Case Report

Thrombocytopenia in COVID-19 : A Diagnostic and Therapeutic Challenge

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The World started to experience the wrath of pandemic in the form of SARS-COV 2/COVID-19 infection since 2020. It is not the first time that we are experiencing such life threatening pandemics. But, what we forget to remember is the known diseases that are always there around us along with this pandemic. COVID-19 has its affect on almost every Organ System and one of its complications being Thrombogenicity. In order to combat this condition, we are using Anticoagulant Therapy mostly in the form of unfractionated Heparin or Low Molecular Weight heparin. But, it is also evident that heparin itself can result in state of Thrombosis in the form of heparin-induced Thrombocytopenia Complex and thus worsening the condition of the patient if not identified and treated early. In this report, we are going to discuss about a case of Thrombocytopenia Associated with COVID-19 which might be provoked by COVID-19 itself or use of Heparin and have given a brief review of literature on this topic.

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The most common presentation of Thrombocytopenia is Petechiae[1]. Some of the causes of thrombocytopenia are drug induced (Cytotoxic Drugs), Bone Marrow Failure / Infective Hematopoiesis (Aplastic Anemia and Leukemia), Inherited (Wiskott-Aldrich Syndrome), immune-mediated destruction (Heparin Induced Thrombocytopenia and Idiopathic Thrombocytopenic Purpura) Non-immune Mediated Destruction (disseminated intravascular coagulation) and Hypersplenism[2].

In other hand, we are presently encountering the COVID-19 pandemic which itself has a wide variety of presentation even though its major complications are in the Respiratory System[3]. It has been evident that COVID-19 infection has multi-organ involvement due to a number of mechanisms such as Coagulopathy, thrombocytopenia and Cytokine storm[4-6]. In our case report, we are trying to relate a case of COVID-19 and Thrombocytopenia and find out a possible co- relation if any.

Case Report

A 64-year-old known hypertensive male was admitted with complain of dry cough and fever for last two days. On presentation, his peripheral Oxygen Saturation (SpO2) was 79% on room air, respiratory rate of 24/min, blood pressure of 140/90 mm Hg; his Chest on auscultation had bilateral mild and basal crackles and otherwise physical examination was unremarkable. He was Non-diabetic and was on regular Anti-hypertensive medication since his diagnosis 2 years back. His past history and family history was unremarkable. Reverse Transcription–Polymerase Chain Reaction (RT-PCR) from nasopharyngeal and oropharyngeal swab for COVID-19 came positive. He was started with supplemental Oxygen and other supportive therapy as per the standard guideline of COVID-19 management. He was started on Anticoagulants (Enoxaparin at the dose of 60 mg twice a day by subcutaneous route) due to presence of Pneumonia in Chest Radiography and elevated D-dimer levels. He was changed to unfractionated Heparin as he started to show signs of Acute Kidney Injury from day 4 of his hospitalisation. In the following days, his condition was improving, his Oxygen demand was decreasing and Renal Functions also started improving. On day-8 of his hospitalisation, he started developing

Editor's Comment :

- Thrombocytopenia per se, is not an usual hematological manifestation of COVID-19.
- Low platelets count in a patient with COVID-19 should make the physician aware of several other etiologies, such as co-infections (Dengue, Malaria or Scrub Typhus), drugs (heparin, low molecular weight heparin, antibiotics) and sepsis associated with disseminated intravascular coagulation.

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dyspnea as his SpO2 started to decrease ranging from 76%-85% and was then maintained in Non-invasive positive pressure support. His blood counts showed Platelet Count around 40000/uL whereas Total Leukocyte count was 8500/cumm, Hemoglobin was 10.0gm/dl. His blood reports on the next few consecutive days were unremarkable except the Platelet Count range from 40000/uL to 50000/uL; he was having no signs of bleeding or petechial rashes. He suddenly had Cardiac arrest and was unable to resuscitate.

Discussion

The COVID-19 pandemic has successfully created a huge impact on the lives of every human being. We as Healthcare professionals forms a distinguished part of the Healthcare System getting an ample of opportunity to observe, discuss and develop new ways to combat this Viral Infection. COVID-19 infection affects the Respiratory System mainly but it also has a role in our Vasculature and may cause Vasculitis, Thrombosis, Thrombocytopenia and as a result affecting the other Organ Systems as a whole[7]. We are advised to administer anticoagulants mostly unfractionated Heparin or Low Molecular Weight Heparin to combat the coagulopathy seen with COVID-19 infection[8]. In our case scenario, the patient was admitted with COVID-19 infection was having normal levels of Platelet Count till day 7 of his hospitalisation. In the above case study, the most common causes of fever associating with thrombocytopenia like Dengue, Malaria, HIV, septicemia, Tuberculosis were ruled out and the patient had only two days history of fever throughout the entire period. Our patient's condition deteriorated suddenly after day-7 of his hospitalisation developing Dyspnea and Thrombocytopenia. In this scenario, where the patient was infected with COVID-19 infection; increasing Dyspnea draws our attention to mostly worsening of COVID-19 infection and thus we acted accordingly. But unfortunately, we were not alerted by the warning signs of Thrombocytopenia associating with administration of Heparin. The patient's Platelet Count decreased below normal level and varied from 40000-70000/uL though he showed no signs of petechial rashes. The increasing Dyspnea can be due to an event of Micro-Thromboembolism affecting pulmonary circulation which was not ruled out due to Lack of proper radiological intervention, thus leading to sudden Cardiac arrest. Platelet Factor-4 (PF-4) has one of its functions in promoting blood coagulation in response to infection. In Respiratory Virus Infection PF4 stimulates antigen presenting cells, thus stimulating natural killer-cells and Lymphocytes. PF4 also shows great affinity to bind with Heparin due to surface charge differences. This heparin-PF4, PF4Ab together constitutes the Heparin Induced Thrombocytopenia (HIT) complex thus facilitating the production of Procoagulant Cytokines[9]. On the other side, COVID-19 infection also facilitates Coagulopathy even though there is less common chances of Prothrombin Time (PT) or Activated Partial Thromboplastin Clotting Time (aPTT) prolongation or evident Thrombocytopenia or bleeding manifestations[10]. The immune mediated response due to Cytokines, Hypoxia, Endothelial damages leads to thrombosis in COVID-19 infection[11]. These Thromboses are capable to cause both arterial and Venous Thromboembolic events and it is also evident from various studies that these Thrombotic events can affect the Pulmonary Vasculature too. But, in COVID-19 infection there is both increased Platelet Consumption and increased Platelet production thus leading to mild or no Thrombocytopenia[12]. In our case scenario, the Patient started to deteriorate in his condition suddenly from day-8 of his hospitalisation even after improving in his clinical condition; this gives our suspicion more towards HIT rather than only COVID-19 infection even though we failed to diagnose it on time. Thus, this Thromboembolic event may have led to the Cardiac Arrest of the patient.

Conclusion

In order to prevent Thrombogenicity in COVID-19 infection, we are mostly using Heparin. In many cases it has helped to limit the mortality but in some cases we still lose our patients. Sometimes, conditions such as HIT leads to further worsening the case scenarios by inducing coagulopathy. Hence, further detailed studies are required to prevent such preventable events of Coagulopathy while managing moderate to severe cases of COVID-19 infection.

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