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Surgery

Functional Recovery of A Spotted Deer (Axis Axis) From Unilateral Multiple Limb Compound Fractures with Management of Capture Myopathy Syndrome: A Case Report

Sridhar Kanniappan[1*] and Aparna Gopinadhan[1]

(1) Arignar Anna Zoological Park, Vandalur, Chennai- 600048, Tamil Nadu, India.

[*]Corresponding Author: dr.srivet@gmail.com *Received: 14/9/2023 Accepted: 4/12/2023*

ABSTRACT

Spotted deer (Axis axis) are terrestrial animals found in the Indian subcontinent, which are listed under least concern in IUCN and are under Schedule III of Wildlife Protection Act of India 1972. A large population of spotted deer are found in Guindy National Park, which is located in the middle of Chennai city, making them highly vulnerable to automobile accidents. A spotted deer with compound comminuted fracture of the left radius and ulna and compound complete distal physeal fracture of the left metatarsus due to road trauma is rescued and treated by appropriate capture myopathy syndrome preventive measures by combination chemical and physical restraint while handling and fracture immobilization with gutter splint with window for wound dressing. The wounds on the fracture sight were treated regularly and two days interval with disturbing the fracture immobilization by external coaptation technique. The animal recovered uneventfully and was released back in to wild after rehabilitation.

Key words: Capture myopathy, Compound fractures, External co-optation technique, Multiple fractures, and Spotted deer

INTRODUCTION

Guindy National Park is a home for a large population of Spotted Deer (*Axis axis*). As the National Park is located in the heart of Chennai city, the deer are more vulnerable to automobile accidents, which in turn can lead to fractures of the long bones. Capture, restraint and transportation of these animals, will initiate a cascade of events leading to a complex condition, termed as capture myopathy (Dinesh et al., 2020; Montané et al., 2002). Clinical signs of capture myopathy may be noticed from the day of triggering event to several weeks later. Cases with severe clinical signs, could succumb within 30 days (Dechen Quinn et al., 2014; HO et al., 2010). The onset of capture myopathy and its prognosis are affected by species, age, sex, physiological status, environment and capture- related factors (Dinesh et al., 2020; Jessica, 2007). This case report will discuss about a spotted deer with multiple limb compound comminuted fracture treated with simple external co-optation technique could lead to successful recovery when it is approached scientifically considering the factor of predisposition of the species to capture myopathy syndrome.

MATERIAL AND METHODS

Case history and observation

A female, Spotted deer fawn, met with an automobile accident near Guindy National

Park, and was presented to Arignar Anna Zoological Park, Zoo Veterinary Hospital. On observation, it was in sternal recumbency but active and alert.

Figure 1. Orthopaedic examination revealed compound comminuted fracture of the left radius and ulna and compound complete distal physeal fracture of the left metatarsus.

RESULTS

Treatment

The deer was sedated using midazolam (Neon Laboratories Ltd., Mumbai, Maharashtra-400 093, India; 0.2 mg/kg IM, PRN) (Miller and Fowler, 2012) before transportation. It was blindfolded and ears were plugged with cotton during transport to the hospital (Beringer *et al.,* 1996; Jon, 2000; Ashraf, 2001; Montané *et al*., 2002; Arnemo *et al*., 2007; Todd, 2007). After arrival, at the hospital midazolam (Neon Laboratories Ltd., 0.2 mg/kg IV, PRN) and butorphanol (Neon Laboratories Ltd.; 0.2 mg/kg IV, PRN) (Miller and Fowler, 2012) were administered. The deer allowed to be handled without struggling after seven minutes, xylazine (Indian Immunologicals Ltd., Siddipet, Telangana- 502281, India; 1 mg/kg IM, PRN) (Sontakke *et al*., 2007) was given after placing the animal on the operation table. After three minutes, the animal attained chin drop posture and was then positioned to lateral recumbency.

Figure 2 (A, B, C, and **D).** On radiography, comminuted fracture of the left radius-ulna and compound complete distal physeal fracture of the left metatarsus was confirmed.

The wounds over the fracture site of both limbs were flushed using normal saline (Aculife Healthcare Pvt. Ltd., Sanchana, Gujarat- 382150, India, PRN). The radius and ulnar fracture were reduced by traction and was stabilized using a PVC gutter splint placed along the caudal aspect from the elbow to hoof. The fracture fragments of the metatarsus were reduced and was stabilized using a PVC gutter splint from the hock joint till the hoof on the caudal aspect as the wound was on cranio-medial aspect (Figure 6). On both the limbs, bandaging was done with a window over the wound for regular flushing (Figure 7). The deer was administered ringers lactate (Aculife Healthcare Pvt. Ltd. ; 10 mL/kg IV, PRN), ceftrioxone sodium (InnovaCaptab Ltd.,

Solan, Himachal Pradesh- 173205, India; 30 mg/kg IV,q24h) enrofloxacin (Virbac Animal Health India Pvt. Ltd., Mumbai, Maharashtra- 400066, India; 7.5 mg/kg SC, q72h), meloxicam (Intas Pharmaceuticals Ltd., Ahmedabad, Gujarat- 382210, India; 0.2 mg/kg IV, q24h), buprenorphine (Neon Laboratories Ltd.; 0.02 mg/kg SC, q24h) and ivermectin (Virbac Animal Health India Pvt. Ltd.; 0.2 mg/kg SC, PRN).

Figure 3 (A, B, and **C).** Soon after the procedure, the deer was kept in sling support until complete recovery.

Post operatively, without disturbing the external coaptation splint bandage, the wound alone was flushed and bandaged with Bactigras™ (Smith & Nephew Healthcare Pvt. Ltd., Mumbai, Maharashtra- 400059, India, q48h) once in two days. The animal started bearing weight on the hindlimb on the next day and on the forelimb on the seventh day of procedure (Figure 9). Midazolam (Neon Laboratories Ltd.; 0.2 mg/kg IM, PRN) was administered as an anxiolytic, and the animal was blindfolded prior to each dressing. On 65th day, the wounds had healed and radiographs were taken which revealed bridging callus formation. The deer was then released into a fenced open yard of Guindy National Park (Figure 10 -13). It was fed with green fodder and concentrate ration supplemented with mineral mixture. Concentrates were gradually tapered to acclimatize it for grazing in the wild.

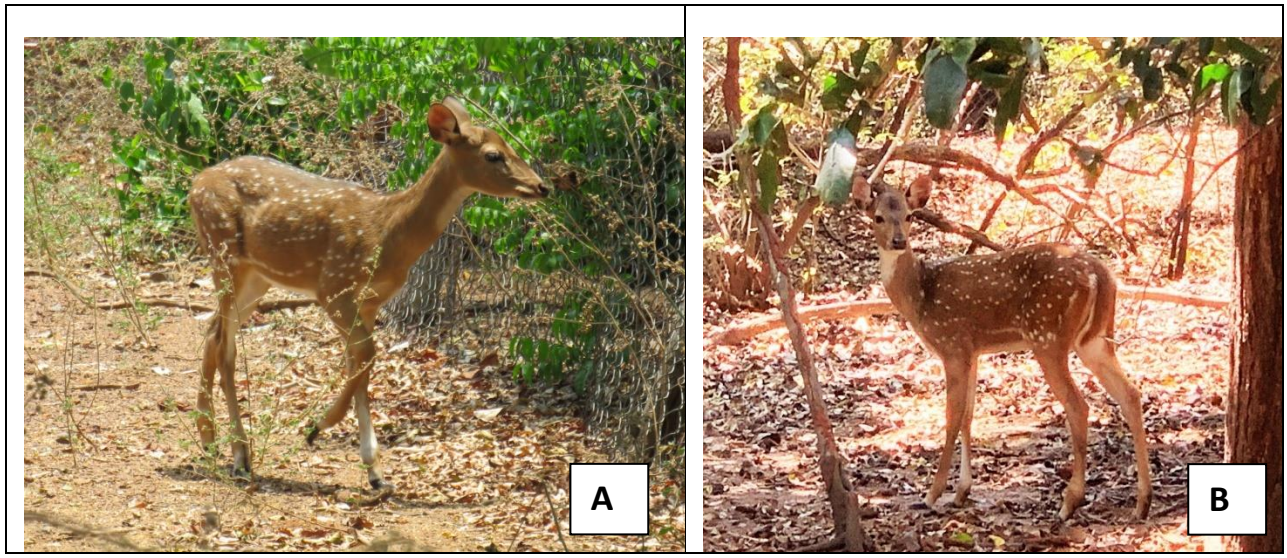

Figure 4 (A and **B).** After rehabilitation, the deer was released into Guindy National Park.

DISCUSSION

Capture myopathy, otherwise called as exertional rhabdomyolysis is a complex syndrome common in wild animals, particularly in ungulates (Bartsch et al. 1977; Jessica, 2007). The stress due to capture and exertion will lead to a cascade of events which result in myocellular necrosis of skeletal and cardiac muscles and renal failure due to myoglobinemia (Breed et al., 2019; HO et al., 2010). They can be presented with hyper-acute shock syndrome, acute ataxic myoglobinuric syndrome, ruptured muscle syndrome, and chronic debility or delayed per-acute syndrome [HO et al., 2010). Use of appropriate chemical immobilization drugs at optimal doses and apropos capture techniques, would help to reduce the probability of occurrence and severity of capture myopathy. Reducing the chase speed and capture time to less than two minutes, sedating animals, providing rest during transport, minimizing sensory perception to sound and light to minimize fear, and avoiding physical contact with the animal, would reduce mortality [HO et al., 2010; Jessica, 2007; Ray, 2007).

Captured animals should be blindfolded, ear plugged, positioned to get optimum ventilation with minimal human contact, and

treated for shock, dehydration and myoglubinuria as per the clinical assessment (Beringer et al., 1996; Ashraf, 2001; Montané, et al., 2002; Jon et al., 2007; Todd, 2007). Being an automobile accident case, opting an ideal capture environment was not possible. Since the deer was non-ambulatory and had compound fractures unilaterally in two limbs, transporting the animal under sedation was beneficial as it suppressed voluntary movement and prevented further complications.

It was observed that most of the fractures in young animals and adults were seen in long bones. Metacarpals and metatarsals were more prone to compound fractures due to limited amount of soft tissue supporting it (Ayaz, 2000; HO et al., 2010). Compound fractures require daily dressing to improve wound healing and hence, use of anxiolytics and sedatives for reduction of stress while handling, play a major role in wild animal treatment. Midazolam was used for anxiolysis as it had an advantage over other benzodiazepines, with long half-life and water solubility, and permits intramuscular use (Plumb, 2008). It has been reported that external coaptation in the treatment of compound fractures of metacarpal and metatarsal is a feasible method (Tulleners, 1996; Velavan et al., 2014). Immobilizing the fracture by an external coaptation technique with PVC gutter splint and a dressing window in the bandage was done in this deer, which aided in complete healing of fracture and recovery.

CONCLUSION

Anxiolysis, appropriate handling, an external coaptation technique with a provision for regular dressing of wounds in case of compound comminuted fracture, lead to the healing and successful recovery of the deer, providing it another chance for a life in the wild.

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Director, Arignar Anna Zoological Park, Chennai-600048, India

Wildlife Warden, Wildlife division, Chennai-600022, India

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