Indian Vet. J., May 2024, 101 (5) : 48 - 52

Occurrence and Clinical Presentation of Amphistomosis Affected Dairy Cattle in the Cauvery Delta Region of Tamil Nadu

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(Received : February, 2024 40/24 Accepted : April, 2024)

Abstract

The present study included a total of 128cross-bredJersey cows presented to the Veterinary Clinical Complex, Veterinary College and Research Institute, Orathanadu, Thanjavur district of Tamil Nadu with a history of jowl edema and voiding foul-smelling diarrhea during the period January to December 2020. Breed-wise distribution of paramphistomosis infestation was higher in Jersey crossbred (59.37%) followed by Holstein Friesian Cross-bred (25%), non-descript breed (10.93%) and Kangayam (4.68%). Older aged dairy cows (>4 years, 28.3%), were found to have a higher infection with paramphistomosis. On clinical examination, increased / normal body temperature, heart, respiratory rate, slight pale to congested conjunctival mucous membranes, and jowledema were noticed in the animals. Microscopic examination of fecal samples of animals and micrometry confirmed that 151 x 72 µmsize oval-shaped eggs with distinct operculum as amphistome eggs. The animals were treated with Oxyclozanide@ 18.7mg/ kg body weight orally for 2 days subsequently along with supportivetherapy, improvements were noticed in the health status of the animals after treatment. Further examination of fecal samples from these animals did not show any ova of endoparasites on the 15^{15th} day after treatment. This study describes the occurrence and management of Paramphistomosis in cattle from the Cauvery Deltaregion of Tamil Nadu.

Key words: Cattle, Paramphistomosis, Occurrence, Cauvery Delta

Gastrointestinal parasites cause considerable economic loss to marginal and small-scale farmers. Among the gastrointestinal parasites affecting cattle and buffaloes, flukes play a major role and cause production losses and mortality in India (Juyal *et al.* 2003). These flukes include *Fasciola gigantica*, *Fasciolahepatica* and Paramphistomes affecting the large ruminants. Diagnostic imaging may aid in the diagnosis of parasitic disease as it allows the direct visualization of parasite stages and/or the lesions caused by parasites themselves (Arsenopoulos *et al.* 2017).

Materials and Methods

One Twenty-Eight Jersey cross-bred cow with the presence of symptoms like jowl edema or diarrhea or having both symptoms which lasted for one week to a month period was considered

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in the present study. These dairy cows were presented to the Large Animal Medicine Referral Clinic at the Veterinary Clinical Complex, Veterinary College and Research Institute, Orathanadu from January to December 2020. On physical examination, cows revealed moist to dry muzzle, slight pale pink to congested conjunctival mucous membranes, and varying degrees of jowl edema. Their dung varied from solid consistency to watery malodorous diarrhea or dung with mucous. Their vital parameters were found to be normal (Temperature 38.1 ± 0.04^0C, Heart rate- 75.19 ± 0.56 bpm, Respiratory rate - 26.16 ± 0.31 bpm). On abdominal palpation, ruminal consistency varied from resilient to doughy and ruminal contractions. Orogastric intubation was done in cases with bloat and rumen fluid was collected and analyzed for the protozoal study. Fecal samples were subjected to parasitological examination. The dung score of each cow was done to assess the approximation of fecal consistency or prevalence of diarrhea based on fecal staining around the tail and hindquarters (scale of 0.5 to 5). As frequent TRP cases were encountered in this area, the abdominal ultrasonographic examination was also planned and conducted to rule out TRP-associated jowl edema.

Ultrasonography of the thorax and abdomen was carried out using a 2.5 to 5 MHz curvy linear transducer (Esaote My lab 1 portable ultrasound system) after applying ultrasound gel and as per standard protocols (Braun 2009, Venkatesan *et al.* 2019). Heart, pericardium, reticulum, spleen, and thoracic examinations were carried out on the left side from the 4^{th} to 8^{th} intercostal space on the right side of the abdomen kidney, intestine, omasum (Braun, 1998), liver and gall bladder (Braun 2005, Mohamed *et al.* 2021) were examined by beginning from the right paralumbarfossa and extending forward to the 8^{th}intercostal space both in dorsal and ventral aspects. Fecal samples were processed by both sedimentation and floatation methods. One gram of fecal sample was processed for detection of egg per gram of feces (EPG) by following Stoll's dilution method (Soulsby1982).

Results and Discussion

Most of the rural poor and farmers depend on dairy cattle for their day-to-day livelihood earning in the Cauvery Delta region in Tamil Nadu. Their ignorance and lack of resources make their dairy cattle vulnerable to many diseases, especially parasitic diseases.

The present study revealed that older aged dairy cows (>4 years) of Jersey crossbreeds were found to have a higher followed by Holstein Friesian Crossbred, non-descript breeds, and Kangayam. Submandibular edema was found in 68.7 percent of animals; 67.9 percent of animals voided dung in semisolid consistency. This made the farmers seek veterinary experts and indicated the severity. Hypoalbuminaemia and small intestinal affections were commonly caused by Paramphistomes. Diarrhoea, anorexia, rough hair coat, intestinal hemorrhages, anemia, reduced milk production, intermandibular edema, and death in animals with a heavy infestation of immature flukes in the duodenum (Paul *et al.* 2011). Similar clinical presentations were observed in this study also. Cows with dung scores of 4and 5 were found to have a severe infestation with paramphistomes (Fig.1) in this study.

Orogastric intubation was done to relieve the gas in bloat-formed animals. In such cases, the presence of live reddish or pomegranate pulp-shaped paramphistomes was found adhering to the strainer of the rumen probang along with gut contents (Table I). In this present study, examination of rumen fluid collected through left paralumbar fossa revealed the presence of amphistome eggs along with ruminal protozoa in three cows. These findings indicated the presence of mature worm infections in the fore stomach. Heavy infestations in the fore stomach were found to cause loss of weight, anemia, rough hair coat, and a drop in milk production (Constable *et al.* 2016). All these were observed in the present study also. The finding of eggs in rumen fluid and mature worms in the forestomach indicated the severity of the issue. Hence, point of care assessment can be considered to use rumen fluid evaluation for detecting paramphistome infections especially when there were fewer/ no shedding Amphistome eggs in dung

Fig.1. Cow having a dung score of 5had severe infection with immature amphistomes

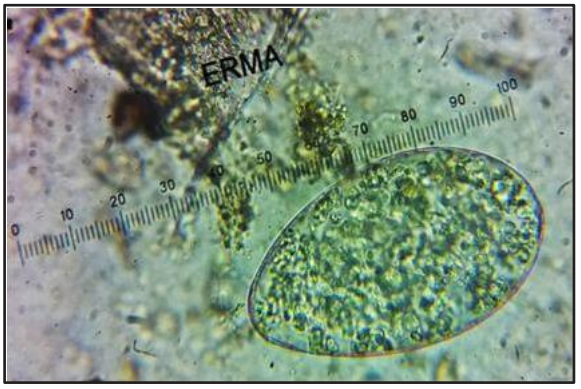

Fig. 2. Faecal examination showed Amphistome eggs measuring 151 x 72 *µm, (x400)*

Fig. 3a. Ultrasonography of abomasum (Hyperechoic folds) at left side 6th intercostal space showing its displacement in 4.5-year-old Cross Bred Jersey cow.

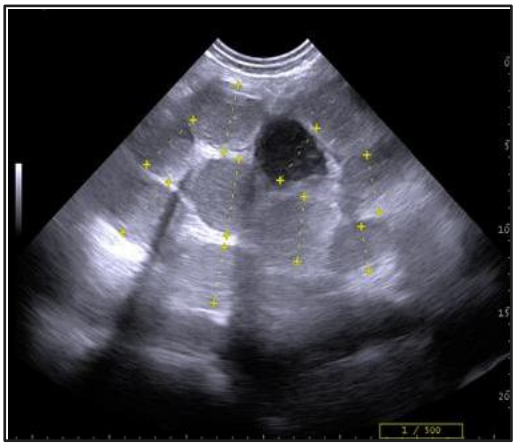

Fig. 3b. Ultrasonography of intestine at right side mid abdomen 10th to 12th intercostal space (multiple distended loops >3.83cm diameter) in 5-year-old Crossbred Jersey cow.

samples.

The floatation method of fecal examination did not reveal any eggs. But fecal sample examination by sedimentation method revealed the presence of Amphistome eggs. Measurement of eggs of parasites was carried out using micrometry which confirmed 151 x 72 µm size eggs as Amphistome eggs (Fig.2) with average (EPG) was 800.

Ultrasonographic assessment of internal organs in this study showed not many abnormalities except abomasums and intestine (98 and 30 out of 128 cows respectively). Abomasum was displaced in 98 cows to the left side extending 6th to 10thintercostal space in the lower abdomen and it was confirmed by visualization of hyperechoic abomasal folds with the emptiness of abomasum. These findings were following the previous report stating that such displacements as incidental findings due to continuous diarrhea, the emptiness of the abomasum, bloat formation and displacement of the abomasum (Venkatesan *et al.* 2020). Ultrasonography of the right-side mid-abdomen (single window) showed the presence of multiple distended intestinal loops (> 3.8cm dia) which may be due to inflammation and more volume of feces present in the intestine (Fig. 3a, b). Thus, abdominal ultrasonographic assessment not only helped to assess the severity of the affections but also helped to rule out TRP, as jowl edema is a common sign in TRP-affected cows. In a recent study, findings along with fecal and bile examinations and ultrasonography helped to assess the severity of enteritis inconcurrent

Table I : Clinical presentations in paramphistomosis of cows (n=128)

Clinical Parameters	No. of cases	Percentage
Age		
<2 year	34	26.6
2.1 year to 4yr	45	35.2
>4.1yrs	49	38.3
Sex (Female)	128	100
The posture of the animal		
Standing	69	53.9
Sternal recumbency	46	35.9
Lateral recumbency	13	10.2
Visible Mucous membrane (Conjunctiva)		
Pink and Moist	45	35.2
Pale pink and moist	55	43
Blanched	23	18
Congested and moist	5	3.9
Presence of edema in body parts		
Submandibular region only	88	68.7
Submandibular and brisket	12	9.4
Jowl and Sclera	28	21.8
Dung Appearance		
Solid with mucous coated	22	17.2
Semisolid	87	67.9
Semisolid with blood tinged	10	7.8
Only mucous	9	7.03
Dung score		
0.5	20	15.62
1	17	13.28
2	16	12.5
3	15	11.71
4	25	19.53
5	35	27.34
Severity based on Egg count		
Stray	27	21.1
+	31	24.2
++	25	19.5
+++	45	35.2
Presence of paramphistome eggs		
Dung (identified by Sedimentation Method)	125	97.65
Presence of bloat & paramphistomes in rumen fluid	26	20.26

infections of *Fasciola gigantica* and Paramphistomes (Venkatesan *et al.* 2020). Ultrasound should be considered an auxiliary method that can be integrated with epidemiological data, clinical findings, and laboratory diagnoses of parasitic diseases in domestic animals (Corda *et al.* 2022). Hence, apart from routine diagnostic methods for helminthic enteritis, point-of-care ultrasonography can be applied to assess the severity and consequences associated with such severe parasitism in dairy cows. Thereby it also helps in assessing the therapeutic strategies.

The affected dairy cows were provided supportive care with Inj. Ringers lactate 2.5 to 3.5 L IV, inj. Flunixin meglumine @ 1.1 mg/kgBwt IM and Inj. Vit B_1 $B_6$$B_{12}$ plus Liver extract 10 ml, Light Kaolin powder 100g mixed with 4 no. of egg white was given orally for 3 to 5 days to control the severity of diarrhea. Two doses of suspension of Oxyclozanide @ 18.7 mg/kg body weight were given orally 2 days apart (Constable *et al.* 2016). A liver tonic of 50 ml per day was given continuously for around 20 days. A Liquid Protin C supplement of 30ml per day was given orally for 3 to 5 days. Improvement was noticed in cows and their dung voiding become solid in consistency from the 3rd day of treatment. Review examinations offeces for amphistome eggs were done at various intervals for each animal according to their next visit to the hospital (ranging between 10 to 20 days) and it showed negative results for parasitic eggs. Thereafter the health status of the animal was assessed through telephonic call reviews. The animal owners were advised not to graze the animals near ponds, small lakes or stagnant pockets of river basins to avoid cows from ingesting the infective metacercaria stages from infected grass/plants.

Conclusion

In the present study, clinical signs, fecal examination and ultrasound of the abomasum and intestine aided in detecting paramphistomosis infection in cows of the Cauvery delta regions of Tamil Nadu. The study concluded that cows with dungs cores of 4 and 5, older age were heavily infested with immature amphistomes. The finding of amphistomes eggs in rumen fluid, the presence of live flukes in the rumen suction

pump, and ultrasonographic visualization of displaced abomasal hyperechoic folds are to be taken as the point of care assessment for cows with jowl edema and diarrhoea.

Acknowledgment

The authors are thankful to the Dean, of Veterinary College and Research Institute, Orathanadu, and Director of Clinics, Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu for providing facilities.

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