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METABOLIC FEATURES OF HEART FAILURE WITH DIFFERENT ETIOLOGY

Dilated cardiomyopathy (DCM) and chronic degenerative valvular disease (CDVD) are very common in dogs nowadays. However, we also can meet chemotherapy-induced cardiomyopathies more often. We have lack of information about pathogenic mechanisms underlying doxorubicin-induced cardiomyopathy (DoxCM) and features differentiating it from CDVD and DCM. In this study we investigate metabolic features bounded to DoxCM, DCM-like phenotype cardiomyopathies and CDVD.

Materials and Methods

The study population consisted of 46 dogs of different age, sex and breed. Fresh myocardial biopsies taken immediately after euthanasia from left ventricular apex, freezed in liquid nitrogen for biochemical study.

Results

Myocardium metabolism in control group was accepted as physiological. In CDVD group, we defined statistically non-significant changes in studied parameters (Table 1). This data characterized compensated state of myocardial metabolism. Data from DCM group characterized significant metabolic alterations. All investigated parameters were suppressed, except lactate concentration. Despite decreased GLUT 4 concentrations, level of produced lactate reflects ability to utilize carbohydrates for energy supplementation. In case of DoxCM investigated parameters were severely decreased. Doxorubicin toxicity led to glucose metabolism blockade and worsen severity of developing cardiomyopathy.

Conclusions

This preliminary study shows changes induced by doxorubicin in dogs. These findings mostly connected with mitochondrial disturbances, insulin resistance and energy depletion. In this study also shown several features connected with development of CDVD and differences from DCM.

Table 1. Myocardial metabolism

Group	ATP, ng/g	GLUT 4, ng/mg	Lact, μ mol/g	LDH, U/g	CK, U/mg
Control (n=14)	3,37 \pm 0,67	138,68 \pm 88,81	13,2 \pm 8,32	251,31 \pm 55,94	3,34 \pm 1,01
CDVD (n=16)	3,01 \pm 0,9	106,59 \pm 64,97	13,44 \pm 4,22	264,58 \pm 47,42	3,93 \pm 0,55**
DCM (n=6)	0,59 \pm 0,59*+	51,69 \pm 20,76*+	10,05 \pm 5,34++	94,87 \pm 42,74*+	1,36 \pm 0,24*+
DoxCM (n=10)	0,27 \pm 0,1*+	45,21 \pm 11,0*+	8,84 \pm 4,7++	54,76 \pm 20,65*+	2,1 \pm 0,54*+'''