STUDIES ON ULTRASTRUCTURAL PATHOLOGY AND PATHOGENESIS OF HYDROPERICARDIUM SYNDROME IN EXPERIMENTALLY INFECTED CHICKENS

S.K. SONI¹, M.U. KHAROLE² and A.K. PRUTHI³

Hydropericardium syndrome (HPS) is an important disease affecting the chicken population particularly on the Indian subcontinent. The present investigation was conducted with a view to study the pathology and pathogenesis of HPS in experimentally infected chickens. The disease was reproduced experimentally in broiler chicks by inoculation of ID₉₀ (0.087 ml of 20 per cent HPS infected liver suspension) subcutaneously at 21 days of age. The clinical signs observed were dullness, depression, reluctance to move, ruffled feathers and chest resting posture with closed eyes. The most conspicuous gross lesion was hydropericardium noticed as early as 36 hours post inoculation (h PI). The liver was markedly enlarged congested/pale with petechiae. Lungs exhibited varying degree of congestion and oedema. Microscopical lesions in liver were characterized by cloudy swelling, hydropic changes, fatty changes, necrosis and hepatitis. The basophilic intranuclear inclusion bodies were conspicuous in hepatocytes. The predominant changes in the heart included separation and atrophy of cardiac muscle fibres and interstitial oedema with congestion, haemorrhage, mild myocarditis. In the lungs there was interlobular oedema with infiltration of mononuclear cells and congested blood vessels. The spleen exhibited depletion of lymphocytes in white pulp and reticuloendothelial cell hyperplasia. The bursa of Fabricius showed depletion of lymphocytes in medulla and increased interfollicular connective tissue. Similar lesions (gross and microscopic) have been described by other workers in HPS infected chicks (Asrani et al., 1997).

Electron microscopic studies of the liver revealed degenerative lesions in hepatocytes as swelling of mitochondria with loss of cristae and viral particles were seen as electron dense spherical granules in the nucleus. In the heart, electron semilucent lipid bodies, autophagic vacuoles, swollen mitochondria with loss of cristae and disintegration of Z-lines were seen in cardiomyofibril cells. The chromatin material was marginalized in the nucleus of pericardial mesothelial cells.

Ingue et al. (1977) have observed that elevation of serum creatine phosphokinase (CPK) levels is indicative of myocardial damage in human beings. Biochemical assays revealed a significant increase in the serum levels of lactate dehydrogenase and CPK indicating degenerative changes in tissues, particularly the liver and heart. Further evidence of myocardial damage was demonstrated in heart slices of infected birds stained with triphenyl-tetrazolium chloride (Jolly et al., 1984). Serum antibodies to HPS were detected by an agar gel precipitation test as early as 120 h PI in infected chicks and turkey poults.


¹ Government Poultry Farm, Ambala City (Haryana).
² Indovax Laboratories, Hisar (Haryana).
³ Department of Veterinary Pathology, CCS Haryana Agricultural University, Hisar-125004 (Haryana).