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General anesthesia in an albino python (*Python molurus bivittatus*): A case report.

General anesthesia in albino python (Python molurus bivittatus): Case Report

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Summary

Veterinary medicine, in its wide range of areas of practice, also encompasses a large variety of species. One possible classification includes domestic animals, exotic animals, and wild animals, as well as exotic and wild animals found in zoos.

A male albino python, approximately 23 years old, weighing 27.5 kg and measuring 5.22 m in length, from the Dois Irmãos Park Zoo, presented with a six-month evolution of increased volume in the right chin region after therapeutic treatment with non-steroidal and steroidal anti-inflammatory drugs. It was referred for surgical and anesthetic treatment to remove the neoformation. Frequently, anesthetic and analgesic protocols, as well as the techniques employed and expected reactions in reptilian anesthesia, are derived from events observed and well-studied and described in domestic animals, although this extrapolation is difficult considering all the differences between these classes. Therefore, the chances of prolonged recovery and complications and failures in snake anesthesia are much greater than if everything were properly planned and prepared for these species. The described anesthetic protocol proved to be safe and effective.

Keywords: Anesthetics, Exotics, Reptilians, Analgesics.

Abstract

Veterinary medicine, in its breadth of areas of activity, also includes a wide variety of species addressed. In one of the possible classifications, there are domestic animals, exotic and wild animals, and even exotic and wild animals that are found in zoological parks. An albino python, male, approximately 23 years old, weighing 27.5 kg, and measuring 5.22 m in length, from the Parque Dois Irmãos Zoo, showing an increase in volume in the right mental region with evolution of six months, after therapeutic treatment using non-steroidal and steroidal anti-inflammatory drugs, she was referred for a surgical and anesthetic procedure to remove the neoformation. Often, the anesthetic and analgesic protocols, as well as the techniques used and reactions expected in the anesthesia of reptilians come from events visualized and already well studied and described in domestic animals, although this extrapolation is difficult, taking into account all the differences between these classes. .

As a result, the chances of prolonged recovery and complications and failures in snake anesthesia are much greater than if everything had been properly thought out and prepared for these species. The anesthetic protocol described was safe and effective.

Keywords: Anesthetics, Exotics, Reptilians, Analgesics



1. Introduction

Veterinary medicine, in its wide range of areas of practice, also encompasses a broad spectrum of applications. A variety of species are covered. One possible classification includes domestic animals, Exotic and wild animals, and even exotic and wild animals found in zoos. Human interest in collecting animals is nothing new, as there are records from Egypt dating back more than 5,000 years – as well as from India, China, and Japan – of wild animals kept in captivity. mainly hyenas, monkeys and antelopes (Pires, 2011). In Brazil, zoological parks had It began in 1895 with the Zoobotanical Park of the Museu Paraense Emílio Goeldi, in Belém – PA (Sanjad, 2012; Pires, 2011). Nowadays, these places operate from the point of view of education, research and conservation, as well as educational leisure, play an important role in perpetuation and care of wild and exotic species (Pires, 2011).

Reptiles constitute a very heterogeneous class of animals, with striking differences. within the classification itself. As of August 2020, 11,341 species of reptiles were known. with 3,848 snakes (Uetz; Hosek, 2020).

Snakes belong to the order *Squamata* (which means scaled), and the families of this The suborders most frequently observed in herpetoculture are *Boidae* and *Xenopeltidae*. *Pythonidae*, *Viperidae*, *Lamprophiidae*, *Elapidae*, and *Colubridae*. The *Pythonidae* family encompasses eight genera and 25 species of animals originating from Africa, South Asia, Indoaustralia, and Australia, and which are several of the world's largest snakes (Funk; Jr, 2019).

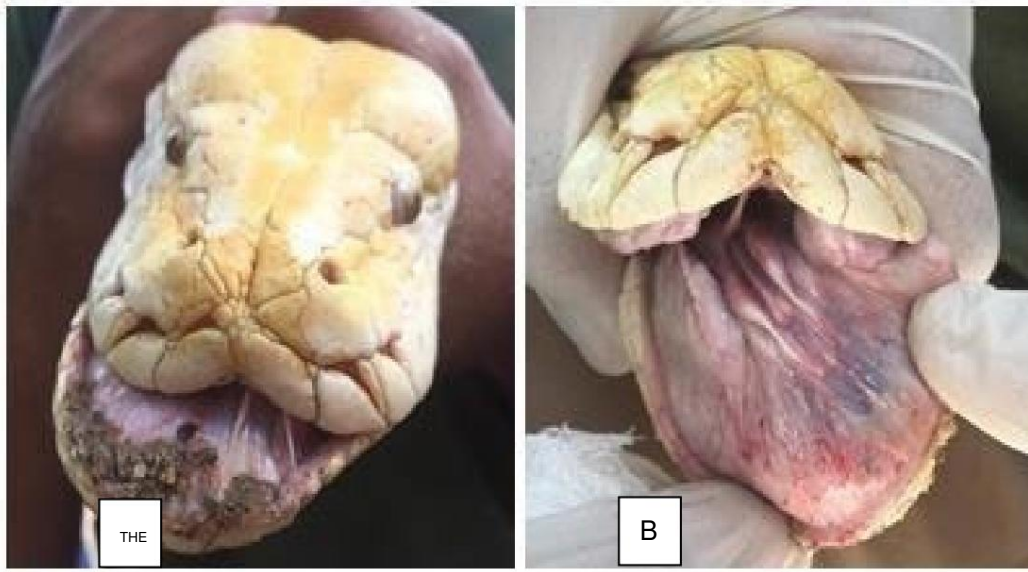
Anesthesia in reptiles has historically posed a challenge for the veterinary anesthesiologist. According to Mans et al. (2019), this is due to three main factors: the vast variety of species (and consequently different sizes, anatomies, physiologies and pharmacological responses) in the class *Reptilia*; the lack of extensive studies in reptiles regarding the effects, dosages, and adverse effects of the main... drugs used; and a persistent stigmatization of this class, resulting in a scarce The number of case reports and scientific articles on anesthesia in these species. Snakes have been... a target of interest, especially in recent years, both for research and for the creation of like pets. And with that, there is a growing need to improve procedures, such as sedation, anesthesia, and analgesia, are becoming increasingly less common. empirical (Carregaro *et al.*, 2009), although there is still much to be studied and discovered.

Therefore, the objective of this work is to report on a general anesthesia procedure in a Albino python (*Python molurus bivittatus*) from the Dois Irmãos Park Zoo for excision of New formation in the right chin region.

An albino male python, approximately 23 years old, weighing 27.5 kg and measuring 5.22 m. of length, originating from the Dois Irmãos Park Zoo, showed an increase of Volume in the right chin region (Figure 1) with an evolution of approximately six months. It was performed Therapeutic treatment using non-steroidal and steroidal anti-inflammatory drugs, but without response. clinical. Therefore, the referral for surgical procedure was made and Anesthetic for the removal of a neoplasm.

Figure 1 – A. Increase in volume in the right chin region of an albino python in November 2019;

B. Clinical-surgical evaluation and palpation of increased volume in the right chin region of an albino python in November 2019.



Source: Personal archive (2019).

The animal underwent a 15-day fasting period prior to surgery, which began as soon as the decision was made. of the case. On the day of the procedure, management began in the morning. Pre-medication Anesthetic (MPA) was administered intramuscularly, under physical restraint (Figure 2), with midazolam 0.5%, at a dose of 1 mg/kg (5.5 mL), ketamine 10%, at a dose of 20 mg/kg (5.5 mL) and butorphanol 1%, at a dose of 1.5 mg/kg (4.1 mL).

Figure 2 – Physical restraint for administering MPA to an albino python via intramuscular injection.



Source: Personal archive (2019).

The animal was transported to the surgical center 15 minutes after the administration of MPA.

To verify adequate sedation, the righting reflex was used, at which point it was noted...

His absence; orotracheal intubation was then performed approximately 30 minutes later, with a

Size 3.5 tube with *cuff*, successfully inserted, followed by maintenance of anesthesia with

Isoflurane in a universal vaporizer and 100% oxygen, via an open anesthetic circuit.

(Baraka or Ayres double T) (Figure 3).

Figure 3 – A. Orotracheal intubation of an albino python; B. Anesthetic maintenance via open circuit (Baraka) in an albino python.



Source: Personal archive (2019).

The animal's anesthetic plane was verified and adequate anesthetic depth was noted.

Local anesthesia was then administered via infiltration at the planned incision site, as indicated by the team.

surgical intervention, using the local anesthetic lidocaine 2%, at a dose of 4 mg/kg (Figure 4).

Figure 4 – Local infiltrative anesthesia with lidocaine in an albino python.



Source: Personal archive (2019).

For monitoring, parameters such as heart rate were used via *Doppler*.
vascular positioned in the ventral region in the topography of the heart, located by means of palpation and observation of precordial shock, and electrocardiogram (Figure 5).

Figure 5 – A. Vascular Doppler positioning in an albino python (arrow); B. Electrocardiogram and vascular *Doppler* in an albino python



Source: Personal archive (2019).

In addition to cardiovascular parameters, respiratory rate was also monitored.
recorded by observing spontaneous or assisted respiratory movements, temperature
Cloacal examination with an infrared thermometer (Figure 6) and response to tail pinching (Figure 7).

Figure 6 – Cloacal temperature measurement with an infrared thermometer in an albino python.



Source: Personal archive (2019).

Figure 7 – Pinch test for evaluating the tail reflex in an albino python.



Source: Personal archive (2019)

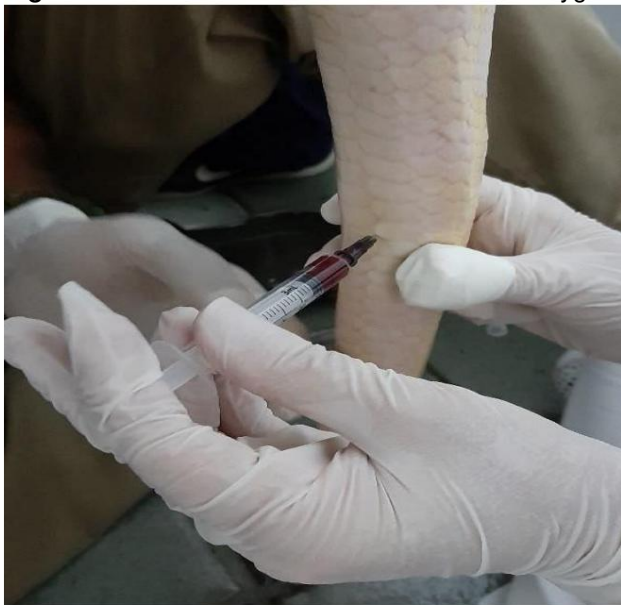
To maintain its body temperature, the snake was placed on thermal mats.

Throughout the procedure, the animal remained breathless and received assisted ventilation. six respiratory movements per minute (6 bpm). The parameters were observed and monitored. constantly, and recorded every 15 minutes. The time and values of each parameter can be observed in Table 1.

During the procedure, blood was collected from the animal for subsequent hematological analysis. through puncture of the caudal coccygeal vein (Figure 8), the results of which are found in the Tables.

2 and 3.

Figure 8 – Blood collection from the caudal coccygeal vein in an albino python.



Source: Personal archive (2019)

The surgical procedure lasted 1 hour and 37 minutes, without complications, being Removal of the salivary gland closest to the neoplasm was performed (Figure 9).

During the immediate post-anesthetic period, the animal was kept intubated, still under... Assisted ventilation (Figure 10) was administered until spontaneous breathing movements returned, which It lasted about two hours after the isoflurane supply ceased.

Figure 9 – Salivary gland removed along with neof ormation in an albino python.



Source: Personal archive (2019).

Figure 10 – Immediate post-anesthetic state of an albino python



Source: Personal archive (2019).

The patient was monitored seven hours after the end of the surgical procedure. because it was an animal belonging to the zoo. The following day, the snake was still there. under the effect of anesthetics and was placed in the sun to maintain the temperature (Figure 11).

Figure 11 – Albino python placed in the sun 48 hours after anesthetic procedure.



Source: Dois Irmãos Park Zoo (2019).

After 48 hours the animal demonstrated full anesthetic recovery, presenting a The animal exhibited skittish behavior during handling. Post-operative care continued with the administration of meloxicam. 2% (0.4 mL, intramuscularly), for four days, and surgical wound management performed with chlorhexidine and ointment containing gentamicin, sulfadiazine, sulfanilamide, urea and vitamin A. daily, for a period of 10 days, with the wound healing without incident.

Twenty-four days after the surgery, the snake fed without difficulty, and the The patient's progress continued without incident, and they were discharged 70 days after the procedure. The procedure was followed when the animal returned to its exhibition enclosure.

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The excised material was sent for histopathological examination, which was performed in the laboratory of histology from the Department of Animal Morphology and Physiology at UFRPE and histopathological examination, with a diagnosis of fibrosarcoma.

Ten months after the surgical procedure, a new increase in volume was observed in the area. right chin, in the same location as the surgery (Figure 12).

Figure 12 – Increased volume in the right chin region of an albino python in January 2021.



Source: Dois Irmãos Park Zoo (2021).

3. Discussion

Frequently, the anesthetic and analgesic protocols, as well as the techniques employed. The expected reactions to reptilian anesthesia stem from the events visualized and already well understood. studied and described in domestic animals, although this extrapolation is difficult, taking into account considering all the differences between these classes (Mosley, 2005; Baron, 2013; Bertelsen, 2014; (Mans *et al.*, 2019). Therefore, the chances of prolonged recovery and complications are increased. Failures in snake anesthesia are much greater than if everything were properly planned and prepared for these species. Furthermore, snakes are animals surrounded by prejudice. Mysticism and stigmatization are much easier to manage, especially for the vast majority of doctors. veterinarians adopt an empathetic stance reflected in a more diligent anesthetic protocol and analgesic in domestic species, more so than in reptiles – especially when it comes to snakes, although there is ample evidence that these animals are capable of feeling pain (Longley, 2008; James *et al.*, 2017; Mosley; Mosley, 2015; Sladky; Mans, 2019). Added to this is the enormous variety of species in this order and their particularities.



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The patient's anesthesia took place in the morning, corroborating what Mosley (2015)

It recommends this, since procedures performed early in the day allow for the restoration of animals predisposed to prolonged recovery periods, such as snakes.

Anesthetic protocols for reptiles are becoming less and less empirical (Carregaro *et al.*, 2009). and more specific to each patient and procedure, as observed in the report, in which was used multimodal anesthesia, in line with what Perez and Nevarez (2017) report on the importance this approach aims to ensure pain control, reduced drug dosage, and greater stability. hemodynamics.

Although Greene (2004) and Longley (2008) suggest fasting periods of at least 72–96 hours prior to elective procedures, the snake's last feeding occurred 15 days before the procedure. anesthetic procedure, due to its size, eating habits and management practices at the zoo.

Ketamine, a drug widely used for restraining snakes (Kurniawan; Govendan, 2001; Read, 2004; Longley, 2008; Bertelsen, 2014; Schuszler *et al.*, 2018; Mans *et al.*, 2019), was administered in combination with a benzodiazepine and an opioid, as recommended in the literature. (Bennett, 1998; Mans *et al.*, 2019), and this combination provided adequate sedation for transport. from the animal to the operating table, as well as its preparation, from positioning to intubation and Positioning of the monitoring equipment. The first reflex to be monitored was that of straightening, which was absent 15 minutes after MPA administration, corroborating with Bennett (1991), Greene (2004), Bertelsen (2014) and Grego *et al.* (2014).

Oxygen consumption in reptiles is lower than in other species, and the stimulus for Snake respiration is closely related to low oxygen concentrations (Longley, (2008), this fact may justify the state of apnea demonstrated by the patient during the procedure. Anesthetic, since 100% oxygen supplementation was provided; However, to ensure the For safety reasons, the animal was kept under assisted ventilation, as recommended by Longley (2008). Bertelsen (2014) and Grego *et al.* (2014).

The other monitoring parameters remained within the normal range for the species. with absence of tongue reflex and response to tail pinching, as is expected in planes surgical anesthetics, according to Bennett (1991), Greene (2004), Bertelsen (2014) and Grego *et al.* (2014), although the temperature remained between 33.9 – 35.2°C, being slightly above what is described by Longley (2008) as being the ideal temperature in pythons (25 – 30°C).

Heart rate measured using *Doppler* ultrasound positioned over the heart.

It differed in almost all measurements from that presented by the electrocardiogram. This may be due to the positioning of the electrodes (Kik; Mitchell, 2005; Baron, 2013), to the fact that the animal is finding the skin in ecdysis at the time hinders the placement of electrodes on the scales, and also to Electrical interference from the thermal mats covering the snake's entire body, in addition to manipulation.



surgical.

Regarding recovery time, Bertelsen (2014) reports that the use of 15 mg/kg Ketamine treatment results in a recovery period of approximately 6–24 hours. In the reported case, 10 mg/kg was used. However, it took 48 hours for a full recovery; this fact may be correlated with the association, along with other drugs used in pre-anesthetic medication, in addition to the animal's more advanced age, which results in a slower metabolism compared to younger animals.

As recommended by the literature, the animal was exposed to sunlight, since, due to due to the species' inherent ectothermic nature, it obtains heat from external sources (Mosley, 2005; Longley, 2008). The animal should be kept within its ideal temperature for a faster recovery. (Baron, 2013), since the anesthetic recovery period in snakes is directly influenced by body temperature, which can be prolonged or accelerated (Carregaro *et al.*, 2009; Bertelsen, 2014).

There are reports of neoplasms in virtually all snake systems, with the major cause being... Most findings are from necropsy (Grego *et al.*, 2014). In the case of the snake in the report, because it is a Neoplasia in the external region of the oral cavity; it was possible to visualize the alteration and plan a Surgical intervention. Cutaneous and oral fibrosarcomas are described in reptiles, and are prevalent in lizards, turtles, and snakes (Garner *et al.*, 2004), which corroborates the histopathological report of Fibrosarcoma obtained after removal of the neoplasm.

4. Final Considerations

The anesthetic protocol described proved to be safe and effective. The snake remained stable throughout the entire procedure, without signs of pain, with complete anesthetic recovery from the inside of the The expected period was uneventful. However, further studies in anesthesia are needed. snakes of this and other species, so that more safe protocols can be reported and suggested. with a diversity of drugs and doses, thus expanding anesthesia in snakes.

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