

# Ascites – The Winter Fear Psychosis of Broiler Industry



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The Ascites syndrome in broilers is increasing at an alarming rate creating fear psychosis and becoming a leading cause of mortality and carcass condemnations throughout the world. Ascites

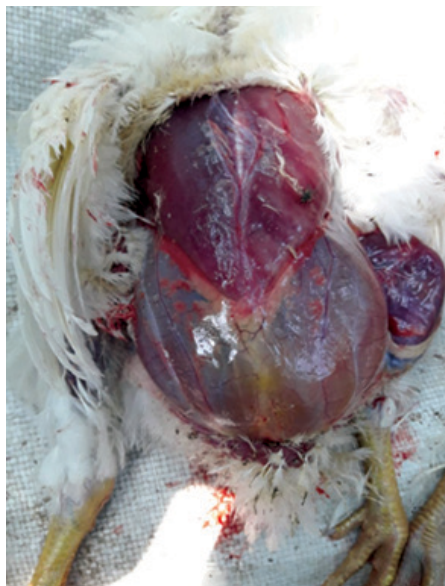
represents a spectrum of physiological and metabolic changes leading to the excess accumulation of fluid in the abdominal cavity. These changes occur in response to a number of dietary, environmental and genetic factors.

The term “Ascites” refers to the fluid accumulation in abdominal cavity; so-called “water belly”. The disease is scientifically known as pulmonary hypertension syndrome.



*Fig. 1. Fluid Accumulation in Abdominal Cavity in Ascites*

Ascites emerged as the major reason of economic loss in the broiler Industry, especially during winter months & in farms of high altitude. Mortality of 5-12% is common and may go up to 25% in extreme cases along with huge carcass condemnation.



*Fig. 2. Abdominal distension in Ascites*

Ascites is not a disease but a syndrome due to metabolic dysfunction and is related to (dis) function of the heart (mainly) & lungs (associated). The left ventricle of birds is much thicker than that of mammals. The right ventricle is thin walled & small. The atria are large & thin walled.

The thin-walled right ventricle is meant to work as a volume pump, not as pressure pump. Right ventricle responds very rapidly to an increased workload by dilatation, thickening & enlargement (hypertrophy). The heart muscles respond to increased workload by enlargement, which then has increased heart muscle mass, but the wall is not thickened.

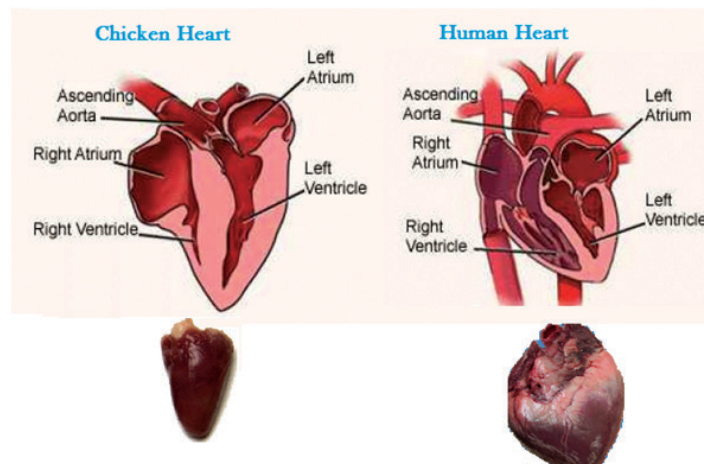
### Why Ascites in Poultry

There are basic differences in respiratory systems of mammals & mmbirds:

- The lungs of birds cannot expand like mammalian lungs because they are rigid & can't enlarge as they are fitted tightly into the thoracic cavity.
- The capillaries can enlarge very little and cannot accommodate increased blood flow like mammalian lungs, which have restricted space for blood flow.
- The lungs of chicken grow slowly compared to the rest of the body.

### Why Ascites in Broiler Only?

- Modern broilers have rapid body growth rate, high Feed Conversion Efficiency and large breast muscle; everything requires a high oxygen demand, makes them vulnerable to ascites.



*Fig. 3. Comparative structure of Human & Avian Heart*

- The BMR of broilers is very high, and thus a simple imbalance between oxygen supply & oxygen required to sustain that fast growth & high feed efficiencies results in Ascites in broilers.
- Modern broilers have small lungs compared to the body mass, which makes its respiratory system unable to meet the increased oxygen requirements.
- The RBC of broilers are more rigid than those of layers; they are less flexible and can't change shape.
- Broilers have a thicker blood-gas barrier than layers; the partition in the exchange of oxygen between the air capillaries of the lung and the blood capillaries are thicker which makes the broiler less efficient in oxygenation of lungs.
- Oxygen saturation of haemoglobin is less efficient in broilers than layers.
- Broilers are more prone to "oxidative stress"; more vulnerable to harmful effects of "freeradicals". There are lower levels of antioxidants found in liver & lungs of Ascitic chicken.
- These factors together create oxygen deficiency (Hypoxaemia; the major factor in the development of Ascites) in blood, and make broilers the victims of Ascites.

#### Contributing Factors For Ascites

Anything causing reduced oxygen supply and/or increased oxygen demand results in Hypoxaemia, leading to development of Ascites in broilers.

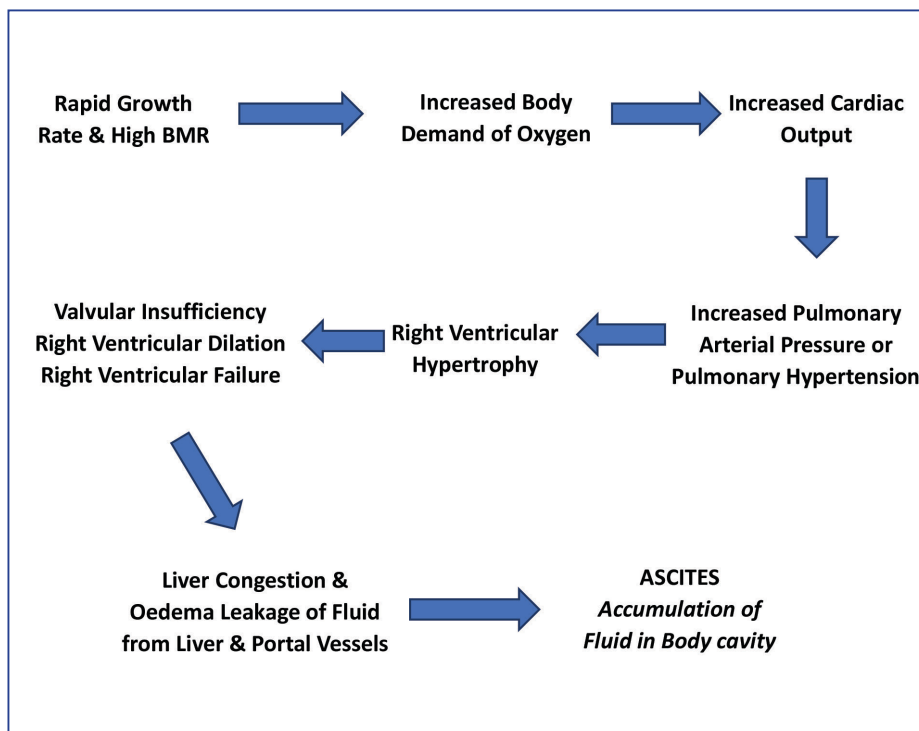
- Cold Climate; Increased metabolic rate with increased oxygen demand to sustain chilling.
- Poor Ventilation results in insufficient oxygen supply especially during winter months to cover-up poor temperature maintenance
- High litter ammonia & dust in poultry house.
- Disease like Aspergillosis (Brooder Pneumonia), IBH
- Mycotoxins affecting liver
- Faulty brooding leading to oxygen crisis at chick level.

The predisposing factors are:

- Fast growing broiler with relatively smaller lung capacity.
- High energy pelleted feed to reach the targeted performance.
- High altitude environment.
- Cold stress resulting in increased oxygen demand.

The aggravating factors are:

- High sodium & low phosphorus feed formulation.
- Vitamin E/Selenium Deficiency.
- Overcrowding.



#### Development of Ascites

##### Symptoms of Ascites:

- Sudden death without showing symptoms is a common finding.
- Peak Ascites problem with high mortality usually seen after 26 days age.
- Poor growth, ruffled feather, pale head & shrunken comb.
- Abdominal distension with increased respiratory rate and Reduced Exercise Tolerance
- Difficult breathing (Dyspnoea)
- Moderately affected birds show Cyanosis (the Bluish discolouration of skin), Reluctant to move; these birds die



Fig. 4. Abdominal Distension with Cyanosis



Fig. 5. Reluctant to move broiler

spontaneously when excited.

#### Post Mortem Findings In Ascites

- Presence of Large amount of clear yellow fluid in the abdominal cavity, "Water Belly" with or without fibrin clots
- The heart is markedly enlarged; both left & right atrium side and right ven-



Fig. 6. Congested Liver, Hydropericardium & Ascitic Fluid

tricular enlargement. Hydropericardium may be seen.

- The liver may be congested & swollen

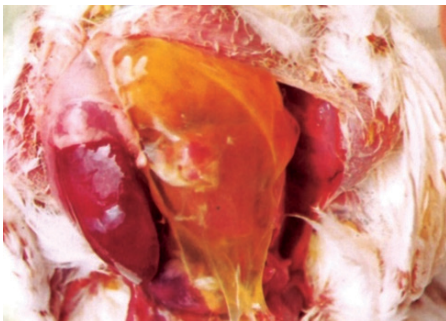


Fig. 7. Shrunken Liver & Yellow Fibrin clots

or firm & shrunken with irregular surface

- The lungs are extremely congested & oedematous
- Not all the birds that die from Ascites show accumulation of fluid in the abdominal cavity. Death occurs before



Fig. 8. Normal heart & Ascites Heart mentioned in original word document

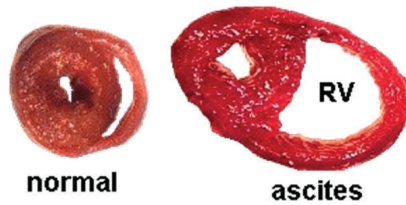


Fig. 9. Right Ventricle cavity of Ascites Heart

symptoms develop due to cardio-respiratory failure.

#### Treatment & Control of Ascites

There is no effective treatment for Ascites.



tes, once birds show symptoms, death is bound to come and fairly quickly. Frusemide may be used as diuretic to reduce mortality which decreases fluid & electrolyte retention and reduces pulmonary vascular resistance. Antioxidants like Vit C, Vit E & organic selenium are effective in reducing mortality on account of their capacity to minimize oxidative stress & formation of free radicals.

Control of Ascites revolves between 2 basic issues; improve O<sub>2</sub> supply and reduce NH<sub>3</sub>, CO<sub>2</sub> & CO in the poultry house throughout the growing period.

- Ensure adequate ventilation in Poultry house throughout the growing period, especially during brooding. Ascites is very common during winter months in open system broiler farms because of compromised & inadequate ventilation to cover-up low temperature brooding due to Poor Heat sources.

- Avoid chilling or exposure to cold during brooding period. The chicks are susceptible to Cold Stress during early part of life and this chilling increases metabolic rate which requires more oxygen to raise body temperature. But oxygen supply cannot be increased in

a poultry house where chicks are already suffering chilling.

- Minimize dust & ammonia in poultry house environment to reduce irritants to lungs.
- Minimize mycotoxin contamination level to protect liver
- Judicious feed formulation to control sodium level. Increased level of Arginine, Vit C, Vit E & Selenium help reducing loss due to ascites
- Feed restriction in terms of quantity and/or energy content, but by sacrificing Growth & FCR.

