17 December 2020Cloacal Diseases in Companion Parrots: A Retrospective Study of 43 Cases (2012–2018)
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Abstract
Cloacal disease is considered a common presenting complaint in companion parrots. The purpose of this study was to better characterize the prevalence of cloacal disease within a population of owned psittacine birds. Medical records of all owned parrots presented to an exotic animal specialty service between July 2012 and January 2018 were retrospectively reviewed for the presence of cloacal disease. Cloacal disease was identified in 43 of 1137 cases (3.8%). Cockatoos presented with cloacal disease significantly more often than other psittacine groups ($P < .001$). Female parrots presented with cloacal disease significantly more often than males and unsexed birds ($P < .001$). Cockatoos with cloacal disease predominantly presented with prolapse of the cloaca itself ($P = .006$). There was no significant difference in outcome based on taxonomic group, sex, or primary cloacal pathology. Prospective studies with parrot species are encouraged to have an increased understanding of the behavioral and medical conditions that result in cloacal disease. These studies would hopefully facilitate the development of better treatment options for this relatively common disease presentation.

INTRODUCTION

The cloaca in birds is the anatomic terminus of the gastrointestinal, urinary, and reproductive systems. The cloaca is composed of 3 chambers: the coprodeum, urodeum, and proctodeum. The coprodeum connects to the rectum, the urodeum receives the ureters and reproductive system (paired ductus deferens or left-sided oviduct), and the proctodeum connects the coprodeum and urodeum to the external environment through the vent.[1–5] The bursa of Fabricius, an important site in B-cell maturation, connects to the dorsal surface of the proctodeum and is most developed in juvenile birds.[1–5] The vent is composed of dorsal and ventral lips and is controlled by a series of skeletal muscles (the sphincter, transverse, and levator muscles of the cloaca).[1–5] Internally, physical and functional separation of the cloacal chambers is achieved with muscular folds of tissue: the sphincter-like coprourodeal fold and the dorsal semicircular uroproctodeal fold.[1–5] These muscular folds of tissue facilitate the many functions of the cloaca, including defecation, urination, retroperistalsis of urine into the colon, copulation, oviposition, and exposure of the bursa to environmental antigens.[1,3]

There are numerous cloacal disease conditions that have been reported in birds, including papillomatous disease and other neoplasms, cloacitis (bacterial, fungal, and parasitic), prolapse (of the cloaca, phallus, oviduct, or rectum), cloacolithiasis, stricture, traumatic injury, and atony.[1–3,6–8] There are conflicting published reports regarding

which cloacal diseases are diagnosed most often in birds.[1,2,7,9] Clinical signs associated with avian cloacal disease include prolapse, tenesmus, flatulence, foul-smelling feces, soiled pericloacal area, and hematochezia.[2,6]

There are few studies documenting the prevalence of cloacal diseases in birds. Currently, a few case series describe cloacal conditions in birds with similar pathology, namely prolapses in diurnal raptors,[10] male cockatoos with prolapse of the cloaca,[11] and cloacal papillomas in parrots.[12] Avian cloacal disease is also mentioned in pathology retrospectives[9,13] and is the subject of individual case reports.[14–23] The objective of this study was to determine the prevalence, associated risk factors, and prognosis, of owned psittacine birds that presented with cloacal disease to a referral center in Florida, USA, during a 5.5-year period.

MATERIALS AND METHODS

Case selection

Medical records of all avian patients seen by an exotic animal specialty service between July 2012 and January 2018 were reviewed. Nonparrots and unowned psittacine birds were excluded from the data as were birds in which the genus or sex (female, male, or unknown) was not specified in available records. A total of 1137 birds met the inclusion criteria; these cases defined the general population of owned parrots presented within the study's time frame. Of those 1137 cases, 43 birds (3.8%) presented with signs of active cloacal disease during the study period.

All 1137 cases (100%) were divided into frequently identified taxonomic groups; common names were used for the groups when applicable and were evaluated based on reported sex. Age was not assessed because of the large differences in anticipated lifespan between the groups and the lack of verification for owner-reported ages.

For the 43 psittacine cases diagnosed with cloacal disease, data collected included species, sex, and cloacal pathology present on examination. Additionally, for each case, it was noted whether clinical signs of cloacitis were documented, and the case summary and outcome was reviewed. Outcome was assessed as both the outcome of the initial presentation and the status of the bird in June 2018 based on hospital records and communication with primary care veterinarians.

Additional data associated with the common cloacal diseases was also noted. Cloacal prolapse was also evaluated with respect to inappropriate sexual behavior (eg, treating the owner as a mate, masturbation, posturing) and cause. Oviductal prolapses and their relationship with reproductive activity and abnormal sexual behaviors were also evaluated in this study.

Statistical analysis

The risk of presenting with cloacal disease was compared between taxa and sexes with the χ^2 test. The contributions of individual taxa and sexes were assessed against a Bonferroni corrected *P* value. Taxa with 3 or more cases of cloacal disease were further

assessed for outcome and were again compared with the χ^2 test. Significance was set at $P < .05$.

RESULTS

All 1137 parrots (100%) seen during the study period are summarized by group in Table 1. Cloacal disease was noted in 43 birds (3.8%). There was an overall significant difference in the frequency of cloacal disease between taxa ($P < .001$). When comparing the individual groups, this effect was from cockatoos presenting with cloacal disease significantly more often than other parrots (Table 1).

Table 1.

Data for the 1137 owned unknown age parrots that presented during the study period, July 2012 through January 2018, sorted by group and the presence of cloacal disease clinical signs. The prevalence of cloacal disease is the percentage of the total birds from each group that had cloacal disease for at least 1 presentation. Group *P* value is for the χ^2 test comparing observed versus expected incidence of cloacal disease in that group, to all other birds (example, African gray parrots versus non–African gray parrots). Significance was based on a Bonferroni corrected $P < .003$, and significant values are in bold.

Group	Cloacal disease cases	Total cases seen	Prevalence of cloacal disease per group, %	Group *P* value
African gray	3	137	2.2	.307
Amazon parrots	5	137	3.6	.932
Budgerigar	1	79	1.3	.233
Caique	0	27	0.0	.306
Cockatiel	5	169	3.0	.551
Cockatoo	18	115	15.7	**<.001**
Conure	7	150	4.7	.550
Eclectus	0	41	0.0	.205
Lory	0	7	0.0	.606
Lovebird	1	32	3.1	.846
Macaw	1	129	0.8	.062
Parrotlet	1	22	4.5	.853
Pionus	1	3	33.3	.008
Poicephalus	0	12	0.0	.498
Psittacula	0	12	0.0	.498
Quaker	0	60	0.0	.121
Other parrots	0	5	0.0	.663
Total	43	1137	3.8	

The sex distribution of the general population and birds with cloacal disease are compared in Table 2. There was a significant difference in the distribution between the general population and the birds with cloacal disease ($P < .001$). Female birds were diagnosed with cloacal disease more often than the male psittacine birds included in this study. Birds recorded as female comprised 41.1% (467 of 1137) of the general population but 70.0% of the cloacal disease cases (30 of 43), whereas males comprised 37.0% (421 of 1137) and 20.9% (9 of 43), respectively (Table 2).

Table 2.

The reported sexes of the population with cloacal disease and the entire population evaluated during the study period, July 2012 through January 2018. There was a significant difference between the 2 populations ($P < .001$). The prevalence of cloacal disease in each sex is displayed. Sex *P* value is based on the observed versus expected incidence of cloacal disease for that sex (example, females versus nonfemales); significant values are in bold and are compared with a Bonferroni corrected $P < .017$.

Sex	Cloacal disease cases	Total cases seen	Prevalence of cloacal disease per sex, %	Sex *P* value
Female	30	467	6.4	**<.001**
Male	9	421	2.1	.029
Unknown	4	249	1.6	.046
Total	43	1137	3.8	

Psittacine species represented in the 43 avian cases diagnosed with cloacal disease included the Congo African gray parrot (*Psittacus erithacus*), the orange-winged Amazon parrot (*Amazona amazonica*), the yellow-naped Amazon parrot (*Amazona auropalliata*), the yellow-crowned Amazon parrot (*Amazona ochrocephala*), an unidentified Amazon parrot species (*Amazona* species), the cockatiel (*Nymphicus hollandicus*), the umbrella cockatoo (*Cacatua alba*), the nanday conure (*Aratinga nenday*), the sun conure (*Aratinga solstitialis*), the cherry-headed conure (*Psittacara erythrogenys*), the blue-crowned conure (*Thectocercus acuticaudatus*), and other parrots, with single cases of a budgerigar (*Melopsittacus undulatus*), a Fischer's lovebird (*Agapornis fischeri*), a blue-and-gold macaw (*Ara ararauna*), a Pacific parrotlet (*Forpus coelestis*), and a white-crowned pionus parrot (*Pionus senilis*). Primary and secondary cloacal disease conditions diagnosed in the avian patients listed above included prolapse (with cloaca, oviduct, and rectum differentiated by luminal appearance and anatomy), masses arising from the cloaca, and a cloacolith. There was a significant difference in cloacal disease type among the taxa ($P = .006$), primarily because 17 of 18 cockatoos (94.4%) with cloacal disease presented with a cloacal prolapse. There were no other significant relationships between taxa and cloacal disease. Additionally, all cockatoos with cloacal disease were umbrella cockatoos (*Cacatua alba*), despite other species presenting during the study period including Moluccan cockatoos (*Cacatua moluccensis*), Goffin's cockatoos or Tanimbar corellas (*Cacatua goffiniana*), and galahs or rose-breasted cockatoos (*Eolophus roseicapilla*).

In total, 28 of 43 cases (65.1%) were presented with prolapse of the cloaca itself. Most were cockatoos (17 of 28; 60.7%). The sex distribution resembled the general cloacal disease population, with 19 female birds (67.9%), 7 male birds (25.0%), and 2 birds (7.1%) of unknown sex. In addition, almost half of the birds with cloacal disease had a history of inappropriate sexual behaviors (excluding egg laying); of these 13 birds (46.4%), 10 were cockatoos (76.9%) and 11 were female (84.6%). In the 15 parrots (53.6%) without abnormal sexual behavior, identified factors that led to cloacal prolapse included displacement by a coelomic mass effect or cloacal mass and progression from egg laying and/or oviductal prolapse. In 6 birds (21.4%) no cause was identified (4 umbrella cockatoos [67%], 1 Congo African gray parrot [17%], and 1 nanday conure [17%]). Of these, 5 (83%) were male, and in 1 (a cockatoo; 17%), the sex was not identified.

Oviductal prolapse was noted in 11 of 43 cases (25.6%). In all cases in which a detailed medical history was recorded (10 of the 11 cases [90.9%]), concurrent reproductive disease was noted: 8 birds (72.7%) were actively laying at the time of prolapse, and 7 birds (22.2%) had a history of abnormal reproductive behavior, including excessive egg laying.

A prolapsed or externalized gastrointestinal tract was identified in 2 cockatoos (4.7% of cases with cloacal disease). In 1 cockatoo, the cloacal prolapse developed into an intussusception and prolapse of the distal rectum. In the second bird, the chronic cloacal prolapse resulted in necrosis of the cloacal wall, with subsequent intestinal herniation and strangulation.

Cloacal masses were present in 9 of 43 cases (20.9%). Histopathology was only performed on 2 of the 9 cases (22%): an orange-winged Amazon parrot that was diagnosed with recurrent papillomas and glandular hyperplasia, and another orange-winged Amazon parrot that was diagnosed with cloacitis, leiomyositis, and a suspected neoplasm (specifically a leiomyoma).

A cloacolith was noted in 1 of 43 cases (2.3%). The cloacolith was suspected to have formed secondary to urate retention from a partially obstructive cloacal mass effect in the previously discussed orange-winged Amazon parrot diagnosed with cloacitis, leiomyositis, and a suspected neoplasm.

Additionally, evidence of cloacitis was present in 15 of 43 birds (34.9%), based on an external physical examination, cloacoscopy, and/or histopathology. In all cases, cloacitis was a considered a secondary disease condition.

There was no significant difference in initial outcome (dead or alive) based on species ($P = .73$), sex ($P = .99$), or primary pathology ($P = .80$). Long-term prognosis was difficult to evaluate for the diagnosed cases of cloacal prolapse because many were lost to follow-up, and at least several were known to have continued to prolapse without seeking veterinary care until the disease became more problematic. Of the oviductal prolapse cases, 7 of 11 birds (64%) survived to discharge, and 5 (45%) had no recurrence when reexamined. Neither of the 2 birds (18%) with externalized gastrointestinal tracts survived to discharge. Long-term prognosis was also difficult to determine for cloacal masses because few cases pursued further diagnostic testing once the mass was identified. It is known that 5 of the 9 cases (56%) in which a cloacal mass was diagnosed were euthanized or died from the presence or progression of the mass, and 2 cases (22%) were lost to follow-up after neoplasia was suspected, despite attempts to contact the owners. Of the 2 cases (22%) that pursued further evaluation, including histopathology, the case with papillomas was recurrent and eventually euthanized, and the suspected leiomyoma was surgically removed, with no reported recurrence several years later.

DISCUSSION

Cloacal disease is a common disease condition in birds, including psittacine species. However, reports of the prevalence of cloacal disease in birds have been based on case reports, small case series, and textbook information. This study reviewed the medical records of 1137 parrots presented over 5.5 years, with the goals of determining the prevalence of cloacal disease in the study population and to determine whether that clinical presentation was more common in certain psittacine taxa and sexes. A secondary goal was to look for further medical trends in the data. Significant findings included an increased prevalence in female birds among the cases with cloacal pathology and an increased prevalence of cockatoos among the psittacine birds diagnosed with cloacal disease and cloacal prolapse. Reproductive disease, including abnormal behavior, was not statistically analyzed because of the small sample sizes but was commonly associated with both cloacal and oviductal prolapse.

Certain groups of parrots are reported to be at increased risk of cloacal disease, specifically Amazon parrots, macaws, and cockatoos.[1–3,13,24–26] A review[9] of 712 psittacine cloacal biopsies submitted to a pathology laboratory found that more than one-half of the samples were from Amazon parrots, macaws, and cockatoos. The current study also found a high incidence of cloacal disease among cockatoos; although cockatoos represented 10% (115 of 1137) of the parrots examined during this period, they represented 42% (18 of 43) of the cloacal disease cases. However, in contrast to previous reports, this study found no significant increase in cloacal disease among either Amazon parrots or macaws (Table 1).

Previous reports are vague on whether cloacal disease is more common in female or male birds. A significant number of the cloacal disease cases in this study were female (Table 2). Two weaknesses of this study were that sex was unknown for some cases (249 of 1137; 21.9%), and that medical records did not always specify if the reported sex was based on reliable evidence (DNA sexing, previous oviposition, sexual dimorphism) or owner reports. Prospective studies would be better able to ascertain the association of a parrot's sex with cloacal disease through DNA sexing in sexually monomorphic species.

Few studies have assessed the relative prevalence of different cloacal diseases within a group of birds. A retrospective study of 16 prolapses in raptors found that colonic prolapse was most common, followed by oviductal prolapse and cloacal prolapse from cloacolithasis.[10] Within the psittacine group, it has been reported that Amazon parrots and macaws are most at risk for papillomatous disease,[1,13,24] and cockatoos are most at risk for idiopathic and hypersexual behavior–related prolapse[1–3,24–26]; however, that has not been evaluated statistically. In the previously mentioned psittacine cloacal biopsy review,[9] the 3 most common histopathologic diagnoses for cloacal disease were cloacitis, papillomatous lesions, and adenocarcinoma. Papillomas were the most common pathology in macaws, cloacitis was most common in cockatoos, and the pathologies occurred with equal frequency in Amazon parrots.[9] Prolapses were rare, with only 10 of 712 samples (1.4%) coded as prolapses, but it is likely that number was underreported because the case histories were not analyzed.[9] In the current study, the most common primary pathology was prolapse of the cloaca, followed by oviductal prolapse and cloacal

masses. As in the biopsy review, cloacitis was present in about one-third of study cases (15 of 43; 34.9%), but it was always secondary to another disease process.

Beyond the previously mentioned studies, existing case series and reports in the literature have focused on specific cloacal pathologies to characterize syndromes and their treatment options.

Two syndromes of cloacal prolapse have been reported. One syndrome is cloacal prolapse secondary to excess hormonal stimulation and hypersexual behavior in imprinted parrots of both sexes.[2,3,24–26] It is reported as being more common in cockatoos but is diagnosed in many parrot species and occurs because of anatomic changes to the cloaca and vent caused by chronic hormonal stimulation.[2] The other syndrome is progressive idiopathic coprodeal prolapse and straining. Some sources report this to be the most common form of prolapse diagnosed in parrots.[1–3,10,11] Most cases have been in cockatoos (specifically umbrella and Moluccan cockatoos [*Cacatua moluccensis*]), but it has also been reported in African gray parrots and blue-and-gold macaws.[1,3,11,14,26] Additional reported risk factors include male gender, single-parrot households, a close bond to one human, and a prolonged weaning period. Progressive idiopathic coprodeal prolapse generally starts around maturity, but the birds do not display normal sexual behaviors, differentiating this syndrome from that seen with hypersexual behavior, and is reported as progressive if not aggressively managed.[1,3,14]

The current study also found significant relationships between cockatoos (specifically umbrella cockatoos), cloacal disease, and prolapse of the cloaca. However, in contrast to the reported overrepresentation of male cockatoos with idiopathic prolapse, more females presented in this study. It is possible that many of the female birds had cloacal prolapse secondary to hypersexual behavior and changes from increased hormones, whereas the male birds were more consistent with the described idiopathic prolapse syndrome. In support of that, cloacal prolapse cases with inappropriate sexual behaviors were predominantly cockatoos and female, whereas the birds in which no underlying cause for the prolapse was identified were predominantly male cockatoos and a male African gray parrot.

Oviductal prolapse was the second most common cloacal disease diagnosed in this study. It is normally associated with reproductive activity,[1,3,4] although it has been reported secondary to neoplasia,[15] and iatrogenic venereal colibacillosis.[15,16] Almost all cases in this study were also associated with reproductive activity.

Prolapse of the gastrointestinal tract through the vent requires immediate surgical correction.[1,4,24,25,27] This was the most common type of prolapse seen in the raptor study[10]; however, in this study of psittacine species, only a single intussusception and an intestinal herniation were diagnosed.

Cloacal masses were identified in 9 of the 43 parrot cases (20.9%). In previous reports, the most commonly noted neoplastic lesions involving cloaca tissue were papillomas and adenomatous polyps,[1,9,13] suspected to be associated with a herpesviral

infection.[1,13,24,28] These lesions can undergo malignant transformation[13,29] and have been anecdotally associated with biliary and pancreatic adenocarcinoma, especially in Amazon parrots.[1,2,12,13,17,28,29] The next most commonly reported neoplasm of the avian cloaca is adenocarcinoma, followed by rare reports of others, including leiomyomas.[1,9,19–21] In this study, histopathology was only performed on 2 cloacal masses—a papilloma and a suspected leiomyoma.

Cloacoliths are firm aggregates of urates that form in the cloaca. Urate retention and excess water absorption from either traumatic neuropathy or brooding behavior[1,3,24,27] are normally suspected as the inciting cause of cloacolith formation in birds. The risk of cloacolith formation may also be higher in carnivorous birds because of their high-protein diet.[24] A single cloacolith occurred in the study population and is believed to have formed secondary to a mass-altering cloacal function.

Cloacitis, also known as *vent gleet*, is uncommonly reported as a primary cause of cloacal disease[1–3,8] but is frequently diagnosed as a complicating secondary factor.[1,25] Clinical signs of cloacitis in birds include foul odor and pasting or staining of the feathers around the vent.[2,25] The foul odor is often from an overgrowth of anaerobes, especially *Clostridium* species,[22,23,26] but *Escherichia coli*[18] and budding yeast[15] have also been reported as possible contributors to this odiferous condition. In this parrot study, cloacitis was present as a complication of other cloacal diseases in at least one-third (15 of 43; 34.9%) of the cases. Although often a secondary problem, inflammation of the cloacal mucosa can contribute to the decline in the health of the affected tissue. Because of the frequency with which it is diagnosed, all cloacal disease should be assessed for the presence of cloacitis, which should be appropriately treated when present.

Several findings in the current study were unexpected. The significant number of cockatoos with cloacal prolapse was consistent with previous reports, but the lack of significance associated with Amazon parrots and macaws was not. This may be incidental; however, it may be due to changes in the captive population as the proportion of older, wild-caught psittacine species decline and captive-bred conspecifics predominate. Certain diseases of wild-caught parrots, including herpesvirus,[28] are declining because of testing and exclusion from breeding colonies. In contrast, many behavioral diseases of imprinting and captivity, which are thought to predispose birds to abnormal reproductive behaviors, cloacal prolapse, and oviductal prolapse, are thought to be increasing.[30]

In contrast to previous raptor studies in which gastrointestinal prolapse and cloacoliths were commonly diagnosed, this population of parrots was presented with cloacal prolapse most often, followed by oviductal prolapse. These findings are believed to be, at least partially, associated with abnormal behavior of imprinted captive parrots.

Although this study found no significant effect of taxonomic group, sex, or type of cloacal disease on a patient's survival from initial presentation to discharge, we were unable to assess treatment recommendations and prognosis because of several factors. Records, especially owner-reported histories, varied in terminology, accuracy, and

detail. For example, “cloacopexy” was often used without specifying the type (eg, blind percutaneous tack, ventral incisional, rib/sternal) and was also used erroneously to describe both permanent ventplasties and temporary narrowing of the vent with transverse sutures. Response to treatment was only able to be defined as the presence or continued absence of the bird presenting for a prolapse or mass; improvement without full resolution was not quantifiable, and some birds continued to have abnormalities, but the owners did not seek further veterinary care for extended periods of time. The retrospective nature of this study led to significant limitations in follow-up information and detailed behavioral analyses. Future studies to try to better determine treatment and prognosis of birds presenting for cloacal disease should include prospective examination with detailed behavioral evaluation, defined and quantifiable metrics to measure improvement or the lack thereof, and consistent and specific usage of terms.

This study established a prevalence of cloacal disease around 3.8% (43 of 1137) in this population. Cockatoo species did present significantly more often with cloacal disease, specifically cloacal prolapse, than other psittacine species included in this study, but despite historical reports, there was no significance associated with macaws or Amazon parrots. The proportion of cloacal disease cases that were female was also significantly greater than the general population, despite reports of certain syndromes being common and predominantly affecting males. Reproductive disease, including abnormal behavior, was commonly noted with cloacal disease in parrots. Further studies are needed to classify the different presentations of cloacal prolapse. Prospective studies with frequent and defined follow-up are required to assess therapeutic options and prognosis for parrots with cloacal disease.

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