PATHOGENICITY OF FOWL ADENOVIRUS ISOLATES IN SPECIFIC PATHOGEN-FREE EMBRYONATED CHICKEN EGGS

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Abstract

Fowl adenovirus (FAdV) is the primary pathogen in inclusion body hepatitis (IBH) in chickens and causes sudden onset of mortality in broiler and layer chickens. Inclusion body hepatitis outbreak has a worldwide distribution and has recently been reported in the region. The clinical signs of the infection were weakness, dehydration, ruffled feather and paleness of comb in the affected chickens. Upon necropsy, the infected chickens showed swollen liver with petechial to focal haemorrhages, hydropericardium, and gizzard erosion and haemorrhages. Isolation of the virus from clinical cases is needed to determine the pathogenicity of the avian adenovirus. Thus the objective of this study was to determine the pathogenicity of recent FAdV isolates in specific pathogen-free (SPF) embryonated chicken eggs. Two isolates of FAdV were obtained from recent outbreaks of the disease in layer (Group A) and broiler (Group B) chicken farms. Isolate from each liver sample was processed and inoculated in SPF eggs. The eggs were harvested and liver of the embryo collected for preparation of FAdV inocula. Sixty 9-day-old SPF embryonated chicken eggs were used in the study. They were divided into three major groups, namely, Group A [A1 (sacrifice) and A2 (mortality)], B [B1 (sacrifice) and B2 (mortality)] and C [C1 (sacrifice) and C2 (mortality)]. Five eggs each from Groups A2, B2 and C2 were labeled as mortality groups and observed for mortality throughout the trial. Twenty eggs from Groups A and B were inoculated with 0.1 mL FAdV isolates A and B, respectively. Twenty eggs from Group C were not inoculated and served as the control group. The eggs were candled twice daily and mortality recorded. Three eggs each from Groups A1, B1 and C1 were sacrificed at days 1, 3, 6, 9 and 12 post-inoculation (pi). At necropsy, the gross lesions were recorded and liver, gizzard and chorioallantoic membrane (CAM) samples were fixed in 10% buffered formalin for histological examination. The study showed 100% mortalities in Groups A and B within 1 to 9 days pi for the mortality group. The control group had no mortality throughout the trials. The number of dead embryo from the sacrifice group was 7 and 11 in the groups A and B, respectively. Control group did not show mortality. Gross lesions in the sacrifice group of Group A were mainly observed in the CAM, liver and gizzard. The CAM became thickened and cloudy beginning day 3 pi. Lesions in the liver revealed enlarged, pale, petechial haemorrhages with multifocal area of necrosis, which were first observed on day 6 pi. The gizzard was congested at day 9 pi. The gross lesions observed in Group B were mainly in the CAM and liver. The lesions were observed as early as day 3 pi with thickening and cloudiness of the CAM as well as enlargement, pale to yellowish liver. The control group remained normal throughout the trial. Histologically, typical intranuclear inclusion bodies were observed in the CAM, liver and gizzard in Group A.

The lesions were confined to the CAM and liver in Group B. It was concluded that FAdV is highly pathogenic to SPF embryonated chicken eggs and the embryonic liver should be used for isolation and propagation of the virus.

Keywords: fowl adenovirus (FAdV), specific pathogen free (SPF) embryonated chicken eggs, pathogenicity, liver, chorioallantoic membrane (CAM)