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Needle paracentesis technique for surgical extraction of eye worm from an anterior chamber of Marwari horse

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Abstract
A 5-year-old female Marwari horse was diagnosed with an eye condition. During the initial examination, the left eye was diagnosed with severe uveitis, which included hypopyon. In addition, a live parasite around 3 cm long was observed squirming in the left eye. A modified needle aspiration approach was used to extract the live eye worm from the eye's anterior chamber. Within one month, the patient was fully healed with no postoperative problems. This improved needle aspiration approach could be an efficient way to get rid of eye worms in horses.

Keywords: Equine, eye worm, setaria digitata, needle paracentesis

Introduction
Setaria digitata, and Setaria equina, Thelazia lacrymalis are frequently responsible for corneal opacity in cases of equine ocular setariosis in India (Sathu, 1974; Ladoucer and Kazacos, 1981; Parrah *et al.*, 2004) [12, 7, 8]. Asia is the primary host region for S. digitata, a parasite of cattle and other hoofed mammals. Horses and other equines are infected with S. equina globally. Adult Setaria worms usually prefer to live in the peritoneal cavity. They can occasionally enter the central nervous system or the eyes, Microfilariae (immature larvae) exist in the blood (Yadav *et al.* 2006) [18]. Mosquitoes (*Anopheles peditaneniatus* and *Culex nilgiricus*) transmit the parasite into the bloodstream. Adult female worms release microfilariae in their hosts' abdominal cavities. Microfilariae enter the bloodstream and travel to the skin's capillaries. Mosquitoes become infected with microfilariae after feeding on infected hosts. Microfilariae develop into infective larvae inside mosquitos in 2-3 weeks. Through blood feeding, infected mosquitoes spread infectious larvae to vulnerable hosts. Since mosquito vectors are most active in the summer and fall, ocular setariasis is more common during these seasons (Al-Azawi *et al.*, 2012) [1].

The parasite migrates and can be detected in many organs including the heart, lungs, spleen, kidney, uterus, oviduct, ovary, and urinary bladder in odd hosts such as horses, donkeys, and humans. Equines are more susceptible to ocular worms (Jayakumar *et al.*, 2012) [6]. The young worm can also enter the eye through the vascular system (Tuntivanich *et al.*, 2011; Townsend, 2013) [16, 15]. The eye infection occurs when the adult worm invades through intraocular tissue, thus it is also called an eye worm.

Worm movement in the eye's anterior chamber (AC) can irritate the corneal endothelium, leading to symptoms such as lacrimation, photophobia, corneal opacity, conjunctivitis (Patil *et al.*, 2012) [10] and even vision loss; Gopinathan *et al.*, 2013) [5]. Dead filarial worms attached to the endothelium in the anterior chamber can induce corneal edoema. The deceased worm may release toxins into the anterior chamber, causing endothelial damage and corneal oedema. This can result in severe complications such as synechia, cataract, and retinal detachment. Ocular examinations such as pupillary light response and menace reflex, can help categorise and limit diagnostic possibilities at a low cost. Indirect ophthalmoscopy to evaluate the fundus, fluorescein staining for corneal ulcers, ultrasonography, and Schirmer's tear test are among the diagnostic methods (Andrade *et al.*, 2005) [2].

Materials and Methods

A 5-year-old Marwari horse was presented with a history of thread-like floating worm in the left eye along with corneal opacity, lacrimation, conjunctivitis and poor vision. A thorough eye examination using both direct and lateral illumination revealed the presence of a floating worm in the anterior chamber. On the basis of clinical symptoms and presence of worm in eye, it was decided for surgical removal of worm by paracentesis of anterior chamber through needle in dorsal limbus incision.

The intended surgical procedure involved depriving the horse of food for a 12-24 hours and water for 8 hours before general anaesthesia. Tetanus toxoid and systemic non-steroidal anti-inflammatory agents (Flunixin meglumine @ 1.1 mg/ kg) and antibiotics Ceftriaxone and Tazobactam - 3375 mg, i.v. was administered pre-operatively. For sedation Inj. Xylazine HCL @ 1.1 mg/kg and for induction Ketamine HCL @ 2.2 mg/ kg i.v. was used. The horse was placed in a right lateral recumbent position once anaesthesia was established, and the left eye's periocular skin was cleaned and prepared for surgery using aseptic methods. To secure the top and lower eyelids of the left eye, a wire speculum was placed (Fig. 1). 18 G needle is inserted at the limbus in 11 o'clock position (Fig. 2). Eye worm is drained out through the 18 G needle from anterior chamber (Fig. 3). After removing the worm chloramphenicol aplicap was applied into the eye and temporary tarsorrhaphy is done by using non-absorbable suture material (Fig. 4). Recovery was smooth. Postoperatively antibiotics and anti-inflammatories and topical application of chloramphenicol aplicaps were given for 5 days

Results and Discussion

On the 5th day following the procedure, a progressive decrease in lacrimation and conjunctivitis was seen. Corneal opacity declined during a period of 15 days. Corneal oedema, kerato-uveitis, and blindness are believed to result from the worm's unpredictable movement within the eye's corneal endothelium, which causes extreme irritation (Ansari and Buchoo, 2005) [3]. Similar findings were also reported by Patil *et al.* (2016) [9], Rafee and Amarpal (2016) [11] in eye worm infestation in horses.

Since aspiration is an easy and rapid approach, we followed Singh *et al.*, 1976 [14] and Verma *et al.*, 2019's [17] recommendations and did it. Aspiration of intraoccular parasites from the bovine eye (Shin *et al.*, 2002) [13] and horse eye (Gangwar *et al.*, 2008) [4] has been reported to be successful. The aspiration was performed with a 16-gauge needle attached to a 5-mL syringe and an 18-gauge needle attached to a 10-mL syringe, respectively. It is hypothesised that the aspiration device's size and type selection in this investigation contributed to the parasite's inadequate removal.

Surgery is necessary to treat parasitic manifestations in the eye in order to control uveitis, which can result in blindness or visual impairment. We provided comprehensive instructions for effectively eliminating intraocular parasites from an equine's anterior chamber while preserving visual integrity. There is a wealth of scholarly literature accessible on anterior chamber paracentesis methods, including aspiration and incision. Nonetheless, it is important to take into account that both surgical procedures have some benefits and drawbacks.

We opted the needle paracentesis method over the stab incision method because of the likelihood of shrinkage of the eyeball as a result of aqueous humor effusion. There is a possibility that several factors, such as location, width, method, and closure of corneal incision or a combination, may play a part in the effusion of aqueous humor from the eyeball (Singh *et al.*, 1976) [14]. Since bacterial keratitis in horses is widespread, topical antibiotic administration is strongly advised. For prophylaxis, this horse was first treated with chloramphenicol.

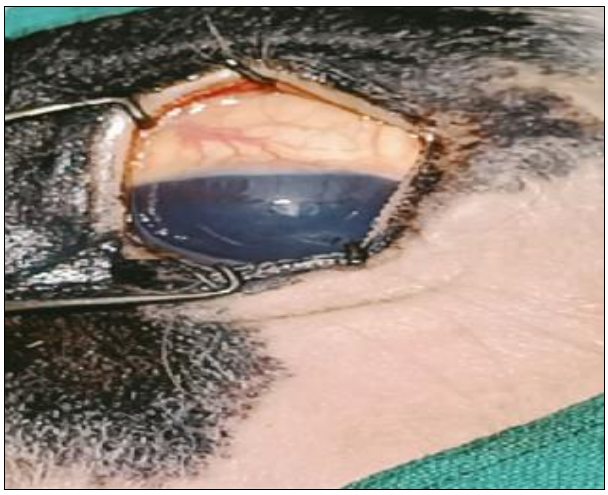

Fig 1: Application of wire speculum

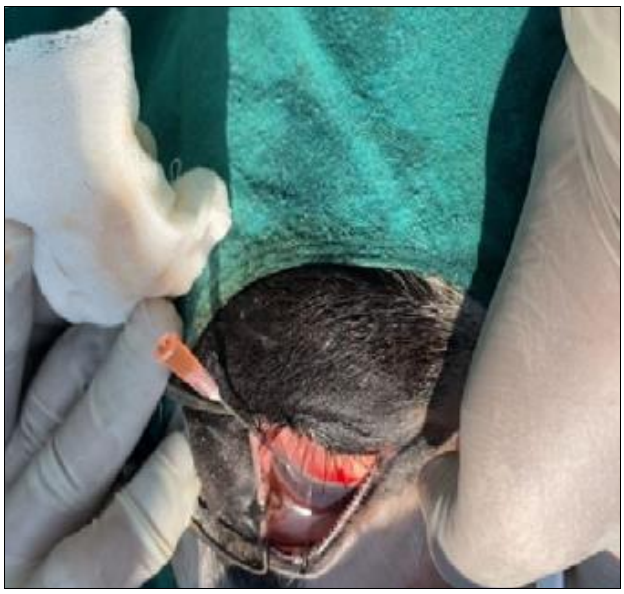

Fig 2: 18 G needle is inserted at the limbus in 11o' clock position

Fig 3: Eye worm drained out from anterior chamber of eye

Fig 4: Temporary Trasorrhaphy

Conclusion

Equine ocular setariasis can be effectively treated with anterior chamber paracentesis with needle without experiencing major problems. Following surgery, the horse's vision was determined to be intact, and everyday performance was noted to be good.

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