Asian Pacific Journal of Tropical Disease

journal homepage: http://www.apjtcm.com

Original article https://doi.org/10.12980/apjtd.7.2017D7-234

Therapeutic response of West African Dwarf goats infected with Peste des Petits Ruminants whose oral lesions were treated with oxytetracycline long acting and gentian violet topical spray

Iniobong Chukwuebuka Ikenna Ugochukwu[1*], Emmanuel Ikenna Ugochukwu[2], Cornelius Chijioke Chukwu[2]

[1]*Department of Veterinary Pathology and Microbiology, University of Nigeria, Nsukka, Nigeria*

[2]*Department of Veterinary Medicine, University of Nigeria, Nsukka, Nigeria*

ARTICLE INFO

Article history:
Received 17 Oct 2017
Received in revised form 26 Oct, 2nd revised form 6 Nov 2017
Accepted 20 Nov 2017
Available online 29 Nov 2017

Keywords:
Peste des Petit Ruminants
Labial lesions
Stomatitis
Oxytetracycline LA
Gentian violet
West African Dwarf goats

ABSTRACT

Objective: To assess the therapeutic response of West African Dwarf (WAD) goats infected with Peste des Petits Ruminants (PPR) virus treated with Amantidine hydrochloride.
Methods: Apart from the presence of the characteristic clinical signs, complement ELISA and haemagglutination inhibition (HI) tests were used to confirm PPR infection in the WAD goats. The oral lesions in one group were cleaned with 70% alcohol and treated with oxytetracycline long acting (LA) intramuscularly (IM) and topically treated with gentian violet spray which also contained oxytetracycline, and in another group WAD goats infected with PPR virus were only treated with oxytetracycline LA intramuscularly.
Results: The oral lesions in the group cleaned with 70% alcohol, treated with oxyteteracycline LA intramuscularly and gentian violet spray which also contained oxytetracycline topically healed appreciably within 3 weeks before the termination of the experiment, while the group that was treated with oxyteteracycline LA intramuscularly only healed poorly. The mortality of the WAD goats with PPR whose oral lesions were not treated with gentian violet topical spray was 100%, while the mortality of WAD goats treated with oxytetracycline LA intramuscularly and gentian violet topical spray was 71.42%.
Conclusions: The results of this present study suggest that in addition to antiviral therapy, cleaning with 70% alcohol, combination of oxytetracycline LA and topical spraying of the oral lesions with gentian violet spray which also contains oxytetracycline reduced the morbidity and mortality considerably.

1. Introduction

West African Dwarf (WAD) goats are very important to the economies of rural communities of West African countries[1]. Peste des Petits Ruminants (PPR) is a fatal and fulminating viral disease of small domestic and wildlife ruminants. It is very contagious and produces acute and subacute clinical signs[2-4]. The first report of PPR was in the Cote d'Ivoire, but it has been reported in other parts of the world like in sub-Saharan region, Middle East and other parts of Asian continent[5-7]. PPR virus (PPRV), the aetiologic agent of this devastating animal viral disease is a morbillivirus of the family Paramyxoviridae[8]. PPR is a disease of huge economic importance because it poses continual hindrance to sustainable livestock production in developing countries[9]. The common clinical signs associated with this disease are pyrexia, hypersalivation, pneumonia, anorexia, erosive or necrotic stomatitis, purulent ocular and nasal discharges, gingivitis, labial lesions and severe diarrhoea[2,10-12]. The disease is more severe among young animals; it is also more severe in goats than sheep[13-15]. The oral lesions in PPR clinical infection are characterized by swelling around the mouth, erosion, ulceration and necrosis on the lips, gums, buccal cavity, tongue and palate[6,16]. These oral lesions are subsequently contaminated by bacteria which leads to complication of the

*Corresponding author: Iniobong Chukwuebuka Ikenna Ugochukwu, Department of Veterinary Pathology and Microbiology, University of Nigeria, Nsukka, Nigeria.
Tel: +234 8037322220
E-mail: iniobongugochukwu@gmail.com
The journal implements double-blind peer review practiced by specially invited international editorial board members.

pathogenesis of PPR. Also the presence of these oral lesions is in part responsible for the inappetence, which is a constant clinical feature in PPR natural infection[17]. The objective of this study was to compare the therapeutic response of WAD goats infected with PPR whose oral lesions were treated with oxytetracycline LA intramuscularly and gentian violet spray and WAD goats administered only with oxytetracycline hydrochloride LA intramuscularly.

2. Materials and methods

2.1. Study area

Nsukka, our study area, is located in Nsukka Local Government Area of Enugu State, Nigeria. Nsukka is situated at latitude 6°51'24" N and longitude 7°23'45" E. The climate here is tropical with an average temperature of 24.9 °C and an average annual rainfall of 1 579 mm[18].

2.2. Animals

Sixteen goats of the West African Dwarf breed whose ages ranged from 6 months to one year (twelve males and four females) and clinically adjudge to be free from PPR infection were purchased from Ibagwa market, Nsukka Local Government, Enugu State. The ages of the goats were estimated by history, dentition and the number of rings on the horn. The goats were given green grass in the mornings and evenings. In addition, growers mash was also offered to them at the rate of 6 kg per day. For the duration of this experiment, water was also given to them *ad libitum*.

2.3. Experimental infection

After the period of stabilization and acclimatization, the study animals were experimentally infected by the application of mucopurulent nasal and ocular discharges swab sticks from WAD goats clinically adjudged to be suffering from PPR. PPR infection was confirmed in the infected goats by haemagglutination inhibition test and complement ELISA. This was done according to standard procedures as described[10]. Then 3–5 days after the induction of experimental infection, the goats were housed together and started to show obvious clinical signs of PPR infection.

2.4. Experimental design

The infected goats were divided into two groups of eight per group. However, seven goats of the eight in each group, apart from showing other typical clinical signs of PPR, also showed oral lesions like stomatitis and orf-like lesions on the lips.

2.5. Tentative diagnosis

This was based on clinical signs and macroscopic lesions which are pointers to acute and per-acute cases of PPR[17].

2.6. Serological diagnosis

The serological confirmation of PPR for this investigation was mainly by complement-ELISA in which about 5 mL of blood was collected from each animal into a sterile universal bottle. The bottle was placed in a slanting position to allow the blood clot at room temperature for 1 h. The expressed serum was centrifuged at 3 000 r/min for 15 min at 4 °C and clear straw coloured serum was collected. PPR complement-ELISA kit designed to detect antibodies directed against the nucleoprotein of PPR virus, developed by FAO reference laboratory (CIRAD-EMVT, Montpellier, France, was used. Procedure for monoclonal antibody based competitive-ELISA was done[19] and haemagglutination inhibition test was done following the standard procedures as described[20].

2.7. Treatment

Oxytetracycline hydrochloride long acting (Pfizer Inc., US) (Primamycin/LA) was administered intramuscularly to the WAD goats in one group at the dose of 20 mg/kg of body weight. In addition, gentian violet spray containing oxytetracycline (Pantex Oxytetra spray, Pantex, Holland) was applied topically on the lips of the goats with oral lesions after cleaning with 70% alcohol. In the other group, WAD goats with oral lesions were only treated with oxytetracycline hydrochloride long acting (Pfizer Inc., US) (Primamycin/LA) intramuscularly. The clinical response and mortality were monitored for 21 days.

3. Results

The oral lesions, as shown in Figure 1, in the group treated with oxyteteracycline LA intramuscularly and gentian violet spray containing oxytetracycline healed appreciably within 3 weeks as shown in Figure 2, before the termination of the experiment, while the group that was treated with oxyteteracycline LA intramuscularly only healed poorly.

However, in the infected WAD goats whose oral lesions were not treated with gentian violet topical spray, the mortality was 100%, while the mortality of WAD goats treated with

Table 1
Clinical response and mortality of WAD goats infected with PPR.

	Group A	Group B
No. of WAD goats	8	8
No. of WAD goats with oral lesions	7	7
Treatment regimen	Oxytet LA (IM)	Oxytet LA (IM) + gentian violet with oxytet topically
Healing of oral lesions within 3 weeks	Poor	Good
Mortality (%)	100%	71.42%

oxytetracycline LA intramuscularly and gentian violet topical spray was 71.42% within 21 days (Table 1).

Figure 1. Labial orf-like lesions in WAD goats suffering from PPR.

Figure 2. Receded labial orf-like lesions in WAD goats suffering from PPR after treatment with oxytetracycline LA intramuscularly and gentian violet topical spray.

4. Discussion

PPR is an highly fatal disease of small ruminants of great significance[21]. Largely present in developing nations of the world, this viral disease has catastrophic effects on small ruminants which provide a major source of income for millions of livestock farmers. Beyond a shadow of doubt, PPR is a disease of great socioeconomic importance[22]. Stomatitis, gingivitis and labial lesions are common clinical manifestations in PPR infection[23]. The labial lesions and stomatitis observed in this present study agree with the findings of previous researchers[9,24-26].

The result of this experiment indicated that oral lesions in WAD goats treated with gentian violet spray containing oxytetracycline healed faster within 3 weeks, while oral lesions in WAD goats not treated topically with gentian violet spray containing oxytetracycline healed poorly. In addition, the mortality in WAS goats whose oral lesions were topically treated was lower (71.42%) than that in the untreated group (100%).

Some veterinary clinicians do not take oral lesions of sheep and goats suffering from PPR into consideration. They just give anti-diarrhoea agents, anthelminthic and systemic antibiotics, ignoring the oral lesions, since there was a reduction in the morbidity and mortality of the goats. The present study suggests that cleaning with 70% alcohol, treatment with oxytetracycline long acting intramuscularly, and topical spraying with gentian violet spray which also contains oxytetracycline reduced morbidity and mortality considerably. Due to our limited resources, we recommend that further work should use a larger population of goats before definite conclusions can be made. We also recommend that further research be made for more effective chemotherapeutic methods to heal the oral lesions and reduce the mortality in PPR affected goats.

Conflict of interest statement

We declare that we have no conflict of interest.

Acknowledgments

Special appreciation goes to the staff of the Nigeria Veterinary Research Institute, Vom, Plateau State and Department of Veterinary Medicine, University of Nigeria, Nsukka for assisting in conducting the serological tests.

References

[1] Chiejina SN, Behnke JM, Fakae BB. Haemonchotolerance in West African Dwarf goats: contribution to sustainable, anthelmintics-free helminth control in traditionally managed Nigerian dwarf goats. *Parasite* 2015; doi: 10.1051/parasite/2015006.

[2] Aytekin İ. A sub clinic Peste des Petits Ruminants case in a lamb. *Atatürk Üni Vet Bil Derg* 2008; **3**: 8-10.

[3] Kumar N, Maherchandani S, Kashyap SK, Singh SV, Sharma S, Chaubey KK, et al. Peste Des Petits Ruminants virus infection of small ruminants: a comprehensive review. *Viruses* 2014; **6**(6): 2287-327.

[4] Wohlsein P, Singh R. Peste des Petits Ruminants in unusual hosts: epidemiology, disease, and impact on eradication. In: Munir M, editor. *Peste des Petits Ruminants virus*. Heidelberg: Springer; 2015, p. 95-118.

[5] Shaila MS, Shamaki D, Forsyth MA, Diallo A, Goatley L, Kitching RP, et al. Geographic distribution and epidemiology of Peste des Petits Ruminants viruses. *Virus Res* 1996; **43**: 149-53.

[6] Kul O, Kabakci N, Atmaca HT, Ozkul A. Natural Peste des Petits Ruminants virus infection: novel pathologic findings resembling other morbillivirus infections. *Vet Pathol* 2007; **44**: 479-86.

[7] Singh RK, Balamurugan V, Bhanuprakash V, Sen A, Saravanan P, Yadav MP. Possible control and eradication of Peste des Petits Ruminants from India: technical aspects. *Vet Ital* 2009; **45**: 449-62.

[8] Berguido FJ, Bodjo SC, Loitsch A, Diallo A. Specific detection of Peste des Petits Ruminants virus antibodies in sheep and goat sera by the luciferase immunoprecipitation system. *J Virol Methods* 2016; **227**: 40-6.

[9] Pope RA, Parida S, Bailey D, Brownlie J, Barrett T, Banyard AC. Early events following experimental infection with Peste-Des-Petits Ruminants virus suggest immune cell targeting. *PLoS One* 2013; **8**(2): e55830.

[10] Nduaka O, Ihemelandu EC. Observations on pneumoniaenteritis complex in dwarf goats in Eastern Region of Nigerian–preliminary report. *Bull Epizoot Dis Afr* 1973; **21**: 89-98.

[11] Çam Y, Gençay A, Beyaz L, Atalay O, Atasever A, Özkul A, et al. Peste des Petits Ruminants in a sheep and goat flock in Kayseri province, Turkey. *Vet Rec* 2005; **157**: 523-4.

[12] Abubakar M, Irfan M. An overview of treatment options to combat Peste des Petits Ruminants in endemic situations. *Res J Vet Pract* 2014; **2**(1S): 4-7.

[13] Al-Dubaib MA. Peste des Petits Ruminants morbillivirus infection in lambs and young goats at Qassim region, Saudi Arabia. *Trop Anim Hlth Prod* 2009; **41**: 217-20.

[14] Albayrak H, Gür S. A serologic investigation for Peste des Petits Ruminants infection in sheep, cattle and camels (*Camelus dromedarius*) in Aydın province, West Anatolia. *Trop Anim Hlth Prod* 2010; **42**: 151-3.

[15] Kwiatek O, Minet C, Grillet C, Hurardy C, Carlsson E, Karimov B, et al. Peste des Petits Ruminants (PPR) outbreak in Tajikistan. *J Comp Pathol* 2007; **136**: 111-9.

[16] Aytekin I, Mamak N, Ulucan A, Kalinbacak A. Clinical, haematological, biochemical and pathological findings in lambs with Peste des Petits Ruminants. *Kafkas Univ Vet Fak Derg* 2011; **17**(3): 349-55.

[17] Ugochukwu EI. *Textbook of equine, porcine and ruminant medicine*. 1st ed. Enugu: Computer Edge Publishers; 2011, p. 49-53.

[18] Climate: Nsukka. [Online] Available from: https://en.climate-data.org/location/404904/ [Accessed on 17th January, 2017]

[19] Singh RP, Sreenivasa BP, Dhar P, Shah LC, Bandyopadhyay SK. Development of a monoclonal antibody based competitive-ELISA for detection and titration of antibodies to Peste des Petits Ruminants (PPR) virus. *Vet Microbiol* 2002; **98**: 3-15.

[20] Manoharan S, Jayakumar R, Govindarajan R, Koteeswaran A. Haemagglutination as a confirmatory test for Peste des Petits Ruminants diagnosis. *Small Rum Res* 2005; **59**(1): 75-8.

[21] Ugochukwu ICI, Ugochukwu EI, Chukwu CC. Haematological parameters and serum biochemical assay of West African Dwarf goats infected with Peste des Petits Ruminants virus in Nsukka, Enugu State. *Comp Clin Pathol* 2017; doi: 10.1007/s00580-017-2545-9.

[22] Roos N. Seroepidemiology of Peste des Petits Ruminants in central Tanzania alongside an evaluation of filter paper as transport medium. DVM Project. Uppsala: Swedish University of Agricultural Sciences; 2016.

[23] Chowdhury EH, Bhuiyan AR, Rahman MM, Siddique MSA, Islam MR. Natural Peste des Petits Ruminants virus infection in Black Bengal goats: virological, pathological and immunohistochemical investigation. *BMC Vet Res* 2014; **10**: 263.

[24] Kataria AK, Kataria N, Gahlot AK. Large scale outbreaks of Peste des Petits Ruminants in sheep and goats in Thar desert of India. *Slov Vet Res* 2007; **44**: 123-32.

[25] Narayanan R, Gopu P, Baegan S. Barathidasan clinical management in an outbreak of Peste Des Petits Ruminants in Barbari Goats. *Vet World* 2008; **1**(3): 81-2.

[26] Chauhan HC, Chandel BS, Kher HN, Dadawala AI, Agrawal SM. Pesti Des Petits ruminants virus infection in animals. *Vet World* 2009; **2**(4): 150-5.