Title of the Thesis : Studies on Prevalence, Pathology and Diagnosis of Porcine Reproductive and Respiratory Syndrome in Pig Population of Mizoram

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Porcine Reproductive and Respiratory Syndrome (PRRS) is an emerging new threat to the pig population worldwide. The present study was undertaken to study the prevalence, pathology and diagnosis of PRRS in Mizoram. A total of 1297 numbers of pigs from both organized and backyard farms in Mizoram were surveyed during the period of first outbreak of PRRS in pig population of Mizoram, India. Clinical examination of affected pigs of different age groups revealed an acute phase of illness characterized by severe depression, anorexia, high fever with respiratory distress. Abortion, stillbirth, mummification, birth of weak piglets and agalactia was observed in pregnant sows, in addition to other clinical signs observed in acute illness. The highest morbidity (80.29%), mortality (66.25%) and case fatality rate (82.51%) was observed in pre-weaned pigs and average morbidity, mortality and case fatality rate in the population was recorded as 55.58%, 37.23% and 66.99% respectively.

Detailed necropsy examination in PRRS positive cases revealed noncollapseable haemorrhagic lungs; swollen, congested and hemorrhagic lymph nodes; swollen congested spleen with areas of infarction; enlarged, soft and congested liver and swollen, congested kidneys. The most striking microscopical changes included interstitial pneumonia characterized by thickening of alveolar septae due to infiltration of mononuclear cells, congestion, hemorrhage, edema, hyperplasia of pneumocyte II, hypertrophy and hyperplasia of bronchiolar epithelial cells; lymphoid depletion in germinal centers in lymphoid tissue with congestion and haemorrhages. Interstitial & glomerulo nephritis characterized by hypercellularity of glomerular tuft, infiltration by mononuclear cells in interstitium and tubular degeneration was observed in kidney sections. Vasculitis characterized by swollen and injured endothelial cells leading to thrombi formation was observed in lung, bronchial and mesenteric lymph node tissue sections. ELISA to detect antibodies against PRRSV by using IDEXX PRRS X3 kit, on a total of 368 random serum samples revealed 28.26% seropositivity. The diagnosis of PRRS was confirmed by RT-PCR. A 300 bp fragment of ORF7 gene of PRRSV was successfully amplified in total 37 numbers of cases out of 96 necropsy cases tested.

The amplified 300 bp fragment of sample no. PRRSV/MZ/AZ/1/13 was purified, cloned and sequenced. Blast analysis of the sequence (GenBank Acc. KF208423) derived, revealed 99% sequence homology with the PRRSV isolate from China. Phylogenetic analysis of the sequence revealed that the PRRSV that caused outbreak of PRRS in Mizoram belongs to the genotype II (North American type) and closely relate to the PRRSV of Chinese origin.

Title of the Thesis : Prevalence, pathology and molecular studies of peste des petits ruminants in goats of Assam

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Peste des petits ruminants (PPR) is an acute, febrile, emerging and economically important viral disease of goats having high morbidity and mortality rate. In the present investigation, 456 serum samples collected from affected and apparently healthy goats from different places of Assam were screened for seroprevalence of PPR in goats by HI test and c ELISA test. Out of 456 serum samples screened, PPR viral antibody could be detected in 269 samples by HI test (145 serum samples from affected goats and 124 from apparently healthy goats) and 209 samples by c ELISA test (136 from affected goats and 73 from apparently healthy goats). 60 serum samples (9 from affected goats and 51 from apparently healthy goats) showed positive in HI test but were found negative by c ELISA test. In comparative study it was revealed that HI test was more sensitive than c ELISA.

The haematological study of 26 affected goats showed significant increase in total erythrocyte count, haemoglobin, packed cell volume and significant decrease in total leucocytes count. Lymphopenia was constant finding in differential leucocytes count. Biochemical study revealed significant decrease in serum protein and significant increase in serum potassium level, with nonsignificant increase of serum sodium level. All the 10 necropsied carcasses showed emaciation and dehydration with soiled hindquarters and sunken of eye balls. Ulcerative lesions on gum, lips, dental pad and tongue, enteritis and linear haemorrhages on the crests of the folds of large intestine were invariably observed. The liver was enlarged with engorged gall bladder. Spleen and lymph nodes were enlarged. The lungs showed congestion and consolidation of anterior and cardiac lobes with emphysema in diaphragmatic lobes. On cut section, lung showed large quantities of white frothy exudate particularly in the bronchi. The histopathological study showed degeneration, necrosis, ulceration and sloughing out of lining epithelium in lips, tongue, small intestine and large intestine. Below the ulcerated areas severe infiltration of mononuclear and polymorphonuclear cells were observed. Some cells of stratum granulosum showed presence of intracytoplasmic eosinophilic inclusion bodies. Hepatocytes showed coagulative necrosis with cytoplasmic and nuclear degeneration. The lungs showed broncho-interstitial pneumonia and presence of intracytoplasmic eosinophilic inclusion bodies. Renal tubular degeneration with coagulative necrosis and atrophy of glomeruli were observed. Edema in both the cortical and medullary areas with severe depletion lymphocytes was observed in the lymph node. Syncytial giant cells were also found in the lymph nodes. Spleen showed depletion of lymphoid population. Some lymphoid follicles were completely destroyed, leaving cystic cavities. In RT-PCR, out of 79 post mortem samples, 58 showed amplification of PPR viral nucleic acid at 463 bp for N gene using N gene specific primers.