rco2024.03b00f0

Seventeen Years of Bird-Related Eye Injuries at the Royal Victorian Eye and Ear Hospital, Melbourne, 2006–2022

Jeremy P. M. Flanagan[1,2], Melissa Moyes[1], Todd Goodwin[3], Carmel Crock[1], Thomas G. Campbell[1,2,4,5]

[1]The Royal Victorian Eye and Ear Hospital, East Melbourne, VIC, Australia; [2] Centre for Eye Research Australia, East Melbourne, VIC, Australia; [3] James Cook University, Townsville, QLD, Australia; [4] Department of Ophthalmology, Sunshine Coast University Hospital, Sunshine Coast, QLD, Australia; [5] University of the Sunshine Coast, Sunshine Coast, QLD, Australia

Aim

Several Australian bird species are known to swoop at perceived threats to nesting offspring, which may result in serious ophthalmic injury. Despite this, the literature on bird-related ocular injuries is limited to 77 published cases, of which just six describe swooping bird attacks. This does not reflect the clinical caseload at the Royal Victorian Eye and Ear Hospital (RVEEH), a quaternary Australian ophthalmic centre where clinicians frequently treat injuries caused by both swooping and non-swooping birds.

The Australian magpie (*Cracticus tibicen*) is a native Australian bird renowned for its unique vocalisations. It has also achieved notoriety as the most frequent instigator of human–wildlife conflict in Australia, due to male magpies aggressively swooping at perceived threats to their nesting offspring. This occurs so frequently that several state governments warn their constituents each year about the risk of injury from swooping attacks during magpie breeding season (August to September), despite only 10% of male magpies being responsible for this behaviour.

There are only six cases – published over two decades ago – reporting ophthalmic injury following magpie attacks, fewer than the number of informal reports in the Australian media (1). Indeed, eye injuries caused by any bird species are rarely reported in the literature. Only 40 manuscripts describe bird-related eye injuries in detail and a comprehensive review of these cases has not been published to date. These limited reports do not reflect the volume of bird-related eye injuries seen at the Royal Victorian Eye and Ear Hospital (RVEEH), a quaternary metropolitan ophthalmic centre in the state of Victoria, Australia.

The aims of this study are twofold: to retrospectively review all bird-related eye injuries, including those caused by swooping birds and presenting at the RVEEH over the last 17 years; and to collate the published literature for comparison.

Method

This study was carried out in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. Approval for this project was granted by the Human Research Ethics Committee of the Royal Victorian Eye and Ear Hospital (09/886H/19).

The RVEEH Emergency Department (ED) database was searched for relevant cases using a combination of injury, bird appendage and bird name keywords. Information on patient demographics, ophthalmic diagnosis, and bird species was extracted manually. Cases were excluded if the presentation was not bird-related, if patients discharged against medical advice prior to completion of treatment, if no eye injury was identified, or if patients re-presented for the same injury.

Literature Review

Searches were performed in MEDLINE, EMBASE, and Google Scholar using combinations of ‘eye’, ‘bird’, ‘ocular’, and ‘ophthalmic’ as keywords to screen relevant papers published prior to October 11 2023. Articles not written in English were excluded. After removing irrelevant articles and duplicate results, forward and reverse searches were performed on each relevant manuscript.

Results

There were 312,217 unique presentations to the RVEEH ED between 1st January 2006 and 31st December 2022, of which 80,690 were ocular injuries. Our database search criteria generated 849 results. Of these, 687 patients (0.2% of all ED presentations; 0.9% of all ocular injury ED presentations) were diagnosed with a bird-related eye injury.

The demographics of our case series were as follows: mean age of 41.0 years, ranging from 2 to 88 years old; 390 females, 297 males; 18 paediatric cases; and four individuals injured on two separate occasions. Almost all were pedestrians, with the exception of one elderly male using a motorised scooter, one middle-aged male riding a motorbike, and one adolescent male cyclist. All but one had unilateral eye involvement. Most (90.5%) were non-perforating injuries involving the eyelids, cornea, and/or conjunctiva

The annual number of bird-related eye injuries seen at the RVEEH ED increased between January 2006 and December 2022, peaking in 2017 and 2018 before dropping back to 2006 levels by December 2022 (*Figure 1A*). Eye injuries followed seasonal trends, peaking in May–July/October (*Figure 1B*).

Several bird species were identified by the patient and recorded by the clinician:

- Magpies were the most frequently identified bird (275 cases), followed by the magpie-lark (44) and the domestic chicken (26);
- Eleven other bird species were identified in 23 cases.
- The bird species was not identified by the patient and/or not reported by the clinician in the remaining 319 cases.
  - Of these, the triage notes for almost a third of cases (92) described a bird that ‘swooped’ or ‘attacked’.

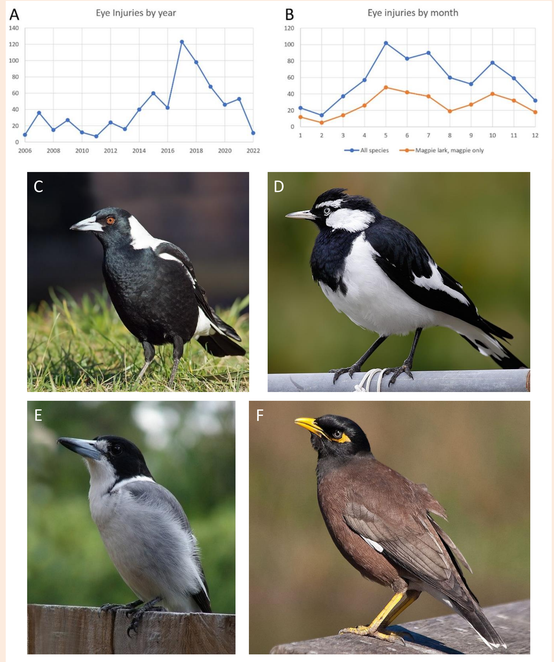


Figure 1: *(A) Trends in bird eye injuries by calendar year. (B) Trends in bird eye injuries by calendar month. (C) An Australian magpie (*Cracticus tibicen*); (D) a male mudlark (*Grallina cyanoleuca*), also known as the magpie-lark, peewee, or pee-wee; (E) a butcherbird (*Artamidae melloria, Artamidae cracticus*); and (F) a common mynah (*Acridotheres tristis*). Blue graph dots = all bird species; red graph dots = magpies and magpie-larks only. Bird species images are open access (Wikipedia).*

Literature Review

After removing duplicates and irrelevant articles, 38 relevant manuscripts (77 cases) were identified. Every World Health Organization (WHO) region was represented by several published manuscripts. Case demographics were as follows: mean age of 23.14 years, ranging from 1 to 75 years old; 26 females and 50 males; and 42 paediatric cases. Patient sex was not reported in one case, and age in a separate case. Causative species were a mix of birds native to the particular geographical region (e.g. black-naped oriole in Singapore) and domestic species kept as pets or livestock (e.g. chickens). Most published cases (84.4%) reported a penetrating eye injury.

Conclusion

In Australia, bird-related ocular injuries are common, seasonal, and largely attributable to swooping birds. Our study provides a more accurate representation of the scope of injuries likely to be encountered by practitioners. Our data suggests that local governmental authorities, schools, and businesses should begin bird swooping safety campaigns prior to May, rather than in August and September. Alternatively, residents of mainland Australia may consider moving to Tasmania, a state where magpies do not swoop.

Discussion

Our study documents almost ten times as many cases as the collective published literature. Most injuries appear to follow deliberate swooping by magpies and magpie-larks.

It is likely that most cases with an 'unknown or unreported bird species involved swooping birds, as most were pedestrians who described being ‘attacked’ or ‘swooped’. The presence of several black and white swooping birds in Australia (*Figure 2C-E*) increases the possibility of species misidentification, especially when evading the offending bird. The common myna (Scridotheres tristis; *Figure 2F*) is also highly territorial in response to other bird species and has been known to swoop. It is likely that magpies and other swooping birds cause many more presentations to tertiary EDs with non-ophthalmic injuries, especially for cyclists and motorcyclists where loss of control at speed can result in serious whole-body trauma. Fortunately the three non-pedestrians swooped in our study retained control of their mode of transportation and suffered non-penetrating ocular injuries, in contrast to the two previously reported cases of cyclists attacked by magpies.

Non-swooping bird species, both domestic (cockatiel, parrot, chicken) and wild (kookaburra, seagull, etc.), are known to cause injury as an unintended consequence of food seeking or being disturbed unexpectedly (e.g. from adjacent shrubs or on footpaths). Of these, the most frequent culprit is the domestic chicken (Gallus domesticus), responsible for 26 RVEEH presentations and 25 published cases. The average age of cases seen at the RVEEH involving domestic chickens was 33.5 years (range: 2–66 years old) and 23% of cases were paediatric. In contrast, the average age of individuals reported in published cases was 12.2 years (range: 1–62 years old) and 84% cases were paediatric. Although previous studies have suggested that ocular injuries due to chickens only occur in rural areas, most patients in this study (65%) lived in metropolitan Melbourne.

Compared with previous studies, the low proportion of penetrating eye injuries in our study across all bird species (1.6% in our study versus 84.4% in the literature), magpies (2.9% versus 100%), and chickens (0.9% versus 88%) is almost certainly due to a reporting bias in favour of serious complications. Previous newspaper reports and magpie-injury factsheets suggest that most attacks occur during the magpie and magpie-lark breeding season (August to October), but interestingly most injuries in this study occurred during May-July.

Curiously, bird-related eye injuries presenting to the RVEEH ED increased 13-fold between 2006 and 2017 but had returned to 2006 levels by 2022. The cause of this is obscure and likely multi-factorial, related to changes in human and bird populations, inter-species competition for nesting sites, and the removal/relocation of particularly aggressive swooping birds by authorities. It may also be influenced by the restriction of outdoor movement due to government-mandated COVID-19 lockdowns, several of which occurred during the magpie and magpie-lark breeding seasons.

Acknowledgements

CERA gratefully acknowledges the support of its affiliates, the University of Melbourne and the Royal Victorian Eye & Ear Hospital

Thank you to Virginia Brumby and Josephine Pickett for their assistance with the database review.

Bibliography

1. Horsburgh BJ, Stark DJ, Harrison JD. Ocular injuries caused by magpies. Med J Aust. 1992;157(11-12):756-9.

Hope in sight