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ANESTHESIA AND AMPUTATION IN CURURU TOAD– CASE REPORT

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Abstract: Amphibians have less structured pain receptors and neuroanatomical pathways than mammals, but capable of a complete nociceptive experience. Many anesthetics have been used in amphibians like bath solutions of MS-222, benzocaine, eugenol, tiletamine, barbiturates, propofol and gas administrations of methoxyflurane, halothane and isoflurane however some of them are not available in Brazil. The objective of this report was to describe the anesthetic and surgical procedure in a Cururu frog brought by the Environmental Police with a laceration in the left posterior limb. After the procedure, the animal recovered from anesthesia moving with adapted locomotion.
Keywords: Toad anesthesia. Amphibian surgery. Amphibian anesthetic protocol.

INTRODUCTION

The Yellow Cururu Toad (*Rhinella icterica*) is a species of frog belonging to the *Bufonidae* family, has a relatively wide distribution throughout Brazil, mainly in forests with good adaptation in other areas (SABAGH, CARVALHO-E-SILVA & ROCHA, 2012). The *Rhinella icterica* specie presents sexual dimorphism, the male is smaller and gray-yellow color and the female is larger when it reaches sexual maturity, presenting a beige or brown-light color, both with a large blackish spot on the back, divided longitudinally by a light stripe (PINTO, 2009). However, in some cases, males can be the same size or larger than females, due to selective pressure generated by competition and fights between males.

The musculoskeletal system of anuran amphibians is highly modified to allow locomotion through jumping. Among them the presence of the sternum (figure 1) to support the internal organs, despite the absence or partial development of ribs (DE PAULA & TOLEDO, 2014).

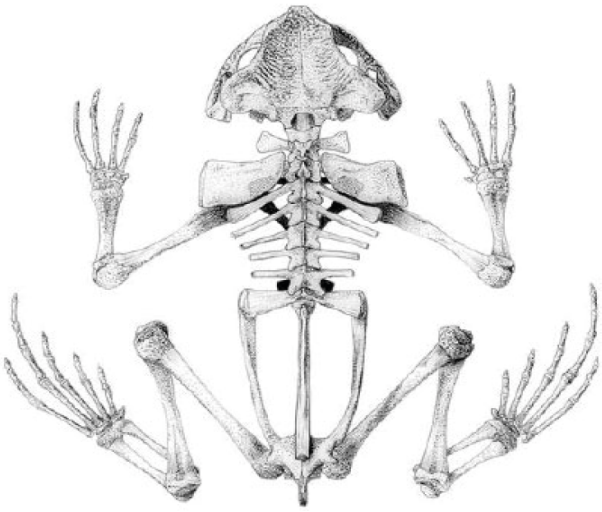

Figure 1 – Anatomy of the Cururu toad skeleton

Source: De Paula & Toledo (2014)

The present work aims to report a case of amputation of the left posterior limb, in Cururu toad (*R. icterica*).

METHODOLOGY

On March 12 (twelfth) of this year, a yellow Cururu toad (*Rhinella icterica*) was brought by the Environmental Patrol. The animal treated was an adult female weighing 243 grams and presented tegumentary laceration, with exposed fracture of the femur and adjacent necrosis in the left hind limb (figure 2) and required amputation to preserve the animal's homeostasis.

Figure 2. Fracture in left hind limb

The procedure was performed on the same day, with tiletamine associated zolazepam at a dose of 15 mg/kg intramuscularly and fentanyl 0.5 mg/kg subcutaneously. Next, lidocaine gel was used on the lesion and local anesthetic blockade with injectable lidocaine. Depth of anesthesia were monitored by the absence of corneal protective reflexes and heart rate, throughout the procedure a humidity source was maintained under the animal. A semicircular incision was made on the lateral and medial sides of the left hind limb. The skin was dissected and the femoral artery and vein were sectioned and connected cranially to the gracilis major muscle. On the lateral side, caudally to the femur, the biceps femoris, semimembranosus and gracilis muscles were sectioned. The triceps muscle was sectioned in the region of the femoral diaphysis and just after the sartorius, exposing the femur. The adductor muscle was also sectioned to expose the proximal diaphysis, where the section was performed, concluding the amputation. The approximation of the remaining musculature, was performed with 5-0 silk suture, simple isolated stitches, and the skin with 5-0 polyglycolic acid sutures, with simple isolated stitches (figure 3).

Figure 3. Surgical sutures

The patient remained hospitalized for three days and was medicated with enrofloxacin 10 mg/kg SID intramuscular, dexamethasone 1 mg/kg SID and tramadol 4mg/kg BID. He was discharged with a prescription of enrofloxacinoe prednisolone 5 mg/kg SID, orally for another 5 days, recommendation for enclosure control, with a constant source of heat and humidity and observation of feeding, in addition to cleaning the stitches twice a day and weekly return until discharge.

The animal was discharged on April 5th without signs of infection (figure 4) and with adapted locomotion (figure 5).

Figure 4. Postoperative (25 days), day of medical discharge.

Figure 5. Adapted locomotion, 25 days after the surgical procedure.

RESULTS AND DISCUSSION

Anurans have poorly structured pain receptors and neuroanatomical pathways, but capable of a complete nociceptive experience. Many anesthetics depress CNS neuronal activity, this is done by increasing the activity of GABAergic inhibitory neurons (CNS inhibitors) or decreasing glutamatergic activity (CNS excitatory neurotransmitter). In frogs, different species have populations of GABAergic cells ranging from moderate to dense, which may explain the variability in the depth of anesthesia observed after the administration of anesthetics with GABAergic mechanisms (GUENETTE, GIROUX & VACHON, 2013).

In a report of surgery on butter frog (*Leptodactylus latrans*), ketamine and morphine were used for the procedure, however, despite being extensive, it was a superficial laceration (MARIETTO-GONÇALVES & SANTOS, 2015). Thus, in the procedure of this report, other medications available in Brazil were chosen, which proved to be suitable for more invasive procedures. The anesthetic recovery of the study animal was slow, around 4 hours after the procedure it remained standing.

The rate of water loss from the skin of amphibians is much greater than that of other terrestrial vertebrates; therefore fluid therapy is very important.

The skin of anurans is the thinnest among terrestrial vertebrates (those animals that have bones inside the body) and has functions that go beyond protection. Amphibians breathe through their skin and for that to happen, it needs to be moist. They lose a lot of water through the skin, but they can also absorb it.

The ideal fluid to be used in amphibians is still unknown (DE PAULA & TOLEDO, 2014). Anurans have highly vascularized and flexible tissue, with remarkable regeneration capacity, which facilitates surgical procedures (FRANCO et al., 2018). Surgical procedures in amphibians are relatively rare, but as described in the present work, there is a good recovery. Proper post-operative management is fundamental for a faster recovery, so some precautions must be taken, such as correct cleaning of the stitches, cleaning the environment and restricting movement. The prevention of opportunistic infections was performed by keeping the animal out of the water during the postoperative period, as reported in the report by MARIETTO-GONÇALVES & SANTOS (2015).

FINAL CONSIDERATIONS

General anesthesia is indicated for painful procedures and long duration in amphibians. The protocol used was suitable for the procedure, providing good analgesia and an ideal anesthetic plan for the proposed procedure.The animal satisfactorily adapted to the lack of the left hind limb, not showing any kind of pain or discomfort when walking. This report concludes that it is essential to know the differences between the species and the degree of pain that the procedure will generate in order to establish an ideal anesthetic protocol.

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