

Histopathological study of cutaneous form of Avipoxvirus infection in Jungle crow (*Corvus macrorhynchos*)

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Abstract

Aim: A detailed histopathological examination of the samples collected from morbid jungle crow was performed to know the cause of death.

Materials and Methods: Gross as well as histopathological examination was conducted. The suspected tissues get processed by formalin fixation and paraffin embedding technique.

Result: On gross examination, dry pox lesions were seen on the external body surface whereas no internal lesions were observed. However on histopathological examination, the keratin layer of the epidermis was found to be intact and there was extensive proliferation of subdermal connective tissue infiltrated with polymorph mononuclear (PMN) cells. There was marked ballooning of keratinocytes. Swollen keratinocytes had enlarged pleomorphic and hyper-chromatic nuclei. Several keratinocytes also showed presence of eosinophilic intracytoplasmic inclusions (Bollinger bodies) which was considered confirmatory.

Conclusion: Avipoxvirus infection was noticed in a jungle crow. On histopathological study, proliferation of subdermal connective tissue, swollen keratinocytes, pleomorphic and hyper-chromatic nucleus and eosinophilic intracytoplasmic inclusions were noticed.

Key words: Avipoxvirus, Histopathology, Jungle crow

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Introduction

Avipoxviruses (APVs), belonging to subfamily *Chordopoxvirinae* of the family *Poxviridae*, are the largest group of slowly spreading viruses which are structurally complex [1]. They are distributed globally affecting domestic as well as wild birds of over 232 species belonging to 23 orders of birds [2] such as rough legged hawk [3], partridges [4], mourning dove [5], jungle mynahs [6], short-toed larks [7], peafowls [8], eagles [9] etc. Infections have also been reported in a number of endangered species or species in captive breeding recovery programmes [10]. They infect birds of either sex and of all age groups [11]. Modes of transmission are via biting insects and aerosols. Viruses were generally named on the basis of the bird species from which it was first isolated and characterized [12]. The disease proper is generally manifested either cutaneously or diphtheritically,

although both forms may also occur in the same bird [13]. In the cutaneous form, the nodular proliferative lesions are primarily confined to unfeathered areas of skin, e.g., legs, head, and eyelids, while in more fatal diphtheritic form, fibrinonecrotic and proliferative lesions occurs in upper respiratory tract, mouth, and oesophagus [14]. It is the cutaneous form which is most commonly observed in passerine birds [15].

Spontaneous cases of pox infection have been reported in different species of wild birds. Tripathy *et al* [12] isolated two strains of avian pox viruses from cutaneous lesions in Hawaiian crows. Literak *et al* [16] reported avipoxvirus infection in wild birds of Slovakia and Poland. Hsieh *et al* [6] reported pox lesions in jungle mynahs. Mortality in wild birds is however usually low depending on the number and size of the proliferative lesions. If infection occurs in feather-free areas of the skin with secondary bacterial

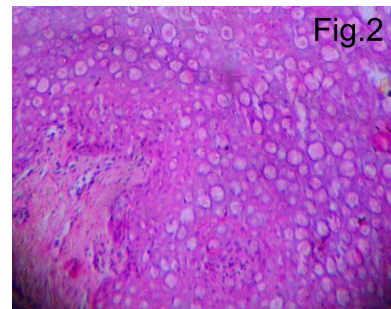


Fig: 1 Gross lesions of Avipoxvirus infection in jungle crow 1a: well developed cauliflower like growth on eyelid and base of beak. 1b: characteristic nodular growth on feet of the bird.

Fig:2. Extensive proliferation of fibrous connective tissue, infiltrated with polymorph mononuclear (PMN) cells. Haematoxylin and eosin. Magnification x100.

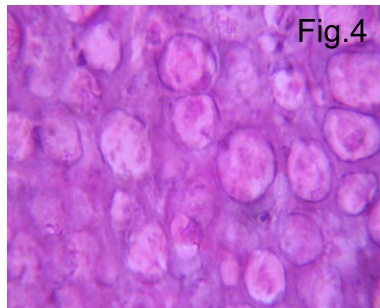
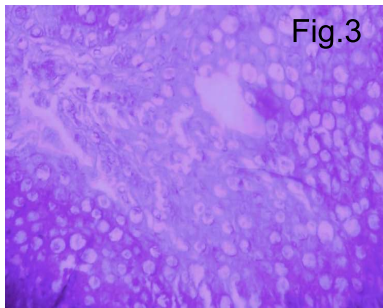


Fig:3. Rounded and swollen keratinocytes with eosinophilic intracytoplasmic inclusion bodies (Bollinger bodies). Haematoxylin and eosin. Magnification x100.

Fig:4. Swollen keratinocytes with eosinophilic intracytoplasmic inclusion bodies (Bollinger bodies). Haematoxylin and eosin. Magnification x400.

infection, then mortality may be high [17]. Although clinical signs vary depending on the virulence of the virus and susceptibility of the host, the pathology of pox infection remains similar regardless of the strain of poxvirus [7]. Here, the present study describes clinical as well as histopathological findings in the skin of jungle crow naturally infected with pox virus.

Materials and Methods

The study was carried out on the male jungle crow found dead alongside the road towards the College of Veterinary and Animal Sciences, Pantnagar on April 22, 2010. It was then brought to the Department of Veterinary Microbiology since it bears certain lesions on the external body surface. The subject was then examined grossly on various parts of the body in order to reveal the cause of death. The types of lesion present on external body surface were recorded after which the bird was subjected to complete necropsy for further investigation. However no other bird with similar lesions was further encountered in that area. Samples of morbid tissues were preserved in 10% neutral buffered formalin and embedded in paraffin. Thin sections of the fixed lesions were stained with hematoxylin and eosin and were examined under the microscope. Samplings were made as per the guidelines of Institutional Animal Ethics Committee.

Results and Discussion

Gross lesions: The most prominent findings were erosions, crusts and nodular lesions on unfeathered portion of the body like eye lids, beak, legs and toes (Fig-1). Pledger [5] also reported the similar findings in mourning dove. Mostly the lesions were in the form single or multiple nodular growths but sometimes cauliflower-like growth was also observed (Fig-1). Nodular and proliferative skin lesions in various avian pox-affected birds have been reported by [4,7]. Internally, no lesions were observed in necropsied birds. Similarly, Khan *et al* [8] also showed dry pox lesions on the external body surfaces of peafowl chicks with no internal lesions in necropsied birds.

Histopathology: Histopathological examination of pox lesions from various affected portions revealed similar pathology. There was hypertrophy and hyperplasia in the lower layers of epidermis. Extensive proliferation of subdermal connective tissue occurs, which was also infiltrated with polymorph mononuclear cells and macrophages. Fibroblast proliferation and fibrosis were also observed in the areas (Fig-2). There was ballooning degeneration of stratified squamous epithelium. Epithelial cells were swollen, rounded, and separated from each other (Fig-3). Cytoplasm of the hyperplastic epithelial cells

contained characteristic large eosinophilic inclusions identified as Bollinger bodies with cytoplasmic vacuolation (Fig-4). Similar results have also been reported by other workers [5, 18]. The appearance of eosinophilic intracytoplasmic inclusion bodies is considered confirmatory [5, 19].

Author's contribution

Sumit Joshi brought the test sample and designed the work plan. Mir Mudasir and Sumit Joshi helped in necropsy examination. Mir Mudasir helped in the preparation of histopathological slides. Deepesh Sharma helped in photography of the slides. Sumit Joshi and Rashmi Singh drafted the manuscript and revised it. All authors read and approved the final manuscript.

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Competing interests

Authors declares that they have no competing interests.

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