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A CROSS-SECTIONAL OBSERVATION STUDY TO ASSESS ASSOCIATION OF D – DIMER LEVEL AS PROGNOSTIC INDICATOR IN COVID 19 PATIENTS.

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ABSTRACT

Background: D- dimer test can help to assess the severity of the disease and risk of Cardio pulmonary complication due to covid 19. **Objectives:** To analyse Covid 19 coagulation deregulatory effect, specially to D-dimer elevation and its co relation with thrombotic events and ARDS which leads to mortality and morbidity in Covid 19 patient. **Design :** RECORD BASED DESCRIPTIVE STUDY **Patients:** Case record of All covid 19 patient age >18 **Methods:** Data collection done by using Proforma. The data included age, gender, smoking status, comorbidities, disease onset time, antiviral regimens, progress to severe or critical, mode of ventilation, time of symptomatic recovery and radiological recovery. Statistical analysis was expressed as mean with standard deviation and were compared between the groups by the student 't' test. Categorical variables were expressed as number (%) and compared by chi-square (v2) test or Fisher's exact test. A p value of 0.05 or less was considered for statistical significance. **Results:** In this study out of 300 patients most common age group were in 41-50 years, male were predominantly high, fever was most common symptom followed by cough and dyspnoea respectively. In this study elevated d dimer was effectively significant in age, comorbidities like HTN and DM, complaint such as fever, cough, dyspnoea and fatigue, biochemical parameters like TLC, CRP and LDH and SpO2 saturation < 94% and mortality compared to normal d dimer level. **Conclusion:** Based on this clinical study we conclude that elevated D-dimer level seen in severe Covid 19 infection and significantly higher level could predict the hospital mortality and duration of hospital stay and improves management of Covid 19 patients in hospital.

KEYWORDS : D- Dimer, Covid 19

INTRODUCTION

A newly defined 2019 corona virus (SARS-CoV-2) has been declared as a pandemic by the World Health Organization (WHO) on March 11, 2020.[1] As the pandemic becomes widespread over time, standardize the treatment options and the prognostic factors to detect critically ill patients as early as possible becomes vital.

D-dimer has been presented as one of the most frequent and promptly elevated laboratory findings associated with coagulopathy in corona virus disease 2019 (COVID-19) patients.[2] A strong synergy between SARS-CoV-2 infection and venous thrombo-embolism is a remarkable relation representative of the predictive value of D-dimer in these patients. The prevalence of venous thrombo-embolism has been reported to be 25% in patients with severe pneumonia due to SARS-CoV 2 infection.[3] On the contrary, high serum levels of D-dimer are not disease specific and are usually related to several medical circumstances such as infection, inflammation, and pregnancy.[4]

METHODS :

Study Design: Record Based Descriptive Study
Study Population: All case record of RDT and RTPCR positive patients of COVID 19 admitted in Sir T. General Hospital, Bhavnagar during 1st February 2021 to 30th May 2021.
Study Duration: 6 months (July 2021 to December 2021)

Inclusion Criteria

Case record of All covid 19 patient age >18.

Exclusion Criteria

Case record of Covid 19 positive patient with recent (with in 30 day) surgery or trauma & Pregnant female.

Sample Size: Covid 19 positive cases (n=300) admitted in Sir-T Hospital from 1st February 2021 to 30th May 2021.

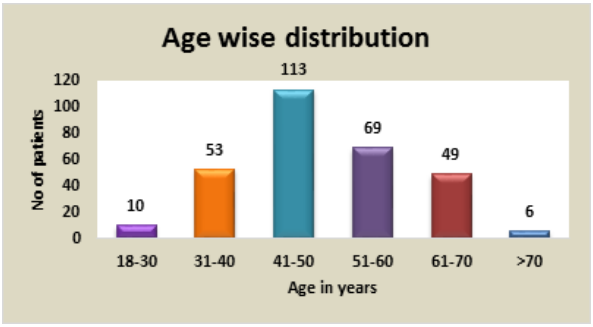
Methodology

Epidemiological, clinical, laboratory and radiological characteristic data of patients were obtained with standardized data collection by using Proforma. The data included age, gender, smoking status, comorbidities (diabetes, hypertension, cardiovascular disease, etc.), disease onset time (self reported or history given by relative of start of either fever or cough during epidemiological investigation) antiviral regimens (duration of a drug used for more than 3 days) progress to severe or critical, non-invasive assisted ventilation (non-invasive ventilation or high-flow nasal cannula), invasive mechanical ventilation, time of symptomatic recovery (temperature lower than 37.5°C, reduce coughing and being vitaly stable) and time of radiological recovery (improvement or reduce of initial pulmonary lesions and no new radiological lesions occurred at other parts). Statistical Analysis Continuous variables were expressed as mean with standard deviation and were compared between the groups by the student't' test. Categorical variables were expressed as number (%) and compared by chi-square (v2) test or Fisher's exact test as appropriate. All statistical analyses were performed using the IBM SPSS 22.0 software. The significance level of the hypothesis tests was set at 0.05 (two-sided).

RESULT

In the present study, it was found that maximum number 113 (37.66%) of COVID-19 Pneumonitis were in 41-50 years age group followed by 69 (23%) of patients in 51-60 years of age group. Moreover, the lowest age patients of COVID-19 Pneumonitis was 24 years old, while highest was 74 years with

mean age of 48.96 ± 10.51years. with age wise distribution maximum mean d-dimer level (885.90 ±680.1) seen in age group of 18-30 years followed by 800.8±1621.4 of patients of 51-60 years age group.



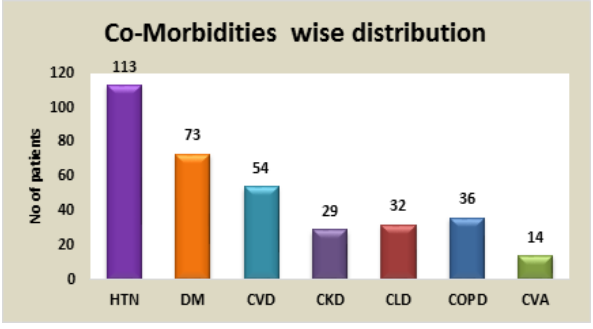
Graph 1: Age Wise Distribution

In the present study, it was found that 185 (61.66%) of male COVID -19 Pneumonitis were predominantly higher than female COVID-19 Pneumonitis 115(38.33%). Moreover, the male: female ratio was found 1.60:1.

Table 1: Gender Wise Distribution

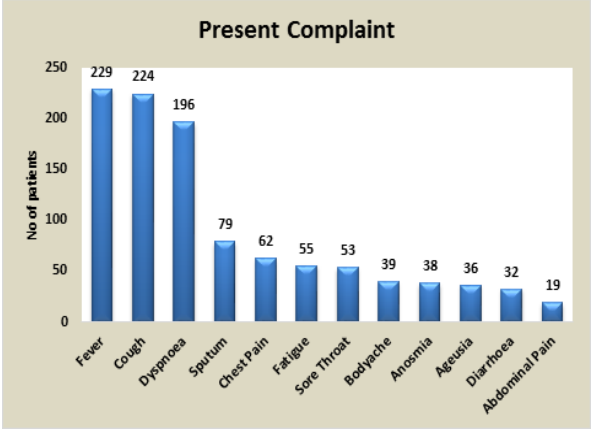
Gender	No of patients (n=300)
Male	185 (61.66%)
Female	115(38.33%)
Total	300 (100%)
M:F Ratio	1.60:1

In the present study, HTN is most common 113(37.66%) comorbidity present in covid 19 patients followed by DM patients as 73 (24.33%) and CVD 54 (18%) of patients, while others were found in table above.



Graph 2: Co-morbidities Wise Distribution

In the present study, COVID-19 Pneumonitis patients with present complaints fever is most common symptom present in 229 (76.33%) patients out off 300 patient followed by cough present in 224 (74.66%) patients then dyspnoea in 196 (65.33%) while others were found in table above.



Graph 3: Present Complaint Wise Distribution

In the present study of biochemical parameters, it was found that CBC, creatinine and coagulation profile were found in normal range. except CRP and D-dimer profile which is higher than normal range.

Table 2: Biochemical Paramters

Category	No of patients (n=300)
Hb (gm/dL)	12.39 ± 2.12
Total Count (*103/cmm)	8.12 ± 3.73
Platelet (*103/cmm)	223.05 ± 78.87
SGOT (U/L)	58.75 ± 54.68
SGPT (U/L)	47.64 ± 42.99
S. Creatinine (mg/dL)	1.09 ± 0.49
PT/INR	1.17 ± 0.20
D Dimer (ng/mL)	763.16 ± 677.85
CRP (mg/L)	10.84 ± 7.67
LDH (IU/L)	259.31 ± 123.71

Table 3: Correlation Of D Dimer With Other Parameters

	Norma D-Dimer (<500ng/ml) (n=155)	Elevated D-dimer (>500ng/ml) (n=145)	P value
Mean Age (yrs)	47.73 ± 10.69	50.30 ± 11.59	0.0466
Gender	99 (63.87%)	86 (59.31%)	0.4169
• Male	56 (36.12%)	59 (40.68%)	
• Female			
Comorbidities			
• HTN	31 (20%)	82 (56.55%)	<0.0001
• DM	24 (15.48%)	49 (33.79%)	0.0002
• CVD	22 (14.19%)	32 (22.06%)	0.0761
• CKD	14 (9.03%)	15 (10.34%)	0.7004
• CLD	16 (10.32%)	15 (10.34%)	1.0000
• CPOD	17 (10.96%)	18 (12.41%)	0.6966
• CVA	9 (5.81%)	5 (3.44%)	0.3333
Complaint			
• Fever	102 (65.80%)	127 (87.58%)	<0.0001
• Cough	104 (67.09%)	120 (82.75%)	0.0018
• Dyspnoea	79 (50.96%)	117 (80.68%)	<0.0001
• Sputum	41 (26.45%)	38 (26.20%)	0.9643
• Chest pain	28 (18.06%)	34 (23.44%)	0.2498
• Fatigue	20 (12.90%)	35 (24.13%)	0.0119
• Sore Throat	21 (13.54%)	32 (22.06%)	0.0531
• Bodyache	16 (10.32%)	23 (15.86%)	0.1539
• Anosmia	13 (8.38%)	25 (17.24%)	0.2121
• Ageusia	14 (9.03%)	22 (15.17%)	0.1019
• Diarrhoea	10 (6.45%)	22 (15.17%)	0.1444
• Abdominal Pain	6 (3.87%)	13 (8.96%)	0.0702
Biochemical			<0.0001
Parameters	12.93 ± 1.95	11.82 ± 2.14	0.0020
• Hb	7.47 ± 3.01	8.81 ± 4.28	0.0048
• TC	235.43 ± 84.23	209.82 ± 70.63	0.0636
• PLC	52.82 ± 48.54	65.09 ± 60.09	0.7540
• SGPT	46.89 ± 41.46	48.45 ± 44.69	0.2956
• SGOT	1.12 ± 0.55	1.06 ± 0.43	0.0015
• S. Creatinine	1.13 ± 0.14	1.20 ± 0.23	<0.0001
• PT/INR	10.23 ± 7.69	11.49 ± 7.62	<0.0001
• CRP	270.70 ±	248.64 ±	
• LDH	130.75	116.16	
SPO2 Saturation			0.0182
<94%	124 (80%)	132 (91.03%)	
>94%	31 (20%)	13 (8.96%)	
CT Score	10.64 ± 3.85	12.86 ± 4.78	<0.0001
Hospital Stay (days)	6.07 ± 1.71	6.10 ± 1.55	0.8739
Mortality	14 (9.03%)	32 (22.06%)	0.0017

DISCUSSION

D-dimer is a small protein fragment released into the blood when a blood clot is degraded by fibrinolysis. Thrombosis can be diagnosed by determining the D-dimer concentration: D-dimer is increased when the coagulation system is activated

because of the associated thrombosis or disseminated intravascular coagulation For the reason, In present study Coagulation disorder occurred at the early stage of COVID-19 infection, with (48.33%) patients having increased D-dimer levels.

In the present study maximum number (37.66%) of COVID-19 Pneumonitis were in 41-50 years age group followed by (23%) of patients in 51-60 years age group with mean age of 48.96 ± 10.51 years.61.66%) of male COVID-19 Pneumonitis were predominantly higher than female COVID-19 Pneumonitis (38.33%).Co-Morbidities found such as HTN was immensely in (37.66%) then DM patients as (24.33%) and CVD (18%) of patients. Fever was most common complaint in (76.33%) COVID-19 Pneumonitis patients then cough as complaints (74.66%) and Dyspnoea (65.33%) of patients.COVID-19 Pneumonitis patients were categorized by onset of symptoms as Mild (16.33%), Moderate (49.66%) and Severe (34%) patients respectively.The mean age of elevated D dimer group was 50.30 ± 11.59, and in normal D-dimer group its 47.73 ± 10.69. In the elevated D-dimer group, 56.55% was found to be hypertensive and in normal D-dimer its 20%. In group of elevated d dimer, 33.79% was found to be diabetics in compared of normal D- dimer its 15.48%. complaint such as fever present in 87.85 % of elevated d dimer group in compared of normal d dimer its 65.80%, cough present in 82.75% of elevated d dimer group in compared of normal d dimer its 67.09%, dyspnoea present in 80.68% in elevated group in compared to 50.96% in normal d dimer group and fatigue as a symptom present in 24.13% of elevated d dimer group in compared of normal d dimer its 12.90%.Spo2 saturation <94% present in 47.58% of elevated d dimer group in compared to 34.19% in normal d dimer, in group of elevated d dimer CT score is 12.86 ± 4.78 in compared to normal d dimer its 10.64 ± 3.85, and mortality is higher in elevated d dimer group 22.06% in compared to normal d dimer 9.03%.In this study elevated d dimer was effectively significant in age , comorbidities like HTN and DM, complaint such as fever, cough, dyspnoea and fatigue, biochemical parameters like HB, TLC, PLC, PT/INR, CRP and LDH, and spo2 saturation <94% and mortality compared to normal d dimer level ($p<0.05$).

According to Wang L et al [5] have found that the median D-dimer level was 0.70 mg/L which of (48.8%) patients had D-dimer level above the median level (0.7 mg/L). Patients with D-dimer level above 0.7 mg/L had older age (67 yrs vs. 51 yrs; $P < 0.001$), higher level of C-reactive protein (35.8 mg/L. 5.6 mg/L; $P = 0.017$) and NT-proBNP (200.4 pg/ml vs. 32.6 pg/ml $P < 0.001$) than the ones with D-dimer level ≤ 0.7 mg/L. Further, there were more patients received oxygen therapy in the group with D-dimer level > 0.7 mg/L than ≤ 0.7 mg/L (73.8% vs. 45.5%, $P = 0.009$). Patients with D-dimer level > 0.7 mg/L had lower oxygenation index compared with patients with D-dimer level ≤ 0.7 mg/L (273.2 vs. 337.3, $P < 0.047$). There were more patients had oxygenation index < 300 in the group with D-dimer level > 0.7 mg/L than ≤ 0.7 mg/L (57.6% vs. 25%, $P = 0.043$). Moreover, patients with D-dimer level > 0.7 mg/L had significantly higher CT score (12.0 vs. 6.0 $P < 0.001$) and higher incidence of reticulation and/or traction bronchiectasis on chest CT images (83.3% vs. 46.2%, $P = 0.002$) than patients with D-dimer level ≤ 0.7 mg/L. study by He X et al [6] have found that Most patients with abnormal D-dimer values were over 60 years old and have a higher average age ($p < 0.001$). There was no significant difference in gender and length of hospital stay. The clinical symptoms presented by patients at admission were mainly fever (73.4%) and cough (67.0%). Patients with abnormal D-dimer values were more likely to have clinical manifestations of dyspnea, gastrointestinal and mental symptoms ($p < 0.05$) and to have some previous underlying condition, such as hypertension, renal insufficiency, cerebro vascular disease or traumatic fracture ($p < 0.05$), Yao Y et al [7] have found that it was found that elevated D dimer was significantly effective to elder age (64.6 ± 12.6yrs vs 58.0 ± 14.4yrs), comorbidities (HTN (35.7% vs 19%), Clinical staging at admission, CURB-65, SOFA score, In-hospital mortality (9.2%), Biochemical Parameters (Hb, TC, WBC, PLC,PT/INR, CRP, PCT, LDH, eGFR and LDH) and Area of affected lung on Chest CT compared to normal D-Dimer level. ($p<0.05$).

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