

Case Outcomes and Treatment Length for Wild Birds with Neurologic Signs after Traumatic Impact Injury

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Abstract: Wild birds commonly are presented with trauma at wildlife clinics and rehabilitation centers. Trauma can affect multiple body systems including the nervous system. Since specific diagnosis of nervous system injuries is more difficult compared to other body system injuries and may require advanced imaging, individuals often are treated symptomatically. This retrospective study focused on wild birds that presented with primary neurologic signs after a confirmed or presumed impact injury (vehicular trauma, window collision, or wire strike). The case outcomes, mean number of days in rehabilitation prior to release, and most commonly affected species were identified from data collected by Tri-State Bird Rescue and Research, Inc., (TSBRR) over 10 years. Further studies could be done to investigate the influence of species, type and severity of neurologic signs, and different treatment modalities on case outcomes and duration of treatment.

Key words: wildlife, birds, neurologic, impact, trauma, retrospective, release, collision

INTRODUCTION

Trauma is one of the most common clinical presentations in wild birds and human activity has been implicated as a significant cause (Müller et al 2007; Morishita et al 1997; Komnenou et al 2005; Deem et al 1998; Fanke et al 2011). Traumatic injuries often are seen after collisions with vehicles, wires, or windows, and frequently result in damage to several body systems (Morishita et al 1997).

The neurologic examination has been described in birds and is an important tool wildlife clinics and rehabilitation centers can use when presented with wild birds that display neurologic signs (Clippinger et al 1996). These facilities often do not have the appropriate resources for diagnostic imaging of the nervous system, so supportive treatment frequently is initiated without a definitive diagnosis.

The likelihood of successful return to the wild and the projected time spent in rehabilitation are important information in a setting with limited resources and a high volume of patients. Certain avian

species may be more likely to be seen with traumatic injuries because of their closer proximity to people, since a large percentage of traumatic injuries are secondary to human activity. Of these species, some may be more likely to develop neurologic signs secondary to trauma due to differences in natural behavior and flight pattern (Klem 1989).

The purpose of this retrospective study was to investigate the number of wild birds that presented to Tri-State Bird Rescue & Research, Inc. (TSBRR) with primary neurologic signs secondary to impact (PNSSI) that were released, died, euthanized, or transferred, to quantify the number of days wild birds successfully treated and released were kept in care, and to identify the most common avian species that presented with PNSSI over a 10-year time period.

MATERIALS AND METHODS

Data from 1082 wild birds of over 100 species presented to TSBRR from 2001 to 2007, in 2009, and from 2011 to 2012 were reviewed. Neurologic signs included but were not limited to seizures, obtundation (mental dullness), head tilt, torticollis, ataxia, and paresis or paralysis including inability to use legs or wings. Impact was listed as a cause of injury when birds were known or suspected to have collided with an unknown object/force, were struck by a moving vehicle, or flew into a window or wire. Data from 2008 and 2010 were entered in the computer database in a dissimilar manner compared to other years, and thus, could not be included in this study. The information was then entered and managed in a Microsoft[®] Excel[®] spreadsheet.

The total number of wild birds that presented for impact with primary neurologic signs as observed by clinic supervisors and/or veterinarians was recorded. The numbers of wild birds that were released, died, euthanized, or transferred were tabulated and the percentages within each category calculated. Wild

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birds that died before arrival were included in the group of individuals that died in care, and wild birds that were euthanized on arrival were included in the group of individuals that were euthanized in care. The case outcome 'died before arrival' was not used in 2001. The time from admission to successful release was counted for each individual that was released from 2001 to 2007, in 2009, and from 2011 to 2012, a 10-year period. The mean, standard deviation, range, median, and mode for the number of days from admission to release was calculated for all years combined. The six most common species presented with PNSSI regardless of case outcome were identified through counts of the number of individuals from each species for all years.

RESULTS

Of the 1082 wild birds that presented with PNSSI, only 22.6 percent were successfully released. The remaining individuals either died, were euthanized, or were transferred to other facilities for various uses including, but not limited to, use in educational programs, captive propagation, and foster parenting (Table 1).

The mean number of days (+/- standard deviation) spent in rehabilitation for birds successfully released was 20.3 +/-20.7. Additional statistics are located in Table 2.

The most common avian species that presented with PNSSI were the American robin (*Turdus migratorius*), mourning dove (*Zenaidura macroura*), northern cardinal (*Cardinalis cardinalis*), gray catbird (*Dumetella carolinensis*), Cooper's hawk (*Accipiter cooperii*), and common grackle (*Quiscalus quiscula*) (Table 3). There were many other species that presented with PNSSI but with lower numbers of individuals.

DISCUSSION

This retrospective study was conducted to quantify the successful release of wild birds that presented with PNSSI based on initial admission physical examination findings over a 10-year period. By quantifying the average number of days spent in rehabilitation prior to release, the amount of time commonly needed for recovery and successful release can be evaluated more effectively. Identifying the most common avian species that presented with PNSSI increases awareness of the high likelihood of neurologic signs in these species.

The results of this study suggest the majority of wild birds that initially present with PNSSI are not released successfully. It is highly likely that many of the individuals that were euthanized or died could have had severe neurologic deficits or concurrent

Table 1. Case outcomes for birds presenting with PNSSI (N=1082).

Released	22.6%
Died	46.4%
Euthanized	30.8%
Transferred	0.3%

Table 2. Number of days spent in rehabilitation prior to release for birds presenting with PNSSI (N=244).

Mean	20.3
SD	20.7
Range	1-171
Median	15
Mode	2

Table 3. Most common species presented for PNSSI in a ten year period (N=1082).

Avian Species	Number of Individuals
American robin	99
Mourning dove	72
Northern cardinal	59
Gray catbird	56
Cooper's hawk	50
Common grackle	50

diseases, making release an unlikely option. Since the severity of neurologic signs was not quantified and other types of secondary injuries such as orthopedic or soft tissue damage were not addressed in the analysis, the author cannot evaluate accurately what their effect could have been on case outcome for neurologic birds. In addition, birds that presented for PNSSI could have had preexisting neurologic deficits due to either an infectious or toxic etiology, which predisposed them to impact. Since diagnostics for infectious or toxin etiologies were not performed, it is uncertain whether this scenario was true in any of the individuals included in this study.

Even though the mean number of days was found to be 20.3 days, suggesting a fairly short period of rehabilitation prior to release, the standard deviation was large. This suggests that the number of days individuals spend in rehabilitation can vary dramatically. Important contributing factors to the large standard deviation may include secondary, or iatrogenic injuries, or relative susceptibility to stress in captivity.

The American robin, mourning dove, northern cardinal, gray catbird, Cooper's hawk, and common grackle were the most common avian species presented

to TSBRR with PNSSI. This could be because these species live in urban/suburban settings and are thus, a) more likely to be picked up by people and brought in for evaluation, and b) more likely to sustain injuries secondary to impact since most impacts are directly or indirectly related to human activity. Accipiters, such as Cooper's hawks, have been observed to crash into windows while pursuing avian prey (Morishita et al 1997). American robins, gray catbirds, and northern cardinals have been amongst the most frequently reported avian species to have struck windows in the United States and Canada (Klem 1989). Such window strikes could be due to being chased by other individuals or could be secondary to spatial disorientation because of poor visibility and artificial lights (Klem 1989). Mourning doves and common grackles often visit bird feeders, which can predispose them to collisions with windows (Brittingham and Temple 1988).

Future studies should address the severity of neurologic signs after impact and further define the type of neurologic disease such as head or spinal trauma since these could differ in their prognosis. The effectiveness of different case management techniques could be examined for variable species. Furthermore, the number of days specific species spent in rehabilitation can be investigated since differences in recovery period may be due to variety in their size, physiology, or stress level in captivity. Such information could be very useful to wildlife clinics and rehabilitation centers that need to make practical decisions to best use limited resources.

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LITERATURE CITED

- Brittingham, M. C., and S. A. Temple. 1988. Avian Disease and Winter Bird Feeding. *The Passenger Pigeon*. 50(3): 195-204.
- Clippinger, T. L., R. A. Bennett, and S. R. Platt. 1996. The Avian Neurologic Examination and Ancillary Neurodiagnostic Techniques. *Journal of Avian Medicine and Surgery*. 10(4): 221-247.
- Deem, S. L., S. P. Terrell, and D. J. Forrester. 1998. A Retrospective Study of Morbidity and Mortality of Raptors in Florida: 1988-1994. *Journal of Zoo and Wildlife Medicine*. 29(2): 160-164.
- Fanke, J., G. Wibbelt, and O. Krone. 2011. Mortality Factors and Diseases in Free-ranging Eurasian Cranes (*Grus grus*) in Germany. *Journal of Wildlife Diseases*. 47(3): 627-637.
- Klem, D., Jr. 1989. Bird-window Collisions. *The Wilson Bulletin*. 101(4): 606-620.
- Kommenou, A. T., I. Georgopoulou, I. Savvas, and A. Dessiris. 2005. A Retrospective Study of Presentation, Treatment, and Outcome of Free-ranging Raptors in Greece (1997-2000). *Journal of Zoo and Wildlife Medicine*. 36(2): 222-228.
- Morishita, T. Y., P. P. Aye, and D. L. Brooks. 1997. A Survey of Diseases of Raptorial Birds. *Journal of Avian Medicine and Surgery*. 11(2): 77-92.
- Müller, K., R. Altenkamp, and L. Brunnberg. 2007. Morbidity of Free-ranging White-tailed Sea Eagles (*Haliaeetus albicilla*) in Germany. *Journal of Avian Medicine and Surgery*. 21(4): 265- 274. (N)



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