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Short Communication

Diagnostic accuracy of Red Cell Distribution Width in the diagnosis of iron deficiency anemia and beta thalasshemia trait

Ghazala Qamar

Chughtai Institute of pathology, Pakistan

Abstract:

Iron deficiency is the leading cause of anemia in developing countries like Pakistan, particularly in children and females of child bearing age. This is mainly due to inappropriate dietary iron intake and increased demand of iron during pregnancy. Iron is a major component of hemoglobin and lack of this essential element results in lower hemoglobin content in red cells. Complete blood count (CBC) can provide us with a better estimate of iron deficiency. Red cell distribution width (RDW) is a significant CBC parameter and a credible marker of variation in red cell size (anisocytosis) on many routine hematology analyzers. RDW is usually elevated in IDA due to variation in size of erythrocytes while it is normal in beta thalasshemia trait. Ferritin is a gold standard measure in IDA but as it is also an Acute Phase Reactant which tends to falsely elevate in various infections and inflammatory disorders. Therefore it is not of considerable significance in detection of IDA in such clinical conditions.

Objective:

The study aims to detect the sensitivity and specificity of RDW in iron deficiency anemia (IDA) and beta thalasshemia trait (TT). In under resourced areas, tests like iron studies, Ferritin assays and Hb electrophoresis are usually not available . Hence, RDW is cost effective and a reliable parameter in detecting IDA in the absence of many other diagnostic and clinical choices. .

Materials and methods:

The study was conducted at Chughtai Institute of Pathology Lahore from September 2019 –November 2019. It was a Cross sectional Prospective study and included 115 Patients which were divided in to two main groups i.e. Group 1 and Group 2. Group 1 included patients of IDA, both males and females ranging from 1-50 year of age. Patients with a hemoglobin <11g/dl, mean cell volume (MCV) < 26fl, mean cell hemoglobin (MCH) < 76 g/dl and serum ferritin <15ug were included in Group1. Group 2 included patients with beta TT having Hb A2 values of >3.5 diagnosed on Capillary Hb Electrophoresis.

Results:

Patients in Group 1 had a mean Hb of 7.5g/dl (SD±1.74), mean MCV of 68.9 fL (SD±16.7),mean MCH of 20.3 pg (SD±6.6) and a mean RDW of 21.4 % (SD±4.4). Patients in Group 2 had a mean Hb of 11.0 g/dl (SD±1.72), mean MCV of 60.9 fL (SD±4.9), mean MCH of 18.4 pg (SD±1.21) and a mean RDW of 16.3 % (SD±1.0). There was a significant difference in RDW of Group 1 and Group 2 (p value <0.001). In group 1, RDW had a sensitivity of 75.8%, specificity of 84.6%, negative predictive value of 61.11% and positive predictive value of 91.6%. In group 2, RDW had a sensitivity of 69.2%, specificity of 82.7%, negative predictive value of 85.7 % and positive predictive value of 64.2%.

Conclusion:

RDWis a reliable and useful index for the diagnosis of IDA and differentiates it from beta TT.

Biography:

Mosaed Alhumaimess is Associate professor at Jouf University, SA. He started his research on Physical chemistry at King Saud University, SA. During his Ph.D. he joined research groups at Cardiff University, United Kingdom. He obtained Ph.D on 2012, and started his academic carrier as assistant professor at Jouf University, and promoted to Associate professor on 2019. Dr. Mosaed has successfully published several papers related to the area of designing new nanomaterials for catalysis applications.