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Biochemical analysis during early pregnancy in mare

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The embryo-maternal communication is a complex mechanism of interaction between the mother and the embryo. Systemic changes during early pregnancy in mares have been sparingly studied. However, they may reveal important aspects of the complex physiology of the embryo-maternal interaction. The aim of this study was to evaluate changes in biochemical analysis during early pregnancy in mares. Blood samples were collected from 8 cyclic mares, aged 6 to 15 years, during the breeding season. The samples were collected on the day of ovulation induction (D-2) and on days 15 (D15), 25 (D25), and 45 (D45) of pregnancy. All mares were artificially inseminated. The samples collected through jugular venipuncture were sent to a laboratory for biochemical analysis. The serum metabolites analyzed were aspartate aminotransferase (AST), total bilirubin, direct bilirubin, albumin, alkaline phosphatase (AP), total calcium, phosphorus, creatinine, urea and total serum protein. After clot retraction, the samples were centrifuged and the serum used to measure specific analytes. The biochemicals were measured by the colorimetric-kinetic/enzymatic method, according to the specific technique for each analyte, using commercial kits and automatic biochemical analyzer Labmax 240, LABTEST®. Statistically significant differences were observed in total bilirubin, which decreased by D45 compared to D-2. AST concentration was higher on D25 than D-2. The fibrinogen evidenced a gradual growth during the initial days evaluated, showing an increase on D25 compared to D-2 and D45. An increase in fibrinogen levels at D25 may be associated with the disappearance of the embryonic capsule. Similar to fibronectin, fibrinogen binds to integrins which mediate cell adhesion. The endometrial expression of those integrins suggests that conceptus fibrinogen supports attachment by interacting with endometrial integrins during early pregnancy. Inflammatory responses are characterized by elevated fibrinogen levels, which may explain the findings analyzed in the present study. The literature lacks consensus regarding the observed alterations of AST and bilirubin. These hormonal shifts result in increased plasma volume and physiological phenomena such as hemodilution, heightened metabolic demand, and hepatic overload. In conclusion, significant systemic changes occur in AST, bilirubin and fibrinogen during the early stages of pregnancy, which could be important for embryo development, physiological adaptation and for maternal recognition to the pregnant mare.

Keywords: Equine reproduction. Pregnancy. Embryo-maternal interaction. Biochemical profile.