Macedonian Pharmaceutical Bulletin, 72 (Suppl 1) 365 - 366 (2026)
Online ISSN: 1857-8969
DOI: 10.33320/maced.pharm.bull.2026.72.03.176
Short communication

Association between serum iron and hematological parameters in pregnant women undergoing routine laboratory screening

Hristina Srbinovska*

Private Health Institution "Oraldent" Medical Biochemistry Laboratory, 11th of October, 7000 Bitola, North Macedonia

Introduction

Pregnancy is associated with significant physiological and hematological changes that may influence maternal and fetal health. Iron deficiency and anemia are among the most common nutritional and hematological disorders observed during pregnancy worldwide. Increased maternal iron requirements and plasma volume expansion may contribute to decreased serum iron concentrations and altered hematological parameters, particularly hemoglobin (HGB), hematocrit (Hct), mean corpuscular volume (MCV), and mean corpuscular hemoglobin (MCH) (Achebe and Gafter-Gvili, 2017; American College of Obstetricians and Gynecologists, 2021).

Iron deficiency anemia during pregnancy has been associated with maternal fatigue, impaired fetal development, low birth weight, and increased risk of preterm delivery (Bencaiova and Breymann, 2014). Therefore, routine laboratory screening represents an important component of preventive maternal healthcare and allows early detection of hematological abnormalities requiring therapeutic intervention and follow-up (Pavord et al., 2020).

The aim of this study was to evaluate the association between serum iron concentrations and hematological parameters in pregnant women undergoing routine laboratory screening in a private medical biochemistry laboratory.

Materials and methods

A retrospective cross-sectional study was conducted using anonymized laboratory data obtained from the database of the Private Health Institution "Oraldent" Medical Biochemistry Laboratory, where the author is employed. Institutional approval for the scientific use of anonymized laboratory data was obtained prior to the study.

The study included 32 pregnant women undergoing routine laboratory screening during a one-year period. Only the first laboratory result obtained from each participant during the study period was included in the analysis in order to avoid duplication of data. The age of the participants ranged from 23 to 41 years, with a mean age of 32 years.

The evaluated parameters included serum iron concentration, hemoglobin (HGB), erythrocyte count (RBC), hematocrit (Hct), mean corpuscular volume (MCV), and mean corpuscular hemoglobin (MCH). All laboratory analyses were performed using standard automated hematology and biochemical

*hkocovska@yahoo.com

analyzers routinely used in medical biochemistry practice.

Data were analyzed using descriptive statistics (mean ± standard deviation) and Spearman's rank correlation analysis. Statistical significance was defined as $p < 0.05$.

Results and discussion

The study included 32 pregnant women with a mean age of 32 years. Mean serum iron concentration was 11.9 ± 6.7 µmol/L, while the mean hemoglobin concentration was 122.4 ± 10.2 g/L. Mean erythrocyte count was 4.25 ± 0.29 × 10^{12}/L, mean hematocrit value was 0.36 ± 0.03 L/L, mean MCV was 87.1 ± 4.4 fL, and mean MCH was 29.0 ± 1.8 pg.

Spearman's rank correlation analysis identified a statistically significant moderate positive correlation between serum iron concentration and MCV ($\rho = 0.44$, $p = 0.012$). No statistically significant correlations were observed between serum iron concentration and hemoglobin ($\rho = 0.16$, $p = 0.387$), RBC count ($\rho = -0.16$, $p = 0.379$), or MCH ($\rho = 0.14$, $p = 0.452$).

Reduced serum iron concentrations were identified in 13 (40.6%) participants, while hemoglobin values suggestive of mild anemia were observed in 9 (28.1%) pregnant women.

The relatively high proportion of pregnant women with reduced serum iron concentrations observed in the present study further emphasizes the importance of routine laboratory screening for the early detection of iron deficiency during pregnancy (Pavord et al., 2020). Routine laboratory monitoring may facilitate early diagnosis, appropriate nutritional counseling, timely iron supplementation, and appropriate clinical follow-up.

Conclusion

Routine laboratory screening during pregnancy represents an important tool for early detection of iron deficiency and hematological abnormalities. The present study identified a significant association between serum iron concentrations and MCV, while no significant correlations were observed with other evaluated hematological parameters.

Early interpretation of laboratory findings allows timely therapeutic intervention, adequate supplementation, and improved patient counseling. Interdisciplinary collaboration between laboratory professionals, pharmacists, and gynecologists contributes to preventive maternal healthcare and improved pregnancy outcomes.

References

Achebe, M.M., Gafter-Gvili, A., 2017. How I treat anemia in pregnancy: iron, cobalamin, and folate. Blood, 129(8), 940–949. https://doi.org/10.1182/blood-2016-08-672246

American College of Obstetricians and Gynecologists (ACOG), 2021. Anemia in pregnancy. Obstet. Gynecol. 138(2), e55–e64. https://doi.org/10.1097/AOG.0000000000004477

Bencaiova, G., Breymann, C., 2014. Mild anemia and pregnancy outcome in a Swiss collective. J. Pregnancy, 2014, 307535. https://doi.org/10.1155/2014/307535

Pavord, S., Myers, B., Robinson, S., Allard, S., Strong, J., Oppenheimer, C., 2020. UK guidelines on the management of iron deficiency in pregnancy. Br. J. Haematol. 188(6), 819–830. https://doi.org/10.1111/bjh.16221