

Case Report

Severe Orf in Lambs: Clinical Description and Response to Treatment against Secondary Infection

Joshua Onyango CertAH^{1,2*}, Wanda McCormick¹, Stella Chapman³¹Department of Animal Welfare and Animal Management Moulton College, USA²University of Northampton, School of Science and Technology, USA³Department of Veterinary Medicine Stag Hill Campus, University of Surrey Guildford, USA

*Corresponding author

Joshua Onyango, University of Northampton, School of Science and Technology, St Georges Avenue, Northampton NN2 6JD, USA, Tel: +4401604 491131; E-mail: joshua.onyango@northampton.ac.uk

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Abstract

In May 2014, severe disease affecting areas around the muzzle and the entire buccal mucosa was observed in two lambs from a flock of approximately 200 Highlander and Charolaise ewes. The lambs were ten weeks old. Clinical signs of proliferative lesions around the mucocutaneous junction of the mouth and the presence of scabs extending for 4 to 6 cm around the muzzle were supportive of severe orf. No laboratory test was undertaken. It was therefore deemed necessary to offer treatment against secondary infection. Both lambs responded very well to a combination of 200mg/kg procaine penicillin and 250mg/kg body weight dihydrostreptomycin sulphate and 1,5 pentanediol in petroleum based soft emollient cream administered once daily for three consecutive days. The treatment regime showed that secondary infection during severe orf cases can be treated with penicillin-streptomycin and petroleum based soft emollient cream in order to reduce losses associated with the disease.

INTRODUCTION

ORF, also known as scabby mouth, contagious ecthyma, contagious pustular dermatitis is a viral disease caused by *Parapoxvirus* (Orf virus) that affects sheep, goats, camels and other species including humans [1,2]. Scarification or macroabrasions of the epidermis is necessary before the disease can occur. Clinical presentation is more severe in lambs causing proliferative lesions around the mucocutaneous junction of the mouth. Overall, the clinical picture of the disease has been characterised by formation of scabs and proliferation of the epidermis causing painful lesions on the vulva, udder and teats in ewes; whilst in lambs the lesions affect the mouth, nostrils, and lips extending to the oesophagus, and in some cases progressing to the hooves causing strawberry foot rot [3,4]. Secondary bacterial infection involving *Staphylococcus aureus* and *Arcanobacterium pyogenes* have been reported during orf cases [5]. The incubation period is relatively short and first signs can be noted from day four in lambs and this may persist for up to three weeks or longer; whilst full recovery can take up to 8 weeks [6].

Orf can cause welfare and economic impacts usually associated with poor growth in lambs, mastitis in ewes and death in worst case scenarios [7]. A live attenuated vaccine is

available, although this can only provide immunity for a maximum period of one year. The low efficacy of the vaccine has been attributed to host immune response mechanisms whereby the virus has developed mechanisms that can enable it to evade the immune response [8]. Also the heterogeneity among orf viruses has been linked to poor vaccine efficacy [9]. The disease can be diagnosed by veterinarians or more experienced sheep farmers and shepherds based on clinical signs in particular characteristic proliferative lesions around nostrils and lips, however, definitive diagnosis requires electron microscopy or polymerase chain reaction tests [10].

CASE PRESENTATION

This case presentation reports a severe outbreak and treatment of orf in two lambs, which responded well to a combination of 200mg/kg procaine penicillin and 250mg/kg body weight dihydrostreptomycin sulphate and 1,5 pentanediol in petroleum based soft emollient cream. During May 2014, a flock of approximately 200 Highlander and Charolaise ewes flock with 300 lambs born in March 2014 was visited to investigate on cases of orf. We diagnosed the cases based on clinical signs with

no samples taken for confirmatory diagnosis. Several studies have documented that orf can often be diagnosed via clinical signs such as proliferative lesions on the skin around the lips and muzzle in ewes and lambs [1]. Around 30 lambs were found with signs of orf with two lambs presenting with severe signs of the disease. The two lambs that became of further interest showed signs of severe weight loss, probably due to the fact that they could not eat due to the severe painful lesions around the muzzle extending to the buccal mucosa. Rostrally, scabs were clearly visible extending for 4 to 6 cm around the muzzle. On careful removal of the scabs, there was bleeding and serous exudate with pus accumulation, characteristic of a secondary bacterial infection (Figure 1). In addition, lymphadenopathy involving both prefemoral and prescapular lymph nodes was noted. According to the farmer he had noticed a few lambs with orf 10 days before our visit. However, looking at the severity of the two cases the disease may have started much earlier.

We therefore focused around the two lambs to try administering some treatment against secondary infection. To facilitate wound healing and treatment for secondary infection the two lambs were given an intramuscular injection of 200mg/kg body weight procaine penicillin and 250mg/kg body weight dihydrostreptomycin sulphate [11] combined with 1,5 pentanediol in petroleum-based soft emollient cream once daily for three consecutive days. The choice for administering penicillin-dihydrostreptomycin sulphate combination was based on the fact that it has a broad spectrum activity against a wide range of pathogenic micro-organisms such as



Figure 1 Ten weeks old lamb with severe orf.



Figure 2 Response to treatment after 1 week.



Figure 3 Response to treatment after 2 weeks.

Arcanobacterium pyogenes, *Staphylococcus spp*, *Streptococcus spp* and *Salmonella spp*, *Klebsiella pneumonia*, *Listeria spp*, *Mannheimia haemolytica* and *Pasteurella multocida* [11]. When re-examined seven days later, the lesions had improved (Figure 2) and after two weeks the majority of scabs had almost cleared to a certain degree (Figure 3).

DISCUSSION

Orf is commonly seen soon after lambing and appears to occur during spring and summer months. It is caused by a parapox virus in the family *Poxviridae*. The prevalence of the disease varies between farms and this has been linked to management practices such as vaccination and other on farm biosecurity measures [12]. Though it can produce lesions elsewhere on the open surfaces of the skin, the common early signs involve papulo-vesicular eruption on the lips and mucocutaneous junction of the mouth [5]. A vaccine is available but only provides immunity for up to 1 year. The disease can become much worse when opportunistic pathogens such as *Staphylococcus aureus* and *Arcanobacterium pyogenes* are involved resulting in secondary bacterial infection. The present study looked at clinical presentation and therapeutic efficacy of procaine penicillin and dihydrostreptomycin sulphate [11] combined with 1,5 pentanediol in petrolatum based soft emollient cream (NET TEX™) on two orf cases associated with secondary bacterial infection. Previous studies have concentrated around the use of antibiotics and antivirals but it is our understanding that no published work has employed symptomatic treatment involving parenteral procaine penicillin and dihydrostreptomycin sulphate and topical application of 1,5 pentanediol in petroleum based soft emollient cream against severe erythematous orf.

It would be important to note that there are no treatments for orf due to the fact that it is a viral infection and thus any treatment is always focused around secondary infections. Most orf cases can last for up to eight weeks before the lambs recover fully while deaths have been reported during severe cases [5]. In the present study the lesions resolved within three weeks and both lambs showed good prognosis after treatment. Studies have shown that procaine penicillin and dihydrostreptomycin sulphate can have an extended spectrum of activity against target pathogens such as *Arcanobacterium pyogenes*, *Klebsiella pneumonia*, *Staphylococcus spp*, *Streptococcus spp* and *Salmonella*

spp [13]. Though this study did not go as far as identifying the pathogens which might have been present, Wilson and others [5] isolated *Staphylococcus aureus* and *Arcanobacterium pyogenes* some of the bacterial pathogens that were present during a severe orf outbreak in lambs. Studies conducted to test the safety and efficacy of 1,5-pentanediol petroleum based emollient showed a safety margin of 36.53% when used on dermatitis cases in humans [14]. The product also restored the skin barrier by increasing amount of lipids within the skin. The current product (1,5-pentanediol cream) applied around orf lesions may have worked by helping soften the scabs while restoring the skin barrier, similar to previous efficacy studies on dermatitis cases in humans.

There was a history of the farm having had orf 3 years ago after having bought feeding troughs from an agricultural auction market, which could have been a possible source of infection. It has also been documented that the virus can remain in buildings, soil or pasture for a long period while infected animals can remain carriers [15] which also could explain the occurrence of reported cases. The good prognosis to treatment did demonstrate that a combination of broad spectrum parenteral procaine penicillin and dihydrostreptomycin sulphate and topical application of 1,5 pentanediol in petrolatum based soft emollient cream is effective in the treatment against secondary infection during orf cases.

CONCLUSION

This study established that parenteral procaine penicillin and dihydrostreptomycin sulphate and topical application of 1,5 pentanediol in petroleum based soft emollient cream is effective in the treatment against secondary infections that followed during an orf outbreak in lambs. It is important to note that this study did not carry out any diagnostic tests to identify the specific pathogens present. It would be beneficial to carry out early treatment involving both parenteral and topical applications which could help reduce some of the health and welfare consequences associated with the disease. It would also be worth trying a similar type of treatment on a larger cross sectional study in future studies for more accurate results.

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