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Bone remodeling biomarkers and lumbar vertebrae plasticity in cows with hypophosphatemia

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Abstract

Although hypophosphatemia is a major metabolic disorder in cattle, a clinically useful method has not been proposed for its rapid screening in cattle. This study aimed to evaluate bone biomarkers and lumbar vertebrae plasticity in cows with hypophosphatemia. Among referral cows suspected of hypophosphatemia, 27 hypophosphatemic and 10 healthy cows were recruited. Firstly, the plasticity of transverse processes of lumbar vertebrae was determined. Serum levels of calcium, magnesium, vitamin D, bone sialoprotein (BSP), and ALP activity were assayed. Results revealed a significant increase in serum ALP activity and a significant decrease in vitamin D in the hypophosphatemic compared with the healthy cows. Serum BSP had an insignificant increment in the patients than the healthy group. The patients were segregated into 3 subgroups of severe, moderate and mild hypophosphatemia. Serum ALP activity was higher in severe hypophosphatemic than the other subgroups. A strong negative correlation was observed between serum phosphorus concentration and severity of lumbar vertebrate plasticity. In conclusion, hypophosphatemia was associated with significant changes in bone remodeling biomarkers. Since degree of lumbar vertebrate plasticity was directly related to the intensity of hypophosphatemia, it can be used for clinical screening and determining the degree of hypophosphatemia in cattle.

Keywords: ALP activity, Bone sialoprotein, Hooves deformity, Vertebrate plasticity

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