

The Potential Involvement of Platelet Indices in Insulin Resistance in Morbid Obese Children

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Abstract : Association between insulin resistance (IR) and hematological parameters has long been a matter of interest. Within this context, body mass index (BMI), red blood cells, white blood cells and platelets were involved in this discussion. Parameters related to platelets associated with IR may be useful indicators for the identification of IR. Platelet indices such as mean platelet volume (MPV), platelet distribution width (PDW) and plateletcrit (PCT) are being questioned for their possible association with IR. The aim of this study was to investigate the association between platelet (PLT) count as well as PLT indices and the surrogate indices used to determine IR in morbid obese (MO) children. A total of 167 children participated in the study. Three groups were constituted. The number of cases was 34, 97 and 36 children in the normal BMI, MO and metabolic syndrome (MetS) groups, respectively. Sex- and age-dependent BMI-based percentile tables prepared by World Health Organization were used for the definition of morbid obesity. MetS criteria were determined. BMI values, homeostatic model assessment for IR (HOMA-IR), alanine transaminase-to-aspartate transaminase ratio (ALT/AST) and diagnostic obesity notation model assessment laboratory (DONMA-lab) index values were computed. PLT count and indices were analyzed using automated hematology analyzer. Data were collected for statistical analysis using SPSS for Windows. Arithmetic mean and standard deviation were calculated. Mean values of PLT-related parameters in both control and study groups were compared by one-way ANOVA followed by Tukey post hoc tests to determine whether a significant difference exists among the groups. The correlation analyses between PLT as well as IR indices were performed. Statistically significant difference was accepted as $p < 0.05$. Increased values were detected for PLT ($p < 0.01$) and PCT ($p > 0.05$) in MO group compared to those observed in children with N-BMI. Significant increases for PLT ($p < 0.01$) and PCT ($p < 0.05$) were observed in MetS group in comparison with the values obtained in children with N-BMI ($p < 0.01$). Significantly lower MPV and PDW values were obtained in MO group compared to the control group ($p < 0.01$). HOMA-IR ($p < 0.05$), DONMA-lab index ($p < 0.001$) and ALT/AST ($p < 0.001$) values in MO and MetS groups were significantly increased compared to the N-BMI group. On the other hand, DONMA-lab index values also differed between MO and MetS groups ($p < 0.001$). In the MO group, PLT was negatively correlated with MPV and PDW values. These correlations were not observed in the N-BMI group. None of the IR indices exhibited a correlation with PLT and PLT indices in the N-BMI group. HOMA-IR showed significant correlations both with PLT and PCT in the MO group. All of the three IR indices were well-correlated with each other in all groups. These findings point out the missing link between IR and PLT activation. In conclusion, PLT and PCT may be related to IR in addition to their identities as hemostasis markers during morbid obesity. Our findings have suggested that DONMA-lab index appears as the best surrogate marker for IR due to its discriminative feature between morbid obesity and MetS.

Keywords : children, insulin resistance, metabolic syndrome, plateletcrit, platelet indices

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