General Characteristics of Laboratory Findings and Comorbid for COVID-19 Patients in Bali Mandara Regional General Hospital

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1. Introduction

COVID-19 was first discovered in December 2019, when several cases of pneumonia with unknown cause were found in Wuhan, China. The first case in Indonesia was reported on the March , 2020 with two cases. As of June 2020, there were 31,186 confirmed cases and 1851 cases died in Indonesia. As of July 1, 2020, Covid-19 has infected more than 200 countries, causing more than 10 million cases and 508,000 deaths[1,15]. The Covid-19 primarily infects the respiratory system, although other organ systems can also be infected[2]. Covid-19 can cause serious complications, especially in elderly patients and patients with previous comorbidities, especially diabetes, vascular disease, obesity; Cancer and pathology of the digestive, nervous and respiratory systems[7].

The most common laboratory findings include lymphocytopenia, neutrophilia, and thrombocytopenia. The leukocyte count may be normal, reduced or increased. [7]. Patients with severe Covid-19 also show data that cytokine storms involve an increase in inflammatory markers including ferritin and C-Reactive Protein (CRP) which are markers of inflammation, which are associated with critical and life-threatening illness[5].

Coagulation disorders in patients with COVID-19 lead to a hypercoagulable state. D-Dimer is a degradation product of fibrin, the discovery of D-Dimer in the bloodstream indicates the degradation of fibrin by plasmin and is associated with the formation of thrombus[3]. Some elevated levels of procalcitonin indicate the onset of a critical phase in viral infection[4].

The results of laboratory and comorbid examinations have a significant effect on the severity of Covid-19 infection, we want to report the laboratory findings and comorbid characteristics of Covid-19 patients treated at Bali Mandara Regional General Hospital .

2. Method

Descriptive review was carried out on patient data derived from medical records and epidemiological investigation forms. The patient with confirmation positive based on the results of the RT-PCR swab. The basic characteristics that we observe are hematology laboratory and comorbid.

3. Result

We found 8% patients with elevated white blood cells, 12% patients with decreased levels of hemoglobin, about 20% patients with trombositopenia, 20 % lymphopenia, and 20% neutrophilia, 44% patients slightly increase of alanine aminotransferase (ALT) and aspartate aminotransferase (AST), 8% patients with increase of creatinin, CRP level is the highest significant increase of around 76% patients and 16% patients increase of procalcitonin, About 48% patients elevated of D-dimer, 40% patients with increase of ferritin, and 24% patients with elevated blood glucose > 200 mg/dl and all of them has diabetes comorbid, There are 68% patients with comorbid, and 32% without comorbid.
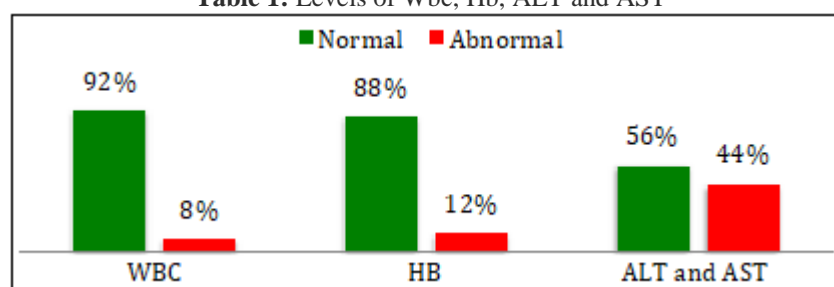
Table 1: Levels of Wbc, Hb, ALT and AST

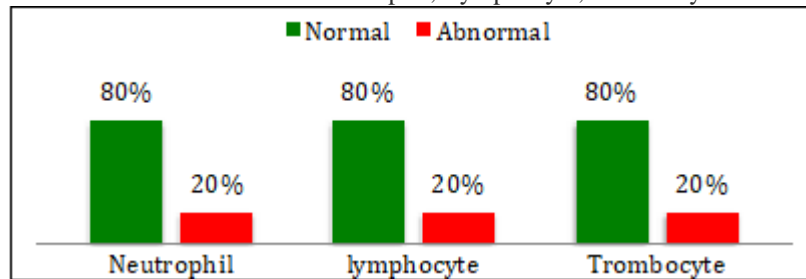**Table 2:** Levels of Neutrophil, Lymphocyte, Trombocyte

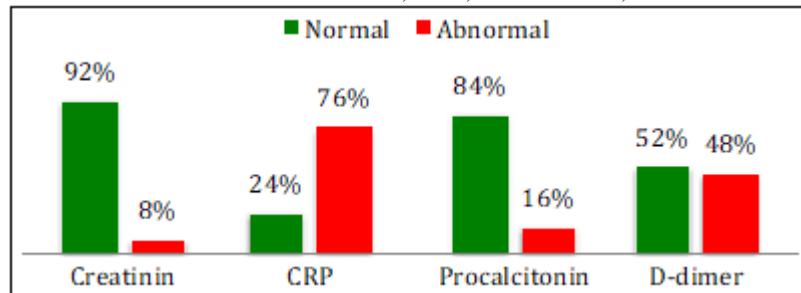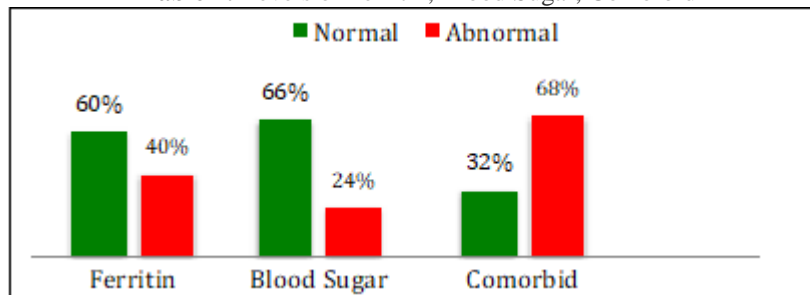**Table 3:** Levels of Creatinin, CRP, Procalcitonin, D-dimer

Table 4: Levels of Ferritin, Blood Sugar, Comorbid

4. Discussion

From the 25 patients who were positive covid-19 we found about 8% patients with elevated white blood cells and the 92% patient has normal white blood cells. Hematological changes are common in patients with COVID-19, which include reduced lymphocyte count and platelet count but white blood cell count usually normal [9]. Leukocytosis is found in a minority of COVID-19 infected patients and usually appears in patients with bacterial infection[8].

We found 12% patients with decreased levels of hemoglobin, To date, no reports specifically addressed the investigation of anemia in COVID-19, with determination of its prevalence, pathogenesis and prognostic significance[10]. About 20% patients was found with trombocytopenia. Thrombocytopenia is an important indicator of severe disease in COVID-19 patients[8]. Xu et al Reported that there are very few reports of the mechanisms of thrombocytopenia in patients with COVID-19. Following virus infection, cytokine storm destroys bone marrow progenitor cells and leads to the decrease of platelet production. Lung injury indirectly results in reduction of platelet synthesis[18].

We found 20% patients with lymphopenia. Lymphopenia is the condition with low counts of lymphocytes in the blood. The condition that is associated with increased COVID-19 severity, Zhao et al note that further studies are needed to focus on lymphocyte changes in COVID-19 to confirm the predictive ability of lymphopenia in COVID-19[17]. About 20% patients founded with neutrophilia. The data on neutrophilia are incomplete and have not been widely addressed in the literature. The available data suggest that neutrophilia is an expression of the cytokine storm and hyperinflammatory state which have an important pathogenetic role in COVID-19[8].

About 44% patients slightly increase of alanine aminotransferase (ALT) and aspartate aminotransferase (AST). Mildly abnormal AST and ALT, are frequently observed in patients with COVID-19. The pathogenetic mechanisms for abnormal Liver function test in COVID-19 are not fully understood. In general, abnormal Liver function test in patients with COVID-19 do not lead to significant liver function impairment or failure, and liver directed treatment is unnecessary[11].

We only find 8% patients with increase of creatinin, The exact mechanism of kidney damage caused by COVID-19 is not yet clear. Some reports have indicated that the incidence of acute kidney unjury is inconsistent among patients with COVID-19[12]. C-reactive protein (CRP) is the highest significant increase of around 76% patients. C-reactive protein (CRP) is an acute-phase protein that serves as an early marker of inflammation or infection. C-reactive protein (CRP) is increased in 75%, 93% of patients with COVID-19 infection, particularly in severe disease.[8] We found 16% patients increase of procalcitonin. Elevated

procalcitonin levels may be seen in sepsis and are particularly associated with septic shock and organ dysfunction requiring intervention. On initial presentation, a majority of COVID-19 patients have procalcitonin levels in the normal range[13].

About 48% patients with elevated of D-dimer. D-dimer are useful indicators of prognosis and severity of disease in COVID-19. D-dimer is a fibrin-degradation product which is increased in thrombotic events, indicating fibrinolysis. Scientists studied D-dimer levels of critical COVID-19 pneumonia and their association with a high risk of venous thromboembolism , disease severity, and risk of mortality. Raised D-dimer values contributed to poor prognosis and high mortality in such patients[16].

About 40% patients founded increase of ferritin. The median values of serum ferritin levels from a few recent studies exceeded the upper limit of detection in the COVID-19 patients during all the days of hospitalization, suggesting that ferritin levels continued increased throughout the hospital stay [14]. We found 24% patients with elevated blood glucose > 200 mg/dl and all of them has diabetes comorbid. The significant hyperglycemia that occurs in the acute inflammatory state of COVID-19 patients has been recognized and found to be pronounced among those with diabetes, prediabetes, and obesity[14]. There are 68% patients with comorbids, and 32% without comorbidities. Analyzing the clinical and epidemiological data of COVID-19 from the last few weeks suggest that specific comorbidities increase the risk of infection with worse lung injury and death. The most common comorbidities reported up till now are hypertension, vascular diseases, and diabetes[15].

5. Conclusion

The clinical hematology laboratory plays an important role by providing the clinical team a number of useful prognostic markers. Although information is in some cases based on the results of limited amount of data and should be validated with additional studies. From 25 patients who were positive covid-19 in Bali Mandara Regional General Hospital . We found 8% patients with elevated white blood cells, 12% patients with decreased levels of hemoglobin, about 20% patients with trombositopenia , 20% lymphopenia, and 20% neutrophilia, 44% patients slightly increase of alanine aminotransferase (ALT) and aspartate aminotransferase (AST), 8% patients with increase of creatinin, CRP level is the highest significant increase of around 76% patients and 16% patients increase of procalcitonin, About 48% patients elevated of D-dimer, 40% patients with increase of ferritin, and 24% patients with elevated blood glucose > 200 mg/dl and all of them has diabetes comorbid, There are 68% patients with comorbid, and 32% without comorbid.

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