

Epidemiological and immunopathological studies on *Porcine parvovirus* infection in Punjab

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Abstract

Aim: The aim of this study was to get the first-hand knowledge about the seroprevalence of *Porcine parvovirus* (PPV) in Punjab and a diagnosis of PPV from abortion cases of swine using gross, histopathological, and immunohistopathological techniques to observe the tissue tropism of the virus strain.

Materials and Methods: Tissue samples from the reproductive tract of pig (n=32), placental tissue (n=10), and aborted fetuses (n=18) were collected from Postmortem Hall of the Department of Veterinary Pathology, GADVASU, field outbreaks and from butcher houses in and around Ludhiana. These samples were processed for histopathological and immunohistochemical (IHC) studies. For seroprevalence study, 90 serum samples of different sex and age were collected from 15 swine farms of Punjab and were subjected to indirect enzyme linked immunosorbent assay using commercial kit.

Results: Overall, seroprevalence of PPV was found to be 41.1%. Sex and age related difference in the prevalence was noted. In abortion cases grossly congested and emphysematous lungs, congested internal organs with fluid in abdominal cavity and congestion in brain, changes were noted in fetuses, while diffuse hemorrhages and edema was observed in placental tissue. Histopathologically, the most frequent fetal lesions in aborted fetuses were noted in lungs, liver, and brain. IHC staining revealed PPV antigens in sections of heart, liver, lung, spleen, brain, lymph node of fetuses, placenta, and uterus of sow. Gross, histopathological, and IHC examination of the samples confirmed 5 fetus, 2 placenta and 3 female reproductive samples positive for parvovirus infection.

Conclusions: Seroprevalence results may serve as a support either in prevention or control of the disease. IHC is the sensitive technique for diagnosis of PPV associated with the reproductive tract of swine and was found to supplement the gross and histopathological alterations, respectively, associated with the disease.

Keywords: abortion, enzyme-linked immunosorbent assay, histopathology, immunohistochemistry, indirect, *Porcine parvovirus*, swine.

Introduction

Commercial pig farming is one of the best and profitable businesses in India. As per present scenario, pork production in India represents only 7% of the country's animal protein sources and its population is 10.29 billion in the country according to 19th livestock census. According to 18th livestock census, Punjab contributed 0.23% pigs toward the total livestock population within the country which has increased by 42% in recent years. In Punjab, pork production is 500 MT (million ton), which is 0.21% of country's pork production. It is predicted that pork consumption will be doubled in next decade. However, diseases of the reproductive tract of swine are a major constrain

in this regard as it cause a huge economic loss to the pig farmers in the form of death of the fetus and infertility in sows. Reproductive problems are the 3rd major cause of swine mortality [1]. *Porcine parvovirus* (PPV) is considered to be one of the major causes of reproductive failure in swine characterized by the repeat of estrus, abortion(s), and the delivery of mummified or stillborn fetuses [2]. The virus is endemic in most areas of the world and can be found in all pig herd categories [3].

PPV is the ubiquitous infectious cause of reproductive failure in swine worldwide [4]. PPV is a small non-enveloped, single-stranded DNA virus which is classified in the genus parvovirus (Latin *parvus*=small) of the family *Parvoviridae* [5]. Although there are various viral pathogens of swine which affect its reproductive performance include porcine reproductive and respiratory syndrome virus (PRRSV), PPV, *Porcine circovirus* Type 2 (PCV2), classical swine fever virus, auzesky disease virus, and porcine enterovirus, PPV is considered to be one of the major causes of reproductive failure in swine characterized by the repeat

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