International Journal of
Blood Disorders & Diseases

Editorial

Heparin induced Thrombocytopenia and its Tomorrow -

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Submitted: 11 August 2017; **Approved:** 04 September 2017; **Published:** 06 September 2017

Citation this article: Hussain M, Wendel HP, Gehring FK. Heparin induced Thrombocytopenia and its Tomorrow. Int J Blood Dis Dis. 2017; 1(1): 007-009.

EDITORIAL

Heparin Induced Thrombocytopenia (HIT) is an unwanted immunological reaction to the usage of heparin as an anticoagulant yielding thrombosis rather than the positive anticoagulant effects. The patients under heparin usage for several days are prone to HIT and HIT is connected to the risk of life threatening thrombosis by virtue of intravasal platelet aggregation. The destructive effects of HIT constitute thrombocytopenia and the thromboembolic complications risks in veins and arteries. Normally, HIT symptoms are observed within 4 to 15 days after initiation of heparin therapy and platelet count declines to less than half of the initial value [1].

Under heparin therapy, complexes are produced between negatively charged heparin molecule and the positively charged platelet factor 4 (PF4). Some patients react to the stimulus and lead to the production of antibodies against the heparin/PF4 complex. If the antibodies pertain to the IgG class, the patients are victim of developing the clinically destructive HIT. At molecular levels, specific IgG antibodies react with the PF4/heparin complex to form the PF4/heparin/IgG immune complexes which bind with the FcRIIa receptors on platelets [2]. The outcome is platelet activation, accumulation and decreased platelet counts. The sequences potentially proceed in the form of thrombus formation and embolism due to the interaction with plasmatic pro coagulative stimulation. Therefore the intended positive anticoagulant effect of heparin is reversed into damaging and life threatening. As the thrombosis and reduction in platelet counts are common symptoms in several other diseases, specific assays for HIT diagnostics are prerequisite for adequate treatment [3].

Although functional HIT diagnostics have emerged in clinics department, yet the assays are challenging and need high expertise. Normal HIT diagnosis should not be conducted in laboratories having limited experiences [4], while alternatives are lacking. Safe HIT diagnosis is substantial and essential in the perspectives of the patient's health and cost-effectiveness. A German investigation conducted by Wilke et al [5] divulged that every clinical case of HIT put an average of 9000 Euro of extra costs because of prolonged hospital stay and the costly substitute anticoagulants. Furthermore the alternative anticoagulants for instance argatroban, lepirudin or danaparoid have higher bleeding risks than heparin and are comparatively challenging for monitoring and antagonizing [6]. The recent efforts in the perspectives of HIT diagnostics include the investigations by Hussain et al [7,8], Sachs et al [9], Althaus et al [10], Morel-Kopp et al [11], Solano et al [12], Garritsen et al [13] and Cuker et al [14].

Novel technologies [15] and bio-mimetic approaches [16,17] are a powerful support for the point of care (POC) settings for HIT and relevant studies. For instance, quartz crystal microbalance with dissipation (QCM-D) is an interesting transducer due its unique properties for bio sensing e.g. pharmaceuticals [18,19], clinical investigations etc [20]. The transducer [21,22] has been demonstrated as a proof of principles for HIT [7,8] and haemostatic assays, for instance thromboplastin time (PT) [23,24], activated partial thromboplastin time (aPTT) [25,26], thrombine time (TT) [27], ''Prothrombinase induced Clotting Time" (PiCT), [28,29] coagulation disorders [30], and relevant applications [31,32].

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