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EFFECTS OF DRY CUPPING ON GRIMACE SCALE OF SHEEP INFECTED WITH FOOT ROT

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ABSTRACT

The purpose of this study was to look at how dry cupping affected the Grimace scale of sheep infected with foot rot. Three treatment groups, each with four sheep, were randomly assigned as: I (seemingly healthy sheep with cupping = Negative control), II (infected sheep treated with cupping alone), and III (infected sheep treated with cupping and oxytetracycline). Four distinct areas on each sheep's body received the cupping procedure while photographs of the faces of sheep were taken on days 0, 7, and 14. In comparison with uninfected, all infected sheep had higher Grimace scores, indicating pain. The mean Grimace scores of the sheep decreased after cupping was applied, from 1.5>1>1 in group I, 7.5>3>2.5 in group II and in group III at 8>3.5,>2.5 on days 0, 7, and 14 respectively. The observed sheep pain facial expression scale was able to distinguish between lame sheep that were in excruciating pain. According to this study, cupping therapy is beneficial in the management of foot rot, though its analgesic effect on animals experiencing pain. Cupping should be incorporated in the management of pain in animals, which will reduce the use of analgesics which exposes the animals to severe side effects.

Key words: Dry cupping, Grimace scale, Sheep, Foot rot

Introduction

Cupping (*Hijama* in Arabic) is an ancient, holistic method for the treatment of a variety of diseases. Though the exact origin of cupping therapy is a matter of controversy, its use has been documented in early Egyptian and Chinese medical practices [1]. The Prophet Muhammad's traditions (hadiths) also highlighted cupping therapy during the initial six centuries of the Common Era [2]. One of the complementary and alternative medicine manipulative therapies with a global reach is cupping therapy [2]. Islamic teaching has endorsed it, and Saudi Arabia and other Muslim nations practice it with strong ties to their religious sources [3]. Numerous illnesses have been treated by cupping, particularly those that are linked to excruciating disorders including herpes zoster, facial paralysis, acne, and cervical spondylosis [4] Numerous ideas have been proposed to elucidate the workings and outcomes of cupping therapy [5] which consist of lowering pain, improving blood flow, calming down muscles, altering the composition of nearby tissues, triggering the immune system, and purifying the blood [5]. Cupping is predominantly employed in Asian and Middle Eastern nations to alleviate pain and address various symptoms [6]. Sheep primarily experience pain due to diseases, leading to adverse effects on their well-being and overall productivity [7]. One of such diseases is Foot rot, which causes severe lameness [8]. As lesion severity increases, the intensity of observed lameness also increases, indicating the presence of pain [9]. Resolution of the lesions does not necessarily remove this pain, as hyperalgesia to a mechanical stimulus may still be present for up to three months in sheep that had previously suffered from severe foot rot [10]. Detecting early signs of disease, as well as its associated pain can be challenging in sheep, and because they are prey animals, they do not overtly express signs of pain and weakness. This can leave handlers uncertain about the appropriate use of medications, like non-steroidal anti-inflammatories (NSAIDs).

The Grimace or Sheep Pain Facial Expression Scale is a tool designed for assessing pain levels in sheep by analyzing their facial expressions. Since its development, it has demonstrated high accuracy in recognizing pain [11]. Furthermore, the expression scale has the ability to assess the temporal nature of pain [12], demonstrating whether the degree of fluctuation is high or constant throughout the assessment period enabling the development of a better pain management strategy when the need arises. Although the presence of human is required at the moment, efforts are underway to commercialize the automation of the process which would remove the subjectivity of human assessment.

The effective management of pain in sheep is limited by inability of human to accurately recognize and quantify pain in this species [13]. A gap in knowledge exists on the impact of Cupping therapy on various physiological parameters (including pain) and overall health in different animal species [14]. Current pain assessment and blood assay can be time consuming and expensive [15]. This makes it impractical for on-farm and ambulatory service settings [13]. In addition to fewer side effects, complementary medicine is valued for its holistic approach, addressing not only the symptoms but also the overall well-being of an individual. This makes it appealing to individuals seeking more natural and minimally invasive options [16]; 17].

Materials and Methods

Location and Duration of Experiment

This study was carried out at the Veterinary Teaching Hospital Farm, University of Abuja, Gwagwalada, Abuja, Nigeria. The duration of the study was fourteen days and a three-group experimental design was adopted for the study

Experimental animals

Diagnosis of Foot rot was made by two large animal Consultant to the Veterinary teaching Hospital, University of Abuja. In addition to apparently healthy animals, a total of twelve (12) Yankasa breed, aged 2 – $2^{1/2}$ years were distributed to treatment groups – Group I (apparently healthy sheep), Group II (Infected sheep treated with cupping alone) and Group III (Infected sheep treated with cupping and oxytetracycline). Signalment and comprehensive clinical examination of each sheep was carried out and recorded.

Experimental sheep and Clinical examination

A total of three treatment groups were used for the study; Group I (apparently healthy sheep), Group II (Infected sheep treated with cupping alone) and Group III (Infected sheep treated with cupping and oxytetracycline). Signalment and comprehensive clinical examination of each sheep was carried out and recorded.

Pain Assessment Using Sheep Pain Facial Assessment Scale

In all the study groups (I, III, III), photographic images (two photographs for each time points) of sheep faces were taken on the day zero (day 0). All sheep in the treatment and control groups were revisited with images taken on day 7 and 14. Observers who had been trained scored the facial expression of sheep. Using a maximum pain score of 10 (a score of 2 for each of the 5 facial areas), the total pain scores were determined by adding the individual scores for each of the five areas for each photograph as described by [13]. In addition, animals were reassessed for lesions and lameness to assess recovery upon completion of experiment.

Cupping Techniques

In this study, dry cupping was used. The site was shaved and cleaned with disinfectant, the cups were placed on the site and suction was made. The cups were left on the site for 5 minutes, afterwards, it was removed and cleaned. Cupping therapy was performed on day zero, it was repeated on the seventh day. Due to the lack of information on application of cupping in sheep, the Chinese meridian energy concept was used to identify some point that can be used for this purpose. Cupping technique was applied to four specific locations on each sheep's body. The initial two points were situated on the left and right sides of the scapular region, while the subsequent two points were positioned in the rump area, specifically on the posterior-dorsal region corresponding to sacral vertebrae (Figure 1).

Figure 1: Showing the position of cupping in sheep

Results

Grimace Scale of Sheep Infected with Footrot

Facial expression scoring system revealed that all the study animals were experiencing pain, which was mild in apparently healthy sheep and severe in the animals infected with foot rot. In comparison with uninfected group, there was a significant decrease in the grimace scale of infected sheep on day 7 (Table 1).

Table 1: Effect of cupping on Mean Grimace scale score of Sheep infected with footrot

	Day 0	Day 7	Day 14
Footrot + Cupping	7.5	3	2.5
Footrot + Oxytetracycline + Cupping	8	3.5	2.5
Control + Cupping	1.5	1	1

Discussion

This research indicates that both the apparently heathy and unhealthy animal are in pain – an indication that animal welfare must be given the best of attention by all stakeholders [18].

The sheep pain facial expression scale observed was able to identify lame sheep experiencing severe pain. These facial expression changes align with those observed in other species in relation to pain, as documented by various studies [19;20;21;22]. An abnormal ear position observed in all sheep before and after the study could be as a result of mixed breeding, which is usually random and undocumented.

One major observation from the study was that apparently healthy sheep without foot rot lesions had abnormal facial expressions. This outcome could be because of other pain causing conditions experienced by the animals. Sheep without foot rot lesion showed an insignificant improvement in their sheep pain facial expression scale. However, there was a significant decrease in the grimace score of infected Sheep treated with cupping therapy. Our study's findings, which indicate a positive correlation between lameness level and the severity of foot rot lesions, validate our chosen model and align with similar observations in other studies [10;23]. Cupping, either alone or in combination with oxytetracycline caused a decrease in grimace score. This could be indicative of the effectiveness of cupping in ameliorating pain.

Cupping therapy has an analgesic effect in the treatment or management of foot rot. Either in combination with oxytetracycline or as a single therapy, cupping is effective in ameliorating the effect of footrot in sheep. Cupping should be incorporated in the management of pain in animals, this will reduce the use analgesics which exposes the animals to severe side effects. Further investigation should be conducted with Cupping therapy for treatment of other diseases that are of public Health importance.

Conclusion

Cupping therapy has an analgesic effect in the treatment or management of footrot. Either in combination with tetracycline or as a single therapy, cupping is effective in ameliorating the effect of footrot in sheep.

References

1. Qureshi, N. A., Ali, G. I., Abushanab, T. S., El-Olemy, A. T., A lqaed, M. S., El-Subai, I. S., & Al-Bedah, A. M. (2017). History of cupping (Hijama): a narrative review of literature. Journal of integrative medicine, 15(3), 172-181.

2. Furhad, S., Sina, R. E., & Bokhari, A. A. (2023). Cupping therapy. In StatPearls [Internet]. StatPearls Publishing.

3. Khalil, M. K., Al-Eidi, S., Al-Qaed, M., & AlSanad, S. (2018). Cupping therapy in Saudi Arabia: from control to integration. Integrative medicine research, 7(3), 214-218.

4. Cao, H., Li, X., & Liu, J. (2012). An updated review of the efficacy of cupping therapy. PloS one, 7(2), e31793.

5. Al-Bedah, A. M., Elsubai, I. S., Qureshi, N. A., Aboushanab, T. S., Ali, G. I., El-Olemy, A. T., ... & Alqaed, M. S. (2019). The medical perspective of cupping therapy: Effects and mechanisms of action. Journal of traditional and complementary medicine, 9(2), 90-97.

6. Yoo, S. S. and Tausk, F. (2004). Cupping: East meets West. International Journal of Dermatology, 43(9), 664-665

7. McLennan, K., & Mahmoud, M. (2019). Development of an automated pain facial expression detection system for sheep (Ovis Aries). Animals, 9(4), 196.

8. Kaler, J., Daniels, S. L. S., Wright, J. L., & Green, L. E. (2010a). Randomized clinical trial of long-acting oxytetracycline, foot trimming, and flunixine meglumine on time to recovery in sheep with footrot. Journal of Veterinary Internal Medicine, 24(2), 420-425.

9. Kaler, J., Medley, G. F., Grogono-Thomas, R., Wellington, E. M. H., Calvo-Bado, L. A., Wassink, G. J., King, E. M., Moore, L. J., Russel, C. and Green, L. E. (2010b). Factors associated with changes of state of foot conformation and lameness in a flock of sheep. Preventive veterinary medicine, 97(3-4), 237-244.

10. Dolan, S., Kelly, J. G., Monteiro, A. M., & Nolan, A. M. (2003). Up-regulation of metabotropic glutamate receptor subtypes 3 and 5 in spinal cord in a clinical model of persistent inflammation and hyperalgesia. Pain, 106(3), 501-512.

11. McLennan, K. M., Rebelo, C. B. J., Corke, M. J., Holmes, M. A., & Constantino-Casas, F. (2014). The development of a facial grimace score in adult sheep. In Proceedings of ISAE UK and Ireland Regional Meeting (p. 9).

12. Baliki, M. N., Chialvo, D. R., Geha, P. Y., Levy, R. M., Harden, R. N., Parrish, T. B., & Apkarian, A. V. (2006). Chronic pain and the emotional brain: specific brain activity associated with spontaneous fluctuations of intensity of chronic back pain. Journal of Neuroscience, 26(47), 12165-12173.

13. McLennan, K. M., Rebelo, C. J., & Corke, M. J. (2016). Development of a facial expression. Applied Animal Behaviour Science.

14. Shekarforoush, S., Foadoddini, M., Noroozzadeh, A., Akbarinia, H., & Khoshbaten, A. (2012). Cardiac effects of cupping: myocardial infarction, arrhythmias, heart rate and mean arterial blood pressure in the rat heart. Chinese Journal of Physiology, 55(4), 253-258.

15. Mogil, J. S., & Crager, S. E. (2004). What should we be measuring in behavioral studies of chronic pain in animals?. Pain, 112(1), 12-15.

16. Caudill, T. S., Johnson, M. S., Rich, E. C., & McKinney, W. P. (1996). Physicians, pharmaceutical sales representatives, and the cost of prescribing. Archives of family medicine, 5(4), 201-206.

17. Kumar, A. (2003). The use of complementary therapies in Western Sydney. Sociological Research Online, 8(1), 27-44.

18. Anyaku, Caesar Ewutsa, Taiwo Abiola Otunla, Nurudeen Ajibola and Stephanie Mngusonun Ukpi. (2023). Animal Welfare Conditions: A case study of Ogbomoso North Local Government Area, Oyo State, Nigeria. Asian Journal of Research in Animal and Veterinary Sciences 6(3):265-282

19. Dalla Costa, E., Minero, M., Lebelt, D., Stucke, D., Canali, E., & Leach, M. C. (2014). Development of the Horse Grimace Scale (HGS) as a pain assessment tool in horses undergoing routine castration. PLoS one, 9(3), e92281.

20. Keating, S. C., Thomas, A. A., Flecknell, P. A., & Leach, M. C. (2012). Evaluation of EMLA cream for preventing pain during tattooing of rabbits: changes in physiological, behavioural and facial expression responses. https://doi.org/10.1371/journal.pone.0044437.

21. Leach, M. C., Klaus, K., Miller, A. L., Scotto di Perrotolo, M., Sotocinal, S. G., & Flecknell, P. A. (2012). The assessment of post-vasectomy pain in mice using behaviour and the Mouse Grimace Scale. PloS one, 7(4), e35656.

22. Sotocina, S. G., Sorge, R. E., Zaloum, A., Tuttle, A. H., Martin, L. J., Wieskopf, J. S., & Mogil, J. S. (2011). The Rat Grimace Scale: a partially automated method for quantifying pain in the laboratory rat via facial expressions. Molecular pain, 7, 1744-8069.

Kaler, J., George, T. R. N., & Green, L. E. (2011). Why are sheep lame? Temporal associations between severity of foot lesions and severity of lameness in 60 sheep. Animal Welfare, 20(3), 433-438.