MILK ALLERGY IN JERSEY COWS: FIRST REPORT IN BRAZIL

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ABSTRACT

Allergy to milk is the only auto-allergic disease in cattle. It is characterized by the retention and absorption of milk itself, making milk proteins, especially alpha casein, have access to the bloodstream, resulting in a type I hypersensitivity. The purpose of this report is to describe a case of auto-allergic disease in cattle. Here we report the case of a four-year-old Jersey female bovine, which was pregnant and weighing 400Kg. The animal was being treated at (hidden for revision) and had a history of an acute allergic reaction. Its owner reported sudden onset of skin lesions, salivation, and difficulty breathing. As the animal was participating in an agricultural exhibition, it was not being milked to generate mammary gland engorgement (milk retention). In physical examination findings wherein there is presence of multifocal urticarial papules and plaques, mainly on the sides and right and left flanks, besides the absence of pruritus, edema in mucocutaneous regions of the upper and lower eyelids of the right and left eyes, submandibular edema, excessive salivation, inspiratory dyspnea with half-open mouth breathing, respiratory distress, apathy, cough, tachycardia tachypnea, ruminal hypomotility and increased volume of the mammary gland, characterizing milk retention. Clinical suspicion was milk allergy with anaphylactic reaction (type I hypersensitivity). Treatment was based on promethazine administration (1mg/kg; IV) and immediate full milking of the mammary gland. After 12 h of treatment, clinical respiratory signs resolved, and after 24 h, skin changes resolved completely. Based on clinical signs and treatment success, the clinical suspicion of milk allergy causing anaphylactic reaction (type I hypersensitivity) was confirmed.

Keywords*:* anaphylaxis, milk, cattle.

AUTO ALERGIA AO LEITE EM VACA JERSEY: PRIMEIRO RELATO NO BRASIL

RESUMO

A alergia ao leite é a única doença auto-alérgica em bovinos. Caracteriza-se pela retenção e absorção do próprio leite, fazendo com que as proteínas do leite, principalmente a alfa caseína, tenham acesso à corrente sanguínea, resultando em uma hipersensibilidade do tipo I. O objetivo deste relato é descrever um caso de doença autoalérgica em bovinos. Relatamos o caso de uma fêmea bovina da raça Jersey, com quatro anos de idade, prenhe e pesando 400Kg. O animal estava em tratamento (oculto para revisão) e tinha histórico de reação alérgica aguda. Proprietário relatou aparecimento súbito de lesões na pele, salivação e dificuldade respiratória. O animal estava participando de uma exposição agrícola, e não estava sendo ordenhado para gerar ingurgitamento da glândula mamária (retenção de leite). No exame físico identificou-se pápulas e placas urticariformes multifocais, principalmente nas laterais e flancos direito e esquerdo, ausência de prurido, edema em regiões mucocutâneas das pálpebras superior e inferior dos olhos direito e esquerdo, edema submandibular, salivação excessiva, dispneia inspiratória com respiração de boca entreaberta, desconforto respiratório, apatia, tosse, taquicardia, taquipneia, hipomotilidade ruminal e aumento do volume da glândula mamária,

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caracterizando retenção de leite. A suspeita clínica foi alergia ao leite com reação anafilática (hipersensibilidade tipo I). O tratamento baseou-se na administração de prometazina (1mg/kg; IV) e ordenha completa imediata da glândula mamária. Após 12 h de tratamento, os sinais clínicos respiratórios foram resolvidos e, após 24 h, as alterações cutâneas desapareceram completamente. Com base nos sinais clínicos e no sucesso do tratamento, confirmou-se a suspeita de alergia ao leite causando reação anafilática (hipersensibilidade tipo I).

Palavras-chave: anafilaxia, leite, bovino.

ALERGIA A LA LECHE DE AUTO EN VACA JERSEY: PRIMER REPORTE EN BRASIL

RESUMEN

La alergia a la leche es la única enfermedad autoalérgica en el ganado bovino. Se caracteriza por la retención y absorción de la propia leche, provocando que las proteínas de la leche, especialmente la alfa caseína, tengan acceso al torrente sanguíneo, dando lugar a una hipersensibilidad tipo I. El objetivo de este reporte es describir un caso de enfermedad autoalérgica en bovinos. Presentamos el caso de una vaca Jersey hembra de cuatro años, gestante y de 400 kg de peso. El animal estaba siendo atendido en el (oculto para revision) y tenía antecedentes de reacción alérgica aguda. Propietario refirió aparición repentina de lesiones en la piel, salivación y dificultad respiratoria. Como el animal participaba en una exhibición agrícola, no estaba siendo ordeñado para generar congestión de la glándula mamaria (retención de leche). En examen físico en los que se observan pápulas y placas urticariales multifocales, principalmente en costados y flancos derecho e izquierdo, además de ausencia de prurito, edema en las regiones mucocutáneas de los párpados superior e inferior del lado derecho e ojos izquierdos, edema submandibular, salivación excesiva, disnea inspiratoria con respiración con la boca abierta, dificultad respiratoria, apatía, tos, taquicardia (frecuencia cardíaca 88 latidos/minuto), taquipnea (100 movimientos/minuto), normotermia (39,0°C), hipomotilidad ruminal (2 movimientos ruminales/5 minutos) y aumento de volumen de la glándula mamaria, caracterizando la retención de leche. La sospecha clínica fue alergia a la leche con reacción anafiláctica (hipersensibilidad tipo I). El tratamiento se basó en la administración de prometazina (1 mg/kg; IV) y ordeño completo inmediato de la glándula mamaria. Después de 12 h de tratamiento, los signos clínicos respiratorios se resolvieron y, después de 24 h, los cambios en la piel desaparecieron por completo. Sobre la base de los signos clínicos y el éxito del tratamiento, se confirmó la sospecha clínica de alergia a la leche que causaba una reacción anafiláctica (hipersensibilidad tipo I).

Palabras clave: anafilaxia, leche, bovino.

INTRODUCTION

Milk allergy is the only auto-allergic cattle disease. It is mostly observed in Jersey and Guernsey breeds and is related to mammary gland engorgement due to milk retention and absorption, resulting in type I hypersensitivity for casein sensitization. The disease can occur after cow drying off, estrus period, or when reducing milking frequency for dairy competitions. Any delay or interruption in milking intervals can predispose animals to this disease (1, 2).

Clinical signs are sudden and include skin lesions (hives and mucocutaneous junction edema), inspiratory dyspnea, and respiratory distress, which can quickly lead to animal death. The aim of this report is to describe a case of milk allergy in a Jersey cow in southern Brazil. It

is noteworthy that early diagnosis and proper treatment are essential to prevent the evolution of clinical picture, which can fast lead to animal death.

CASE DESCRIPTION

Here we report the case of a four-year-old Jersey female bovine, which was pregnant and weighing 400Kg. The animal was being treated at the (hidden for revision) and had a history of an acute allergic reaction. Its owner reported sudden onset of skin lesions, salivation, and difficulty breathing. As the animal was participating in an agricultural exhibition, it was not being milked to generate mammary gland engorgement (milk retention). Physical examination findings wherein there is presence of multifocal urticarial papules and plaques, mainly on the sides and right and left flanks, besides the absence of pruritus, edema in mucocutaneous regions of the upper and lower eyelids of the right and left eyes, submandibular edema, excessive salivation (Figure 1), inspiratory dyspnea with half-open mouth breathing, respiratory distress, apathy, cough, tachycardia (heart rate 88 beats/minute), tachypnea (100 movements/minute), normothermia (39.0°C), ruminal hypomotility (2 ruminal movements /5 minutes), and increased volume of the mammary gland, characterizing milk retention. Clinical suspicion was milk allergy with anaphylactic reaction (type I hypersensitivity). Treatment was based on promethazine [Prometazina®; 1mg/kg; IV; SID, single administration] and immediate full milking of the mammary gland. After 12 h of treatment, clinical respiratory signs resolved, and after 24 h, skin changes resolved completely. Based on clinical signs and treatment success, the clinical suspicion of milk allergy causing anaphylactic reaction (type I hypersensitivity) was confirmed.

Figure 1. (A) Four-year-old pregnant Jersey cow weighing 400Kg treated at the (hidden for revision). The animal had edema of mucocutaneous junctions (lower and upper eyelids of the right eye), and excessive salivation; (B) Presence of multifocal urticarial papules and plaques.

DISCUSSION

There are few reports in the literature on milk allergy in cattle, firstly described by Campbell in 1970 (1). The first reports date back to 1903 in France, where urticaria was observed in Jersey cows which were unmilked to improve udder appearance for purchase and sale. Afterwards, other reports of females in dry period or estrus were published. The scarcity of reports may be due to misdiagnosis, treatment without a definitive diagnosis, or even because it is of rare occurrence. Such findings raised the hypothesis that cows may have some resistance, or that there is an absorption threshold to trigger clinical signs (1).

Cattle participation in milk contests is common, and for this, milking is suppressed to keep the udder as full as possible. Furthermore, cow transportation or milking routine changes can cause milk accumulation. Mammary gland engorgement may allow absorption of milk proteins, especially casein, as this is mediated by histamines that increase vascular permeability (3, 4), generating type I hypersensitivity (anaphylaxis), as in the present report.

Type I hypersensitivity reaction is a serious and potentially fatal systemic disease, which occurs seconds to minutes after contact with an agent. Mast cells and basophils degranulate in response to antigen binding to immunoglobulin E, on their cell surface. These cells release inflammatory mediators responsible for tissue damage (5). Type I hypersensitivity reactions can occur due to different drugs such as penicillin, lidocaine (epidural analgesia), vitamin E, selenium, sulfonamides, tetracyclines, and less commonly due to alpha-casein in milk (6), the latter being the cause of anaphylaxis in this report.

Lesions usually appear when the animal has not been milked for 24 hours, as reported by the owner in our study. Milk proteins, including casein, were detected in urine of cows remaining without milking for 27 to 40 hours; therefore, these constituents were absorbed and distributed into the bloodstream (7). The most affected breed is Jersey (8), just as the case in this report.

The most common clinical sign is urticaria, which stands for multifocal elevations on the skin. This reaction can be primary, that it is formed due to direct contact with a pathogen, such as insect bites, contact with stinging plants, ingestion of food containing allergens, which are often proteins. A secondary reaction occurs as part of a syndrome, such as respiratory tract infections. In this report we have the primary case of urticaria, related to milk protein, an allergic condition characterized by the presence of cutaneous papules (9). They may or may not be itchy and may or may not have serous secretion (9, 10). In the bovine female in this report, there was no pruritus or secretion drainage.

Besides skin lesions, mucocutaneous edema and respiratory changes were observed in the female of the report. An edema originates from exudation from blood vessel walls and lead to development of papules (9). Pulmonary edema is permeable, which occurs due to excessive opening of the interendothelial spaces or damage to the blood-air barrier after release of inflammatory mediators (2, 4, 11). Abortions have been reported in female bovines affected by milk allergy (1). However, despite being pregnant, the cow in this report had no signs of stillbirth up to days after treatment.

Clinical evolution can be more severe in cases of anaphylactic shock. The condition progresses with hypotension, vascular stasis, hypertension, and pulmonary edema. Clinical signs shown are severe breathing difficulty, collapse, loss of consciousness, or seizures. Death can occur quickly (5).

In cases of anaphylaxis in bovines, treatment includes administration of epinephrine (IV, SC or IM) associated with corticosteroids, non-steroidal anti-inflammatory drugs, and fluid imbalance, acid base, and electrolyte corrections. In severe cases of respiratory distress, tracheostomy is indicated (5). Still, in cases of severe pulmonary edema, furosemide can be used as an emergency treatment (6).

In the case report, as the cow was pregnant, corticosteroid therapy as dexamethasone was not adopted, because of its contraindication in pregnant females (2). Promethazine was used associated with complete milking of the mammary gland. Although antihistamines do not respond well (10), the treatment was effective in this case. Nonsteroidal anti-inflammatory drugs, such as flunixin meglumine or meloxicam, could have been included as well (12).

Mere drug administration is often enough to resolve the condition. However, in some cases, treatment should be repeated within 12 or 24 hours of starting therapy (6). In the attended cow, a single application was enough to resolve the clinical picture.

CONCLUSION

Allergy to milk is an acute disease that can lead to death in cattle. It should be included in differential diagnosis in cases of hypersensitivity (anaphylaxis) in cattle. As far as we know, this is the first report of milk allergy in cattle in Brazil.

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