Biochemical Parameters Among Covid-19 Patients Admitted At A Tertiary Care Hospital, Andhra Pradesh.

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Abstract

***INTRODUCTION**: COVID-19 is caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Monitoring ofbiochemical parameters in COVID-19 patients is criticalfor assessing disease severity and progression as well asmonitoring therapeutic intervention. **MATERIAL & METHODS**: It was a hospital based retrospective study conducted at a tertiary care hospital from Vijayawada. A pre designed schedule was designed to get the relevant data. Data on 200 admitted COVID-19 patients was taken from the hospital case records using that schedule. Studyvariables included demographic characteristicslike age, sex, biochemical parameters and outcome. **RESULTS**: A total of 200 hospital case records data was analyzed. Mean age of the study population was 45.85±14.30 years with majority (29%, n=58) belonging to 51-60 years age group. Gender wise distribution showed that more than three fourth (69%, n=138) being males. All biochemical parameters were significantly higher among patients who expired in the hospital compared with those patients who recovered. **CONCLUSIONS**: Studyhighlights the importance of biochemical parameters as a prognostic value among COVID-19 patients.Early intervention and periodic monitoring of these parameters in patients, especially with higher disease severity may help in improving disease outcome.*
Keywords: Covid-19, biochemical parameters, outcome

I. Introduction

Ever since first case of Coronavirus disease 2019 (COVID-19) identified in Wuhan, China in December 2019; it has since then spread worldwide leading to the ongoing Pandemic. COVID-19 is caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). WHO (under International Health Regulations) has declared this outbreak as a "Public HealthEmergency of International Concern" (PHEIC) on 30[th]January 2020. WHO subsequentlydeclared COVID-19 a pandemic on 11th March, 2020.[1,2]

Ever since COVID-19 emerged, being caused by a novel strain; limited information was available at the initial stages regarding the modes of transmission, pathophysiology and management. As the time was moving on, more and more information emerged and guidelines also were updated time to time.[3]

The common laboratory abnormalities in COVID-19deceased patients included coagulation disorder (elevationof prothrombin time and D-dimer), impaired liver andkidney function (mild or moderate elevation of ALT,AST, total bilirubin, alkaline phosphatase, g -glutamyltranspeptidase, BUN, creatinine, hypoalbuminemia,haematuria, and albuminuria), electrolyte disturbance(hypokalemia and hyponatremia), elevated inflammatorymarkers (CRP, ferritin, and ESR) and cytokine storm.[4,5,6]

The mortality rate is reported to be higher among patientsdeveloping into severe or critical levels. Monitoring ofbiochemical parameters in COVID-19 patients is criticalfor assessing disease severity and progression as well asmonitoring therapeutic intervention.[7]Hence the present study has been conducted with an objective to assess the biochemical parameters among covid-19 patients admitted at a tertiary care hospital in Andhra Pradesh.

II. Material & Methods

It was a hospital based retrospective study conducted at a tertiary care hospital from Vijayawada. A pre designed schedule was designed to get the relevant data. Data on 200 admitted COVID-19 patients was taken from the hospital case records using that schedule. Case sheets were selected randomly from November & December 2020.

Studyvariables included demographic characteristicslike age, sex, biochemical parameters including serum creatinine, blood urea, total bilirubin, direct bilirubin, indirect bilirubin, Aspartate transaminase (AST),

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Alanine aminotransferase (ALT), Alkaline Phosphatase (ALP), Serum Creatinine, C-reactive protein (CRP), DEDIMER, Lactate Dehydrogenase (LDH), Interleukin-6 and outcome.

Data was entered in Microsoft Excel 2010 version and analyzed using Open Epi software version 3.01. Numerical data was presented in mean and standard deviation and categorical variables in percentages and proportions. Student't' test was applied wherever necessary with p<0.05 considered as statistically significant.

III. Results:

A total of 200 hospital case records data was analyzed. Mean age of the study population was 45.85±14.30 years with majority (29%, n=58) belonging to 51-60 years age group. Gender wise distribution showed that more than three fourth (69%, n=138) were males and 31% were females with male to female ratio being 2.22:1.

Outcome: Among the total study population, majority (88%, n=176) recovered and got discharged. 12% (n=24) were expired.
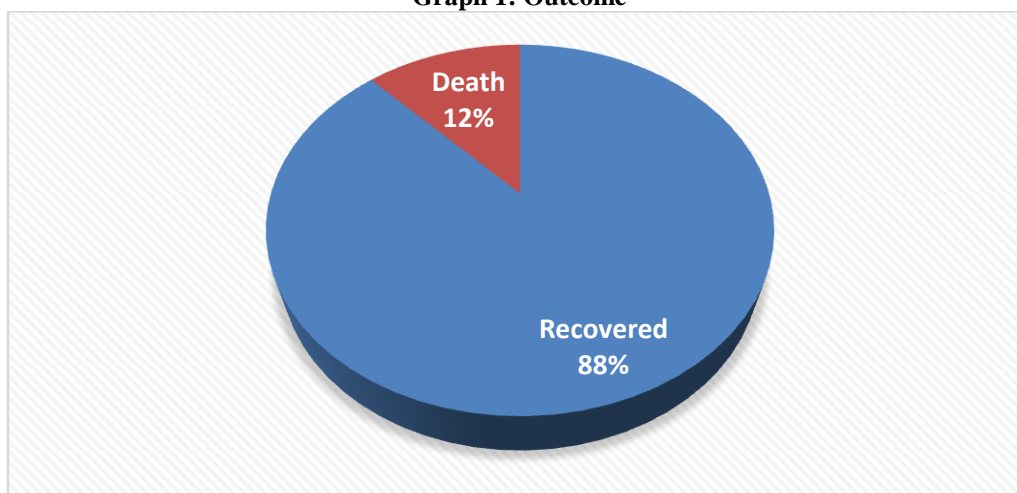
Graph 1: Outcome

Table 1: Biochemical parameters in the study population

Variable	Total (n=200) Mean±SD	Recovered (n=176) Mean±SD	Death (n=24) Mean±SD	P value
Serum Creatinine	2.73±3.42	1.74±2.00	9.70±3.48	0.00003*
Blood Urea	70.37±60.34	54.69±42.59	183.54±51.22	<0.00001*
Total Bilirubin	1.93±4.29	1.07±1.46	8.32±9.58	<0.00001*
Direct	0.72±1.83	0.38±0.80	3.26±3.99	<0.00001*
Indirect	1.21±2.51	0.69±0.72	5.06±5.66	<0.00001*
AST	78.35±135.26	68.15±138.35	158.62±88.11	0.01*
ALT	60.96±107.58	50.04±106.83	144.66±81.29	0.00001*
ALP	122.48±71.74	111.62±64.85	200.29±69.93	0.00002*
Serum Ferritin	363.04±258.65	307.68±222.67	749.68±144.70	0.01*
CRP	8.88±9.81	6.52±7.80	25.36±6.82	<0.00001*
DEDIMER	2.79±13.55	2.22±14.45	7.10±3.54	0.0002*
LDH	445.90±450.42	298.0±184.16	1523.95±355.52	<0.00001*
Interleukin-6	28.94±100.36	3.68±4.83	214.38±211.42	<0.00001*

't' test applied   *p<0.05 considered statistically significant

Various biochemical parameters such as serum creatinine, blood urea, bilirubin, liver enzymes, serum ferritin, c-reactive protein, Dedimer, Lactate Dehydrogenase (LDH)and Interluekin-6 were assessed in the admitted patients. Results showed that all biochemical parameters were significantly higher among patients who expired in the hospital compared with those patients who recovered. This highlights the importance of biochemical parameters as a prognostic value among COVID-19 patients.

IV. Discussion

Present study found that biochemical parameters were significantly higher among patients who expired in the hospital compared with those patients who recovered. Regarding outcome, present study showed high mortality rate (12%) compared to existing literature which might be due random selection of case records. Mean age was 45 years and study showed male preponderance.

Agrawal A et al study found that 97.05% (99/102) recovered while 2.94% (3/102) died. Mean age, total leucocyte count (TLC), neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR), and lactate dehydrogenase (LDH) of severely ill patients were significantly higher than those of patients with non-severe illness.Elevated NLR, TLC, PLR, LDH and lymphopenia were seen in the symptomatic patients especially manifesting severe disease.[8]

Another study from Iran by Mardani R et all found that Patients with positive RT-PCR had significantly higher neutrophil (NEU) count (p =0.0001), and C-reactive protein (CRP) (p = 0.04), lactate dehydrogenase (LDH) (p = 0.0001), aspartate aminotransferase(AST) (p = 0.001), alanine aminotransferase (ALT) (p = 0.0001), and Urea (p = 0.001) levels in serum.In addition, patients with positive RT-PCR had lower white blood cell (WBC) count (p = 0.0001) and serum albuminlevel (p = 0.0001) compared to others. ALT (AUC = 0.879), CRP (AUC = 0.870), NEU (AUC = 0.858), LDH (AUC= 0.835), and Urea (AUC = 0.835) had very good accuracy inpredicting cases with positive RT-PCR for COVID-19,respectively.[9]

Raad Hassan Najim, Sinan Ridhakadhim study on Biochemical and hematological parameters as apredictor for COVID -19 infection in Kirkuk city observed that 65 patients with positive PCR covid -19 infection with mean age(44.2±13.1) and 65 participant as control with negative RT-PCR with meanage (41.6±14.9). Patients showing significant decrease in total WBC count andLymphocytes (P-value:0.0001,0.0001),and significant rise of LDH,DDimer,CRP and Ferritin levels (P-value:0.004,0.002,0.001,0.0001).[10]

Comparative study of some biochemical parameters among of COVID-19 symptoms and non COVID-19 symptoms individuals from Iraq found that All three biochemical parameters increased among patients with COVID-19 symptoms, but more significantly, steadily increase was observed only in LDH value in age above and under 40 years (284.43±10.29 and 321.23±16.32 U/L), and p-value was (0.0488).

V.   Conclusions:

Biochemical parameters were higher in the higher among patients who expired in the hospital compared with those patients who recovered. Studyhighlights the importance of biochemical parameters as a prognostic value among COVID-19 patients. Early intervention and periodic monitoring of these parameters in patients, especially with higher disease severity may help in improving disease outcome.

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