Managemental practices to control ascitis in a flock

Yancy Mary Issac*, John Abraham, Sreeparvathy, Jini George and C. Balusami

Department of L.P.M.,
College of Veterinary and Animal Sciences, Pookot, Wayanad dist, Kerala.
* Corresponding author e-mail: tinayancy88@yahoo.co.in

Abstract

Ascitis is a metabolic disease of poultry in which excess amounts of fluid accumulates in the abdominal cavity. Ascitis is initiated by factors that elevate the blood pressure within arteries supplying the lungs. This increase in pulmonary arterial pressure (hypertension) triggers the accumulation of fluid in the abdominal cavity (ascitis). This condition, generally recognized in broilers is often lethal. If at all the bird survives, the carcass would most often be condemned. When birds are chronically exposed to low oxygen levels, it tend to lead to a high incidence of ascitis. Other predisposing factors associated with the syndrome are rapid tissue growth, low protein or high sodium chloride in the mash, ammonia, noxious gases and mycotoxin. Hepatitis, cardiovascular, pulmonary and renal diseases are also considered important in the etiology of ascitis syndrome. The birds affected show shrunken comb, loss of feathers in the abdominal region, subcutaneous odema, odema of head, cyanosis, pot bellied appearance, staggering gait and respiratory distress. It is better to prevent ascitis than going for treatment. Methods of feed restriction, Temperature, Air quality, Dust, Ammonia, Oxygen play a very useful role in control of ascitis.

Keywords: Management, Ascitis, Flock, Broiler, Abdomen, Renal Disease, Pulmonary Disease, Cardiovascular Disease.

Introduction

Ascitis is a metabolic disease of poultry in which excess amounts of fluid accumulates in the abdominal cavity. Ascitis is initiated by factors that elevate the blood pressure within arteries supplying the lungs. This increase in pulmonary arterial pressure (hypertension) triggers the accumulation of fluid in the abdominal cavity (ascitis). This condition, generally recognized in broilers is often lethal. If at all the bird survives, the carcass would most often be condemned.

Traditionally, genetics has been blamed for ascitis in bird flocks. However, breeding companies have improved genetic resistance of stock to this syndrome. A considerable number of ascites occurrences are triggered by microbial factors (E. coli, Salmonella sp., Aspergillus) coupled with contributing environmental and nutritional factors. Lower ambient temperatures trigger the incidence of ascitis in broilers. Cool temperatures increase cardiac output since the bird's metabolic rate must increase to maintain body temperature. When birds are chronically exposed to low oxygen levels, it tend to lead to a high incidence of ascitis. Other predisposing factors associated with the syndrome are rapid tissue growth, low protein or high sodium chloride in the mash, ammonia, noxious gases and mycotoxin. Hepatitis, cardiovascular, pulmonary and renal diseases are also considered important in the etiology of ascitis syndrome. The birds affected show shrunken comb, loss of feathers in the abdominal region, subcutaneous odema, odema of head, cyanosis, pot bellied appearance, staggering gait and respiratory distress.

Preventive measures

It is better to prevent ascitis than going for treatment. Selection for rapid growth and efficient feed conversion has resulted in broilers with high metabolic rates. In such cases, sometimes their heart and lungs are rarely capable of providing enough oxygen to sustain the body. Slower growing birds have reduced oxygen needs, allowing the cardiopulmonary organs (heart and lungs) to keep up with oxygen demands of the birds. In the case of ascitis caused by genetic factors, feed restriction might reduce the effect of the disease. However, reducing the feed intake of broilers decreases the growth performance.

Methods of feed restriction

a) Feed form: Feeding of mash feeds rather than

pelleted feeds, in the first four weeks, can reduce the incidence of ascitis without down grading market parameters.

b) Composition of feeds: Feed restriction can be achieved by lowering the energy content of the diet. It can be done early in life, when feed intake per unit of metabolic weight is at its highest. Thus susceptibility to ascitis is also reduced.

c) Limited access to feed. Lighting programmes can be adopted to reduce the incidence of ascitis. It is a method of restricting feed intake by restricting access to feed.

d) Skip a day feeding: It is recommended when mortality due to ascitis is very severe. This skip a day programme can be applied during the starter period.

Feed restriction can become an effective tool in reducing the incidence of ascitis only in conjunction with good management practices.

Microorganisms

In the case of ascites caused by micro-organisms, acidifiers have shown promising results. Dietary acidification with organic acids prevents feed and water from microbial and fungal deterioration. It is also proven that acidifiers successfully fight against gastrointestinal pathogens thus improving animal's growth performance and health status.

Environmental Factors

In case of ascites caused due to enviromental factors, we should take care of the temperature, air quality, dust, oxygen and ammonia levels in poultry houses.

a) Temperature: Careful attention of brooding temperature is critical in the prevention of ascitis. Minimum temperatures of 29.4°C, 26.7°C and 24.4°C in the first, second and third week, respectively, have been suggested to optimize the energetic efficiency of the ingested feed while reducing ascites-related mortality to a minimum. Research has shown that adding supplemental arginine to broiler diets effectively reduces pulmonary vascular resistance and the incidence of ascites in broilers exposed to cool temperatures. L-arginine is required as a substrate for nitric oxide, a potent endogenous pulmonary vasodilator.

b) Air quality: Poor air quality in the house (such as high levels of dust and ammonia) has been shown to exert an oxidative stress on the antioxidants of the lung lining fluid of broilers. This was found to be positively correlated with the right ventricle to total ventricle ratio. Therefore, oxidative stress in the lung lining fluid may be related to subsequent development of ascites. Thus the air quality within the poultry houses should be carefully monitored to prevent the incidence of ascites.

c) Dust: Dusty environments can contribute to the onset of ascitis. Disease causing organisms along with dust, when inhaled causes infection in lungs. Thus there is reduced oxygen transfer between the bird and environment. Therefore there should be very minor amount of dust in poultry houses.

d) Ammonia: High levels of ammonia in the broiler house can irritate the lungs, resulting in decreased oxygen transfer between the bird and the environment, leading to ascitis. For that reason the amount of ammonia within poultry houses should be kept as minimum as possible.

e) Oxygen: Adequate air exchange systems should be provided in broiler houses. Satisfactory oxygen levels are essential to prevent the stress on respiratory system and consequently the heart.

Other factors and remedial measures

Lipid peroxidation is said to be involved in the degeneration of cardiac tissue and has been stated as one of the reasons for the development of pulmonary hypertension syndrome. Higher levels of dietary vitamin C and E along with selenium are said to be beneficial, because of their role in improving cellular integrity.

Alpha-linolenic acid is a precursor of eicosapentaenoic acid (EPA, 20:5 n-3) and docosahexaenoic acid (DHA, 22:6 n-3). EPA and DHA are further metabolized to prostacyclins, PGI3 and PGI2, which function as coronary relaxants. So the higher dietary ratio of n3/n6 fatty acids increases the production of compounds that reduce the resistance to blood flow. Thus oils rich in n-3 fatty acids (flax oil, fish, linseed and canola oils) can reduce pulmonary hypertension and, consequently the incidence of ascites.

Dietary electrolyte balance also seems to have a role in the prevention of ascitis. The inclusion of 1000 mg potassium carbonate per liter of drinking water may be a practical method to increase blood oxygenation (PaO2) of broilers and perhaps to act as a prophylactic to reduce losses due to ascites. The addition of 1% sodium bicarbonate to the diets of broilers has decreased mortality due to ascites.

The use of nutrients/drugs that increase the vascular capacity of the lungs or decrease the pulmonary vascular resistance may help to alleviate the problem. Diuretics have also shown positive effects in the prevention of ascitis because there is a decline of sodium and a reduction of fluid retention in the body.

Thus by keeping an eye on the interacting factors such as genetics, environment and management, ascitis can be controlled to a bare minimum in broiler flocks.

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