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Avian Pox Infection in a Eurasian Jay (*Garrulus glandarius*) in Korea

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Abstract : A Eurasian jay (*Garrulus glandarius*) with lethargy, dyspnea, and poor physical condition was rescued and referred to the Animal Health Center, Seoul Zoo, Korea. The jay's eyelids were sealed with dark-colored hard scabs and it died the day after arrival. At necropsy, diphtheritic membranes on the tongue and oral mucosa were apparent, suggesting avian poxvirus infection based on the appearance of the oral diphtheritic lesions. PCR was conducted using a tissue sample to confirm the causative agent. The jay was diagnosed with an avian pox viral infection. This report describes the first case of a natural avian pox infection in a Eurasian jay in Korea.

Key words **:** Avian pox, Eurasian jay, *Garrulus glandarius*, wild bird.

Introduction

Natural poxvirus infection is common in commercial poultry (chickens and turkeys), pet birds, and more than 60 species of free-living birds representing 20 families (9,10,12). Avian poxvirus infection leads to either cutaneous lesions on the unfeathered parts of the skin (dry or cutaneous form) and/or diphtheritic lesions in the upper respiratory and gastrointestinal tracts (wet or diphtheritic form) (1). The most common form is cutaneous, and it consists of warty nodules that develop on the non-feathered legs, feet, face, and base of the beak (3). The diphtheritic lesions occur in the mucous membranes of the oropharynx and respiratory tract, and outbreaks in farm-raised poultry and free-living partridges have been well described (3,4,5). Host specificity of poxviruses is known to play a role in the clinical manifestation of the two forms with some pox species presenting as diphtheritic lesions in one avian species and as cutaneous lesions in others (3,6).

Avian pox is a common disease of domestic poultry and wild birds throughout the world, and poxvirus infection in wild birds has been reported in the USA (11), Germany (7), and Australia (2), but not in Korea. This report describes a severe case of avian pox in a Eurasian jay (*Garrulus glandarius*) that was referred to the Animal Health Center of the Seoul Zoo, Korea.

Case

A Eurasian jay was rescued by local residents on the roadside having difficulty in flying and was referred to the Animal Health Center of the Seoul Zoo for further examination in October 2010. The jay had a body weight of 90 g and was in poor physical condition. The jay's eyelids were sealed with dark-colored hard scabs. Multiple discrete, pale yellow to cream-colored, raised necrotic lesions were distributed irregularly across the oropharyngeal mucosa (Fig 1). The jay died the day after arrival. As diphtheritic membranes on the tongue and

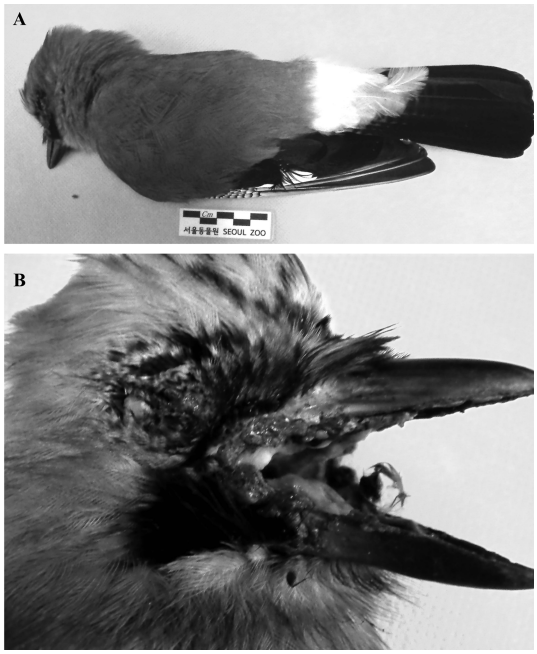

Fig 1. Photograph of the Eurasian jay infected with avian poxvirus: A, whole body of the Eurasian jay; B, eyelids sealed with dark-colored hard scabs and diphtheritic membranes on the tongue and oral mucosa.

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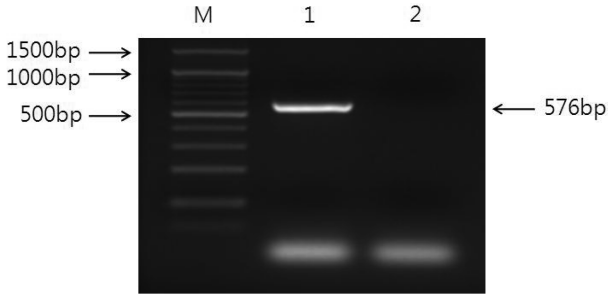

Fig 2. PCR amplification with primers (CP1/CP2) specific to the avian poxvirus 4b core protein gene. Lane M, 100-bp DNA ladder; lane 1, oral swab from the Eurasian jay with pox-like lesions; lane 2, oral swab from a Eurasian jay without any symptoms. The amplicon produced was analyzed on an agarose gel (1.5%) following UV trans-illumination. Selected markers are indicated on the left, and the arrow on the right refers to the expected amplicon at 576 bp.

oral mucosa were apparent at necropsy, avian poxvirus was suspected based on the clinical examination and necropsy.

Samples were collected from tissues with or without skin lesions for a diagnosis. DNA samples were prepared using a viral RNA extraction kit (Qiagen, Valencia, CA, USA), according to the manufacturer's instruction. The avian poxvirus PCR 4b core protein gene was used as the target gene for amplification using an AccuPower PCR Premix kit (Bioneer, Seoul, South Korea). Forward (CP1, 5'-CAGCAGGTGCTAAACAACAA-3') and reverse (CP2, 5'-CGGTAGCTTAACGCCGAATA-3') primers specific to the 4b core protein gene of avian poxvirus were used (Weli 2004). PCR thermal cycling was conducted in a T-gradient thermoblock (Biometra, Goettingen, Germany) as follows: an initial hot-start of 94ºC/5 min; 35 cycles of 94ºC/20 s, 55ºC/30 s, and 72ºC/40 s; and a final extension at 72ºC/5 min. The sizes of the PCR amplicons were estimated by agarose gel (1.5%) electrophoresis following UV trans-illumination. The expected size of the amplicon was about 576 bp. The Eurasian jay was diagnosed with avian poxvirus infection by PCR (Fig 2).

Discussion

The highly visible, wart-like lesions associated with the featherless areas of birds have facilitated recognition of avian pox since ancient times. Avian pox is the common name for a mild-to-severe and slow developing disease of birds that is caused by a large virus belonging to the avipoxvirus group, a subgroup of poxviruses (13). Different clinical forms of poxvirus disease have been described in birds, including cutaneous, diphtheroid, and septicemic forms (8). The diphtheritic form appears as moist, necrotic lesions on the mucus membranes of the mouth and upper digestive and respiratory tracts and has occasionally been reported in wild birds. This form of avian pox probably occurs more frequently in wild birds than reported, because it is less observable than the cutaneous form. Furthermore, the more severe consequences of wet pox undoubtedly cause greater morbidity and mortality, thereby leading to removal of infected birds by predators and scavengers (13). Avian wet and systemic pox in Houbara Bustards (*Chlamydotis undulata*) and waterfowl consists of multiple discrete, pale yellow/cream-colored, and raised necrotic lesions irregularly distributed across the oropharyngeal mucosa (10). The lesions found in the Eurasian jay were characteristic of the diphtheritic form of avian poxvirus infection.

Avian pox occurs worldwide, but little is known regarding its prevalence in wild bird populations. Pox outbreaks are commonly reported at aviaries, rehabilitation centers, and other places where confinement provides close contact among birds. Birds can become disease carriers and spread avian pox among local populations, such as between bird feeding stations, and along migratory routes used by various bird species (13). In free-ranging birds, poxvirus infection may have important implications in the decline of threatened or endangered species (1,14). This is the first description of a natural avian pox infection in a Eurasian jay in Korea.

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어치에서 계두의 자연발생 증례보고

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요 약 : 기면 및 호흡곤란 상태로 서울대공원 동물병원으로 내원하여 다음날 폐사한 체중 90 g의 어치를 검사한 결과 양쪽 눈 모두 건조한 딱지로 덮여 눈을 떨 수 없는 상태로 눈꺼풀이 붙어 있었으며, 혀 및 구강내부 점막에 누런 치즈 양 물질이 붙어 있어 계두로 의심되어 PCR 검사를 실시한 결과 국내에서 자연 발생한 계두의 첫 증례로 진단되었다.

주요어 : 계두, 어치, 야생조류