The effect of respiratory diseases on serum lactate dehydrogenase and its isoenzyme patterns in calves

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Abstract

In this study we examined the serum activity of lactate dehydrogenase (LDH) and its isoenzyme patterns in 28 calves of a lowland black spotted breed and its crossbreeds at the age of 2-6 months suffering from clinically noticeable manifested respiratory diseases – bronchopneumonia (BRD Group). As a control group we used 35 clinically healthy calves of the same age, breed and nutrition (Healthy Group). The sick calves did not show clinical signs or pathological lesions on other organ systems. The results found in sick calves showed a significantly higher total activity of LDH than in clinically healthy animals (P<0.01). The mean activity of LDH was 2012 U/l in healthy calves and in calves with respiratory diseases 2529 U/l. The differences in all LDH isoenzyme patterns between both groups of animals were significant (P<0.001) and in calves with respiratory diseases are characterized by a marked increase of the LDH 1 fraction and a decrease in the proportion of the other four LDH isoenzymes. Our results differ from those observed and presented in respiratory diseases in human medicine or in sheep. The explanation for the obtained results in calves and the determination of their diagnostic significance needs further studies and investigations using more animals with various severity of clinical signs and pathological changes, including analysis and determination of lactate dehydrogenase isoenzyme patterns in healthy and affected cattle lung tissue.

Key words: calves, respiratory diseases, lactate dehydrogenase, isoenzymes, electrophoresis

Introduction

Lactate dehydrogenase (LDH) is an enzyme which catalyses the interconversion of lactic and pyruvic acids using the NAD⁺ coenzyme. It is widely distributed in the body, high activities are found in the heart, liver, skeletal muscle, kidney, and erythrocytes; lesser amounts are found in the lung, smooth muscle, and brain. Because of its widespread activity in numerous body tissues, LDH is elevated in a variety of disorders (Johnson-Davis and McMillin 2010). There are many conditions which contribute to increased activity, and an elevated total LDH value is a rather non-specific finding. Therefore, LDH assays assume