Journal of Poultry Sciences and Avian Diseases

Journal homepage: www.jpsad.com

Diagnosis and treatment of hepatic lipidosis in a 42-year-old gray parrot: A case report

Ali Salavati[1], Zahra Talebi[2], Maryam Mahdipour[3], Iman Shojaei[4], Seyed Mostafa Peighambari[1*]

[1] Department of Avian Diseases, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran
[2] Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran
[3] Department of Surgery and Radiology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran
[4] Department of Clinical Pathology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

*** Corresponding author email address**: mpeigham@ut.ac.ir

A r t i c l e I n f o

Article type:
Case Report

How to cite this article:
Salavati, A., Talebi, Z., Mahdipour, M., Shojaei, I., & Peighambari, S. M. (2023). Diagnosis and treatment of hepatic lipidosis in a 42-year-old gray parrot: A case report. *Journal of Poultry Sciences and Avian Diseases, 1*(1), 34-39.
http://dx.doi.org/10.61838/kman.jpsad.1.1.4

A B S T R A C T

The African grey (*Psittacus erithacus*) parrot is among the world's most well-known seed-eating cage birds. A grain-eating diet has been reported to cause liver lipidosis in parrots. Fatty liver syndrome occurs when the liver cannot metabolize and re-secrete processed fatty acids due to excessive dietary fatty acids or lipolysis. The present study involves a 42-year-old African grey parrot with extensive feather pecking in the neck, legs, and chest areas, red color changes in the feathers on the legs, and lethargy. The patient's medical history includes the consumption of sugar, chocolate, and whole grains, which is the main reason for metabolic disorders. A comprehensive evaluation of serum biochemistry, total protein levels, aspartate aminotransferase (AST), creatine kinase (CK), triglycerides, and uric acid was conducted on the first visit. Following two weeks of treatment, the bird was again referred to the clinic for clinical pathological evaluation and diagnostic imaging. Different liver medicines, such as herbal antioxidants, vitamins, and amino acid supplements, are prescribed during the treatment process. In addition, the bird's diet was modified. Following the diet and treatment, the blood parameters reached normal limits. The echogenicity of liver tissue was close to normal after the initial observation of feathers regrowing in some areas, as well as blood sample evaluation. A paraclinical test was taken on the bird again after two months of treatment to ensure the disease did not recur. Diligent care, nutritional support, veterinary monitoring, and appropriate medications can improve hepatic lipidosis, but permanent damage may occur. Therefore, it is very critical to quickly diagnose and prevent the recurrence of the illness.

Keywords: *Serum Biochemistry, Diagnostic Imaging, Nutrition, African grey Parrot, Liver Lipidosis, Hematology*

1 Introduction

The liver is the largest gland in the body, but its relative size varies among animal species (1). This organ is involved in more than 40 biochemical reactions in the body, which perform many vital functions to maintain homeostasis. Among these vital functions are the storage of lipids obtained from the diet, the result of the accumulation

Article history:
Received 15 December 2022
Accepted 29 January 2023
Revised 04 February 2023
Published Online 01 March 2023

of fatty acids in the fat reserves, as well as the result of the synthesis of fatty acids produced in the liver itself, which these lipids are in the form of triglycerides, fatty acids, there are phospholipids, cholesterol, and cholesterol esters (1, 2).

Under normal conditions, fatty acids absorbed from the digestive system use albumin in the blood circulation to reach the liver. Inside the hepatocytes, they are oxidized to produce energy or converted into triglycerides for storage. If the intake of dietary fatty acids or lipolysis exceeds the liver's ability to metabolize and re-secrete processed fatty acids into the bloodstream, the accumulation of triglycerides in hepatocytes leads to liver lipidosis (3).

Birds with liver lipidosis have significant clinical manifestations and no fixed or specific clinical signs (2). There has been evidence of lipidosis in parrot species for decades (4). Clinical signs of hepatic lipidosis in parrots include obesity, anorexia, lethargy, and abnormal droppings (5). In the more advanced stages of the disease, ascites, hepatomegaly and changes in feather pigments can be seen (4). Due to the pressure caused by the enlarged liver on the air sacs, these symptoms often appear at a young age with severe shortness of breath (4, 6). This disease is more common in adult birds with a diet containing large amounts of oilseeds (especially sunflower seeds), fatty foods (such as dairy products, chocolate), and sugar. Also, lack of physical movement due to constant presence in the cage also makes the bird prone to this disease (4).

The African grey parrot has two subspecies, Congo African Grey Parrot and Timneh African Grey Parrot, from Central Africa (7). It is one of the most well-known caged birds in the world, eating seeds and fruits in the wild (8). Whole grain diets are high in fat and low in nutrients such as biotin, choline, and methionine. In fact, with a very high saturated fat content, it significantly affects plasma cholesterol concentration. This makes the bird susceptible to liver complications, especially lipidosis. One of the common mistakes gray parrot owners make is feeding too many oilseeds (9).

2 Case Presentation

During this study, a 42-year-old African grey parrot who displayed signs of feather pecking (plucking feathers with the beak), extensive feathering and filling in the neck, legs, and chest, change of color of feathers in the leg area to red, lethargy, and depression were noted. The bird was referred to the clinic. In the bird's history, eating a whole grain diet (mainly sunflower seeds) and sugar and chocolate is mentioned. Based on this bird's improper diet and observed clinical symptoms, metabolic complications, especially liver problems, were investigated. This study analyzed patient information both pre- and post-treatment (use of Livercare ® tablets dosage according to human dosage, L-carnitine oral solution, AD3E supplement, amino acid supplement all according to company label dosage, and change in diet that replace seeds to vegetables) was examined.

Table 1. Result of Hematological and Biochemical Analysis Compared to Normal Range (10-12).

Parameters	Before Treatment	2 weeks after Treatment	Normal Range
WBC´ 10^3	5	7	5-11
Heterophils (%)	66	63	55-75
Immature Heterophils (%)	1	0	-
Lymphocytes (%)	32	34	25-45
Monocytes (%)	1	3	0-3
PCV (%)	37	39	46.4±5.3
CK (u/l)	238	320	140-411
Total protein (g/dl)	0.53	2.95	3-4.6
Triglycerides (mg/dl)	14	166	45-145
AST (u/l)	13	206	100-365
Uric acid (mg/dl)	0.1	4.30	4.5-9.5

Biochemical evaluation of blood samples can heighten suspicion for liver disease. In addition, diagnostic tests should also include bird radiography, and positioning should be optimal for assessing liver size. Radiography probably

only shows liver enlargement and cannot diagnose definitively. In cases of suspected hepatic lipidosis, ultrasound can be used to evaluate the level of fatty changes in the hepatic tissue. Often, a liver biopsy can provide a definitive diagnosis, but due to the animal's old age, anesthesia risks, and the owner's reluctance, a liver biopsy wasn't performed in this case study. In the first visit, blood was taken for biochemical evaluation including total protein level, aspartate aminotransferase (AST), creatine kinase (CK), blood triglyceride, and uric acid, as well as ultrasound evaluation to check liver size and tissue. A second evaluation of the bird's clinical pathology and ultrasonography was performed after two weeks of treatment. Paraclinical tests were also conducted on the bird after two months of treatment to make sure the disease did not recur.

Figure 1. Lateral view of radiograph before treatment. No enlargement was seen in liver and kidneys.

3 Discussion

Aging is associated with progressive cellular changes and physiological decline (13). These changes lead to general disturbances in physiological functions, reduced ability to respond to stress, increased risk of age-related diseases, and increased probability of death (13, 14). Veterinarians have observed various conditions in birds with aging, including changes in the kidneys and liver's function due to various reasons in parrots (13). Liver disease in birds lacks pathognomonic clinical signs and liver dysfunction can arise from various causes (15). The patient's history and clinical symptoms at the time of referral are very variable. Compilation of a detailed history may provide information on the duration, severity, and cause of liver disease. It is essential for a complete evaluation of any sick bird. The collected patient information should encompass a review of physical symptoms, ownership history, diet, reproductive status, housing, the health status of other animals in the home, medications, and supplements taken previously. Nonspecific signs associated with liver disease in birds include anorexia, lethargy, weakness, dehydration, weight loss or obesity, vomiting, polydipsia, tachycardia, dyspnea, and sudden death. Liver dysfunction can also cause a range of coat problems, such as excessive growth and scaling of the beak and nails, abnormal molting, poor feather quality with darkening of the feather pigment, itching, and mottling (16).

Figure 2. Ventrodorsal view of radiograph before treatment. The hourglass appearance of liver and heart silhouette is normal.

In the parrot investigated in the present report, severe feather pecking, excessive emaciation, lethargy, and depression were observed. For further investigations, blood tests were performed to assess some biochemical and hematological factors. The hematology tests indicated that blood parameters were normal to some extent. According to the biochemical evaluation before treatment, the amount of total protein was much lower than the normal value. Triglyceride, aspartate aminotransferase and uric acid levels were also lower than expected values. This problem was probably due to damage to the liver tissue's function and its inability to produce the mentioned factors. In the imaging evaluations, the liver size was normal in radiology. However, during the ultrasound examination, an increase in the echogenicity of the liver parenchyma was observed. This could be due to hepatic lipidosis. In the treatment process, drugs that affect the liver tissue, including plant antioxidants, group B vitamins and AD3E, vitamin K, L-carnitine, choline chloride, betaine, and sorbitol were used to restore liver cells, increase bile secretion, regulate cholesterol levels, and amino acid supplements. Also, the diet was modified and oil seeds (especially sunflower seeds) were limited. In the patient's visit two weeks after the treatment and the initial observation of the regrowth of feathers in some areas, as well as the blood sample evaluation, after observing the diet and the treatment diet, the level of the blood parameters is close to normal values, and the ultrasound examination also indicates the improvement of the tissue condition. Finally, after two months, the blood parameters and imaging showed no recurrence of the disease in the bird.

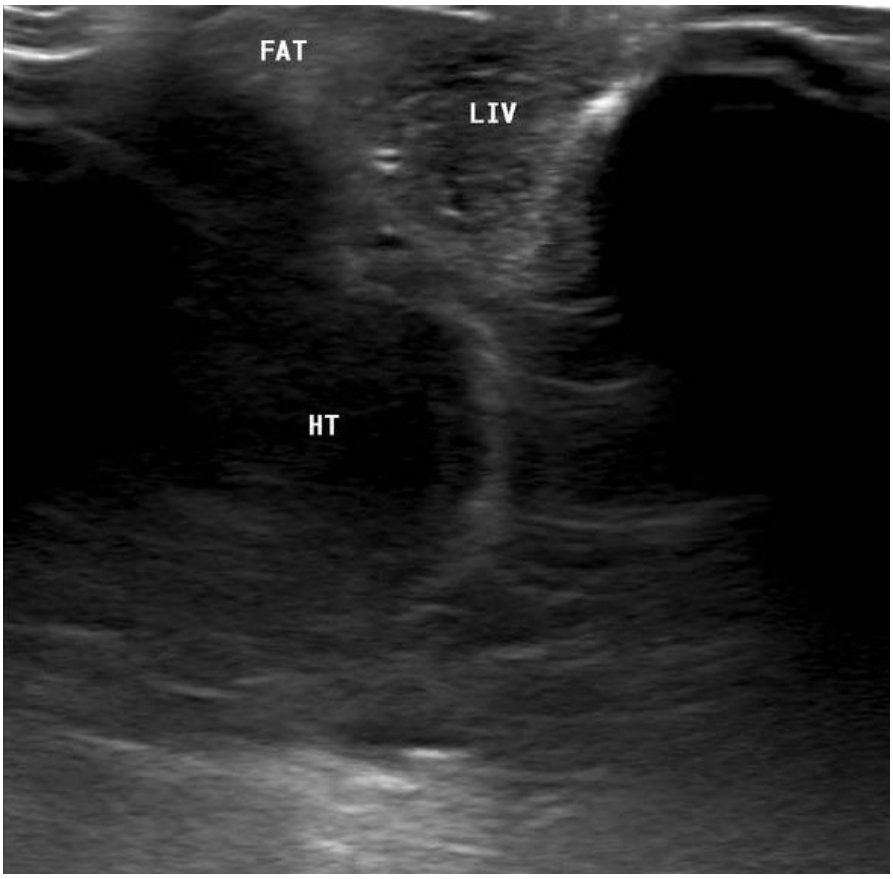

Figure 3. Ultrasonography of liver before treatment (FAT= Fat Tissue, LIV= Liver Tissue, HT= Heart). Noted that liver echogenicity is close to fat tissue that suggested fatty change.

Hepatic lipidosis can be reversed with diligent care, veterinary supervision, appropriate nutritional support, and appropriate medications, but permanent liver damage may occur. A healthy liver can heal itself and reverse the damage that has been done to it. However, once the liver tissue is destroyed and only fibrous connective tissue remains, that part of the liver is destroyed forever (4). Therefore, the earlier hepatic lipidosis is diagnosed, the better the prognosis for returning to healthy health and normal function. A bird that has been diagnosed with and successfully treated for hepatic lipidosis can potentially enjoy a long, healthy life. This is as long as it does not revert to the behavior that caused hepatic lipidosis in the first place.

Conflict of Interest

The authors declared no conflicts of interest.

Authors Contributions

All authors contributed to the original idea and study design.

Funding

This research was supported by the University of Tehran Research Council (Grant numbers: 7508007-6-42 and 98021).

References

1. Zaefarian F, Abdollahi MR, Cowieson A, Ravindran V. Avian Liver: The Forgotten Organ. Animals. 2019;9(2):63. [PMID: 30781411] [PMCID: PMC6406855] DOI: 10.3390/ani9020063
2. Jaensch S, editor Diagnosis of avian hepatic disease. Seminars in avian and exotic pet medicine; 2000: Elsevier.
3. Doneley B, editor Treating liver disease in the avian patient. Seminars in avian and exotic pet medicine; 2004: Elsevier. DOI: 10.1053/S1055-937X(03)00053-7
4. Davies RR. Avian liver disease: etiology and pathogenesis. Seminars in Avian and Exotic Pet Medicine. 2000;3(9):115-25. DOI: 10.1053/ax.2000.7138

5. Beaufrère H, Reavill D, Heatley J, Susta L. Lipid-Related Lesions in Quaker Parrots (Myiopsitta monachus). Veterinary Pathology. 2018;56(2):282-8. [PMID: 30244665] DOI: 10.1177/0300985818800025
6. Khodayari M, Baghkheirati AA, Peighambari SM, Shokrpoor S, Razmyar J. Case Report Abdominal Hernia in a Common Mynah (Acridoth-eres tristis) Associated With Hepatic Lipidosis and Concurrent Respiratory Aspergillosis. DOI: 10.22059/ijvm.17.1.1005114
7. Mazengenya P, Bhagwandin A, Manger PR, Ihunwo AO. Putative adult neurogenesis in old world parrots: the Congo African grey parrot (Psittacus erithacus) and Timneh grey parrot (Psittacus timneh). Frontiers in Neuroanatomy. 2018;12:7. [PMID: 29487507] [PMCID: PMC5816827] DOI: 10.3389/fnana.2018.00007
8. Stahl S, Kronfeld D, editors. Veterinary nutrition of large Psittacines. Seminars in Avian and Exotic Pet Medicine; 1998: Elsevier. DOI: 10.1016/S1055-937X(98)80003-0
9. Chitty J, Monks D. BSAVA Manual of Avian Practice: A Foundation Manual. 1 ed: BSAVA; 2018.
10. Brooks MB, Harr KE, Seelig DM, Wardrop KJ, Weiss DJ. Schalm's veterinary hematology2022.
11. Harr KE. Clinical chemistry of companion avian species: a review. Veterinary clinical pathology. 2002;31(3):140-51. [PMID: 12189602] DOI: 10.1111/j.1939-165x.2002.tb00295.x
12. Harrison GJ, Lightfoot TL, Harrison LR. Clinical avian medicine: Spix publishing Palm Beach, FL; 2006.
13. Reavill DR, Dorrestein GM. Pathology of aging psittacines. Veterinary Clinics: Exotic Animal Practice. 2010;13(1):135-50. [PMID: 20159547] DOI: 10.1016/j.cvex.2009.12.001
14. Harper JM, Holmes DJ. New perspectives on avian models for studies of basic aging processes. Biomedicines. 2021;9(6):649. [PMID: 34200297] [PMCID: PMC8230007] DOI: 10.3390/biomedicines9060649
15. Madani SA, Hatamkhani A, Soroori S. Hepatic lipidosis in a common mynah (Acridotheres tristis) associated with pododermatitis and consumption of broiler pelleted feed. Iranian Journal of Veterinary Medicine. 2012;6(4):279-84. DOI: 10.22059/ijvm.2012.30226
16. Grunkemeyer VL. Advanced diagnostic approaches and current management of avian hepatic disorders. Veterinary Clinics: Exotic Animal Practice. 2010;13(3):413-27. [PMID: 20682427] DOI: 10.1016/j.cvex.2010.05.005