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**FACTORS AFFECTING THE APPEARANCE ATHEROSCLEROSIS
IN DOGS**

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Atherosclerosis is a condition in which lipids (the oily substance that is part of the cell structure), fatty materials, such as cholesterol, and calcium collect along the walls of the arteries (blood vessels that carry oxygen-enriched blood). This buildup is referred to as plaque, and over time results in loss of elasticity, and a narrowing of the lumen (the inner space) of the affected arteries.

Over time the deposited fatty material thickens, hardens, and ultimately blocks the arteries, or, it may rupture, causing blood clots to form and travel to other parts of the body. The main goal of researches is analysis of literature sources for the main factors of the appearance atherosclerosis in dogs.

Hyperlipidemia is one of the main risk factors for atherosclerosis in human beings, and has been associated with atherosclerosis in hypothyroid dogs. Spontaneous atherosclerosis in dogs has been reported mainly in association with hypothyroidism, and is thought to develop due to hypercholesterolemia.

Diabetes mellitus, hypothyroidism, and hyperadrenocorticism (HAC) were examined retrospectively as possible risk factors for atherosclerosis in dogs, because all three endocrinopathies are associated with hypercholesterolemia.

Here are the results of research by scientists from the United States. The case group included 30 dogs with histopathological evidence of atherosclerosis. The control

group included 142 dogs with results of a complete necropsy, and no histopathological evidence of atherosclerosis.

Serum was assessed subjectively for lipemia in all dogs included in the study. Lipemia was noted in 12 dogs (40 %) in the case group and in 10 dogs (7 %) in the control group. Mean serum cholesterol concentration in the group of dogs with atherosclerosis was 578 ± 330 mg/dl, which was significantly higher than mean serum cholesterol concentration of 199 ± 64 mg/dl in the group of dogs with no histopathologic evidence of atherosclerosis ($p < 0.0001$). Serum cholesterol concentration was abnormally high (> 359 mg/dl) in 19 dogs (63 %) with atherosclerosis and one dog (1 %) with no histopathologic evidence of atherosclerosis. It is therefore concluded that serum cholesterol concentration is significantly higher in dogs that develop atherosclerosis than in dogs that do not have atherosclerosis.

In the group of 30 dogs with atherosclerosis, 15 dogs with hypothyroidism had a mean serum cholesterol concentration of 554 ± 388 mg/dl, 7 dogs with no endocrinopathy had a mean serum cholesterol concentration of 351 ± 181 mg/dl, 3 dogs with concurrent hypothyroidism and diabetes mellitus had a mean serum cholesterol concentration of 826 ± 361 mg/dl, 2 dogs with HAC had a mean serum cholesterol concentration of 609 ± 484 mg/dl, 2 dogs with diabetes mellitus had a mean serum cholesterol concentration of 651 ± 479 mg/dl, and 1 dog with concurrent HAC and diabetes mellitus had a serum cholesterol concentration of 426 mg/dl. Difference between serum cholesterol concentration in dogs with hypothyroidism and dogs with no endocrinopathy approached significance ($p = 0.053$). Statistical analysis for the other groups of dogs was not possible due to small sample size.

Cholesterol and lipoprotein concentrations have been investigated in dogs with hypothyroidism, diabetes mellitus, and HAC. Dogs with hypothyroidism have been shown to have increased very low-density lipoproteins (VLDL), LDL, and HDL, dogs with diabetes mellitus have been shown to have increased VLDL and HDL, and dogs with HAC have been shown to have increased LDL. Additional studies are needed to determine whether dogs with a specific pattern of hyperlipidemia are at increased risk for spontaneous atherosclerosis.

Most dogs with atherosclerosis had an endocrinopathy (23/30, 77 %). Eighteen of 30 dogs (60 %) with atherosclerosis had hypothyroidism, 6 (20 %) had diabetes mellitus, and 3 (10 %) had HAC. In the age-matched control group of dogs with no histopathologic evidence of atherosclerosis, 5 of 142 dogs (3.5 %) had hypothyroidism, 5 dogs (3.5 %) had HAC, and 1 dog (1%) had diabetes mellitus.

Dogs with atherosclerosis were about 53 times more likely to have diabetes mellitus and approximately 51 times more likely to have hypothyroidism compared to dogs with no histopathologic evidence of atherosclerosis. The results of this study suggest that the prevalence of diabetes mellitus and hypothyroidism in dogs with atherosclerosis is similar. Dogs with atherosclerosis were not found to be more likely to have HAC than dogs that did not have atherosclerosis.

It is possible that diabetes mellitus and hypothyroidism increase the risk for development of atherosclerosis in dogs, because they are associated with hypercholesterolemia.