



Udder Cleft Dermatitis (UCD) in Dairy cow:

Almost incurable even fatal dermatitis

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Issue 14, Vol 2

Article received: December 12, 2023, final acceptance: December 24, 2023

Autumn and Winter 2023

Home messages:

- Based on clinical findings, laboratory results and histopathology in this research, the presence of UCD in the dairy farms of Iran is announced and confirmed for the first time.
- After more than three decades after the diagnosis of this disease, its etiology, epidemiology, risk factors, durations of disease, disease process and treatment have many unknown dimensions.
- The risk factors related to the farm environment included the type of stall, ventilation equipment, number of ventilators, stall floor shape, frequency of litter cleaning and bed charging, type of bed cleaning device, use of lime and its frequency were significantly associated with the disease.
- There was a significant association between the severity of injuries and some of the characteristics of wound appearance such as the presence of foul-smelling, bleeding, exudate, scar tissue, granular tissue and coverage.
- The result of the PCR test for treponema from UCD wound samples (31), DD (4) and healthy cleft skin (10) were positive in 22.6%, 50% and 0% of cases, respectively.

- In histopathological examination, injuries similar to digital dermatitis and the presence of treponema were reported.
- Two treatment methods include 1. package of Ceftiofur Hydrochloride (Excenel), Nitrofurazone ointment, Flunixin meglumine, Povidone-iodine and 2. Zinc and copper sprays were introduced as the best treatments respectively.

Keywords: Udder Cleft Dermatitis, Dairy cow, Risk factors, Treponema, Histopathology, Culture, Iran.

Introduction:

Udder cleft dermatitis is an ulcerative, exudative and foul-smelling dermatitis. This disease in cattle is also known by other names which include: udder ulcerative dermatitis, udder rot, udder necrotic dermatitis, udder seborrhea, intertrigo, udder sores and udder scald. Injuries usually begin at the junction of the forequarters and the abdominal wall. However, in our research, the cleft between the two forequarters and the junction of four quarters were also affected. In rare cases, the extent of the wound included the entire skin of quarters and even teats.

Importance: UCD is not usually a fatal disease but the economic loss may be heavy. The problems caused by the disease can be summarized as follows: UCD has a long and painful course and becomes a chronic disease in the herd, the disease is contagious and may

affect up to 85% of dairy cows, UCD is almost incurable and even fatal, the treatment and recovery period is very long (up to 38 weeks) and the cost of treatment is high. It is involved in the etiology and pathogenesis of digital dermatitis, embolic pneumonia, endocarditis, fatal bleeding from mammary vessels, mastitis and removal of cows from the herd, continuous secretion of pus and blood, contamination of milking machine or spread of bacteria between cows, creating an unpleasant sight and smell during milking, UCD injuries reduce the cow's comfort and thus reduce the quantity and quality of milk.

Etiology: Many hypotheses have been proposed, but there are very few proven findings, they include udder edema, wear between cartiers, a wide range of aerobic and anaerobic bacteria, viruses, fungi, infection with treponemas, mite infestation, etc., But

the causal relationship of none of them with UCD has not been proven.

Incidence: Studies in other countries, such as the Netherlands, Sweden, England and Germany show that it has a prevalence of up to 85% of herds and within herds from zero to 39%. In our study, out of 3472 cows in two farms, 238 (6.85%) cows with UCD were identified and investigated. Affected cows in the two farms had significant differences in terms of number and percentage, severity of injuries and laboratory results.

Risk factors: Risk factors related to farm environment, condition and history of infected cows were evaluated. UCD injuries were identified and scored in terms of size, form, severity, type of secretions, cover, bleeding and other characteristics. The risk factors related to the farm environment included the type of stall, ventilation equipment, number of ventilators, stall floor shape, frequency of litter cleaning and bed charging, type of bed cleaning device, use of lime and its frequency were significantly associated with the disease. There was no significant relationship between the disease severity and any of the risk factors related to the infected cow's condition. Moreover, there was not any

significant association between the disease severity and any of the risk factors related to the history of livestock including age, number of parities, and milk production, ... There was a significant association between the severity of injuries and some of the characteristics of wound appearance such as the presence of foul-smelling, bleeding, exudate, scar tissue, granular tissue and coverage, furthermore, a significant relationship was identified between lesion area and lesion length, lesion length and open wound length.

Bacteriology & Diagnostic PCR: Aerobic culture results were positive in 85% of the submitted samples from UCD, *Corynebacterium bovis* and *Staphylococcus* spp. were the most isolated. Unexpectedly, the results of anaerobic culture on similar sample numbers were negative in all cases. The results of PCR test for *Treponema* from UCD wound (31 samples), Digital dermatitis (4 samples) and healthy udder cleft skin (10 samples) were positive in 7 (22.6%), 2 (50%) and 0% of cases, respectively. Unfortunately, it was not possible to type *Treponema* species. It is noteworthy that all the positive cases of *Treponema* belonged to farm A with a high prevalence of digital dermatitis.

Histopathology: Tissue samples (5 cows) were prepared from the wounds of UCD-affected cows that had a positive PCR test for treponema (7 cows). In the results of cellular pathology, there were pustule formation and fibrosis in 100%, acanthosis and angiogenesis in 80%, and inflammation and granulation tissue formation in 60% of the samples. Microscopic injuries in tissue samples were similar to digital dermatitis injuries in 3 cases, similar to papillomatous digital dermatitis in 2 cases, and similar to ischemic teat necrosis in one case. Treponema bacteria was observed in the histopathology section of one of the samples.

Treatment: Cows were randomly placed in six groups of 12 cows for treatment. Treatment groups included: Control, Electrolyzed water (Anolyte), Boviderm spray, Copper and Zinc chelate spray, Lincomycin powder, Copper and Zinc gel (Hoof gel) and the package included Excenel, Flunixin meglumine, povidone-iodine and Nitrofurazone ointment. All treated cows received one dose of AD3E and Theranekron, the wounds were washed with water and cleaned of feces, litter, dirt, etc. and dried. Evaluation of changes in the area, length and quality indicators of UCD injuries before and

after treatment in therapeutic groups and comparing it with the control group showed that the principle of treatment can be preferred to the theory of non-treatment of UCD injuries. The effect of each treatment method on four quality indicators including bleeding, fat content, hyperemia and the presence of exudate are very different from each other. The following two treatment methods were identified as the best, respectively: 1- Package of Cefotiofur Hydrochloride (Excenel), Nitrofurazone ointment, Flunixin meglumine, Povidone-iodine and 2-Zinc and copper sprays. Although UCD is almost incurable a definitive cure will not occur.

Conclusion:

UCD is a relatively unknown disease, it has a short history in several European countries. After more than three decades of the diagnosis of this disease, its ethology, epidemiology, risk factors, durations of disease, disease process and treatment have many unknown dimensions. There is no report or research on it in Iran. Based on clinical findings, laboratory results and histopathology in this research, the presence of UCD in the dairy farms of Iran is announced and confirmed for the first time. Several risk factors related to the farm

environment, the history and condition of infected animals, and the characteristics of UCD wounds were investigated. The results obtained were significant in many cases, but similar to the etiology, their impact on the occurrence of UCD cannot be determined. The results obtained from the aerobic culture of UCD wound samples are consistent with the results of almost all articles, but unexpectedly, results of anaerobic culture on similar sample numbers were negative in all cases. This result is completely different from the results of other researches. Problems in taking and sending samples, as well as the insufficient adequacy of the laboratory, should be kept in mind.

Considering the significant prevalence of UCD and DD diseases in farm A, Treponema positive PCR results from UCD and DD wounds only in this farm (A), and also negative PCR results of treponema from the healthy skin of the udder cleft, it can be concluded that first: more attention should be paid to Treponema not as a bacterium from healthy skin flora, but

as a possible pathogen bacterium and important in causing UCD. Second: after the formation of UCD, based on a set of factors, due to the high prevalence of DD in farm A, the opportunity for transfer and establishment of treponemas in UCD wounds has been provided. Microscopic injuries in tissue samples were similar to digital dermatitis injuries in 3 cases, similar to papillomatous digital dermatitis in 2 cases, and similar to ischemic teat necrosis in one case. Treponema bacteria was observed in the histopathology section of one of the samples. These results suggest the possibility of similarity in etiopathogenesis in these three diseases. Several cases of ischemic teat necrosis (ITN) have been observed by the author in dairy farms, and in some cases, the Treponema PCR test has been positive in the wound samples.

Acknowledgments: The authors gratefully acknowledge the help of Dr. Farhad Mousakhani and Behrooz Mohammadi.

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