19th World Congress in Fetal Medicine

Differential endothelial and angiogenic profile of preeclampsia versus COVID-19 in pregnancy

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Objective

To study biomarkers of endothelial damage, coagulation, innate immune response and angiogenesis in preeclampsia (PE) and COVID-19 in pregnancy.

Methods

Plasma and sera samples were obtained from pregnant women with COVID-19 infection classified into mild (n=10) or severe (n=9) in addition to normotensive pregnancies as controls (n=10) and patients with preeclampsia (n=13). A panel of plasmatic biomarkers was assessed including vascular cell adhesion molecule-1 (VCAM-1), soluble TNF-receptor I (sTNFRI), heparan sulfate (HS), von Willebrand factor (VWF) antigen, activity and multimeric pattern, α2-antiplasmin (α2AP), C5b9, neutrophil extracellular traps (NETS), placental growth factor (PlGF), fms-like tyrosine kinase-1 (sFlt-1) and angiopoietin 2 (Ang2). Statistical analysis included univariate and multivariate methods.

Results

Both COVID-19 and PE showed abnormal results in most endothelial and immune response markers, with distinctive profiles among them: severe COVID-19 with predominant alterations in HS, NETS and PlGF, versus PE with most significant alterations in VCAM-1, sTNFRI, Ang2, VWF, C5b9 and sFlt1. The principal component analysis demonstrated a clear separation between PE and the rest of groups (first and second components explained 42.2% and 13.5% of the variance), mainly differentiated by variables related to VWF that were markedly reduced in PE.

Conclusion

COVID-19 and PE exhibit distinctive profiles of endothelial damage, immune dysregulation and angiogenic imbalance, which could help in the differential diagnosis and development of new therapeutic strategies.