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Original Research Paper

Radiodiagnosis

CORRELATION OF CTSEVERITY WITH PROGRESSION OF DISEASE IN CO-MORBID AND NON COMORBID COVID PATIENTS

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ABSTRACT

Background: To correlate CT severity with progression of disease in comorbid and non-co morbid Covid patients. Materials and methods: This is a prospective study including 491 Covid patients in wards and ICU. Serial CT scans when done were evaluated for the progression of disease in comorbid and non-co morbid Covid patients. . **Results:** There was a male preponderance (72.91% male and 27.08 % females The most prevalent comorbidities were Diabetes,mellitus, Hypertension, COPD, Tuberculosis, CAD,CKD,Smoking and others like hypothyroidism, anemia, CVA. Peripheral ground glassing with lower zone distribution were found in 76% of patients. Out of 55 patients with co- morbidities who underwent serial CT scans for progression, 44 (80%) patients has progression into more severe CT scoring while 11(20%) patients do not have progression. And Out of 91 patients with no co-morbidities who underwent serial CT scans too look for progression, 16 (17.6%) patients has progression into more severe CT scoring while 75 (82.41%) patients do not have progression. The progression of the CT severity score was higher in out of total 55 patients with co-morbidities viz. progression from normal scoring to mild score was in 3 (5.45 %) of patients and the progression from mild scoring to severe scoring was in 12 (21.81 %) of patients and the progression of severe score to death of patients in 29 (52.72 %) of patients while it was lower in out of total 91 patients without co-morbidities viz. progression from normal scoring to mild score was in 3(3.29 %) of patients and the progression from mild scoring to severe scoring was in 5 (5.49 %) of patients and the progression of severe score to death of patients in 8 (8.8 %) of patients. Conclusion: The progression of the CT severity was higher in patients with co-morbidities than patients with non co-morbidities

KEYWORDS : CT severity, co morbidities ,Covid

INTRODUCTION

The global pandemic COVID -19 is caused by SARS COV2 corona virus.HRCT is used in the monitoring and to assess the severity of viral pneumonia caused by COVID-19. In this study, we correlated CT severity with progression of disease in comorbid and non-co morbid Covid patients and had derived various results.

AIMS AND OBJECTIVES

- To study various comorbidities associated with COVID 19 infection.
- To quantify the severity of COVID-19 infection on high-resolution chest computed tomography (CT).
- To correlate CT severity scoring with progression of disease in comorbid and non-co morbid Covid patients.

MATERIALS AND METHODS

A hospital based prospective study was conducted in the Department of Radiodiagnosis, MLB Medical College, Jhansi. Subjects include all adults between age group 20-60 years getting admitted in COVID wards and ICU. CT were performed in total 491 COVID positive subjects for a 5 month period from 11th August 2020 to 30th March 2021 using 16slice Philips CT Machine and CT Severity scoring was done in all the patients.Various comorbidities associated with COVID 19 infection were then noted for all COVID patients. Serial CT scans when done were evaluated for the progression of disease in comorbid and non-co morbid Covid patients.

Statistical analysis:

The correlation of CT severity scoring with progression of disease in comorbid and non-co morbid Covid patients was then calculated by CHI SQUARE TEST and p-value <0.05 was considered significant.

RESULTS

S.NO	SEX	NO. OF PATIENTS	%
1.	MALES	358	72.91%
2.	FEMALES	133	27.08%
	TOTAL	491	100%

TABLE 1: SEX DISTRIBUTION

S.NO	COVID STATUS	NO. OF PATIENTS	%
1.	20-30 years	61	12.42%
2.	31-40 years	70	14.25%
3.	41-50 years	103	20.98%
4.	51-60 years	126	25.66%
5.	61-70 years	78	15.88%
6.	71-80 years	42	8.55%
7.	81-90 years	10	2.03%
8.	91-100 years	1	0.20%
9.	Total	491	100%

TABLE 2: AGE DISTRIBUTION OF COVID PATIENTS

S.NO	CO-MORBID STATUS	NO. OF PATIENTS	%
1.	Yes	172	35.03%
2.	No	319	64.97%
	TOTAL	491	100%

TABLE 3: CLINICAL SYMPTOMS FEVER,COUGH,DYSPNEA,SORE THROAT

TABLE 4: DISTRIBUTION OF CO-MORBID STATUS IN COVID PATIENTS

TABLE 5: CO-MORBIDITIES IN COVID PATIENTS

DIABETES,HYPERTENSION,COPD,TB,CAD,SMOKING AND MISCELLANEOUS

TABLE 6: CT FINDINGS IN COVID PATIENTS

Peripheral ground glassing, Peripheral consolidation, Perihilar consolidation, Crazy paving pattern, Peripheral and central GGO/Consolidation, Reverse halo/Atoll sign, Vascular dilatation

S.NO	COVID Scoring	NO. OF PATIENTS with comorbidities	%
1.	Normal	6	3.49%
2.	Mild COVID	107	62.22%
3.	Severe COVID	59	34.99%
4.	TOTAL	172	100%

TABLE 7: DISTRIBUTION OF PATIENTS WITH CO-MORBIDITIES ACCORDING TO CT SEVERITY SCORE

S.NO	COVID Scoring	NO. OF PATIENTS without comorbidities	%
1.	Normal	26	8.15%
2.	Mild COVID	216	67.71%
3.	Severe COVID	77	24.13%
4.	TOTAL	319	100%

TABLE 8: DISTRIBUTION OF PATIENTS WITHOUT CO-MORBIDITIES ACCORDING TO CT SEVERITY SCORE

S.NO	COVID Scoring	NO. OF PATIENTS with comorbidities who underwent serial CT scans	%
1.	Normal	4	7.2%
2.	Mild COVID	17	30.9%
3.	Severe COVID	34	61.9%
4.	TOTAL	55	100%

TABLE 9: TOTAL NO. OF PATIENTS WITH CO-MORBIDITIES WHO UNDERWENT SERIAL CT SCANS

Only 55 (1.9 %) out of 172 patients with co-morbidities required serial CT scans to look for progression and for follow up.

S.NO	COVID Scoring	NO. OF PATIENTS with no comorbidities who underwent serial CT scans	%
1.	Normal	14	15.38%
2.	Mild COVID	31	34.06%
3.	Severe COVID	46	50.56%
4.	TOTAL	91	100%

TABLE 10: TOTAL NO. OF PATIENTS WITH NO CO-MORBIDITIES WHO UNDERWENT SERIAL CT SCANS

Only 91 (28.52%) out of 319 patients with no co-morbidities underwent serial CT scans to look for progression and for follow up.

S.NO	Worsening of CTSI In patients with co-morbidities	Progression of Normal score to Mild/severe score	%
1.	Yes	3	75%
2.	No	1	25%
3.	TOTAL	4	100%

TABLE 11: PROGRESSION OF NORMAL COVID SCORING IN PATIENTS WITH CO-MORBIDITIES WHO UNDERWENT SERIAL CT SCANS

S.NO	Worsening of CTSI In patients with no co-morbidities	Progression of Normal score to Mild/severe score	%
1.	Yes	3	21.43%
2.	No	11	78.57
	TOTAL	14	100%

TABLE 12: PROGRESSION OF NORMAL COVID SCORING IN PATIENTS WITH NO CO-MORBIDITIES WHO UNDERWENT SERIAL CT SCANS

S.NO	Worsening of CTSI In patients with co-morbidities	Progression of Mild score to severe score	%
1.	Yes	12	70.6%
2.	No	5	29.4%
	TOTAL	17	100%

TABLE 13: PROGRESSION OF MILD COVID SCORING IN PATIENTS WITH CO-MORBIDITIES WHO UNDERWENT SERIAL CT SCANS

S.NO	Worsening of CTSI In patients without co-morbidities	Progression of Mild score to severe score	%
1.	Yes	5	16.13%
2.	No	26	83.87%
	TOTAL	31	100%

TABLE 14: PROGRESSION OF MILD COVID SCORING IN PATIENTS WITHOUT CO-MORBIDITIES WHO UNDERWENT SERIAL CT SCANS

S.NO	Worsening of CTSI In patients with co-morbidities	Progression of severe score/death	%
1.	Yes	29	85.29%
2.	No	5	14.70%
	TOTAL	34	100%

TABLE 15: PROGRESSION OF SEVERE COVID SCORING IN PATIENTS WITH CO-MORBIDITIES WHO UNDERWENT SERIAL CT SCANS

S.NO	Worsening of CTSI In patients without co-morbidities	Progression of severe score/death	%
1.	Yes	8	17.4%
2.	No	38	82.60%
	TOTAL	46	100%

TABLE 16: PROGRESSION OF SEVERE COVID SCORING IN PATIENTS WITHOUT CO-MORBIDITIES WHO UNDERWENT SERIAL CT SCANS

S.NO	Progression of CTSI In patients with co-morbidities		Progression of CTSI In patients with no co-morbidities	
Yes	44	80%	16	17.6%
No	11	20%	75	18.4%
Total	55	100%	91	100%

TABLE 17: TOTAL PROGRESSION OF COVID SCORING IN PATIENTS WITH AND WITHOUT CO-MORBIDITIES WHO UNDERWENT SERIAL CT SCANS

Progression of disease	Normal COVID with no co-morbidities	Normal COVID with co-morbidities	Chi square (x^2)	Df	P
Yes	3	3	4.01786	1	0.04
No	11	1			

TABLE 18: PROGRESSION OF DISEASE IN NORMAL COVID IN NON CO-MORBID AND CO-MORBID PATIENTS WHO UNDERWENT SERIAL CT SCANS

Progression of disease was found to be more maintained in Normal patients with no comorbidities while it was progressed or worsened more commonly in patients with co-morbidities and was found to be statistically significant.

Progression of disease	MILD COVID with no co-morbidities	Mild COVID with co-morbidities	Chi square (x2)	Df	P
Yes	5	12	14.2359	1	0
No	26	5			

TABLE 19: PROGRESSION OF DISEASE IN MILD COVID IN NON CO-MORBID AND CO-MORBID PATIENTS WHO UNDERWENT SERIAL CT SCANS

Progression of disease was found to be more maintained in MILD COVID patients with no comorbidities while it was progressed or worsened more commonly in patients with co-morbidities and was found to be statistically significant.

Progression of disease	Severe COVID with no co-morbidities	Severe COVID with co-morbidities	Chi square (x2)	Df	p
Yes	8	29	36.2604	1	0
No	38	5			

TABLE 20: PROGRESSION OF DISEASE IN SEVERE COVID IN NON CO-MORBID AND CO-MORBID PATIENTS WHO UNDERWENT SERIAL CT SCANS

Progression of disease was found to be more maintained in Severe COVID patients with no comorbidities while it was progressed or worsened more commonly in patients with co-morbidities and was found to be statistically significant.

DISCUSSION

A total of 491 patients of laboratory confirmed COVID-19 test by RT-PCR admitted in COVID ICU and Covid wards were assessed. Among the confirmed cases, Most of the cases 126 (25.66%)patients were in the fifth and sixth decade of age group with mean age of 50 years. There was a male preponderance (72.91% male and 27.08 % female).***In a study conducted by Sudhir Bandari et al.[1] there was a male preponderance in his study of clinicoradiological correlation and covid patients***. Out of total analyzed patients, fever, cough, shortness of breath and sore throat were the most common presenting clinical manifestations. 35.03 % patients had some underlying co morbid disease in sample population. The most prevalent comorbidities were Diabetes mellitus, Hypertension, COPD, Tuberculosis, CAD, CKD, Smoking and others like hypothyroidism, anemia, CVA etc. The lung pathological changes were evaluated by HRCT imaging and by assigning CT severity score. The CT findings include Peripheral ground glassing Peripheral ground glassing with consolidation, Peripheral consolidation, Parahilar consolidation, crazy paving, atoll sign, vascular dilatation.

Peripheral ground glassing with lower zone distribution were found in 76% of patients.***This commensurates with a study conducted by MNIslam et al.[2] where 80% of patients had peripheral ground glassing with lower zone predominance.***

The clinical status of patients correlated with the CT severity score. The CT features varied with duration and course of disease.

Only 55 (31.9 %) out of 172 patients with co-morbidities underwent serial CT scans to look for progression and for follow up.

Only 91 (28.52 %) out of 319 patients with no co-morbidities underwent serial CT scans to look for progression and for follow up.

Out of 55 patients with co- morbidities who underwent serial CT scans for progression, 44 (80%) patients has progression into more severe CT scoring while 11(20%) patients do not have progression.

And Out of 91 patients with no co-morbidities who underwent serial CT scans too look for progression, 16 (17.6%) patients has progression into more severe CT scoring while 75 (82.41%) patients do not have progression.

The progression of the CT severity score was higher in out of total 55 patients with co-morbidities viz. progression from normal scoring to mild score was in 3 (5.45 %) of patients and the progression from mild scoring to severe scoring was in 12 (21.81 %) of patients and the progression of severe score to death of patients in 29 (52.72 %) of patients while it was lower in out of total 91 patients without co-morbidities viz. progression from normal scoring to mild score was in 3(3.29 %) of patients and the progression from mild scoring to severe scoring was in 5 (5.49 %) of patients and the progression of severe score to death of patients in 8 (8.8 %) of patients.***This commensurates with a study conducted by Swati et al[3]. where they studied HRCT feature in Covid patients and found that patients with co-morbidities tend to develop more severe disease than those without co-morbidities.***

The correlation of CT severity scoring with progression of disease in comorbid and non-co morbid Covid patients was then calculated by Medical biostatistics viz. CHI SQUARE TEST for each of the Normal, mild and severe covid groups respectively and was found to be significant p value <0.05

CONCLUSION

The varied spectra of COVID-19 presentation included fever, cough, shortness of breath, sore throat etc. Diabetes mellitus, hypertension, COPD and CAD were found as major comorbid conditions. Symptomatic presentation of COVID-19 was observed to be higher in patients with co morbid disease, especially if multiple. HRCT chest in COVID-19 patients had a major diagnostic and prognostic importance as positive CT findings were more prominent in symptomatic patients and co-morbid patients.The progression of the CT severity was higher in patients with co-morbidities than patients with non co-morbidities.

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