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Jitendra Kant Nagar

Teaching Associate, Rajasthan University of Veterinary and Animal Science, Bikaner, Rajasthan, India

Sarjna Meena

Assistant Professor, Rajasthan University of Veterinary and Animal Science, Bikaner, Rajasthan, India

Pratikshit Sanel

Teaching Associate, Rajasthan University of Veterinary and Animal Science, Bikaner, Rajasthan, India

Shashi Choudhary

Teaching Associate, Rajasthan University of Veterinary and Animal Science, Bikaner, Rajasthan, India

Sunita Rolania

Department of Veterinary Pathology, Rajasthan University of Veterinary and Animal Science, Bikaner, Rajasthan, India

Corresponding Author:

Jitendra Kant Nagar

Teaching Associate, Rajasthan University of Veterinary and Animal Science, Bikaner, Rajasthan, India

Fatty liver haemorrhagic syndrome in poultry

Jitendra Kant Nagar, Sarjna Meena, Pratikshit Sanel, Shashi Choudhary and Sunita Rolania

Abstract

In poultry, FLHS is a most important non-infectious metabolic disorder which results in heavy mortality. It is characterized by dullness, depression, enlargement of liver due to excessive accumulation of lipids in liver, decrease egg production and frequently sudden death in a flock. Many factors involved to cause of FLHS such as nutritional/excessive energy diet, environmental, abnormal hormonal, lack of exercise, hereditary etc. Thirteen chickens presented in Veterinary Clinical Complex, PGIVER, Jaipur with history of off feed, dull and sudden dead five chicken at home. Fatty liver haemorrhagic syndrome was diagnosed by clinical symptoms and post mortem of dead chickens. Nine chickens were cured by proper exercise, optimum diet with necessary multivitamin supplements and regular monitoring of body weight but four chicken dead within one day due to serious condition. The clinical symptoms were like depression, sudden decrease egg number and sudden death. The post mortem findings were enlarged liver, liver haemorrhages and liver engorged with fat. Choline is more effective in this condition but its quantity differs among the different raw materials.

Keywords: Poultry, FLHS, Choline, Mortality

Introduction

In poultry, FLHS is most important non-infectious metabolic disorder which results in heavy and frequently mortality. This occurs mostly in caged birds fed on high energy diet, which results in a decreased egg number, increased deposition of fat in the liver then liver rupture and internal bleeding and death in last stage (Butler, 1976; Crespo and Shivaprasad, 2008; Lee *et al.*, 2010; Rozenboim *et al.*, 2016) ^[1, 3, 5, 9]. In another the study in Queensland (Australia), 74% of totally mortality was found in caged birds due to fatty liver haemorrhagic syndrome (Shini, 2014) ^[11]. Considering commercial both layer and broiler breeder are traditionally reared in cages. Due to various factors causing fatty liver haemorrhagic syndrome (FLHS), FLHS is causes high mortality and decrease egg production in affected flocks, resulting in huge financial losses to farmers or industry. It is generally seen only in caged birds but it was also found in free range backyard poultry farm in America and northern California (Mete *et al.*, 2013; Trott *et al.*, 2014) ^[7, 15]. Multiple factors involved in this disease such as nutritional, environmental (Pearson *et al.*, 1981) ^[8], hereditary (Thomson *et al.*, 2003; Yeh *et al.*, 2009) ^[14, 16], hormonal imbalance and metabolic factors. In nutritional factors, excessive consumption of high energy diet combined with less exercise has been strongly associated with the occurrence of this condition. Supplements diet with antioxidant reduces the incidence of fatty liver haemorrhagic syndrome (Spurlock and Savage, 1993) ^[12]. The present study describes the characteristics gross and histopathological in liver of poultry affected with fatty liver haemorrhagic syndrome.

Materials and Methods

FLHS was detected by clinical examination and post mortem examination of chicken. It was diagnosed upon post mortem examination. The diagnosis of FLHS is based on morphologically and histopathological analysis. History and clinical symptoms with morphological lesions were recorded. Liver tissue (1×1 cm³) was collected and fixed with 10 percent neutral buffered formalin (fixation). Then, the tissue was washed under running tap water for overnight then dehydrated in ascending grades (85, 90, 95, 100 Percent) of alcohol and cleared in xylene, embedded in paraffin for preparation into fine blocks.

5µm thin tissue sections were cut from wax paraffin blocks by microtome. Fine sections were stained with haematoxyline and eosin (H & E) stain. Gross and histopathological examination of the dead Chickens were performed according to the standard procedure (Luna, 1968)^[6].

Results and Discussion

According to the clinical signs and symptoms, thirteen sick chickens showed dullness and depression, low egg production and frequently death in which nine chickens were cured by proper exercise, optimum diet with necessary multivitamin supplements and regular monitoring of body weight but four chicken dead within one day due to serious condition. On

gross pathology of four dead chickens during post mortem, liver were enlarged, friable and greasy due to fat layer on liver in all dead chickens (Fig 2). Microscopically section of liver found distended hepatocytes with small clear vacuoles in cytoplasm which displaced nucleus to periphery (Fig 3). FLHS is a diagnosed only after post mortem (Yousefi *et al.*, 2005)^[17].

In this present investigation, gross lesions noticed in dead chickens affected with fatty liver haemorrhagic syndrome (FLHS) included enlarged, friable, greasy due to fat on liver with haemorrhagic surface. Microscopically, liver tissue section showed small and clear fat vacuoles in the cytoplasm of hepatocytes.



Fig 1: Dead birds due to fatty liver haemorrhagic syndrome



Fig 2: Enlargement of liver of affected birds with fatty liver haemorrhagic syndrome

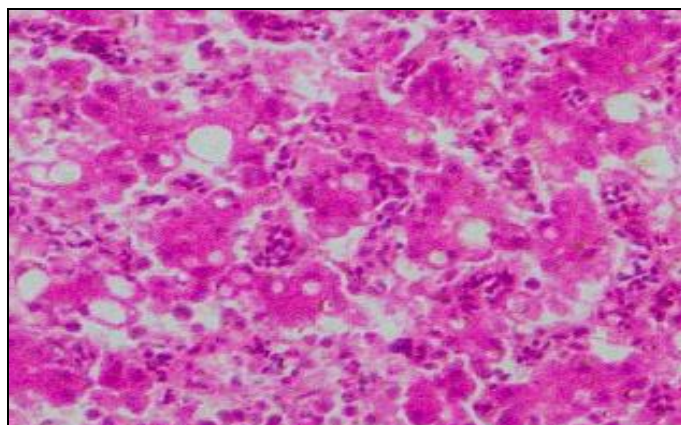


Fig 3: Vacuoles in hepatocytes in fatty liver haemorrhagic syndrome

The findings of present investigation are in agreement with that Trott *et al.*, (2014)^[15], Shini, (2014)^[11]; Dey *et al.*, (2018)^[4]; Sandaand *et al.*, (2019)^[10]. Tablante *et al.*, (1994)

^[13] stated that FLHS may be predisposed by high energy diet, overcrowding, high temperature and cage system in poultry farms. In present study, FLHS might have precipitated by cage system, high temperature and high energy diet. In current study, the FLHS was seen in birds that are in active stage of laying which indicates that there is a hormonal involvement in the occurrence of this disorder (Dey *et al.*, 2018)^[4].

High protein diet, vitamin with antioxidant supplements and by maintaining the environmental temperature the incidence of FLHS can be reduced. Diets should contain enough amounts of lipotropic factors like choline. Choline is highly effective, but its quantity differ among the different raw materials in market. There should be given dose 500 ppm choline during the rearing period and 1000 ppm choline during the egg production period to chicken

Conclusion

The present investigation declared that fatty liver hemorrhagic syndrome (FLHS) diagnosed based on gross and microscopic histopathologic lesions of the liver. Fatty liver hemorrhagic syndrome (FLHS) can result from several factors such as high dietary energy, high temperature, cage system management. Therefore, good diet and well management can save the farmer from financial loss.

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