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Amyloidosis in domestic animals: diagnosis and sequelae

Rudolph Virchow, a German scientist, first used the term "amyloid" in 1854(Jean and Alan, 2000). Amyloid is a misfolded protein that appears as an amorphous, eosinophilic, hyaline substance and its deposition in interstitial tissues during wide variety of clinical disorders leads to amyloidosis (Moges, 2012). Many factors viz., solvent, temperature, pH, radiation, aging, oxidative stress, pathogenic mutation, etc., affect protein folding (Chaturvedi et al., 2016). Affected organs appear waxy especially on a cut surface, hence also known as waxy degeneration. Apolipoprotein-E (apoE), Sulfated glycosaminoglycans (GAGs), -1 anti-chymotrypsin, Protein X, and other components like complement, proteases, and membrane constituents make up the majority of the non-fibrillar component of amyloid, which makes up about 5% of the total amount of amyloid (Mohan, 2010). There are 36 distinct biochemical variants of the complicated chemical molecule amyloid. Using cutting-edge scientific methods, it has been identified to generate non-branching fibrils with a -pleated sheet structure as one of its recurrent appearance and behaviour traits. Researchers recently analysed the gene sequence for serum amyloid A and the shape of AA amyloid fibrils in five distinct animal species.

The incidence of amyloid is reported 94.52% in dogs (Segev et al., 2012), 87.12% in horses (Nicola et al., 2020), 75% in sheep (Mensua et al., 2003), 42% in chicken (Kanata et al., 2015), 35.29% in cats (Pietro et al., 2012), and 6.09% in cattle (Elitok et al., 2008).

Amyloidosis is mainly classified as local and systemic amyloidosis. Systemic amyloidosis is further classified into primary (AL), secondary (AA), and familial types (Paul, 2017).

Amyloidosis often affects the organs and causes abnormalities such enlargement, mild stiffness, and aberrant colour. The most often impacted organs are the spleen, liver, and kidneys, which may expand depending on the level of amyloid accumulation (Kumar et al., 2015). Amyloid deposition is a permanent change, and persists for the life of the individual. Mechanisms responsible for amyloid deposition, its pathogenesis and proteomics and mass spectrometry evaluation of amyloidosis especially in domestic animals and birds needs to be studied.

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