Neurological signs in a Magpie (*Pica pica*) associated with a common inadequate management in captivity

Marco Di Giuseppe*, Marco Luparello & Laura Faraci

Centro Veterinario per Animali Esotici, viale Regione Siciliana Sud-Est 422-426, 90129 Palermo.
*Corresponding author: *marcodigiuseppe@yahoo.com*

Abstract. A 10 year-old magpie, kept outside in an aviary from where it could fly during the day, shown neurological clinical signs. After countless of analysis and different diagnostic hypothesis, a diagnosis of zinc intoxication was made. The galvanized wire of the cage was identified as the intoxication source. Once the diagnosis was achieved a specific therapy was started and the magpie slowly has recovered.

Key words: Corvidae, *Pica pica*, zinc, galvanized wire, neurological signs.

INTRODUCTION

Magpie is a common wild bird of the family *Corvidae* that is spread across Sicily both in countryside and in urban areas. They are well known for their characteristic steal tendency shiny objects to adorn their nests.

Moreover they have been studied as a bio indicator because of their opportunistic diet that allows them to accumulate chemical compounds in proportion to the available pool in the environment (Krzysztof, 1999).

In spring and summer usually chiks fall from their nest during windy or rainy days or during their first flights. Chicks are often found on the ground and referred to wildlife rehabilitation centres, to be hand fed or treated by a veterinarian, because often injured for several reasons (impact caused by the fall, lack of food or predators bites).

The main problem of these birds in wildlife rehabilitation centre is to hand feed them without imprinting themselves to humans. In fact a bird imprinted cannot come back in the wild. Often for this reason, birds of the *Corvidae* family are often kept as educational birds in wildlife rehabilitation centres.

Clinical case

A 10-year magpie (*Pica pica*) was referred to our clinic for neurological clinical signs. The bird was adopted by a family from the local wildlife rehabilitation. The magpie was kept inside an outdoor cage and fed with an appropriate diet. Moreover the magpie could spend some time out from its cage flying around the house supervised by the owner. Once a left rear limb lameness has appeared. Day after day the lesion increased until it produced a loss of balance and, few months later, tremors and a suddenly blindness. At that point the first consulted veterinarian treated it with antibiotics and corticosteroids without any improvement. When

the animal came to us for a second opinion, it was in a poor body condition and unable to fly because of the loss of balance; the plumage was in bad condition and the tail feather was absent because of the persistent walking position (Fig. 1.1). Dorso-ventral and latero-lateral radiograph, biochemistry and total blood count, faecal analysis (both fresh smear, flotation technique and Gram stain) were all unremarkable. Therefore we gave careful consideration to an infectious disease that might have explained these clinical signs in a semi-wild bird. PCR for West Nile (*Flavivirus*), Newcastle disease (*Paramyxovirus*) and Avian *Bornavirus* were all negative. The last chance was to visit the place where the bird was kept to see if there was any possible toxins exposition that could explain the clinical status of the patient. At the first look the cage, the diet, the place of living were all appropriate although a galvanized wire characterized the enclosure. Another blood sample was taken to measure zinc blood level and it was increased. It was immediately started a therapy for heavy metal intoxication with 40 mg/kg of Calcium EDTA (Sodio Calcio Edetato 1 g/10 ml S.A.L.F. Bg, Italy) IM q12h for 21 days.

Day after day the magpie recovered and all clinical signs slowly disappeared. After 21 days a new blood sample was performed to check blood zinc level after the chelating agent administration.

Result showed a normal blood zinc level and therefore the therapy was stopped. Meanwhile the galvanized panel of the cage was changed with a powder coated one to prevent any recurrences. For the same reason stainless dishes were suggested as well as stainless screw to fix the new powder coated panels on the wooden cage structure.

During therapy, force feeding with a recovery formula was necessary as well as the use of a handmade support to allow the bird to stand (Fig. 1.2). In fact a proper standing position is essential in order to gain muscles tonicity and to let the feather grow properly. Moreover a short section of physiotherapy was performed twice a day.

Tremors and blindness disappeared after almost 10 days of therapy while more time was necessary to gain balance, strength and muscle tonicity. After few months the magpie finally gained a good standing position (Fig. 1.3) and when the moult was completed it was able to fly again (Fig. 1.4).

After 3 years no recurrences were seen.

DISCUSSION

Heavy metals such as lead, mercury, copper and zync have been known for their toxicity to animals. Copper and zync are required as trace elements in the diet of animals, but when they occur in relatively high levels, they become toxic (Gasaway and Buss, 1972)

Young, growing birds are typically more sensitive to the toxic effects of chronic metal exposure than adults, and other species are often more sensitive than precocial species (Scheuhammer ,1972)

Zinc is used for many cages to prevent rusting and if new, before it has oxidised, it is toxic to birds when ingested. For this reason zinc intoxication is also called “New Wire Disease”. Lead poisoning occurs in older houses and when birds chew on the solder, which joins the wires together inside the cage (Harcourt-Brown, 2000).

Galvanized zinc dishes should not be used, because may contaminate the food or water. Dishes should be cleaned daily. Food and water dishes should not be placed alongside each other, because many birds can drop their food into the water, producing a broth within a few

Fig. 1 – **1**. Aspect of the magpie when came for the second opinion. Notice the bad plumage without the tail feather because of the persistent walking position and the loss of balance laying on tarsus. **2**. Handmade support to allow the magpie to stand. A towel was attached to the edge of a plastic box with pincers and two holes in the middle were created to fit both rear limbs. Height was regulated on the basis of the standing position assumed by the magpie. A perch was placed on the ground so the bird was able to use the fingers for grasping the perch. **3**. The magpie few months after treatment standing by its self. **4**. The magpie after moult totally recovered.

hours. Birds that tend to dunk their food into their water may need to have the water and food dishes placed on the opposite sides of the cage (Doneley et al., 2006).

Usually clinical signs displayed during heavy metal intoxication vary among species and type of metal ingested. In case of a galvanized wire chewed, the intoxication is usually slow and chronic due to continuing or repeated exposures. Differently in case of ingestion of metal foreign body, an acute onset is usually seen.

Zinc toxicosis affects renal, liver and hematopoietic tissues and clinical signs displayed area specific: lethargy, weight loss, diarrhea, polyuria and/or polydipsia with subsequent passive regurgitation of water, anaemia, seizures and sudden death.

Radiography let us to discover the presence of metal objects in the gastrointestinal tract. The diagnosis may be confirmed measuring blood levels. It is important to remember that blood tubes must not have rubber stoppers or gaskets because some of these compounds contain enough zinc to provide a false positive result (Harcourt-Brown, 2000).

Therapy is based on the administration of chelating agents until the blood value decreases. In case of metal foreign bodies, extraction by endoscopy or surgery is suggested.

Several medical protocols are recommended for removing ingested foreign bodies in birds: mineral oil acidification of water, peanut butter, but some considerations must be done:

1) Oral administration of mineral oil can grease the bird's feathers and may be aspirated. The high fat content of peanut butter can be harmful to a patient already compromised.
2) The purpose of acidifying the drinking water prevent dilution of gastric acids by drinking water, and maintains a low gastric pH. This promotes acid digestion of the metal and reduces the particle size but may be ineffective in birds whose water consumption is minimal.
3) Psyllium 1%, lactulose and recovery formula were suggested in order to increase fibres in the diet and gastrointestinal movements but the results are controversial.

In the study of Lupu and Robins 2009 it was demonstrated that one administration of insoluble grit composed by silica, appeared to be the most effective method for eliminating a metal foreign object from the ventriculus in budgeries. Moreover in the same study it was seen that in all birds, the size of the metal particles became smaller just before their disappearance on radiographs, suggesting that an insoluble grit helps to physically destroy metal foreign bodies.

In conclusion, zinc intoxication in cage bird is not exclusive to parrot species and can occur also in an old aviary. Probably the terms "new wire disease" should be reconsidered.

In wildlife rehabilitation centre special care must be taken when a magpie is housed because of their curious nature and attraction for shiny objects. In fact an inappropriate cage can be the cause of sudden illness or death for heavy metal intoxication.

In case of neurological disorders in wild birds not only infectious diseases but also heavy metal intoxication have to be taken in consideration in the differential diagnosis process.

In case of negative radiographs for heavy metal foreign bodies, measure of zinc and lead levels in the blood must be performed if a heavy metal intoxication is suspected.

RIASSUNTO

Una gazza imprintata dall'uomo durante il ricovero presso un centro di recupero di fauna selvatica è stata adottata da alcuni allevatori e mantenuta in una voliera esterna con la possibilità, di volare anche al di fuori della gabbia. All'età di 10 anni cominciò a mostrare una lieve zoppia dell'arto sinistro che con il tempo si aggravò sino a stabilire una vera e propria mancanza di equilibrio. In un primo momento il primo veterinario consultato decise di instaurare una terapia con antibiotici e corticosteroidi ma senza alcun esito. Quando la gazza ci venne consegnata per la cura, si presentava ormai molto debilitata, con un pessimo piumaggio, incapace sia di volare sia di stare in stazione poggiando sui tarsi e cieca. Emocromo, biochimico, esame delle feci e radiografia non mostrano alcuna patologia. Vista la natura dei sintomi, la stabulazione all'esterno e le abitudini della gazza, si decise di eseguire delle PCR per alcune malattie infettive: New Castel, West Nyle e Borna Virus Aviario. Anche questi risultati furono negativi, così si decise di indagare il luogo di stabulazione in cerca di possibili tossine e si constatò che la voliera era costituita da pannelli di rete zincata. Successivamente venne effettuato un prelievo di sangue accertando che la zinchemia risultava aumentata. Dopo una terapia di

21 giorni con il calcio edetato sodico, la gazza si è ripresa lentamente. Contemporaneamente vennero sostituiti i pannelli di rete zincata con altri pannelli di rete verniciata a polvere e cotta al forno. Anche le viti, anch'esse zincate, che fissavano i pannelli di rete al telai, vennero sostituiti con viti in acciaio, così come le ciotole.

Lo zinco è essenziale in piccolissime quantità nella dieta dei vertebrati ma se assunto in eccesso può divenire tossico. L'intossicazione da zinco è ben nota nei pappagalli meno nelle altre specie. Spesso sono gli uccelli giovani ad essere più colpiti da questa intossicazione, sicuramente perché vengono mantenuti in gabbie nuove dove sono alti i valori di zinco. Tuttavia le gazze sono attratte da oggetti luccicanti e questa loro abitudine potrebbe essere determinante a episodi di zinchemia poiché tendono a beccare le sbarre della gabbie. In corso di sintomi neurologici in una gazza, è bene valutare oltre a possibili malattie infettive anche una eventuale intossicazione da metalli pesanti. È opportuno prestare attenzione al materiale usato per la costruzione della gabbia e dei suoi arredi, in particolare in specie come le gazze o i corvidi in generale.

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