

<https://doi.org/10.31533/pubvet.v18n08e1636>

Visceral uric gout in an adult *Aburria jacutinga*: Case report

Clara Rocha Barreto Corrêa Manhães^{1*} , Karen dos Santos Barreto Rangel² , Carlos Ramón Ruiz-Miranda³ 

¹Setor de Etologia aplicada à Reintrodução e Conservação de Animais Silvestres, Laboratório de Ciências Ambientais, Centro de Biociências e Biotecnologia, Universidade Estadual do Norte Fluminense Darcy Ribeiro, Av. Alberto Lamego, 2000, Campos dos Goytacazes, Rio de Janeiro, Brasil.

²Instituto Claravis, Centro de Conservação de Aves da Mata Atlântica, Parque das Aves. Av. das Cataratas, 12450. Foz do Iguaçu, Paraná, Brasil.

³Setor de Etologia aplicada à Reintrodução e Conservação de Animais Silvestres, Laboratório de Ciências Ambientais, Centro de Biociências e Biotecnologia, Universidade Estadual do Norte Fluminense Darcy Ribeiro, Av. Alberto Lamego, 2000, Campos dos Goytacazes, Rio de Janeiro, Brasil.

*Correspondence author, e-mail: clararochabcm@gmail.com

Abstract. Visceral uric gout is a metabolic disorder characterized by the accumulation of urate crystals on the serous surfaces of the coelomic cavity and in the kidneys. In the present study, we describe a case of visceral uric gout in an adult black-fronted piping guan (*Aburria jacutinga*) under human care. Macroscopic findings showed urate crystals in the mesentery, pericardium, liver, and kidneys. The kidneys were enlarged, and the vessels of the right kidney were congested. Microscopically, we observed the presence of fine crystals with the appearance of "needles". The lesions found are compatible with those previously described in the literature for visceral uric gout syndrome in birds. This is the first report of visceral uric gout in *Aburria jacutinga*.

Keywords: *Aburria jacutinga*, Cracids, visceral uric gout, macroscopic findings, necropsy

Gota úrica visceral em uma *Aburria jacutinga* adulta: Relato de caso

Resumo. A gota úrica visceral é um distúrbio metabólico caracterizado pelo acúmulo de cristais de urato nas superfícies serosas da cavidade celomática e nos rins. No presente trabalho foi descrito um caso de gota úrica visceral em um indivíduo adulto de jacutinga (*Aburria jacutinga*) sob cuidados humanos. Nos achados macroscópicos foram observados cristais de urato no mesentério, pericárdio, fígado e rins. Os rins apresentaram-se aumentados e os vasos do rim direito apresentaram-se congestionados. Microscopicamente foi observada a presença de cristais finos com aparência de "agulhas". As lesões encontradas são compatíveis com as descritas anteriormente em literatura referente à síndrome da gota úrica visceral em aves. Este é o primeiro relato de gota úrica visceral em *Aburria jacutinga*.

Palavras-chave: *Aburria jacutinga*, achados macroscópicos, Cracidae, gota úrica visceral, necropsia

Introduction

Aburria jacutinga (Galliformes: Cracidae) is an endangered bird species because of habitat loss and fragmentation of the Atlantic Forest, the illegal extraction of the juçara palm heart (*Euterpe edulis*), a key fruit of its diet, and extensive hunting. A species population recovery project, the Jacutinga Project, is being carried out by the Sociedade para Conservação das Aves do Brasil (SAVE Brasil) following the

guidelines of the National Galliformes Action Plan ([Silveira et al., 2008](#)). The Setor de Etologia aplicada à Reintrodução e Conservação de Animais Silvestres (SERCAS – UENF) acts as a conservation breeding and research site providing individuals for reintroduction into the wild and carrying out behavioral and veterinary research on this little studied species.

Visceral or articular uric gout, avian urolithiasis, is characterized by hyperuricemia and subsequent accumulation of urate crystals in the kidneys and on the serosal surfaces of the organs of the coelomic cavity or in the articulations of the limbs ([Fink et al., 2018](#); [Sales et al., 2015](#); [Silva & Reis, 2021](#)). This accumulation may occur due to the decrease in excretion of this compound caused by renal failure or by renal overload caused resulting from an increase in its production ([Grespan & Raso, 2014b](#); [Thrall et al., 2022](#); [Vila, 2013](#)). The main causes for an increase in uric acid in the bloodstream are high-protein diet, imbalance of calcium, phosphorus and potassium; increased intake of vitamins D, B and C; bacterial or viral infections, reproductive status, trauma, dehydration, obesity, stress, pyelonephritis, immune-mediated glomerulonephritis; as a result of starvation or severe tissue necrosis; and secondary uropathy related to post-renal obstruction ([Campbell et al., 1994](#); [Gartrell et al., 2003](#); [Hochleithner, 1994](#); [Pollock, 2006](#); [Rupley, 1997, 1999](#); [Saif et al., 2008](#); [Silva & Reis, 2021](#)). The main clinical signs observed are anorexia, prostration, increased water intake, weight loss, diarrhea, apathy, and sudden death due to heart failure ([Grespan & Raso, 2014a](#)). The occurrence of lower limb paralysis has also been suggested due to compression of the lumbosacral nerve plexus caused by nephromegaly ([Herbert et al., 2011](#)).

Diagnosis of avian urolithiasis can be made by measuring serum uric acid levels, but this does not provide accurate data, as it may be unchanged, since uric acid would be deposited on the surfaces of organs and joints ([Latney & Donnelly, 2013](#)). Imaging tests such as radiography, ultrasound and endoscopy can provide accurate information ([Harcourt-Brown, 2010](#); [Latney & Donnelly, 2013](#); [Lierz, 2003](#)). As it is a disease that does not present clinical signs at an early stage, its diagnosis is based on post-mortem findings ([Grespan & Raso, 2014a](#)). Treatments are not usually effective; however, therapeutic protocols include supplementation of vitamins E, A and selenium, correction of protein levels in the diet and administration of allopurinol to reduce plasma concentrations of uric acid ([Lehninger, 2007](#)).

This work presents the macroscopic necropsy findings of an individual of *Aburria jacutinga* from the SERCAS-UENF flock. This finding adds to be body of information of this endangered species that could be relevant for refining captive-management protocols.

Case report

The study was carried out in the Setor de Etologia aplicada à Reintrodução e Conservação de Animais Silvestres (SERCAS) is located at the Universidade Estadual do Norte Fluminense Darcy Ribeiro, Campos dos Goytacazes-RJ. This research was approved by the Ethics Committee of the Universidade Estadual do Norte Fluminense Darcy Ribeiro, protocol n° 477.

The individual under analysis was a 5-year-old female housed with a male during the reproductive period. The diet was based on pelleted chicken feed, fruit (bananas and papayas), and water *ad libitum*. Shortly after pair formation, behaviors related to the reproductive season were observed (Souza et al., 2020). However, due to the lack of sexual receptivity by the female, the interactions between the pair became aggressive. The male persistently chased and cornered the female, and then pecked the nape of the female's neck during attempted copulations, for example, to the point of causing injuries to the skin and muscles in the region. The female appeared prostrate, isolated within the enclosure and an increase in food leftovers was noted. For this reason, she was removed from the enclosure for veterinary care.

On physical examination, extensive lesions were observed in the facial, cervical, and cloacal regions, with the latter showing exposure of the coelomic cavity. The animal had a body condition score of 2, severe dehydration, hypothermia, and considerable weight loss in a short period of time. The wound was cleaned with saline solution, debridement of the necrotic edges, removal of feathers around the lesion

and topical use of antimicrobial and healing ointment. As a therapeutic protocol, dipyron (IM), meloxicam 0.2% (IM), enrofloxacin 5% (SC), glucose (PO), fluid therapy with serum ringer's lactate (SC), and feeding with vitamin supplementation via tube were administered. The patient was placed near a heating lamp to restore its temperature and remained under medical care. Care notwithstanding, the patient died in the early hours of the morning. Necropsy was performed on the same day following the standard technique for birds ([Soncini, 1983](#)). The material deposited on the surface was collected using the scraping technique for microscopic visualization ([Herbert et al., 2011](#)).

Discussion

During necropsy, the bird presented loss of body mass, mostly on the pectoral muscle, dehydration and absence of visceral fat. Diffuse deposition of whitish material, like “chalk dust”, was observed on the surface of the pericardium, liver, spleen, mesentery, in addition to multifocal whitish spots on the kidneys (Figure 1-4). These findings are compatible with those reported in Visceral Uric Gout Syndrome in birds ([Coppola et al., 2012](#); [Sales et al., 2015](#); [Silva & Reis, 2021](#)). Nephromegaly were observed, as well as congestion of the vessels and ureter of the right kidney. The ovary and oviduct were also congested. The lungs and intestine were hemorrhagic. The absence of deposits in the joints of this bird were noted, ruling out the diagnosis of Joint Uric Gout.

As part of monitoring the health of the flock, blood count and biochemistry tests were carried out periodically, in addition to weighing and clinical evaluation. According to parameters observed by [Vaz et al. \(2016\)](#), the jacutinga in question had been presenting serum uric acid values within normal limits ($10.1 \text{ mg/dL} \pm 4.4$) in the two months preceding the incident (6.4 mg/dL and 11.06 mg/dL), thus ruling out a possible chronicity of the disease. The whitish material collected through scraping when observed microscopically showed fine needle-shaped crystals ([Coppola et al., 2012](#); [Fink et al., 2018](#); [Lakshmi et al., 2019](#); [Rupley, 1997, 1999](#)).



Figure 1. Macroscopic necropsy findings of *Aburria jacutinga*. [A] Diffuse deposition of urate crystals; [B] Nephromegaly and precipitate of urate in the kidneys. [C] Characteristic "chalk dust" formation over pericardium and liver. [4] Gastrointestinal tract also affected by the formations.

Due to the acute nature of the condition, no additional tests were carried out before death. Regarding the etiology of this case, the hypothesis that related the findings to diet was discarded, since there was no change during the period, therefore, there was no increase in protein, vitamin or mineral intake, such as calcium and phosphorus. Another explanation considered was the increase in the serum concentration of uric acid due to the reproductive period and laying phase, however, this was also discarded since the increase in this element in this situation, without a pre-existing renal condition or secondary cause, would only be physiological. Therefore, the most likely cause of the kidney injury would be severe dehydration caused by the state of starvation in which the animal was in the days preceding death, resulting from trauma suffered and the state of stress. Furthermore, it must be considered that the animal was possibly suffering from a serious infection or sepsis, caused by the extensive injuries.

Conclusion

A diagnosis and first report of uric visceral gout in *Aburria jacutinga* was warranted based on macroscopic lesions observed during the necropsy, the visualization of the crystals on a slide and the clinical picture were compatible with what has been reported in the literature, even though it was not possible to perform the histopathological examination.

Acknowledgments: This study was supported by the Setor de Etologia aplicada à Reintrodução e Conservação de Animais Silvestres da Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF/RJ)

Conflict of interest: The authors declare no conflict of interest.

References

- Campbell, T., Ritchie, B., & Harrison, L. (1994). Avian medicine, principles and application. In *Avian medicine, principles and application*.
- Coppola, M., Zamae, J., Sampaio, A., Lopes, J., Andreatti, R., & Okamoto, A. (2012). Gota úrica visceral em tucano toco (*Ramphastos toco*). *Veterinária e Zootecnia*, 53(9), 260–263.
- Fink, D., Drumond, L., Basílio, M. I., Sartori, C. M., Andrade, T. R., Santos, N. Z., & Cremer, M. J. (2018). Gota úrica visceral em bobo-pequeno (*Puffinus puffinus*) no sul do Brasil. *Arquivo Brasileiro de Medicina Veterinária e Zootecnia*, 70(2), 486–490. <https://doi.org/10.1590/1678-4162-9916>.
- Gartrell, B. D., Raidal, S. R., & Jones, S. M. (2003). Renal disease in captive swift parrots (*Lathamus discolor*): Clinical findings and disease management. *Journal of Avian Medicine and Surgery*, 17(4), 206–212. <https://doi.org/10.1647/2002-001>.
- Grespan, A., & Raso, T. F. (2014a). Psittaciformes (arara, papagaio, periquito, calopsitas e cacatuas). In Z. S. Cubas, J. C. R. Silva, & J. L. Catão-Dias (Eds.), *Tratado de animais selvagens: Medicina veterinária* (2a ed., pp. 614–656). Roca.
- Grespan, A., & Raso, T. F. (2014b). Psittaciformes (Araras, Papagaios, Periquitos, Calopsitas e Cacatuas). In Z. S. Cubas, L. C. R. Silva, & J. L. Catão-Dias (Eds.), *Tratado de animais selvagens: Medicina Veterinária* (pp. 550–589). Roca, Brasil.
- Harcourt-Brown, N. H. (2010). Psittacine birds. In T. N. Tully, G. M. Dorrestein, & Jones. A K (Eds.), *Avian medicine* (pp. 112–143). Elsevier.
- Herbert, J. D., Coulson, J. O., & Coulson, T. D. (2011). Quantification of tissue uric acid levels in a Harris's Hawk with visceral gout. *Avian Diseases*, 55(3). <https://doi.org/10.1637/9676-020211-Case.1>.
- Hochleithner, M. (1994). Biochemistries. In B. W. Ritchie, G. J. Harrison, & L. R. Harrison (Eds.), *Avian medicine: Principles and application* (pp. 223–245). Wingers Publishing. Inc, Flórida.

- Lakshmi, N. M., Kumar, R. Y., & Lakshman, M. (2019). Pathology of visceral gout in layer chicken. *International Journal of Recent Science Research*, 10(10), 35546–35548.
- Latney, L. T., & Donnelly, T. M. (2013). Urolithiasis. In J. Mayer & T. Donnelly (Eds.), *Clinical veterinary advisor, birds and exotic pets* (pp. 282–283). Edit: Saunders.
- Lehninger A.L, Nelson D.L & Cox M.M. (2007). *Princípios de Bioquímica*. 4ª ed. Sarvier, São Paulo. 1232p.
- Lierz, M. (2003). Avian renal disease: pathogenesis, diagnosis, and therapy. *The Veterinary Clinics of North America. Exotic Animal Practice*, 6(1), 29–55.
- Miller R.E. & Fowler M.E. 2012. *Zoo and Wild Animal Medicine*. 8th ed. Elsevier, Missouri, p.667-669.
- Pollock, C. (2006). Diagnosis and treatment of avian renal disease. In *Veterinary Clinics of North America - Exotic Animal Practice* (Vol. 9, Issue 1, pp. 107–128). <https://doi.org/10.1016/j.cvex.2005.10.007>.
- Rupley, A. E. (1997). *Manual of avian practice*. Saunders.
- Rupley, A. E. (1999). Diagnostic techniques for gastrointestinal diseases of psittacines. *Seminars in Avian and Exotic Pet Medicine*, 8(2), 51–65. [https://doi.org/10.1016/s1055-937x\(99\)80037-1](https://doi.org/10.1016/s1055-937x(99)80037-1).
- Saif Y.M., Fadly A.M., Glisson J.R., McDougald L.R., Nolan L.K. & Swayne D.E. 2008. *Diseases of poultry*, 12nd ed. Wiley-Blackwell, New Jersey, p. 1175-1178.
- Sales, I. S., Nogueira, C. H. O., & Silveira, L. S. (2015). Gota úrica visceral em coruja suindara (*Tyto alba*) de vida livre. *Pesquisa Veterinária Brasileira*, 35, 169–172.
- Silva, G. A. M., & Reis, T. M. Q. (2021). Achados necroscópicos de gota úrica visceral em lóris arco-íris (*Trichoglossus haematodus*): Relato de caso. *PUBVET*, 15(10), 1–7. <https://doi.org/10.31533/pubvet.v15n10a948.1-7>.
- Silveira, L. F., Soares, E. S., & Bianchi, C. A. (2008). Plano de Ação Nacional para a Conservação dos Galliformes ameaçados de extinção. *Séries Ameaçadas Instituto Chico Mendes de Conservação Da Biodiversidade*, 6, 1–88.
- Soncini, R. A. (1983). Guia de necropsia de aves e envio para o laboratório. *EMBRAPA*, 40(1), 1–29.
- Thrall, M. A., Weiser, G., Allison, R. W., & Campbell, T. W. (2022). *Veterinary hematology, clinical chemistry, and cytology*. John Wiley & Sons.
- Vaz, F. F., Locatelli-Dittrich, R., Lange, R. R., Beltrame, O. C., Przydzimirski, A. C., Koch, M. O., & Castilhos, B. Q. (2016). Reference intervals for biochemical analytes of captive Black-Fronted Piping-Guan (*Aburria jacutinga*). *Veterinary Clinical Pathology*, 45(2). <https://doi.org/10.1111/vcp.12356>.
- Vila, L. G. (2013). Bioquímica das aves: Revisão de literatura. *Seminário Apresentado No Programa de Pós-graduação em Ciência Animal da Escola Veterinária e Zootecnia de Goiás*.

Article History:**Received:** June 10, 2024**Approved:** July 4, 2024**License information:** License information: This is an open-access article distributed under the terms of the Creative Commons Attribution License 4.0, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.