

LACTATE DEHYDROGENASE (LDH) LEVELS IN SERUM AND SYNOVIAL FLUID OF DOGS

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Introduction

The enzyme lactate dehydrogenase (LDH) catalyses the interconversion of lactic and pyruvic acids. It is widely distributed in the body in relatively high concentration in the tissue, which makes increased plasma LDH a good indicator of tissue damage. The lack of tissue specificity of LDH has been partly circumvented by the discovery that it exists in a variety of molecular forms called isoenzymes. Five isoenzymes LDH1-5 are present in different proportions in various tissues. The synovial fluid analysis is the most effective clinico-pathologic procedure available to determine the cause, type, duration and prognosis of the joint disorders caused by infectious agents. Increased LDH is a good indicator of tissue damage (Veys and Wieme, 1968). Several studies have been reported in horses camels, cattle and pigs (Liberg et al. 1977; Grun and Weder, 1978; Yancik et al. 1987) and human (Apple and Rogers, 1986). However little work has been done to date on enzyme levels in canine and feline synovial fluid.

The objectives of the work include: (1) To determine characteristic of LDH isoenzyme level in serum and synovial fluid in clinically healthy dogs; (2) to establish the relationship of LDH enzyme levels with ages, body weights and sexes in clinically healthy dogs; (3) to correlate enzyme levels in the serum with those in synovial fluid; and (4) to determine the relationship between the enzyme level and pathologic changes found in the dogs.

Materials and Methods

Synovial Fluid: Synovial fluid samples from the left and right stifle joints were collected from 40 clinically healthy dogs that were chosen randomly from different ages, sexes and body weights. Synovial samples were stabilised with 3.8% sodium citrate immediately after collection before being treated with hyaluronidase for 15 minutes. The samples were left for 20 minutes before being centrifuged at 2000xg at 6°C for 30 minutes. The supernatants were collected for LDH isoenzyme analysis by electrophoresis (LD Isoenzyme Electrophoresis Procedure, Helena Laboratories, Texas). **Serum Samples:** Venous blood samples were taken from the cephalic vein from each dog using plain tubes and centrifuged at 3000 rpm for 20 minutes before the serum were analysed for LDH using the electrophoresis method.

The comparison could be made from the results to show any significant correlation between the level of the enzymes in the serum and the enzymes in the synovial fluid from the same dogs.

Results and Discussion

Serum LDH: The value for total LDH in serum of dogs below 10 kg was 149.5 ± 18 B-B unit/ml. There was no significant difference between sexes, ages and body weights of clinically healthy dogs. There were no significant correlation between each LDH isoenzyme with the blood parameters (ALT, BUN, creatinine and serum protein) in clinically healthy dogs. For RBC, there was slight negative correlation between LDH4 ($r=-0.33$). For WBC, LDH3 showed a positive correlation ($r=0.474$) when compared to LDH2 ($r=0.329$). For PCV, LDH2 gave a positive correlation ($r=0.49$) compared to LDH4 ($r=-0.346$).

The comparison between each LDH isoenzyme shows that there is strong correlation between LDH3 and LDH2 ($r=0.708$) where as there is strong negative correlation between LDH5 with LDH3 ($r=-0.887$) followed by LDH2 ($r=-0.838$) and LDH1 ($r=-0.562$). The percentages of the LDH isoenzymes in clinically healthy dogs were 11.78% (LDH1), 17.59% (LDH2), 31.11% (LDH3), 20.02% (LDH4) and 19.45% (LDH5).

Synovial LDH: Determination the characteristic of lactic dehydrogenase enzyme level in synovial fluid in clinically healthy dogs was difficult due to the small volume and high viscosity of synovial fluid was obtained from the stifle joints. The technique has improved and dilution factors had been introduced in the analytical methods. The determination of the characteristic of lactic dehydrogenase enzyme level in synovial fluid would be completed. The normal trend of LDH in serum of clinically healthy dogs ($n=40$) has been established but values for synovial fluid in stifle joints have not been satisfactory. Future research is needed in dogs to determine the total LDH in serum and synovial fluid.

Conclusions

There is no significant difference between sexes, ages and body weights for LDH isoenzymes in serum of clinically healthy dogs. There is no strong correlation between LDH isoenzyme with blood parameters but there is strong correlation between each LDH isoenzyme.

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