatory mediators which eventually leads to ARDS.[2]

Characterization of epidemiological, clinical, comorbid features with recovery and mortality of covid 19 is crucial for development and implementing effective control strategies and management protocol.

The incubation period is generally from 3, up to 14 days. The elderly and those with underlying diseases are more seriously ill after infection. Children and infants can also be infected. Many patients have reported as having at least one comorbidity with diabetes, hypertension, and cardiovascular and cerebrovascular diseases being most commonly reported. Symptoms resulting from COVID-19 infection in the prodromal phase can be non-specific.[3] Therefore, high-resolution computed tomography (HRCT), represents valuable tools in identifying patients with COVID-19 infections in an early stage when clinical symptoms may be unspecific.[4] As like influenza, COVID-19 can also more readily predisposes to respiratory failure and death in susceptible patients.[1] Recovery and mortality of patients from COVID-19 is influenced by their respiratory system involvement and other systemic comorbidities and other clinical characteristics.

MATERIALS AND METHODOLOGY:

It is a hospital based observational cross-sectional study.

Inclusion Criteria:

1.All patients with nasopharyngeal/oropharyngeal swab for RT-PCR or TrueNat positive for COVID 19.

2.All patients with room air spo2 less than 90 % at admission.

Exclusion Criteria:

1.All patients with spo2≥90% room air at admission.

2.Radiological positive for covid 19 but nasopharyngeal or oropharyngeal swab negative for covid 19.

*Methodology:*A total of 270 patients with lab confirmed COVID 19 with oxygen saturation less than 90% admitted between April 2021 to June 2021 at Government Hospital for Chest and Communicable Diseases, Department of Pulmonary Medicine, Andhra Medical College, Visakhapatnam was enrolled in the study. Clinical history of patient was noted, initial blood workup data, radiological findings were obtained. Appropriate treatment was provided as per government guidelines. The course and final outcomes of treatment was also noted and analyzed.

RESULTS:

The study included 270 patients, of which 195 (72.30%) were males and 75 (27.70%) patients were females (figure 1).

Predominant age group in this study was in 30-39 years {72 (26.7%)}. Mean age of 54 years and 4 (1.5%) patients were under 20 years and one patient (0.4%) above 80 years was affected. Age distribution in table 1.

Out of 270 patients, 71 (26.3%) patients had both diabetes and hypertension. 37 (13.7%) patients had hypertension. Diabetes in 33 (12.2%) patients. 20 (7.4%) patients had chronic kidney diseases. 15 patients (5.55%) had coronary artery diseases. Hypothyroidism noted in 11 patients (4.1%). 6 patients (2.22%) had bronchial asthma and was on inhaler therapy. Out of total 4 patients (1.5%) of CVA, one developed stroke during the course of stay in our hospital and reffered to higher centre of further management. 4 patients (1.5%) of malignancy had covid 19 {CA Buccal Mucosa, CA Ovary, CA Lung,CA Urinary Bladder}. All the malignancy patients were under cancer treatment during the development of covid 19. Among the total 3 (1.11%) patients of covid 19, two were diagnosed to have newly detected MDR TB and one patient diagnosed to have Rifampicin sensitive PTB reactivation. All 3 patients (1.11%) of COPD with covid 19 were on inhaler or home nebulization therapy. One case of epilepsy and one case of Osteogenesis Imperfecta were also admitted with covid 19.

The most common symptom observed was breathlessness {265 (98.1%)}. Mean time between onset of symptoms and hospitalization was 6.5 days. 193 patients (71.5%) had history of cough, among them 153 (79.2%) patients had expectoration and 40 (20.7%) had dry cough. Third most common symptom observed was fever, in 189 (70%) patients. Other symptoms observed were myalgia [22 (8.15%)], sorethroat [15 (5.55%), headache [11 (4.07%)], diarrhoea [10 (3.7%), vomiting [8 (3%), anosmia [8 (3%), loss of apetite [6 (2.2%)], generalised weakness

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[5 (1.85%), hemoptysis [4 (1.5%)], chestpain [4 (1.5%)]. (Figure 2)

Saturation at time of admission depicted in table 2. 14.4% (39) patients presented with less than 50% saturation.

52.9% of patients recieved low flow oxygen delivery devices like face mask and nasal prongs. 18.5% (50) patients were on non-invasive ventillation. 15.5% (42) patients on high flow nasal devices. 12.9% (35) patients were intubated and managed. Mode of oxygen received in table 3.

Among 270 patients, most common hematological abnormalities observed were lymphopenia in 129 (48%) patients, thrombocytopenia in 62 (23%) patients, anemia in 4 (1.5%) patients, deranged liver function test in 56 (20.7%) patients, lymphocytosis in 20%. CRP was found to increase in 83% patients, elevated D Dimer in 232 (86%) patients, LDH in 72% patients and ferritin in 51 % patients.

Most common blood group affected was A blood group 90 (33%). 63 (70%) patients were A positive among them. 78 (28.8%) patients were O blood group, 58 (21.4%) were AB blood group, 44 (16.2%) were B blood group.

Out of 270 patients 4 (1.5%) patient had normal chest x ray, remaining 266 (98.5%) had abnormalities detected in chest x ray (figure 3). Bilateral chest x ray abnormalities detected in 215 patients, left side abnormalities in 35 patients and right-side abnormalities in 20 patients. (Figure 4)

Majority of chest x ray shows air space opacity as common finding (90%). Most common zone affected in chest x ray is lower zone, [167 (62.7%)] followed by diffuse distribution of radiological findings [51 (19.17%)]. Least affected zone was middle, only one case reported. The distribution of chest x ray findings shown in table 4.

Peripheral distribution predominates in 98.1% of cases in their HRCT. 199 (73.7%) patients were admitted with a CORADS 5 grade. 68 (25.18%) patients with CORADS 4 grade and 3 (1.11%) patients with CORADS 3 grade. (Table 5)

Most common CT findings noted were GGO with Consolidation [142 (52.5%)], pure consolidation alone in 106 (39.2%), only GGO in 101 (37.4%), GGO with Crazy pavement in 62 (22.9%). Pleural thickening noted in 34 (12.5%) patients, 3 (1.1%) patients had mild pleural effusion. No thoracic lymphadenopathy noted among patient in HRCT. (Table 6)

Most common lobe affected is left lower lobe [175 (65%)], followed by right lower lobe [170 (63%)]. In upper lobe most commonly distributed findings in left [130 (48.1%)] than right [119 (44%)] similar to lower lobes. Lobar distribution in HRCT in table 7 and figure 5.

162 (60%) patients had more than 2 lobes involvment. All the five lobes involved in 50% of patients. Only one lobe involved in 59 (22%) patients. 24 patients (8.8%) had involvement in two lobes. Three lobes were involved in 41 patients (15%). 73 patient (27%) had involvement in four lobes. Table 8 and figure 6 shows the number of lobes involved.

60 patients died in the course of stay in our hospital accounts for 22.2% mortality due to respiratory failure. Maximum mortality observed in more than 60 years of age group. Figure 7 shows age distribution of expired cases. As concerning the comorbid diseases, the most common one was hypertension (47%), followed by diabetes (27%), heart disease, kidney disease, COPD, and other preexisting lung conditions in mortaliy associated with covid 19.

DISCUSSION

In this study, we reported 270 COVID-19 cases. The clinical characters of these patients indicated that the age and underlying diseases were the most important risk factors. Mean age being 54 years, which is closer to age reported by Wang et al (56.0 year)[5] and Chen et al (55.5 years)[6].

Most of the patients having covid 19 were male (72.30%) which was similar to that reported by Huang et al[7] and Chen et al[6] which shows 73% male predominance but higher as compared to Wang et al[5] (54.3%).

As concerning the underlying diseases, the most common one was hypertension and diabetes followed by hypertension, diabetes, CKD, heart disorder, hypothyroidism followed by preexisting lung conditions. In other studies, it found that hypertension as most common comorbidity associated. Two new cases of MDR TB diagnosed along with covid 19.

Most common symptom noted being breathlessness (98.1%) followed by cough and fever which was

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contrast to that reported in Huang et al[7] and Wang et al[5] where fever was the most common symptom found (91.7%). Unusual symptom like mild hemoptysis also noted among patients.

Among 270 patients, most common hematological abnormalities observed were lymphopenia in 129 (48%) patients which is lesser than reported by Zhang et al[8]. Thrombocytopenia reported in 62 (23%) patients. Elevated inflammatory markers were also observed as similar to other studies.

More than half of the patients were treated with low flow oxygen delivery system. Others were on HFNO, NIV, IMV. 90% of patients received remdesvir.

Elevated inflammatory markers were also noted. Most common blood group affected is A blood group similar to study reported by Yanardag Acik D[9]. But least common affected is B blood, contradicting the Yanardag Acik D[9] study where O blood group was reported as least affected.

Bilateral involvement of lung field in chest x ray with major finding was air space opacity. Three fourth of patients were in CORADS 5, GGO with consolidation predominanetly in peripheries were noted as similar to other studies. Lower lobe distribution and multilobar involvement noted in HRCT CHEST similar to other studies [10,11].

Elderly peoples with comorbidities were more in mortality group as similar to other studies[12]. In present study, patients died of respiratory failure, indicated that the lung is the most common target organ of SARS-CoV-2. Multiple organ dysfunction could also be observed, the most common organ damage outside the lungs was the heart, followed by kidney and liver.

CONCLUSION

Risk factors for COVID-19 patients identified in this study are the age factor ≥60 years, COVID-19 complications namely low oxygen saturation and organ failure. Comorbidity or concomitant diseases of diabetes mellitus, hypertension, chronic kidney disease, cardiovascular disease, TB and underlying lung diseases are also important risk factors for mortality. Clinical and radiological characters vary among different population. HRCT has proven to be highly efficient diagnostic tool in assessment of Covid 19 disease, both in terms of diagnosis and assessing severity and also in follow up. Various mortality and morbidity risk factors that occur in COVID-19 patients identified in this study are expected to be a guide in efforts to prevent death in COVID-19 patients in future quickly and accurately.

ACKNOWLEDGEMENTS

The correspondence author would like to guarantee that the manuscript is not, either in part or whole, under active consideration by any other journal, will not be submitted for review to another journal and has not been published in any other journal. Dr.Arya Ramachandran had full access to the data in the study and taken full responsibility for the integrity of the study. All co-authors (Dr. K V V Vijayakumar M.D.,Dr. V Suryakumari M.D. and Dr. K Preethi M.D.) have made a substantial contribution to the design, data collection and analysis of the reasearch and the drafting of the manuscript and have reviewed and accepted the contents of the manuscript before its submission. The authors are grateful to all participants who participated in this study.

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TABLES

AGE GROUP	NUMBER(%)
<20	4(1.5%)
20-29	12(4.44%)
30-39	72(26.7%)
40-49	44(16.3%)
50-59	63(23.33%)
60-69	38(14.1%)
70-79	36(13.33%)
>80	1(0.4%)

Table 1: Age group distribution among admitted 270 covid 19 cases

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SATURATION AT TIME REQUIREMENT OF ADMISSION

SPO_2	N(%)
86-90%	77(28.5%)
75-85%	76(28.1%)
74-50%	78(28.8%)
<50%	39(14.4%)

Table 2: Saturation of patients at time of admission.

OXYGEN MODE OF DELIVERY	N(%)
FM and NP	143(52.9%)
HFNO	42(15.5%)
NIV	50(18.5%)
IMV	35(12.9%)

Table 3: Mode of oxygen delivery system used by patients.

ZONE INVOLVED	N(%)
LOWER	167(62.7%)
DIFFUSE	51(19.17%)
LOWER AND MIDDLE	36(13.5%)
UPPER AND MIDDLE	6(2.25%)
UPPER	5(1.87%)
MIDDLE	1(0.37%)

Table 4: Distribution of radiological findings in chest x ray.

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CORADS GRADINGS

CORADS GRADING	N(%)
CORADS 5	199(73.7%)
CORADS 4	68(25.18%)
CORADS 3	3(1.11%)

Table 5: Percentage of patients based on CORADS grading at time of admission.

CT FINDINGS

CT FINDINGS	N(%)
GGO	101(37.4%)
GGO WITH CRAZY PAVEMENT	62(22.9%)
GGOS WITH CONSOLIDATION	142(52.5%)
PURE CONSOLIDATION	106(39.2%)
CAVITY WITH GGO	1(0.3%)
PLEURAL EFFUSION	3(1.1%)
PLEURAL THICKENING	34(12.5%)
THORACIC LYMPHADENOPATHY	0(0%)

Table 6: Distribution of HRCT findings

LOBES	N	%
L LL	175	65
R LL	170	63
L UL	130	48.1
R UL	119	44
R ML	110	40.7

Table 7: Distribution of HRCT findings in lobes.

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NO OF LOBES INVOLVED	N	%
1	59	22
2	24	8.8
3	41	15
4	73	27
5	135	50
MORE THAN 2 LOBES	162	60

Table 8: Number of lobes involved in HRCT.

FIGURES

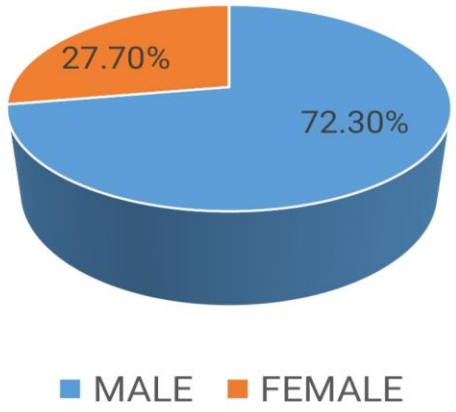

Figure 1: Gender distribution

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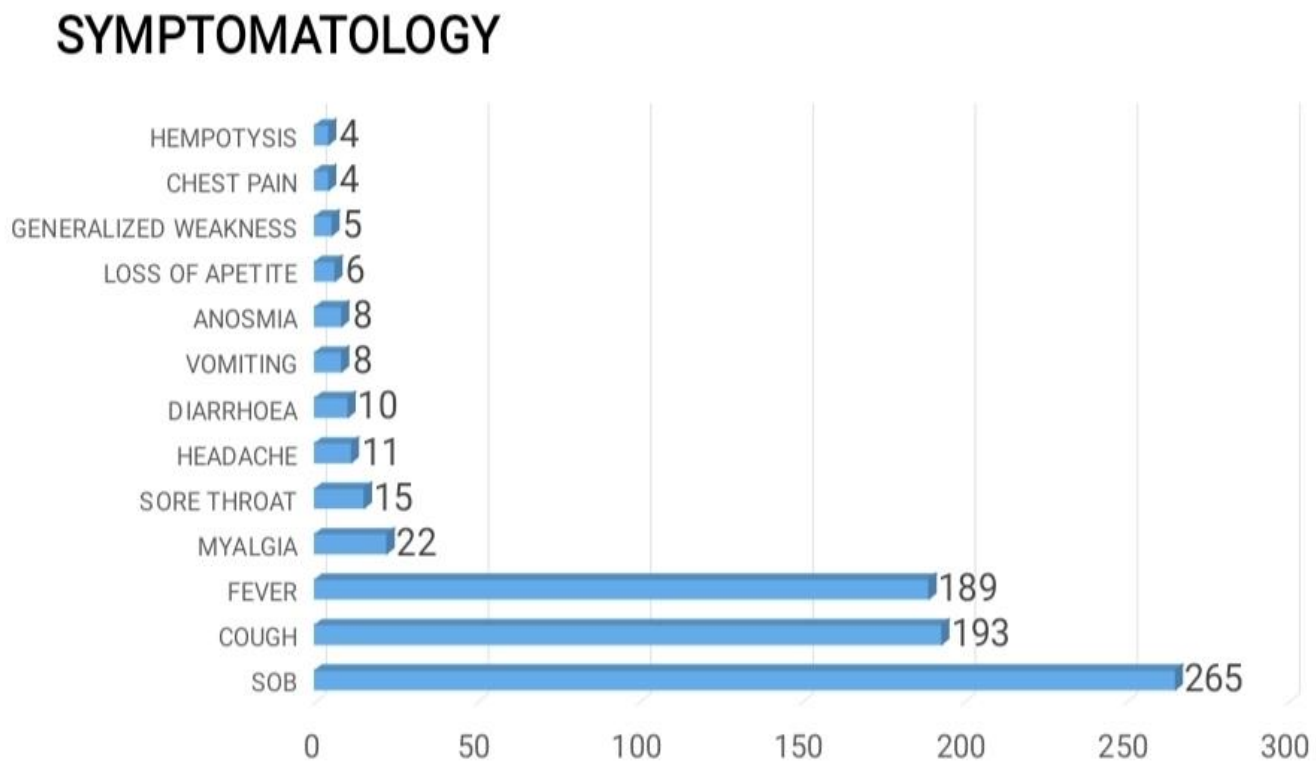

Figure 2: Symptomatology

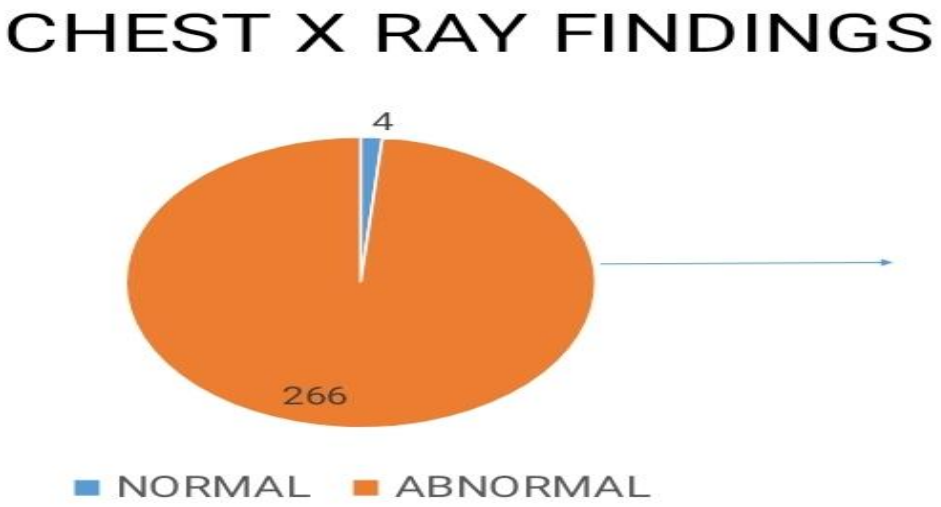

Figure 3: Chest x ray abnormality distribution

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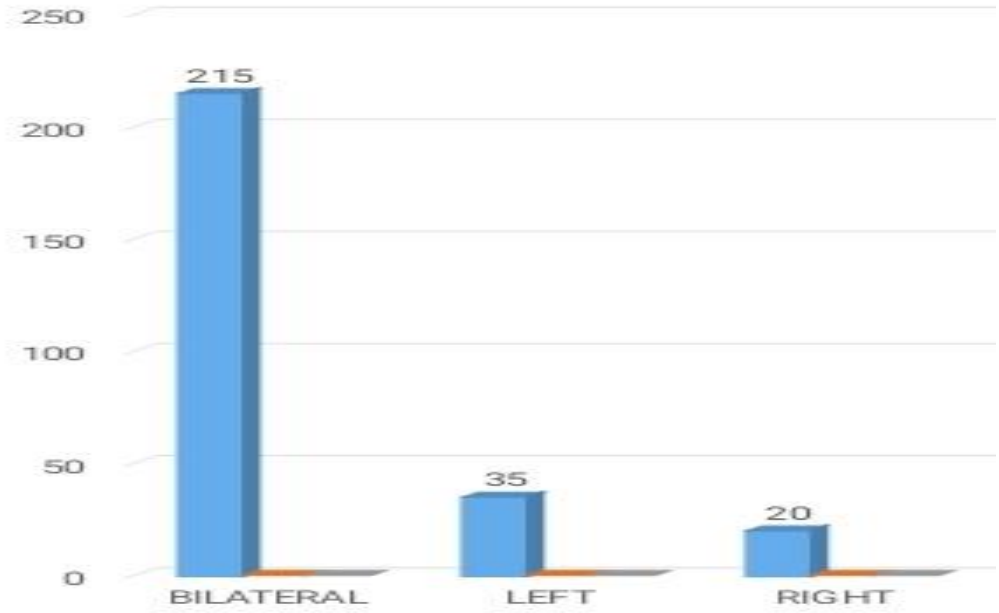

Figure 4: Involvement of sides in chest x ray

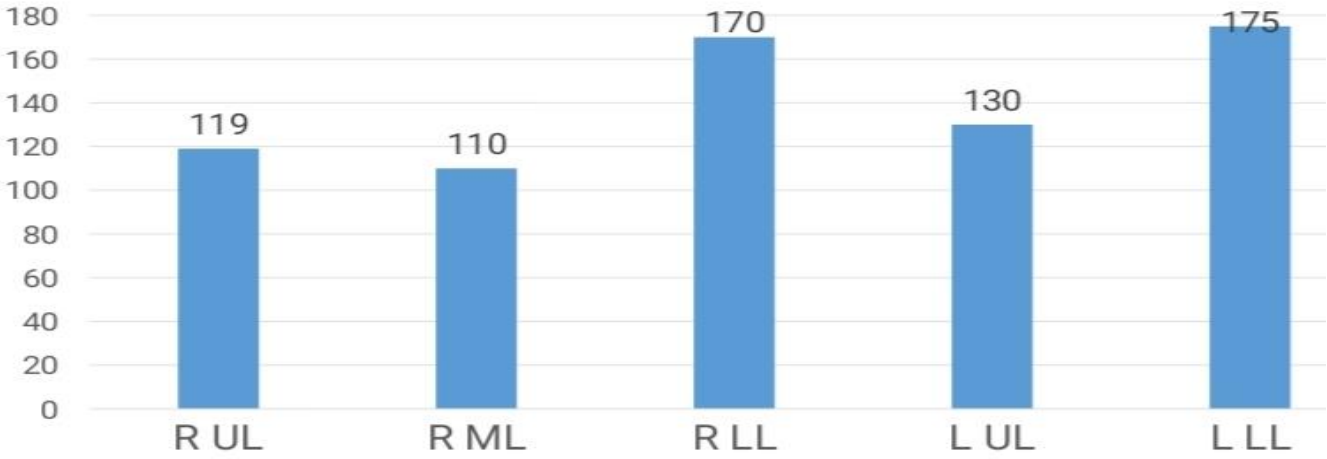

Figure 5: Radiological abnormalities observed in HRCT chest in lobar distribution.

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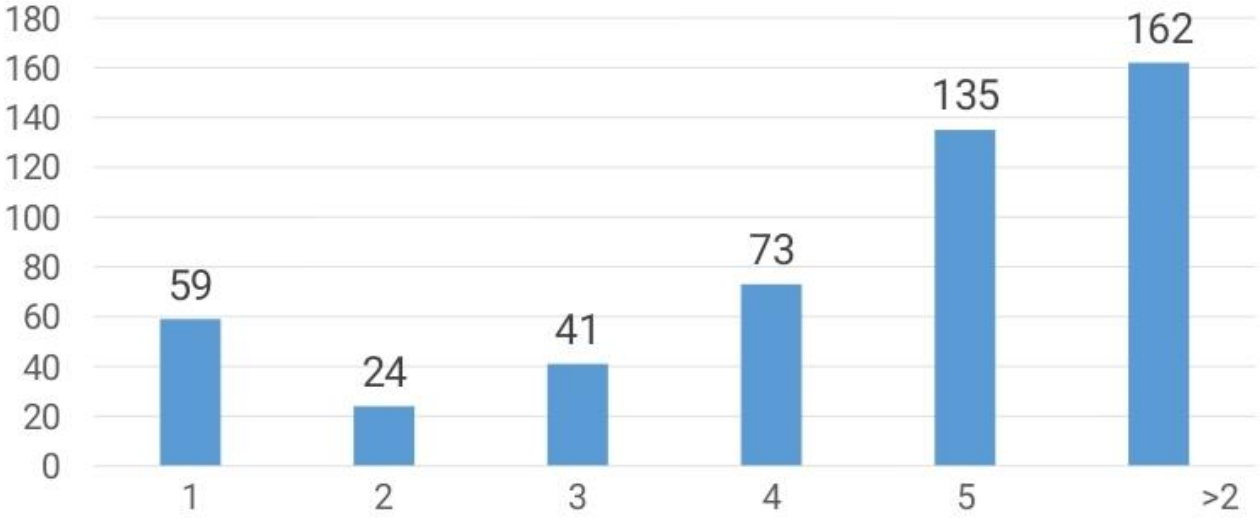

Figure 6: Number of lobes involved in CT CHEST.

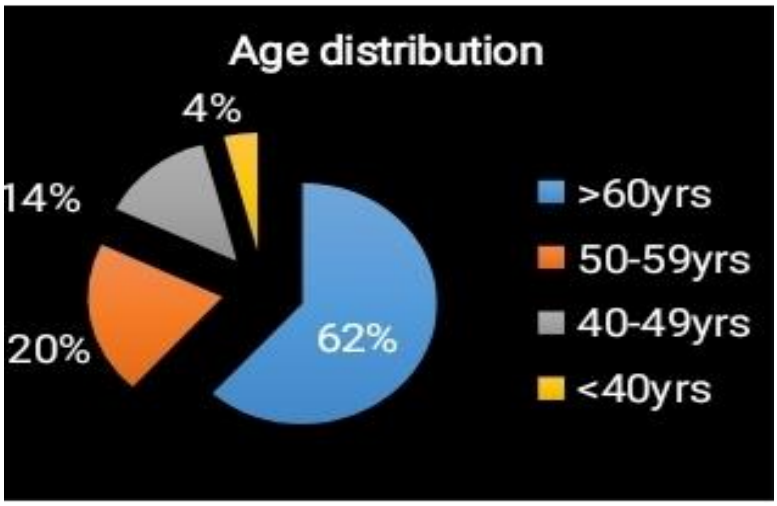

Figure 7: Age distribution of expired cases.

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