

Hygiene Protocols for the Prevention
and Control of Diseases
(Particularly Beak and Feather Disease)
in Australian Birds

Psittacid Herpesvirus Disease



Australian Government

Department of the Environment and Heritage

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Psittacid Herpesvirus Disease

Two psittacine herpesviruses, Psittacid Herpesvirus 1 (PsHV1) and Psittacid Herpesvirus 2 (PsHV2), have been described. PsHV1 has been associated with two main disease syndromes in psittacine birds: Pacheco's disease and mucosal papillomas (MP, internal papillomatous disease, IPD, cloacal papillomatosis) (Tomaszewski *et al.*, 2003). PsHV2 is a newly described virus most commonly found in African grey parrots. The virus can be inactivated by heating to 56°C for 10 minutes or by exposing it to pH <5 (Ritchie 1995).

In birds that recover from infection, the virus appears to cause persistent, latent infections with intermittent or continuous viral shedding (Phalen *et al.*, 2001). Host-adapted strains of PsHV1 may cause a mild, subclinical, latent infection in a natural psittacine host, but severe disease in an unnatural psittacine host (Phalen *et al.*, 2004). In a latently infected bird, virus shedding can be intermittent, but is more likely during periods of stress such as transport and the introduction of new birds (Ritchie 1995).

Pacheco's disease (Pacheco's Parrot Disease)

Pacheco's disease has been reported in several countries where South American and Australasian psittacine birds are kept as pets. Cockatoos and Amazon parrots are highly susceptible and usually die acutely. Macaws are also very susceptible but usually show clinical signs for several days before death. Conures, particularly Nanday and Patagonian, appear to be resistant to severe disease and may become carriers. Although there appears to be variation in susceptibility of different species of parrots to infection with Pacheco's virus, it must be assumed that they are all probably susceptible until proved otherwise.

Pacheco's disease *per se* has not been reported in Australia. However, mucosal papillomas in macaws have been reported, and these are a chronic manifestation of Pacheco's disease.

Signs

PD was initially described by Pacheco and Bier (1930) and the cause characterised as a herpesvirus by Simpson *et al.* (1975). In species that show clinical signs, there is only a brief illness, and birds in excellent body condition may be found dead with full crops (indicating a rapid death). With infection by virulent strains, birds may be found dead without showing clinical signs. In some birds, death is preceded by lethargy and puffing of the feathers. There may be moist droppings and/or regurgitation of a clear or sanguineous fluid. The mortality in susceptible species can be very high, and most birds die within 48 hours of initial clinical signs. Any bird that recovers from infection should be considered a carrier (Phalen *et al.*, 2001).

Some birds may survive infection, be permanently immune and become carriers (latently infected). Although appearing normal, they nonetheless excrete virulent virus and so may infect other birds. Latently infected birds shed virus in the faeces after periods of stress, such as transportation and overcrowding. The virus is extremely difficult to detect in carrier flocks. Serum neutralising antibody levels in recovered birds may be useful in identifying birds that have been recently exposed, but may not be helpful in identifying carriers since these may have declining or non-detectable antibody levels. Carrier birds may also excrete virus intermittently, and so would need to be serially sampled.

Lesions

There may be no gross lesions in birds that have died rapidly. Most show enlarged spleens and livers and areas of necrosis of liver tissue. Because these clinical signs and gross pathology are not specific proof of PD, histopathology and other aids to diagnosis, such as serological tests, are necessary to confirm the diagnosis. Histopathology shows amorphous areas within the nuclei of liver cells (these contain viral particles), as well as necrosis of areas of the liver and haemorrhage within the liver.

Epidemiology

- Australian species of parrots have been involved in outbreaks of Pacheco's disease overseas.
- As with most herpesviruses, PsHV1 produces asymptomatic carriers in some psittacine birds.
- There is no evidence that PsHV1 is transmitted through the egg.
- PsHV1 has the potential to cause severe losses in parrots under stress such as in birds in importation quarantine.
- PsHV1 can be readily isolated from affected organs of parrots affected with Pacheco's disease, but no satisfactory practical method has been developed for identifying asymptomatic carrier birds.
- Inactivated vaccines have been used in North America and Europe in attempts to control Pacheco's disease, mainly under outbreak conditions. It is very difficult to assess their effectiveness from evidence provided in the published literature.
- It would be impossible to prevent the introduction of Pacheco's virus into Australia if parrots are imported from countries that have traded in aviary birds for many years, e.g. countries in North America and Europe.
- It could be expected that the introduction of Pacheco's virus into some aviaries in Australia would cause significant disease problems, particularly in the early stages of an outbreak.
- There is no evidence to indicate what effect Pacheco's disease has on native wild populations of parrots.
- Birds with mucosal papillomas are carriers of PsHV1, since the virus is present in the mucosal papillomas (Styles *et al.*, 2004).

Diagnosis

Diagnosis is based on clinical signs, post-mortem findings and detection of the virus by cell culture, serology or PCR (Phalen *et al.*, 2001). Virus isolation from living birds is done on cloacal and/or oropharyngeal mucosal samples, or from faeces or blood feathers. Virus can also be isolated from the blood, liver, spleen, kidney, lung or cerebellum (Gravendyck *et al.*, 1998). PCR can be used to detect PsHV1 antigen in diseased and apparently healthy carrier birds. A second test 4-6 weeks after the first will increase the sensitivity of the assay (Phalen *et al.*, 2001).

Treatment

Acyclovir has been successfully used to reduce death rates. Administration by IV, IM, and oral routes has been used. Note that treatment with acyclovir does not prevent establishment of carrier status and latent infection.

Prevention

Quarantine. Avoid crowding and other periods of stress. An inactivated vaccine is available in the USA, but there have been adverse reactions to its use (Gerlach 1994).

Mucosal Papillomas

Introduction

- The etiology of mucosal papillomas is now known to be Pacheco's disease herpesvirus, PsHV1.
- MP affects a number of psittacine species, but is most commonly seen in macaws, Amazon parrots and hawk-headed parrots, and also in budgerigars, a cockatiel and an African grey parrot.
- MP has been reported in a number of captive psittacine species in Europe and U.S.A., and was identified in two male green-winged macaws (*Ara chloroptera*) which had not previously been in contact with each other and had been imported in separate legal shipments into Australia in 1993.
- MP have not been reported in wild psittacine populations.
- MP have been reported only rarely in Australian species of parrots kept in overseas aviaries.
- The disease has been reported in Australia in macaws.
- There are no satisfactory screening tests that can be applied to detect subclinically affected birds or birds that may have recovered from the disease.
- When eggs are collected from affected birds and hatched in isolation, it is not known whether the progeny remain free of internal papillomatous disease when they are also reared in isolation.
- Treatment of birds with cloacal papillomas produces equivocal results.
- Control procedures incorporating regular examinations, treatment and segregation of affected birds appear to have been successful.
- Not all susceptible parrots infected with PsHV1 develop clinical signs (Phalen *et al.*, 2004).

Clinical Signs

MP are associated with wart-like lesions on mucosal surfaces, most commonly in the cloaca and choanal cleft but also on the oropharynx, conjunctiva, larynx, oesophagus, crop, proventriculus, ventriculus, nasal mucosa and nasolacrimal duct. Many birds ultimately develop bile duct or pancreatic carcinomas or both. Even though affected birds may live for years with MP many will lose condition and die or are euthanased.

Clinical signs depend on the location of the lesions. Birds with lower intestinal or cloacal lesions may strain, have pasted vents, odoriferous or bloody droppings, recurrent enteritis, flatulence or cloacoliths. Those with oral cavity or upper gastrointestinal lesions may show dysphagia, dyspnoea, wheezing, gastrointestinal blockage, anorexia, vomiting, weight loss, dilatation of the proventriculus or ventriculus or passing whole seeds. Infertility or reduced fertility may occur because of genital tract obstruction or general ill health. Death can result from suffocation as a result of laryngeal obstruction, intestinal obstruction or debilitating systemic disease. Initially some birds do not show any clinical signs but develop problems if stressed by other illness or environmental factors. Some authors report periods of regression and recrudescence of lesions ranging from 2 to 18 months.

Chronic irritation, vitamin A deficiency and environmental stress have been suggested as contributing to the development of MP. MP needs to be differentiated from other causes of mucosal tissue proliferation, including psittacine poxvirus (an exotic disease in Australia but widespread overseas), granulation tissue and squamous metaplasia due to hypovitaminosis A. Other gastrointestinal diseases such as proventricular dilatation syndrome, bacterial infections, chlamydophilosis or parasitic infections could mimic MP involving the upper gastrointestinal tract, liver or pancreas.

Examination for lesions

Some birds with MP exhibit no clinical signs but examination of the cloaca or choana under general anaesthesia may reveal early lesions. The vent may be soaked with alcohol and illuminated with a bright light. The end of a cotton bud is introduced into the cloaca, the tip pushed to one side and slowly withdrawn to ease out the cloacal lining and allow for inspection. The process is repeated on the opposite

side. It is difficult to examine the most proximal aspect of the cloaca in this manner. The mucosa should be pink in colour (in African grey parrots the muco-cutaneous junction is pigmented), slightly moist and completely smooth in texture.

Papillomatous lesions appear as large distinct masses or as numerous small, raised lesions covering the mucosa. These friable growths may be pink or white and tend to bleed easily when bruised. On gross examination they may cloacal prolapses or granulation tissue. Acetic acid (5%) will turn papillomatous tissue white, helping to identify suspect tissue. Cloacal lesions often result in prolapse of the either the papilloma or the proctodeum. Severe congestion and oedema may hinder reduction of the prolapse.

Incubation period

MP appears to have a long incubation period, since papillomas develop in parrots within a year of infection with PsHV1 (Phalen *et al.*, 2004). Bile duct and pancreatic duct carcinomas may develop within a few years of the onset of mucosal papillomas (Phalen *et al.*, 2004).

Diagnosis

The disease should be distinguished from cutaneous papillomas which affect epidermal, as opposed to mucosal surfaces. Cutaneous papillomas have been shown to be associated with papillomavirus in chaffinches, brambling finches and an African grey parrot.

The detection of PsHV1 infection with PCR on a combination of oral and cloacal mucosal swabs and blood samples. Even though, viral DNA may not be detected in all latently infected birds (Phalen *et al.*, 2004).

Treatment

Treatment is palliative, recurrence is common and birds probably remain infectious. Surgical excision is usually followed by strictures and abnormal vent healing. Electrosurgery, cryosurgery, radiation therapy and the use of autogenous vaccines have been attempted but long term follow up of treated birds has not been reported.

Eradication and prevention

Vectored toward control and eradication of the causative herpesvirus and re-stocking with negative birds.

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