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VA Patel

Postgraduate Institute of Veterinary Education & Research (PGIVER) Kamdhenu University, Rajpur (Nava), Himmatnagar, Gujarat, India

PJ Gajjar

Postgraduate Institute of Veterinary Education & Research (PGIVER) Kamdhenu University, Rajpur (Nava), Himmatnagar, Gujarat, India

CM Bhadesiya

Postgraduate Institute of Veterinary Education & Research (PGIVER) Kamdhenu University, Rajpur (Nava), Himmatnagar, Gujarat, India

GR Chaudhary

Postgraduate Institute of Veterinary Education & Research (PGIVER) Kamdhenu University, Rajpur (Nava), Himmatnagar, Gujarat, India

TP Patel

Postgraduate Institute of Veterinary Education & Research (PGIVER) Kamdhenu University, Rajpur (Nava), Himmatnagar, Gujarat, India

LM Sorathiya

Postgraduate Institute of Veterinary Education & Research (PGIVER) Kamdhenu University, Rajpur (Nava), Himmatnagar, Gujarat, India

MJ Anikar

Postgraduate Institute of Veterinary Education & Research (PGIVER) Kamdhenu University, Rajpur (Nava), Himmatnagar, Gujarat, India

Corresponding Author:

CM Bhadesiya

Postgraduate Institute of Veterinary Education & Research (PGIVER) Kamdhenu University, Rajpur (Nava), Himmatnagar, Gujarat, India

Therapeutic management of balanitis in an Indian palm squirrel (*Funambulus palmarum*; Linnaeus, 1766)

VA Patel, PJ Gajjar, CM Bhadesiya, GR Chaudhary, TP Patel, LM Sorathiya and MJ Anikar

Abstract

The Indian palm squirrel (*Funambulus palmarum*; Linnaeus, 1766), a rodent commonly found in India, can suffer from various disease conditions. Neither the prevalence nor the therapeutic aspects of diseases in this species have been studied extensively. A case of a male Indian palm squirrel was reported to Veterinary Hospital, Postgraduate Institute of Veterinary Education & Research (PGIVER), Himmatnagar, and Gujarat with a history of swollen penis protruding from the prepuce. The condition was identified as balanitis. Clinical symptoms included paraphimosis, stranguria, frequent licking and suckling of affected area. Therapeutic approach included topical application of *Aloe vera* and oral administration of meloxicam. The treatment resulted in complete clinical recovery on 14th day post-treatment. The present paper elaborates clinical signs, restraint and therapeutic management of balanitis in an Indian palm squirrel by using combination of a herbal plant and a commonly available anti-inflammatory drug.

Keywords: Indian palm squirrel, Balanitis, treatment, *aloe vera*, meloxicam

Introduction

The Indian palm squirrel (*Funambulus palmarum*; Linnaeus, 1766) or Three-striped palm squirrel is a commonly found rodent in India. It is considered as a sacred species in India because of its depiction in a legend on Lord Rama. This happens to be one of the reasons why the Indian palm squirrel is not harmed by people. It is not covered under the threatened category of the International Union for Conservation of Nature (IUCN) which could be due to large population and distribution range, adaptation for survival in different geographical areas, lesser threats etc.

The species is prone to develop diseases which are caused by infectious or non-infectious etiological factors. Extensive studies on disease conditions affecting Indian palm squirrel are not carried out in India. Moreover, there is no established drug formulary or recommendation on dose rate of veterinary drugs to be used in the Indian palm squirrel. The present paper describes clinical management of balanitis in a male Indian palm squirrel. Topical application of commonly available *Aloe vera* plant along with oral administration of meloxicam was used for treatment. The present case study highlights different aspects of balanitis in the Indian palm squirrel and therapeutic considerations for successful clinical outcome.

Case History and Observations

A case of a male Indian Palm Squirrel was reported to Veterinary Hospital functioning under Postgraduate Institute of Veterinary Education & Research (PGIVER), Kamdhenu University, Rajpur (Nava), Himmatnagar, Gujarat with a history of swollen penis protruding from the prepuce (Figure-1). Reportedly, the squirrel was straining while urination and was unable to retract the penis inside the prepuce. History did not involve any other specific details.

Later, the squirrel was restrained physically by use of clean soft gloves. The condition was identified as balanitis (Figure-2). Clinical signs such as paraphimosis, frequent licking and suckling at the affected area and stranguria were also observed. Sepsis/bacterial infection, bleeding from tissue and hematuria were not observed. Feed intake, defecation and general physical activity were not affected by the condition.



Fig 1: Paraphimosis in a male Indian palm squirrel (Day-1)



Fig 3: Use of collar to prevent frequent licking



Fig 2: Balanitis

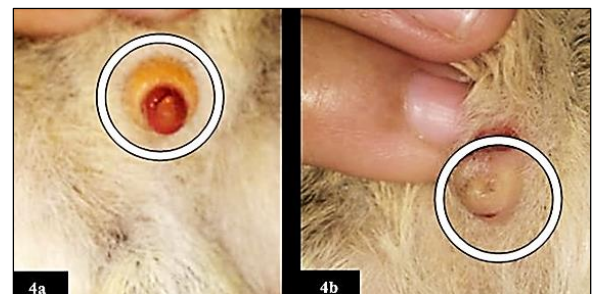


Fig 4: (4a) Gradual improvement-Day-4; (4b) Recovery on 14th day post-treatment

Treatment and Discussion

The exposed penile tissues of the Indian palm squirrel were flushed with sterile fluid (normal saline) initially to remove dirt, debris, hairs and saliva. A combination of *Aloe vera* (topical) and meloxicam (oral) was used for treatment. *Aloe vera* extract was applied on external aspect of affected penile tissue while oral suspension of meloxicam (Melonex, Intas Pharmaceuticals Ltd., Ahmedabad) was administered at dosage of one small drop-three times a day for five consecutive days. The topical application of *Aloe vera* was continued until recovery. A collar was also prepared on daily basis and applied around the neck to prevent licking (Figure-3). The Indian palm squirrel was not administered with antibiotics to avoid possible side effects or resistance. Gradual improvement in condition was observed from 4th day post-treatment (Figure-4a). The squirrel showed uneventful recovery on 14th day of treatment (Figure-4b). Clinical recovery was evident with normal urination and disappearance of paraphimosis.

Balanitis is an inflammation of the glans or head of the penis in animals which can develop either due to infectious etiology (e.g., bacterial, viral, fungal, parasitic etc.) or non-infectious causes (e.g., poor hygiene, frequent contact with external surfaces, vices, chronic paraphimosis etc.). Pain, irritation, frequent licking, suckling, redness, presence of foul-smelling discharge due to sepsis etc. are common clinical manifestations depending on the severity of case. Simple cases of balanitis are known to recover with topical treatment only; however, treatment regimen must include use of antibiotic in septic balanitis. Cases of chronic balanitis may also show excessive swelling of the glans penis which causes difficulty in retraction of penis inside prepuce (*i.e.*, paraphimosis). The penile tissues in the present case did not show sepsis or bleeding. Hence, use of antibiotic and hemostatic products was not desirable.

Different steroidal (e.g., dexamethasone etc.) and non-steroidal anti-inflammatory drugs (NSAIDs; e.g., meloxicam, diclofenac, carprofen etc.) are used to treat inflammatory conditions in animals on regular basis. Meloxicam is widely used by veterinary practitioners in India to treat inflammatory conditions in domestic and wild animals. It is an NSAID which acts by blocking cyclooxygenase-2 (COX-2). It is available in bolus, oral suspension and injectable forms for veterinary use. Meloxicam provides desired results when used at standard dose rate. Literature suggests that meloxicam can be used for pain management in rodent^[1]; however, there is no evidence on exact dose rate in squirrels to the best of our knowledge. Moreover, it is also documented to have side

effects on gastrointestinal tissues such as bleeding and ulceration. Therefore, treatment approach was diverted towards topical use of commonly available plant *Aloe vera* along with oral meloxicam.

Aloe vera is a commonly available medicinal plant. It is known to have various elements such as vitamins (*i.e.*, A, C and E), eight different types of enzymes, minerals (such as Ca, P, Cu, Se, Mg etc.), carbohydrates/sugars, fatty acids etc. which are useful for different ailments [2, 3, 4]. Topical application of *Aloe vera* provides moisturizing effect [5] and protection against radiation [6]. Presence of anti-inflammatory C-glucosyl chromone [7] in *Aloe vera* makes the plant useful to treat inflammatory conditions while glucomannan can cause increase in collagen formation and wound healing after topical application [8,9]. These characteristics of *Aloe vera* could be the reason behind gradual reduction of inflammation and complete healing of the penile tissues. Surjushe *et al.* (2008) [2] documented redness, burning sensation, stinging sensation and dermatitis (rare) as possible side effects of topical application of *Aloe vera*. However, the Indian palm squirrel did not show any side effects in the present case.

In the present case, the combination of *Aloe vera* and meloxicam resulted in successful clinical recovery on 14th day post-treatment. This observation directs veterinarians, academicians and researchers to evaluate therapeutic effects of *Aloe vera* for treatment of inflammatory conditions in Indian palm squirrel.

Conclusion

Successful therapeutic management of balanitis in an Indian palm squirrel is documented.

Use of a combination of *Aloe vera* (topical) and meloxicam (oral) proved to be an effective therapeutic approach for successful clinical outcome. Documentation on clinical signs, diagnosis and treatment of clinical diseases affecting the Indian palm squirrels should be encouraged to generate database for future research.

Conflict of Interest

Authors declare no conflict of interest with special regards to funding.

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