Histopathological detection of hog cholera from field outbreaks

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Abstract: The study was carried out to detect and describe the outbreaks of Hog Cholera (HC) or Classical Swine Fever (CSF) in different parts of North-Eastern region of India by histopathological techniques in post mortem samples. Histopathological alterations in different lymphoid and non-lymphoid organs provides clue to confirm hog cholera disease. Pigs died of suspected swine fever (hog cholera) virus infection were subjected to postmortem examination and gross lesions were recorded. Samples like kidneys, mesenteric lymph node, spleen and tonsils of approximately 8x8cm size were collected and preserved in 10% formal saline solution. Histopathologies were done as per the method described by Luna, 1968. From 9 outbreaks of hog cholera, 60 samples were collected for histopathological examination. Histopathological alterations in different lymphoid and non-lymphoid organs provides clue to confirm hog cholera disease. Presence of pathogonomic changes in post mortal samples confirms the outbreak of Hog Cholera disease.

Key words: Tonsil, MLN, HCV and CSF

Introduction

Hog Cholera (HC) or Classical Swine Fever (CSF) is the single most fetal disease of pigs and is responsible for an enormous economic loss to the pig husbandry in North-East India. Hog Cholera is classified under list A disease by OIE and trans-boundary disease by FAO. The causative virus is a member of genus Pestivirus of the family Flaviviridae (Francki et al., 1991). The virus gets entry through Oronasal route and localizes in tonsil, from where it disseminate to other target organs through lymphocytes. Pathological changes in pigs due to the local strains of hog cholera virus (HCV) have not been studied extensively. In the absence of facilities for detection of HCV antigen in tissues, histopathology can play a very important role in diagnosis of hog cholera in field conditions (Done, 1957). The present study describes the outbreaks of CSF in different parts of North-Eastern region of India and the histopathological techniques used for detecting the alterations in post mortem samples. Histopathological alterations in different lymphoid and non-lymphoid organs provides clue to confirm hog cholera disease.

Materials and Method

Pigs died of suspected swine fever (hog cholera) virus infection were subjected to postmortem examination. Samples like kidneys, mesenteric lymph node, spleen and tonsils of approximately 8x8cm size were collected without using any preservative and brought to the laboratory in ice container. For histopathological study samples of size 2 x 2 cm tissue pieces were kept in 10% formal saline solution. At the time of necropsy examination, the clinical history of each pig was recorded as provided by the farm manager and animal owners. Besides, animal was subjected to external examinations, which included general health status of the carcass, skin rash, external injury or any congenital defect.

Necropsy examination of carcasses was conducted following conventional method used in the Department of Veterinary Pathology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati (Assam). During postmortem examination, the following points were noted – presence of haemorrhages in tonsils, epiglottis, kidneys, lymph nodes, urinary bladder, brain and in intestine. Infarcted lesions on spleen, turkey egg appearance of kidneys and button shaped ulcers on mucosal surface of large intestine were also carefully examined in the respective organ. The representative tissue samples showing gross lesions were collected in 10 per cent formalin solution. The formalin fixed tissue samples were trimmed into small pieces after 24 hours and transferred to a fresh formalin solution. After proper fixation, the tissues were processed through ascending grades of alcohol, cleared in xylene and embedded in paraffin. Sections of 4-5 thickness were cut and stained by routine Haematoxylin and Eosin staining (H & E) method as described by Luna (1968). The stained sections were examined under the light microscope and the histopathological alterations, if any, were recorded.

Results and Discussion

Altogether nine (9) outbreaks of hog cholera were recorded from different parts of the North Eastern Region - Pathsala (1),...
Basistha (1), Kabilipara (1), Khanapara (1), Narengi (1), Bihpuria (1), Haflong (1) in Assam, Nirjuli of Arunachal Pradesh and Nine mile of Meghalya state. A total of 60 samples were collected from 20 clinically affected pigs for histopathological examination. The clinical history included high rise of temperature (41-42°C), anorexia,
conjunctivitis, hyperaemia (Fig. 1), vomiting, constipation followed by watery diarrhoea, respiratory rails and nervous distress. Some of the piglets developed hind limb paralysis, while some died without showing any clinical symptoms. Dead animals subjected to postmortem examination revealed various gross changes in lymphoid organs, kidney, heart, epiglottis, gall bladder, urinary bladder, brain and in intestine. Animals below 2 months of age showed haemorrhages and congestion (90.00%) in heart, kidney and spleen. Tonsils and mesenteric lymph nodes were swollen and congested (65-90%). Prominent pathological changes in grower piglets were congestion and haemorrhages in tonsils, mesenteric lymph nodes, spleen and in brain (Fig. 2). Kidney revealed pinpoint haemorrhages in subcapsular surface (Fig. 3). Haemorrhagic changes were also recorded in myocardium. Intestine was highly congested and showed focal necrosis in the colon. In grower and adult pigs tonsils and lymph nodes were swollen and highly haemorrhagic (40-80%). Spleen showed focal areas of infarction (Fig. 4). Petechial to ecchymotic haemorrhages were recorded in the subcapsular tissues of kidney. Haemorrhages were recorded in myocardium, epiglottis, urinary bladder and gall bladder. A few chronically infected adult animals showed early lesions of button ulcers in the large intestine (Fig. 5).

For histopathological study, a total of 60 serologically diagnosed positive samples (tonsil, kidney, intestine, mesenteric lymph node, brain) were processed and stained with haematoxylin and eosin stain. Microscopically, renal tubular epithelium showed degenerative changes in kidney. Focal areas of coagulative necrosis were also present in kidney. Tonsil and mesenteric lymph node showed diffuse areas of necrosis with depletion of lymphocytes in lymphoid follicles and severe congestion. In a few cases, Fibronous deposit with infiltration of neutrophils and mononuclear cells were present in lymph nodes. The splenic follicle showed complete necrosis with occasional presence of surviving lymphoid cells at the centre. The changes observed in the tonsil, mesenteric lymph nodes and spleen were very much in conformity with Van Oirschot (1992), Saini et al. (2000), Rahman et al. (2001) and Dutta et al. (2003). Large intestine showed congestion and necrosis of the intestinal villi in most of the cases. Degenerative changes were also observed in the intestinal glandular epithelium. In a few cases, the mucosal epithelium showed focal areas of necrosis indicating early lesions of button ulcer. The typical and pathognomonic lesions of button ulcers in the large intestine described by various workers (Van Oirschot, 1999; Saini et al., 2000; Dutta et al., 2003 and Rout and Saikumar, 2012) were not observed in the present study. Kidney showed congestion and petechial haemorrhages on the subcapsular surfaces. Microscopically, renal tubular epithelium showed degenerative changes and focal areas of coagulative necrosis in most of the cases. Similar microscopic changes have been described by Rahman et al. (2001) and Dutta et al. (2003) except focal areas of interstitial nephritis. Pathognomonic gross and microscopic alterations in lymphoid and non lymphoid organs confirm the presence of hog cholera disease outbreaks. Histopathology is one of the routinely used confirmatory techniques for detection of hog cholera outbreaks in pigs.

Hog cholera is an important viral disease of pigs causing high morbidity and mortality. Hog cholera was found endemic in Assam as well as in other states of the North Eastern Region of India. Young piglets were found most susceptible to HCV infection and affected piglets died shortly in acute course of the disease. However, in adult HCV infection occurred in sub acute to chronic form. The accurate diagnosis of the disease can be made by the clinical symptoms, postmortem changes as well as histopathological alterations in lymphoid and non-lymphoid organs.

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References