Comparison Of Prothrombin Time, D-Dimer And Neutrophil: Lymphocyte Ratio In Rt-Pcr Positive Covid-19 Patients

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Abstract
Introduction :
Currently, Novel Coronavirus Infection (Covid-19) Has Affected More Than 200 Countries And Regions Around The World. More Than 100 Million People Have Been Infected And Nearly 2 Million Have Died. Most Patients Infected With Novel Coronavirus Presentswith Acute Respiratory Tract Infection In Early Course, And Some Patients Quickly Progressto Acute Respiratory Distress Syndrome, Acute Respiratory Failure, Or Other Severe Secondary Complications.
Complete Blood Count(Cbc) Is A Basic And Economical Investigation Done For Every Admitted Patient. Cbc, Along With Coagulation Parameters Provide A Potential Information About Haematological Aspect Of Disease Progression.
In A Study, Wang D Et Al. Tookfirst 138 Laboratory-Confirmed Cases With Covid-19showed The Changes Of Neutrophil Count, Lymphocyte Count, And D-Dimer Levels.This Study Is Aimed At Comparing Cbc And Coagulation Parameters With Special Reference To Neutophil : Lymphocyte Ratio(Nlr), Prothrombin Time(Pt) And D-Dimer Levels.
Objectives : *Comparison And Correlation Of Nlr, Pt And D-Dimer Levels In Covid – 19 Patients.*
Methods:
First 25rt-Pcr Confirmed Covid 19 Patients Admitted In Kles Dr.Prabhakarkore Hospital And Medical Research Centre, Belagavi Were Included. Blood Samples Were Drawn (Edta And Citrated Vacutainers) From Patients And The Cbc And Coagulation Parameters Were Analyzed Using Cal 6000 – Mindray Haematology Analyzer And Acl Top 500-Cts Respectively.
The Readings Are Tabulated And Compared.
Results:
The Main Haematological Findings Were Increased Neutrophil Count, Decreased Lymphocyte Count, Increased Levels Of D-Dimer And Deranged Pt. Out Of The 25 Cases Under Study, 72%(18) Showed Increase In Nlr And D-Dimer Levels While 64%(16) Showed Prolonged Pt. Most Of The Patients Had A Normal Total Leucocyte Count That Is 68%(17) While 44%(11) Showed Lymphopenia. Rbc Count, Haemoglobin And Platelet Count Were Mostly In Normal Ranges And No Significant Variations Were Seen.
Conclusions:
In Conclusion, Nlr, Pt And D-Dimer Levels Show Abnormalities In Corona Virus Patients And These Are Easily Available And Important Investigations Which Can Predict Early Course Of Disease As Well As Alarm The Treating Clinician About The Haematological Aspect Of Disease Progression.This Would Minimize Morbidity And Mortality Arising Out Of Severe Complications Of Corona Virus Disease.
Keywords: *Neutophil : Lymphocyte Ratio(Nlr), Covid-19, D-Dimer, Prothrombin Time(Pt)*

I.   Introduction:

COVID-19, the novel coronavirus infection, first appeared in Wuhan, China, in December 2019. It quickly spread to over 200 countries, causing a global pandemic. The disease is highly contagious and can range from asymptomatic cases to severe pneumonia and acute respiratory distress syndrome (ARDS). Some people show no symptoms, while others experience fever, cough, and shortness of breath. The impact has been significant, straining healthcare systems worldwide. Testing, contact tracing, social distancing, and vaccination efforts have been crucial in controlling the virus. Ongoing research and international cooperation remain vital in fighting this global health crisis.

Investigations to be done :
1.	CBC with PS examination
2.	Coagulation studies – PT, aPTT, d-Dimer
3.	Biochemical – IL-6, LDH
4.	Acute phase reactants - Ferritin, CRP
5.	Diagnostic - rt-PCR
6.	Radiological – C.T. chest

Objectives:
•	Correlation of NLR, PT and d-Dimer levels in Covid – 19 patients.
•	To suspect/diagnose Covid-19 infection based on above parameters.

## II.	Methodology:
•	First 25 rt-PCR confirmed covid-19 patients
•	Admitted in KLES Dr.Prabhakar Kore Hospital and Medical research centre, Belagavi. Blood Samples were drawn (EDTA and Citrated vacutainers)
•	CBC and Coagulation parameters were analyzed using CAL 6000 – Mindray haematology analyzer and ACL TOP 500-CTS respectively.
•	The readings are tabulated and compared.

## III.	Results:
The main haematological findings were :
1.	Lymphopenia (relative Neutrophilia)
2.	High Neutrophil : Lymphocyte ratio
3.	Raised Prothrombin time
4.	Raised d-Dimer levels
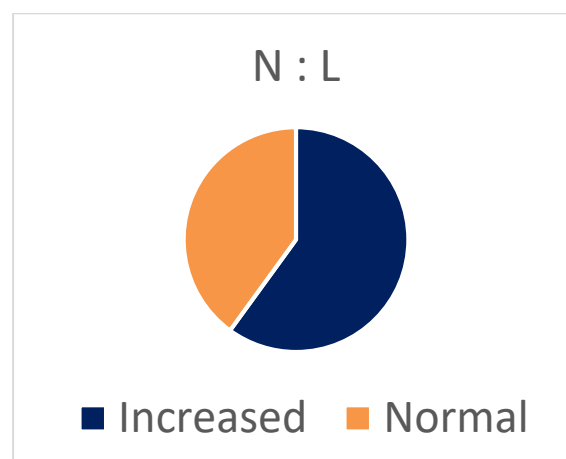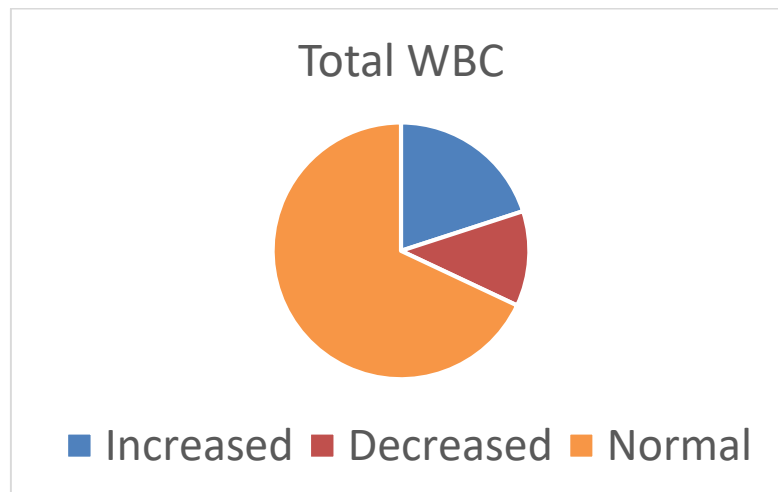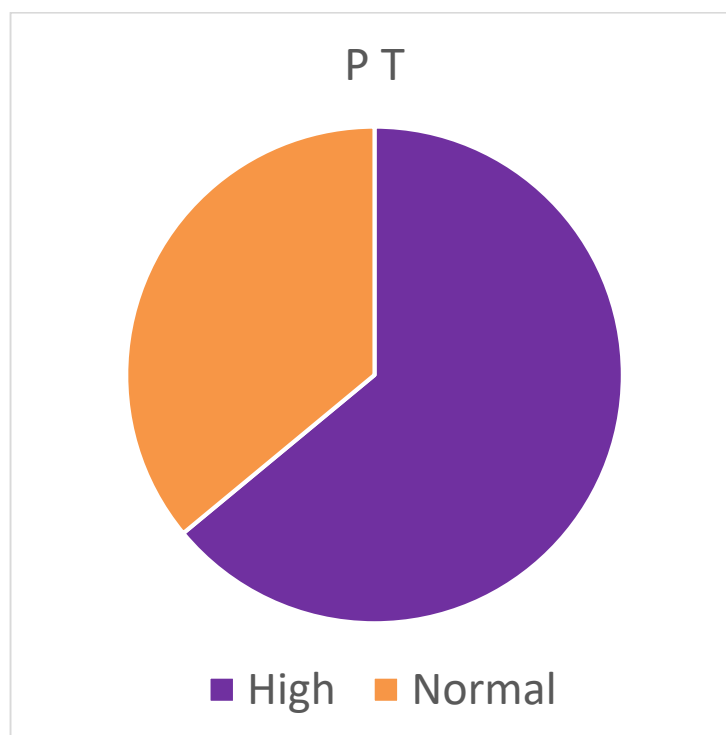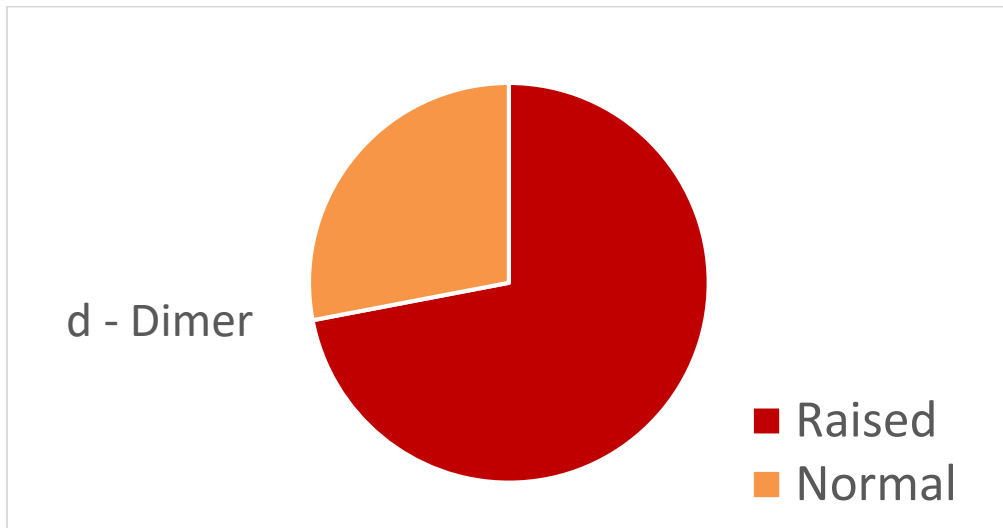
Case No.	Age/Sex	Total WBC	N : L	P T	d – Dimer
1)	50/M	4.9	**11**	**20.4**	**684**
2)	45/F	**13.6**	**4.4**	**18.6**	**528**
3)	25/M	**10.6**	**2.8**	12.7	140
4)	15/M	5.77	**3.4**	10.1	**390**
5)	67/M	**12.4**	**16.6**	**13.2**	**959**
6)	70/M	7.09	**5**	**13.2**	**474**
7)	30/M	6.5	1.3	11.8	**237**
8)	40/M	7.02	**3.75**	**13.7**	**222**

9)	23/M	7.7	**2.72**	**15.5**	**285**
10)	45/F	7.96	**11**	**17.6**	**571**
11)	22/M	6.24	1.1	11.3	103
12)	58/F	6.28	2.5	1**2.9**	**210**

Case No.	Age/Sex	Total WBC	N : L	P T	d – Dimer
13)	25/M	8.7	**10.8**	**15.1**	**684**
14)	51/F	5.4	2.2	**13**	**306**
15)	27/M	7.58	0.9	11.2	144
16)	48/M	*3.76*	**11.1**	**14**	**539**
17)	29/M	**11.6**	**15.8**	**16.1**	**498**
18)	63/M	6.02	**9.7**	12.4	199
19)	31/M	*3.59*	1.6	11.8	141
20)	54/M	*3.57*	0.5	11.3	94
21)	65/F	6.33	**4.3**	**15.4**	**362**
22)	31/M	6.24	1.4	**14.9**	**601**
23)	54/M	**11.4**	**14.3**	**17.8**	**819**
24)	44/M	4.78	1.2	11.9	116
25)	63/M	5.48	2.4	**13.1**	**337**

Peripheral Smear Findings:
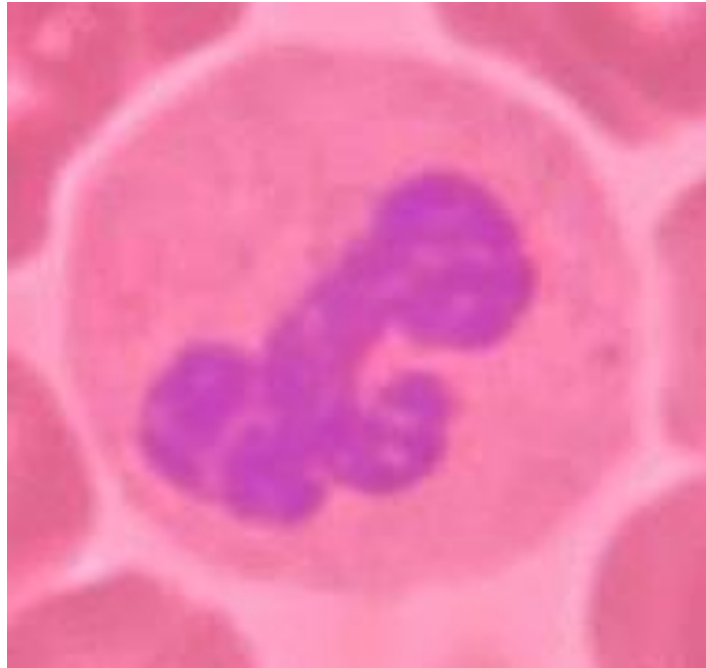
IV.   Discussion:

* Novel corona virus is a declared pandemic
* Various manifestations and investigations are known for COVID-19
* CBC(with PS) along with Coagulation Studies are routine and easily available investigations.
* Abnormalities in above can provide a clue to diagnosis
* In a study, Wang D et al. took first 138 laboratory-confirmed cases with COVID-19
* Showed the changes of neutrophil count, lymphocyte count, and D-dimer levels.
* In another study, Yuan et. al. correlated laboratory findings from 117 patients :
➢ Lower lymphocyte count
➢ Decreased red blood cell and hemoglobin
➢ Higher D-dimer levels
➢ High neutrophil count (due to Lymphopenia)
➢ High interleukin-6 , C-reactive protein, ferritin, lactate dehydrogenase

V.   Conclusion:

* NLR, PT and d-Dimer levels show abnormalities in corona virus patients
* These investigations are easily available
* Predicts early course of disease
* Alarm the treating clinician about the haematological aspect of disease progression
* Helps to minimize morbidity and mortality arising out of severe complications of corona virus disease.

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