Clinical and metabolic evaluation in hyperlactatemics foals from mares with placentitis

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Lactate is an important marker of sepsis and neonatal hypoxemia and clinical evaluation of this and other metabolites may be relevant in the prognosis of foals from mares with placentitis. We hypothesized that hyperlactatemic foals from mares with placentitis will have altered biochemistry profiles of hepatic and renal functions. The aim of this study was to determine changes in biochemistry profiles in response to hyperlactatemia in newborn foals from mares with placentitis. We included twenty-four foals with high blood lactate concentrations (>3mmol/L) from mares with placentitis. Placentitis was confirmed by histologic evaluation. All foals were born at term (≥ 320 days). From the assessment of neuromuscular reflexes and behavioral signs, the foals were divided into two groups: 1) mature foals (n=14), with normal neuromuscular reflexes and behavioral signs and, 2) dysmature foals (n=10), with abnormal signs and behavior consistent with immaturity, including the following: low birth weight, laxity of the flexor tendons, domed forehead, fine, silky haircoat with soft ears and lips. Blood samples were collected from all foals at birth (within 5 minutes) and at 24 hrs for the estimation of lactate (mmol/L), glucose (mg/dL), creatinine (mg/dL), albumin (g/dL), total bilirubin (mg/dL), alkaline phosphatase (ALP; U/L), creatine kinase (CK; U/L) and gamma glutamyl transferase (GGT; U/L). Normality of the data was assessed by Shapiro-Wilk test. One-way ANOVA was used to evaluate the difference in the biochemistry profile between groups. Significance was set at p<0.05. The results of biochemical evaluation (mean±SD) in mature and dysmature foals were, respectively: at 5 minutes after birth: lactate (4.3±0.4; 4.7±0.5), glucose (114±13; 114±17), creatinine (2.6±0.4; 4.3±0.5), albumin (3.3±0.1; 2.6±0.1), total bilirubin (6.1±0.8; 8.8±0.9), ALP (943±77; 975±91), CK (185±28; 167±33) and GGT (13±3; 31±4). At 24 hrs: lactate (3.9±0.3; 3.9±0.4), glucose (170±9; 160±11), creatinine (1.8±0.1; 1.9±0.2), albumin (3.1±0.2; 2.4±0.4), total bilirubin (8.0±1.1; 8.3±1.5), ALP (850±102; 957±121), CK (379±45; 212±49) and GGT (27±4; 24±5). In dysmature foals, higher concentrations of creatinine and GGT at birth (p<0.05) and lower albumin concentrations, at birth and at 24h (p<0.05) were observed. Further a trend for an increase in bilirubin concentrations at birth was noted in dysmature foals (p = 0.07). Hypercreatinemia in the first hours of life could be a result of placental injury and fetal stress. The high concentration of GGT and low albumin in dysmature foals at birth, may be indicative of hepatic disorder. Low albumin concentrations may also be related to protein catabolism in these foals. In conclusion, assessments of creatinine, GGT and albumin are important to identify high-risk newborn foals from mares with placentitis, in addition to blood lactate. More studies are required to relate the use of these metabolites in the prognosis of foals.

Keywords: Lactate, GGT, creatinine, albumin, immaturity