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Disease Associated with Vitamin Deficiency in Birds

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INTRODUCTION

Vitamin A deficiency –

It is also referred to as infection resisting vitamin because proper development of the epithelium, bursa of fabricius and immunity depends on vitamin A which plays s vital role within the disease prevention. Symptoms aren't pathognomonic but may include weakness, imbalance, and retardation in body growth, ruffled father loss of yellow colour of the shank and abnormally large combs and testes. Highly deficient chicks become susceptible to conjunctivitis, CRD, coccidiosis and other infections. If breeder flock is deficient in vitamin A then embryonic death occur more frequently. Mucosal surface of the oesophagus show most characteristic changes where swelling of the gland occur within the sort of vesicles or pustules up to 1.2 – 2.0 mm in size. Ulcer could also be formed in mouth which get covered with cheesy exudates that resembling to lesion of pox. Cheesy exudates can also be present on the palate and in nostril in well developed case dry flakes are found in the respiratory tract which may give suspension of ILT. In young chicks bursa can also shows cheesy exudates.

Vitamin E deficiency –

Since it has got antioxidant property so it help in preservation of vitamin A, D and fatty acid etc .It has got complementary relations with selenium and cysteine and has preventive effect against the degenerative changes of muscles and exudative diathesis .The deficiency of vitamine and the other two factors may leads to following condition such as avian encephalomalacia, exudative diathesis, muscular dystrophy, enlarged hocks.

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Avian encephalomalacia –

These is mostly seen in 2-6 weeks old birds. Due to its characteristic symptom it is also reffered as "crazy chick disease" because the diseased chick appears to push heads beneath its breast followed by paralysis. The diseased bird is died within few days. The mature birds don't show any symptoms except drop by egg production while the male birds show the degenerative changes in the germinal epithelium of the testes within the chicks haemorrhage are seen in the cerebellum and the medulla of oblongata. It may also show the area of necrosis with haemorrhage at periphery.

Exudative diathesis –

During this condition oedema is occurred in the subcutaneous tissue which later turns green due to lysis of RBCs. Oedema usually seen on the ventral aspect of the body and the pericardium. Birds developed moderate anaemia and haemorrhage within the breast, thigh, intestine, and gizzards. The disease occur in same age group as in avian encephalomalacia (that is 2-6 weeks) are may be also seen slightly older birds.

Muscular dystrophy –

This disease develop in chicken due to deficiency of vitamin E and sulphur containing amino acid like methionine .while in duck only vitamin E deficiency will lead to muscular dystrophy .This disease is mostly occur in birds of age group of 4 weeks . In this white necrotic area of muscle are seen in the breast muscle but in the ducks and some time in other species necrotic area along with oedema may be also seen. In Turkey lesion in gizzards develop due to combined effect of vitamin E and selenium deficiency.

Enlarged hocks –

In this hog joint become enlarges and distorted this disease develop at 2-3 weeks of age and get spontaneously cured after few weeks.

Hypovitaminosis K –

However vitamin k is abundantly present in the green vegetable and grass and also synthesize to some amount by the microbes present in the intestine but it is not sufficient to complete the dietary requirement. Some fungal toxins and sulpha-drug may have the inhibitory effect on vitamin K synthesis and their deficiency is considered to one of the etiological factors of haemorrhagic syndrome in poultry. Deficiency of vitamin k can be determines apparently by determination of clotting time. The diseased bird excrete blood tinged droppings and mortality rate may reach to as higher as 50%. Haemorrhages are also seen within the thigh, breast muscles and other organs. Bone marrow appears to be paled.

Vitamin C deficiency –

During heat and stress condition the requirement vitamin - C is increased. This vitamin is also help in recovery from cold and pox and by giving in feed it also increased the resistance of poultry E. coli infection and also against stress R.D and M. gallisepticum.

Thiamine (vitamin B) deficiency –

It's present in grain and husk the requirement of this vitamin is higher in layers and broilers and it plays important role in the carbohydrate metabolism and normal functioning of the nerves. The disease is commonly seen at 2 weeks of age or may be within the adult birds.

Symptoms – Develop quickly in young birds and slowly in the adults. Disturbance in carbohydrate metabolism causes subnormal body temperature and in most of the birds the head is pulled towards its back as a result of paralysis of extensor muscles. Similarly paralysis of extensor muscles of leg cause the birds to sit on hocks. Pulling of the head towards the head is described as a "star gazing" appearance. At P.M testes in male and ovary in female show atrophy to some extent. Right side of the heart may be dilated which result in congestion and sight subcutaneous oedema.

Riboflavin (vitamin B2) deficiency–

This vitamin is important for normal metabolism in the body ad their deficiency affects nerves embryos, body growth etc. The important symptom include inward curling of the toes and sitting on the hocks. Therefore the disease is additionally called as "curled toe paralysis". The birds also show dropping of wings and head dermatitis of eyelid, feet and mouth along with slight decline in egg

production in layers. Laying and brooding capacity of adult bird is considerably reduced. Embryo from such egg become atrophic and oedematous and their feathers give typical clubbed appearance especially in feather of neck and back because the sheath of feather do not rupture . Embryonic mortality occurs at second or forth weeks of incubation. The sciatic nerves of the diseased chicks or affected embryo becomes three to four times thick, oedematous and soft due to myelin degeneration and Schwann cell proliferation.

Niacin or nicotinic acid deficiency –

This vitamin is synthesised from aminoalkanoic acid tryptophan within the diet with the help of vitamin B6. It is an essential component of nicotinamide adenine dinucleotide (NAD) diphospho pyridine nucleotide (DPN) and nicotinamide adenine dinucleotide phosphate (NADP) which is essential for the metabolism of the carbohydrate, lipids and protein.

Symptoms – Are shown by growing chicks, turkey and ducks. The hock joint become enlarged and the legs bend out ward as seen in perosis. But during this disease the gastroenemius tendon retain its original position. Besides this the symptom - like diarrhoea , stomatitis ,oesophagitis and improper development of feather are also recorded . The egg production and hatchability also declines.

Pantothenic acid deficiency –

It is also called as bird anti-dermatitis vitamin. This vitamin is essential for the synthesis of co-enzyme A, which is required for the metabolism of carbohydrate, protein and lipids.

Symptoms – Most important symptom consist of formation of scabs at the commeasures of the mouth, sometimes eyelids and toes along with stunted growth and ruffled feathers. And other important change consists of nodular hyperplasia or crakes in the skin of foot pads, at the joint of the claws. P.M finding show spleen hypoplasia , liver is small and yellowish . Yellow pus like material may be found in the mouth and proventriculus. There is increased embryo mortality by second week of incubation. The embryos show subcutaneous oedema and haemorrhage.

Pyridoxine (vitamin B6) deficiency –

Its deficiency leads to stunted growth, staggering, inco-ordination in the movement and encephalomalacia . Number of birds may show jerking movement or convulsions of legs and wings, resulting on rolling onto back with legs upwards. The birds run aimlessly with flapping of wings and death occurs. Mature birds show loss of appetite, drop in egg production and hatchability.

Folic acid deficiency –

Folic acid takes part within the synthesis of amino acids and macromolecules hence it's important for the cellular division where cell still multiply like blood forming cells and most of the cells in the body of the growing chicks.

The symptom of their deficiency are retardation of body and feather growth and anaemia and also essential for the colouration of the feather. Death of embryo takes place due to lack of optimum rate of cellular multiplication or weaklings of hatched which die soon after hatching. Death embryo has distorted limbs and backs.

Biotin deficiency –

The deficiency of biotin is rare because it is present in sufficient amount in natural diet. But like pantothenic acid deficiency it also produces dermatitis, perosis etc. Their deficiency in layer causes embryonic death either in the first week or during last 2-3 days of incubation. The dead embryo show parrot beak, distorted limbs and larege web between 3^{rd} and 4^{th} phalanges.

Cholin deficiency –

It regulates the normal functioning of parasympathetic nerves, thus regulating the activity of heart, eyes and digestive system. The most characteristic symptom, of cholin deficiency in chicken and turkeys is perosis in which there is deformity in the tibia – tarsal joints, sleeping of gastro enemius tendon and lateral deviation of legs. Cholin also plays a crucial role within the origin of fatty liver syndrome and their deficiency leads to excessive deposition of lipids in the liver (fatty

liver syndrome) particularly within the female and egg production is also reduced.

Vitamin B12 deficiency –

This vitamin is important for haemopoiesis and synthesis of macromolecules, methionine, proteins and metabolism of fats and carbohydrates which are most essential for embryonic development.

Its deficiency will results in to stunted growth and reduced capacity or fed intake. Since this vitamin is essential for utilisation of methyl group, hence its deficiency leads to deficiency of cholin and methionine which may result in development of perossis and fatty liver. Its deficiency also affect the hatching capacity of birds and leads to death of birds mostly around 17^{th} day of hatching. Dead embryos generally show atrophic leg muscles and haemorrhages in almost all the tissue.

Fig. 1: Poultry Birds suffer from Vitamin B Deficiency

