Prevalence of Trypanosomiasis (Surra) in Horses of Saurashtra Region in Gujarat

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ABSTRACT

Surra is one of the fatal diseases of the horse caused by Trypanosoma evansi. The disease is characterized by fever, progressive emaciation, anemia, subcutaneous edema, nervous signs, and death. To know the epidemiological status of surra in horses, retrospective information was retrieved by scrutinizing the data bank of the Veterinary Clinical Complex, JAU, Junagadh for three years (2013-15) covering 633 equine cases. According to symptoms, the incidence of surra was 10.64% (28/263) among medicinal cases, of which 57.14% (16/28) had shown signs of hemoprotozoan disease and 50.00% (8/16) were confirmed to have Trypanosoma evansi on blood smear examinations. Overall the clinical prevalence of T. evansi was 2.52% of the total equine cases (16/633). The age-wise incidence was higher in adult horses (68.75%) followed by yearling (25.00%) and foal (6.25%). The breed-wise incidence of T. evansi was higher in Kathiawari breed (68.75%) followed in descending order in non-descript (18.75%) and Marwari breed (12.50%). The incidence was higher in female (68.75%) than the male. The season-wise prevalence rate of T. evansi was higher in monsoon (July-October) (75.00%) than winter season (25.00%), while no case was observed in summer.

Keywords: Horse, Prevalence, Surra, Saurashtra region.

INTRODUCTION

Trypanosomosis, an arthropod-borne hemoprotozoan disease, commonly known as Surra (Hoare, 1964), a hindi term meaning “rotten,” is caused by Trypanosoma evansi. Several species of hematophagous flies, including Tabanids and Stomoxys are implicated in transferring infection from host to host, acting as mechanical vectors. The disease is characterized by fever, progressive emaciation, anemia, subcutaneous edema, nervous signs, and death. Surra affects a wide range of hosts, including horse, camel, cattle, buffalo, donkey, mule, dog, sheep, goat, pig, and variety of wildlife (Constable et al., 2017). The disease is endemic throughout India, particularly in low-lying areas. However, it is seasonal, and the incidence is higher during monsoon and post-rainy periods due to the preponderance of Tabanus flies. “Surra” in India is generally considered as a disease prevalent mostly in animals of Northern India, and its prevalence in equines of Northern India has been reported earlier (Chaudhri et al., 1985; Singh et al., 1995; Soodan et al., 1995). Due to the paucity of information on the prevalence of surra in horses of Saurashtra region, this study was planned to ascertain the prevalence of surra in horses presented to Veterinary Clinics of the College in Junagadh from Saurashtra region of Gujarat.

MATERIALS AND METHODS

To know the epidemiological status of surra in horses, the information based on age, breed, sex, etc. pertaining to the cases presented at college hospital was collected and analyzed. Three years (January 2013 to December 2015) retrospective information, as mentioned above, were retrieved by scrutinizing the data bank of the Veterinary Clinical Complex of the College at JAU, Junagadh. These data were suitably analyzed and appropriately inferred to establish the clinical as well as the epidemiological status of surra in a hospital population of horses.

RESULTS AND DISCUSSION

Overall Prevalence

Among the total of 9564 new cases of different health disorders in different species of animals registered at VCC, JAU, Junagadh over three years (2013-15), 633 (6.61%) cases were of horses. Among them, 263 (41.54%) cases were of
the medicinal type, of which 28 (10.64\%) cases showed the symptoms of hemoproteozoon disease. Among these 28 symptomatically suspected horses, 16 (57.14\%) showed clinical signs of *T. evansi*, and 08 (50.00\%) cases were confirmed positive for *T. evansi* on blood smear examination.

**Age-wise Incidence**

Of the total 633 cases of horses registered, 49 (7.74\%) were foal (< 1 year), 49 (7.74\%) were yearlings (1-2 years), 532 (84.04\%) were adult (2-18 years) and 03 (0.47\%) were aged (above 18 years). Retrospectively according to symptoms, where the incidence of *T. evansi* was 2.52\% of total equine cases (16/633), the age-wise incidence rate was higher in adult horses (68.75\%) followed by yearling (25.00\%) and foal (6.25\%). In contrast, no case was recorded in aged horses (Table 1). On blood smear examination of surra suspected 16 horses, the incidence of *T. evansi* was confirmed in 50.00 (8/16) cases. The age-wise incidence rate of *T. evansi* was higher in adult horses (87.50\%), whereas no confirmed case was recorded in foal and aged horses.

Similar findings were also reported by Sumbria et al. (2017) and Abdullah et al. (2018). These findings were, however, in contrary to the observations of Mavadiya et al. (2010) and Chavda et al. (2015), who reported the highest incidence of *T. evansi* in adult horses followed by aged ones. Maternal antibodies provide passive immunity to the young ones until the age of 3-6 months. This immunity diminishes from 6 months to 2 years of age, and then chances of encountering the infection increases (Kumar et al., 2008). The level of disease prevalence may be associated with the number of animals studied, diagnostic methods employed, geographic area, and difference in the spread of vectors between areas. However, stress, inadequate nutrition, inadequate exercise, close confinement, transportation, and negligence in management play a major role in predisposing the adult group to disease.

**Breed-wise Incidence**

The breed-wise incidence of *T. evansi* was higher in Kathiawari breed (68.75\%) followed in descending order in non-descript (18.75 \%) and Marwari breed (12.50 \%), and no case was found in Indian Thoroughbred (Table 2). These findings were in accordance with the report of Mavadiya et al. (2010), whereas it was contrary to findings obtained by Chavda et al. (2015), who reported the highest incidence rate of *T. evansi* in Marwari, Kathiawari and non-descript breed of horses. The confirmed cases were higher in Kathiawari than Marwari and non-descript breeds of horses in the present study probably because of the large population of this breed than any other breed. It is also dependent on the immune status of animals and management practices adopted by the owner.

**Sex-wise Incidence**

Of the total 633 cases of horses registered, 469 (74.67\%) were females, 154 (24.33\%) were intact male, and 10 (1.58\%) were geldings. The sex-wise prevalence of *T. evansi* was higher in females (68.75\%; 11/16) than the male (31.25\%; 5/16), and blood smears confirmed it in 87.50\% females (7/8) and 12.50\% in male (1/8). These findings were in agreement with the reports of Abdullah et al. (2018), Sumbria et al. (2017), Chavda et al. (2015), and Mavadiya et al. (2010), who reported that the males were less affected than the female horses. The reason for the difference was probably due to a greater population of females than males and gelding, their use as both draught and breeding animals, the management factors, and difference in vector population of the area of each study.

**Month-wise Incidence**

According to symptoms, the cases positive for *T. evansi* were recorded higher during the month of September (43.75\%) followed by October (31.25\%), January (12.50\%), February (6.50\%) and November (6.25\%), while no case was recorded during March to August and December. According to blood smear examination, the incidence of *T. evansi* was confirmed in 50.00\% of a suspected case, and it was recorded highest during September (75.00\%) followed by October and November (12.50 each), while no confirmed case was recorded during other months.

| Table 1: Age-wise incidence of *T. evansi* in horses in Saurashtra region |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                              | Foal (< 1 yr)               | Yearling (1-2 yrs)          | Adult (2-18 yrs)            |
| Total horses (n= 633)        | 49 (7.74\%)                | 49 (7.74\%)                | 532 (84.04\%)              |
| No. of horses showed symptoms (n = 16) (2.52\% of the total horses) | 01 (6.25\%)                | 04 (25.00\%)                | 11 (68.75\%)              |
| Smear examination (n = 08) (50\% of suspected horses) | 00                        | 01 (12.50\%)                | 07 (87.50\%)              |

| Table 2: Breed wise incidence of *T. evansi* in horses in Saurashtra region |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                              | Kathiawari                  | Marwari                    | Non-descript |
| Total horses (n = 633)        | 442 (69.82\%)              | 83 (13.11\%)                | 98 (15.48\%) |
| No. of horses showed symptoms (n = 16) (2.52\% of the total horses) | 011 (68.75\%)              | 02 (12.50\%)                | 03 (18.75\%) |
| Smear examination (n = 08) (50\% of the *T. evansi* suspected horses) | 06 (75.00\%)               | 01 (12.50\%)                | 01 (12.50\%) |

58 The Indian Journal of Veterinary Sciences and Biotechnology, Volume 15 Issue 3 (January-March 2020)
The result of the study was in close agreement with that of Mavadiya et al. (2010), Chavda et al. (2015), and Singh et al. (2016), who reported similar findings on the month-wise incidence of *T. evansi* in horses. The higher incidences of surra in equines have also been reported between the months of July and December by Soodan et al. (1995), which was attributed to the increased population of Tabanid flies and increased incidence in September to November was mainly due to the rainfall in August that creates suitable conditions for larval activity of fly leading to a rise of fly load in September. They also observed the lowest prevalence of surra in April and May, when water sources dried up and fly breeding completely ceased. The vector population increases considerably from June to September, causing disease epizootic from September to November, though some chronic cases occur in January and February due to latent infection. Other possible factors for this bimodal peak could be loss of body vigor of horse because of stress conditions in the winter and rainy season, lack of exercise, and keeping all horses in a commonplace with greater exposure to vectors.

**Season-wise Incidence**

Of the total 633 cases of horses registered, 192 (30.33%) were presented in monsoon season (July-October), 258 (40.76%) in the winter season (November-February) and 183 (28.91%) in summer season (March-June). The season-wise incidence of *T. evansi* was higher in monsoon season (75.00%) followed by winter season (25.00%), while no case was observed in the summer season. The blood smear examination of suspected horses confirmed *T. evansi* to be higher prevalent in rainy season (87.50%) followed by winter season (12.50%), while no case was confirmed in the summer season (Table 3). Similar findings were also reported by Chavda et al. (2015) and Singh et al. (2016), where the highest numbers of cases were recorded in the rainy season followed by winter and the lowest in summer season.

The probable reason for the higher disease occurrence in monsoon was associated with considerable rainfall and spring grasses, which is the most suitable environment for the breeding of Tabanids. Basu et al. (1952) observed the incidence of surra and tabanids as co-extensive. Surra has seasonal distribution since it commences a few weeks after the onset of monsoon in late May through June over most parts of India.

**Table 3:** Season-wise prevalence of equine surra in Saurashtra region

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<tr>
<th>Particulars</th>
<th>Season</th>
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<tr>
<td></td>
<td>Monsoon (July-Oct)</td>
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<td>Total horses (n = 633)</td>
<td>192 (30.33%)</td>
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<tr>
<td>No. showed symptoms of <em>T. evansi</em> (n = 16)</td>
<td>12 (75.00%)</td>
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<tr>
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<td>07 (87.50%)</td>
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**CONCLUSION**

The retrospective study of 633 horses presented at VCC, Junagadh showed that 263 (41.54%) cases were of a medicinal type, and 28 (10.64%) of them showed the symptoms of hemoproteozan disease. Among these 28 suspected horses, 16 (57.14%) showed clinical signs of *T. evansi*, and 08 (50.00%) cases were confirmed positive for *T. evansi* on blood smear examination. The prevalence of surra was higher in adult horses, in Kathiawari breed during monsoon season, particularly in September.

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