pISSN 1598-298X / eISSN 2384-0749
J Vet Clin 32(3) : 272-274 (2015)
http://dx.doi.org/10.17555/jvc.2015.06.32.3.272

Journal of Veterinary Clinics
www.ksvc.or.kr

Multiple Exostoses in a Blak Kite (*Milvus migrans*)

Dongin Jung, Jaehoon KIM*, Seongchan YEON and Heechun LEE[1]

Research Institute of Life Sciences, Gyeongsang National University, Jinju, South Korea
**College of Veterinary Medicine, Jeju National University, Jeju 690-756, Korea*

(Accepted: June 12, 2015)

Abstract : A black kite (*Milvus migrans*) was referred to the Gyeongnam Wild Animal Rescue Center, Jinju, Korea, with a clinical history of lethargy. On physical examination, three hard, variable sized, round shaped masses were found in the carpal and digit region of the right wing. On plain radiographs, three various sized, round to oval shaped, bony opacity masses with smooth margin were identified on the major digit, alular digit, carpometacarpus. The bird was euthanized due to poor prognosis. A full necropsy was performed, and the histopathologic findings in the bird were consistent with multiple exostoses.

Key words **:** Black kite, bony mass, exostoses, Milvus migrans, radiography.

Introduction

The black kite (*Milvus migrans*) is listed on Appendix II of CITES (7). The black kite is found through most of Africa, Europe and Asia (except for the Sahara, central China and the extreme north) and in parts of Indonesia, New Guinea and Australia. Several subspecies include *Milvus migrans migrans, Milvus migrans lineatus, Milvus migrans formoscanus, Milvus migrans govinda, Milvus migrans affinis, Milvus migrans aegyptius* and *Milvus migrans parasitus* (7,11).

Multiple cartilaginous exostoses is a capped exostoses (osteochondromas) arising from the metaphyses of bones and formed by cartilage (2). Synonyms of multiple cartilaginous exostoses include dyschondroplasia, osteochondromatosis, multiple exostoses, multiple osteogenic exostoses, hereditary multiple exostoses, diaphysial aclasia, hereditary deforming chondrodysplasia, multiple osteochondromas, and multiple benign exostoses (2,5). These lesions are considered a developmental condition of growing animals, and the causes include frequently metabolic or infectious ones (6).

Case

A black kite with unknown ages and sex was discovered from the road and delivered to the Gyeongnam Wild Animal Rescue Center due to lethargy. On physical examination, feather loss was evident over the entire right wing, and the remaining feathers were dull and dirty. In addition, three hard, variable sized, round shaped masses were located in the carpal and digit region of the right wing (Fig 1A). A complete blood count and serum biochemistry were performed. Value of leukocytes was 3,960 cells/μL (heterophils; 2500 cells/μL, lymphocytes; 1400 cells/μL) and value of hematocrit was 40.7% (reference range[4]: 40-50%). Values of blood urea nitrogen (BUN), creatinine, glucose, calcium were 5.0 mg/dL, 0.2 mg/dL, 294 mg/dL (reference range[4]: 260-418 mg/

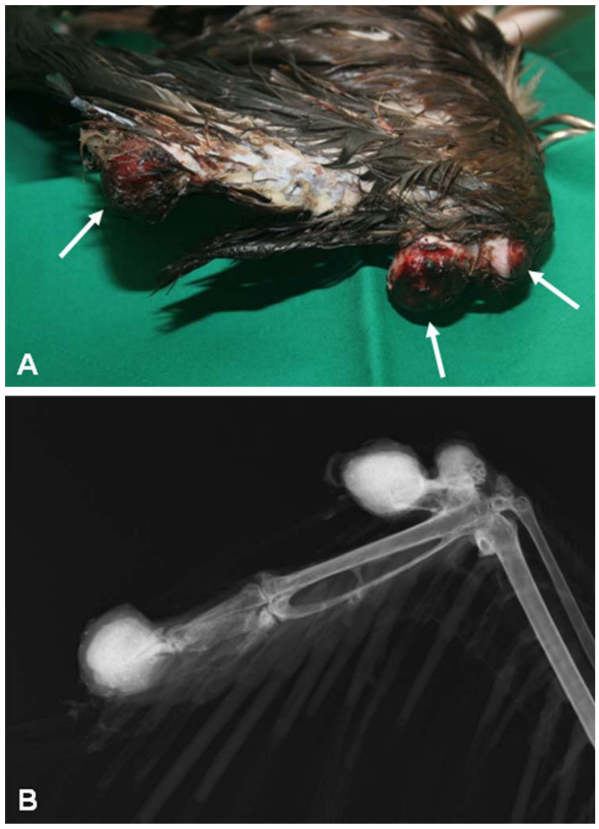

Fig 1. A. Three hard, variable sized, round shaped bone masses of right wing (arrows). Feather loss is evident in this bird. B. Ventrodorsal view of the right wing of the black kite. Radiograph shows three various sized, round to oval shaped, bone opacity masses with smooth margin on the major digit, alular digit, carpometacarpus.

[1]Corresponding author.
E-mail : lhc@gnu.ac.kr

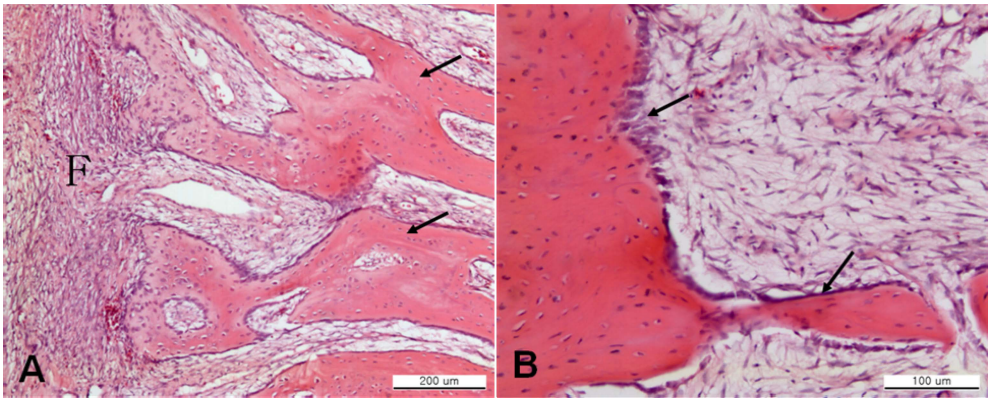

Fig 2. Bone mass. A. The mass was composed of bony spicules of mature woven bone (arrows) and adjacent marrow cavities. Note abrupt change from the fibrous layer (F) to bony trabeculae. H&E. Bar = 200 μm. B. The proliferating fibrous connective tissues were occupied in marrow cavity. Note linearly lined osteoblasts (arrows) in the surface of bony trabeculae. H&E. Bar = 100 μm.

dL), 7.3 mg/dL (reference range[4]: 7.2-10.7 mg/dL) respectively. The concentration of total protein (2.1 g/dL; reference range[4]: 3.1-4.1 g/dL) and albumin (0.4 g/dL; reference range[4]: 0.6-2.3 g/dL) were low. And values of aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), creatine kinase (CK) were 319 U/l, 42 U/l, 233 U/l, 491 U/l respectively. Radiograph of the bird revealed three various sized, round to oval shaped, bony opacity masses with smooth margin; one was 2.1 cm × 2.1 cm sized, round shaped mass on the major digit with 2nd phalanges, and another was 2.3 cm × 1.8 cm sized, oval shaped mass on the alular digit, and the third was 1.4 cm × 1.4 cm sized, round shaped mass on the carpometacarpus (Fig 1B). There are no periosteal reaction and invasion of adjacent bone. Because of the extent and number of lesions and the bird's overall poor condition, a poor prognosis was given. The bird was euthanized and the body was submitted for necropsy.

No gross lesions were seen involving any internal organs. Three bony masses and several internal organs were submitted to standard methods of preparation for histological examination after fixation in 10% buffered formalin solution. The tissues were then processed for inclusion in paraffin, sectioned at 3 μm and stained with haematoxylin and eosin (H&E). On histopathologic examination, masses were composed of mature woven bone with osteocytes in their lacunae surrounding marrow cavities. The most upper surface of masses was covered with squamous epithelium with partial ulceration. Numerous heterophils, red blood cells, and many bacterial cocci formed diffuse crust in ulcerated epidermis. The beneath zone of epidermis was occupied with dense connective tissues. In most areas of periphery in masses there was sudden transition from the fibrous layer to bony trabeculae (Fig 2A). Numerous osteoblasts lined the surface of bony spicules, however osteoclasts were not visible. Proliferating fibrous connective tissues presented in adjacent bone marrow cavities (Fig 2B). However, in the center of masses, the bone marrow cavities were composed of abundant fat, a few hematopoietic cells, small blood vessels within RBC, and osteoblasts. These characteristic histopathologic features were consistent with multiple exostoses. There were no typical lesions in other visceral organs such as heart, lung, liver, and kidney.

Discussion

In human medicine, multiple exostoses exist as a well documented entity (2). Multiple exostoses, also known as osteochondromas, are common benign tumors of bone, and often arise from the metaphyses of long bones (2). Multiple cartilaginous exostoses has also been described in the dog (1,5), cat (10), horse (9), lesser panda (*Ailurus fulgens*) (12), lovebird (*agapornis personata*) (6), and similar lesions of unknown etiology have been described in red panda (*Ailurus fulgens*) (8), fruit bats (*Pteropus giganteus, P. poliocephalus, Rousettus aegyptiacus*) (3). Multiple exostoses in birds are seldom described. In this report, we describe multiple exostoses in a black kite (*Milvus migrans*).

In this case, we believe that leukopenia was considered comparing with other avian reference range, although there wasn't any reference range for leukocytes in the black kite yet. In our opinion, lethargy and malnutrition may have contributed to this leukopenia. It could also explain the hypoproteinemia.

Birds which were seen with multiple nodular bony proliferation similarly have been reported in the lovebird and fruit bats (3,6). Nodular bony proliferation in fruit bats was attributed to fluorosis and the cause of the nodular bony proliferation in the lovebird was unknown. In this case, the cause of the nodular bony proliferation could not be proved due to insufficienct information of the patient and reference data. Only one research about hematological values in *Milvus migrans*, including hematocrit, glucose, urea, cholesterol, total protein, albumin, globulin and calcium, has been existed (4).

In dogs, radiographic signs of multiple exostoses have an eccentric expansile lesion of bone, usually metaphyseal, with smooth cortex, a trabecular pattern, and no periosteal reaction typically (13). Expansile lesions containing trabecular bone with smooth margins were identified in the postmortem radiographs of a lovebird (6). Radiographic signs of this case were similar to previous reports. In veterinary medicine, a very limited amount of research about the black kite has been existed (4,7). Therefore, we could not make a tentative diagnosis in this case before histopathologic examination was performed to confirm it. We believe that bony masses with radiographic findings revealed in this case should be

ruled in multiple exostoses.

Acknowlegements

This research was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (2010-0007394).

References

1. Banks WC, Bridges CH. Multiple cartilaginous exostosis in a dog. J Am Vet Med Assoc 1956; 129: 131-135.
2. Bovée JV. Multiple osteochondromas. Orphanet. J Rare Dis 2008; 13: 3.
3. Duncan M, Crawshaw GJ, Mehren KG, Pritzker KPH, Mendes M, Smith DA. Multicentric hyperostosis consistent with fluorosis in captive fruit bats (Pteropus giganteus, P. poliocephalus and Rousettus aegyptiacus). J Zoo Wildl Med 1996; 27: 325-338.
4. Ferrer M, García-Rodríquez T, Carrillo JC, Castroviejo J. Hematocrit and blood chemistry values in captive raptors (Gyps fulvus, Buteo buteo, Milvus migrans, Aquila heliaca). Comp Biochem Physiol A Comp Physiol 1987; 87: 1123-1127.
5. Gee BR, Doige CE. Multiple cartilaginous exostoses in a litter of dogs. J Am Vet Med Assoc 1970; 159: 895-897.
6. Giddings RF, Richter AG. Multiple exostoses in a black-masked blue lovebird (Agapornis personata). J Avian Med Surg 2000; 14: 48-52.
7. Grioni A. Tibiotarsal fracture and neurologic problems of a black-eared kite (Milvus migrans). Vet Clin North Am Exot Anim Pract 2006; 9: 533-538.
8. Lynch M, McCracken H, Slocombe R. Hyperostotic bone disease in red pandas (Ailurus fulgens). J Zoo Wildl Med 2002; 33: 263-271.
9. Morgan JP, Carlson WD, Adams OR. Hereditary multiple exostoses in the horse. J Am Vet Med Assoc 1962; 140: 1320-1322.
10. Pool RR, Carrig CB. Multiple cartilaginous exostoses in a cat. Vet Path 1972; 9: 350-359.
11. Scheider J, Wink M, Stubbe M, Hille S, Wiltschko W. Phylogeographic relationships of the black kite Milvus migrans. In: Chancellor, R. D., and B. U. Meyburg (eds.). Proceedings of the 6th World Conference on Birds of Prey and Owls. Budapest, Hungary. 2004; 467-472.
12. Wahlberg C, Karkkainen M. Development of multiple exostoses in the lesser panda (Ailurus fulgens). In: Ippen, R., and H. D. Schroder (eds.). 25th International Symposium on the Pathology of Zoo Animals. Berlin, Germany. 1983; 411-415.
13. Wisner ER, Konde LJ. Diseases of the immature skeleton. In: Thrall, D. E (eds.). Textbook of Veterinary Diagnostic Radiology. Philadelphia: WB Saunders. 2002; 146-160.

검은독수리 (*Milvus migrans*)에서 발생한 Multiple Exostoses

정동인 · 김재훈* · 연성찬 · 이희천[1]

경상대학교 생명과학연구원, *제주대학교 수의과대학

요 약 : 탈진증상을 보이는 검은 독수리 (Milvus migrans)가 경상남도 야생동물구조센터에 진료의뢰되었다. 신체검사상에서 우측날개의 말단부에서 3개의 크기가 다양하고 원형의 경결한 종괴가 확인되었으며, 방사선 검사상에서도 이 종괴들은 골밀도를 보이고 있음이 확인되었다. 본 환자는 불량한 예후를 사유로 안락사 조치되었다. 안락사후 실시한 부검에서 종괴들은 다발성 외골종으로 판명되었다.

주요어 : 검은독수리, 종괴, 외골증, 방사선 검사