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Medicinal management of corneal opacity in free ranging rhesus macaques (*Macaca mulatta*) of Shivalik hills in Western Himalayas, Northern India

V. Kumar¹ and V. Sankhyan^{2,*}

¹Monkey Sterilization Centre Forest Division Hamirpur, HP, India, 177001

²Department of Animal Breeding Genetics CSKHPKV, Palampur HP, India, 176062

Abstract

Corneal opacification was diagnosed in 17 free ranging rhesus macaques during detailed ophthalmic examination as a part of clinical health examination, at the monkey rescue sterilization centre in Hamirpur Himachal Pradesh, India. The cornea was completely opaque permitting only a little vision with respect to the affected eye. Medical management with topical ciprofloxacin and prednisolone along with ketoprofen and vitamin A was instituted. The corneal lesions subsided completely within one week following treatment. The treatment protocol successfully eliminated the discomfort and intraocular lesions with no serious subsequent irritation due to the treatment in these animals.

Keywords: Corneal opacity, Ophthalmic disorder, Rhesus macaque, Shivalik hills.

Introduction

Naturally occurring ophthalmic diseases are common in free ranging non-human primates but are rarely reported. The cornea is the transparent structure at the front of the globe. It provides a pathway for light to enter the front part of the eye in order to reach the retina, playing an integral part of the refractive power of the eye. Corneal opacification occurs when the cornea becomes scarred which subsequently prevents light from passing through the cornea to the retina and may cause the cornea to appear white or clouded. Various factors such as increasing age, exposure to ultraviolet light, trauma, atopic dermatitis, diabetes and genetics are thought to be associated with ocular opacities (Seth *et al.*, 2001; Asbell *et al.*, 2005; Ajitkumar *et al.*, 2010). Corneal opacity attributed to poor management of commonly occurring injuries like external trauma, foreign bodies and parasites have been documented previously (Pratap *et al.*, 2003). We present here a set of interesting clinical cases involving corneal opacities in free ranging rhesus macaques (*Macaca mulatta*) and their successful medical management. Based on our literature review, there has been no published report of corneal opacity treated with medicines in free ranging rhesus macaques.

Materials and Methods

A total of 17 cases (11 females and 6 males) were identified to be suffering from corneal opacification during the ophthalmic examination of the 59 free ranging rhesus macaques captured from highways, temples and villages around Hamirpur, Himachal Pradesh, India. Detailed ophthalmic examination of both eyes was performed with a direct ophthalmoscope in all the animals as a part of clinical health examination, under sedation with xylazine

HCl (Ilium Xylazil[®]) and ketamine HCl (Ketamil[®], TROY LABORATORIES PTY LTD, Australia) at the Monkey Sterilization Centre Hamirpur. After careful examination and based on clinical history of the cases; it was decided to initiate medical therapy to treat the corneal opacities in these macaques. The animals were treated with topical instillation of ciprofloxacin eye drops (Ciplox[®], Cipla Ltd. India), prednisolone acetate eye drops (Pred Forte[®], Allergan India Pvt. Ltd.) and intramuscular injection of ketoprofen (KETOP[®], Alembic Pharma Ltd.) at 1 mg/kg, daily for 7-10 days along with a single dose of ivermectin 0.1 ml (PARID[®], Vetsfarma Ltd.) subcutaneous, under sedation with xylazine (0.5 mg/kg) and ketamine (1 mg/Kg). Also 2 ml of vitamin A [600,000 IU], (vitamin A[®], Virbac Animal Health India Pvt. Ltd.) intramuscular injection, on alternate day was given to all cases.

Results and Discussion

In the present clinical cases, the identification of the disease condition was followed by successful treatment by medical therapy. The corneal opacity encountered in all cases was unilateral and the cornea was completely opaque permitting a little vision with respect to the affected eye (Fig. 1). In 5 cases, the right eye contained an opacity which seemingly involved one-third of the cornea. The opacity appeared as originating from the medial angle of the eye but not sufficiently extending to obliterate vision in the eye. The left eye however was normal and transparent. No other abnormality was detected in either eye. Physiological parameters on an average were normal [heart rate (82±5/min), respiration rate (36±3/min) and rectal temperature (100.8±0.5°F)] and there were no signs of lacrimation or ocular discharges. After one week to 10 days of treatment the opacity had almost completely disappeared. After

*Corresponding Author: Varun Sankhyan, Department of Animal Breeding Genetics CSKHPKV, Palampur HP, India, 176062.
Tel.: +91-1894-230321. E-mail: sankhyan@gmail.com



Fig. 1. Ophthalmic examination showing corneal opacity.

12 days, recession of the opacity was complete with no subsequent irritation effects noted. Subsequent observations have revealed no return of the growth or any abnormality as a result of the treatment. The macaques recovered uneventfully as the corneal opacity subsided gradually and the cornea regained transparency and vision. In these macaques the corneal opacity observed can be assumed due to lens induced uveitis or due to corneal trauma in all the cases. Existing literature suggested preferring conservative therapy for lens induced uveitis to surgical treatment (Nicholas, 1991). Thus, the aim of the treatment was to provide relief from pain, shorten the duration of disease, preventing the progression to loss of vision and to restoring a clear vision.

The eye is an extremely delicate organ with an ample sensory nerve supply. This is especially evident in the cornea, in which a network of sensory nerves is located at a very superficial level (Williams *et al.*, 2002). The cases responded well to the topical treatment with ciprofloxacin, topical prednisolone and use of a preferred COX-2 inhibitor (ketoprofen) parentally in the present cases made the animals more comfortable. No irritation effect was noticed to be caused by the treatment except the momentary release of tears immediately following medication. Complete resorption of the corneal opacity was seen following one week of treatment. This is in agreement with the earlier studies (Buchoo *et al.*, 2005; Jaiswal *et al.*, 2006) where they found complete corneal transparency in 15-18 days.

In summary, a nonsurgical treatment of opacities of the cornea of the eye in free ranging rhesus macaques is reported. Significant results observed that includes a complete recession of the opacity, no serious subsequent irritation due to the treatment and most importantly, no

observable tendency for the opacity to re-occur. There may be some species-specific variation or there could be a possible role of the medicinal therapy for the early resorption of corneal opacity in these animals. This must be investigated further. To our knowledge, this is the first report of corneal opacity in free ranging rhesus macaques which was successfully treated with medicinal therapy.

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