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Pankaj Kumar Patel

Division of Medicine, ICAR-Indian
Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

Sonam Bhatt

Division of Medicine, ICAR-Indian
Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

Naveen Kumar Verma

Division of Surgery, ICAR-Indian
Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

Babul Rudra Paul

Division of Medicine, ICAR-Indian
Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

Manjari Pandey

Animal Genetics Division, ICAR-
Indian Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

Akhilesh

Division of Medicine, ICAR-Indian
Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

Akhilesh Kumar

Division of Medicine, ICAR-Indian
Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

Sumit Mahajan

Division of Medicine, ICAR-Indian
Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

SK Dixit

Division of Medicine, ICAR-Indian
Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

Correspondence

SK Dixit

Division of Medicine, ICAR-Indian
Veterinary Research Institute,
Izatnagar, Uttar Pradesh, India

Clinical management of spastic leg with curled toe paralysis in birds

Pankaj Kumar Patel, Sonam Bhatt, Naveen Kumar Verma, Babul Rudra Paul, Manjari Pandey, Akhilesh, Akhilesh Kumar, Sumit Mahajan and SK Dixit

Abstract

Two birds including the 1st case of a 2-month old male parrot and 2nd case a male duckling aged 3 weeks were presented to the Referral Veterinary Polyclinic, IVRI Izatnagar with extended, stiffed limb and curled toes and the complaint of inappetence, weakness, ataxia, difficult object grasping capacity. Skin scraping and fecal examination were found negative for any parasite. Both, the birds were successfully treated using riboflavin along with multivitamins therapy.

Keywords: Curled toes, riboflavin, extended and stiffed limbs

1. Introduction

Curled-toe complicated with spastic leg paralysis is a sudden onset of paralysis of both legs which is characterised by ataxia, weakness, difficulty in grabbing of the branches with the whole limb being extended and stiffly behind, often with curled toes and moving freely at the floor on its hocks and wings but shows normal feeding and behaviour. The correct etiology of the paralysis is unclear, but it is considered that a deficiency in calcium and/or vitamins A, B1, B2, B6, D, and E may be involved, especially as a dry seed diet is particularly lacking in these ingredients are the main cause of the diseases [7, 11]. Riboflavin (7, 8-dimethyl-10-ribityl-isoalloxazine) is a water-soluble vitamin (vitamin B2) and precursor of flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD) [3]. FMN and FAD are coenzymes for numerous metabolic enzymes of energy production and their deficiency leads to impaired fatty acid oxidation and biological redox reactions [2-3]. Riboflavin deficiency causes depression of flavin-dependent enzymes causing impaired fatty acid oxidation which further leads to hypoglycemia and accumulation of fatty acid oxidation intermediates [9]. The typical PM lesion of riboflavin deficiency is a significant enlargement of the sciatic and brachial nerve sheaths due to focal swelling of the myelin sheath [3, 4]. In the present study deals with clinical management of spastic leg with curled toe paralysis in a parrot and a duckling.

2. Methodology

2.1 Case History

Two birds including the 1st case of a 2-month old male parrot and 2nd case a male duckling aged 3 weeks were presented to the Referral Veterinary Polyclinic, IVRI Izatnagar with extended, stiffed limb with curled toes and with the complaint of inappetence, weakness, ataxia, difficult object grasping capacity (Fig.1 &2). Both the birds were showed the normal behavioral pattern and were dewormed as per standard regimen.

2.2 Clinical examinations and laboratory findings

Clinical examinations of both the birds show normal body temperature (106.1°F and 107.3°F), heart rate (420 and 220 beats/minute), respiration rate (56 and 40 breaths/ minute) respectively. Both the birds were normally reluctant but on external stimulation, they started crawling on their hocks with the aid of their wings (Fig.2 &4). Skin scraping examination was found negative for any ectoparasitic infestation. Fecal smear examination by direct under the microscope was negative for the gastrointestinal parasite. A detailed questionnaire was done to rule out any other cause may be related to environmental change, managerial problem, separation anxiety any history of cerebral injuries or hyperactivity.



Fig 1: Stiffed and Extended Limb and Curled toes



Fig 2: Crawling through hocks & wings



Fig 3: Curled toes in Duckling



Fig 4: Crawling through hocks & wings

2.3 Treatment

Treatment was started with Vitamin B complex (Vitamin B12, B1, B2, B6, B3 and Folic acid), Vitamin C and Calcium Pantothenate containing syrup (Becosule) @ 3 drops, PO, BID and Vitamin A, D3, E and B12 containing syrup (Vimeral) @ 3 drops, PO, BID for 6 weeks.

3. Results and discussions

A slight improvement was noticed after one week of the treatment and complete recovery was reported by the owner after 6 weeks of therapy. Riboflavin deficiency affects the epithelium and myelin sheaths of some of the main nerves like sciatic which causes “curled-toe” paralysis in growing birds. Mostly riboflavin deficient chicks show reluctant activity but some external stimuli they frequently start crawling on its hocks with the aid of their wings [9]. Segmental demyelination with endoneurial edema, hypertrophic Schwann cells, lipid deposition in the cytoplasm of Schwann cells and focal myelin swellings leads to splitting, degeneration and enlargement of the nerve, atrophy as well as flabbiness of the leg muscles and in advanced stages the chicks lie horizontally with extended legs, sometimes in opposite directions [3, 4]. It has been reported that young one recover spontaneously after 3 weeks possibly due to the formation of endogenous riboflavin by intestinal bacteria and also riboflavin requirement was decreased with increasing age and decreased growth in chickens [3], pigeons [17], rats [18], dogs [10] and humans [6]. 100 µg daily doses for chicks or poults should be sufficient for treatment of riboflavin-deficiency, followed by incorporation of an adequate level in the diet. However, long-lasting, chronic and advanced stage of curled-toe deformity leads to irreparable damage to the sciatic nerve, and the administration of riboflavin is no longer curative. Riboflavin deficiency also results in a decrease in the conversion of the vitamin B6 (Shane, 2008) and effect iron metabolism [15]. It is considered that calcium and/or vitamins A, B1, 2&6, D and E deficiencies may also involve in disease [7, 11]. Vitamin B complex-(Vitamin B12, B1, B2, B6, B3, B12 and Folic acid) is essential for energy metabolism [13-14]. Vitamin C acts as antioxidants which prevent oxidative stress and helps in collagen production as well as tissue repair [1, 12]. Calcium Pantothenate is involved in the utilization of carbohydrates, lipids, proteins synthesis and the preservation of blood vessels integrity. Vitamin D had neuroprotective and immunomodulatory effects so its use can be benefited [5] and vitamin E improves the ratio of sympathetic to parasympathetic tone and prevents oxidative stress and results in early return from disease [8].

4. Conclusion

Spastic leg with curled toe paralysis is due to many nutritional etiological factors in birds but mostly occur due to deficiency of riboflavin in growing birds. The present cases were successfully managed with sequential daily 100 µg doses of riboflavin as well as other essential vitamins followed by an adequate amount of nutrients in the feed.

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