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Red Cell Distribution Width Analysis in Differentiation between Iron Deficiency and Thalassemia minor

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The use of flow cytometry for routine blood counts allows one to know the distribution of red cell volume, measured as coefficient of variation and reported as red cell distribution width (RDW). This parameter has been very useful in the initial classification of anemias [1, 2], and mainly as a discriminant between iron deficiency and α - or β -thalassemia minor [3–7].

Using a Coulter Counter, model S Plus II, we have studied the RDW in 477 microcytic anemias (116 with iron deficiency, 186 β -thalassemia minor and 175 δ , β -thalassemia minor). Iron-deficient patients were selected if their serum iron was below, and their total iron-binding capacity above the normal limits for the laboratory. According with Weatherall and Clegg [8], heterozygotes for β -thalassemia were selected on the basis of high levels of hemoglobin A₂, and heterozygotes for δ , β -thalassemia, by normal or decreased levels of hemoglobin A₂ and high levels of hemoglobin F. RDW from iron deficiency (18.39 ± 4.18) and δ , β -thalassemia (19.67 ± 2.93) were significantly higher ($p < 0.001$) than β -thalassemia values (16.67 ± 2.94), but no significant difference could be demonstrated between iron deficiency and δ , β -thalassemia (unpaired t test). 84% patients with β -thalassemia minor had a RDW below 18%, and 72% with δ , β -thalassemia minor above 18%. If we consider a RDW of 18% as a discriminant factor between both thalassemias, the positive predictive value for β -thalassemia is 82% and 76% for δ , β -thalassemia.

Several possible explanations can be proposed to account for this increased RDW in δ , β -thalassemia minor. Anemia, iron deficiency and high reticulocyte count are the main factors that increase the RDW value in microcytic anemias [4, 9]. In this study, none of them are able to explain the difference between RDW from both groups of thalassemia, because no significant differences have been found between them. Our

results show that the RDW does not discriminate between iron deficiency and δ , β -thalassemia, but it can be helpful in the screening between β - and δ , β -thalassemia traits.

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