

Pelvic Limb Amputation in a Giant Anteater (*Myrmecophaga tridactyla*) Traumatized by an Agricultural Harvester

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ABSTRACT

Background: The giant anteater (*Myrmecophaga tridactyla*) returned to the category of vulnerable by the 2014 IUCN / SSC, due to the population reduction, less than 30%. The main reasons are: environmental degradation and fragmentation, being run over, burning, attacks by hunting dogs, illegal trade and diseases. It is very common to find these fractured patients and the treatment is mostly surgical. Amputation is indicated when there are extensive lacerations and when reconstructive surgery is not possible. The objective is to report a viable treatment option in fractured wild patients, contributing to the preservation of the species.

Case: It was received at the Veterinary Hospital Dr. Halim Atique - UNIRP an young female giant anteater (*M. tridactyla*) weighing 5.75 kg, brought by the Environmental Forestry Police of the municipality of São José do Rio Preto - SP, found in the region of Olímpia at a gas station. The animal was traumatized by an agricultural harvester, with partial traumatic amputation in the left pelvic limb and tail. In the preoperative period, the patient was admitted to hospital under assisted care, analgesia and all the necessary support for stabilization. High amputation was performed, with hip disarticulation and treatment of the tail wound, which was initially opted for healing in the first intention, where sutures were used to approach the edges of the wound, but presented dehiscence and was treated as a second intention. There were almost 2 months of care with specific food, cleaning of the enclosures, medications and dressings. After 57 days of hospitalization, the patient was transferred to the Municipal Zoo of São José do Rio Preto - SP, where it was moved to a larger and ideal enclosure for the species, with other giant anteaters also rescued.

Discussion: The rate of complex fractures in accidents with wild animals is high. Amputations are indicated for patients with extensive lacerations without possible reconstructions, the patient in the present study had partial amputation of the limb, and reconstruction was impossible. The amputation technique of choice was disarticulation of the hip, as it is important that the patient does not try to support the limb, to avoid further trauma. The adaptation of animals to amputation is satisfactory, however, it should be noted that these individuals must remain under observation in the postoperative period, must remain confined to small rooms to avoid complications such as hemorrhage, seroma, dehiscence and infection of the surgical wound. The multidisciplinary team specialized in the required areas must be trained for this type of service. Adaptation to the new hospital environment, adaptation without an amputated limb, different food from that found in nature, daily handling for dressings and the movement of people in the sector are precautions that we must have for the success of the treatment. The great challenge for the recovery of traumatized wild patients is capture stress, transport to the operating room, lack of adaptation to the hospital environment and use of protocols that are unsuitable for the species, factors that can compromise the success of the treatment. Amputation can be a viable treatment alternative for fractured giant anteaters, when bone reconstruction is not possible. The amputation was performed successfully, providing another opportunity for this patient and contributing to the preservation of the species.

Keywords: fracture, amputation, *Myrmecophaga tridactyla*, giant anteater.

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INTRODUCTION

Belonging to the Pilosa order and the Myrmecophagidae family, they are divided into three genera. Myrmecophaga, which is represented by the giant anteater (*Myrmecophaga tridactyla*), Tamandua represented by the giant anteater (*Tamandua tetradactyla*) and Cyclopes represented by the anteater (*Cyclopes* spp.) [6,10].

The giant anteater returned to the category of vulnerable by the IUCN / SSC 2014 [5], due to the estimated population reduction, below 30% and being listed in the threatened category in almost all regions. The main reasons for the decrease in the population are: environmental degradation and fragmentation, being run over, burning, attacks by hunting dogs, illegal trade and diseases [10].

Many injuries to wild animals result in bone fractures [3]. The literature reports that comminuted fractures are the most common [4]. The great challenge for the recovery of traumatized wild patients is the stress of capture, transport to the operating room, lack of adaptation to the hospital environment and use of protocols that are inappropriate to the species, factors that can compromise the success of the treatment [2].

Treatment is most often surgical. Amputation is indicated when the prognosis for functional limb return is unfavorable, such as extensive lacerations and when reconstructive surgery is not possible [3]. The amputation technique must be high, so that the animal does not support the stump of the amputated limb. The adaptation of animals to amputation is satisfactory, however, it should be noted that these individuals must remain confined to small rooms, to avoid possible complications such as hemorrhage, seroma, dehiscence and infection [3].

CASE

It was received at the Veterinary Hospital Dr. Halim Atique - UNIRP an young female giant anteater (*M. tridactyla*) weighing 5.75 kg, brought by the Forestry Environmental Police of the municipality of São José do Rio Preto - SP and found in the region of Olímpia at a gas station (Figure 1). The animal showed signs of trauma, possibly due to an agricultural harvester, partial traumatic amputation of the left pelvic limb (Figure 2) and tail (Figure 3).

Ketamine (Dopalen®)¹ was used at a dose of 7 mg/kg IM and midazolam² at a dose of 0.3 mg/kg IM as a chemical containment. After, trichotomy was performed, the cephalic vein was catheterized with a 22 G catheter to perform fluid therapy with lactated ringer

(5 mL/kg/h) and anesthetic maintenance with propofol (Propovan®)³, at a dose of 2.5 mg/kg IV. The temperature measured in the physical examination was 33°C, heart rate of 70 beats per minute (bpm), respiratory rate of 8 movements per minute (mpm) and blood glucose 81 mg/dL. The limb had partial amputation with bone exposure in the distal middle third of the diaphysis of the tibia and left fibula, there was contamination and larvae of *Cochliomyia hominivorax*. The patient's tail was sectioned in the distal portion with bone exposure and a high level of contamination and larvae.

The complementary exams were performed and the values found when compared with references in the literature, we observed thrombocytosis (195,000 μ L, reference value: $31,362 \pm 123,458 \mu$ L), hyperproteinemia (7.2 g/dL, reference value: 0.49 ± 6.23 g/dL), neutrophilia (72%, reference value: $10.34\% \pm 71.50\%$), eosinophilia (11%, reference value: $4.70 \pm 6.67\%$) and monocytopenia (0%, reference value: $2.57 \pm 3.33\%$).

In the cranio-caudal and mediolateral radiographic projections, the absence of a distal third of the tibia, fibula, tarsus, metatarsus, phalanges and corresponding soft tissues was observed. Radiographic examination of the pelvis without changes. Radiographic examination of coccygeal vertebrae in the ventro-dorsal and mediolateral projections showed no evident changes in the remaining vertebrae.

Nursing care included cleaning the wounds on the left pelvic limb and tail with saline solution (0.9% NaCl sodium chloride)⁴ and 2% chlorhexidine (Digliconato de clorexidina)⁵, daily dressings with sugar and ricinus ointment (Ricin®)⁶, sterile gauze, bandages and cover with elastic bandage. Antibiotic therapy performed with cephalothin [Generic cephalothin⁷ - dose of 30 mg/kg, TID, IV]. Analgesia was performed with dipyrone [Dornil®⁸ - dose of 25 mg/kg, TID, SC] and tramadol hydrochloride² [dose of 4 mg/kg, TID, SC]. Ranitidine² [dose of 2 mg/kg TID, SC] was used as gastric protector.

One day after the animal was cared for, the patient was referred to the operating room for an amputation procedure with disarticulation of the affected limb's hip. The patient was induced with ketamine [Dopalen®¹ - dose of 7 mg/kg IM] and midazolam [Generic Midazolam² - dose of 0.3 mg/kg IM] maintained in inhalation anesthesia with isoflurane and in lactated ringer fluid therapy (5 mL/kg/h) with lactated ringer solution in the trans-surgical procedure until full



Figure 1. A female giant anteater, found traumatized, possibly by an agricultural harvester, with a traumatic partial amputation of the left pelvic limb and tail.



Figure 2. Left pelvic limb of a giant anteater partially amputated with bone exposure.



Figure 3. The partially amputated tail of a giant anteater.

recovery. The medications were maintained until the surgical wound was completely healed and the stitches were removed.

The tail was not surgically treated at first, but after eight days a new surgical intervention was necessary



Figura 4. Surgical wound, 12 days after the postoperative amputation of the pelvic limb of a giant anteater.

for resection of the injured vertebrae (Cc29-Cc30) due to the risk of osteomyelitis. The same anesthetic protocol was performed for the partial caudectomy procedure.

The surgical wound of the limb showed good healing in the expected period and the stitches were removed in twelve days (Figure 4). In the surgical wound of the tail, dehiscence of two surgical points occurred and was treated by second intention, the dressings made daily with ricinus ointment (Ricinus®)⁶. After 5 days of resection of the tail, the wound already had an ideal scar tissue.

Daily dressings were suspended and after 57 days of hospitalization the patient was referred to the Municipal Zoo of São José do Rio Preto - SP (Figure 5). Where it lives in a wide and ideal place for the species, with other giant anteaters that were also rescued.



Figure 5. A- Giant anteater patient 30 days after surgery. B- The same patient in the quarantine sector in the Municipal Zoo of São José do Rio Preto, SP, Brazil, 54 days after surgery.

DISCUSSION

The present report corroborates with the literature that describes a high rate of fractures in accidents with wild animals [3], with complex fractures [4]. Amputations in wild animals are indicated for patients with extensive lacerations without possible reconstructions [3], the patient in the present study had partial limb amputation, making reconstruction impossible. The amputation technique of choice was disarticulation of the hip joint as described in the literature, as it is important that the patient does not try to support the limb, to avoid further trauma [3].

The amputated patient must remain confined to small rooms to avoid complications such as dehiscence of stitches, non-adaptation to the amputated limb, inflammatory reactions. Despite the multidisciplinary team specialized in the areas required for this type of care, the age, size, origin, severity and location of the trauma define the therapeutic prognosis [3]. According to the literature, the patient in the present report presented some difficulties with adapting to the new hospitalization environment, adaptation without an amputated limb, different food from that found in nature, daily handling for dressings and the movement of people in the sector, care that we must have for the success of the treatment [2].

In the literature, a deer (*Mazama gouazoubira*) was observed for thirty days with the thoracic limb amputated and the treatment was successful [7]. A maned wolf (*Chrysocyon brachyurus*) had no complications after amputation of the right thoracic limb [1]. The report of the black tufted marmoset (*Callithrix peni-*

cillata) that suffered a thoracic limb amputation due to osteomyelitis complications suggests that success depends on adequate anesthesia and surgery [9]. In the case of the small anteater (*Tamandua tetradactyla*) that suffered partial amputation [8], the authors reported that the procedure contributed to the well-being of the animal and the conservation of the species.

The giant anteater in this report showed good recovery, with good roam and responding to external stimuli, with 57 days of treatment the patient was discharged from the hospital and was sent to the Municipal Zoo of São José do Rio Preto, SP, Brazil.

Amputation can be a viable treatment alternative for fractured giant anteaters, when bone reconstruction is not possible. The amputation was performed successfully, providing another opportunity for this patient and contributing to the preservation of the species.

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