ENZOOTIC BOVINE LEUCOSIS: A CASE REPORT

LEUCOSE ENZOÓTICA BOVINA: UM RELATO DE CASO

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Abstract: Enzootic bovine leucosis is an infectious disease of cattle caused by the bovine leukemia virus that results in lymphoma within target tissues. Cattle might demonstrate four clinicopathological age-related manifestations of the disease: juvenile, adult, thymic, and cutaneous form. This article describes the unusual manifestation of this disease in a 4-yr-old cow. Regional lymph nodes were enlarged during clinical examination. Peripheral and internal lymph nodes, as well as the vagina, uterus, spleen, liver, heart, thoracic vertebrae, eye and the thoracic and abdominal cavities demonstrated lymphoma at necropsy. Bovine enzootic leucosis was confirmed by histopathology and agar gel immunodifusion.

KEYWORDS: Bovine leukemia virus. Pathology. Agar gel immunodifusion.

INTRODUCTION

Enzootic bovine leucosis is an infectious disease of adult dairy cattle caused by the bovine leukemia virus (BLV) an oncogenic type C retrovirus that integrates as a provirus into the host DNA (JACOBS et al., 2002). The disease is associated with predominant B-lymphocyte and persistent lymphocytosis (FRY; McGAVIN, 2007) and might result in the manifestation of lymphoma in target tissues. In cattle there are four distinct clincopathological age-related manifestation of lymphoma: a) juvenile, normally in calves with less than 6 months of age; b) thymic, more frequently described in beef cattle from 6 to 18 months of age; c) adult, in diary animals that are more than 2 years of age; and d) cutaneous, in cattle between 2 to 3 years of age (JACOBS et al., 2002). However, in these animals the disease is predominantly multicentric (FRY; McGAVIN, 2007).

The disease is considered endemic in Brazil, occurs in most States and the prevalence vary from 9 to 53% of the cattle population (TOSTES, 2005), resulting in significant annual economic loss to the local cattle industry. Approximately 30% of infected cattle with the viral infection demonstrate nonneoplastic persistent lymphocytosis, while only less than 5% of these develop the tumorous manifestation of the disease (FRY; McGAVIN, 2007). This article is important since it describes atypical manifestations of bovine enzootic leucosis in a dairy cow, and contributes to the documentation of this disease in Brazil.

CASE REPORT

The case in question was a four-year-old Holstein-Friesian lactating cow with recurrent ocular problems; she was attended at the Veterinary Hospital, Faculdade Integrado, Campo Mourão, PR, in December 2005. The owner revealed that ocular dysfunctions began three months earlier (September, 2005) with the appearance of a tumorous mass within the right ocular globe; the tumor had been removed surgically. Clinical examination revealed a similar mass that resulted in exophthalmia of the left eye; other significant clinical manifestations were severe enlargement of lymph nodes (submandibular, pre-scapular, and illiac) and body temperature of 39.1 ºC. Bovine enzootic leucosis was suspected and later confirmed serologically by agar gel immunodifusion and histopathological evaluation. The animal was subsequently euthanized; necropsy was preformed soon after death and selected tissues were fixed in 10% formalin solution and processed for routine histopathological evaluation.

Gross lesions were widespread in nature and occurred in regional and internal lymph nodes, the reproductive tract, thoracic and abdominal cavities, liver, spleen, and thoracic vertebrae. The submandibular, pre-scapular, illiac, pulmonary, hepatic, splenic, inguinal, and the mesenteric and mediastianal lymph nodes were severely enlarged (Figure 1A-D). The sectioned surface of most lymph nodes revealed the severe proliferation of a whitish-cream soft tissue that replaced part of the normal architecture of the organ (Figure 1C). Similar

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proliferative masses were observed in the vaginal and uterine walls (Figure 1E-F), and also adhered to the large uterine ligament; several similar masses were seen adhered to the thoracic vertebrae (Figure 1G) and within the lungs (Figure 1D). Hepatic and splenic involvement resulted in severe hepatomegaly (Figure 1H) and splenomegaly; multifocal whitish areas were observed within the cardiac muscle.

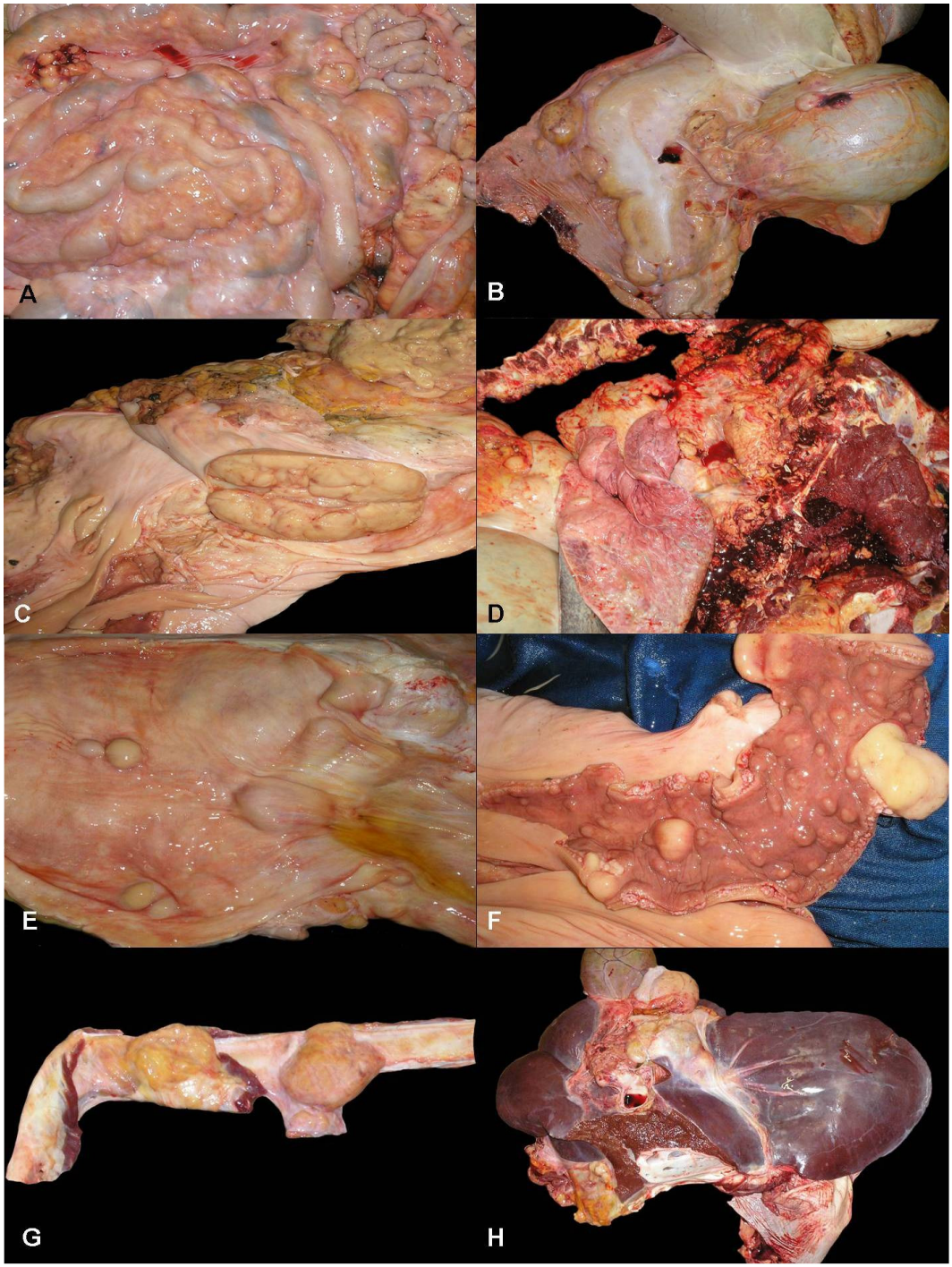

Figure 1. Widespread gross lesions of enzootic bovine leucosis; 4-year-old Holstein-Friesian cow. Observe severe enlargement of mesenteric (A), peri-gastric (B), inguinal (C) and mediastinic (D) lymph nodes. Various examples of lymphoma-related nodules are shown in the walls of the vagina (E) and uterus (F), and adhered to thoracic vertebrae (G); there is severe hepatomegaly (H) due to intrahepatic proliferation of the tumor.

Histopathological evaluation of the organs (uterine and vaginal walls, liver, lungs, heart, skeletal muscle, and lymph nodes) revealed lymphoma characterized by diffuse proliferation of neoplastic lymphocytes distributed in an extensive solid pattern; in some areas, the neoplastic cells were separated by a thin strand of connective tissue (Figure 2A-D). Neoplastic lymphocytes were of the same type and form, with rounded nucleus, scant cytoplasm and granular chromatin.

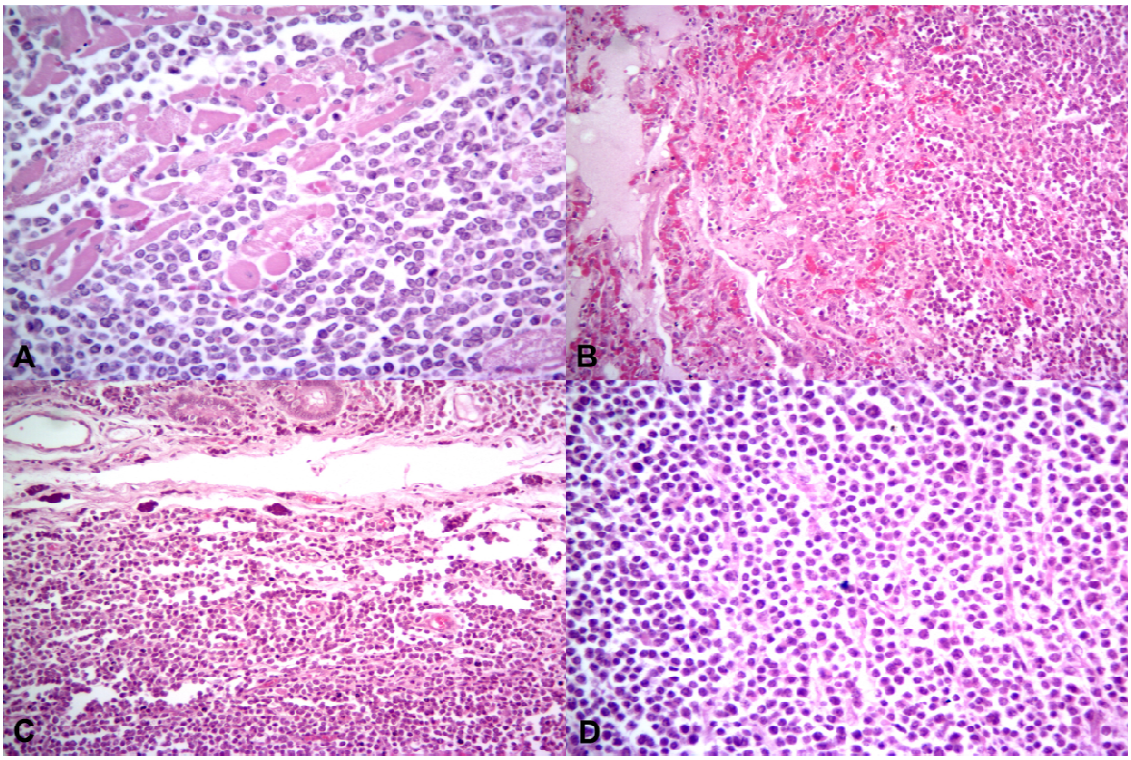

Figure 2. Histopathological characterization of enzootic bovine leucosis; 4-year-old Holstein-Friesian cow. There is accumulation of neoplastic lymphocytes within the myocardium (A), lung (B), and uterine wall (C). The neoplastic proliferation of lymphocytes is separated by thin fibrous connective tissue; mass attached to thoracic vertebra (D). (Hematoxylin and eosin stain; A and D, 40 x Obj.; B, 10x Obj.; C, 20x Obj.)

The diagnosis of enzootic bovine leucosis was based on gross, histological, and serological findings that are consistent with this disease (VALLI, 1993; FRY; McGAVIN, 2007). Bovine leucosis can be classified as enzootic, when associated with BLV, as occurred in this case; or as sporadic, in cases where there is no confirmed participation of the virus (VALLI, 1993). However, this sporadic non-viral manifestation of bovine leucosis occurs principally in young animals and can also present the thymic, cutaneous, and multicentric clincopathological forms of the disease (FRY; McGAVIN, 2007). Although leucosis in adult cattle is predominantly enzootic than sporadic in nature (VALLI, 1993), an unusual case of sporadic manifestation of the disease affecting only the renal system of a 6-year-old diary cow has been described (SPARLING, 2000).

In the case herein described lymphoma occurred in the vagina and other reproductive organs; cases of bovine enzootic leucosis affecting the vagina of cattle are not frequently described, although the uterus and reproductive tract are considered target sites of the virus (REBHUN, 1995). Additionally, lymphoma was diagnosed in the liver and spleen of this cow; these organs as well as the lower respiratory tract, udder, forestomach, and ureter of cattle are considered as atypical locations for the manifestation of this disease (REBHUN, 1995). However, the liver and spleen can be affected in most cases (JACOBS et al., 2002), and in cases of severe splenic involvement rupture and subsequent abdominal hemorrhage may occur (VALLI, 1993). Typical anatomic sites for the manifestation of multicentric bovine lymphoma include peripheral and internal lymph nodes, the heart, uterus, abomasum, retrobulbar space and the epidural region of the central nervous system (REBHUN, 1995; FRY; McGAVIN, 2007). Exophthalmia as described in

this case is related to advanced cases of bovine lymphoma, can be unilateral or bilateral (FRY; McGAVIN, 2007), and represents the classical ocular manifestation of this disease in adult cattle (REBHUN, 1995).

Additionally, most tumors of the disease in adult cattle are predominant in one anatomic location (REBHUN, 1995), which justifies the clincopathological age-related classification of the disease (JACOBS et al., 2002). However, in the case herein described the tumor was observed in several organ-systems. Further the febrile state of this cow is not a common manifestation of this disease in adult cattle (REBHUN, 1995), and when occur can mislead the attending veterinary to diagnose a bacterial, inflammatory or infectious disease. Fever is not a direct manifestation of the BLV, but has been related to the liberation of tumor necrosis factor, concomitant presence of secondary bacterial infections, and/or pyrogens associated with the secretion of cellular and soluble inflammatory mediators by neoplastic lymphocytes (REBHUN, 1995).

RESUMO: A leucose enzoótica bovina é uma doença infecciosa de bovinos causada pelo vírus da leucemia bovina que produz linfoma em tecidos alvos. Bovinos podem demonstrar quatro manifestações clínico-patológicas da doença relacionadas à idade: forma juvenil, adulta, tímica e cutânea. Esse artigo descreve a manifestação incomum dessa doença em uma vaca de quatro anos de idade. Os linfonodos regionais apresentaram-se aumentados no exame clínico. Linfoma foi observado nos linfonodos periféricos e internos bem como na vagina, útero, baço, fígado, coração, vértebras torácicas, olho e nas cavidades torácica e abdominal durante a necropsia. A leucose enzoótica bovina foi confirmada na histopatologia e pela imunodifusão em gel de ágar.

PALAVRAS-CHAVE: Vírus da leucemia bovina. Patologia. Imunodifusão em gel de ágar.

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