



# Alterations in Haematological and Biochemical Parameters in Sokoto Red Goats Infected with Orf Virus: A Case Report

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## **Authors' contributions**

This work was carried out in collaboration among all authors. Author YSB conceived the idea for manuscript writing and wrote the original draft of the manuscript. Authors MBB and NL carried out the viral isolation and identification. Author UGR performed the case management. Authors AA and AAR served as clinical pathologist and histopathologist, respectively. All authors read and approved the final manuscript.

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**Case Study**

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## **ABSTRACT**

**Aims:** To determine the alterations in some haematological and serum biochemical parameters in contagious ecthyma (CE) or Orf-infected Sokoto red goats (SRG).

**Presentation of Case:** Following a complaint of sore mouth disease in SRG, the patients were noticed to be docile, pyrexia with congested visible mucous membranes. There were crusty skin

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lesions around the oral and nasal commissures which were firm and painful. Blood samples were taken for routine haematological and biochemical investigations and results presented and discussed.

**Discussion and Conclusion:** There are paucity of information on the haematological and serum biochemical changes associated with CE in SRG. Thus, this case report presents the alterations in some haematological and biochemical parameters in SRG following an outbreak in Sokoto metropolis, Nigeria. Contagious ecthyma was diagnosed based on the presented clinical signs and confirmatory diagnosis via molecular technique, polymerase chain reaction. The affected goats were successfully managed through scrapping, cleaning and disinfecting the scabby lesions. Subsequently, broad spectrum antibiotics and multivitamin injections were administered. In conclusion, the observed clinicopathological changes in SRG were suggestive of an ongoing disease, marked stress and polycythaemia which were associated features of Orf disease in small ruminants.

*Keywords: Haematology; Nigeria; Orf; serum biochemistry; Sokoto red goats.*

## 1. INTRODUCTION

Contagious ecthyma (CE), is a highly contagious viral skin disease affecting mostly young ruminants, sheep and goats [1]. The disease is popularly known as Orf, and is also called by other names such as pustular dermatitis, infectious labial dermatitis, scabby mouth and sore mouth [2,3]. Orf disease can also affects dog, cattle, camel and wild animals [4,5], and its zoonotic imperative has been reported in humans [6,7]. Orf is a global disease mostly occurring in late summer, fall and winter on pasture and in feedlots, and the virus can be contracted via direct contact and is highly resistant capable of survival in the environment for many months [8]. Animals grazing on coarse pastures is considered as a predisposing factor in the transmission of the disease especially when oral abrasions are established [9]. Orf virus has an incubation period of 4 to 8 days, as such affected animals present with numerous clinical signs such as pyrexia, anorexia, severe emaciation and death [1]. The disease is also associated with huge economic losses as a result of high morbidity and low mortality rate, especially in young unvaccinated animals [9]. The mortality is largely due to secondary bacterial infections [1].

In Sokoto metropolis, Nigeria there is no reliable data on the haematological and biochemical profiles of CE despite its endemic nature, causing high morbidity and huge economic losses annually. In addition, histopathology and serology or molecular finding are great tools in the viral diagnosis. But the current case report describes some haematological and serum biochemical parameters of CE in Sokoto red goats (SRG). The disease outbreak was

confirmed via molecular technique, polymerase chain reaction (PCR) [10].

## 2. PRESENTATION OF CASE

A complaint of sore mouth disease in SRG was received from a farm in Sokoto metropolis, Nigeria. According to the client, the condition was noticed four days prior to the reporting. There were fifteen goats (eight were affected), eight sheep and one cow in the farm, and the animals were managed semi-intensively. History further revealed that, there was medication with an undisclosed drug and the farm had no history of vaccination. On physical examination, the patients were docile with congested visible mucus membranes. There were crusty skin lesions around the oral and nasal commissures which were firm and painful (Fig. 1). Some lesions appeared moist and ulcerated measuring about 2cm to 5cm in diameter. Similarly, there were pyrexia, anorexia, dehydration and teeth grinding in the affected goats. The average body weight of the goats was 20 kg.

Subsequently, blood samples were taken for routine haematological and biochemical analyses and results from some goats showing clinical signs were presented in Table 1 and Table 2, respectively.

## 3. DISCUSSION

Contagious ecthyma, is a highly contagious viral skin disease affecting mostly young ruminants, sheep and goats throughout the world. The Orf proliferative lesions develop from erythema, macules, papules, vesicles, pustules and crusts [13,7]. As observed in SRG, lesions are mostly found around the lips, muzzle, mouth, teats, hooves and other parts of the body especially in

young animals [14,15]. Orf can be diagnosed based on its characteristic skin lesions on the predilection sites. However, the disease should be differentiated grossly with goat pox, foot and mouth disease, staphylococcal dermatitis, dermatophilosis and ulcerative dermatosis [16,17].

Haematology results represent that there were increase in white blood cell, neutrophils, lymphocytes, monocytes and band cell count perhaps due to severe Orf virus infection. While the increase in red blood cell and haemoglobin concentration indicates polycythaemia due to dehydration in diseased goats. Alterations in



**Fig. 1. Moist skin lesions around the oral and nasal commissures in SRG infected with Orf virus**

**Table 1. Haematological profile of Sokoto red goats infected with Orf virus**

Parameters	Obtained Values		Absolute Values		Reference values
	Goat A	Goat B	Goat A	Goat B	
Packed cell volume (%)	25	24	-	-	22.0 – 38.0
Haemoglobin (g/dl)	8.0	7.3	-	-	8.0 – 12.0
Red blood cell ( $\times 10^6/\text{mm}^3$ )	11.23	9.31	-	-	5.0 – 8.0
White blood cell ( $\times 10^3/\text{mm}^3$ )	14.25	13.40	-	-	4.0 – 13.0
Neutrophils (%)	58	53	8.27	7.10	1.2 – 7.2
Lymphocytes (%)	36	43	5.13	5.76	2.0 – 9.0
Monocytes (%)	5	1	0.71	0.13	0.0 – 0.6
Eosinophils (%)	0	1	0.00	0.13	0.0 – 0.70
Basophils (%)	0	0	0.00	0.00	0.0 – 0.2
Band cells (%)	1	2	0.14	0.26*	Rare

Reference values [11, 12]

**Table 2. Serum biochemical profile of Sokoto red goats infected with Orf virus**

Parameters	Obtained Values		Reference values
	Goat A	Goat B	
Aspartate aminotransferase (IU)	31	7	52 - 107
Alanine aminotransferase (IU)	20	20	9 - 24
Total bilirubin (mg/dL)	0.6	0.8	0 – 0.1
Total protein (mmol/L)	7.8	7.2	69 - 73
Albumin (mmol/L)	4.1	4.0	31

Reference values [12]

haematological parameters have been reported previously, and were linked to inflammatory response to CE, secondary bacterial infection and stress [18,19]. Serum biochemical changes have been associated with Orf virus infection [8]; however, the present case did not show remarkable findings.

Other important diagnostic tools in CE include histopathology, cell culture isolation, serology, polymerase chain reaction (PCR), real time PCR and restricted fragment length polymorphism [8]. Interestingly, this case was confirmed by our research group to be Orf using PCR [10]. According to the confirmatory diagnosis, embryonated chicken eggs were employed to isolate the orf virus using established laboratory protocol. Viral DNA was extracted and full coding region of B2L gene was amplified through PCR, sequenced and blasted for identification and phylogenetic analysis. The B2L gene sequences isolated showed slight variability (96– 98.7%) with the reference sequences as it clustered within the same clade with Korean, Zambian and Ethiopian strains, signifying a close genetic relationship. Unique amino acid substitutions were also observed. Hence, this is showing the first genetic characterization of B2L gene of orf virus circulating in Nigeria. Orf is believed to be self-limiting disease, however superimposition by bacterial infection might confound the situation [17]. However, this condition was successfully managed by scrapping, cleaning and disinfecting the scabby lesions. Subsequently, broad spectrum antibiotics and multivitamin injections were administered as recommended [8].

#### 4. CONCLUSION

The case report has established haematological and serum biochemical alterations associated with CE in SRG. The observed clinicopathological changes in the affected goats were suggestive of inflammatory response to CE, secondary bacterial infection and stressful condition. Biosecurity, quarantine and vaccination measures should be employed to prevent future disease outbreak in animals.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

#### REFERENCES

1. Adedeji AJ, Maurice NA, Wungak YS, Adole JA, Chima NC, Woma TY, Chukwuedo AA, Shamaki D. Diagnosis of orf in west African dwarf goats in Uyo, Akwa Ibom state, Nigeria. *African J. Infect. Dis.* 2017;11:90–94.
2. Wet C, Murie J. Lamb pays lip service: Two cases of ecthyma contagiosum (Orf). *Scott Med J.* 2011;56(1):59.
3. Tedla M, Berhan N, Molla W, Temesgen W, Alemu S. Molecular identification and investigations of contagious ecthyma (orf virus) in small ruminants, North west Ethiopia. *BMC Vet. Res.* 2018;14(1): 1–8.
4. Haig DM, Mercer AA. Ovine diseases. *Orf Vet Res.* 1998;29:311–26.
5. Adedeji AJ, Adole JA, Chima NC, Maguda AS, Dyek DY, Jambol AR, Anefu EO, Shallmizhili JJ, Luka PD. Contagious ecthyma in three flocks of goats in Jos-south LGA, Plateau State, Nigeria. *Sokoto J. Vet. Sci.* 2018;16:107.
6. Pal M, Tesfaye S, Dave P. Zoonoses occupationally acquired by abattoir workers. *J Environ Occu Sci.* 2013;2(3): 155–62.
7. Demiraslan H, Dinc G, Doganay M. An overview of Orf virus infection in humans and animals. *Recent Pat Antiinfect Drug Discov.* 2017;12(1):21-30.
8. Nandi S, De UK, Chowdhury S. Current status of contagious ecthyma or orf disease in goat and sheep—A global perspective. *Small Rumin. Res.* 2011; 96(2-3):73-82.
9. Kumar R, Trivedi RN, Bhatt P, Khan SUH, Khurana, SK, Tiwari R, Karthik K, Malik YS, Dhama K, Chandra R. Contagious Pustular dermatitis (Orf disease) – epidemiology, diagnosis, control and public health concerns. *Adv. Anim. Vet. Sci.* 2015;3(4):560–9.
10. Lawal N, Ibrahim M, Onawala DA, Bello MB, Aliyu RM, Baraya YS, Aliyu A, Ibrahim AM, Sa'adu A. Molecular characterization and phylogenetic analysis of orf virus isolated from goats in Sokoto metropolis, Nigeria. *Future Sci.* 2021; 7(6):FSO700.

11. Gyang EO. An Introduction to Large Animal Surgery. Zaria, Agitab Publishers Ltd. 1990;5.
12. Njidda AA, Hassan IT, Olatunji EA. Haematological and biochemical parameters of goats of semi arid environment fed on Natural grazing rangeland of northern Nigeria. IOSR-JAVS. 2013;3(2):01-08.
13. Joseph RH, Haddad FA, Matthews AL, Maroufi A, Monroe B, Reynolds M. Erythema multiforme after Orf virus infection: A report of two cases and literature review. Epidemiol. Infect. 2015; 143(02):385-390.
14. Bala JA, Balakrishnan KN, Jesse FFA, Abdullah AA, Noorzahari MSB, Ghazali MT, Mohamed RB, Haron AW, Noordin MM, Mohd-Azmi ML. Identification of strain diversity and phylogenetic analysis based on two major essential proteins of Orf viruses isolated from several clinical cases reported in Malaysia. Infect. Genet. Evol. 2020;77:104076.
15. Wang G, Wang Y, Kong J, Li Y, Wu J, Chen Y, Liu X, Shang Y, Zhang Z. Comparison of the sensitivity of three cell cultures to ORFV. BMC Vet Res. 2019; 15(1):13.
16. Watson P. Differential diagnosis of oral lesions and FMD in sheep. In Pract. 2004;26:182-191.
17. Wilson DJ, Scott PR, Sargison ND, Bell G, Rhind M. Effective treatment of severe facial dermatitis in lambs. Vet. Rec. 2002;150:45-46.
18. Ghani MU, Khan MUR, Aslam A, Shabbir Z, Bo L, Anwar N. Pathological studies on contagious ecthyma in naturally infected small ruminants. H & V. 2019;6(1): 16-22.
19. Kumar R, Moudgil P, Grakh K, Jindal N, Sharma M, Gupta R. Epidemiology, clinical features, and molecular detection of orf virus in Haryana (India) and its adjoining areas. Trop Anim Health Prod. 2022; 54(5):268.

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